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

WATER-SUPPLY PAPER 250

SURFACE WATER SUPPLY OF THE UNITED STATES

1907-8

PART X. THE GREAT BASIN

PREPARED UNDER THE DIRECTION OF M. O. LEIGHTON

BY

E. C. LA RUE AND F. F. HENSHAW

WASHINGTON
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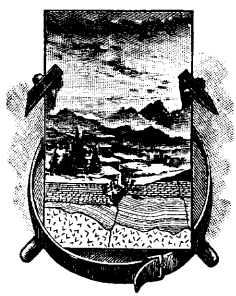

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CONTENTS.

	Page.
Introduction	5
Authority for investigations	5
Scope of investigations	6
Purposes of the work	7
Publications	8
Definition of terms	11
Convenient equivalents	12
Explanation of tables	13
Field methods of measuring stream flow	14
Office methods of computing and studying discharge and run-off	19
Accuracy and reliability of field data and comparative results	24
Use of the data	25
Cooperation and acknowledgments	26
Division of work	26
General description of the Great Basin	26
Wasatch Mountain drainage area	28
Principal streams	28
Bear River basin	29
Description	29
Bear River at Dingle, Idaho	31
Bear River near Preston, Idaho	33
Bear River near Collinston, Utah	37
Logan River near Logan, Utah	40
Logan, Hyde Park, and Smithfield canal near Logan, Utah	45
Blacksmith Fork and power plant race near Hyrum, Utah	47
Weber River basin	52
Description	52
Weber River near Oakley, Utah	53
Weber River near Croyden, Utah	56
Weber River near Plain City, Utah	59
Provo River basin	62
Description	62
Provo River above Telluride Power Company's dam near Provo, Utah	63
Provo River at mouth of canyon near Provo, Utah	66
Hobble Creek basin	67
Description	67
Hobble Creek near Springville, Utah	68
Spanish Fork basin	70
Description	70
Spanish Fork at Thistle, Utah	71
Spanish Fork near Spanish Fork, Utah	73
Spanish Fork near Lake Shore, Utah	76
Diamond Fork near Thistle, Utah	78
Sevier River basin	79
Description	79
Sevier River near Marysvale, Utah	80
Sevier River near Gunnison, Utah	83

Page.
Humboldt Sink drainage basin 86
Humboldt River 86
Description 86
Humboldt River near Golconda, Nev 87
Humboldt River near Oreana, Nev 90
North Fork Humboldt River near Halleck, Nev 93
South Fork Humboldt River near Elko, Nev 96
Sierra Nevada drainage area 100
Principal streams 100
Truckee River basin 100
Description 100
Lake Tahoe at Tahoe, Cal 101
Truckee River at Tahoe, Cal 103
Truckee River at Nevada-California state line 105
Truckee River at Vista, Nev 108
Truckee River at Derby dam, Nev 110
Donner Creek near Truckee, Cal 113
Prosser Creek near Hobart Mills, Cal 115
Little Truckee River at Pine Station and Starr, Cal 117
Carson River basin 121
Description 121
East Fork Carson River near Gardnerville, Nev 121
Carson River and Brunswick Mill power canal near Empire, Nev 123
Carson River near Hazen, Nev 127
West Fork Carson River near Woodfords, Cal 128
Walker River basin 131
Description 131
East Fork Walker River near Yerington, Nev 132
Walker River near Wabuska, Nev 134
West Fork Walker River near Coleville, Cal 136
Owens River basin 139
Great Basin drainage in Oregon 139
Description 139
Silver Creek near Silver Lake, Oreg 140
Chewaucan River at Paisley, Oreg 141
Miscellaneous measurements 142
Index 145

ILLUSTRATIONS.

Page.
PLATE I. *A*, Current-meter rating station at Los Angeles, Cal.; *B*, Bridge station and cross section of stream, illustrative of 0.2 and 0.8 depth method. 16
II. Price penta-recording current meters 18
III. *A*, View at head of proposed diversion canal from Bear River to Bear Lake; *B*, Headworks of power canal on Spanish Fork, Strawberry Valley project, Utah 30
IV. Portion of Lake Tahoe 100
V. *A*, Falls on Little Truckee River, one-half mile below Webber Lake; *B*, Power house of Truckee River General Electric Company at Mystic, Cal. 102
VI. Diversion dam on Truckee River, Truckee-Carson project, Nevada.. 110
FIGURE 1. Discharge curves for Weber River near Croyden, Utah 21

SURFACE WATER SUPPLY OF THE GREAT BASIN, 1907–8.

By E. C. La Rue and F. F. Henshaw.

INTRODUCTION.

AUTHORITY FOR INVESTIGATIONS.

This volume contains results of flow measurements made on certain streams in the United States. The work was performed by the water-resources branch of the United States Geological Survey, either independently or in cooperation with organizations mentioned herein. These investigations are authorized by the organic law of the Geological Survey (Stat. L., vol. 20, p. 394), which provides, among other things, as follows:

> 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.

Inasmuch as water is the most abundant and most valuable mineral in nature, the investigation of water resources is included under the above provision for investigating 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

SCOPE OF INVESTIGATIONS.

These investigations are not complete nor do they include all the river systems or parts thereof that might purposefully be studied. The scope of the work is limited to that which can be provided with the appropriations available. The field covered and the character of the work are believed to be the best that could be accomplished under the controlling conditions. It would undoubtedly be of more scientific importance and ultimately of more practical value if the money now applied to wide areas were concentrated on a few small basins. 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 maintained during a period of years sufficient to cover all stages, in order that within reasonable limits the entire range of flow from the absolute maximum to the absolute minimum may be determined. The length of such a period manifestly varies for different streams and can not be absolutely determined. Experience has shown that the records should cover from five to ten years, or for some streams twenty years or more, the limit being determined by the relative importance of the stream and the interdependence of the results and other long-time records on adjacent streams.

In the performance of this work the Geological Survey endeavors to approach as nearly as possible the highest degree of precision which a rational expenditure of time and a judicious expenditure of a small amount of money will allow. In all engineering work there is a point of refinement beyond which it is needless and wasteful to proceed, and this principle applies with especial force to stream-flow measurements. It is confidently believed that with some unavoidable exceptions the stream-flow data presented in the publications of the Survey are 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 many stations. All persons are cautioned to exercise the greatest care in the utilization of such incomplete records.

Records of varying lengths have been obtained at about 1,400 different points in the United States, and in addition the surface water supply of small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, has been investigated. During 1907 and 1908 regular gaging stations were maintained by the Survey and cooperating organizations at about 740 points in the United States, and in addition numerous miscellaneous measurements were made. Data were also obtained in regard to precipitation, evaporation, storage reser-

voirs, river profiles, and water power in many sections of the country. These data will be made available in the regular surface water-supply papers and in special papers from time to time.

PURPOSES OF THE WORK.

Among the purposes for which the results contained in this volume are requisite are navigation, irrigation, domestic water supply, water power, swamp and overflow land drainage, and flood prevention. The demands of all these interests are immediate.

Navigation.—The Federal Government has expended more than $250,000,000 for the improvement of inland navigation and prospective expenditures will approximate several times this amount. It is obvious that the determination of stream flow is necessary to the intelligent solution of the many problems involved.

Irrigation.—The United States is now expending $42,000,000 on federal irrigation systems, and this amount is far exceeded by the private expenditures of this nature in the arid West. The integrity of any irrigation system is based absolutely on the amount of water available. Therefore investigations of stream flow in that portion of the country are of first importance in the redemption of the lands, as well as constituting an insurance of federal and private investments.

Domestic water supply.—The highest use of water is that of domestic supply, and while the federal interest in this aspect of the matter is less direct than in the aspects already named, this use of water nevertheless has so broad a significance with respect to the general welfare that the Federal Government is ultimately and intimately concerned.

Water power.—The time is rapidly approaching when the development of the water power of the country will be an economic necessity. Our stock of coal is being rapidly depleted and the cost of steam power is increasing accordingly. Industry will cease its growth if cheap power is not available, and in that event the United States as a nation will cease to progress. Water power is the only avenue now open. When the electric transmission of power was accomplished, the relation of our water powers to national economy changed entirely. Previous to the day of electric transmission the importance of a water power was largely confined to the locality at which it was generated, but it has now become a public utility in which the individual citizen is vitally interested. Inasmuch as the amount of water power that may be made available is dependent on the flow of rivers, the investigation of flow becomes a prerequisite in the judicious management of this source of energy.

Drainage of swamp and overflowed lands.—More than 70,000,000 acres of the richest land in this country are now practically worth-

less, or of precarious value, by reason of overflow and swamp conditions. When this land is drained it becomes exceedingly productive and its value increases many fold. Such reclamation would add to the national assets at least $700,000,000. The study of run-off is the first consideration in connection with drainage projects. If by the drainage of a large area into any particular channel that channel becomes so gorged with water that overflow conditions are created in places not previously subject to inundation, then drainage results merely in an exchange of land values. This is not the purpose of drainage improvement.

Flood prevention.—The damage from floods in the United States exceeds $100,000,000 annually, and in the year 1908 the aggregate damage, based on reliable data, approximated $250,000,000. Such an annual tax on the property of great regions should be reduced in the orderly progress of government. It goes without saying that any consideration of flood prevention must be based on a thorough knowledge of stream flow, both in the contributing areas which furnish the water and along the great lowland rivers.

PUBLICATIONS.

The data on stream flow collected by the United States Geological Survey since its inception 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 has 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 twelve 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 1907 and 1908. 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, 1907–8.

Part.	No.	Title.	Part.	No.	Title.
I	241	North Atlantic coast.	VI	246	Missouri River basin.
II	242	South Atlantic coast and eastern Gulf of Mexico.	VII	247	Lower Mississippi River basin.
			VIII	248	Western Gulf of Mexico.
III	243	Ohio River basin.	IX	249	Colorado River basin.
IV	244	St. Lawrence River basin.	X	250	Great Basin.
V	245	Upper Mississippi River and Hudson Bay basins.	XI	251	California.
			XII	252	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 all special papers. Numbers of reports are inclusive and dates also are inclusive so far as the data are available.

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

[Ann.=Annual Report; B.=Bulletin; W. S.=Water-Supply Paper.]

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

NOTE.—No data regarding stream flow are given in the 15th and 17th 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 1908. 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, 1899–1908.

	1899.[a]	1900.[b]	1901.	1902.	1903.	1904.	1905.	1906.	1907–8.
Atlantic coast and eastern Gulf of Mexico:									
New England rivers	35	47	65, 75	82	97	124	165	201	241
Hudson River to Delaware River, inclusive	35	47, (48)	65, 75	82	97	125	166	202	241
Susquehanna River to York River, inclusive	35	48	65, 75	82	97	126	167	203	241
James River to Yadkin River, inclusive	(35), 36	48	65, 75	(82), 83	(97), 98	126	167	203	242
Santee River to Pearl River, inclusive	36	48	65, 75	83	98	127	168	204	242
St. Lawrence River	36	49	65, 75	(82), 83	97	129	170	206	244
Hudson Bay	.....	.....	66, 75	85	100	130	171	207	245
Mississippi River:									
Ohio River	36	48, (49)	65, 75	83	98	128	169	205	243
Upper Mississippi River	36	49	65, 75	83	98, (99)	128, (130)	171	207	245
Missouri River	(36), 37	49, (50)	66, 75	84	99	130, (131)	172	208	246
Lower Mississippi River	37	50	(65), 66, 75	(83), 84	(98), 99	(128), 131	(169), 173	(205), 209	247
Western Gulf of Mexico	37	50	66, 75	84	99	132	174	210	248
Pacific coast and Great Basin:									
Colorado River	(37), 38	50	66, 75	85	100	133, (134)	175, (177)	211, (213)	249, (251)
Great Basin	38, (39)	51	66, 75	85	100	133, (134)	176, (177)	212, (213)	250, (251)
South Pacific coast to Klamath River, inclusive	(38), 39	51	66, 75	85	100	134	177	213	251
North Pacific coast	38	51	66, 75	85	100	135	(177), 178	214	252

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39.
[b] 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	Do.
99	Upper Mississippi	Tributaries from the west.
128	Lower Mississippi	Yazoo.
130	Upper Mississippi	Tributaries from the west.
131	Missouri	Platte, Kansas.
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	All stations in Colorado and Great Basin drainages lying in California repeated.
	Great Basin	

The order of treatment of stations in any basin in these papers is downstream. The main stem of any river is determined on the

basis of drainage area, local changes in name and lake surface being disregarded. After all stations from the source to the mouth of the main stem of the river have been given, the tributaries are taken up in regular order from source to mouth. The tributaries are treated the same as the main stream, all stations in each tributary basin being given before taking up the next one 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 often clearer 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. 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.

"Gallons per minute" is generally used in connection with pumping and city water supply.

The "miner's inch" is the rate of discharge of water that passes through an orifice 1 inch square under a head which varies locally. It is commonly used by miners and irrigators throughout the West and is defined by statute in each State in which it is used.

"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 March 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 646,272 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 equal 18.7 United States gallons per second.
100 California miner's inches equal 96.0 Colorado miner's inches.
100 California miner's inches for one day equal 4.96 acre-feet.
100 Colorado miner's inches equal 2.60 second-feet.
100 Colorado miner's inches equal 19.5 United States gallons per second.
100 Colorado miner's inches equal 104 California miner's inches.
100 Colorado miner's inches for one day equal 5.17 acre-feet.
100 United States gallons per minute equal 0.223 second-foot.
100 United States gallons per minute for one day equal 0.442 acre-foot.
1,000,000 United States gallons per day equal 1.55 second-feet.
1,000,000 United States gallons equal 3.07 acre-feet.
1,000,000 cubic feet equal 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.

1⅓ horsepower equal 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 TABLES.

For each drainage basin there is given a brief description of general conditions covering such features as area, source, tributaries, topography, geology, conditions of forestation, rainfall, ice conditions, irrigation, storage, power possibilities, and other special features of importance or interest.

For each regular current-meter gaging station are given in general, and so far as available, the following data: Description of station, list of discharge measurements, table of daily gage heights, rating table, table of monthly and yearly discharges and run-off. For stations located at weirs or dams the gage-height and rating tables are omitted and a table of daily discharge is substituted. For stations where the flow is computed by shifting-channel methods, a table of daily discharge is given in place of rating tables, which are not used in these methods of computation.

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 conditions of flow, and backwater; also full 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 gives 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 during ice conditions, backwater from obstructions, etc., are published as recorded, with suitable footnotes. The rating is not applicable for such periods unless the proper correction to the gage heights is 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 the rating 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 published to enable engineers to determine the daily discharge by its application to the table of gage heights or to check results in the table of monthly discharge.

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 period when the water surface was at crest height and the corresponding discharge consequently larger than given in this 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 11, are based.

FIELD METHODS OF MEASURING STREAM FLOW.

There are three distinct methods of determining the flow of open-channel streams: (1) By measurements of slope and cross section and the use of Chezy's and Kutter's formulas; (2) by means of a weir or dam; (3) by measurements of the velocity of the current and of the area of the cross section. The method chosen depends on the local physical conditions, the degree of accuracy desired, the funds available, and the length of time that the record is to be continued.

Slope method.—Much information has been collected relative to the coefficients to be used in the Chezy formula, $V = c\sqrt{Rs}$. This has been utilized by Kutter, both in developing his formula for c and in determining the values of the coefficient n which appears therein. The results obtained by the slope method are in general only roughly approximate, owing to the difficulty in obtaining accurate data and the uncertainty of the value for n to be used in Kutter's formula. The most common use of this method is in estimating the flood discharge of a stream when the only data available are the cross section, the slope as shown by marks along the bank, and a knowledge of the general conditions. It is seldom used by the United States Geological Survey. For full information regarding the method the reader is referred to the various text-books on hydraulics.

Weir method.—Relatively few stations are maintained at weirs or dams by the United States Geological Survey. Standard types of sharp-crested and broad-crested weirs within the limits for which

accurate coefficients have been experimentally obtained give very accurate records of discharge if properly maintained. At practically all broad-crested weirs, however, there is a diversion of water either through or around the dam, usually for the purpose of development of water power. The flow is often complicated and the records are subject to errors from such sources as leakage through the dam, backwater at high stages, uncertainty regarding coefficient, crest which is not level, obstructions from logs or ice, use of flashboards, old turbines with imperfect ratings, and many others depending on the type of development and the uses of the diverted water.

In general, records of discharge at dams are usually accurate enough for practical use if no others are available. It has been the general experience of the United States Geological Survey, however, that records at current-meter gaging stations under unobstructed channel conditions are more accurate than those collected at dams, and where the conditions are reasonably favorable are practically as good as those obtained at sharp-crested weirs.

The determination of discharge over the different types of weirs and dams is treated fully in "Weir experiments, coefficients, and formulas" (Water-Supply Paper 200)[a] and in the various text-books on hydraulics. "Turbine water-wheel tests and power tables" (Water-Supply Paper 180) treats of the discharge through turbines when used as meters. The edition of this water-supply paper is exhausted. It can, however, be consulted at most of the larger libraries of the country or can be obtained from the Superintendent of Documents, Washington, D. C., at a cost of 20 cents. Remittances must be made by postal money order, express order, or New York draft.

Velocity method.—Streams in general present throughout their courses to a greater or less extent all conditions of permanent, semi-permanent, and varying conditions of flow. In accordance with the location of the measuring section with respect to these physical conditions, current-meter gaging stations may in general be divided into four classes—(1) those with permanent conditions of flow; (2) those with beds which change only during extreme high water; (3) those with beds which change frequently but which do not cause a variation of more than about 5 per cent in the discharge curves from year to year; and (4) those with constantly shifting beds. In determining the daily flow different office methods are necessary for each class. The field data on which the determinations are based and the methods of collecting them are, however, in general the same.

Great care is taken in the selection and equipment of gaging stations for determining discharge by velocity measurements, in order that the data may have the required degree of accuracy.

[a] Water-Supply Paper 200 is a revision of No. 150, the edition of which is exhausted.

They are located, as far as possible, at such points that the relation between gage height and discharge will always remain constant for any given stage. The experience of engineers of the Geological Survey has been that permanency of conditions of flow is the prime requisite of any current-meter gaging station when maintained for several years unless funds are available to cover all changes in conditions of flow. A straight, smooth section without cross currents, backwater, boils, etc., at any stage is highly desirable, but on most streams is not attainable except at the cost of a cable equipment. Rough, permanent sections, if measurements are properly made by experienced engineers, taking measuring points at a distance apart of 2 to 5 per cent or less of the total width, will within reasonable limits yield better results for a given outlay of money than semipermanent or shifting sections with smooth, uniform current. So far as possible, stations are located where the banks are high and not subject to overflow at high stages and out of the influence of tributary streams, dams, or other artificial obstructions which might affect the relation between gage height and discharge.

A gaging station consists essentially of a gage for determining the daily fluctuations of stage of the river and some structure or apparatus from which discharge measurements are made, usually a bridge or cable.

The two factors required to determine the discharge of a stream past a section perpendicular to the mean direction of the current are the area of the cross section and the mean velocity of flow normal to that section.

In making a measurement with a current meter a number of points, called measuring points, are measured off above and in the plane of the measuring section at which observations of depth and velocity are taken. (See Pl. I, *B*.) These points are spaced equally for those parts of the section where the flow is uniform and smooth and are spaced unequally for other parts according to the discretion and judgment of the engineer. In general the points should not be spaced farther apart than 5 per cent of the distance between piers, nor farther apart than the approximate mean depth at the time of measurement.

The measuring points divide the total cross section into elementary strips at each end of which observations of depth and velocity are made. The discharge of any elementary strip is the product of the average of the depths at the two ends times the width of the strip times the average of the mean velocities at the two ends of the strip. The sum of the discharges of the elementary strips is the total discharge of the stream. (For a discussion of methods of computing the discharge of a stream see Engineering News, June 25, 1908.)

A. CURRENT-METER RATING STATION AT LOS ANGELES, CAL.

B. BRIDGE STATION AND CROSS SECTION OF STREAM.

Illustrating 0.2 and 0.8 depth method.

Depths for the determination of the area are usually obtained by sounding with the current meter and cable. In rough sections or swift current an ordinary weight and cable are used, particular care being taken that all observations shall be in the plane of the cross section.

Two methods of determining the velocity of flow of a stream are in general use—the float method and the current-meter method.

The float method with its various modifications of surface, subsurface, and tube or rod floats is now considered obsolete in the ordinary practice of the United States Geological Survey. The use of this method is limited to special conditions where it is impracticable to use the current meter, such as in places where large quantities of ice or débris which may damage the meter are flowing with the current, and for miscellaneous measurements or other work where a high degree of accuracy is not necessary. Tube floats are very satisfactory for use in canals with regular bottoms and even flow of current. Measurements by the float method are made as follows: The velocity of flow of the stream is obtained by observing the time which it takes floats set free at different points across the stream to pass between two range lines about 200 feet apart. The area used is the mean value obtained from several cross sections measured between the two range lines. The chief disadvantages of this method are difficulty in obtaining the correct value of mean area for the course used and uncertainty regarding the proper coefficient to apply to the observed velocity. For further information regarding this method the reader is referred to Water-Supply Paper 95 and to the various text-books covering the general subject of stream flow.

The Price current meter is now used almost to the exclusion of other types of meters by the United States Geological Survey in the determination of the velocity of flow of water in open channels, a use for which it is adapted under practically all conditions. Plate II shows in the center the new type of penta-recording current meter equipped for measurements at bridge and cable stations. On the sides the same type of meter is shown equipped for wading measurements to record by the acoustic method on the left and by the electric method on the right. Briefly, the meter consists of six cups attached to a vertical shaft which revolves on a conical hardened steel point when immersed in moving water. The number of revolutions is indicated electrically. The rating, or relation between the velocity of the moving water and the revolutions of the wheel, is determined for each meter by drawing it through still water for a given distance at different speeds and noting the number of revolutions for each run. (See Pl. I, *A*.) From these data a rating table is prepared which gives the velocity per second of moving water for any number of revolutions in a given time interval. The ratio of revolutions per

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second to velocity of flow in feet per second is very nearly a constant for all speeds and is approximately 0.45.

Three classes of methods of measuring velocity with current meters are in general use—multiple-point, single-point, and integration.

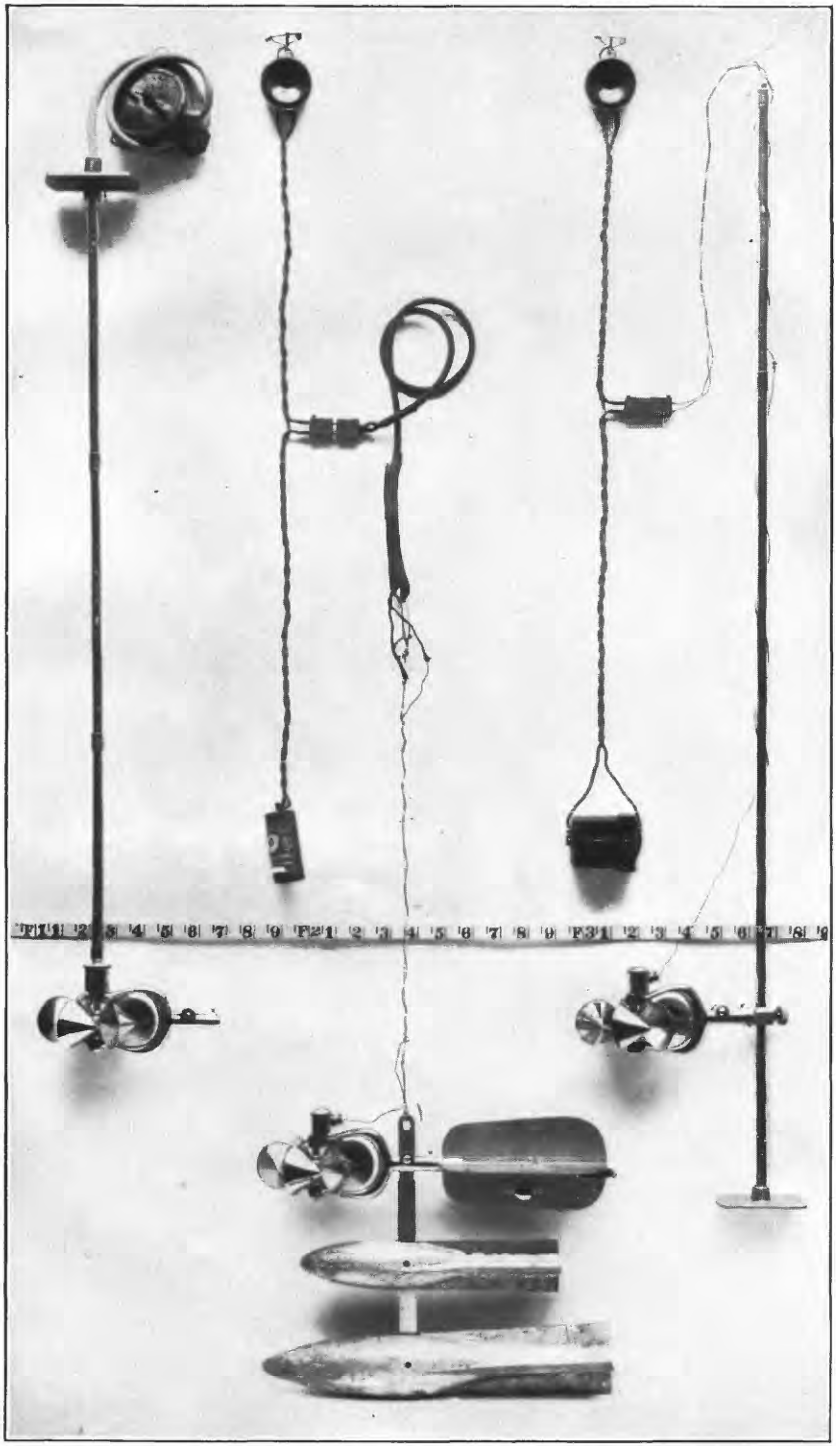
The two principal multiple-point methods in general use are the vertical velocity curve and 0.2 and 0.8 depth.

In the vertical velocity curve method a series of velocity determinations are made in each vertical at regular intervals, usually about 10 to 20 per cent of the depth apart. By platting these velocities as abscissas and their depths as ordinates and drawing a smooth curve among the resulting points, the vertical velocity curve is developed. This curve shows graphically the magnitude and changes in velocity from the surface to the bottom of the stream. The mean velocity in the vertical is then obtained by dividing the area bounded by this velocity curve and its axis by the depth. This method of obtaining the mean velocity in the vertical is probably the best known, but on account of the length of time required to make a complete measurement its use is largely limited to the determination of coefficients for purposes of comparison and to measurements under ice.

In the second multiple-point method the meter is held successively at 0.2 and 0.8 depth, and the mean of the velocities at these two points is taken as the mean velocity for that vertical. (See Pl. I.) On the assumption that the vertical velocity curve is a common parabola with horizontal axis, the mean of the velocities at 0.22 and 0.79 depth will give (closely) the mean velocity in the vertical. Actual observations under a wide range of conditions show that this multiple-point method gives the mean velocity very closely for open-water conditions and that in a completed measurement it seldom varies as much as 1 per cent from the value given by the vertical velocity curve method. Moreover, the indications are that it holds nearly as well for ice-covered rivers. It is very extensively used in the regular practice of the United States Geological Survey.

The single-point method consists in holding the meter either at the depth of the thread of mean velocity or at an arbitrary depth for which the coefficient for reducing to mean velocity has been determined or must be assumed.

Extensive experiments by means of vertical velocity curves show that the thread of mean velocity generally occurs between 0.5 and 0.7 total depth. In general practice the thread of mean velocity is considered to be at 0.6 depth, and at this point the meter is held in most of the measurements made by the single-point method. A large number of vertical velocity curve measurements, taken on many streams and under varying conditions, show that the average coefficient for reducing the velocity obtained at 0.6 depth to mean velocity is practically unity. The variation of the coefficient from



PRICE PENTA-RECORDING CURRENT METERS.

unity in individual cases is, however, greater than in the 0.2 and 0.8 methods and the general results are not as satisfactory.

In the other principal single-point method the meter is held near the surface, usually 1 foot below, or low enough to be out of the effect of the wind or other disturbing influences. This is known as the subsurface method. The coefficient for reducing the velocity taken at the subsurface to the mean has been found to be in general from about 0.85 to 0.95, depending on the stage, velocity, and channel conditions. The higher the stage the larger the coefficient. This method is especially adapted for flood measurements, or when the velocity is so great that the meter can not be kept in the correct position for the other methods.

The vertical-integration method consists in moving the meter at a slow, uniform speed from the surface to the bottom and back again to the surface and noting the number of revolutions and the time taken in the operation. This method has the advantage that the velocity at each point of the vertical is measured twice. It is useful as a check on the point methods. In using the Price meter great care should be taken that the vertical movement of the meter is not rapid enough to vitiate the accuracy of the resulting velocity.

The determination of the flow of an ice-covered stream is difficult, owing to diversity and instability of conditions during the winter period and also to lack of definite information in regard to the laws of flow of water under ice. The method now employed is to make frequent discharge measurements during the frozen periods by the 0.2 and 0.8 and the vertical velocity curve methods, and to keep an accurate record of the conditions, such as the gage height to the surface of the water as it rises in a hole cut in the ice, and the thickness and character of the ice. From these data an approximate estimate of the daily flow can be made by constructing a rating curve (really a series of curves) similar to that used for open channels, but considering, in addition to gage heights and discharge, the varying thickness of ice. For information in regard to flow under ice cover, see Water-Supply Paper 187.

OFFICE METHODS OF COMPUTING AND STUDYING DISCHARGE AND RUN-OFF.

At the end of each year the field or base data for current-meter gaging stations, consisting of daily gage heights, discharge measurements, and full notes, are assembled. The measurements are plotted on cross-section paper and rating curves are drawn wherever feasible. The rating tables prepared from these curves are then applied to the tables of daily gage heights to obtain the daily discharges, and from these applications the tables of monthly discharge and run-off are computed.

Rating curves are drawn and studied with special reference to the class of channel conditions which they represent. (See p. 17.) The discharge measurements for all classes of stations when plotted with gage heights in feet as ordinates and discharges in second-feet as abscissas define rating curves which are more or less generally parabolic in form. In many cases curves of area in square feet and mean velocity in feet per second are also constructed to the same scale of ordinates as the discharge curve. These are used mainly to extend the discharge curves beyond the limits of the plotted discharge measurements, and for checking purposes to avoid errors in the form of the discharge curve and to determine and eliminate erroneous measurements.

For every published rating table the following assumptions are made for the period of application of the table: (*a*) That the discharge is a function of and increases gradually with the stage; (*b*) that the discharge is the same whenever the stream is at a given stage, and hence such changes in conditions of flow as may have occurred during the period of application are either compensating or negligible, except that the rating as stated in the footnote of each table is not applicable for known conditions of ice, log jams, or other similar obstructions; (*c*) that the increased and decreased discharge due to change of slope on rising and falling stages is either negligible or compensating.

As already stated, the gaging stations may be divided into several classes, as indicated in the following paragraphs:

The stations of class 1 represent the most favorable conditions for an accurate rating and are also the most economical to maintain. The bed of the stream is usually composed of rock and is not subject to the deposit of sediment and loose material. This class includes also many stations located in a pool below which is a permanent rocky riffle that controls the flow like a weir. Provided the control is sufficiently high and close to the gage to prevent cut and fill at the gaging point from materially affecting the slope of the water surface, the gage height will for all practical purposes be a true index of the discharge. Discharge measurements made at such stations usually plot within 2 or 3 per cent of the mean-discharge curve and the rating developed from that curve represents a very high degree of accuracy. For illustrative example of a station of this type see Water-Supply Paper 241.

Class 2 is confined mainly to stations on rough mountainous streams with steep slopes. (See fig. 1.) The beds of such streams are as a rule comparatively permanent during low and medium stages and when the flow is sufficiently well defined by an adequate number of discharge measurements before and after each flood the stations of this class give nearly as good results as those of class 1. As it is seldom pos-

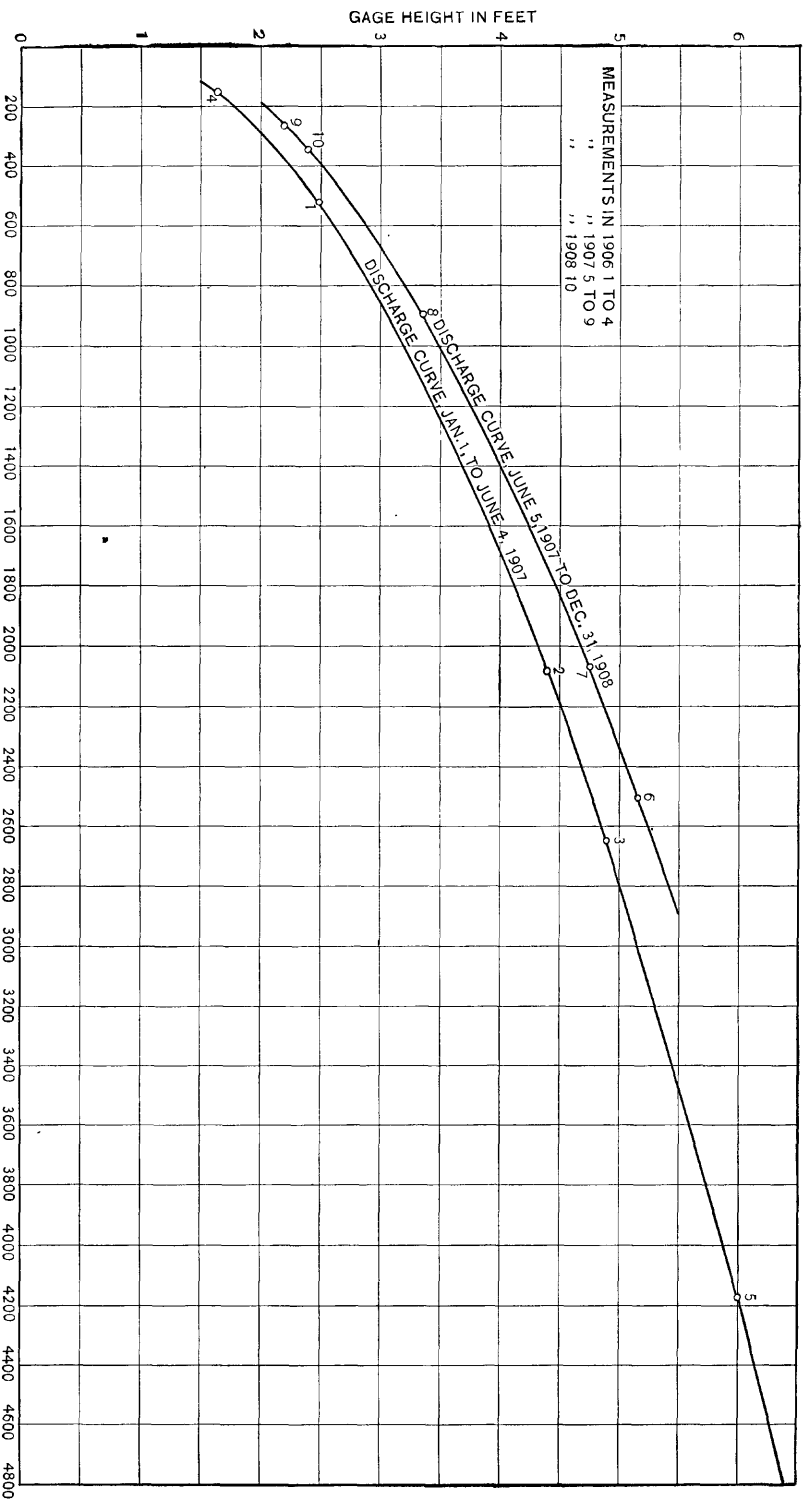


FIGURE 1.—Discharge curves for Weber River near Croyden, Utah.

sible to make measurements covering the time of change at flood stage, the assumption is often made that the curves before and after the flood converged to a common point at the highest gage height recorded during the flood. Hence the only uncertain period occurs during the few days of highest gage heights covering the period of actual change in conditions of flow.

Class 3 includes most of the current-meter gaging stations maintained by the United States Geological Survey. If sufficient measurements could be made at stations of this class results would be obtained nearly equaling those of class 1, but owing to the limited funds at the disposal of the Survey this is manifestly impossible, nor is it necessary for the uses to which discharge data are applied. The critical points are as a rule at relatively high or low stages. The percentage error, however, is greater at low stages. No absolute rule can be laid down for stations of this class. Each rating curve must be constructed mainly on the basis of the measurements of the current year, the engineer being guided largely by the past history of the station and the following general law: If all measurements ever made at a station of this class are plotted on cross-section paper, they will define a mean curve which may be called a standard curve. It has been found in practice that if, after a change caused by high stage, a relatively constant condition of flow occurs at medium and low stages, all measurements made after the change will plot on a smooth curve which is practically parallel to the standard curve with respect to their ordinates, or gage heights. This law of the parallelism of ratings is the fundamental basis of all ratings and estimates at stations with semipermanent and shifting channels. It is not absolutely correct, but with few exceptions answers all the practical requirements of estimates made at low and medium stages after a change at a high stage. This law appears to hold equally true whether the change occurs at the measuring section or at some controlling point below. The change is of course fundamentally due to change in the channel caused by cut, or fill, or both, at and near the measuring section. For all except small streams the changes in section usually occur at the bottom. The following simple but typical examples illustrate this law:

(*a*) If 0.5 foot of planking were to be nailed on the bottom of a well-rated wooden flume of rectangular section there would result, other conditions of flow being equal, new curves of discharge, area, and velocity, each plotting 0.5 foot above the original curves when referred to the original gage. In other words, this condition would be analogous to a uniform fill or cut in a river channel which either reduces or increases all three values of discharge, area, and velocity for any gage height. In practice, however, such ideal conditions rarely exist.

(*b*) In the case of a cut or fill at the measuring section there is a marked tendency toward decrease or increase, respectively, of the velocity. In other words, the velocity has a compensating effect and if the compensation is exact at all stages the discharge at a given stage will be the same under both the new and the old conditions.

(*c*) In the case of uniform change along the crest of a weir or rocky controlling point, the area curve will remain the same as before the change, and it can be shown that here again the change in velocity curve is such that it will produce a new discharge curve essentially parallel to the original discharge curve with respect to their ordinates.

Of course in actual practice such simple changes of section do not occur. The changes are complicated and lack uniformity, a cut at one place being largely offset by a fill at another and vice versa. If these changes are very radical and involve large percentages of the total area—as, for example, on small streams—there may result a wide departure from the law of parallelism of ratings. In complicated changes of section the corresponding changes in velocity, which tend to produce a new parallel discharge curve, may interfere with each other materially, causing eddies, boils, backwater, and radical changes in slope. In such extreme conditions, however, the measuring section would more properly fall under class 4 and would require very frequent measurements of discharge. Special stress is laid on the fact that in the lack of other data to the contrary the utilization of this law will yield the most probable results.

Slight changes at low or medium stages of an oscillating character are usually averaged by a mean curve drawn among them parallel to the standard curve, and if the individual measurements do not vary more than 5 per cent from the rating curve the results are considered good for stations of this class. For description of a station of this class see Water-Supply Paper 242.

Class 4 comprises stations that have soft, muddy, or sandy beds. Good results can be obtained from such sections only by frequent discharge measurements, the frequency varying from a measurement every two or three weeks to a measurement every day, according to the rate of diurnal change in conditions of flow. These measurements are plotted and a mean or standard curve drawn among them. It is assumed that there is a different rating curve for every day of the year and that this rating is parallel to the standard curve with respect to their ordinates. On the day of a measurement the rating curve for that day passes through that measurement. For days between successive measurements it is assumed that the rate of change is uniform, and hence the ratings for the intervening days are equally spaced between the ratings passing through the two measurements. This method must be

modified or abandoned altogether under special conditions. Personal judgment and a knowledge of the conditions involved can alone dictate the course to pursue in such cases. For illustrative example of a station of this type, showing the Bolster method of determining the daily discharge graphically, see Water-Supply Papers 247 and 249.

The computations have, as a rule, been carried to three significant figures. Computation machines, Crelle's tables, and the 20-inch slide rule have been generally used. All computations are carefully checked.

After the computations have been completed they are entered in tables and carefully studied and intercompared to eliminate or account for all gross errors so far as possible. Missing periods are filled in, so far as is feasible, by means of comparison with adjacent streams. The attempt is made to complete years or periods of discharge, thus eliminating fragmentary and disjointed records. Full notes accompanying such estimates follow the monthly discharge tables.

For most of the northern stations estimates have been made of the monthly discharge during frozen periods. These are based on measurements under ice conditions wherever available, daily records of temperature and precipitation obtained from the United States Weather Bureau climate and crop reports, observers' notes of conditions, and a careful and thorough intercomparison of results with adjacent streams. Although every care possible is used in making these estimates they are often very rough, the data for some of them being so poor that the estimates are liable to as much as 25 to 50 per cent error. It is believed, however, that estimates of this character are better than none at all, and serve the purpose of indicating in a relative way the proportionate amount of flow during the frozen period. These estimates are as a rule included in the annual discharge. The large error of the individual months has a relatively small effect on the annual total, and it is for many purposes desirable to have the yearly discharge computed even though some error is involved in doing so.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

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 tests and experiments have been made to test the accuracy of current-meter work. These 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 uncertainty regarding the coefficient and complicated conditions of flow prevail.

The work is, of course, dependent on the reliability of the observers. With relatively few exceptions, the observers perform their work honestly. Care is taken, however, to watch them closely and to inquire into any discrepancies. It is, of course, 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.

In order to give engineers and others information regarding the probable accuracy of the computed results, footnotes are added to the rating tables and an accuracy column is inserted in the monthly discharge table. In 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.

USE OF THE DATA.

In general the policy is followed of making available for the public the base data which are collected in the field each year by the Survey engineers. This is done 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 data given in these papers will verify all ratings and make such adjustments in earlier years as may seem necessary. The work of compiling, studying, revising, and republishing data for different drainage basins for five or ten year periods or

more is carried on by the United States Geological Survey so far as the funds for such work are available.

The values 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. This is particularly true of the maximum and minimum figures, which in the very nature of the method of collecting these data are liable to large errors. The maximum value should be increased considerably for many stations in considering designs for spillways, and the minimum value should be considered for a group of, say, seven days and not for one day.

The rating table, provided the engineer accepts it, is published primarily to allow him to apply it directly to the daily gage heights and rearrange the daily discharges in order of magnitude or by some other method.

COOPERATION AND ACKNOWLEDGMENTS.

Assistance has been rendered and records furnished by the United States Reclamation Service, which bears the expense of maintenance of stations on Spanish Fork, Truckee, and Carson rivers, and by the following persons, to whom special acknowledgment is due: Caleb Tanner, state engineer of Utah; Henry Thurtell and F. R. Nicholas, state engineers of Nevada; and the Telluride Power Company.

DIVISION OF WORK.

The field data in the Great Basin drainage area in Utah, Nevada, and Idaho were collected under the direction of E. C. LaRue, district engineer, assisted by A. D. Williams, E. A. Porter, G. T. Burridge, and M. B. Kennedy. The field data in Oregon were collected under the direction of J. C. Stevens, district engineer. The ratings, special estimates, and studies of the completed data were made by F. F. Henshaw and E. C. LaRue. The computation and preparation of the completed data for publication were made under the direction of F. F. Henshaw, assisted by H. D. Padgett, G. L. Parker, G. C. Stevens, R. C. Rice, J. G. Mathers, and E. S. Fuller. The manuscript has been edited by Mrs. B. D. Wood.

GENERAL DESCRIPTION OF THE GREAT BASIN.

In the interior of the North American Continent, west of the Rocky Mountains, is an immense area known as the Great Basin, the streams of which do not discharge to the ocean. The area is not one single drainage basin, but consists rather of a number of basins, some of which are connected and others closed; the outer rim of all, however, is at such an elevation that the region as a whole has no surface outlet.

In outline the Great Basin is rudely triangular. It is bordered on the west by the Sierra Nevada, on the north by the Columbia pla-

teaus, on the east by the Rocky Mountains and the Colorado plateaus, and the southern extremity extends almost to the Gulf of California. This inclosed area is approximately 800 miles long from north to south, 500 miles broad at its widest part, and has been estimated to include 208,000 square miles. It comprises the western part of Utah, almost all of Nevada, and contiguous parts of Idaho, Oregon, and California.

Topographically this interior drainage area is characterized by isolated, narrow mountain ranges, trending north and south and separated by broad valleys varying considerably in altitude. In the southern part the valleys are low, Death Valley being below sea level; in the north the valleys have a general elevation of 4,000 to 5,000 feet. Many of the intervening highlands rise several thousand feet above their bases, and some of the peaks of the bordering ranges attain elevations of 13,000 feet above sea level.

Upper branches of the intermontane valleys extend into the interior ranges as narrow drainage ways that are dry during most of the year; but the drainage from the high mountains on the east and west borders of the basin passes through deep canyons into the broad valleys, where the perennial streams maintain lakes. Among these are Great Salt, Utah, and Sevier lakes in the eastern part, and Pyramid, Winnemucca, Honey, Walker, Mono, and Owens lakes in the western part of the Great Basin. Except Utah Lake, which discharges by Jordan River into Great Salt Lake, these lakes are saline in character, as a consequence of the concentration of salts due to evaporation. Bear Lake in the mountains of the eastern border, and Lake Tahoe, in the Sierra, are large bodies of fresh water that drain, respectively, to Great Salt and Pyramid lakes. Shallow, temporary bodies of water accumulate in some of the broad intermontane valleys during the wet season but completely evaporate during the summer, leaving muddy plains called playas.

Geologically the Great Basin is well known as the type region of the "basin-range structure." Many of the isolated narrow mountain ranges that trend north and south are steep on one side, exposing cross sections of the rocks, and sloping on the other, conforming with the dip of the strata. These ranges have been uplifted by movements of the earth's crust which have broken it into tilted blocks. The greatest displacements of the Great Basin are associated with the eastern and western borders, the Wasatch Mountains and the Sierra Nevada having been uplifted many thousand feet. The mountains of the Great Basin are commonly composed of Paleozoic strata, often modified by volcanism, and the products of weathering and disintegration of these rocks have accumulated in the broad intervening valleys which are strewn to great depths with unconsolidated débris.

The climate of the Great Basin is extremely arid, and except in a few favored spots where irrigation is practiced the region in general is

a desert. Over the larger part of the area the precipitation is less than 10 inches, but it is greater on the bordering highlands, especially on the Sierra Nevada, where it is over 40 inches. The temperature varies widely, owing to the large extent of the area and to differences in elevation. Over most of the region the heat of the summer days is intense, but the diurnal variation is considerable. Evaporation is enormous. From the surface of the water in the vicinity of Salt Lake City it amounts to about 60 inches in a year, and over the major part of the Great Basin it is much greater, amounting in places to possibly 150 inches.

An arid climate, however, has not always prevailed in this region. In late geologic time (early Quaternary) the bordering high mountains supported glaciers and enormous lakes, the old shore lines of which are now plainly marked on the sides of many valleys, accumulated in the Great Basin. The two largest of these lakes have been named after early explorers. Lake Bonneville occupied a considerable part of western Utah, its shrunken remnants being represented by Sevier, Utah, and Great Salt lakes; and Lake Lahontan covered an immense area in western Nevada.

The chief rivers of the Great Basin rise in the mountains which form its eastern and western borders and receive their principal supply from melting snow. The nature of the stream discharge is characteristic; the maximum commonly occurs in late spring or early summer, after which the flow decreases, reaching a minimum during the winter months. After leaving the mountains the streams receive little or no increment; in the broad, waste-filled valleys evaporation and seepage cause diminution in size, and often they entirely cease to flow.

For convenience of treatment the drainage of the Great Basin has been divided into four areas, viz, Wasatch Mountains, Humboldt Sink, Sierra Nevada, and Great Basin drainage in Oregon. The data collected in these areas during 1907 and 1908 are given in the following pages.

WASATCH MOUNTAINS DRAINAGE AREA.

PRINCIPAL STREAMS.

The Wasatch Mountains drainage area includes the western half of Utah and small portions of Idaho and Wyoming. The various streams head either in the Wasatch Mountains or in the plateaus to the south, and discharge into Great Salt Lake or Sevier Lake. The following are the principal rivers of the area:

Bear and Weber rivers, discharging into Great Salt Lake.

City, Parleys, Emigration, Mill, and Big and Little Cottonwood creeks, tributary to Jordan River and thus to Great Salt Lake. These creeks have small drainage areas, but in their mountain courses maintain perennial flows. On reaching the main valley they are exten-

sively used for irrigation, and the first three furnish the chief water supply for Salt Lake City.

American Fork, Hobble Creek, Spanish Fork, and Provo River, discharging into Utah Lake.

Sevier River, with its tributary San Pitch River, draining into Sevier Lake.

BEAR RIVER BASIN.

DESCRIPTION.

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

In the upper part of its course, above the Dingle gaging station, the country is rough and broken, the rocks of the extreme headwater regions being principally sandstone and quartzite covered with a thin layer of soil, which supports scattered groves of fir and aspen. Farther down the prevailing formation is a compact limestone covered with a clayey soil, generally dry and with a rank growth of sagebrush. The tributary streams are numerous and well distributed, but most of them are short and confined to steep, narrow canyons. The basin contains no marshes, extensive meadows, or forests, but a few small lakes lie near the head of the river. The greater part of the precipitation is in the form of snow. Numerous small springs and the melting snow are the chief sources of supply of the streams. The annual high-water period occurs during May and June, and the stream is not subject to quick floods or freshets.

Just below Dingle the main stream passes through the north end of Bear Lake valley in a well-defined channel with no overflow, and from this point to Preston it is confined largely to a steep-walled canyon, interrupted by occasional short, narrow valleys containing irrigated farms. The tributaries in this portion of the basin are few, the principal ones being Mink and Cottonwood creeks. About 10 miles below Dingle the outlet to Bear Lake joins the river. This is a small, crooked, sluggish stream that discharges but little water at any time, though it is the only visible outlet to Bear Lake, which has an area of about 144 square miles.

The total unappropriated flow between Dingle and Preston is used for irrigation. 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 Collinston the Bear flows sluggishly along the west side of Cache Valley in a well-defined channel, and during

extreme floods overflows slightly and covers a very narrow strip immediately along the river. The principal tributary streams in this portion of the course are Cub Creek and Logan River. Cub Creek rises in the Bear River Range and drains a rough limestone country with but little overlying soil. The creek is confined to a steep, narrow canyon until it reaches Cache Valley, where it flows sluggishly for about 15 miles through a winding, but well-defined, channel into Bear River. It discharges considerable water into the main stream during flood and winter seasons, but its entire summer flow is used for irrigation in the north end of Cache Valley. A gaging station was maintained during a part of 1900 and 1901 on Cub Creek about 4 miles northeast of Franklin, at the mouth of the canyon, but owing to unfavorable conditions it was discontinued.

Logan River enters the Bear about 7 miles above the gaging station at Collinston, a short distance above the point where it leaves Cache Valley and enters the canyon.

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 Company diverts the entire summer flow of the stream above Collinston onto 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 1907 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.

Gaging stations have been maintained in this basin as follows:

Bear River at Dingle, Idaho, 1903–1908.
Bear River near Preston, Idaho, 1889–1908.
Bear River near Collinston, Utah, 1889–1908.
Bear Lake at Fishhaven, Idaho, 1904–1906.
Cub Creek near Franklin, Idaho, 1900–1901.
Logan River near Logan, Utah, 1896–1908.
Logan, Hyde Park, and Smithfield canal, 1904, 1906–7.
Blacksmith Fork near Hyrum, Utah, 1900–1908.
Blacksmith Fork power plant race near Hyrum, Utah, 1904–1908.

A. VIEW AT HEAD OF PROPOSED DIVERSION CANAL FROM BEAR RIVER TO BEAR LAKE, IDAHO.

B. HEADWORKS OF POWER CANAL ON SPANISH FORK, STRAWBERRY VALLEY PROJECT, UTAH.

BEAR RIVER AT DINGLE, IDAHO.

This station, which was established May 9, 1903, to determine the discharge available for storage in Bear Lake, is located about 10 miles above the outlet of Bear Lake, below the proposed intake of the diversion canal to the lake (see Pl. III, *A*), and above all important diversions.

The station is situated in a cut-off built by the Oregon Short Line Railroad Company. Measuring conditions are excellent, the channel is fairly permanent, and records for the open-water season are very reliable. The river is frozen over from about December 1 until the middle or last of March, the ice gradually increasing to a thickness of about 1.2 feet. No anchor or needle ice forms and fairly accurate estimates of discharge during the frozen period can be made. These estimates are specially important, as in the winter season all the water is available for diversion into Bear Lake.

Discharge measurements of Bear River at Dingle, Idaho, in 1907.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 25	A. D. Williams	126	676	7.90	3,110
July 12	do	126	679	7.95	3,140
July 29	do	119	433	6.25	1,460
Aug. 24	do	112	265	4.80	480
September 28	La Rue and Williams	111	251	4.62	412

NOTE.—No discharge measurements were made during 1908.

Daily gage height, in feet, of Bear River at Dingle, Idaho, for 1907 and 1908.

[M. K. Hopkins, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	4.1	4.6	5.9	5.5	6.9	8.75	7.9	5.9	5.0	.....	.....	5.0
2	4.0	4.6	5.8	5.5	7.0	8.7	7.8	5.8	.....	4.65	4.6	4.45
3	4.05	4.6	5.5	5.6	7.1	8.65	7.7	5.7	4.95	4.6	4.6	5.1
4	4.0	4.7	5.3	5.75	7.1	8.6	7.7	5.7	4.95	4.6	4.6	4.7
5	4.05	4.8	5.15	6.1	7.1	8.6	7.7	5.6	4.95	4.6	4.6	4.6
6	4.1	4.9	4.85	6.4	7.0	8.5	7.8	5.6	4.95	4.6	4.6	4.5
7	4.1	4.95	4.9	6.45	7.0	8.5	7.85	5.6	4.9	4.6	4.6	4.55
8	.....	5.0	4.9	6.5	7.1	8.5	7.9	5.5	4.9	4.6	4.6	4.5
9	4.1	5.0	5.1	6.55	7.1	8.6	7.9	.....	4.9	4.6	4.55	4.5
10	4.8	5.0	4.85	6.6	7.2	8.6	7.95	5.3	4.9	4.6	4.5	4.5
11	4.5	5.0	4.85	6.6	7.2	8.6	7.9	5.3	4.85	4.6	4.5	4.5
12	4.3	5.0	5.2	6.7	7.35	8.6	7.95	5.2	4.8	4.6	4.5	4.5
13	4.4	5.1	4.9	6.9	7.6	8.6	8.0	5.2	4.8	4.6	4.5	4.5
14	4.5	5.1	4.85	7.1	7.8	8.6	8.0	5.1	4.8	4.65	4.5	4.3
15	4.5	5.1	5.4	7.3	8.0	8.65	8.0	5.0	4.7	4.65	4.5	4.4
16	4.4	5.0	5.0	7.5	8.0	8.65	8.1	5.0	4.7	.....	4.5	4.6
17	4.4	4.9	4.6	7.6	7.9	8.6	8.0	.....	4.7	.....	4.5	4.3
18	4.4	4.9	4.55	7.8	7.95	8.5	7.9	4.95	4.65	4.6	4.45	4.7
19	4.35	5.0	4.7	7.9	8.0	8.35	7.8	.....	4.65	4.6	4.3	4.65
20	4.3	5.05	4.9	7.9	8.1	8.3	7.55	4.85	4.65	4.6	4.5	4.6
21	4.4	5.05	5.6	7.75	8.3	8.2	7.1	.....	.....	4.6	4.4	4.7
22	4.3	5.0	6.0	7.55	8.4	8.05	6.85	4.8	4.65	4.6	4.5	4.75
23	4.35	5.1	6.5	7.2	8.5	7.9	6.8	4.8	4.65	4.6	4.45	.....
24	4.4	5.1	6.8	7.1	8.6	7.9	.....	4.8	4.6	4.6	4.2	4.7
25	4.4	5.1	7.0	7.0	8.7	7.9	6.6	4.8	4.6	4.6	4.55	4.7

Daily gage height, in feet, of Bear River at Dingle, Idaho, for 1907 and 1908—Cont'd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
26	4.5	5.2	7.0	6.9	8.75	7.9	6.5	4.8	4.6	4.6	4.5	4.8
27	4.5	5.6	6.75	6.8	8.7	7.9	6.4	.....	4.6	4.6	5.0	4.8
28	4.5	5.75	6.5	6.8	8.7	7.9	6.3	4.8	4.6	4.6	5.1	4.8
29	4.5	.....	6.2	6.8	8.6	7.9	6.25	4.8	4.65	4.6	3.7	4.8
30	4.55	.....	6.0	6.8	8.6	7.9	6.1	4.8	4.6	4.6	4.1	4.85
31	4.55	.....	5.7	.....	8.7	.....	6.0	4.9	.....	4.6	.....	4.8
1908.												
1	4.8	5.1	.....	4.9	4.9	4.35	5.9	4.35	4.3	4.25	4.4	4.4
2	4.8	.....	.....	4.6	4.9	4.4	5.8	4.35	4.3	4.3	4.4	4.3
3	4.8	.....	5.2	4.75	4.9	4.4	.....	.....	4.3	4.35	4.4	4.35
4	4.8	.....	.....	4.7	4.9	4.5	5.5	4.3	4.3	4.4	4.4	4.4
5	4.85	5.1	.....	4.7	4.9	4.5	5.5	4.4	4.3	4.4	4.4	.....
6	.....	.....	.....	4.7	4.95	4.5	5.5	4.5	4.3	4.45	4.4	4.45
7	4.9	.....	5.25	4.7	5.1	4.5	5.4	4.45	4.25	4.45	4.4	4.4
8	4.9	5.1	.....	4.7	5.0	4.6	5.4	4.4	4.25	4.45	4.4	4.4
9	4.9	.....	.....	4.8	5.0	4.75	5.2	4.4	4.25	4.45	4.4	4.4
10	4.9	.....	5.1	4.8	5.1	4.75	5.1	4.35	4.25	4.45	4.35	.....
11	4.95	.....	.....	4.9	5.1	4.75	5.1	4.4	4.2	4.45	.....	4.4
12	4.95	5.2	.....	4.9	5.1	4.8	5.05	.....	4.2	4.45	4.3	4.45
13	.....	.....	.....	4.9	5.1	4.8	4.95	4.4	4.2	4.4	4.1	4.5
14	5.0	.....	5.0	5.0	4.95	4.8	4.9	4.4	.....	4.4	[a]3.7	.....
15	5.0	5.1	.....	5.1	4.9	5.1	4.8	4.4	4.2	4.5	[a]3.8	4.4
16	.....	.....	.....	5.1	4.8	5.5	4.75	4.4	4.15	4.5	4.5	4.45
17	.....	5.2	.....	5.2	4.75	5.75	4.7	4.4	4.15	4.5	4.35	4.4
18	.....	.....	5.5	5.2	4.7	6.0	4.65	4.35	4.15	4.5	4.5	4.45
19	5.0	5.2	6.0	5.2	4.6	6.3	4.6	4.5	4.15	4.5	4.0	.....
20	.....	.....	6.0	.....	4.6	6.5	4.6	4.4	4.15	4.5	4.0	4.3
21	.....	.....	6.1	5.25	4.5	6.6	4.6	4.35	.....	4.5	4.4	4.45
22	5.1	5.1	6.0	5.25	4.45	6.5	4.6	4.35	4.15	.....	4.3	.....
23	.....	.....	5.8	5.3	4.4	6.35	4.6	4.35	4.15	4.4	4.35	4.5
24	.....	.....	5.4	5.3	4.5	6.45	4.6	4.4	4.15	4.5	4.3	4.5
25	5.0	.....	5.3	5.3	4.3	6.1	4.55	4.4	4.15	4.45	4.3	.....
26	.....	.....	5.1	5.25	4.45	6.15	4.55	4.4	4.2	4.4	.....	4.6
27	.....	5.15	5.0	5.2	.....	6.05	4.5	4.4	4.2	.....	4.3	4.6
28	.....	.....	5.0	5.1	4.45	6.0	.....	4.4	4.2	4.4	4.3	.....
29	5.1	5.2	5.0	5.0	4.45	5.95	4.4	4.4	4.2	4.4	.....	4.65
30	.....	.....	4.95	4.95	4.4	.....	.....	4.3	.....	4.4	4.3	4.65
31	.....	.....	4.9	.....	4.3	.....	4.4	4.3	.....	4.4	.....	.....

[a] River probably blocked with ice above gaging station, thus shutting off the water and releasing it in the two or three days following.

NOTE.—The river was frozen over January 1 to March 9, 1907; the ice increased in thickness from 0.6 foot, January 6, to 1.2 February 7 to 22; decreased to 0.6 foot March 7, and was gone March 18. Ice conditions November 25 to 28, 1907, and from about December 18, 1907, to March 17, 1908; the ice reached a maximum thickness of 1.2 feet February 1 to 15, 1908. River began to freeze November 14, 1908, but probably was not frozen over until about December 20.

Rating tables for Bear River at Dingle, Idaho.

JANUARY 1, 1904, TO MAY 15, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.60	160	4.60	540	5.60	1,085	6.60	1,910
3.70	190	4.70	590	5.70	1,155	6.70	2,000
3.80	225	4.80	635	5.80	1,230	6.80	2,090
3.90	260	4.90	685	5.90	1,300	6.90	2,180
4.00	295	5.00	740	6.00	1,375	7.00	2,275
4.10	330	5.10	790	6.10	1,460	7.20	2,455
4.20	370	5.20	840	6.20	1,550	7.40	2,635
4.30	410	5.30	895	6.30	1,640	7.60	2,815
4.40	455	5.40	955	6.40	1,730	7.80	2,995
4.50	495	5.50	1,020	6.50	1,820	8.00	3,175

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 14 discharge measurements made during 1903–1906 and is well defined between gage heights 3.5 feet and 7.4 feet. Above gage height 6.1 feet the rating curve is a tangent, the difference being 90 per tenth.

Rating tables for Bear River at Dingle, Idaho—Continued.

MAY 16, 1907, TO DECEMBER 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.70	106	4.80	482	5.90	1,180	7.00	2,120
3.80	128	4.90	534	6.00	1,250	7.20	2,320
3.90	153	5.00	590	6.10	1,330	7.40	2,520
4.00	180	5.10	650	6.20	1,410	7.60	2,740
4.10	210	5.20	710	6.30	1,490	7.80	2,960
4.20	242	5.30	770	6.40	1,570	8.00	3,180
4.30	276	5.40	830	6.50	1,660	8.20	3,400
4.40	312	5.50	900	6.60	1,750	8.40	3,630
4.50	350	5.60	970	6.70	1,840	8.60	3,870
4.60	390	5.70	1,040	6.80	1,930	8.80	4,110
4.70	434	5.80	1,110	6.90	2,020		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during 1907, and is well defined between gage heights 4.6 feet and 8.0 feet.

Monthly discharge of Bear River at Dingle, Idaho, for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
January	430	175	234	14,400	C.
February	750	240	392	21,800	C.
March	2,280	450	1,040	64,000	B.
April	3,080	1,020	2,130	127,000	A.
May	4,050	2,180	3,090	190,300	A.
June	4,050	3,070	3,600	214,000	A.
July	3,290	1,250	2,550	157,000	A.
August	1,180	482	689	42,400	A.
September	590	390	468	27,800	A.
October	412	390	393	24,200	A.
November	390	106	316	18,800	B.
December	650	276	351	21,600	C.
The year	4,050	106	1,270	923,000	
1908.					
January	330	250	290	17,800	C.
February	320	285	298	17,100	C.
March	1,250	250	587	36,100	B.
April	770	390	596	35,500	A.
May	650	276	466	28,700	A.
June	1,750	294	859	51,100	A.
July	1,180	312	576	35,400	A.
August	350	276	306	18,800	A.
September	276	226	246	14,600	A.
October	350	259	324	19,900	A.
November	350	106	276	16,400	B.
December	350	220	292	18,000	C.
The year	1,750	106	426	309,000	

NOTE.—The discharges for ice periods were determined as follows: For February, 1907, an ice rating table was used, based on measurements in 1904 to 1906 under ice conditions similar to those existing in February, through ice 1 to 1.2 feet thick. For January and March 1 to 9, discharges were estimated by a transition between this table and that for the open channel periods before and after, taking into account the thickness of ice. November 25 to 28 were interpolated on account of slush ice. For January 19 to March 14, 1908, an ice table was used, parallel with respect to gage height to that used in February, 1907, and 0.35 foot higher, this being the amount that the 1908 open water rating plots above that for the period before the high water of 1907. December 18, 1907, to January 18, 1908, estimated by transition between open water and ice tables; March 15 to 17 interpolated. For December 21 to 31, ice has been assumed to be 0.5 foot thick.

BEAR RIVER NEAR PRESTON, IDAHO.

This station, which is situated at the upper end of Cache Valley, about 6 miles from Preston, Idaho, and 10 miles north of the Idaho-Utah state line, has been maintained continuously since October 11,

1889. The records are necessary to determine the amount of water passing from Idaho into Utah and will be of value in the final adjudication of water rights.

Cub Creek and Logan River enter the Bear in the valley below the station. Few diversions are made above, but large areas of irrigable land are available. It is possible to divert the river from a point near Soda Springs, at the north end of the Bear River Range, over the divide to lands adjacent to Portneuf River, a tributary of the Snake.

More or less ice forms at this station for two or three months during the winter. The river seldom freezes over, but when the morning gage readings show the effect of anchor and slush ice the afternoon readings have been used. The channel shifts slightly during floods but measuring conditions are good.

Discharge measurements of Bear River near Preston, Idaho, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 12	G. T. Burridge	224	1,160	5.70	6,560
June 26	do	216	957	4.90	5,160
July 21	do	202	795	3.82	3,340
August 14	La Rue and Burridge	196	510	2.10	1,280
1908.					
July 23	A. D. Williams	196	372	1.35	675

Daily gage height, in feet, of Bear River near Preston, Idaho, for 1906, 1907, and 1908.

[Mrs. Hannah Nelson and O. M. Seamons, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.[a]												
1	.....	1.30	1.25	2.70	3.20	4.45	2.78	1.38	1.85	1.52	1.52	1.52
2	.....	1.20	1.20	2.70	3.12	4.40	2.68	1.30	1.85	1.50	1.55	1.55
3	.....	1.20	1.20	2.55	2.95	4.40	2.58	1.28	1.85	1.40	1.55	1.62
4	.....	1.20	1.20	2.50	3.00	4.42	2.52	1.22	1.80	1.40	1.55	1.70
5	.....	1.05	1.20	2.58	3.00	4.48	2.50	1.20	1.80	1.40	1.55	1.70
6	2.90	1.20	1.25	2.62	2.95	4.70	2.42	1.15	1.75	1.40	1.55	1.70
7	.....	1.52	1.25	2.90	2.90	4.68	2.32	1.10	1.75	1.40	1.55	1.70
8	.....	1.68	1.25	3.25	2.90	4.58	2.22	1.10	1.75	1.42	1.55	1.70
9	.....	1.40	1.30	3.42	2.90	4.50	2.30	1.05	1.75	1.45	1.55	1.70
10	.....	1.20	1.30	3.60	2.90	4.48	2.28	1.00	1.75	1.45	1.55	1.70
11	.....	1.12	1.30	3.60	2.90	4.38	2.22	1.00	1.75	1.42	1.55	1.70
12	3.00	1.05	1.30	3.40	2.90	4.25	2.18	1.00	1.70	1.40	1.55	1.70
13	.....	1.05	1.30	3.40	3.12	4.12	2.10	.95	1.65	1.40	1.55	1.70
14	.....	1.05	1.30	3.52	3.40	4.05	2.10	.90	1.68	1.40	1.55	1.70
15	.....	1.05	1.30	3.65	3.82	4.00	2.10	.90	1.70	1.40	1.55	1.70
16	.....	1.12	1.30	3.70	3.88	3.95	2.08	.85	1.60	1.40	1.55	1.70
17	.....	1.20	1.35	3.82	3.80	3.85	2.00	.85	1.60	1.40	1.55	1.70
18	.....	1.20	1.35	3.72	3.80	3.80	1.95	.85	1.60	1.40	1.70	1.70
19	.....	1.38	1.60	3.70	3.80	3.72	1.88	.85	1.58	1.40	1.70	1.70
20	1.60	1.35	1.60	3.62	3.80	3.68	1.80	.85	1.55	1.40	1.70	1.70
21	1.60	1.35	1.40	3.60	3.80	3.52	1.75	.90	1.55	1.40	1.70	1.70
22	1.62	1.30	1.40	3.52	3.80	3.32	1.70	.95	1.52	1.40	1.70	1.70
23	1.35	1.25	1.55	3.50	3.80	3.30	1.65	1.25	1.50	1.40	1.70	1.70
24	1.30	1.25	1.90	3.50	3.85	3.30	1.60	1.50	1.50	1.40	1.70	1.70
25	1.25	1.25	2.25	3.45	4.00	3.32	1.60	1.62	1.50	1.40	1.70	1.70

[a] These gage heights supersede those published in Water-Supply Paper 212, p. 23, many of which were in error, the observer having recorded his readings as hundredths of feet instead of tenths.

Daily gage height, in feet, of Bear River near Preston, Idaho, for 1906, 1907, and 1908—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
26	1.30	1.25	2.15	3.42	4.20	3.28	1.60	1.68	1.50	1.40	1.70	1.75
27	1.20	1.25	1.90	3.40	4.42	3.18	1.60	1.72	1.50	1.40	1.70	1.80
28	1.20	1.25	1.92	3.32	4.52	3.08	1.58	1.78	1.50	1.40	1.50	1.75
29	1.20	.....	1.95	3.20	4.50	2.98	1.52	1.85	1.55	1.40	1.50	1.72
30	1.20	.....	1.98	3.20	4.60	2.88	1.48	1.85	1.55	1.40	1.50	1.68
31	1.20	.....	2.20	.....	4.52	.....	1.40	1.85	.....	1.40	.....	1.65
1907.												
1	1.6	1.6	2.1	4.1	4.5	4.75	4.5	2.8	1.8	1.8	1.9	1.6
2	1.55	1.65	2.1	4.05	4.5	4.7	4.4	2.8	1.8	1.85	1.85	1.6
3	1.5	1.65	2.15	4.15	4.4	4.7	4.3	2.7	1.8	1.9	1.85	1.65
4	1.5	1.7	2.15	4.3	4.4	4.7	.....	2.6	1.85	1.9	1.85	1.7
5	1.5	1.7	2.2	4.1	4.4	4.8	.....	2.6	1.85	1.85	1.85	1.8
6	1.5	1.7	2.35	4.1	4.4	.....	.....	2.5	1.9	1.85	1.8	1.8
7	1.5	1.7	2.5	4.1	4.4	.....	4.2	2.4	1.9	1.8	1.8	1.85
8	1.5	1.8	2.5	4.1	4.4	.....	4.1	2.4	2.0	1.8	1.8	1.9
9	1.6	1.8	2.5	4.2	4.5	.....	4.0	2.35	2.0	1.8	1.8	1.85
10	1.65	2.0	2.5	4.3	4.55	.....	4.0	2.3	1.95	1.8	1.8	1.7
11	1.7	2.0	2.5	4.5	4.65	.....	4.0	2.2	1.95	1.8	1.8	1.65
12	1.65	1.9	2.4	4.6	4.7	5.7	4.0	2.1	1.9	1.9	1.8	1.65
13	1.6	2.0	2.4	4.65	4.7	.....	4.0	2.3	1.9	1.9	1.8	1.6
14	1.6	2.0	2.4	4.75	4.7	.....	3.9	2.1	1.9	1.9	1.8	1.6
15	1.6	1.9	2.3	4.85	4.7	.....	3.85	2.0	1.9	1.9	1.8	1.6
16	1.6	1.9	2.2	4.9	4.7	.....	3.85	2.0	1.8	1.9	1.8	1.6
17	1.6	1.85	2.45	4.9	4.8	.....	3.85	1.9	1.8	1.85	1.8	1.4
18	1.6	1.85	2.6	4.9	4.95	.....	3.85	1.85	1.8	1.85	1.8	.....
19	1.6	1.85	2.9	4.9	5.15	.....	3.85	1.8	1.75	1.8	1.7	1.2
20	1.65	1.85	3.5	4.9	5.25	5.3	3.8	1.7	1.75	1.8	1.7	1.6
21	1.7	1.85	4.2	5.0	5.3	5.25	3.8	1.7	1.75	1.85	1.7	1.8
22	1.8	2.0	4.15	5.0	5.3	5.2	3.7	1.7	1.8	1.8	1.75	1.85
23	1.5	2.2	4.0	5.0	5.3	5.15	3.5	1.65	1.8	1.8	1.75	1.85
24	1.5	2.0	4.0	5.0	5.55	5.1	3.5	1.6	1.8	1.8	1.75	1.9
25	1.5	2.0	4.15	4.95	5.7	5.05	3.4	1.7	1.8	1.8	1.75	1.95
26	1.5	2.0	4.3	4.8	5.8	4.95	3.3	1.75	1.8	1.8	1.70	2.0
27	1.7	2.0	4.35	4.75	5.8	4.8	3.2	1.8	1.8	1.8	1.70	2.0
28	1.7	2.0	4.5	4.7	5.8	4.7	.....	1.8	1.8	1.85	1.65	1.8
29	1.7	.....	4.45	4.65	5.8	4.6	.....	1.85	1.8	1.85	1.65	1.8
30	1.6	.....	4.3	4.5	5.8	4.6	2.9	1.8	1.8	1.9	1.60	1.8
31	1.6	.....	4.2	.....	5.8	.....	2.9	1.8	.....	1.9	.....	1.75
1908.												
1	1.8	1.7	1.7	2.45	2.3	1.8	2.6	1.3	1.3	.....	1.6	1.5
2	1.8	1.7	1.75	2.3	2.3	1.85	2.5	1.3	1.3	.....	1.6	1.6
3	1.8	1.6	1.8	2.3	2.25	1.9	2.4	1.25	1.3	.....	1.6	1.5
4	1.8	1.45	1.8	2.3	2.2	2.05	2.3	1.2	1.25	.....	1.6	1.65
5	.....	1.5	1.7	2.3	2.2	2.3	2.3	1.05	1.25	.....	1.6	1.65
6	1.8	1.5	1.7	2.4	2.15	2.4	2.15	1.0	1.25	.....	1.6	1.7
7	1.8	1.55	1.7	2.4	2.15	2.5	2.0	.95	1.25	.....	1.6	1.6
8	1.8	1.85	1.65	2.45	2.1	2.6	1.9	.95	1.25	.....	1.6	1.6
9	1.8	1.7	1.65	2.45	2.1	2.6	1.8	.9	1.25	.....	1.6	1.6
10	1.75	1.7	1.7	2.45	2.2	2.65	1.7	.9	1.25	.....	1.6	1.65
11	1.7	1.7	1.7	2.4	2.2	2.7	1.6	.9	1.25	.....	1.6	1.6
12	1.7	1.7	1.75	2.4	2.1	2.7	1.5	.9	1.25	.....	1.6	1.6
13	1.7	1.6	1.8	2.4	2.0	2.8	1.5	.9	1.25	.....	1.6	1.6
14	1.7	1.6	1.85	2.4	1.95	2.8	1.5	.9	1.25	.....	1.5	1.6
15	1.7	1.6	1.9	2.5	.....	2.85	1.45	.9	1.25	.....	1.5	1.6
16	1.65	1.6	2.05	2.5	.....	2.85	1.4	.9	1.2	1.65	1.5	1.6
17	1.6	1.55	2.25	2.55	.....	2.9	1.35	.9	1.2	1.65	1.5	1.55
18	1.6	1.5	2.4	2.55	1.8	2.95	1.35	.9	1.2	1.65	1.5	1.4
19	1.6	1.5	2.5	2.6	1.8	2.95	1.35	.9	1.2	1.7	1.5	1.4
20	1.7	1.5	2.6	2.65	1.75	3.0	1.35	.95	1.2	1.7	1.5	1.35
21	1.7	1.45	2.7	2.7	1.7	3.0	1.35	.95	1.2	1.65	1.55	1.4
22	1.7	1.5	2.85	2.7	1.7	3.0	1.35	.95	1.2	1.65	1.6	1.75
23	1.7	1.55	3.0	2.7	1.35	3.1	1.35	1.0	1.2	1.65	1.6	1.9
24	1.7	1.6	3.1	2.65	1.3	3.0	1.3	1.2	.....	1.65	1.7	2.25
25	1.6	1.6	3.1	2.6	1.4	.....	1.3	1.2	.....	1.65	1.7	2.25
26	1.6	1.6	2.9	2.6	1.6	.....	1.3	1.25	.....	1.6	1.6	2.85
27	1.7	1.7	2.8	2.5	1.75	.....	1.3	1.25	.....	1.6	1.5	2.35
28	1.7	1.7	2.8	2.5	1.8	.....	1.25	1.3	.....	1.6	1.5	1.7
29	1.7	1.7	2.7	2.4	1.8	.....	1.2	1.3	.....	1.6	1.5	1.5
30	1.7	.....	2.6	2.35	1.8	2.7	1.2	1.3	.....	1.6	1.5	1.5
31	1.7	.....	2.6	.....	1.8	.....	1.35	1.3	.....	1.6	.....	1.5

NOTE.—The river is known to have been frozen or the gage heights to have been affected by slush or anchor ice during the following periods: January 1 to 26, February 7 to 9, and November 18 to 27, 1906; December 17 to 24, 1907; February 4 to 9, November 29 to December 3, and December 17 to 27, 1908. There was slush ice in the morning at other times during December to March, but the afternoon readings were unaffected and have been used. There was some obstruction from ice from about January 1 to February 10, 1907, which probably did not materially affect the gage readings.

Rating tables for Bear River near Preston, Idaho.

FOR 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.80	320	1.80	960	2.80	1,800	3.80	3,150
.90	365	1.90	975	2.90	1,910	3.90	3,310
1.00	415	2.00	1,050	3.00	2,030	4.00	3,470
1.10	465	2.10	1,130	3.10	2,150	4.20	3,800
1.20	520	2.20	1,215	3.20	2,280	4.40	4,140
1.30	575	2.30	1,300	3.30	2,410	4.60	4,480
1.40	635	2.40	1,390	3.40	2,550	4.80	4,820
1.50	695	2.50	1,480	3.50	2,690		
1.60	760	2.60	1,580	3.60	2,840		
1.70	830	2.70	1,690	3.70	2,990		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1906 and earlier high water measurements, and is well defined. It supersedes the table for 1906 given in Water-Supply Paper 212, p. 23.

FOR 1907 AND 1908.

0.90	395	2.10	1,160	3.30	2,480	5.00	5,280
1.00	440	2.20	1,240	3.40	2,620	5.20	5,640
1.10	490	2.30	1,330	3.50	2,770	5.40	6,000
1.20	540	2.40	1,420	3.60	2,920	5.60	6,360
1.30	600	2.50	1,520	3.70	3,080	5.80	6,740
1.40	660	2.60	1,620	3.80	3,240	6.00	7,120
1.50	720	2.70	1,730	3.90	3,400	6.20	7,500
1.60	780	2.80	1,840	4.00	3,560	6.40	7,900
1.70	840	2.90	1,960	4.20	3,890	6.60	8,300
1.80	920	3.00	2,080	4.40	4,230	6.80	8,700
1.90	1,000	3.10	2,210	4.60	4,570		
2.00	1,080	3.20	2,340	4.80	4,920		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 9 discharge measurements made during 1906–1908, and is well defined between gage heights 1.2 feet and 6.5 feet.

Monthly discharge of Bear River near Preston, Idaho, for 1905, 1906, 1907, and 1908.

[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.	
1905.[a]							
January	650	580	607	0.135	0.16	37,300	C.
February	770	580	650	.144	.15	36,100	C.
March	1,200	580	907	.202	.23	55,800	A.
April	1,020	779	871	.194	.22	51,800	A.
May	1,320	722	991	.220	.25	60,900	A.
June	855	328	599	.133	.15	35,600	A.
July	251	164	201	.045	.05	12,400	A.
August	234	158	176	.039	.04	10,800	A.
September	328	217	250	.056	.06	14,900	A.
October	580	328	490	.109	.13	30,100	A.
November	522	443	495	.110	.12	29,500	A.
December	468	418	423	.094	.11	26,000	C.
The year	1,320	158	555	.123	1.67	401,000	
1906.[b]							
January	520	420	459	0.102	0.12	28,200	D.
February	623	440	522	.116	.12	29,000	C.
March	1,260	520	717	.159	.18	44,100	B.
April	3,180	1,480	2,450	.544	.61	146 000	A.
May	4,480	1,910	2,880	.640	.74	177,000	A.
June	4,650	1,890	3,360	.747	.83	200,000	A.
July	1,780	635	1,090	.242	.28	67,000	B.
August	938	342	545	.121	.14	33,500	B.
September	938	695	796	.177	.20	47,400	B.
October	708	635	642	.143	.16	39,500	B.
November	728	695	719	.160	.18	42,800	B.
December	900	708	824	.183	.21	50,700	C.
The year	4,650	342	1,250	.278	3.77	905,000	

[a] These discharges for 1905 supersede those published in Water-Supply Paper 176, p. 25. Many of the gage heights as given on p. 24 of that report are in error, 1.4 being recorded by observer as 1.04, etc. The same rating table has been used in recomputing.

[b] These discharges supersede those published in Water-Supply Paper 212, p. 24. See footnotes to table of gage heights (p. 34).

Monthly discharge of Bear River near Preston, Idaho, for 1905, 1906, 1907, and 1908—Con.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Mimimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1907.							
January	920	720	777	0.173	0.20	47,800	C.
February	1,240	780	980	.218	.23	54,400	C.
March	4,400	1,100	2,360	.524	.60	145,000	A.
April	5,280	3,640	4,560	1.01	1.13	271,000	A.
May	6,740	4,230	5,280	1.17	1.35	325,000	A.
June	8,500	4,570	5,860	1.30	1.45	349,000	B.
July	4,400	1,960	3,250	.722	.83	200,000	A.
August	1,840	780	1,170	.260	.30	71,900	B.
September	1,080	880	953	.212	.24	56,700	B.
October	1,000	920	954	.212	.24	58,700	B.
November	1,000	780	897	.199	.22	53,400	B.
December	1,080	540	865	.192	.22	53,200	C.
The year	8,500	540	2,330	.516	7.01	1,690,000	
1908.							
January	920	780	854	0.190	0.22	52,500	C.
February	960	690	783	.174	.19	45,000	C.
March	2,210	810	1,320	.293	.34	81,200	A.
April	1,730	1,330	1,500	.333	.37	89,300	A.
May	1,330	600	1,010	.224	.26	62,100	B.
June	2,210	920	1,730	.384	.43	103,000	B.
July	1,620	540	827	.184	.21	50,800	B.
August	600	395	475	.106	.12	29,200	B.
September	600	540	561	.125	.14	33,400	B.
October	840	600	758	.168	.19	46,600	B.
November	840	720	761	.169	.19	45,300	B.
December	840	630	737	.164	.19	45,300	C.
The year	2,210	395	943	.209	2.85	684,000	

NOTE.—In computing the above discharges the following corrections and estimates have been made: 1905, January 1 to 18, interpolated; February 10 to 20, interpolated with measurement of February 17; December 7 to January 19, 1906, discharge assumed to have remained practically constant at 418 to 420 second-feet; January 27 to 31, 1906, estimated; February 7 to 9, interpolated; November 18 to 27, interpolated. June 6 to 19, 1907, interpolated with aid of hydrograph following rate of rise and fall at Collinston. September 24 to October 15, 1908, and December 22 to 28, 1908, interpolated.

BEAR RIVER NEAR COLLINSTON, UTAH.

This station, which is located 6 miles north of Collinston station, on the Oregon Short Line Railroad, about one-fourth mile below the electric-power plant in Bear River canyon, was established July 1, 1889, and has been kept continuously since that date. From July 6, 1906, to August, 1907, however, only weekly gage readings were obtained.

The station is at the lower end of the canyon separating Cache and Great Salt Lake valleys and is below all diversions from the stream. The records show the amount of unappropriated water discharged into Great Salt Lake. Malade River is the only tributary below this point.

Almost the entire summer flow of the stream in years of low water is diverted by the Bear River Canal Company at a point above the station to agricultural lands on both sides of the river below the canyon. The system has a capacity of about 1,000 second-feet, and during the winter and flood seasons a part of the water is used

to develop electric power above the gaging station and is returned to the river.

Bear River seldom freezes over at this station. During December and January ice forms in a narrow strip along each bank, but does not appreciably affect the determination of discharge.

The stream bed at the section has not changed in several years and records are very reliable. Changes of load at the power plant above and changes in the amount of diversion in canals may, however, cause sudden fluctuations in gage heights.

Discharge measurements of Bear River near Collinston, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 24	G. T. Burridge	293	1,830	6.60	10,100
June 13	do	280	1,940	7.00	9,710
June 27	do	288	1,650	6.00	7,190
July 19	do	280	1,190	4.15	4,190
August 15	La Rue and Burridge	281	998	3.50	3,120
1908.					
July 24	A. D. Williams	203	252	1.00	526

Daily gage height, in feet, of Bear River near Collinston, Utah, for 1907 and 1908.

[J. L. Sellers, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1						6.5			1.5	2.7	2.6	2.5
2		2.2	2.7						1.4	2.8	2.6	2.5
3								3.05	2.4	2.8	2.6	2.5
4					5.55				2.4	2.5	2.6	2.5
5	1.9								2.6	2.4	2.5	2.5
6				5.2			5.25		2.4	2.4	2.5	2.5
7									2.4	2.4	2.5	2.6
8						7.0			2.4	2.4	2.5	2.6
9		3.65	3.35						2.4	2.4	2.5	2.8
10								2.55	2.3	2.4	2.4	2.8
11					5.3	7.2			2.3	2.3	2.4	2.7
12	1.95								2.4	2.3	2.4	2.6
13				5.8		7.0	4.5		2.6	2.3	2.5	2.6
14									2.5	2.3	2.5	2.6
15						6.9		3.5	2.5	2.4	2.6	2.7
16		2.65	3.05					2.1	2.4	2.4	2.6	2.6
17				6.55				2.3	2.3	2.4	2.5	1.9
18				6.6	5.9			2.2	2.1	2.5	2.5	1.7
19	1.85						4.15	2.1	2.0	2.5	2.5	1.6
20				6.45			4.1	2.1	2.0	2.5	2.5	1.5
21								2.0	2.0	2.5	2.5	1.5
22						6.3		2.0	1.9	2.5	2.5	1.9
23		2.75	3.35					1.9	1.9	2.5	2.5	2.4
24					6.6			1.9	1.8	2.5	2.5	2.6
25					6.85			2.0	1.7	2.5	2.5	2.8
26	1.85							2.1	1.6	2.5	2.5	3.0
27				5.8		6.0	3.65	2.0	1.5	2.5	2.5	3.7
28								2.2	2.0	2.5	2.5	3.3
29						5.9		2.3	2.3	2.5	2.5	2.9
30			5.2					1.6	2.5	2.5	2.5	2.4
31								1.5		2.5		2.0

Daily gage-height, in feet, of Bear River near Collinston, Utah, for 1907 and 1908—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	2.3	1.9	2.9	3.0	2.9	2.9	3.3	1.0	1.2	1.7	2.4	2.0
2	2.5	1.9	2.8	3.0	2.6	3.0	3.1	1.0	1.2	1.7	2.4	2.1
3	2.6	2.0	2.6	2.9	2.5	3.1	2.8	1.2	1.3	1.7	2.3	2.2
4	2.6	2.2	2.6	2.9	2.5	3.3	2.6	1.2	1.3	1.8	2.3	2.2
5	2.1	2.2	2.6	2.9	2.5	3.6	2.5	1.2	1.3	1.9	2.1	2.4
6	2.3	2.4	2.6	2.9	2.3	4.0	2.2	1.2	1.3	2.0	2.0	2.4
7	2.4	2.5	2.6	2.9	2.3	4.0	2.0	1.2	1.3	2.1	1.8	2.4
8	2.4	2.5	2.6	2.9	2.2	4.0	1.8	1.2	1.3	2.2	2.0	2.4
9	2.4	2.4	2.5	2.9	2.2	4.0	1.8	1.2	1.3	2.1	2.0	2.4
10	2.5	2.4	2.5	2.8	2.4	3.9	1.8	1.2	1.3	2.0	2.2	2.4
11	2.5	2.4	2.5	2.8	2.3	3.9	1.8	1.2	1.3	2.0	2.2	2.4
12	2.5	2.5	2.5	2.8	2.3	3.9	1.6	1.2	1.3	2.0	2.3	2.4
13	2.5	2.5	2.6	2.9	2.4	3.9	1.6	1.2	1.3	2.0	2.3	2.4
14	2.5	2.4	2.6	3.0	2.4	4.1	1.6	1.2	1.3	1.95	2.3	2.4
15	2.5	2.4	2.8	3.1	2.3	4.3	1.5	1.2	1.3	2.0	2.3	2.3
16	2.4	2.3	2.9	3.2	2.2	4.5	1.4	1.2	1.4	2.2	2.3	2.3
17	2.4	2.3	3.0	3.3	2.2	4.5	1.2	1.2	1.4	2.3	2.3	2.3
18	2.2	2.4	3.2	3.4	2.2	4.7	1.0	1.2	1.4	2.3	2.3	1.8
19	2.4	2.4	3.3	3.4	2.1	4.7	1.0	1.2	1.4	2.3	2.3	1.4
20	2.5	2.3	3.2	3.4	2.2	4.9	1.0	1.2	1.4	2.35	2.3	1.2
21	2.5	2.2	3.1	3.3	2.3	4.7	1.0	1.3	1.4	2.4	2.3	1.0
22	2.5	2.2	3.2	3.3	2.3	4.5	.8	1.3	1.4	2.4	2.3	1.0
23	2.4	2.3	3.3	3.5	2.2	4.4	.8	1.3	1.4	2.4	2.3	1.0
24	2.4	2.3	3.5	3.6	2.2	4.3	.8	1.3	1.5	2.4	2.3	1.0
25	2.4	2.4	3.6	3.8	2.2	4.1	.8	1.2	1.6	2.35	2.3	1.0
26	2.4	2.4	3.8	3.8	2.3	4.0	.8	1.2	1.6	2.3	2.4	1.0
27	2.4	2.5	3.9	3.7	2.6	3.9	.9	1.2	1.6	2.3	2.4	1.2
28	2.3	2.7	3.9	3.5	2.9	3.7	1.0	1.2	1.6	2.3	2.4	1.6
29	2.4	2.9	3.7	3.3	2.9	3.7	1.0	1.2	1.6	2.3	1.9	2.0
30	2.5	.....	3.4	3.1	2.9	3.5	1.0	1.2	1.6	2.4	1.9	2.2
31	2.5	.....	3.0	.....	2.9	.....	1.0	1.2	.....	2.4	.....	2.3

NOTE.—Bear River seldom freezes over at this station, the only ice being a narrow strip along each bank during December and January.

Rating table for Bear River near Collinston, Utah, for January 1, 1907, to December 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.80	385	2.10	1,530	3.40	3,110	5.40	6,320
0.90	440	2.20	1,640	3.50	3,250	5.60	6,680
1.00	500	2.30	1,750	3.60	3,390	5.80	7,040
1.10	570	2.40	1,860	3.70	3,530	6.00	7,400
1.20	645	2.50	1,970	3.80	3,670	6.20	7,800
1.30	725	2.60	2,080	3.90	3,820	6.40	8,220
1.40	810	2.70	2,190	4.00	3,980	6.60	8,660
1.50	900	2.80	2,300	4.20	4,300	6.80	9,140
1.60	1,000	2.90	2,420	4.40	4,620	7.00	9,640
1.70	1,100	3.00	2,550	4.60	4,960	7.20	10,160
1.80	1,200	3.10	2,690	4.80	5,300		
1.90	1,310	3.20	2,830	5.00	5,640		
2.00	1,420	3.30	2,970	5.20	5,980		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 19 discharge measurements made during 1904–1908, and the form of the 1903 curve at low water, and is well defined.

Monthly discharge of Bear River near Collinston, Utah, for 1907 and 1908.

[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.	
1907.							
January	1,500	1,250	1,320	0.220	0.25	81,200	B.
February	3,460	1,260	2,340	.390	.41	130,000	B.
March	5,980	2,120	3,410	.568	.65	210,000	B.
April	8,790	5,850	7,270	1.21	1.35	433,000	B.
May	9,280	6,000	7,350	1.22	1.41	452,000	B.
June	10,200	7,130	8,600	1.43	1.60	512,000	B.
July	6,850	3,000	4,740	.790	.91	291,000	B.
August	3,250	900	1,870	.312	.36	115,000	B.
September	2,080	810	1,590	.265	.30	94,600	A.
October	2,300	1,750	1,940	.323	.37	119,000	A.
November	2,080	1,860	1,980	.330	.37	118,000	A.
December	3,530	900	1,960	.327	.38	121,000	B.
The year	10,200	810	3,700	.615	8.36	2,680,000	
1908.							
January	2,080	1,530	1,890	0.315	0.36	116,000	B.
February	2,420	1,310	1,810	.302	.33	104,000	A.
March	3,820	1,970	2,610	.435	.50	160,000	A.
April	3,670	2,300	2,800	.467	.52	167,000	A.
May	2,420	1,530	1,870	.312	.36	115,000	A.
June	5,470	2,420	3,980	.663	.74	237,000	A.
July	2,970	385	1,020	.170	.20	62,700	A.
August	725	500	646	.108	.12	39,700	A.
September	1,000	645	803	.134	.15	47,800	A.
October	1,860	1,100	1,580	.263	.30	97,200	A.
November	1,860	1,200	1,670	.278	.31	99,400	A.
December	1,860	500	1,360	.227	.26	83,600	B.
The year	5,470	385	1,840	.306	4.15	1,330,000	

NOTE.—Daily discharges for January 1 to August 15, 1907, were obtained from weekly gage readings by the aid of a hydrograph, following the rate of rise and fall of the river at the Preston station.

LOGAN RIVER NEAR LOGAN, UTAH.

Logan River rises on the west slope of the Bear River Range, flows southwest, then northwest, and unites with Bear River near Benson, Utah. The entire basin is rough and rugged, the elevations ranging from 4,500 to 9,000 feet, and the stream being confined largely to a steep and rough channel in a comparatively narrow canyon. The principal rock is a compact limestone with little or no soil covering except near the summit of the range, where a thin layer supports large groves of fir and aspen. The lower reaches of the stream are practically barren of timber except for a few scattered pines and a growth of underbrush. A large amount of timber has been cut and the area has been overgrazed by sheep and cattle.

Probably three-fourths of the precipitation in the basin is snow, the melting of which forms the chief source of supply for the spring and early 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 numerous short and swift tributaries. Temple Fork and South Fork, which enter, respectively,

about 10 and 15 miles above the Logan, are perennial streams and furnish one-third to one-fourth of the total flow. Blacksmith Fork comes in below the gaging station. None of the run-off is stored at present. The entire flow of the river after being used to develop power at two electric plants near the mouth of the canyon, is diverted for irrigation.

A gaging station was established June 1, 1896, about 2 miles east of the city of Logan, near the mouth of the canyon. It was discontinued July 18, 1903, and reestablished April 13, 1904, at a point along the canyon road about 50 feet below the highway bridge, at the mouth of the canyon, 800 feet below the Hercules power house and about 1,000 feet above the old gaging station.

This point is above Blacksmith Fork and Cache River and is below all other tributaries. It is above all diversions except the Logan, Hyde Park, and Smithfield canal. Records have been kept on this canal at various times in order to determine the total flow of the river. (See p. 45.) The drainage area is 218 square miles.

The gage was moved downstream about 400 feet January 1, 1906. The datum has not been changed since that date.

Practically no ice forms at this station and measuring conditions are fairly good, but the channel shifts considerably. Velocities are so high that bowlders and gravel are moved along the river bed during floods. The results are therefore liable to some error.

Discharge measurements of Logan River near Logan, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 25	G. T. Burridge	75	190	4.15	1,070
July 20	do	64	153	3.60	752
August 13	La Rue and Burridge	48	113	2.82	410
November 11	A. D. Williams	45	81	2.25	203
1908.					
July 22	A. D. Williams	45	82	2.35	221

Daily gage height, in feet, of Logan River near Logan, Utah, for 1907 and 1908.

[Telluride Power Company, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.15	2.1	2.1	2.5	3.2	4.6	4.25	3.15	2.6	2.45	2.4	2.2
2	2.15	2.15	2.25	2.55	3.25	4.7	4.2	3.1	2.65	2.5	2.3	2.2
3	2.15	2.2	2.15	2.65	3.2	5.2	4.25	3.0	2.55	2.45	2.3	2.2
4	2.15	2.35	2.1	2.75	3.25	5.25	4.3	3.0	2.55	2.4	2.3	2.2
5	2.15	2.6	2.2	2.75	3.2	5.3	4.2	3.1	2.6	2.4	2.3	2.2
6	2.15	2.4	2.15	2.8	3.1	5.3	4.15	3.0	2.55	2.4	2.3	2.2
7	2.15	2.35	2.2	2.9	3.15	5.4	4.0	3.0	2.55	2.4	2.3	2.2
8	2.05	2.35	2.2	3.0	3.2	5.5	4.0	2.9	2.5	2.4	2.3	2.2
9	1.95	2.2	2.1	3.0	3.2	5.2	4.0	3.0	2.5	2.4	2.3	2.2
10	2.0	2.15	2.05	3.1	3.15	5.2	4.05	2.9	2.5	2.4	2.3	2.2

Daily gage height, in feet, of Logan River near Logan, Utah, for 1907 and 1908—Cont'd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
11	2.1	2.15	2.2	3.2	3.2	5.0	4.0	2.85	2.5	2.4	2.3	2.2
12	2.2	2.05	2.2	3.3	3.35	5.0	3.9	2.85	2.5	2.4	2.3	2.2
13	2.05	2.1	2.2	3.35	3.4	4.9	4.0	2.8	2.5	2.45	2.25	2.2
14	2.05	2.05	2.2	3.4	3.2	4.6	3.95	2.8	2.45	2.4	2.3	2.15
15	2.1	2.0	2.2	3.5	3.2	4.6	3.8	2.8	2.45	2.35	2.25	2.15
16	2.1	2.05	2.25	3 6	3.5	4.5	3.7	2.8	2.45	2.35	2.25	2.15
17	2.15	2 1	2.25	3.75	3.5	4.4	3.5	2.8	2.45	2.35	2.25	2.1
18	2.15	2.1	2.3	3.6	4.1	4.4	3.6	2.75	2.45	2.3	2.25	2.1
19	2.1	2.25	2.6	3.5	4.7	4.3	3.6	2.75	2.45	2.3	2.25	2.1
20	2.0	2.25	3.0	3.35	5.0	4.3	3.6	2.75	2.45	2.3	2.25	2.1
21	2.05	2.3	3.1	3.2	5.3	4.25	3.6	2.75	2.4	2.3	2.25	2.1
22	2.0	2.35	2.95	3.1	5.3	4.2	3.5	2.75	2.4	2.3	2.2	2.1
23	2.0	2.35	3.0	3.1	5.3	4 2	3 4	2.75	2.4	2.3	2.2	2.25
24	2.0	2.25	2.85	3.1	5.4	4.2	3.4	2.7	2.4	2.35	2.2	2.25
25	2.05	2.25	2.75	3.1	5.0	4.15	3.4	2.7	2.4	2.35	2.2	2.2
26	2.1	2.3	2.7	3.15	4.7	4.15	3.4	2.65	2.4	2.35	2.25	2.2
27	2.1	2.3	2.6	3.2	4.1	4.15	3.2	2.65	2.4	2.35	2.25	2.2
28	2.15	2.3	2.65	3.3	4.1	4.15	3.1	2.65	2.4	2.4	2.25	2.2
29	2.1	.....	2.6	3.35	4.3	4.15	3.1	2.65	2.4	2.4	2.2	2.15
30	2.1	.....	2.4	3.3	4.1	4.15	3.1	2.65	2.5	2.4	2.2	2.2
31	2.1	.....	2.6	.....	4.3	.....	3.2	2.65	.....	2.4	.....	2.15
1908.												
1	2.15	2.0	2.0	2.0	2.3	2.7	3.0	2.3	2.1	2.15	2.05	2.0
2	2.15	2.0	2.0	2.0	2.3	2.7	2.95	2.3	2.1	2.1	2.05	1.9
3	2.1	2.0	2.1	2.0	2 3	2.7	2.9	2.25	2.1	2.1	2.0	2.1
4	2.15	2.15	2.15	2.0	2.3	2.7	2.9	2.25	2.05	2.15	1.95	2.0
5	2.1	2.1	2.1	2.0	2.4	2.7	2.85	2.25	2.05	2.1	2.0	2.1
6	2.1	2.1	2.0	2.05	2.5	2.7	2.8	2.3	2.05	2.1	2.0	1.9
7	2.15	2.0	2.0	2.1	2.7	2.75	2.8	2.3	2.05	2.1	2.0	2.1
8	2.15	2.05	2.0	2.1	2.8	2.75	2.75	2.25	2.05	2.1	2.0	2.0
9	2.15	2.05	2.0	2.1	2.8	2.85	2.75	2.25	2.05	2.1	1.9	1.9
10	2.15	2.15	2.0	2.1	2.8	2.9	2.7	2.2	2.0	2.1	1.85	2.0
11	2.15	2.15	2.0	2.15	2.6	3.05	2.65	2.2	2.0	2.1	2.0	1.9
12	2.15	2.15	2.0	2.2	2.6	3.1	2.6	2.2	2.0	2.1	2.0	1.9
13	2.15	2.0	2.0	2.3	2.6	3.15	2.6	2.2	2.0	2.1	2.05	2.0
14	2.15	2.0	2.0	2.35	2.6	3.2	2.55	2.2	2.0	2.1	1.85	1.9
15	2.15	2.0	2.0	2.4	2.55	3.3	2.55	2.2	2.0	2.1	1.95	1.9
16	2.15	2.1	2.1	2.4	2.6	3.35	2.5	2.15	2.0	2.1	1.95	1.9
17	2.15	2.1	2.15	2.45	2.6	3.4	2.5	2.15	2.0	2.1	1.95	1.9
18	2.15	2.1	2.2	2.5	2.5	3.45	2.5	2.15	2.0	2.1	2.15	1.9
19	2.15	2.1	2.15	2.5	2.6	3.45	2.45	2.15	2.1	2.1	2.13	1.9
20	2.15	2.15	2.15	2.6	2.7	3.4	2.4	2.15	2.1	2.1	2.05	1.9
21	2.15	2.15	2.15	2.7	2.6	3.2	2.4	2.15	2.1	2.15	2.05	1.85
22	2.15	2.05	2.15	2.75	2.6	3.1	2.35	2.15	2.1	2.15	2.05	1.85
23	2.15	2.05	2.15	2.75	2.7	3.0	2.35	2.15	2.2	2.05	2.0	1.85
24	2.15	2.1	2.15	2.6	2.7	3.5	2.35	2.15	2.2	2.05	2.05	1.8
25	2.15	2.1	2.05	2.5	2.7	3.1	2.35	2.15	2.1	2.05	2.05	1.8
26	2.15	2.1	2.1	2.45	2.65	3.1	2.3	2.1	2.1	2.1	2.0	1.9
27	2.15	2.15	2.1	2.4	2.65	3.15	2.3	2.1	2.1	2.1	2.0	1.9
28	2.15	2.15	2.0	2.3	2.65	3.1	2.3	2.1	2.1	2.15	2.05	1.9
29	2.1	2.15	2.0	2.3	2.7	3.5	2.3	2.1	2.1	2.05	2.0	1.9
30	2.1	.....	2.0	2.3	2.7	3.0	2.3	2.1	2.1	2.05	2.0	1.9
31	2.1	.....	2.0	.....	2.75	.....	2.3	2.1	.....	2.05	.....	1.9

Rating tables for Logan River near Logan, Utah.

JANUARY 1 TO MAY 23, 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.60	50	2.10	190	2.50	380	2.90	660
1.70	70	2.20	230	2.60	440	3.00	740
1.80	94	2.30	274	2.70	510	3.10	820
1.90	122	2.40	324	2.80	585	3.20	905
2.00	154						

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during 1906, and is well defined between gage heights 1.8 feet and 2.8 feet.

Rating tables for Logan River near Logan, Utah—Continued.

MAY 24, 1906, TO APRIL 15, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.90	64	2.40	212	2.90	490	3.40	870
2.00	84	2.50	256	3.00	560	3.50	950
2.10	110	2.60	305	3.10	635	3.60	1,030
2.20	138	2.70	360	3.20	710	3.70	1.115
2.30	172	2.80	420	3.30	790	3.80	1.200

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during 1906, and is well defined between gage heights 2.5 feet and 3.4 feet.

APRIL 16 TO OCTOBER 31, 1907.

[Daily discharges obtained by indirect method for shifting channels.]

NOVEMBER 1, 1907, TO JUNE 20, 1908.

2.00	115	2.50	315	2.90	560	3.30	850
2.10	145	2.60	370	3.00	630	3.40	930
2.20	180	2.70	430	3.10	700	3.50	1,015
2.30	220	2.80	495	3.20	775	3.60	1,100
2.40	265						

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 1 discharge measurement made during 1907 and the form of the other curves, and is fairly well defined.

JUNE 21, 1908, TO DECEMBER 31, 1908.

1.80	55	2.30	205	2.80	455	3.20	725
1.90	75	2.40	245	2.90	520	3.30	800
2.00	100	2.50	290	3.00	585	3.40	875
2.10	130	2.60	340	3.10	655	3.50	950
2.20	165	2.70	395				

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1908-9, and is fairly well defined.

Daily discharge, in second-feet, of Logan River near Logan, Utah, for 1907.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	.....	635	1,640	1,200	543	314	263
2	.....	672	1,730	1,160	520	333	280
3	.....	635	2,150	1,200	474	297	266
4	.....	672	2,200	1,240	474	297	243
5	.....	635	2,250	1,160	520	314	246
6	.....	525	2,250	1,120	474	297	246
7	.....	560	2,350	990	474	297	246
8	.....	598	2,450	1,030	432	280	246
9	.....	598	2,150	1,030	474	280	246
10	.....	560	2,150	1,070	432	280	246
11	.....	598	1,910	1,030	411	280	246
12	.....	710	1,910	950	411	280	246
13	.....	750	1,820	1,030	390	280	263
14	.....	560	1,550	990	390	263	246
15	.....	560	1,550	870	390	263	231
16	990	790	1,420	830	390	263	231
17	1,110	790	1,330	672	390	263	231
18	990	1,290	1,330	750	371	263	216
19	910	1,820	1,240	750	371	263	216
20	790	2,100	1,240	750	371	263	216
21	672	2,350	1,200	750	371	246	216
22	598	2,350	1,160	718	371	246	216
23	598	2,350	1,120	666	371	246	216
24	598	2,450	1,120	666	352	246	231
25	598	2,050	1,070	666	352	246	231
26	598	1,780	1,070	666	333	246	231
27	635	1,240	1,070	566	333	246	231
28	710	1,200	1,070	520	333	246	246
29	710	1,370	1,070	520	333	246	246
30	710	1,200	1,120	520	333	280	246
31	.....	1,370	.....	566	333	.....	246

NOTE.—These discharges were obtained by the indirect method for shifting channels.

Monthly discharge of Logan River near Logan, Utah, for 1906.

[Drainage area, 218 square miles.]

Month.	Discharge in second-feet.						Run-off.		Accuracy.
	River.			Canal (mean).	Total (mean).	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
	Maximum.	Minimum.	Mean.						
January	183	70	105	16.4	121	0.555	0.64	7,440	A.
February	111	62	97.4	15.3	113	.518	.54	6,280	A.
March	154	77	103	8.41	111	.509	.59	6,820	A.
April	410	108	267	8.45	275	1.26	1.41	16,400	A.
May	1,200	352	754	13.7	768	3.52	4.06	47,200	B.
June	1,030	658	868	39.8	908	4.17	4.65	54,000	B.
July	635	234	389	87.3	476	2.18	2.51	29,300	A.
August	476	155	209	58.1	267	1.22	1.41	16,400	A.
September	184	132	157	24.9	182	.835	.93	10,800	B.
October	256	84	129	11.1	140	.642	.74	8,610	B.
November	172	64	110	13.2	123	.564	.63	7,320	C.
December	138	110	123	13.0	136	.624	.72	8,360	C.
The year	1,200	62	276	25.8	302	1.38	18.83	219,000	

NOTE.—These discharges supersede those published in Water-Supply Paper 212, p. 27. Five second-feet have been deducted from the discharge of the canal, November 14 to 20, and 27 to December 31, this amount having been spilled into the river below the station on the canal and above the station on the river. Discharge measurements and gage heights for 1906 are given in Water-Supply Paper 212, pp. 26–27.

Monthly discharge of Logan River near Logan, Utah, for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
January	138	74	108	6,640	C.
February	192	84	152	8,440	C.
March	635	97	247	15,200	B.
April	1,110	256	656	39,000	B.
May	2,450	525	1,150	70,700	C.
June	2,450	1,070	1,590	94,600	C.
July	1,240	520	860	52,900	B.
August	543	333	404	24,800	B.
September	333	246	272	16,200	B.
October	280	216	240	14,800	B.
November	265	180	206	12,300	B.
December	200	145	172	10,600	B.
The year	2,450	74	505	366,000	
1908.					
January	162	145	159	9,780	B.
February	162	115	141	8,110	B.
March	180	115	135	8,300	B.
April	462	115	239	14,200	B.
May	495	220	374	23,000	B.
June	972	430	671	39,900	B.
July	585	205	331	20,400	A.
August	205	130	161	9,900	A.
September	165	100	120	7,140	B.
October	148	115	130	7,990	B.
November	148	65	103	6,130	B.
December	130	55	82.1	5,050	C.
The year	972	55	221	160,000	

NOTE.—These discharges do not include the flow of the Logan, Hyde Park, and Smithfield canal, which diverts water past the station. The records on the canal for 1904 to 1907 give an approximate idea of the amount of diversion for other years. (See p. 45.)

LOGAN, HYDE PARK, AND SMITHFIELD CANAL NEAR LOGAN, UTAH.

This canal diverts water for irrigation and domestic use in the three towns. Records are fragmentary. Gage heights are available for parts of 1904 and 1905, for the entire year 1906, and for part of 1907.

The channel is permanent, however, and a rating curve has been developed from measurements made in 1909. These discharges, so far as are available, have been added to those at the station on Logan River at the mouth of the canyon in order to determine the total flow of the river.

The gage in the canal is above a spillway which discharges into the river above the station. The amount spilled has usually been estimated by the observer and has been deducted from the total discharge obtained as indicated above.

Discharge measurements of Logan, Hyde Park, and Smithfield canal near Logan, Utah, in 1905 and 1909.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
1905.					
August 24	W. D. Beers	10.0	14.0	4.50	31
1909.					
May 5	E. S. Fuller	9.5	6.0	3.90	10.4
June 12	do	10.8	18.2	5.10	60
July 17	do	10.5	22.8	5.55	87

Daily gage height, in feet, of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for 1906 and 1907.

[Telluride Power Company, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.[a]												
1	4.00	4.09	3.90	3.65	3.79	4.15	5.35	5.50	4.35	4.30	4.00	4.15
2	4.00	4.10	3.75	3.68	3.78	4.30	5.30	5.50	4.35	4.25	4.10	4.15
3	4.00	4.08	3.70	3.70	3.78	4.40	5.30	5.50	4.35	4.30	4.00	4.15
4	4.05	4.05	3.72	3.73	3.78	4.42	5.40	5.50	4.35	4.25	4.00	4.15
5	4.30	4.05	3.75	3.73	3.79	4.42	5.40	5.48	4.35	4.12	4.10	4.15
6	4.20	4.08	3.75	3.73	3.79	4.43	5.45	5.48	4.35	4.05	3.90	4.15
7	4.20	4.00	3.75	3.73	3.45	4.42	5.50	5.48	4.35	4.10	4.10	4.15
8	4.00	4.05	3.73	3.75	.....	4.43	5.60	5.40	4.35	4.20	4.10	4.15
9	4.10	4.08	3.72	3.75	.....	4.50	5.60	5.40	4.35	4.10	4.05	4.15
10	4.30	4.08	3.65	3.80	.....	4.52	5.65	5.40	4.40	4.10	4.00	4.15
11	4.30	4.08	3.60	3.75	3.90	4.55	5.65	5.40	4.40	4.05	4.05	4.15
12	4.30	4.08	3.50	3.75	3.90	4.52	5.65	5.35	4.40	4.10	4.00	4.15
13	4.30	4.08	4.15	3.75	3.98	4.60	5.60	5.35	4.40	4.10	4.10	4.15
14	4.30	4.08	3.80	3.90	4.00	4.60	5.65	3.50	4.40	4.20	4.10	4.15
15	3.50	4.12	3.81	3.90	3.95	4.67	5.75	5.30	4.40	3.50	4.00	4.15
16	4.05	4.10	3.75	3.85	3.95	4.75	5.75	5.30	4.40	3.50	4.10	4.15
17	4.05	4.07	3.85	3.85	3.90	4.70	5.65	5.30	4.40	3.60	4.00	4.15
18	4.27	4.15	3.90	3.87	3.89	4.65	5.65	5.30	4.40	3.60	3.90	4.15
19	4.27	4.15	3.90	3.85	3.90	4.60	5.65	5.30	4.40	4.00	4.10	4.15
20	4.14	4.07	3.90	3.85	3.93	4.58	5.60	5.35	4.40	3.00	4.00	4.15

[a] These gage heights were omitted from the 1906 report, as not enough measurements were available at that time for constructing a rating.

Daily gage height, in feet, of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for 1906 and 1907—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
21	4.03	4.10	3.88	3.85	3.95	4.70	5.60	5.35	4.40	3.00	4.00	4.15
22	4.02	4.10	3.90	3.87	4.40	4.75	5.60	4.05	4.40	3.50	4.05	4.15
23	4.15	4.10	3.92	3.87	4.40	4.70	5.60	4.40	4.40	3.30	4.10	4.15
24	4.08	4.08	3.94	3.87	4.47	4.65	5.60	4.35	4.45	3.40	4.15	4.15
25	4.05	4.08	3.90	3.89	4.40	4.90	5.55	4.35	4.40	3.50	4.15	4.15
26	4.05	4.09	3.90	3.89	4.78	4.90	5.55	4.35	4.35	3.70	4.20	4.15
27	4.03	4.08	3.90	3.87	4.50	5.40	5.55	4.35	4.30	3.60	4.20	4.15
28	4.03	4.01	3.90	3.87	4.10	5.50	5.50	4.35	4.28	4.00	4.15	4.15
29	4.03	.....	3.50	3.85	4.10	5.30	5.50	4.35	4.28	4.00	4.15	4.15
30	4.02	.....	3.65	3.78	4.05	5.35	5.50	4.35	4.30	3.80	4.15	4.15
31	4.05	.....	3.55	.....	4.10	.....	5.50	4.35	.....	3.70	.....	4.15
1907.												
1	4.15	4.15	.....	3.6	4.0	4.6	.....	.....	.....	.....	.....	.....
2	4.15	4.2	.....	3.65	4.1	4.6	.....	.....	.....	.....	.....	.....
3	4.15	4.2	.....	3.6	4.2	4.45	.....	.....	.....	.....	.....	.....
4	4.15	4.2	.....	3.65	4.15	4.5	.....	.....	.....	.....	4.5	.....
5	4.15	4.3	.....	3.6	4.2	4.3	.....	.....	.....	.....	.....	.....
6	4.15	4.3	.....	3.65	4.2	4.3	.....	.....	.....	.....	.....	.....
7	4.15	4.3	.....	3.65	4.2	4.3	.....	.....	.....	.....	.....	.....
8	4.15	4.3	.....	3.8	4.2	4.4	.....	.....	.....	.....	.....	.....
9	4.15	4.1	.....	3.9	4.15	4.5	.....	.....	.....	.....	.....	4.3
10	4.15	4.1	.....	3.9	4.3	4.2	.....	.....	.....	.....	.....	.....
11	4.15	4.1	.....	.....	4.1	4.3	.....	.....	.....	.....	.....	.....
12	4.15	4.1	.....	3.6	4.3	3.9	.....	.....	.....	.....	.....	.....
13	4.15	4.05	.....	3.7	4.7	4.0	.....	.....	.....	.....	.....	.....
14	4.1	4.1	.....	3.6	4.5	3.9	.....	.....	.....	.....	.....	.....
15	4.15	4.0	.....	3.8	4.5	3.9	.....	.....	.....	.....	4.4	.....
16	4.15	4.0	.....	4.0	4.3	.....	.....	.....	.....	.....	.....	.....
17	4.15	3.95	.....	4.1	4.5	.....	.....	.....	.....	.....	.....	.....
18	4.15	4.0	.....	4.2	4.5	.....	.....	.....	.....	.....	.....	.....
19	4.15	4.15	.....	4.0	4.6	.....	.....	.....	.....	.....	.....	4.3
20	4.1	4.1	.....	4.15	4.7	.....	.....	.....	.....	.....	.....	.....
21	4.2	4.15	.....	4.2	4.7	.....	.....	.....	.....	.....	.....	.....
22	4.0	4.1	.....	4.1	4.8	.....	.....	.....	.....	.....	.....	.....
23	4.1	4.15	.....	4.0	4.6	.....	.....	.....	.....	4.5	.....	.....
24	4.1	.....	.....	4.2	4.6	.....	.....	.....	.....	.....	.....	.....
25	4.1	.....	.....	4.3	4.7	.....	.....	.....	.....	.....	.....	.....
26	4.1	.....	.....	4.2	4.5	.....	.....	.....	.....	.....	.....	4.3
27	4.15	.....	.....	3.7	4.3	.....	.....	.....	.....	.....	.....	.....
28	4.15	.....	.....	3.8	4.6	.....	.....	.....	.....	.....	.....	.....
29	4.2	.....	.....	3.9	4.5	.....	.....	.....	.....	.....	4.3	.....
30	4.15	.....	.....	4.0	4.3	.....	.....	.....	.....	.....	.....	.....
31	4.15	.....	.....	.....	4.6	.....	.....	.....	.....	.....	.....	.....

Rating table for Logan, Hyde Park, and Smithfield canal near Logan, Utah, for 1904 to 1909.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.00	0	3.80	8.2	4.60	35	5.40	78
3.10	.3	3.90	10.4	4.70	39	5.50	84
3.20	.9	4.00	13	4.80	44	5.60	90
3.30	1.6	4.10	16	4.90	49	5.70	96
3.40	2.5	4.20	19	5.00	54	5.80	102
3.50	3.6	4.30	23	5.10	60	5.90	109
3.60	4.8	4.40	27	5.20	66	6.00	116
3.70	6.4	4.50	31	5.30	72		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 1 discharge measurement made during 1905, 3 during 1909, and the point of zero discharge, and is well defined.

Monthly discharge of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for 1904 to 1907.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1904.[a]					
June 4–30	109	60	87.6	4,690	B.
July	109	96	105	6,460	B.
August	109	78	95.9	5,900	B.
September 1–10	84	78	79.2	1,570	B.
1905.					
September 17–23	30	29	29.3	407	B.
1906.					
January	23	3.6	16.4	1,010	B.
February	18	13	15.3	850	B.
March	18	3.6	8.41	517	C.
April	10.4	5.6	8.45	503	C.
May	43	3	13.7	842	B.
June	84	18	39.8	2,370	B.
July	99	72	87.3	5,370	B.
August	84	3.6	58.1	3,570	B.
September	29	22	24.9	1,480	B.
October	23	0	11.1	682	B.
November	19	10.4	15.1	898	B.
December	18	18	18.0	1,110	B.
The year	99	0	26.4	19,200	
1907.					
January	19	13	17.5	1,080	B.
February 1–23	23	11.7	17.3	789	B.
April	23	0	10.5	625	C.
May	44	13	27.5	1,690	B.
June 1–15	35	10.4	22.9	681	B.
October 24–31	.....	.....	31.0	492	C.
November	.....	.....	27.0	1,610	C.
December	.....	.....	23.0	1,410	C.

[a] Gage heights for 1904 are given in Water-Supply Paper 133, p. 248, for September 17 to 23, 1905; they ranged from 4.45 to 4.47. This is the only portion of 1905 for which records are available.

NOTE.—Water was spilled from the canal below the gage into the river above the station on the latter, as follows: November 14 to 20, and November 27 to December 31, 1906, 5 second-feet; January 1 to May 31, 1907, 2 to 7.5 second-feet; August 26 to December 31, 1907, 1 to 10 second-feet. These figures are very uncertain, as they were only estimated by the observer.

BLACKSMITH FORK AND POWER-PLANT RACE 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 station on Blacksmith Fork was established July 19, 1900, near the tollgate in the mouth of the canyon near Hyrum, Utah, and was discontinued December 31, 1902. It was reestablished May 16, 1904, about 1,000 feet farther downstream, 800 feet above the Hyrum city power plant and 500 feet below the intake of the power canal or race.

A station was established on the power-plant race on the same date, to determine the amount diverted past the station on the river. The combined records show the total supply in Blacksmith Fork above diversions for irrigation.

Ice does not form at either gage, and conditions at both stations are good, although the channel of the river shifts slightly at high stages, owing to the very swift current.

Discharge measurements of Blacksmith Fork near Hyrum, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq.ft.*	*Feet.*	*Sec.-ft.*
May 22	G. T. Burridge	56	134	5.90	1,110
June 8	do	54	111	5.40	719
June 25	do	43	78	4.65	346
July 20	do	43	60	4.40	229
August 13	La Rue and Burridge	43	59	4.30	185
1908.					
July 23	A. D. Williams	38	32	3.60	64

Daily gage height, in feet, of Blacksmith Fork near Hyrum, Utah, for 1907 and 1908.

[Uriah Benson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	3.4	3.6	3.6	4.1	5.6	5.6	4.6	4.3	4.2	4.1	4.0	3.8
2	3.4	3.6	3.6	4.3	5.6	5.5	4.6	4.3	4.2	4.1	4.0	3.8
3	3.4	3.6	3.7	4.5	5.6	5.6	4.6	4.3	4.2	4.1	4.0	3.8
4	3.4	3.6	3.6	4.5	5.6	5.6	4.6	4.3	4.2	4.1	4.0	3.8
5	3.4	3.6	3.6	4.5	5.6	5.6	4.5	4.3	4.2	4.1	4.0	3.8
6	3.4	3.9	3.6	4.6	5.6	5.6	4.5	4.3	4.2	4.1	4.0	3.8
7	3.4	4.1	3.6	4.4	5.5	5.5	4.5	4.3	4.2	4.1	4.0	3.8
8	3.4	4.1	3.7	5.1	5.4	5.5	4.5	4.3	4.2	4.1	4.0	3.8
9	3.4	4.1	3.7	4.9	5.4	5.4	4.6	4.3	4.2	4.0	4.0	3.8
10	3.4	3.7	3.6	5.1	5.4	5.4	4.6	4.3	4.2	4.0	4.0	3.8
11	3.4	3.7	3.7	5.4	5.8	5.5	4.6	4.3	4.2	4.0	4.0	3.8
12	3.4	3.7	3.7	5.6	5.9	5.5	4.6	4.3	4.2	4.0	4.0	3.8
13	3.4	3.6	3.7	5.7	5.8	5.6	4.6	4.3	4.2	4.0	4.0	3.8
14	3.4	3.6	3.6	5.8	5.8	5.6	4.6	4.3	4.2	4.0	4.0	3.8
15	3.4	3.6	3.6	6.2	5.4	5.7	4.5	4.3	4.2	4.0	4.0	3.8
16	3.4	3.5	3.6	6.8	5.4	5.7	4.5	4.3	4.2	4.0	4.0	3.8
17	3.4	3.5	3.7	5.9	5.7	5.7	4.5	4.3	4.2	4.0	4.0	3.8
18	3.4	3.5	3.9	5.9	5.8	5.5	4.5	4.3	4.2	4.0	4.0	3.8
19	3.4	3.5	4.4	5.8	5.8	5.4	4.5	4.3	4.2	4.0	4.0	3.8
20	3.4	3.6	4.4	5.2	6.3	5.4	4.5	4.3	4.2	4.0	4.0	3.8
21	3.4	3.6	4.4	5.3	6.4	5.3	4.5	4.3	4.2	4.0	4.0	3.8
22	3.4	3.7	4.4	5.4	6.5	5.3	4.5	4.3	4.2	4.0	4.0	3.8
23	3.4	3.8	4.4	5.4	5.9	5.3	4.5	4.3	4.2	4.0	4.0	3.8
24	3.4	3.7	3.9	5.4	5.8	4.9	4.5	4.3	4.2	4.0	3.8	3.8
25	3.4	3.7	3.8	5.4	5.8	4.9	4.5	4.3	4.2	4.0	3.8	3.8
26	3.4	3.8	3.8	5.6	5.8	4.8	4.6	4.3	4.2	4.0	3.8	3.8
27	3.4	3.7	3.7	5.6	5.8	4.8	4.6	4.3	4.2	4.0	3.8	3.8
28	3.4	3.6	3.7	5.7	5.9	4.7	4.5	4.3	4.2	4.0	3.8	3.8
29	3.4	.....	3.9	5.7	5.9	4.7	4.5	4.3	4.2	4.0	3.8	3.8
30	3.4	.....	3.8	5.6	5.8	4.7	4.5	4.2	4.2	4.0	3.8	3.8
31	3.6	.....	3.6	.....	5.8	.....	4.5	4.2	.....	4.0	.....	3.8
1908.												
1	3.7	3.6	3.7	3.7	3.9	3.8	3.7	3.6	3.6	3.5	3.4	3.5
2	3.7	3.7	3.7	3.7	3.9	3.8	3.7	3.6	3.6	3.6	3.4	3.5
3	3.7	3.7	3.7	3.7	3.9	3.8	3.7	3.6	3.6	3.6	3.4	3.5
4	3.7	3.7	3.7	3.6	3.9	3.8	3.7	3.6	3.6	3.6	3.4	3.5
5	3.7	3.7	3.7	3.6	3.8	3.8	3.7	3.6	3.6	3.6	3.4	3.5
6	3.7	3.7	3.7	3.6	3.8	3.8	3.7	3.6	3.6	3.6	3.4	3.5
7	3.7	3.7	3.7	3.6	3.8	3.8	3.7	3.6	3.6	3.6	3.4	3.5
8	3.8	3.7	3.7	3.6	3.8	3.8	3.7	3.6	3.6	3.5	3.4	3.5
9	3.8	3.7	3.7	3.7	3.8	3.8	3.7	3.6	3.6	3.5	3.4	3.5
10	3.8	3.7	3.7	3.7	3.8	3.8	3.7	3.6	3.6	3.5	3.4	3.5

Daily gage height, in feet, of Blacksmith Fork near Hyrum, Utah, for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
11	3.8	3.7	3.7	3.8	3.8	3.8	3.7	3.6	3.6	3.5	3.4	3.5
12	3.8	3.7	3.7	3.8	3.8	3.9	3.7	3.6	3.6	3.5	3.4	3.5
13	3.8	3.7	3.7	3.8	3.7	3.9	3.7	3.6	3.6	3.5	3.4	3.5
14	3.8	3.7	3.7	3.8	3.7	3.9	3.7	3.6	3.6	3.5	3.4	3.5
15	3.8	3.7	3.7	3.9	3.7	3.9	3.7	3.6	3.6	3.5	3.4	3.4
16	3.8	3.7	3.7	3.9	3.7	3.9	3.7	3.6	3.6	3.5	3.4	3.4
17	3.8	3.7	3.7	3.9	3.7	3.9	3.7	3.6	3.5	3.5	3.5	3.4
18	3.8	3.7	3.7	3.9	3.7	3.9	3.7	3.6	3.5	3.5	3.5	3.4
19	3.8	3.7	3.7	3.9	3.8	4.1	3.6	3.6	3.5	3.5	3.5	3.4
20	3.8	3.7	3.7	3.9	3.8	4.1	3.6	3.6	3.5	3.4	3.5	3.4
21	3.8	3.7	3.7	3.9	3.8	3.9	3.6	3.6	3.5	3.4	3.5	3.3
22	3.8	3.7	3.7	3.9	3.8	3.9	3.6	3.6	3.5	3.4	3.5	3.3
23	3.8	3.7	3.7	3.9	3.8	3.9	3.6	3.6	3.5	3.4	3.5	3.3
24	3.8	3.7	3.7	3.9	3.8	3.8	3.6	3.6	3.5	3.4	3.5	3.3
25	3.8	3.7	3.7	3.9	3.8	3.8	3.6	3.6	3.5	3.4	3.5	3.3
26	3.8	3.7	3.7	3.9	3.8	3.8	3.6	3.6	3.5	3.4	3.5	3.3
27	3.8	3.7	3.7	3.9	3.8	3.8	3.6	3.6	3.5	3.4	3.5	3.3
28	3.8	3.7	3.7	3.9	3.8	3.7	3.6	3.6	3.5	3.4	3.5	3.3
29	3.8	3.7	3.7	3.9	3.8	3.7	3.6	3.6	3.5	3.4	3.5	3.3
30	3.6	.....	3.7	3.9	3.8	3.7	3.6	3.6	3.5	3.4	3.5	3.3
31	3.6	.....	3.7	.....	3.8	.....	3.6	3.6	.....	3.4	.....	3.3

NOTE.—Ice does not form in sufficient quantities to interfere with the discharge.

Rating tables for Blacksmith Fork near Hyrum, Utah.

JANUARY 1, 1907, TO APRIL 15, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.40	42	4.20	224	5.00	622	5.80	1,164
3.50	57	4.30	260	5.10	684	5.90	1,244
3.60	75	4.40	302	5.20	746	6.00	1,326
3.70	94	4.50	350	5.30	810	6.10	1,410
3.80	115	4.60	398	5.40	876	6.20	1,496
3.90	138	4.70	448	5.50	944		
4.00	163	4.80	502	5.60	1,014		
4.10	192	4.90	560	5.70	1,088		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 7 discharge measurements made during 1905–1907 and the form of the later curve, and is well defined below gage height 4.1 feet. Below 4.0 feet it is the same as the 1906 table.

APRIL 16, 1907, TO JUNE 19, 1908.

3.60	44	4.50	268	5.40	724	6.30	1,410
3.70	58	4.60	310	5.50	792	6.40	1,490
3.80	75	4.70	354	5.60	864	6.50	1,570
3.90	95	4.80	400	5.70	940	6.60	1,650
4.00	116	4.90	448	5.80	1,018	6.70	1,730
4.10	140	5.00	498	5.90	1,096	6.80	1,810
4.20	166	5.10	550	6.00	1,174		
4.30	194	5.20	604	6.10	1,252		
4.40	228	5.30	662	6.20	1,330		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during the latter part of 1907 and the form of the previous curve for low water, and is fairly well defined.

JUNE 20, 1908, TO DECEMBER 31, 1908.

3.30	23	3.60	64	3.80	102	4.00	150
3.40	35	3.70	84	3.90	124	4.10	178
3.50	48						

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during 1908–9, and is well defined between gage heights 3.6 feet and 4.4 feet.

Discharge measurements of Blacksmith Fork power-plant race near Hyrum, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 24	G. T. Burridge	13.3	29	4.90	95
June 8	do	13.8	28	4.88	85
June 25	do	12.8	23	4.70	73
July 20	do	12.1	21	4.47	56
August 13	La Rue and Burridge	13.6	27	4.85	79
1908.					
July 23	A. D. Williams	14	28	4.90	92

Daily gage height, in feet, of Blacksmith Fork power-plant race near Hyrum, Utah, for 1907 and 1908.

[Uriah Benson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	4.7	4.9	4.9	4.9	4.8	4.7	4.6	4.9	4.7	4.6	4.6	4.9
2	4.7	4.9	4.9	4.9	4.8	4.8	4.6	4.9	4.7	4.6	4.6	4.9
3	4.7	4.9	4.9	4.9	4.8	4.8	4.6	4.9	4.7	4.6	4.6	4.9
4	4.7	4.9	4.9	4.9	4.8	4.9	4.6	4.9	4.7	4.6	4.6	4.9
5	4.7	4.9	4.9	4.9	4.8	4.9	4.6	4.9	4.7	4.6	4.6	4.9
6	4.7	5.1	4.9	4.9	4.8	4.9	4.6	4.8	4.7	4.6	4.6	4.9
7	4.7	5.1	4.9	4.9	4.7	4.9	4.6	4.8	4.7	4.6	4.6	4.9
8	4.7	5.1	4.9	4.9	4.7	4.9	4.6	4.8	4.7	4.6	4.6	4.9
9	4.7	4.9	4.9	4.9	4.7	4.8	4.6	4.8	4.7	4.7	4.6	4.9
10	4.7	4.9	4.9	4.9	4.7	4.9	4.6	4.8	4.7	4.7	4.6	4.9
11	4.7	4.9	4.9	4.9	4.8	4.8	4.6	4.8	4.7	4.7	4.6	4.9
12	4.7	4.9	4.9	4.9	4.9	4.7	4.6	4.8	4.7	4.7	4.6	4.9
13	4.7	4.9	4.9	4.9	4.8	4.7	4.6	4.8	4.7	4.7	4.6	4.9
14	4.7	4.9	4.9	4.9	4.7	4.7	4.5	4.8	4.7	4.7	4.6	4.9
15	4.7	4.9	4.9	4.9	4.7	4.7	4.5	4.8	4.7	4.7	4.6	4.9
16	4.7	4.9	4.9	4.9	4.7	4.7	4.7	4.8	4.7	4.7	4.6	4.9
17	4.7	4.9	4.9	4.8	4.8	4.8	4.7	4.8	4.7	4.7	4.6	4.9
18	4.7	4.9	4.9	4.8	4.8	4.8	4.7	4.8	4.7	4.7	4.6	4.9
19	4.7	4.9	4.9	4.8	4.9	4.8	4.7	4.8	4.7	4.7	4.6	4.9
20	4.7	4.9	4.9	4.8	4.9	4.8	4.7	4.8	4.7	4.7	4.6	4.9
21	4.7	4.9	4.9	4.6	4.9	4.8	4.6	4.8	4.6	4.7	4.6	4.9
22	4.7	4.9	4.9	4.6	4.9	4.8	4.6	4.8	4.6	4.7	4.6	4.9
23	4.7	4.9	4.9	4.7	4.9	4.8	4.5	4.8	4.6	4.7	4.6	4.9
24	4.7	4.9	4.9	4.7	4.9	4.7	4.5	4.8	4.6	4.7	4.9	4.9
25	4.7	4.9	4.9	4.7	4.9	4.7	4.5	4.8	4.6	4.7	4.9	4.9
26	4.7	4.9	4.9	4.9	4.9	4.7	4.5	4.8	4.6	4.7	4.9	4.9
27	4.7	4.9	4.9	4.9	4.9	4.7	4.5	4.8	4.6	4.7	4.9	4.9
28	4.7	4.9	4.9	4.9	4.9	4.6	4.5	4.8	4.6	4.7	4.9	4.9
29	4.7	.....	4.9	4.9	4.8	4.6	4.5	4.8	4.6	4.7	4.9	4.9
30	4.7	.....	4.9	4.9	4.9	4.6	4.9	4.7	4.6	4.7	4.9	4.9
31	4.9	.....	4.9	.....	4.9	.....	4.9	4.7	.....	4.7	.....	4.9
1908.												
1	4.8	4.6	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9
2	4.8	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9
3	4.8	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9
4	4.8	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9
5	4.8	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
6	4.8	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
7	4.8	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
8	4.8	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
9	4.8	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
10	4.8	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
11	4.8	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
12	4.8	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9
13	4.8	4.6	4.8	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9
14	4.8	4.6	4.8	4.8	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.9
15	4.8	4.6	4.8	4.9	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.8
16	4.8	4.6	4.8	4.9	4.8	4.9	4.9	4.9	4.9	4.9	4.9	4.8
17	4.7	4.6	4.8	4.9	4.8	4.9	4.9	4.9	4.8	4.9	4.9	4.7
18	4.7	4.6	4.8	4.9	4.8	4.9	4.9	4.9	4.8	4.9	4.9	4.6
19	4.7	4.6	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.5
20	4.7	4.6	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.5

Daily gage height, in feet, of Blacksmith Fork power-plant race near Hyrum, Utah, for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
21	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.4
22	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
23	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
24	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
25	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
26	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
27	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
28	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
29	4.7	4.7	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
30	4.6	.....	4.8	4.8	4.9	4.9	4.9	4.9	4.8	4.9	4.9	4.9
31	4.6	.....	4.8	.....	4.9	.....	4.9	4.9	.....	4.9	.....	4.9

Rating table for Blacksmith Fork power-plant race near Hyrum, Utah, for 1905 to 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.40	51	4.60	66	4.80	80	5.00	96
4.50	58	4.70	73	4.90	88	5.10	104

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 17 discharge measurements made during 1904 to 1908, and is well defined.

Monthly discharge of Blacksmith Fork near Hyrum, Utah, for 1907 and 1908.

[Drainage area, 286 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.	
1907.							
January	163	115	117	0.409	0.47	7,190	B.
February	296	145	184	.643	.67	10,200	B.
March	390	163	215	.752	.87	13,200	B.
April	1,900	280	865	3.02	3.37	51,500	B.
May	1,660	797	1,070	3.74	4.31	65,800	B.
June	1,020	420	787	2.75	3.07	46,800	B.
July	376	326	350	1.22	1.41	21,500	B.
August	282	239	273	.955	1.10	16,800	B.
September	239	232	237	.829	.92	14,100	B.
October	206	189	193	.675	.78	11,900	B.
November	182	163	177	.619	.69	10,500	B.
December	163	163	163	.570	.66	10,000	B.
The year	1,900	115	386	1.35	18.32	279,000	
1908.							
January	155	110	145	0.507	0.58	8,920	B.
February	131	110	128	.448	.48	7,360	B.
March	138	131	136	.476	.55	8,360	B.
April	183	124	160	.559	.62	9,520	B.
May	175	138	160	.559	.64	9,840	B.
June	266	163	183	.640	.71	10,900	B.
July	172	152	164	.573	.66	10,100	B.
August	152	152	152	.531	.61	9,350	B.
September	152	128	141	.493	.55	8,390	B.
October	144	123	131	.458	.53	8,060	B.
November	136	123	129	.451	.50	7,680	B.
December	136	74	120	.420	.48	7,380	B.
The year	266	74	146	.509	6.91	106,000	

NOTE.—These are the combined discharges of Blacksmith Fork and the power-plant race, which together give the total flow of the river.

WEBER RIVER BASIN.

DESCRIPTION.

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

The upper portion of the basin is very rough. The highest peaks, reaching an elevation of about 13,000 feet, are masses of sandstone and quartzite, barren of vegetation and covered with snow for almost the entire year. Farther down the prevailing formation is limestone overlain with sandstone and conglomerate. A thin layer of soil covers the basin in patches and supports small groves of fir and aspen. 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. Numerous tributaries, all short and confined to steep, narrow canyons, enter all along the course.

Between Oakley and Croyden the river traverses a very narrow valley comprising irrigated farms. The principal rock formation over this area is of conglomerate and sandstone, with but little loose and porous overlying soil except near the stream bed, where the deposit of bowlders and soil varies from 10 to 20 feet in depth. The chief tributaries in this stretch of the river are Beaver Creek, which enters from the south about 6 miles below Oakley and drains a rough country about 71 square miles in extent; Chalk Creek, from the east, which drains a rough, dry country about 428 miles in area and enters the Weber 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 has a drainage area of 205 square miles.

Between Croyden and Plain City the stream flows in a well-defined channel through a comparatively narrow, steep canyon, with occasional stretches of valley containing irrigated farming lands. The rock is a porous and badly fissured sandstone and conglomerate, with but very little overlying soil. Near the mouth of the canyon the material is a very rough but compact limestone. East Creek, which enters near Morgan, discharges but little water into 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. After leaving the Wasatch Range the Weber enters Great Salt Lake valley, through which it flows in a well-defined channel with no overflow.

Ogden River joins the Weber about 8 miles above Plain City. It drains a rough and rugged limestone area, 363 square miles in ex-

tent, in 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 and Railway Company. 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 1907, when 1,270,000 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.

The gaging stations maintained in this basin are as follows:

Weber River near Oakley, Utah, 1904–1908.
Weber River near Croyden, Utah, 1905–1908.
Weber River near Uinta, Utah, 1889–1901, 1903.
Weber River near Plain City, Utah, 1903–1908.
Lost Creek near Croyden, Utah, 1905.
Chalk Creek at Coalville, Utah, 1904–5.
Ogden River at Ogden, Utah, 1895–1901.

WEBER RIVER NEAR OAKLEY, UTAH.

This station, which is located about 3 miles above Oakley, Utah, 200 feet south of the main canyon road, was established October 22, 1904, to determine the amount of water available for diversion through the low Kamas Pass into Provo River in connection with the Weber River project.

The station, which is about 6,600 feet above sea level, is below South Fork, above Beaver or Kamas Creek, and above all diversions to the Kamas prairie region.

The river is frozen two or three months during the winter, sometimes to a depth of nearly a foot, and occasionally forms jams when it goes out. Gage heights are also affected by slush and anchor ice. Fairly reliable estimates of discharge for the winter period can, however, be made by interpolating between days when open water is known to have existed, as the winter discharge varies little. The channel is permanent and records for the open-water periods are good.

Discharge measurements of Weber River near Oakley, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 26	G. T. Burridge	53	167	6.20	1,020
June 15	La Rue and Burridge	53	150	6.00	1,100
June 29	G. T. Burridge	58	206	7.00	1,850
July 23	do	51	139	5.80	690
August 17	La Rue and Burridge	47	85	4.70	190
1908.					
July 14	A. D. Williams	50	97	5.20	316

Daily gage height, in feet, of Weber River near Oakley, Utah, for 1907 and 1908.

[Elef Franson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	.....	.....	.....	4.4	5.35	6.6	8.0	5.25	4.55	4.3	4.2	4.25
2	4.15	4.15	4.15	4.45	5.35	6.7	8.0	5.2	4.55	4.3	4.2	4.2
3	.....	.....	.....	4.6	5.35	6.8	8.3	5.2	4.5	4.3	4.2	.....
4	.....	.....	.....	4.65	5.2	6.9	8.4	5.3	4.5	4.3	4.2	4.2
5	4.2	.....	.....	4.7	5.2	7.1	8.4	5.2	4.5	4.3	4.2	4.2
6	.....	4.15	4.1	4.6	5.2	7.1	8.5	5.25	4.5	4.3	4.2	4.2
7	.....	.....	.....	4.55	5.25	7.3	8.1	5.1	4.5	4.3	4.2	4.2
8	.....	.....	.....	4.55	5.25	7.0	7.5	5.05	4.45	4.3	4.2	4.2
9	4.2	4.15	4.1	4.65	5.3	6.7	7.5	4.9	4.45	4.3	4.2	4.2
10	.....	.....	.....	4.65	5.4	6.4	7.2	4.85	4.45	4.3	4.2	4.25
11	.....	.....	.....	4.7	5.6	6.4	7.0	4.8	4.4	4.3	4.2	4.25
12	4.4	.....	.....	4.8	5.8	6.8	6.8	4.75	4.4	4.3	4.2	4.25
13	.....	4.15	4.2	4.95	5.7	6.6	6.6	4.75	4.4	4.3	4.2	4.3
14	.....	.....	.....	5.7	5.6	6.4	6.6	4.75	4.4	4.3	4.15	4.3
15	.....	.....	.....	5.8	5.8	6.1	6.5	4.75	4.35	4.3	4.15	4.35
16	4.9	4.2	4.25	5.7	5.9	6.0	6.3	4.75	4.35	4.3	4.15	4.35
17	.....	.....	.....	5.55	6.05	6.0	6.2	4.75	4.3	4.3	4.15	4.5
18	.....	.....	.....	5.55	6.1	6.1	6.15	4.75	4.3	4.3	4.15	4.8
19	4.95	.....	.....	5.55	6.4	6.6	6.15	4.75	4.3	4.25	4.15	5.0
20	.....	4.15	4.5	5.15	6.7	6.8	6.1	4.75	4.3	4.25	4.2	5.0
21	.....	.....	.....	5.2	6.9	7.0	6.05	4.75	4.3	4.25	4.2	5.2
22	.....	.....	.....	5.2	7.0	7.4	5.9	.....	4.3	4.25	4.25	5.5
23	4.8	4.15	4.5	5.15	6.8	6.8	5.85	4.6	4.3	4.25	4.25	5.3
24	.....	.....	.....	5.2	6.6	6.6	5.75	4.6	4.3	4.25	4.25	5.3
25	.....	.....	.....	5.3	6.5	6.6	5.7	4.6	4.3	4.25	4.25	4.9
26	4.95	.....	.....	5.4	6.2	6.7	5.7	4.6	4.3	4.25	4.2	4.8
27	.....	4.15	4.45	5.45	6.1	6.9	5.65	4.6	4.3	4.25	4.2	4.5
28	.....	.....	.....	5.4	6.0	7.3	5.5	4.55	4.3	4.2	4.2	4.6
29	.....	.....	.....	5.4	6.0	7.4	5.45	4.55	4.3	4.2	4.2	4.7
30	4.15	.....	4.4	5.4	6.2	7.4	5.3	4.55	4.3	4.2	4.2	4.5
31	.....	.....	.....	.....	6.4	.....	5.25	4.55	.....	4.2	.....	4.3
1908.												
1	4.4	.....	4.0	4.1	4.75	5.35	6.15	4.75	4.25	4.4	4.45	4.5
2	4.5	4.3	4.0	4.1	4.8	5.3	6.1	4.9	4.25	4.45	4.45	4.6
3	4.7	4.3	4.0	4.15	.....	5.2	6.1	5.0	4.25	4.45	4.45	4.7
4	4.5	4.2	4.0	4.15	4.8	5.2	6.1	4.75	4.25	4.45	4.45	4.3
5	4.5	4.1	4.05	4.15	5.3	5.2	6.0	4.7	4.25	4.45	4.45	4.25
6	4.4	.....	4.1	4.2	5.45	5.2	6.05	5.05	4.25	4.5	4.45	4.25
7	4.9	4.1	4.2	4.2	5.4	5.2	5.9	4.85	4.2	4.5	4.45	4.3
8	6.4	4.1	4.2	4.25	5.45	5.3	5.8	4.7	4.2	4.5	4.3	4.35
9	6.1	4.1	4.1	4.25	5.5	5.4	5.6	4.7	4.2	4.5	4.3	4.5
10	6.15	4.1	4.1	4.3	5.5	5.7	5.4	4.7	4.2	4.55	4.3	4.3
11	6.2	4.1	4.05	4.35	5.45	6.3	5.3	4.7	4.2	4.55	4.3	4.2
12	6.25	4.15	4.0	4.4	5.4	6.8	5.15	4.75	4.3	4.55	4.3	4.25
13	5.7	4.2	4.0	4.45	5.3	6.8	5.15	4.75	4.25	4.5	4.3	4.2
14	5.2	.....	4.0	4.5	5.3	7.1	5.1	4.7	4.25	4.5	4.3	4.2
15	4.5	4.3	4.0	4.55	5.25	7.5	5.1	4.65	4.25	4.5	4.25	4.25

Daily gage height, in feet, of Weber River near Oakley, Utah, for 1907 and 1908—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
16	4.4	4.2	4.0	4.6	5.2	6.8	5.05	4.65	4.25	4.5	4.25	4.3
17	4.4	4.1	4.05	4.7	5.1	6.6	5.0	4.55	4.25	4.5	4.2	4.7
18	4.4	4.1	4.05	4.8	5.15	6.4	4.9	4.5	4.25	4.5	4.2	5.0
19	4.4	4.15	4.05	4.85	5.25	6.1	4.8	4.5	4.25	4.5	4.2	5.4
20	4.3	4.0	.....	4.9	5.4	6.2	4.75	4.5	4.25	4.5	4.2	5.5
21	4.3	4.0	4.05	4.95	5.45	6.4	4.75	4.5	4.25	4.5	4.15	5.7
22	4.25	4.0	4.05	5.0	5.55	6.7	4.75	4.5	4.25	4.5	4.15	5.9
23	4.2	4.0	4.05	5.1	5.4	6.3	4.7	4.45	4.25	4.5	4.15	6.0
24	4.1	4.0	4.05	5.0	5.35	6.2	4.65	4.45	4.65	4.5	4.2	6.0
25	4.2	4.0	4.05	.....	5.4	6.5	4.65	4.45	4.55	4.5	4.2	5.8
26	4.2	4.0	4.05	4.95	5.4	6.9	4.65	4.45	4.5	4.5	4.2	5.7
27	4.2	4.0	4.05	4.9	5.45	7.2	4.6	4.45	.....	4.45	.....	5.6
28	4.3	4.0	4.05	4.8	5.4	7.4	4.6	4.3	4.45	4.45	4.2	5.6
29	.....	4.0	4.05	4.7	5.4	6.5	4.8	4.3	4.45	4.45	4.3	5.55
30	4.4	.....	4.05	4.7	5.45	6.1	4.7	4.3	4.4	4.45	4.35	5.3
31	4.4	.....	4.05	.....	5.3	.....	4.65	4.3	.....	4.45	.....	5.2

NOTE.—Ice conditions from about January 5 to 26, 1907; ice reaching a maximum thickness of 0.9 foot January 26. Ice along sides November 22 to 25 and beginning December 13, 1907. River frozen January 1 to 23, 1908, but not entirely over, the ice reaching a maximum thickness of 1.2 feet along the edges; there was some slush ice up to February 19. River frozen most of time from November 29 to December 31, 1908.

Rating table for Weber River near Oakley, Utah, for 1907 and 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.00	46	5.00	275	6.00	840	7.00	1,850
4.10	58	5.10	315	6.10	930	7.20	2,100
4.20	73	5.20	360	6.20	1,020	7.40	2,360
4.30	90	5.30	410	6.30	1,110	7.60	2,630
4.40	109	5.40	460	6.40	1,210	7.80	2,920
4.50	130	5.50	515	6.50	1,310	8.00	3,220
4.60	154	5.60	570	6.60	1,410	8.20	3,530
4.70	180	5.70	630	6.70	1,510	8.40	3,850
4.80	209	5.80	690	6.80	1,620	8.60	4,170
4.90	241	5.90	760	6.90	1,730		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 15 discharge measurements made during 1904–1908. For 1907 it is well defined between gage heights 4.1 feet and 7.0 feet, but for 1908 it is poorly defined, as the only measurement plots 10 per cent small.

Monthly discharge of Weber River near Oakley, Utah, for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
January	.....	.....	66.0	4,060	C.
February	73	66	67.0	3,720	B.
March	130	58	91.3	5,610	B.
April	690	109	341	20,300	A.
May	1,850	360	847	52,100	A.
June	2,360	840	1,600	95,200	A.
July	4,010	385	1,660	102,000	A.
August	410	142	226	13,900	A.
September	142	90	106	6,310	A.
October	90	73	85.5	5,260	A.
November	73	66	71.6	4,260	B.
December	.....	.....	74.2	4,560	C.
The year	4,010	.....	436	317,000	

Monthly discharge of Weber River near Oakley, Utah, for 1907 and 1908—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1908.					
January			58.0	3,570	C.
February			52.2	3,000	C.
March	73	46	52.2	3,210	B.
April	315	58	160	9,520	B.
May	542	194	415	25,500	B.
June	2,490	360	1,120	66,600	A.
July	975	154	414	25,500	B.
August	295	90	160	9,840	B.
September	167	73	92.2	5,490	B.
October	142	109	128	7,870	B.
November	120	66	87.8	5,220	B.
December			69.4	4,270	C.
The year	2,490		234	170,000	

NOTE.—During the ice periods the discharge has been interpolated between days when the gage is unaffected by ice. The discharge during the winter seems to decrease gradually, reaching a minimum in February or March.

WEBER RIVER NEAR CROYDON, UTAH.

This station, which is located at Devils Slide, about 1½ miles west of the town of Croydon and 10 miles below the town of Echo, just below the canyon at the lower end of Henefer Valley, was established February 1, 1905, to determine the amount of water available for storage in the Henefer basin, about 2 miles above the station, in connection with the Weber River project.

Lost Creek enters one-fourth mile above the station and Chalk Creek about 15 miles above. The only diversions above the station are those in the Kamas prairie region and for the narrow valley below.

The flow is apparently little affected by ice. The occurrence of slush ice is noted, but no allowance is made for this. Otherwise the records are good, although the channel shifts slightly at high water. (See fig. 1, p. 21.)

Discharge measurements of Weber River near Croydon, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 25	G. T. Burridge	110	506	6.00	4,160
June 14	La Rue and Burridge	109	416	5.15	2,500
June 28	G. T. Burridge	108	369	4.75	2,060
July 23	do	101	231	3.35	890
Aug. 16	La Rue and Burridge	94	113	2.20	261
1908.					
July 15	A. D. Williams	96	118	2.40	340

Daily gage height, in feet, of Weber River near Croydon, Utah, for 1907 and 1908.

[George Simpson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1.8	1.85	2.1	2.7	4.3	5.0	5.1	2.8	2.5	2.2	2.2	2.1
2	1.7	1.9	2.15	2.8	4.5	5.1	5.1	2.8	2.5	2.3	2.2	2.1
3	1.75	2.25	2.15	3.2	4.3	5.2	5.2	2.7	2.5	2.3	2.2	2.1
4	1.85	2.5	2.2	3.5	4.1	5.5	5.2	3.0	2.5	2.3	2.2	2.1
5	1.9	3.4	2.25	3.7	3.9	5.4	5.3	3.0	2.4	2.3	2.2	2.1
6	1.85	3.1	2.3	3.7	3.8	5.2	5.4	2.9	2.4	2.3	2.2	2.1
7	1.85	2.65	2.3	3.6	3.8	5.3	5.3	2.8	2.3	2.3	2.2	2.1
8	1.8	2.3	2.3	3.5	3.8	5.4	5.2	2.8	2.3	2.3	2.2	2.2
9	1.8	2.3	2.3	3.6	3.8	5.5	5.0	2.6	2.3	2.3	2.2	2.2
10	1.75	2.1	2.3	4.0	4.2	5.7	4.9	2.5	2.2	2.3	2.2	2.2
11	1.85	2.05	2.3	4.4	4.5	5.6	4.9	2.5	2.2	2.2	2.2	2.2
12	1.8	2.05	2.15	4.7	5.0	5.4	4.5	2.4	2.2	2.2	2.2	2.2
13	1.8	2.0	2.15	5.1	5.0	5.2	4.3	2.4	2.2	2.2	2.2	2.2
14	1.75	2.0	2.0	5.5	4.6	5.2	4.3	2.3	2.2	2.2	2.2	2.2
15	1.8	2.0	1.8	5.6	4.4	5.0	4.2	2.3	2.2	2.2	2.2	2.1
16	1.8	2.0	2.1	5.5	4.5	4.8	4.1	2.3	2.2	2.1	2.2	2.1
17	1.8	2.0	2.15	5.2	4.8	4.7	4.0	2.2	2.2	2.1	2.2	2.1
18	1.85	2.05	2.8	4.8	5.0	4.6	3.9	2.2	2.2	2.2	2.2	2.1
19	1.75	2.1	3.1	4.3	5.3	4.4	3.8	2.2	2.2	2.2	2.2	2.1
20	1.7	2.15	3.9	4.1	5.7	4.6	3.7	2.2	2.2	2.2	2.2	2.1
21	1.85	2.2	4.7	4.0	6.0	4.8	3.6	2.2	2.2	2.2	2.2	2.1
22	1.8	2.25	4.2	3.9	6.1	5.1	3.6	2.2	2.2	2.2	2.2	2.1
23	1.75	2.3	3.5	3.9	6.0	5.1	3.5	2.2	2.2	2.2	2.2	2.2
24	1.8	2.3	3.2	3.9	6.3	5.0	3.4	2.2	2.2	2.2	2.2	2.2
25	1.8	2.35	3.0	3.9	6.1	4.8	3.3	2.2	2.1	2.2	2.2	2.3
26	1.8	2.4	3.0	4.0	5.7	4.4	3.2	2.3	2.1	2.2	2.2	2.3
27	1.8	2.3	2.9	4.3	5.6	4.6	3.2	2.3	2.1	2.2	2.2	2.2
28	1.85	2.0	2.8	4.5	5.4	5.0	3.1	2.3	2.1	2.2	2.2	2.2
29	1.9	.....	2.8	4.4	5.3	4.9	3.1	2.4	2.1	2.2	2.1	2.2
30	1.9	.....	2.6	4.4	5.2	5.1	3.0	2.5	2.1	2.2	2.1	2.1
31	1.85	.....	2.6	.....	5.0	.....	2.9	2.5	.....	2.2	.....	2.1
1908.												
1	2.1	2.1	2.2	2.2	2.8	3.2	3.6	2.4	2.1	2.2	2.3	2.2
2	2.1	2.1	2.2	2.2	3.0	3.3	3.4	2.3	2.1	2.3	2.3	2.2
3	2.1	2.1	2.2	2.2	3.0	3.3	3.2	2.2	2.1	2.5	2.3	2.1
4	2.1	2.1	2.2	2.2	3.0	3.3	3.2	2.2	2.1	2.6	2.3	2.1
5	2.1	2.1	2.2	2.2	3.0	3.3	3.2	2.2	2.1	2.4	2.3	2.1
6	2.1	2.1	2.2	2.2	3.2	3.3	3.2	2.2	2.1	2.4	2.3	2.1
7	2.1	2.1	2.0	2.2	3.3	3.3	3.2	2.2	2.1	2.3	2.3	2.2
8	2.1	2.1	2.0	2.2	3.4	3.4	3.3	2.2	2.1	2.3	2.3	2.2
9	2.1	2.1	2.2	2.3	3.5	3.5	3.3	2.2	2.1	2.3	2.2	2.2
10	2.1	2.1	2.2	2.3	3.5	3.5	3.4	2.2	2.1	2.3	2.2	2.2
11	2.1	2.1	2.2	2.3	3.5	3.6	3.5	2.2	2.1	2.3	2.2	2.2
12	2.1	2.1	2.2	2.3	3.4	3.8	3.5	2.2	2.1	2.3	2.2	2.2
13	2.1	2.1	2.3	2.3	3.3	4.0	3.4	2.2	2.1	2.4	2.2	2.2
14	2.1	2.1	2.3	2.3	3.2	4.1	3.2	2.2	2.1	2.4	2.2	2.2
15	2.1	2.1	2.5	2.3	3.1	4.2	3.1	2.2	2.1	2.5	2.2	2.2
16	2.1	2.1	2.5	2.4	3.1	4.3	2.8	2.2	2.1	2.5	2.2	2.2
17	2.1	2.1	2.6	2.5	3.1	4.6	2.6	2.2	2.1	2.6	2.1	2.2
18	2.1	2.1	2.6	3.0	3.1	4.8	2.4	2.2	2.1	2.6	2.1	2.2
19	2.1	2.1	2.8	3.0	3.0	4.6	2.2	2.2	2.1	2.4	2.1	2.2
20	2.1	2.1	2.6	3.1	3.1	4.0	2.1	2.2	2.1	2.4	2.1	2.2
21	2.1	2.1	2.5	3.2	3.2	4.0	2.1	2.2	2.1	2.4	2.1	2.2
22	2.2	2.2	2.5	3.2	3.3	4.0	2.1	2.2	2.1	2.2	2.1	2.2
23	2.2	2.2	2.4	3.2	3.3	4.0	2.1	2.1	2.1	2.2	2.1	2.2
24	2.2	2.2	2.4	3.2	3.3	4.1	2.1	2.1	2.4	2.2	2.2	2.2
25	2.2	2.2	2.4	3.0	3.3	4.2	2.2	2.1	2.6	2.2	2.2	2.2
26	2.2	2.2	2.4	2.9	3.2	4.2	2.2	2.1	2.8	2.3	2.2	2.2
27	2.2	2.2	2.3	2.8	3.2	4.2	2.2	2.1	2.8	2.3	2.2	2.1
28	2.1	2.2	2.3	2.7	3.2	4.2	2.2	2.1	2.6	2.3	2.2	2.1
29	2.1	2.2	2.2	2.6	3.2	3.9	2.3	2.1	2.4	2.3	2.2	2.1
30	2.1	.....	2.2	2.5	3.2	3.7	2.3	2.1	2.2	2.3	2.2	2.1
31	2.1	.....	2.2	.....	3.2	.....	2.3	2.1	.....	2.3	.....	2.1

NOTE.—The flow during the winter period is probably not much affected by ice conditions.

Rating tables for Weber River near Croydon, Utah.

JANUARY 1 TO JUNE 4, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.50	110	2.60	584	3.70	1,438	4.80	2,542
1.60	138	2.70	646	3.80	1,528	4.90	2,652
1.70	166	2.80	712	3.90	1,620	5.00	2,764
1.80	202	2.90	782	4.00	1,716	5.20	3,000
1.90	240	3.00	856	4.10	1,816	5.40	3,270
2.00	280	3.10	930	4.20	1,916	5.60	3,570
2.10	322	3.20	1,008	4.30	2,018	5.80	3,870
2.20	368	3.30	1,090	4.40	2,120	6.00	4,170
2.30	418	3.40	1,174	4.50	2,224	6.20	4,470
2.40	472	3.50	1,260	4.60	2,328	6.40	4,770
2.50	526	3.60	1,348	4.70	2,434		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during 1906 and 1907, and is well defined. Below gage height 4.2 feet the rating table is the same as that for April to December, 1906.

JUNE 5, 1907, TO DECEMBER 31, 1908.

2.00	175	2.90	599	3.80	1,213	4.70	2,015
2.10	217	3.00	655	3.90	1,297	4.80	2,110
2.20	261	3.10	713	4.00	1,381	4.90	2,215
2.30	305	3.20	773	4.10	1,467	5.00	2,325
2.40	349	3.30	837	4.20	1,553	5.20	2,550
2.50	395	3.40	905	4.30	1,641	5.40	2,790
2.60	443	3.50	977	4.40	1,732	5.60	3,030
2.70	493	3.60	1,053	4.50	1,826	5.80	3,270
2.80	545	3.70	1,133	4.60	1,920		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during 1907 and 1908, and is well defined between gage heights 2.2 feet and 5.2 feet.

Monthly discharge of Weber River near Croydon, Utah, for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
January	240	166	205	12,600	B.
February	1,170	221	408	22,700	B.
March	2,430	202	680	41,800	A.
April	3,570	646	1,930	115,000	A.
May	4,620	1,530	2,750	169,000	A.
June	3,420	1,730	2,460	146,000	A.
July	2,790	599	1,600	98,400	A.
August	655	261	382	23,500	A.
September	395	217	280	16,700	A.
October	305	217	271	16,700	A.
November	261	217	258	15,400	A.
December	305	217	240	14,800	B.
The year	4,620	166	955	693,000	
1908.					
January	261	217	226	13,900	B.
February	261	217	229	13,200	B.
March	545	175	317	19,500	B.
April	773	261	440	26,200	B.
May	977	545	778	47,800	A.
June	2,110	773	1,280	76,200	A.
July	1,050	217	561	34,500	B.
August	349	217	252	15,500	B.
September	545	217	264	15,700	B.
October	443	261	330	20,300	B.
November	305	217	262	15,600	B.
December	261	217	248	15,200	B.
The year	2,110	175	432	314,000	

WEBER RIVER NEAR PLAIN CITY, UTAH.

This station was established in 1903 under the direction of the state engineer of Utah, and was maintained by the State until May 14, 1905, when it was taken up by the United States Geological Survey in cooperation with the State. It is located at the highway bridge on the main road to Plain City and West Weber, 10 miles east of Ogden, and below all diversions and tributaries.

The records show the amount of water discharged into Great Salt Lake, information necessary for the adjudication of water rights on Ogden and Weber rivers.

Ice seldom affects the gage readings, although the river freezes occasionally during extremely cold weather. The current is very sluggish at low water, but at high stages the velocity reaches 3 feet per second and the bed, being composed of clay, sand, and gravel, shifts slightly. A good rating curve has usually been developed for the period between floods.

Discharge measurements of Weber River near Plain City, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 21	La Rue and Burridge	134	1,840	17.70	5,630
June 5	G. T. Burridge	134	1,730	16.60	4,820
June 11	do	133	1,650	16.20	4,480
June 30	do	131	1,100	11.85	2,790
July 22	do	122	487	6.90	959
August 10	La Rue and Burridge	112	143	4.00	188
1908.					
July 16	A. D. Williams	69	69	3.30	61

Daily gage height, in feet, of Weber River near Plain City, Utah, for 1907 and 1908.

[D. O. Wadman, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	5.5	6.0	9.4	10.4	16.7	15.0	11.2	5.2	4.6	4.4	5.1	4.8
2	5.4	6.8	8.8	10.6	16.1	15.4	11.0	5.0	4.6	4.5	5.1	4.8
3	5.3	10.3	8.6	12.2	15.8	15.7	11.1	4.9	4.7	4.5	5.1	4.8
4	5.3	14.8	8.7	14.6	15.4	16.1	11.6	4.8	4.7	4.5	5.1	4.8
5	5.3	18.5	8.9	14.5	14.6	16.5	11.9	4.9	4.7	4.6	5.1	4.8
6	5.4	18.5	9.2	16.1	13.2	16.9	12.3	5.0	4.6	4.6	5.1	4.9
7	5.5	16.5	9.0	16.7	12.8	17.0	12.0	4.8	4.6	4.7	5.1	4.9
8	5.5	14.2	9.1	16.2	12.6	17.4	11.4	4.6	4.5	4.7	5.1	5.0
9	5.4	11.1	8.8	15.8	13.0	17.4	11.0	4.4	4.4	4.8	5.0	5.0
10	5.4	9.9	8.8	15.9	14.4	16.8	10.6	4.2	4.4	4.9	5.0	5.0
11	5.4	9.4	8.7	16.8	15.0	16.2	10.0	4.1	4.3	4.9	5.0	5.1
12	5.4	8.8	8.5	17.7	16.0	15.7	9.5	4.0	4.2	4.9	4.9	5.1
13	5.4	8.6	8.6	17.9	16.7	15.8	9.0	3.8	4.1	4.9	4.9	5.1
14	5.4	8.5	8.9	18.2	17.0	16.1	8.9	3.6	4.0	4.9	4.9	5.1
15	5.5	8.4	9.3	18.7	16.1	15.7	8.7	3.5	4.0	5.0	4.9	5.3
16	5.5	8.4	9.5	19.0	15.8	14.7	8.2	3.3	4.0	5.0	5.0	5.2
17	5.5	8.7	9.8	18.9	15.0	14.0	7.8	3.1	4.1	5.0	5.0	5.2
18	5.5	8.6	10.2	18.0	15.9	13.4	7.5	3.0	4.1	5.1	5.0	5.0
19	5.5	8.7	12.4	17.8	16.7	13.0	7.2	3.0	4.1	5.1	5.0	5.1
20	5.5	9.9	15.7	16.5	17.3	12.8	7.0	3.0	4.1	5.1	5.0	5.0

Daily gage height, in feet, of Weber River near Plain City, Utah, for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
21	5.6	10.8	17.5	15.6	17.6	13.4	6.8	3.0	4.1	5.1	5.0	5.1
22	5.8	11.1	18.7	15.2	17.8	13.5	6.6	3.1	4.1	5.1	5.0	5.1
23	5.9	13.5	17.3	14.9	17.9	13.8	6.4	3.2	4.1	5.1	4.9	5.1
24	6.2	12.2	15.6	14.4	17.9	13.3	6.1	3.3	4.2	5.1	4.9	5.2
25	6.3	11.8	14.8	14.2	17.7	12.2	6.0	3.5	4.2	5.1	4.9	5.4
26	6.3	10.7	13.7	14.4	16.0	11.7	6.0	3.4	4.3	5.1	4.9	5.7
27	6.1	10.1	12.6	15.3	15.5	11.3	5.9	3.6	4.3	5.1	4.9	6.1
28	5.9	9.8	12.0	16.4	15.1	11.2	5.8	3.9	4.4	5.1	4.9	5.8
29	5.7	.....	11.4	16.9	14.9	11.3	5.7	4.5	4.4	5.1	4.9	5.5
30	5.5	.....	11.0	17.3	14.7	11.5	5.5	4.7	4.4	5.1	4.8	5.1
31	5.8	.....	10.7	.....	14.8	.....	5.3	4.5	.....	5.1	.....	5.0
1908.												
1	5.0	5.0	5.8	5.2	6.0	10.3	7.1	2.7	2.6	4.9	5.7	5.1
2	5.0	4.9	5.3	5.4	6.2	10.7	6.6	4.1	2.6	5.0	5.7	5.1
3	4.9	4.9	5.3	5.4	6.5	10.3	6.2	4.6	2.5	5.7	5.6	5.0
4	4.9	4.8	5.3	5.6	6.8	10.6	6.0	4.3	2.5	7.0	5.6	5.0
5	4.9	4.8	5.3	5.6	6.9	12.4	5.7	4.2	2.5	6.7	5.6	5.0
6	5.8	4.9	5.3	5.7	7.0	11.7	5.4	3.9	2.5	6.0	5.6	5.0
7	6.9	4.9	5.4	5.8	7.0	11.5	5.0	3.8	2.5	5.9	5.6	5.0
8	6.3	4.9	5.4	5.8	6.9	11.4	4.8	3.7	2.8	5.9	5.6	5.0
9	5.5	5.0	5.5	6.1	7.3	11.4	4.5	3.5	2.9	5.8	5.5	5.1
10	5.2	5.0	5.7	6.4	7.1	11.5	4.1	3.5	2.9	5.8	5.5	5.1
11	5.0	5.0	5.8	6.4	7.0	11.5	3.7	3.3	2.9	5.7	5.4	5.1
12	5.0	4.9	5.8	6.5	7.2	11.5	3.6	3.2	3.4	5.7	5.3	5.1
13	4.9	4.9	6.2	6.8	7.4	11.6	3.6	3.2	3.6	5.6	5.3	5.1
14	4.9	4.9	6.4	7.2	7.2	11.6	3.5	3.1	3.8	5.6	5.2	5.1
15	5.0	4.9	6.6	7.6	6.9	13.4	3.5	3.1	3.9	5.8	5.2	5.1
16	5.1	4.9	7.1	7.7	6.8	14.0	3.3	3.1	3.9	6.1	5.2	5.2
17	5.1	4.8	7.5	7.8	6.7	13.7	3.1	3.1	4.0	6.4	5.2	5.2
18	5.1	4.8	8.1	8.0	6.6	13.9	2.9	3.0	4.0	6.9	5.3	5.3
19	5.0	4.9	7.8	8.2	6.5	13.4	2.8	3.0	4.0	7.2	5.3	5.5
20	5.1	4.9	7.1	8.4	6.8	11.8	2.7	3.1	4.0	7.1	5.3	5.6
21	5.1	4.8	6.9	8.7	9.0	11.9	2.7	3.1	4.0	7.1	5.2	5.7
22	5.1	4.8	6.8	8.8	8.6	12.0	2.8	3.0	4.0	6.8	5.2	5.7
23	5.1	4.8	6.6	8.5	8.4	11.6	2.8	3.0	4.0	6.6	5.1	5.7
24	5.0	4.8	6.5	8.1	8.1	10.9	2.8	2.9	4.7	6.5	5.0	5.7
25	5.0	4.7	6.3	7.6	8.1	10.6	2.8	2.9	4.9	6.3	5.0	5.7
26	4.9	4.7	6.2	7.3	8.9	10.2	2.7	2.9	5.8	6.2	5.0	5.7
27	4.9	4.7	6.0	7.0	10.1	9.6	2.7	2.8	5.5	6.2	5.1	5.7
28	5.2	4.8	5.8	6.7	9.8	8.9	2.7	2.8	5.3	6.1	5.1	5.7
29	5.2	5.5	5.7	6.3	9.5	8.2	2.7	2.7	5.0	6.0	5.1	5.8
30	5.1	.....	5.6	5.8	9.2	7.7	2.7	2.7	4.9	6.0	5.1	5.8
31	5.0	.....	5.6	.....	9.3	.....	2.7	2.6	.....	5.8	.....	5.8

NOTE.—Ice conditions January 6 to 10 and December 16 to 31, 1908. There was probably little effect from ice in 1907.

Rating tables for Weber River near Plain City, Utah.

JANUARY 1, 1906, TO FEBRUARY 3, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
5.30	335	6.50	625	7.70	1,010	8.90	1,460
5.40	355	6.60	655	7.80	1,045	9.00	1,500
5.50	375	6.70	685	7.90	1,080	9.20	1,570
5.60	395	6.80	715	8.00	1,115	9.40	1,650
5.70	415	6.90	745	8.10	1,150	9.60	1,730
5.80	440	7.00	775	8.20	1,185	9.80	1,810
5.90	465	7.10	805	8.30	1,225	10.00	1,895
6.00	490	7.20	835	8.40	1,265	10.20	1,975
6.10	515	7.30	870	8.50	1,300	10.40	2,060
6.20	540	7.40	905	8.60	1,340		
6.30	565	7.50	940	8.70	1,380		
6.40	595	7.60	975	8.80	1,420		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 7 discharge measurements made during 1906, and is well defined.

Rating tables for Weber River near Plain City, Utah—Continued.

FEBRUARY 4, 1907, TO JUNE 14, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.00	58	4.40	251	5.80	576	8.40	1,384
3.10	68	4.50	269	5.90	602	8.60	1,456
3.20	78	4.60	289	6.00	628	8.80	1,528
3.30	90	4.70	311	6.20	680	9.00	1,600
3.40	102	4.80	333	6.40	734	10.00	1,980
3.50	116	4.90	355	6.60	790	11.00	2,380
3.60	130	5.00	379	6.80	850	12.00	2,790
3.70	145	5.10	403	7.00	910	13.00	3,210
3.80	160	5.20	427	7.20	974	14.00	3,650
3.90	175	5.30	451	7.40	1,038	15.00	4,090
4.00	190	5.40	475	7.60	1,104	16.00	4,530
4.10	205	5.50	500	7.80	1,172	17.00	4,970
4.20	220	5.60	525	8.00	1,240	18.00	5,420
4.30	235	5.70	550	8.20	1,312	19.00	5,880

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 10 discharge measurements made during 1906–7, and is well defined between gage heights 4.0 feet and 17.0 feet.

JUNE 15 TO DECEMBER 31, 1908.

2.50	7	3.80	118	5.10	330	6.80	796
2.60	11	3.90	130	5.20	352	7.00	860
2.70	16	4.00	143	5.30	374	7.20	926
2.80	21	4.10	157	5.40	398	7.40	994
2.90	27	4.20	172	5.50	422	7.60	1,064
3.00	34	4.30	187	5.60	446	7.80	1,136
3.10	42	4.40	203	5.70	472	8.00	1,210
3.20	51	4.50	220	5.80	498	8.20	1,286
3.30	61	4.60	237	5.90	526	8.40	1,362
3.40	72	4.70	255	6.00	554	8.60	1,438
3.50	83	4.80	273	6.20	612	8.80	1,514
3.60	94	4.90	291	6.40	672	9.00	1,590
3.70	106	5.00	310	6.60	732	10.00	1,980

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on one discharge measurement made during 1908 and the form of previous curves, and is fairly well defined. Above gage height 10.0 feet it is the same as the previous table.

Monthly discharge of Weber River near Plain City, Utah, for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
January	565	335	400	24,600	B.
February	5,650	490	2,380	132,000	A.
March	5,740	1,420	2,500	154,000	A.
April	5,880	2,140	4,500	268,000	A.
May	5,370	3,040	4,390	270,000	A.
June	5,150	2,460	3,870	230,000	A.
July	2,920	451	1,490	91,600	A.
August	427	58	197	12,100	B.
September	311	190	240	14,300	A.
October	403	251	360	22,100	A.
November	403	333	375	22,300	A.
December	654	333	412	25,300	A.
The year	5,880	58	1,760	1,270,000	

Monthly discharge of Weber River near Plain City, Utah, for 1907 and 1908—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1908.					
January		355	381	23,400	C.
February	500	311	352	20,200	B.
March	1,280	451	679	41,800	A.
April	1,530	427	901	53,600	A.
May	2,020	628	1,130	69,500	A.
June	3,650	1,100	2,520	150,000	A.
July	892	16	176	10,800	B.
August	237	11	64.7	3,980	B.
September	498	7	138	8,210	B.
October	926	291	604	37,100	A.
November	472	310	381	22,700	A.
December	498	310	389	23,900	C.
The year	3,650	7	643	465,000	

NOTE.—Discharge estimated January 6 to 10, 1908, on account of ice. Values for portions of the winter months may be somewhat too large on account of ice conditions.

PROVO RIVER BASIN.

DESCRIPTION.

Provo River rises in the Uinta Mountains and flows westward in a steep, narrow canyon until it reaches Heber or Provo Valley, through which it winds in a well-defined channel. Leaving the valley it flows southwestward, cutting through the Wasatch Range in another steep, narrow, and extremely rough canyon, and finally discharging its surplus waters into Utah Lake.

In the mountain regions the principal rock is a compact limestone. Except in Heber Valley little soil is found in any part of the basin. Small groves of fir and aspen are, however, scattered over almost the entire area, and there is a light growth of underbrush. No extensive forests, meadows, or marshes exist. In the canyons the stream receives numerous short and swift tributaries which derive their principal supply from springs, but a part also from the melting of the snow that covers portions of the mountains during the entire year. The highest peaks reach elevations of about 13,000 feet above sea level.

Heber Valley, comprising an area of about 20 square miles, is an irrigated farming district. The surface is covered with loose bowlders, gravel, and very porous soil. Most of the water is taken from the main stream, but a part is diverted from small creeks that enter the valley from the south. The most important of these is Daniels Creek, into which some water is diverted from Strawberry River, a tributary of Green River, by three small canals in low passes at the head of the creek.

At the head of the river are a few lakes, but they are so small that they probably have little effect in regulating the flow. No storage is used on the stream at present, but a few favorable sites will doubtless be developed in the future, as the entire flow, after being used by

a power plant at the mouth of the canyon, is now utilized in the vicinity of Utah Lake, and the supply is altogether insufficient.

The wettest year since records have been kept in this basin was 1907, when the discharge at the station of the Telluride Power Company's dam was 477,000 acre-feet. The driest year was 1905, when at the same station the discharge was 192,000 acre-feet.

The following stations have been maintained in this basin:

Provo River above Telluride Power Company's dam near Provo, Utah, 1905–1908.
Provo River at mouth of canyon, near Provo, Utah, 1889–1906.
Provo River at Denver and Rio Grande Railroad bridge, near Provo, Utah, 1905.
Provo River at San Pedro, Los Angeles and Salt Lake Railroad bridge, near Provo, Utah, 1903–4.

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

This station, which was established February 1, 1905, to determine the total flow of the river into this valley, takes the place of the station at the mouth of the canyon, which has been maintained since 1889. It is located about one-half mile below Forks station, on the Provo Canyon branch of the Denver and Rio Grande Railroad, about 4 miles above the mouth of the canyon.

The station is below South Fork and all other tributaries and above all diversions into Utah Lake Valley. Some water is diverted for irrigation in Heber Valley above the station.

Little ice forms at this station. The gage heights have been somewhat affected by backwater from the diversion down below. This dam was raised about July 12, 1908, and the station had to be moved upstream a quarter of a mile, as near the forks as possible, but it is still too near the dam and results since that time have not been satisfactory.

Discharge measurements of Provo River above Telluride Power Company's dam near Provo, Utah, in 1906–1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1906.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 14	W. G. Swendsen	69	113	3.80	222
May 10	H. S. Kleinschmidt	76	222	5.30	886
June 3	Thomas Grieve, jr	80	244	5.40	993
June 13	do	96	396	7.00	1,760
July 7	do	71	156	4.20	402
1907.					
June 18	G. T. Burridge	84	282	5.90	1,390
July 6	do	102	390	7.45	1,880
July 26	La Rue and Burridge	76	188	4.93	642
August 20	do	70	138	4.15	349
1908.					
July 22	E. C. La Rue	76	197	[a] 5.02	245
September 5 [b]	do	72	110	2.13	229
October 30 [b]	do	74	170	3.05	390

[a] Affected by backwater. [b] At new station, established July 24, 1909.

Daily gage height, in feet, of Provo River above Telluride Power Company's dam near Provo, Utah, for 1907 and 1908.

[Telluride Power Company, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	4.05	3.9	4.3	4.3	5.1	5.8	6.85	4.4	4.25	4.2	4.2	4.2
2	3.9	4.0	4.25	4.5	5.4	6.1	7.15	4.4	4.25	4.25	4.2	4.2
3	3.9	4.3	4.3	4.7	5.2	6.9	7.25	4.3	4.25	4.25	4.2	4.2
4	4.0	4.9	4.3	4.8	5.05	7.0	7.2	4.4	4.25	4.2	4.2	4.2
5	4.05	5.1	4.35	5.0	5.0	7.3	7.5	4.35	4.5	4.2	4.2	4.2
6	4.1	4.9	4.2	5.05	4.95	7.65	7.45	4.35	4.5	4.2	4.2	4.2
7	4.0	4.5	4.2	4.9	4.9	7.8	7.2	4.25	4.35	4.25	4.2	4.2
8	3.9	4.4	4.15	4.75	4.85	7.9	6.8	4.25	4.3	4.2	4.2	4.2
9	3.9	4.5	4.35	4.7	4.8	7.6	6.55	4.25	4.35	4.2	4.2	4.2
10	3.85	4.45	4.2	5.0	4.8	7.1	6.35	4.2	4.3	4.2	4.2	4.2
11	3.9	4.5	4.3	5.4	5.1	6.1	6.2	4.2	4.3	4.2	4.2	4.2
12	3.95	4.4	4.3	5.5	5.35	6.85	5.95	4.2	4.3	4.2	4.2	4.2
13	3.9	4.45	4.2	6.1	5.6	7.4	5.8	4.15	4.3	4.25	4.2	4.2
14	3.9	4.5	4.2	6.3	5.3	6.8	5.9	4.15	4.25	4.2	4.2	4.2
15	3.9	4.45	4.15	6.6	5.0	6.5	5.7	4.15	4.25	4.2	4.2	4.2
16	3.95	4.45	4.05	6.6	5.0	6.1	5.55	4.15	4.2	4.2	4.2	4.2
17	4.0	4.1	4.45	6.3	5.35	5.95	5.3	4.15	4.2	4.2	4.2	4.2
18	4.0	4.05	4.6	6.0	5.65	5.9	5.1	4.15	4.2	4.2	4.2	4.15
19	3.95	4.1	4.75	5.75	6.15	6.2	5.1	4.15	4.15	4.2	4.2	4.15
20	3.8	4.1	4.85	5.4	6.8	6.6	5.0	4.15	4.15	4.2	4.2	4.15
21	3.7	4.1	5.05	5.1	7.45	6.8	4.95	4.15	4.2	4.2	4.2	4.2
22	3.7	4.3	4.8	5.1	7.7	7.1	4.85	4.15	4.2	4.2	4.2	4.2
23	3.65	4.5	4.7	5.1	7.7	7.2	4.8	4.15	4.2	4.2	4.2	4.2
24	3.7	4.3	4.5	5.1	7.9	6.4	4.75	4.15	4.2	4.2	4.2	4.2
25	3.95	4.25	4.5	5.1	7.6	6.1	4.7	4.2	4.2	4.2	4.2	4.2
26	4.0	4.3	4.5	5.15	6.8	6.1	4.7	4.2	4.2	4.2	4.2	4.2
27	4.05	4.3	4.55	5.2	6.4	6.2	4.65	4.2	4.2	4.2	4.2	4.4
28	4.1	4.25	4.4	5.5	6.1	6.6	4.6	4.2	4.2	4.2	4.2	4.3
29	3.95	.....	4.4	5.5	5.9	6.95	4.5	4.2	4.2	4.2	4.2	4.25
30	3.95	.....	4.35	5 4	5.8	7.0	4.45	4.3	4.2	4.2	4.2	4.0
31	3.9	.....	4.2	.....	5.85	.....	4.45	4.25	.....	4.2	.....	4.2
1908.												
1	4.2	3.75	4.25	4.1	4.5	5.75	5.7	2.65	2.1	2.7	3.0	2.8
2	4.2	3.9	4.2	4.1	4.8	5.5	5.65	2.4	2.1	2.7	3.0	2.8
3	4.15	4.1	4.2	4.1	4.9	5.65	5.6	2.3	2.1	2.85	3.0	3.0
4	4.2	4.15	4.2	4.1	5.1	5.5	5.55	2.35	2.15	2.9	3.0	2.9
5	4.0	4.1	4.35	4.05	5.0	5.7	5.5	2.1	2.1	3.0	3.0	2.9
6	3.9	4.05	4.25	4.05	5.3	5.65	5.55	2.55	2.1	3.0	3.0	2.9
7	3.8	4.1	4.15	4.1	5.1	5.5	5.5	2.8	2.1	2.85	3.0	2.8
8	3.8	4.1	4.1	4.1	5.15	5.6	5.35	2.6	2.1	2.9	3.0	2.85
9	4.0	4.1	4.1	4.1	5.3	5.55	5.25	2.3	2.2	2.9	2.9	2.9
10	4.2	4.1	4.1	4.1	5.5	5.55	5.2	2.3	2.15	2.95	3.0	2.9
11	4.0	4.05	4.15	4.1	5.35	5.75	5.0	2.55	2.2	2.95	2.95	2.9
12	4.1	4.1	4.15	4.15	5.25	6.2	.....	2.8	2.2	3.0	2.9	2.8
13	4.0	4.1	4.15	4.2	5.5	6.25	.....	2.7	2.2	3.0	2.9	2.9
14	4.1	4.0	4.2	4.3	5.35	6.4	.....	2.5	2.2	3.0	2.9	2.9
15	4.15	4.0	4.3	4.4	5.25	6.65	.....	2.4	2.2	3.0	2.9	2.9
16	4.1	4.05	4.3	4.5	5.25	7.0	.....	2.25	2.2	3.65	2.9	2.9
17	4.1	4.1	4.4	4.8	5.35	6.8	.....	2.2	2.15	3.4	2.9	2.9
18	4.1	4.05	4.4	4.7	5.35	6.4	.....	2.15	2.15	3.1	2.9	2.8
19	4.1	4.05	4.35	4.75	5.3	6.1	.....	2.1	2.15	3.1	2.9	3.6
20	4.1	4.15	4.2	4.9	5.7	5.9	.....	2.2	2.15	3.2	2.9	3.0
21	4.1	4.05	4.15	5.0	5.55	6.1	.....	2.2	2.15	3.15	2.9	3.6
22	4.1	4.05	4.1	5.15	5.4	6.25	.....	2.2	2.15	3.15	3.0	3.6
23	4.1	4.1	4.1	5.3	5.45	6.35	.....	2.15	2.15	3.0	2.9	2.7
24	4.15	4.1	4.1	5.2	5.5	6.0	.....	2.15	2.3	3.0	3.0	2.8
25	4.15	4.05	4.1	5.1	5.4	6.0	2.4	2.1	2.9	3.1	2.95	2.8
26	4.1	4.05	4.1	4.9	5.6	6.1	2.4	2.1	2.6	3.05	2.95	2.8
27	4.05	4.05	4.15	4.9	5.7	6.1	2.2	2.1	2.7	3.0	2.95	2.8
28	4.1	4.1	4.15	4.8	5.6	6.0	2.3	2.1	2.7	3.0	2.45	2.7
29	4.0	4.4	4.1	4.7	5.55	5.9	2.35	2.1	2.7	3.0	2.3	2.6
30	4.0	.....	4.05	4.6	5.5	5.75	2.5	2.1	2.7	3.0	2.6	2.7
31	3.9	.....	4.05	.....	5.6	.....	2.6	2.1	.....	.....	.....	2.6

NOTE.—There was little or no ice during 1907 or 1908. Gage heights July 12 to 24, 1908, were affected by backwater from the diversion dam and have been omitted. Gage heights for the two months previous are liable to be somewhat in error on this account. Gage heights beginning July 25 are for the new station above the old one.

Rating tables for Provo River above Telluride Power Company's dam near Provo, Utah.

JANUARY 1, 1906, TO JULY 11, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.50	153	4.60	544	5.60	1,020	6.60	1,560
3.60	181	4.70	588	5.70	1,070	6.70	1,620
3.70	210	4.80	634	5.80	1,120	6.80	1,680
3.80	240	4.90	680	5.90	1,175	6.90	1,740
3.90	272	5.00	726	6.00	1,230	7.00	1,800
4.00	305	5.10	774	6.10	1,285	7.20	1,920
4.10	340	5.20	822	6.20	1,340	7.40	2,040
4.20	378	5.30	870	6.30	1,395	7.60	2,160
4.30	418	5.40	920	6.40	1,450	7.80	2,280
4.40	458	5.50	970	6.50	1,505	8.00	2,400
4.50	500						

NOTE.—This table is not applicable for ice or obstructed-channel conditions below gage height 5.5 feet. It is based on 14 discharge measurements made during 1905–1907, and is fairly well defined between gage heights 3.7 feet and 5.5 feet. Above gage height 5.5 feet the rating curve is drawn to average the three measurements, two of which were probably made when the gage was affected by backwater from the diversion dam of the power flume. It is not the normal curve but probably gives the best average results.

JULY 25 TO DECEMBER 31, 1908.

2.00	210	2.50	292	3.00	382	3.50	476
2.10	225	2.60	310	3.10	400	3.60	495
2.20	241	2.70	328	3.20	419		
2.30	258	2.80	346	3.30	438		
2.40	275	2.90	364	3.40	457		

NOTE.—This table is not applicable for ice conditions. It is based on 2 discharge measurements made during 1908, and is not well defined. The rating curve is not a normal one as the measurement of October 30 was probably affected by backwater, but it is believed to represent average conditions as they existed during the period.

Monthly discharge of Provo River above Telluride Power Company's dam near Provo, Utah, for 1906–1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1906.[a]					
January			274	16,800	C.
February	340	153	250	13,900	B.
March	657	240	360	22,100	B.
April	774	340	527	31,400	B.
May	1,680	340	973	59,800	B.
June	1,860	500	1,090	64,900	B.
July	479	240	331	20,400	B.
August	359	210	260	16,000	B.
September	322	256	295	17,600	B.
October	272	240	258	15,900	B.
November	340	210	289	17,200	B.
December	479	240	320	19,700	B.
The year	1,860	153	436	316,000	
1907.					
January	340	196	280	17,200	C.
February	774	272	450	25,000	B.
March	750	322	460	28,300	B.
April	1,560	418	897	53,400	B.
May	2,340	634	1,170	71,900	C.
June	2,340	1,120	1,650	98,200	C.
July	2,100	479	1,120	68,900	C.
August	458	359	387	23,800	B.
September	500	359	400	23,800	B.
October	398	378	381	23,400	B.
November	378	378	378	22,500	B.
December	458	305	378	23,200	B.
The year	2,340	196	663	480,000	

[a] These discharges supersede those published in Water-Supply Paper 212, p. 39. Gage heights for 1906 are given in Water-Supply Paper 212, p. 38.

32606—IRR 250—10——5

Monthly discharge of Provo River above Telluride Power Company's dam near Provo, Utah, for 1906–1908—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1908.					
January	378	240	329	20,200	C.
February	458	225	330	19,000	B.
March	458	322	372	22,900	B.
April	870	322	515	30,600	B.
May	1,070	500	886	54,500	C.
June	1,800	970	1,230	73,200	C.
July [a]	1,070		579	35,600	C.
August	346	225	260	16,000	B.
September	364	225	253	15,100	B.
October	504	328	386	23,700	B.
November	382	258	364	21,700	C.
December	495	310	365	22,400	C.
The year	1,800	225	489	355,000	

[a] Discharges interpolated July 12 to 24.

PROVO RIVER AT MOUTH OF CANYON NEAR PROVO, UTAH.

This station, which was located about 6 miles above Provo and 1,200 feet above the power house of the Telluride Power Company, was established July 27, 1889, to determine the amount of water available at the mouth of the canyon for irrigating lands near Utah Lake, and was discontinued June 30, 1906. The station established February, 1905, 4 miles above the mouth of the canyon and above the dam of the Telluride Power Company, now furnishes the necessary data, the discharge being practically the same at the two points.

The discharge of the Telluride Power Company's flume has been added to that at the station to give the total of the river. Discharges were omitted from the 1906 report but are included here for comparative purposes. No discharge measurements were made in 1906.

Rating table for Provo River at mouth of canyon near Provo, Utah, for 1905 and 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.30	7	4.20	177	5.10	589	6.00	1,192
3.40	12	4.30	212	5.20	649	6.10	1,265
3.50	20	4.40	250	5.30	711	6.20	1,340
3.60	31	4.50	290	5.40	775	6.30	1,415
3.70	46	4.60	332	5.50	841	6.40	1,490
3.80	64	4.70	377	5.60	910	6.50	1,565
3.90	87	4.80	425	5.70	980	6.60	1,640
4.00	114	4.90	477	5.80	1,050		
4.10	144	5.00	532	5.90	1,120		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on discharge measurements made during 1903–1905, and is well defined between gage heights 3.5 feet and 6.3 feet.

Daily discharge, in feet, of Telluride Power Company's flume near Provo, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	187	203	182	169	151	a138	16	165	189	152	179	169	136
2	168	204	185	150	160	a138	17	183	194	230	213	158	136
3	168	199	202	143	152	a137	18	198	205	179	156	142	123
4	182	218	146	182	173	133	19	150	186	177	166	143	139
5	189	200	194	238	185	145	20	125	202	158	142	142	134
6	154	199	194	187	145	33.3	21	152	154	172	140	153	139
7	182	201	195	171	161	126	22	193	182	172	112	150	152
8	147	200	181	189	177	158	23	191	192	166	145	146	142
9	140	192	190	164	174	143	24	188	190	162	142	146	132
10	142	192	171	197	148	122	25	184	164	168	148	157	142
11	180	194	188	154	167	143	26	188	163	145	143	157	152
12	189	182	183	165	145	147	27	203	184	164	172	132	150
13	184	195	58	163	155	129	28	192	195	164	133	166	145
14	180	195	190	181	193	139	29	205	.....	127	142	139	149
15	155	194	178	163	177	148	30	223	.....	152	179	145	166
							31	197	.....	167	.....	142	.....

a Interpolated.

NOTE.—These discharges are the mean of two readings, at 8 a. m. and 5 p. m., these being the hours at which the gage on the river was read. They are based on the electric output of the plant.

Monthly discharge of Provo River at mouth of canyon near Provo, Utah, for 1906.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	769	157	279	17,200	B.
February	340	214	264	14,700	B.
March	986	228	421	25,900	B.
April	920	392	637	37,900	B.
May	1,790	585	1,200	73,800	B.
June	2,090	712	1,240	73,800	B.
The period				243,000	

NOTE.—Gage heights for 1906 are given in Water-Supply Paper 212, p. 39.

HOBBLE CREEK BASIN.

DESCRIPTION.

Hobble Creek rises on the western slope of the Wasatch Mountains and flows in a general southwesterly direction to Utah Lake. In the greater part of the basin the soil cover is very thin and supports but a scanty growth of timber and brush. 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 and comprising irrigated farms. As these tracts lie along the banks of the creek, a large part of the water used on them 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. No storage reservoirs, lakes, or marshes control the flood discharge, which occurs in the spring as a result of the melting snow. The entire normal summer flow is used for irrigation below the canyon.

Within the period for which records are available, the year of the greatest run-off was probably 1907, as on other streams in the vicinity, but records are not complete for that year. The driest year, according to the record at Springville, was 1905, when the discharge was 21,650 acre-feet.

Only one station has been maintained in this basin, that near Springville, Utah, 1904–1908.

HOBBLE CREEK NEAR SPRINGVILLE, UTAH.

This station, which is located about 1 mile above the mouth of the canyon, 4 miles southeast of Springville electric-power plant, was established March 23, 1904, to determine the total discharge of the creek available for irrigation in connection with the Strawberry Valley project of the United States Reclamation Service. The station is above all diversions and below all tributaries.

Practically no ice forms at the station, as the normal winter flow comes largely from springs. The channel is composed of loose, fine gravel and shifts almost constantly. As sufficient measurements can not as a rule be made to determine the amount of change, the results obtained are liable to considerable error. Discharges for 1906 and the early part of 1907 can not be computed because of insufficient data.

Discharge measurements of Hobble Creek near Springville, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 19	G. T. Burridge	16	26	2.21	118
July 8	do	17	23	2.00	78
July 27	La Rue and Burridge	17	16	1.60	49
August 21	do	16	16	1.45	42
1908.					
March 27	A. D. Williams	16.5	15	1.50	44
April 18	do	17	21	1.75	68
June 4	do	17	21	1.95	65

Daily gage height, in feet, of Hobble Creek near Springville, Utah, for 1907 and 1908.

[E. P. Noe, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1				1.9		3.5	2.2			1.35		
2	1.55		1.75	2.2			2.2	1.6	1.5		1.3	1.35
3						3.5	2.1	1.55				
4		2.2	1.75			3.6	2.0	1.6	1.5	1.35	1.3	
5	1.55	3.75					2.0	1.6		1.35		
6		2.2	1.75			3.5	2.0	1.6	1.5	1.3		
7								1.6	1.5	1.3		1.35
8	1.55					3.5	2.0	1.6				
9		2.0	1.8					1.55	1.5	1.3	1.3	1.35
10						3.0	2.1	1.55	1.5			

Daily gage height, in feet, of Hobble Creek near Springville, Utah, for 1907 and 1908— Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
11			1.75				2.1		1.45	1.35	1.35	
12	1.55	1.9				3.0	2.1	1.5	1.45	1.3		
13						3.0	2.0	1.5	1.5			
14			1.65			2.9		1.5		1.3		1.35
15	1.55	1.8				2.8	1.9	1.45				
16			1.7				1.9	1.4	1.45	1.3	1.35	
17						2.7		1.4	1.45			1.3
18	1.55		1.95			2.7	1.85	1.45		1.3	1.35	
19		1.7	2.2				1.8	1.4	1.4			
20			2.75			2.5	1.8	1.45	1.4			
21	1.5					2.5		1.45	1.4	1.25		
22						2.45	1.8	1.5				
23							1.75		1.4	1.2	1.35	
24						2.3		1.45	1.4			1.35
25	1.5		2.75			2.3	1.7			1.2		
26						2.25	1.7	1.4		1.25	1.35	
27			2.25			2.2	1.6	1.4	1.4			1.35
28						2.2			1.4	1.25		
29	1.55		1.9			2.2	1.6	1.45	1.35			
30							1.6		1.35	1.25	1.35	
31	1.55						1.6	1.45				1.35
1908.												
1	1.35			1.45	1.6	1.8	1.75	1.35	1.2	1.15		
2					1.6	1.8	1.75		1.2			1.35
3				1.45			1.7	1.35	1.25		1.35	
4			1.25	1.5	1.65	1.75		1.35				
5				1.65	1.6			1.35	1.2	1.2		
6		1.3				1.7	1.7	1.35			1.35	
7				1.6	1.65		1.65	1.35	1.2	1.25		
8				1.6	1.65	1.75	1.6	1.35	1.2			
9				1.5	1.6		1.55					1.35
10	1.35			1.6		1.8	1.55	1.3	1.2	1.2	1.35	
11			1.3	1.65	1.65		1.5	1.35	1.2			
12				1.7	1.65	2.0		1.3	1.2	1.2		
13		1.25		1.8	1.7	2.1	1.45	1.3				
14	1.3			1.85			1.45		1.2		1.35	
15				1.8	1.65	2.2		1.35	1.2			1.35
16				1.75	1.6	2.1	1.4		1.2			
17				1.75		2.0	1.45	1.3		1.2	1.35	
18			1.35	1.75	1.6	1.95	1.45		1.2			
19					1.55	1.85			1.2			
20	1.35	1.25		1.75		1.85	1.4	1.35				
21					1.55		1.4	1.3	1.2		1.4	
22				1.7	1.55	1.8	1.4	1.25	1.2			
23				1.85	1.55		1.4				1.35	1.35
24			1.3	1.75		1.75	1.4			1.2		
25	1.3			1.7	1.55	1.75	1.4	1.25	1.25			
26		1.25				1.7		1.25	1.2			
27			1.5	1.65	2.0	1.7	1.35	1.2		1.25		
28			1.4	1.6	2.0		1.35	1.2	1.2			1.35
29	1.3			1.6		1.75	1.35	1.2				
30			1.45	1.6	2.0	1.75	1.35		1.15			
31			1.45				1.35			1.3		

NOTE.—Floods March 21 to 24, 1907, and April 3 to 18, 1907, gage under water. Gage washed out April 19 1907, and new gage established June 1, 1907, with datum 2.0 feet lower than datum of old gage.

Rating table for Hobble Creek near Springfield, Utah, for June 1, 1907, to December 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.10	30	1.80	63	2.50	162	3.20	310
1.20	32	1.90	73	2.60	182	3.30	333
1.30	35	2.00	84	2.70	202	3.40	357
1.40	39	2.10	97	2.80	222	3.50	382
1.50	43	2.20	112	2.90	244	3.60	410
1.60	48	2.30	127	3.00	266		
1.70	55	2.40	144	3.10	288		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 7 discharge measurements made during 1907-8, and is fairly well defined between gage heights 1.45 feet and 2.2 feet. It is not well defined, however, for the last six months of 1908.

Monthly discharge of Hobble Creek near Springfield, Utah, for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
June	410	112	240	14,300	D.
July	112	48	73.9	4,540	C.
August	48	39	43.0	2,640	C.
September	43	37	40.9	2,430	C.
October	37	32	34.6	2,130	C.
November	37	35	36.3	2,160	C.
December	37	35	36.7	2,260	C.
The period				30,500	
1908.					
January	37	35	36.0	2,210	C.
February	35	34	34.3	1,970	C.
March	43	34	36.2	2,230	C.
April	68	41	53.1	3,160	C.
May	84	46	54.2	3,330	C.
June	112	55	68.3	4,060	D.
July	59	37	43.8	2,690	D.
August	37	32	35.1	2,160	D.
September	34	31	32.2	1,920	D.
October	35	31	32.7	2,010	D.
November	39	35	37.3	2,220	D.
December	39	37	37.3	2,290	D.
The year	112	31	41.7	30,200	

NOTE.—Discharges interpolated on days when gage was not read. There is not sufficient data for computing discharges for the first half of 1907.

SPANISH FORK BASIN.

DESCRIPTION.

Spanish Fork rises in the Wasatch Mountains and flows northwestward into Utah Lake. The area is generally barren and supports but very little timber or brush. The stream is confined to a steep, narrow canyon, with a very few small openings in which are irrigated farms. The tributaries are all short and many of them are intermittent. The most important, Diamond Fork and Thistle Creek, enter, respectively, about 8 and 10 miles above the gaging station, near Spanish Fork, and like the main stream occupy narrow,

steep-walled canyons. The normal flow comes largely from springs scattered over the entire basin; the flood discharge is direct surface run-off from melting snow.

No storage reservoirs are used on the stream. The entire normal low-water flow is diverted at the mouth of the canyon and used for irrigating lands near Utah Lake.

The stream at present is used for power development at one plant installed in 1908 by the United States Reclamation Service, near the mouth of the canyon. (See Pl. III, *B*.)

During the period for which records are available the wettest year was 1907, when discharge at the station at the mouth of the canyon, near Spanish Fork, was 203,000 acre-feet, of which 98,500 acre-feet wasted into Utah Lake, according to the records at the Lake Shore station. The driest year according to the above records was 1905, when 65,810 acre-feet was discharged at the mouth of the canyon, of which 19,230 acre-feet wasted into the lake.

The following stations have been maintained in this basin:

Spanish Fork at Thistle, Utah, 1908.
Spanish Fork near Spanish Fork, Utah, 1900–1908.
Spanish Fork near Mapleton, Utah, 1900–1901.
Spanish Fork near Lake Shore, Utah, 1903–1907.
Diamond Fork near Thistle, Utah, 1908.

SPANISH FORK AT THISTLE, UTAH.

This station, which was established December 3, 1907, is located one-half mile below Thistle station on the Denver and Rio Grande Railroad, just below the mouth of Thistle Creek and about 2 miles above the mouth of Diamond Fork. Gage height records began January 11, 1908.

The flow is uninfluenced by diversion or storage. The gage heights are often affected by ice during the winter. The section is permanent except during extreme floods and results for the open-water period are good.

Discharge measurements of Spanish Fork at Thistle, Utah, in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 30	A. D. Williams	35	29	3.20	59
April 15	do	34	34	3.40	85
June 2	do	34	46.8	3.72	142
June 26	do	35	31	3.27	73
August 27	E. A. Porter	31	19	2.85	33
September 24	La Rue and Lytel	35	55	3.95	192
October 16	E. C. La Rue	33	26	3.05	52
October 29[a]	do	32	24	3.00	44

[a] Wading measurement.

Daily gage height, in feet, of Spanish Fork at Thistle, Utah, for 1908.

[United States Reclamation Service, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	3.2	3.25	3.2	3.45	3.75	3.2	3.2	2.9	2.9	3.0	3.0
2	.....	3.2	3.2	3.2	3.45	3.7	3.2	3.2	2.9	2.9	3.0	3.0
3	.....	3.2	3.0	3.2	3.5	3.7	3.2	3.2	2.9	3.0	3.0	3.0
4	.....	3.25	3.3	3.2	3.5	3.7	3.2	3.2	2.9	2.9	3.0	3.05
5	.....	3.2	3.3	3.2	3.55	3.65	3.2	4.8	2.9	2.9	3.0	3.05
6	.....	3.2	3.2	3.25	3.55	3.65	3.2	3.1	2.9	2.9	3.0	3.0
7	.....	3.2	3.25	3.1	3.5	3.65	3.2	3.1	2.9	2.9	3.0	3.0
8	.....	3.4	3.2	3.05	3.5	3.65	3.2	3.1	2.9	2.9	3.0	2.9
9	.....	3.2	3.1	3.2	3.7	3.65	3.2	3.05	3.5	2.9	3.0	2.9
10	.....	3.25	3.1	3.3	3.6	3.65	3.15	3.75	3.0	2.9	3.0	3.0
11	3.4	3.2	3.2	3.35	3.65	3.65	3.15	3.2	3.7	2.9	3.0	3.05
12	3.3	3.2	3.2	3.35	3.65	3.6	3.15	3.2	3.0	2.9	3.0	3.05
13	3.4	3.2	3.25	3.35	3.7	3.55	3.5	3.15	3.0	2.9	3.0	3.0
14	3.3	3.2	3.3	3.4	3.7	3.55	3.25	3.15	3.0	2.9	3.0	3.0
15	3.2	3.3	3.4	3.4	3.7	3.5	3.2	3.1	3.0	3.0	3.0	3.05
16	3.2	3.4	3.5	3.4	3.7	3.5	3.15	3.05	3.0	3.0	3.0	3.1
17	3.4	3.3	3.5	3.4	3.75	3.5	3.15	3.05	3.0	3.0	3.0	3.15
18	3.4	3.3	3.45	3.5	3.8	3.6	3.15	3.0	2.9	3.0	3.0	3.2
19	3.3	3.1	3.3	3.5	3.8	3.5	3.1	3.0	2.9	3.1	3.0	3.25
20	3.2	3.3	3.2	3.45	3.75	3.45	3.1	3.0	2.9	3.1	3.0	3.4
21	3.2	3.3	3.1	3.5	3.7	3.45	3.1	3.35	2.9	3.0	3.0	3.6
22	3.2	3.4	3.2	3.5	3.7	3.4	3.1	3.0	2.9	3.0	3.0	3.7
23	3.2	3.4	3.2	3.5	3.75	3.4	3.1	3.0	3.0	3.0	3.0	3.9
24	3.2	3.25	3.25	3.5	3.75	3.35	3.05	2.9	4.0	3.0	3.0	4.0
25	3.2	3.2	3.25	3.5	3.75	3.35	3.05	2.9	3.1	3.0	3.0	4.1
26	3.2	3.3	3.2	3.4	3.75	3.3	3.05	2.9	3.0	3.0	3.0	4.3
27	3.2	3.2	3.2	3.25	3.8	3.3	3.05	2.9	3.0	3.0	3.1	4.8
28	3.2	3.25	3.2	3.2	3.75	3.25	5.25	2.9	2.9	3.0	3.05	5.4
29	3.2	3.3	3.2	3.4	3.75	3.25	4.7	2.9	2.9	3.0	3.0	5.6
30	3.2	.....	3.25	3.4	3.75	3.25	3.5	2.9	2.9	3.0	3.0	3.6
31	3.1	.....	3.25	.....	3.75	.....	3.2	2.9	.....	3.0	.....	3.6

NOTE.—The river was frozen over December 21 to 31 and the gage heights were probably affected by ice December 10 to 20.

Rating table for Spanish Fork at Thistle, Utah, for January 1 to December 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.50	14	3.30	73	4.10	230	4.90	470
2.60	17	3.40	86	4.20	257	5.00	502
2.70	22	3.50	101	4.30	285	5.10	534
2.80	29	3.60	118	4.40	315	5.20	566
2.90	37	3.70	137	4.50	345	5.30	598
3.00	45	3.80	157	4.60	376		
3.10	54	3.90	179	4.70	407		
3.20	63	4.00	203	4.80	438		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 8 discharge measurements made during 1908, and is well defined.

Monthly discharge of Spanish Fork at Thistle, Utah, for 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January 11-31	86	54	68.4	2,850	A.
February	86	54	69.0	3,970	A.
March	101	45	68.2	4,190	A.
April	101	50	79.9	4,750	A.
May	157	94	132	8,120	A.
June	147	68	106	6,310	A.
July	582	50	88.0	5,410	A.
August	438	37	66.0	4,060	A.
September	203	37	51.2	3,050	A.
October	54	37	42.2	2,590	A.
November	54	45	45.5	2,710	A.
December			37.7	2,320	C.
The period				50,300	

NOTE.—Discharge estimated December 10 to 31.

SPANISH FORK NEAR SPANISH FORK, UTAH.

This station, which is located 600 feet above the dam of the East Bench Irrigation Company, 5 miles southeast of Spanish Fork, was established May 23, 1900, discontinued November 30, 1901, and reestablished March 26, 1903, to determine the total water supply from Spanish Fork available for irrigating lands near Utah Lake. The records are of special importance to the United States Reclamation Service in connection with Strawberry Valley storage reservoir project.

The station is below all tributaries and above practically all diversions except the Reclamation Service power canal, which diverted some water past the station during the last part of 1908.

Results at the station are little affected by ice, the river freezing only in exceptionally cold weather. The bed of the stream is composed of sand and gravel, and as the current is swift, especially at high water, the channel is somewhat shifting. Satisfactory results, however, have usually been obtained.

Discharge measurements of Spanish Fork near Spanish Fork, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 28	La Rue and Burridge	42	142	3.30	892
June 17	G. T. Burridge	39	107	2.35	598
June 20	do	39	103	2.25	520
July 5	do	36	64	1.37	248
July 9	do	36	56	1.18	209
July 25	do	36	51	.95	165
August 21	LaRue and Burridge	35	40	.70	123
November 14	E. C. La Rue	35	30	.49	82
1908.					
January 30	A. D. Williams	36	36	.60	106
January 31	do	36	29	.45	83
March 26	do	36	36	.65	110
April 17	do	36	42	.90	141
June 3	do	37	54	1.30	212
October 29	E. C. La Rue	36	36	.75	109

Daily gage height, in feet, of Spanish Fork near Spanish Fork, Utah, for 1907 and 1908.

[United States Reclamation Service, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1.3	1.35	1.7	2.25	3.45	3.35	1.5	0.9	0.8	0.75	0.65	0.55
2	1.15	1.35	1.7	2.3	3.4	3.55	1.5	.9	.8	.8	.65	.5
3	1.1	1.6	1.7	2.5	3.2	3.8	1.4	1.1	.75	.8	.65	.5
4	1.15	1.7	1.7	2.7	3.15	3.95	1.35	1.0	.75	.75	.65	.55
5	1.2	3.7	1.7	2.75	3.2	4.05	1.3	.95	.9	.75	.65	.55
6	1.3	2.7	1.7	2.7	3.25	3.9	1.2	.9	.85	.8	.65	.55
7	1.2	2.1	1.65	2.7	3.25	3.75	1.2	.9	.85	.75	.65	.65
8	1.2	1.7	1.65	2.7	3.2	3.65	1.2	.9	.8	.7	.65	.5
9	1.3	1.55	1.65	2.8	3.2	3.35	1.2	.85	.8	.7	.65	.5
10	1.25	1.65	1.65	3.2	3.3	3.15	1.2	.75	.8	.7	.65	.45
11	1.25	1.65	1.65	3.6	3.75	2.95	1.1	.75	.75	.7	.65	.6
12	1.2	1.6	1.9	3.8	3.9	2.95	1.1	.75	.7	.7	.6	.6
13	1.3	1.55	1.9	4.1	4.35	2.95	1.1	.75	.7	.7	.45	.55
14	1.3	1.55	1.65	4.5	3.65	2.6	1.15	.75	.7	.7	.5	.55
15	1.3	1.5	1.7	4.5	3.6	2.5	1.05	.8	.7	.7	.55	.55
16	1.3	1.5	1.7	4.2	3.5	2.5	1.05	.8	.7	.7	.5	.55
17	1.3	1.55	1.75	3.85	3.7	2.35	1.0	.75	.7	.7	.5	.55
18	1.25	1.7	1.8	3.65	4.1	2.3	.95	1.0	.7	.75	.6	.5
19	1.3	1.65	1.8	3.5	4.5	2.25	.95	.85	.7	.7	.6	.5
20	1.2	1.6	1.9	3.2	5.4	2.25	.95	.8	.7	.7	.6	.5
21	1.1	1.6	2.2	3.1	6.0	2.15	1.0	.75	.65	.7	.55	.5
22	1.15	1.65	2.5	3.0	5.8	2.0	1.0	.9	.65	.65	.5	.5
23	1.2	2.0	2.5	2.9	4.7	1.95	.95	.85	.65	.65	.5	.6
24	1.2	1.8	2.4	3.05	4.4	1.75	.9	.85	.65	.65	.55	.55
25	1.3	1.7	2.2	3.1	4.5	1.7	.95	.85	.65	.65	.5	.55
26	1.3	1.7	2.2	3.1	.....	1.65	1.0	.9	.65	.65	.5	.6
27	1.3	1.7	2.2	3.5	.....	1.65	1.0	.8	.65	.65	.5	.65
28	1.3	1.8	2.05	3.9	3.3	1.6	1.05	.8	.7	.65	.55	.65
29	1.3	.....	2.0	3.8	.....	1.6	1.0	.8	.7	.65	.6	.6
30	1.3	.....	2.1	3.5	3.05	1.55	.95	1.0	.75	.65	.5	.55
31	1.35	.....	2.1	.....	3.1	.....	.9	.85	.....	.7	.....	.55
1908.												
1	.5	.35	.6	.6	.8	1.3	.7	.8	.45	.5	.55	.4
2	.5	.4	.6	.6	.85	1.3	.7	.7	.45	.55	.55	.5
3	.5	.5	.6	.6	.9	1.3	.65	.7	.5	.6	.6	.5
4	.5	.6	.65	.6	1.6	1.3	.65	.6	.5	.6	.55	.5
5	.45	.5	.75	.6	.95	1.3	.65	.9	.5	.6	.55	.55
6	.45	.35	.55	.7	.95	1.3	.65	.75	.5	.55	.55	.55
7	.45	.45	.35	.7	1.0	1.3	.65	.65	.5	.55	.55	.4
8	.45	.5	.55	.65	1.05	1.25	.65	.6	.55	.55	.55	.4
9	.45	.55	.5	.65	1.15	1.25	.65	.6	.5	.5	.55	.4
10	.4	.55	.5	.7	1.1	1.25	.65	.55	.5	.5	.55	.45
11	.4	.6	.5	.85	1.1	1.25	.65	.75	.65	.5	.55	.45
12	.35	.55	.6	.85	1.1	1.25	.65	.65	.7	.5	.55	.4
13	.35	.4	.65	.85	1.15	1.15	.65	.6	.6	.5	.55	.4
14	.4	.2	.7	.9	1.1	1.1	.7	.6	.55	.5	.55	.35
15	.5	.3	.8	.9	1.15	1.1	.7	.55	.5	.5	.55	.35
16	.45	.4	.9	.95	1.15	1.1	.65	.55	.5	.65	.45	.35
17	.45	.55	.95	.9	1.15	1.1	.65	.55	.5	.6	.45	.35
18	.45	.5	.9	.9	1.2	1.4	.6	.55	.5	.55	.45	.35
19	.5	.35	.75	.95	1.25	1.2	.55	.5	.5	.65	.45	.3
20	.5	.5	.7	.95	1.3	1.1	.55	.5	.45	.65	.55	.....
21	.5	.4	.65	.95	1.25	1.0	.55	.5	.45	.6	.55	.....
22	.5	.5	.6	.95	1.2	1.0	.55	.6	.45	.6	.5	.....
23	.5	.65	.65	1.1	1.15	1.0	.55	.55	.45	.6	.5	.....
24	.55	.6	.65	1.0	1.1	.9	.55	.5	1.1	.6	.6	.....
25	.55	.6	.7	.95	1.1	.85	.5	.5	.85	.6	.65	.....
26	.55	.6	.7	.85	1.25	.8	.6	.5	.6	.55	.55	.....
27	.5	.6	.65	.85	1.25	.8	.55	.5	.6	.6	.4	.....
28	.5	.65	.65	.85	1.25	.75	1.1	.45	.55	.6	.35	.....
29	.5	.65	.65	.8	1.25	.75	1.7	.45	.55	.55	.4	.....
30	.55	.....	.65	.8	1.25	.7	.7	.4	.55	.55	.4	.....
31	.45	.....	.7	.....	1.3	.....	.7	.45	.....	.55	.....	.....

NOTE.—The river was frozen over December 18 to 31, 1908; there was probably not much ice at other times.

Rating tables for Spanish Fork near Spanish Fork, Utah.

JUNE 2, 1906, TO MAY 19, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.00	52	1.90	203	2.80	439	3.70	684
1.10	62	2.00	227	2.90	466	3.80	712
1.20	74	2.10	252	3.00	493	3.90	740
1.30	88	2.20	277	3.10	520	4.00	768
1.40	104	2.30	304	3.20	547	4.20	824
1.50	120	2.40	331	3.30	574	4.40	880
1.60	138	2.50	358	3.40	601	4.60	936
1.70	158	2.60	385	3.50	629		
1.80	180	2.70	412	3.60	657		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 6 discharge measurements made during 1906, and is not well defined.

MAY 20, 1907, TO APRIL 10, 1908.

0.20	46	1.50	280	2.80	715	4.20	1,250
.30	57	1.60	308	2.90	750	4.40	1,330
.40	70	1.70	338	3.00	785	4.60	1,410
.50	84	1.80	368	3.10	820	4.80	1,490
.60	100	1.90	400	3.20	855	5.00	1,570
.70	117	2.00	435	3.30	890	5.20	1,650
.80	136	2.10	470	3.40	930	5.40	1,730
.90	156	2.20	505	3.50	970	5.60	1,810
1.00	176	2.30	540	3.60	1,010	5.80	1,890
1.10	196	2.40	575	3.70	1,050	6.00	1,970
1.20	216	2.50	610	3.80	1,090		
1.30	236	2.60	645	3.90	1,130		
1.40	256	2.70	680	4.00	1,170		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 11 discharge measurements made during the period covered, and is well defined between gage heights 0.5 foot and 3.5 feet.

APRIL 11 TO DECEMBER 31, 1908.

0.20	39	0.60	87	1.00	154	1.40	240
.30	49	.70	102	1.10	174	1.50	264
.40	60	.80	118	1.20	195	1.60	290
.50	73	.90	135	1.30	217	1.70	318

NOTE—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1908–9 and the form of the previous curve, and is well defined between gage heights 0.6 foot and 1.3 feet.

Monthly discharge of Spanish Fork near Spanish Fork, Utah, for 1907 and 1908.

[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.	
1907.							
January	96	62	80.8	0.121	0.14	4,970	C.
February	684	96	178	.266	.28	9,890	C.
March	358	148	207	.309	.36	12,700	C.
April	908	290	571	.852	.95	34,000	C.
May	1,970	534	889	1.33	1.53	54,700	C.
June	1,190	294	674	1.01	1.13	40,100	B.
July	280	156	197	.294	.34	12,100	A.
August	196	126	147	.219	.25	9,040	A.
September	156	108	122	.182	.20	7,260	A.
October	136	108	118	.176	.20	7,260	A.
November	108	77	96.3	.144	.16	5,730	B.
December	108	77	92.0	.137	.16	5,660	B.
The year	1,970	62	281	.420	5.70	203,000	

Monthly discharge of Spanish Fork near Spanish Fork, Utah, for 1907 and 1908—Con.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1908.							
January	92	64	80.4	0.120	0.14	4,940	B.
February	108	46	84.4	.126	.14	4,850	B.
March	166	64	110	.164	.19	6,760	B.
April	174	100	126	.188	.21	7,500	B.
May	290	118	180	.269	.31	11,100	A.
June	240	102	177	.264	.29	10,500	A.
July	318	73	101	.151	.17	6,210	B.
August	135	60	85.0	.127	.15	5,230	B.
September	174	66	81.0	.121	.14	4,820	B.
October	94	73	82.0	.122	.14	5,040	B.
November	94	54	75.7	.113	.13	4,500	B.
December	.....	.....	57.6	.086	.10	3,540	C.
The year	318	.....	103	.154	2.11	75,000	

NOTE.—Discharge estimated December 18 to 31, 1908.

SPANISH FORK NEAR LAKE SHORE, UTAH.

This station, which was located about 3 miles west of the town of Spanish Fork and about 3 miles from Utah Lake, was established December 10, 1903, to determine the amount of unappropriated run-off discharged into Utah Lake, and was discontinued July 10, 1907. The entire normal summer flow is diverted above the station, and the stream is dry from some time in June and July until about December 1.

The records have been little affected by ice. The bed is of a very shifting character and results have been rather unsatisfactory. Gage heights prior to May 26, 1904, were observed on a gage just below the bridge on the highway from Spanish Fork to Lake Shore. After that time they were read from a gage at the cable, 800 feet above the bridge. All gage heights for 1904 have been reduced to corresponding readings on the old gage.

Discharge measurements of Spanish Fork near Lake Shore, Utah, in 1907.

Date.	Hydrographer.	Area of section.	Gage height.	Discharge.
1907.		*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 17	G. T. Burridge	126	7.75	382
July 5	do	10	4.85	13
July 24	do	4	4.50	0.4

Daily gage height, in feet, of Spanish Fork near Lake Shore, Utah, for 1907.

[L. P. Larsen, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1....	4.9	5.1	5.5	6.2	8.35	8.35	5.1	16....	5.0	5.4	5.6	9.5	8.85	8.0	.....
2....	4.9	5.1	5.5	6.4	8.35	8.35	5.0	17....	5.0	5.5	6.0	9.35	9.25	7.8	.....
3....	4.8	5.6	5.5	6.8	8.35	8.5	5.0	18....	5.0	5.5	6.2	8.65	9.25	7.6	.....
4....	4.8	6.8	5.5	7.4	8.35	8.5	4.8	19....	5.0	5.5	6.5	8.5	9.25	7.4	.....
5....	4.8	8.0	5.5	7.4	8.25	8.5	4.8	20....	4.9	5.5	6.7	8.5	9.5	7.3	.....
6....	4.85	7.7	5.5	7.2	8.25	8.5	4.8	21....	4.9	5.5	6.8	8.65	9.65	6.6	.....
7....	4.85	6.3	5.5	7.0	8.25	8.5	4.8	22....	4.9	5.6	6.9	8.65	9.4	6.5	.....
8....	4.9	5.7	5.5	7.3	8.0	8.5	4.8	23....	4.9	5.6	6.9	8.65	9.2	6.5	.....
9....	4.85	5.6	5.5	7.8	8.0	8.35	4.8	24....	4.8	5.6	6.8	8.85	9.0	6.4	.....
10....	4.9	5.5	5.5	8.0	8.0	8.2	.....	25....	4.8	5.6	6.7	8.85	8.8	6.3	.....
11....	4.9	5.5	5.5	8.35	8.0	8.2	.....	26....	4.9	5.6	6.6	8.85	8.6	5.9	.....
12....	5.0	5.5	5.6	9.0	8.65	8.8	.....	27....	4.9	5.6	6.4	8.85	8.4	5.8	.....
13....	5.0	5.4	5.6	9.3	8.65	8.8	.....	28....	5.0	5.6	6.2	8.6	8.2	5.7	.....
14....	5.0	5.4	5.6	9.5	8.5	8.6	.....	29....	5.0	.....	6.1	8.6	8.2	5.6	.....
15....	5.0	5.4	5.6	9.5	8.5	8.6	.....	30....	5.0	.....	6.0	8.5	8.0	5.4	.....
								31....	5.1	.....	6.0	.....	8.0	.....	.....

NOTE.—Spanish Fork was practically dry after July 9 until late in fall.

Daily discharge, in second-feet, of Spanish Fork near Lake Shore, Utah, for 1907.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1....	63	80	116	192	488	452	24	16....	71	106	126	590	512	410	.....
2....	63	80	116	216	488	452	19	17....	71	116	169	572	560	386	.....
3....	55	126	116	265	488	470	19	18....	71	116	192	488	560	354	.....
4....	55	265	116	338	488	470	11	19....	71	116	228	470	560	316	.....
5....	55	410	116	338	440	470	11	20....	63	116	252	470	590	298	.....
6....	59	375	116	314	440	470	11	21....	63	116	265	488	608	176	.....
7....	59	204	116	289	440	470	11	22....	63	126	277	488	578	161	.....
8....	63	137	116	326	410	470	11	23....	63	126	277	488	554	161	.....
9....	59	126	116	387	410	452	11	24....	55	126	265	512	530	146	.....
10....	53	116	116	410	410	434	.....	25....	55	126	252	512	506	132	.....
11....	53	116	116	452	410	434	.....	26....	63	126	240	512	482	83	.....
12....	71	116	126	530	488	506	.....	27....	63	126	216	512	458	73	.....
13....	71	106	126	566	488	506	.....	28....	71	126	192	482	434	64	.....
14....	71	106	126	590	470	482	.....	29....	71	.....	180	482	434	56	.....
15....	71	106	126	590	470	482	.....	30....	71	.....	168	470	410	41	.....
								31....	80	.....	168	.....	410	.....	.....

NOTE.—These discharges were obtained from two rating tables which are very poorly defined.

Monthly discharge of Spanish Fork near Lake Shore, Utah, for 1907.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	80	53	64.1	3,940	D.
February	410	80	144	8,000	C.
March	277	116	169	10,400	C.
April	590	192	445	26,500	C.
May	608	410	484	29,800	C.
June	506	41	329	19,600	C.
July 1–9	24	.....	14.2	254	D.
The period	.....	.....	.....	98,500	

DIAMOND FORK NEAR THISTLE, UTAH.

Diamond Fork (also known as North Fork) is tributary to Spanish Fork about 2 miles below the mouth of Thistle Creek. The gaging station, which was established December 2, 1907, is located about one-fourth mile above the mouth.

The Strawberry Valley tunnel will discharge into the headwaters at an elevation of nearly 7,500 feet. At present the run-off at the station is unaffected either by diversion or storage. Results are rendered somewhat inaccurate by shifting channel, and during the winter by ice.

Discharge measurements of Diamond Fork near Thistle, Utah, in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 30	A. D. Williams	20.0	18.0	3.12	19.6
March 26	do	20.0	20.0	3.25	26.5
April 16	do	19.5	20.0	3.35	32.0
June 2	do	20.0	24.0	3.50	47.3
June 27	do	19.5	21.0	3.37	34.0
August 27	E. A. Porter	18.0	14.7	3.00	14.0
September 22	E. C. La Rue	18.4	13.0	3.00	11.0
October 13	do	19.7	15.1	3.08	14.3
October 29	do	19.7	14.0	3.10	14.1

Daily gage height, in feet, of Diamond Fork near Thistle, Utah, for 1908.

[United States Reclamation Service, observer.]

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

NOTE.—Ice conditions December 19 to 28.

Daily discharge, in second-feet, of Diamond Fork near Thistle, Utah, for 1908.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		21	20	22	32	42	32	19	13	12	12	13
2		18	20	22	32	47	32	19	13	12	12	13
3		12	20	22	37	47	28	19	13	15	12	14
4		24	27	26	37	47	24	19	13	15	12	16
5		28	27	30	42	47	24	22	13	15	12	14
6		33	23	30	37	42	21	22	13	15	12	14
7		18	23	29	32	42	21	22	13	15	12	14
8		28	14	25	32	42	21	19	12	15	12	14
9		18	12	25	37	42	18	16	12	15	12	14
10		21	23	25	42	42	18	16	12	15	12	14
11	11	18	23	28	42	47	18	19	12	15	12	14
12	11	14	23	32	42	53	16	19	12	15	12	14
13	11	14	22	32	47	53	28	17	12	15	12	13
14	11	24	23	37	42	53	24	17	12	15	12	11
15	14	28	27	37	37	53	21	17	12	15	12	11
16	12	24	31	32	37	59	18	17	12	15	12	11
17	11	32	31	37	37	59	18	17	12	15	12	12
18	13	24	31	37	37	59	18	17	11	15	12	11
19	14	28	23	32	37	53	18	17	11	15	12	11
20	12	28	23	37	42	47	18	17	11	15	12	11
21	11	24	27	37	42	42	19	15	11	15	12	11
22	12	21	23	37	42	37	19	15	11	15	12	11
23	13	24	23	47	37	37	19	14	11	15	12	11
24	21	20	27	42	37	37	19	14	37	15	12	11
25	16	24	31	37	37	42	19	14	23	15	12	11
26	16	24	23	32	42	37	19	14	11	15	12	11
27	21	24	26	28	53	37	22	14	11	13	14	11
28	16	24	23	28	47	37	28	14	12	13	14	11
29	16	24	23	28	42	32	22	14	12	12	12	11
30	20	.....	23	32	42	32	19	14	12	12	13	11
31	14	.....	22	.....	42	.....	22	14	.....	12	.....	11

NOTE.—These discharges were obtained by the indirect method for shifting channels, except December 19 to 28, which were estimated.

Monthly discharge of Diamond Fork near Thistle, Utah, for 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January 11-31	21	11	14.1	587	B.
February	33	12	22.9	1,320	B.
March	31	12	23.8	1,460	B.
April	47	22	31.5	1,870	B.
May	53	32	39.5	2,430	B.
June	59	32	44.9	2,670	B.
July	32	16	21.4	1,320	B.
August	22	14	16.9	1,040	B.
September	37	11	13.2	786	B.
October	15	12	14.4	885	B.
November	14	12	12.2	726	B.
December	.....	.....	12.3	756	C.
The period	.....	.....	.....	15,800	

SEVIER RIVER BASIN.

DESCRIPTION.

Sevier River is formed by the junction of 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, and then turns sharply

to the southwest and discharges into Sevier Lake. It is more than 200 miles long, measured by general course, and drains an area of about 5,000 square miles above the lower end of Sevier Valley.

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

Considerable irrigation is practiced from the Sevier above Gunnison, and the flow is controlled by a few small storage reservoirs.

The wettest year in the basin since 1900 was 1907 and the driest was 1902, the ratios of discharge for the two years being about 11 to 1.

The following gaging stations have been manitained in this basin:

Sevier River near Marysvale, Utah, 1906–1908.
Sevier River near Gunnison, Utah, 1900–1908.
Salina Creek near Salina, Utah, 1900.
San Pitch River near Gunnison, Utah, 1900–1905.
Manti Creek near Manti, Utah, 1900.

SEVIER RIVER NEAR MARYSVALE, UTAH.

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

A gage for high-water records was established May 23, 1906, at a different datum from that of the regular gage and was read until June 9, and for a few days thereafter. All gage heights have been reduced to the datum of the regular gage.

The results are somewhat affected by ice during severe weather, but are otherwise fairly reliable. The stream bed is of clay and will shift occasionally at high water. Gage-height records have not been obtained continuously.

Discharge measurements of Sevier River near Marysvale, Utah, in 1906 to 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1906.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 24	H. S. Kleinschmidt	55	221	4.85	673
July 19	T. Greive, jr	49	128	[a] 3.01	260
1907.					
June 1	G. T. Burridge	60	383	6.40	1,230
July 12	do	50	146	3.30	302
July 30	do	51	154	3.80	397
August 24	La Rue and Burridge	53	195	4.25	537
1908.					
April 14	A. D. Williams	53	176	4.30	480
June 5	do	52	139	3.35	326
June 24	do	51	95	2.70	196

[a] Reduced to datum of regular gage. The gage height as given in Water-Supply Paper 212, p. 47, was referred to the temporary gage.

Daily gage height, in feet, of Sevier River near Marysvale, Utah, for 1906 to 1908.

[Mrs. Martha Pitts, observer.]

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1906.[a]				1906.[a]				1906.[a]			
1		3.5	3.0	11		2.4		21		4.15	
2		3.5	4.0	12		2.5		22		4.0	
3		3.3	3.5	13		2.7		23	2.8	3.9	
4		3.15	3.3	14		2.7		24	2.9	3.8	
5		3.0	3.2	15		3.0		25	3.0	3.55	
6		2.7		16		3.3		26	3.3	3.3	
7		2.6		17		3.6		27	3.5	3.15	
8		2.5		18		3.7		28	3.75	3.0	
9		2.45		19	3.0	3.7		29	3.9	3.0	
10		2.4		20		3.85		30	3.75	3.0	
								31	3.65	3.0	

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.							1907.						
1		3.7	3.75		3.25	3.3	16	2.8	3.2	2.8	3.3	3.1	3.2
2		5.0	3.75		3.25	3.3	17	2.8	3.1	2.8	3.7	3.0	3.1
3		4.3	3.65		3.1	3.4	18	2.8	3.6	2.8	3.2	3.0	3.2
4		4.0	3.65		3.1	3.3	19	2.8	3.5	2.7	3.1	3.0	3.2
5		4.35	3.7		3.25	3.3	20	2.9	3.5	2.6	3.2	3.05	3.1
6		4.15	3.8		3.25	3.4	21	3.1	4.1	2.6	3.1	3.15	3.1
7		4.1	3.7	4.1	3.25	3.4	22	3.1	4.35	2.6	3.1	3.05	3.15
8		4.0	3.7	3.7	3.1	3.4	23	3.15	4.1	3.3	3.1	2.9	3.2
9		3.8	3.65	3.5	3.15	3.4	24	3.3	4.25	3.3	3.2	2.9	3.0
10		3.7	3.5	3.0	3.1	3.4	25	3.45	4.15	3.35	3.2	3.0	3.1
11		3.6	3.4	2.8	3.1	3.4	26	4.3	4.0	3.35	3.1	3.2	3.3
12	3.3	3.5	3.2	2.7	3.1	3.35	27	4.35	3.8	3.3	3.1	3.25	3.1
13	3.2	3.5	3.1	2.8	3.05	3.3	28	4.3	3.8	3.2	3.1	3.3	3.1
14	3.0	3.2	2.95	2.7	3.05	3.4	29	3.95	3.8	3.15	3.25	3.3	3.1
15	2.9	3.2	2.9	3.5	3.05	3.2	30	3.85	3.8	3.1	3.25	3.3	3.2
							31	3.8	3.8		3.25		3.25

[a] These gage heights were omitted from Water-Supply Paper 212, p. 47, where are given gage heights for February to June, 1906.

32606—IRR 250—10——6

Daily gage height, in feet, of Sevier River near Marysvale, Utah, for 1906 to 1908—Cont'd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	3.3	3.05	3.2	3.3	4.1	3.4	2.7	4.7	3.4	3.25	2.9	.....
2	3.2	3.1	3.0	3.25	4.3	3.4	2.8	5.15	3.45	3.2	2.9	.....
3	3.2	3.1	3.0	3.35	4.4	3.3	3.0	4.9	3.6	3.2	2.85	2.65
4	3.2	3.2	3.0	3.50	4.65	3.3	3.0	4.9	3.6	3.25	2.9	.....
5	3.25	3.15	3.0	3.45	4.6	3.25	2.95	4.4	3.8	3.3	2.85	.....
6	3.2	3.3	3.15	3.5	4.55	3.25	3.0	4.25	3.6	2.95	2.85	.....
7	3.1	3.2	3.0	3.6	4.5	3.45	2.9	4.0	3.5	2.8	2.85	.....
8	3.1	3.15	3.0	3.8	4.5	3.45	2.9	3.7	3.5	2.75	2.85	.....
9	3.15	3.3	2.95	3.8	4.55	3.3	2.9	3.45	4.4	2.7	2.8	.....
10	3.2	3.3	2.9	3.7	4.35	3.15	2.95	3.9	3.8	2.6	2.8	.....
11	3.2	3.35	2.9	3.7	4.15	3.1	2.9	5.1	3.8	2.55	2.8	.....
12	3.1	3.2	2.95	3.8	4.1	3.0	3.3	4.6	3.8	2.5	2.8	2.5
13	3.25	3.25	2.95	3.85	4.1	3.05	3.1	4.4	3.85	2.45	2.8	.....
14	3.15	3.1	3.05	4.3	4.0	3.1	3.35	4.1	3.85	2.45	2.8	.....
15	3.35	3.1	3.2	4.7	3.9	3.25	3.55	3.9	3.8	2.4	2.8	.....
16	3.35	3.2	3.35	4.9	3.7	3.2	3.6	3.65	3.75	2.5	2.8	.....
17	3.2	3.2	3.5	4.8	3.5	3.3	3.55	3.55	3.7	2.6	2.75	.....
18	3.1	3.25	3.55	4.8	3.45	3.25	3.5	3.55	3.6	2.7	2.7	.....
19	3.2	3.25	3.55	4.9	3.3	3.2	3.3	3.8	3.5	2.8	2.65	4.4
20	3.2	3.25	3.55	5.3	3.25	3.1	3.2	3.5	3.5	2.8	2.65	4.5
21	3.1	3.2	3.5	5.25	3.3	3.1	3.25	3.35	3.4	2.9	2.7	4.3
22	3.25	3.25	3.5	5.35	3.2	2.85	3.1	3.25	3.4	2.8	2.7	4.3
23	3.25	3.4	3.4	5.6	3.2	2.7	3.1	3.2	3.4	2.8	2.75	4.2
24	3.2	3.3	3.45	5.55	3.2	2.7	3.15	3.1	3.4	2.75	2.7	4.2
25	3.2	3.3	3.5	4.9	3.15	2.65	3.3	3.0	3.4	2.95	.....	4.2
26	3.25	3.35	3.4	4.65	3.15	2.5	3.65	2.95	3.6	3.0	.....	3.3
27	3.25	3.4	3.2	4.5	3.2	2.65	3.65	2.8	3.45	3.0	.....	3.3
28	3.2	3.2	3.45	4.35	3.25	2.3	3.7	2.7	3.6	2.95	.....	3.3
29	3.2	3.1	3.4	4.4	3.2	2.2	4.2	2.75	3.55	2.95	2.6	3.3
30	3.1	.....	3.35	4.2	3.1	2.4	4.9	3.25	3.45	2.9	2.55	3.1
31	3.1	.....	.....	.....	3.3	.....	4.7	3.3	.....	2.9	.....	3.2

NOTE.—Ice conditions December 18 to 31, 1908.

Rating table for Sevier River near Marysvale, Utah, for 1906 to 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.20	140	3.60	358	5.90	705	6.80	1,410
2.30	151	3.70	378	5.10	736	7.00	1,510
2.40	163	3.80	399	5.20	768	7.20	1,610
2.50	176	3.90	421	5.30	800	7.40	1,710
2.60	189	4.00	444	5.40	834	7.60	1,810
2.70	203	4.10	467	5.50	870	7.80	1,910
2.80	218	4.20	491	5.60	906	8.00	2,010
2.90	234	4.30	515	5.70	942	8.20	2,110
3.00	250	4.40	540	5.80	980	8.40	2,210
3.10	267	4.50	565	5.90	1,020	8.60	2,310
3.20	284	4.60	591	6.00	1,060	8.80	2,410
3.30	302	4.70	618	6.20	1,142		
3.40	320	4.80	646	6.40	1,226		
3.50	339	4.90	675	6.60	1,316		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 9 discharge measurements made during 1906 to 1908, and is fairly well defined between gage heights 2.2 feet and 6.5 feet. Above gage height 6.8 feet the rating curve is a tangent, the difference being 50 per tenth.

Monthly discharge of Sevier River near Marysvale, Utah, for 1906 to 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1906.[a]					
February 18–28	208	176	190	4,150	B.
March	258	153	187	11,500	B.
April	736	182	362	21,500	B.
May	2,300	618	1,470	90,400	C.
June	1,640	330	895	53,300	B.
July 19–31	421	218	297	7,660	B.
August	479	163	287	17,600	B.
September 1–5	444	250	324	3,210	B.
The period				209,000	
1907.					
July 12–31	528	218	321	12,700	B.
August	705	267	413	25,400	B.
September	399	189	296	17,600	B.
October	467	203	307	18,900	B.
November	302	234	271	16,100	B.
December	320	250	293	18,000	B.
The period				109,000	
1908.					
January	311	267	284	17,500	B.
February	320	258	289	16,600	B.
March	348	234	291	17,900	B.
April	906	293	534	31,800	B.
May	604	267	406	25,000	B.
June	330	140	258	15,400	B.
July	675	203	315	19,400	B.
August	752	203	412	25,300	B.
September	540	320	363	21,600	B.
October	302	163	224	13,800	B.
November	234	182	212	12,600	B.
December			178	10,900	C.
The year	906	140	314	228,000	

[a] Discharge interpolated February 19 and 20, and May 10 to 22.

NOTE.—Ice conditions December 18 to 31, 1908, and discharge estimated. Discharge interpolated on days when gage was not read.

SEVIER RIVER NEAR GUNNISON, UTAH.

This station, which was established June 29, 1900, to obtain data for use in connection with irrigation in the Sevier Valley, is located about 4 miles west of Gunnison, Utah, on the road to Westview precinct. It is about three-fourths of a mile above the mouth of San Pitch River and below all other tributaries of importance.

The river freezes occasionally during the winter and the channel is liable to shift slightly during floods, but on the whole the records obtained are good.

Discharge measurements of Sevier River near Gunnison, Utah, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 2	G. T. Burridge	78	369	5.35	1,430
July 13	do	50	181	2.50	307
July 31	do	51	188	2.40	309
August 25	La Rue and Burridge	60	245	3.45	709
1908.					
April 15	A. D. Williams	39	137	2.00	173
June 6	do	38	161	1.80	163
June 6	do	42	145	1.80	157
June 25	do	42	135	1.70	132

Daily gage height, in feet, of Sevier River near Gunnison, Utah, for 1907 and 1908.

[L. H. Erickson, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.8	2.85	2.8	3.0	3.75	5.6	4.1	.....	3.0	1.95	2.8	2.8
2	2.8	2.9	2.8	2.95	3.45	5.65	4.05	2.45	2.85	1.9	2.8	2.8
3	2.85	2.9	2.8	2.9	3.4	5.7	4.0	2.7	2.8	2.35	2.8	2.8
4	2.85	2.9	2.8	2.8	3.4	5.75	3.85	2.95	2.8	2.35	2.8	2.8
5	2.85	2.85	2.85	2.75	3.35	5.8	3.5	.....	2.8	2.3	2.8	2.8
6	2.9	2.85	2.85	2.7	3.3	5.85	3.35	2.95	2.75	2.3	2.8	2.85
7	2.85	2.9	2.85	.....	3.4	5.9	3.3	3.2	2.75	2.35	2.8	2.9
8	2.85	2.95	2.9	2.55	3.45	6.0	3.2	3.55	2.7	2.35	2.8	3.0
9	2.85	2.95	2.9	2.6	3.5	6.0	3.1	3.6	2.7	2.35	2.8	3.0
10	2.9	2.95	2.9	2.7	3.45	6.05	3.05	3.6	2.7	2.3	2.85	3.0
11	2.9	2.8	2.9	2.75	3.7	6.1	3.0	3.15	2.7	2.3	2.85	3.05
12	2.9	2.8	2.9	2.8	4.2	6.1	2.8	3.1	2.65	.....	2.9	3.1
13	2.9	2.8	2.85	2.85	4.55	6.1	2.7	3.1	2.6	.....	.....	3.1
14	2.9	2.7	2.8	2.9	4.55	6.1	2.75	2.95	2.6	2.4	2.8	3.2
15	2.9	2.7	2.8	2.95	4.55	6.0	2.7	2.85	2.6	2.45	2.8	3.2
16	2.95	2.6	2.8	3.0	4.7	5.85	2.55	2.8	2.55	2.5	2.8	3.2
17	3.0	2.6	2.75	.....	4.9	5.85	2.3	2.8	2.55	2.5	2.85	3.2
18	3.2	2.6	2.7	3.0	5.0	5.6	2.0	2.85	2.55	2.55	2.85	3.2
19	3.7	2.6	2.7	3.4	5.1	5.45	1.95	2.8	2.5	2.6	2.8	3.25
20	3.3	2.65	2.7	4.05	5.1	5.3	1.75	2.8	2.5	2.6	2.8	3.25
21	3.1	2.6	2.65	4.15	5.1	5.25	1.7	2.8	2.5	2.6	2.8	3.3
22	3.0	2.65	2.65	4.25	5.0	5.2	1.7	2.75	2.45	2.65	.....	3.3
23	3.0	2.65	2.7	4.35	5.15	5.05	1.7	3.0	2.4	2.65	.....	3.3
24	2.85	2.65	2.8	4.45	5.15	5.0	1.65	3.05	2.3	2.7	2.8	3.3
25	2.85	2.6	2.8	4.4	5.1	4.85	1.65	3.3	2.25	2.7	2.8	3.3
26	2.8	2.6	2.8	4.2	5.1	4.5	1.7	3.25	2.2	2.7	2.8	3.3
27	2.8	2.65	2.85	4.15	5.3	5.35	2.1	3.2	2.2	2.8	2.8	3.25
28	2.8	2.8	2.8	4.0	5.45	4.25	2.0	3.1	2.15	2.8	2.85	3.3
29	2.8	.....	2.9	3.75	5.5	4.2	1.95	3.0	1.95	.....	2.8	3.3
30	2.85	.....	2.9	3.7	5.5	4.1	2.0	3.0	1.95	.....	2.8	3.3
31	2.8	.....	3.0	.....	5.55	.....	2.45	3.0	.....	2.8	.....	3.3
1908.												
1	3.3	3.0	3.0	.....	.....	.....	.....	.....	1.95	2.6	3.0	2.7
2	3.3	.....	3.0	.....	2.75	1.9	.....	.....	.....	2.6	.....	2.65
3	3.3	3.0	2.9	2.75	.....	.....	1.7	3.55	2.0	2.65	2.95	2.65
4	3.15	3.0	2.9	.....	2.7	1.95	1.75	.....	.....	2.75	2.95	.....
5	3.15	3.0	.....	2.7	.....	2.1	.....	.....	2.0	2.75	.....	2.7
6	3.1	3.0	.....	2.7	.....	.....	1.75	3.65	.....	2.65	2.9	.....
7	3.1	3.0	2.9	.....	2.7	2.15	.....	3.7	2.0	2.65	.....	2.7
8	3.1	3.0	.....	2.55	.....	.....	1.65	3.7	.....	2.6	2.9	2.7
9	3.15	.....	.....	.....	.....	2.3	.....	.....	2.05	2.5	2.9	.....
10	3.15	3.0	2.9	.....	.....	.....	1.25	3.55	.....	2.5	2.85	2.65
11	3.2	3.0	.....	2.35	2.6	2.35	1.1	.....	2.1	2.5	.....	2.6
12	3.2	3.0	.....	.....	3.0	2.35	.....	3.45	.....	2.55	2.85	.....
13	3.2	3.0	.....	2.1	.....	.....	1.35	.....	2.1	.....	.....	2.7
14	3.2	3.0	2.85	.....	3.15	2.5	.....	.....	2.1	2.6	2.9	.....
15	3.15	3.0	2.8	.....	.....	.....	1.4	3.25	.....	2.65	.....	2.75
16	3.15	3.0	.....	.....	2.8	2.75	.....	.....	2.1	2.65	2.9	.....
17	3.1	3.0	2.8	1.95	2.8	2.65	1.35	3.2	2.2	2.7	2.9	2.75
18	3.1	3.05	.....	.....	.....	.....	1.4	.....	.....	.....	.....	2.75
19	3.1	3.05	.....	2.3	2.75	2.6	.....	3.5	2.2	2.7	2.85	.....
20	3.05	3.05	2.8	.....	.....	.....	1.45	.....	.....	.....	.....	.....
21	3.05	3.05	.....	.....	2.7	1.95	.....	3.3	2.2	2.7	2.85	.....
22	3.1	3.1	2.75	2.7	.....	.....	1.5	.....	.....	.....	.....	.....
23	3.1	3.1	.....	.....	2.7	.....	.....	3.2	2.25	2.9	2.85	.....
24	3.05	3.1	.....	2.9	.....	1.75	2.0	.....	.....	.....	2.85	.....
25	3.1	3.1	2.75	.....	2.6	.....	1.85	3.2	2.4	2.9	.....	.....
26	3.05	3.0	.....	2.85	.....	1.75	.....	.....	.....	2.9	2.85	.....
27	3.05	3.0	2.75	.....	.....	.....	1.55	.....	2.2	.....	.....	.....
28	3.05	.....	.....	3.0	2.0	.....	.....	2.2	2.25	2.9	2.85	.....
29	3.0	.....	2.75	3.1	.....	1.7	1.75	.....	2.3	2.9	.....	.....
30	3.0	.....	.....	2.95	1.95	1.7	.....	1.95	2.45	3.0	2.8	.....
31	3.0	.....	.....	.....	.....	.....	.....	.....	.....	3.0	.....	.....

NOTE.—There was some ice in the latter part of December, 1907, but the gage heights were probably not materially affected. Ice conditions December 19 to 31, 1908.

Rating table for Sevier River near Gunnison, Utah, for 1906 to 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec. ft.*	*Feet.*	*Sec. ft.*	*Feet.*	*Sec. ft.*	*Feet.*	*Sec. ft.*
0.90	37	2.00	202	3.10	495	4.40	1,013
1.00	47	2.10	223	3.20	527	4.60	1,115
1.10	57	2.20	245	3.30	559	4.80	1,223
1.20	68	2.30	269	3.40	593	5.00	1,335
1.30	80	2.40	294	3.50	627	5.20	1,459
1.40	94	2.50	320	3.60	663	5.40	1,592
1.50	109	2.60	348	3.70	701	5.60	1,728
1.60	125	2.70	377	3.80	741	5.80	1,864
1.70	143	2.80	406	3.90	783	6.00	2,000
1.80	162	2.90	435	4.00	825	6.20	2,140
1.90	182	3.00	465	4.20	915	6.40	2,280

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 12 discharge measurements made during 1906–1908, and is fairly well defined below gage height 2.6 feet.

Monthly discharge of Sevier River near Gunnison, Utah, for 1906 to 1908.

[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.	
1906.[a]							
January	701	150	390	0.098	0.11	24,000	C.
February	435	202	308	.077	.08	17,100	B.
March	441	103	286	.072	.08	17,600	B.
April	634	377	520	.130	.14	30,900	C.
May	2,240	627	1,370	.343	.40	84,200	C.
June	1,800	435	1,080	.271	.30	64,300	C.
July	294	42	130	.033	.04	7,990	B.
August	495	132	213	.053	.06	13,100	B.
September	354	182	271	.068	.08	16,100	B.
October	406	202	265	.066	.08	16,300	B.
November	365	269	298	.075	.08	17,700	B.
December	435	383	413	.104	.12	25,400	B.
The year	2,240	42	462	.116	1.57	335,000	
1907.							
January	701	406	445	.112	.13	27,400	B.
February	450	348	392	.098	.10	21,800	B.
March	465	362	410	.103	.12	25,200	B.
April	1,040	334	593	.149	.17	35,300	C.
May	1,690	559	1,100	.276	.32	67,600	C.
June	2,070	869	1,650	.414	.46	98,200	C.
July	869	134	377	.095	.11	23,200	B.
August	663	307	468	.117	.13	28,800	B.
September	465	192	333	.083	.09	19,800	B.
October	406	182	320	.080	.09	19,700	B.
November	435	406	410	.103	.11	24,400	B.
December	559	406	503	.126	.15	30,900	C.
The year	2,070	134	583	.146	1.98	422,000	
1908.							
January	559	465	503	.126	.15	30,900	C.
February	495	465	471	.118	.13	27,100	C.
March	465	392	416	.104	.12	25,600	B.
April	495	192	342	.086	.10	20,400	B.
May	511	192	363	.091	.10	22,300	B.
June	392	143	233	.058	.06	13,900	B.
July	362	57	136	.034	.04	8,360	B.
August	701	192	520	.130	.15	32,000	C.
September	307	192	234	.059	.07	13,900	B.
October	465	320	384	.096	.11	23,600	B.
November	465	406	430	.108	.12	25,600	B.
December	.....	.....	365	.091	.10	22,400	C.
The year	701	57	366	.092	1.26	266,000	

[a] Gage heights for 1906 are given in Water-Supply Paper 212, p. 46. Those for July 1 to 11 are 1.4 too high.

NOTE.—Discharges estimated on account of ice conditions, January 1 to 19, 1906, and December 19 to 31, 1908; the open-channel rating was applied the rest of the three years, though there may have been some ice. Discharges interpolated on days when gage was not read.

HUMBOLDT SINK DRAINAGE BASIN.

HUMBOLDT RIVER.

DESCRIPTION.

Humboldt River rises in the northeastern part of Nevada and flows west and southwest a distance of about 350 miles into Humboldt Lake or Sink, in the western part of the State. The entire basin is surrounded by high and rugged peaks, some of which attain elevations of 11,000 feet above sea. A dam built a few years ago prevents the overflow in flood season from reaching Carson Sink, about 30 miles to the west.

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 is in general through a barren region destitute of large trees and supporting few shrubs except scattered clusters of willows. Affording the only east and west pass through the mountains of Nevada, the valley of the main stream 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 become dry.

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 the 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.

Within the period for which records are available the wettest year was 1907 and the driest year 1905.

The following stations have been maintained in this basin:

Humboldt River near Elko, Nev., 1895–1902.
Humboldt River at Palisade, Nev., 1902–1906.
Humboldt River at Battle Mountain, Nev., 1896–1897.
Humboldt River near Golconda, Nev., 1894–1908.

Humboldt River near Oreana, Nev., 1896–1908.
Marys River near Deeth, Nev., 1902–1903.
North Fork of Humboldt River near Peko, Nev., 1898–1900.
North Fork of Humboldt River near Halleck, Nev., 1902–1908.
South Fork of Humboldt River near Elko, Nev., 1896–1908.
Pine Creek near Palisade, Nev., 1902–1904.
Rock Creek near Battle Mountain, Nev., 1896.

HUMBOLDT RIVER NEAR GOLCONDA, NEV.

This station, which was established October 24, 1894, to determine the quantity of water available for irrigation in the vicinity of Golconda and Winnemucca, is located 1¼ miles north of the town of Golconda.

The station is below the central valley, below Reese River and Rock and Keely creeks, and above all other important tributaries except Little Humboldt River, which enters about 12 miles below. Considerable water is diverted above the station, almost the entire low-water flow being used for irrigation.

The records are believed not to be materially affected by ice, but information as to winter conditions is meager.

Two gages have been used at this station, the difference in datum being 0.1 foot, and the observers' records do not always specify which gage was used. As the channel is somewhat shifting, the records are not of the best, but the station is nevertheless probably the most reliable on the Humboldt.

Discharge measurements of Humboldt River near Golconda, Nev., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 16	Nicholas and Porter	93	558	11.90	1,350
June 25	E. A. Porter	94	651	13.00	1,760
July 29	do	91	479	10.90	1,050
August 20	do		196	7.90	350
1908.					
March 5	E. A. Porter	56	190	7.10	373
April 9	do	56	179	6.50	309
July 18	do	79	260	7.65	522

NOTE.—Gage heights for 1907 were read from the gage at the wagon bridge. This gage was washed away in December. The gage used in 1908 was the old gage on the left bank, which read 0.1 foot higher than the gage at the bridge.

Daily gage height, in feet, of Humboldt River near Golconda, Nev., for 1907 and 1908.

[W. Duyck, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1					16.6	11.4	13.2			6.0	6.9	7.5
2	5.2	7.1	10.5						7.2	6.0	7.0	7.5
3				16.0		11.3	13.6	10.4		6.0	7.1	7.5
4		7.5	10.4		15.2				7.0	6.0	7.1	7.5
5	5.5			16.0		11.6		10.2		6.0	7.1	7.5
6		8.6	10.3	16.0	14.0		14.0			6.0	7.1	7.5
7	5.4							10.0	6.8	6.0	7.1	7.6
8				16.6	13.6	11.6	13.6			6.0	7.1	7.6
9	5.4	8.0	10.2						6.7	6.1	7.1	7.6
10		8.5		16.6		11.8	13.6	9.5		6.1	7.1	7.6
11			10.3		13.2				6.6	6.1	7.1	7.6
12	5.3					12.0		9.1		6.2	7.1	7.6
13		9.2	10.4	16.6	13.0		13.6			6.2	7.2	7.6
14	5.3				13.0			9.0	6.4	6.2	7.2	7.7
15			10.5	16.6	12.9	12.0	13.4			6.2	7.2	7.8
16	5.3	10.0			11.9	12.0			6.2	6.2	7.2	7.8
17		10.0		16.6		12.0	13.3	8.4		6.2	7.2	7.8
18		10.0	10.5		11.8				6.0	6.2	7.3	7.8
19	5.4					12.6		8.0		6.2	7.3	7.8
20		10.0	10.9	16.6	11.7		13.4	7.9		6.3	7.3	7.8
21	5.4		11.0			13.0		7.8	6.0	6.4	7.3	7.9
22			11.3	16.6	11.4	13.0	13.3			6.4	7.3	8.0
23	5.4	10.1	11.5						6.0	6.5	7.3	8.0
24				16.6		13.0	12.6	7.6		6.5	7.4	8.0
25		10.2	11.5		11.4				6.0	6.5	7.4	8.0
26	5.5		12.4			13.1		7.6		6.6	7.4	8.0
27		10.3	13.2	16.6	11.4		11.6			6.8	7.4	8.0
28	5.8							7.5	6.0	6.8	7.4	8.0
29				16.6	11.4	13.3	11.0			6.8	7.4	7.9
30	6.0		14.6						6.0	6.9	7.5	8.0
31			15.2				10.8	7.4		6.9		8.0
1908.												
1			6.5	6.0	6.5	7.0	8.5	6.1	3.3	2.9	2.9	4.5
2	8.3	6.4		6.0	6.6	7.0	9.0	6.0	3.3	3.1	2.9	4.7
3			6.6	6.0	6.6	7.0	9.0		3.3	3.2	2.9	4.9
4		6.3		6.0	6.7	7.1	9.0	5.8	3.2	3.1	2.9	5.0
5	7.9		7.1	6.0	6.5	7.1	8.6		3.2	3.1	2.9	5.15
6				6.0	6.5	7.0	8.4	5.5	3.2	3.1	2.9	5.3
7		6.3	7.4	6.0	6.6	7.0	8.4		3.3	3.1	2.8	5.5
8	7.1			6.2	5.7	7.0		5.0	3.3	3.0	2.8	5.6
9		6.4		6.5	5.7	6.7			3.3	3.0	2.8	5.7
10			7.6	6.4	5.7	6.8		4.8	3.3	2.9	2.9	5.8
11	6.2			6.4	6.0	6.8		4.6	3.3	2.9	2.9	5.9
12		6.5		6.7	6.0	6.7			3.3	2.9	3.0	6.0
13			7.5	6.1	5.8	6.7		4.0	3.3	2.9	3.1	5.9
14	6.3			6.2	6.0	6.7			3.3	2.9	3.2	5.7
15		6.5		6.25	5.6	6.7		4.0	3.3	3.0	3.2	5.6
16	6.3		7.3	6.35	5.6	6.7		4.0	3.2	3.0	3.2	5.5
17		6.6	7.3	6.25	5.0	6.7		4.0	3.1	3.0	3.2	5.4
18	6.4			6.35	4.6	7.5	7.65	4.0	3.1	3.0	3.2	5.3
19				6.3	4.6	7.5		4.0	3.1	3.1	3.2	5.1
20		6.5	7.3	6.5	4.6	7.5		4.0	3.1	3.1	3.2	5.0
21	6.4			6.7	6.6	7.5		4.0	3.1	3.0	3.3	5.0
22		6.5			5.9	7.5		3.8	3.0	3.0	3.3	5.0
23	6.4		7.2	6.6	5.6	8.5		4.0	3.0	3.0	3.5	5.0
24				6.6	6.8	8.5	7.1	3.8	3.0	3.0	3.6	5.0
25	6.5	6.4		6.6	7.0	8.5	7.1	3.6	2.9	3.0	3.75	5.0
26			7.2		7.0	8.5	7.0	3.5	2.9	3.0	3.75	5.0
27		6.4		6.5	7.0	8.5	6.8	3.3	2.9	3.0	3.8	5.0
28	6.6			6.5	7.0	8.5	6.6	3.3	2.9	3.05	3.95	5.0
29		6.5	7.1	6.2	7.0	8.5	6.5	3.3	2.9	3.1	4.1	5.0
30				6.5	7.0	8.5	6.4	3.3	2.9	3.1	4.3	5.0
31	6.4		6.0		7.0		6.2	3.3		3.2		5.0

NOTE.—The river was frozen December 16 to 31, 1908; there was a little ice in the first half of the month; the effect on the discharge was probably very slight. The 1908 gage heights refer to a datum 0.1 foot lower than those of 1907.

Rating tables for Humboldt River near Golconda, Nev.

JANUARY 1, 1907, TO MARCH 31, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
5.20	120	6.70	300	8.20	590	10.40	1,240
5.30	130	6.80	315	8.30	615	10.60	1,310
5.40	140	6.90	330	8.40	640	10.80	1,380
5.50	150	7.00	345	8.50	665	11.00	1,450
5.60	160	7.10	360	8.60	690	11.20	1,520
5.70	171	7.20	380	8.70	715	11.40	1,590
5.80	182	7.30	400	8.80	740	11.60	1,660
5.90	194	7.40	420	8.90	770	11.80	1,730
6.00	206	7.50	440	9.00	800	12.00	1,800
6.10	218	7.60	460	9.20	860	13.00	2,160
6.20	231	7.70	480	9.40	920	14.00	2,560
6.30	244	7.80	500	9.60	980	15.00	2,960
6.40	258	7.90	520	9.80	1,040	16.00	3,360
6.50	272	8.00	540	10.00	1,100		
6.60	286	8.10	565	10.20	1,170		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1906, and is fairly well defined above gage height 5.0 feet.

APRIL 1, 1907, TO DECEMBER 31, 1907.

6.00	100	7.30	252	8.60	487	10.80	1,020
6.10	109	7.40	267	8.70	507	11.00	1,080
6.20	119	7.50	283	8.80	528	11.20	1,140
6.30	129	7.60	299	8.90	549	11.40	1,202
6.40	139	7.70	316	9.00	570	11.60	1,266
6.50	150	7.80	333	9.20	614	11.80	1,332
6.60	161	7.90	351	9.40	659	12.00	1,400
6.70	173	8.00	370	9.60	705	13.00	1,750
6.80	185	8.10	389	9.80	752	14.00	2,120
6.90	197	8.20	408	10.00	800	15.00	2,520
7.00	210	8.30	427	10.20	852	16.00	2,920
7.10	223	8.40	447	10.40	906	17.00	3,320
7.20	237	8.50	467	10.60	962		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1907, and is fairly well defined between gage heights 7.9 feet and 13.0 feet.

JANUARY 1, 1908, TO MARCH 20, 1908.

6.20	236	6.80	323	7.40	428	8.00	549
6.30	250	6.90	339	7.50	447	8.10	571
6.40	264	7.00	356	7.60	467	8.20	593
6.50	278	7.10	373	7.70	487	8.30	615
6.60	292	7.20	391	7.80	507		
6.70	307	7.30	409	7.90	527		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 1 discharge measurement made during 1908 and the form of the 1906 curve, from which it differs only slightly. It is fairly well defined. The change in conditions between the last measurement of 1907 and the first of 1908 may have taken place gradually, but in the absence of definite information it has been assumed to occur on January 1, which was the highest water of the period.

MARCH 21, 1908, TO DECEMBER 31, 1908.

2.80	1.5	4.00	46	5.20	146	6.80	358
2.90	2.5	4.10	52	5.30	156	7.00	390
3.00	4	4.20	59	5.40	166	7.20	426
3.10	6	4.30	66	5.50	178	7.40	466
3.20	9	4.40	74	5.60	190	7.60	508
3.30	12	4.50	82	5.70	202	7.80	554
3.40	16	4.60	90	5.80	214	8.00	606
3.50	20	4.70	98	5.90	226	8.20	658
3.60	24	4.80	107	6.00	240	8.40	710
3.70	29	4.90	116	6.20	268	8.60	766
3.80	34	5.00	126	6.40	296	8.80	822
3.90	40	5.10	136	6.60	326	9.00	880

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 2 discharge measurements made during 1908 and the form of previous curves, and is fairly well defined above gage height 6.0 feet. Below gage height 5.0 feet it is only approximate.

Monthly discharge of Humboldt River near Golconda, Nev., for 1907 and 1908.

[Drainage area, 10,800 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.	
1907.							
January	272	120	147	0.014	0.02	9,040	C.
February	1,200	315	864	.080	.08	48,000	B.
March	3,040	1,170	1,540	.143	.16	94,700	B.
April	3,160	2,920	3,110	.288	.32	185,000	B.
May	3,160	1,200	1,690	.156	.18	104,000	B.
June	1,860	1,170	1,500	.139	.16	89,300	B.
July	2,120	1,020	1,750	.162	.19	108,000	B.
August	962	267	533	.049	.06	32,800	B.
September	252	100	143	.013	.01	8,510	C.
October	197	100	131	.012	.01	8,060	C.
November	283	197	241	.022	.02	14,300	C.
December	370	283	327	.030	.03	20,100	C.
The year	3,160	100	998	.094	1.24	722,000	
1908.							
January	615	236	331	.031	.04	20,400	C.
February	292	250	269	.025	.03	15,500	C.
March	467	240	402	.037	.04	24,700	B.
April	342	240	286	.026	.03	17,000	B.
May	390	90	271	.025	.03	16,700	C.
June	738	342	487	.045	.05	29,000	B.
July	880	268	557	.052	.06	34,200	C.
August	254	12	83.7	.0078	.009	5,150	D.
September	12	2.5	7.90	.00073	.0008	470	D.
October	9	2.5	4.65	.00043	.0005	286	D.
November	66	1.5	14.2	.0013	.001	845	D.
December	240	82	153	.014	.02	9,410	D.
The year	880	1.5	239	.022	.31	174,000	

NOTE.—Discharges interpolated for days when gage was not read.

HUMBOLDT RIVER NEAR OREANA, NEV.

This station, which was established January 27, 1896, to determine the amount of water available for storage-reservoir sites in the vicinity of Humboldt station and also for the six canal systems now in operation below Oreana, is located near Oreana, Nev., about 12 miles northeast of Lovelock and below all tributaries.

The channel is very unstable and sufficient measurements have not been made to give results that are entirely satisfactory or reliable.

Discharge measurements of Humboldt River near Oreana, Nev., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 18	E. A. Porter	114	620	7.40	1,610
June 24	do	108	423	6.90	988
July 22	do	111	537	7.70	1,360
August 19	do	103	216	4.70	476
1908.					
March 14	E. A. Porter	105	207	4.10	388
May 10	do	81	53	2.30	70

Daily gage height, in feet, of Humboldt River near Oreana, Nev., for 1907 and 1908.

[J. J. McCarthy, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.5	3.45	4.85	6.4	8.6	6.7	7.95	7.15	4.05	3.05	3.0	3.3
2	2.65	3.55	4.9	6.45	8.7	6.65	7.95	7.1	4.0	3.0	3.0	3.3
3	2.7	4.0	5.05	6.45	8.7	6.5	8.0	7.05	3.9	3.0	3.0	3.35
4	2.8	4.0	5.1	6.5	8.75	6.5	8.2	6.1	3.85	3.05	3.0	3.35
5	2.8	3.9	5.1	6.85	8.75	6.5	8.3	6.1	3.7	3.0	3.05	3.4
6	2.85	3.85	5.15	6.9	8.7	6.5	8.35	6.5	3.7	3.0	3.05	3.45
7	2.85	3.7	5.15	6.95	8.65	6.45	8.4	5.7	3.65	3.0	3.1	3.5
8	2.8	3.6	5.2	6.95	8.6	6.4	8.4	5.6	3.5	2.95	3.1	3.5
9	2.8	3.55	5.25	7.0	8.5	6.45	8.45	5.55	3.45	3.0	3.05	3.5
10	2.85	3.6	5.25	7.0	8.05	6.45	8.5	5.5	3.45	3.0	3.05	3.4
11	2.95	3.6	5.25	7.1	7.95	6.4	8.55	5.45	3.4	3.0	3.05	3.45
12	2.95	3.65	5.25	7.35	7.8	6.4	8.55	5.3	3.45	3.0	3.15	3.45
13	2.95	3.7	5.3	7.4	7.8	6.45	8.5	5.2	3.45	2.95	3.1	3.5
14	2.95	3.75	5.3	7.65	7.75	6.55	8.3	5.15	3.3	2.95	3.1	3.4
15	2.95	3.8	5.3	7.9	7.7	6.55	8.25	5.05	3.3	3.0	3.15	3.5
16	3.05	3.95	5.35	8.0	7.65	6.6	8.15	4.9	3.3	3.0	3.15	3.5
17	3.1	4.15	5.35	8.1	7.5	6.6	8.5	4.8	3.25	3.0	3.2	3.4
18	3.1	4.25	5.35	8.4	7.4	6.65	7.9	4.75	3.25	3.0	3.2	3.4
19	3.1	4.4	5.4	8.6	7.35	6.65	7.85	4.7	3.25	3.0	3.15	3.35
20	3.15	4.55	5.4	8.65	7.3	6.7	7.85	4.55	3.2	3.0	3.15	3.35
21	3.15	4.6	5.55	8.7	6.4	6.75	7.8	4.55	3.2	3.0	3.2	3.3
22	3.15	4.65	5.55	8.6	6.4	6.75	7.75	4.5	3.2	3.0	3.25	3.5
23	3.2	4.7	5.6	8.55	6.35	6.8	7.75	4.45	3.15	3.05	3.25	3.45
24	3.2	4.7	5.7	8.5	6.35	6.9	7.7	4.4	3.15	3.05	3.25	3.4
25	3.2	4.75	5.75	8.45	6.3	7.5	7.6	4.3	3.15	3.05	3.2	3.4
26	3.2	4.75	5.8	8.4	6.5	7.15	7.55	4.25	3.1	3.1	3.2	3.45
27	3.25	4.8	5.9	8.4	6.65	7.25	7.55	4.2	3.05	3.1	3.25	3.45
28	3.25	4.85	5.95	8.45	6.65	7.4	7.5	4.2	3.05	3.15	3.25	3.5
29	3.3	.....	6.1	8.5	6.65	7.45	7.4	4.15	3.05	3.1	3.3	3.45
30	3.3	.....	6.2	8.55	6.65	7.5	7.35	4.05	3.05	3.05	3.3	3.45
31	3.35	.....	6.25	.....	6.7	.....	7.25	3.95	.....	3.05	.....	3.4
1908.												
1	3.45	3.75	3.65	3.95	2.3	2.05	1.8	3.6	2.35	2.1	2.05	2.35
2	3.5	3.75	3.65	3.95	2.3	2.05	1.8	3.55	2.25	2.1	2.05	2.4
3	3.55	3.7	3.7	3.9	2.35	2.0	1.85	3.5	2.25	2.1	2.1	2.45
4	3.6	3.7	3.75	3.9	2.35	2.0	1.85	3.5	2.25	2.05	2.1	2.5
5	3.55	3.75	3.7	3.8	2.3	2.0	1.85	3.45	2.25	2.05	2.1	2.5
6	3.5	3.8	3.8	3.75	2.3	2.0	1.9	3.4	2.2	2.1	2.1	2.55
7	3.6	3.85	3.8	3.5	2.3	2.0	3.1	3.35	2.35	2.1	2.1	2.6
8	3.55	3.7	3.85	3.3	2.3	2.05	3.3	3.3	2.3	2.1	2.15	2.8
9	3.5	3.7	3.85	3.0	2.3	2.0	3.4	3.2	2.25	2.1	2.15	2.85
10	3.55	3.7	3.85	3.0	2.3	2.0	3.45	3.25	2.2	2.1	2.15	2.9
11	3.5	3.75	3.9	3.1	2.25	2.0	3.5	3.15	2.2	2.05	2.2	3.0
12	3.5	3.8	3.9	3.0	2.25	1.95	4.15	3.1	2.2	2.05	2.2	3.0
13	3.5	3.8	3.95	3.0	2.25	1.9	4.35	2.95	2.2	2.05	2.2	2.95
14	3.55	3.8	4.1	3.0	2.2	1.9	4.5	2.9	2.2	2.1	2.2	2.95
15	3.55	3.75	4.1	2.95	2.2	1.9	4.7	2.85	2.2	2.1	2.2	3.0
16	3.55	3.75	4.0	2.95	2.15	1.9	4.5	2.8	2.25	2.05	2.2	3.0
17	3.65	3.75	4.0	2.9	2.2	1.95	4.3	2.8	2.3	2.05	2.2	3.0
18	3.65	3.7	3.95	2.85	2.2	1.95	4.35	2.8	2.35	2.1	2.2	3.0
19	3.7	3.7	3.95	2.8	2.25	1.95	4.25	2.75	2.3	2.1	2.25	2.95
20	3.7	3.75	3.9	2.75	2.25	1.9	4.15	2.75	2.25	2.1	2.25	2.95
21	3.7	3.7	3.9	2.75	2.25	1.9	4.15	2.7	2.25	2.05	2.25	3.0
22	3.65	3.7	3.85	2.7	2.2	1.9	4.1	2.7	2.2	2.05	2.25	3.0
23	3.65	3.7	3.8	2.7	2.15	1.95	4.1	2.65	2.15	2.1	2.25	3.0
24	3.7	3.7	3.85	2.65	2.15	1.95	4.05	2.6	2.1	2.1	2.3	3.05
25	3.7	3.65	3.9	2.6	2.15	1.9	4.0	2.55	2.1	2.1	2.3	3.0
26	3.7	3.65	3.95	2.55	2.1	1.9	4.35	2.5	2.1	2.05	2.3	3.1
27	3.65	3.65	3.95	2.5	2.1	1.95	4.4	2.4	2.1	2.05	2.3	3.1
28	3.65	3.6	4.0	2.4	2.1	1.9	4.3	2.4	2.05	2.05	2.3	3.05
29	3.7	3.6	4.0	2.4	2.0	1.85	4.25	2.35	2.05	2.1	2.35	3.1
30	3.75	.....	3.95	2.35	2.0	1.8	4.0	2.35	2.05	2.1	2.35	3.1
31	3.75	.....	3.95	.....	2.05	.....	3.6	2.35	.....	2.05	.....	3.05

NOTE.—The river was blocked with ice January 29 to February 7, and December 8 to 31, 1908, and perhaps at other times.

Rating tables for Humboldt River near Oreana, Nev.

JANUARY 1 TO MAY 17, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.50	75	3.80	345	5.10	715	6.80	1,350
2.60	90	3.90	370	5.20	750	7.00	1,430
2.70	106	4.00	395	5.30	785	7.20	1,515
2.80	124	4.10	420	5.40	820	7.40	1,605
2.90	143	4.20	445	5.50	855	7.60	1,695
3.00	163	4.30	470	5.60	890	7.80	1,785
3.10	183	4.40	500	5.70	925	8.00	1,875
3.20	204	4.50	530	5.80	960	8.20	1,965
3.30	226	4.60	560	5.90	995	8.40	2,055
3.40	249	4.70	590	6.00	1,030	8.60	2,145
3.50	272	4.80	620	6.20	1,110	8.80	2,240
3.60	296	4.90	650	6.40	1,190		
3.70	320	5.00	680	6.60	1,270		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1906 and the form of the 1905 curve, and is well defined above gage height 3.0 feet. Below gage height 3.0 feet it is merely a rough approximation.

MAY 18, 1907, TO MAY 4, 1908.

[Daily discharges were obtained by the indirect method for shifting channels.]

MAY 5, 1908, TO DECEMBER 31, 1908.

1.80	16	2.60	124	3.40	295	4.20	520
1.90	23	2.70	144	3.50	320	4.30	550
2.00	32	2.80	164	3.60	345	4.40	580
2.10	43	2.90	184	3.70	370	4.50	610
2.20	56	3.00	204	3.80	400	4.60	640
2.30	70	3.10	226	3.90	430	4.70	670
2.40	86	3.20	248	4.00	460		
2.50	104	3.30	270	4.10	490		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 2 discharge measurements made during 1908 and 1909, and on the form of previous curves. It is fairly well defined above gage height 2.3 feet.

Daily discharge, in second-feet, of Humboldt River near Oreana, Nev., for 1907 and 1908.

Day.	1907.								1908.				
	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1	.....	1,120	1,470	1,200	320	120	120	170	220	250	275	365	70
2	.....	1,100	1,470	1,220	310	115	120	170	230	250	275	365	70
3	.....	1,040	1,500	1,200	285	115	120	190	240	250	285	350	75
4	.....	1,040	1,600	840	275	125	120	190	250	250	300	350	75
5	.....	1,040	1,650	840	240	115	130	200	240	255	285	330	.....
6	.....	1,040	1,680	980	240	115	130	210	230	260	310	320	.....
7	.....	1,020	1,700	710	230	115	140	220	250	270	300	260	.....
8	.....	1,000	1,700	680	200	110	140	220	240	280	320	225	.....
9	.....	1,020	1,720	690	190	115	130	220	230	280	320	165	.....
10	.....	1,020	1,740	680	190	115	130	200	240	280	320	165	.....
11	.....	900	1,760	660	180	115	130	210	230	290	335	185	.....
12	.....	900	1,760	620	190	115	130	210	230	305	335	165	.....
13	.....	920	1,740	580	190	110	140	220	230	305	345	165	.....
14	.....	960	1,650	570	160	110	140	200	240	305	388	165	.....
15	.....	960	1,620	550	160	115	145	200	240	290	390	160	.....
16	.....	980	1,570	540	160	115	145	220	240	290	365	160	.....
17	1,650	980	1,740	510	150	115	155	200	265	290	365	150	.....
18	1,600	1,000	1,450	500	150	115	155	200	265	280	355	145	.....
19	1,580	1,000	1,430	480	150	115	145	190	275	280	355	135	.....
20	1,560	1,020	1,430	440	145	115	145	190	275	290	345	130	.....
21	1,190	950	1,400	440	145	115	155	185	275	280	345	130	.....
22	1,190	950	1,380	430	145	115	165	200	265	280	335	120	.....
23	1,080	960	1,380	415	135	125	165	210	265	280	325	120	.....
24	1,080	1,000	1,360	400	135	120	165	200	275	280	335	115	.....
25	1,060	1,260	1,320	375	135	120	155	200	275	270	345	110	.....
26	1,140	1,100	1,360	365	130	130	155	210	275	270	360	100	.....
27	1,200	1,140	1,360	355	120	130	165	210	265	270	360	95	.....
28	1,200	1,210	1,340	355	120	140	165	220	265	260	375	80	.....
29	1,200	1,240	1,300	340	120	130	170	210	250	260	375	80	.....
30	1,200	1,260	1,280	315	120	120	170	210	250	.....	360	75	.....
31	1,220	.....	1,240	290	.....	120	.....	220	250	.....	360	.....	.....

NOTE.—These discharges were obtained by the indirect method for shifting channels.

Monthly discharge of Humboldt River near Oreana, Nev., for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
January	238	75	167	10,300	C.
February	635	260	427	23,700	C.
March	1,130	635	835	51,300	C.
April	2,190	1,190	1,760	105,000	C.
May	2,220	1,060	1,650	101,000	C.
June	1,260	900	1,040	61,900	C.
July	1,760	1,240	1,520	93,500	C.
August	1,220	290	599	36,800	C.
September	320	120	181	10,800	C.
October	140	110	118	7,260	C.
November	170	120	145	8,630	C.
December	220	170	203	12,500	D.
The year	2,220	75	720	588,000	
1908.					
January	275	220	251	15,400	D.
February	305	.....	276	15,900	D.
March	390	275	337	20,700	C.
April	365	75	183	10,900	C.
May	75	32	58.0	3,570	C.
June	38	16	27.7	1,650	C.
July	670	16	390	24,000	C.
August	345	78	192	11,800	C.
September	78	38	57.7	3,430	C.
October	43	38	40.9	2,510	C.
November	78	38	57.0	3,390	C.
December	.....	.....	100	6,150	D.
The year	670	16	164	119,000	

NOTE.—Discharges estimated January 29 to February 7, and December, 1908.

NORTH FORK OF HUMBOLDT RIVER NEAR HALLECK,[a] NEV.

This station, which was established October 10, 1902, 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. Records at this point show the total flow of the river.

The channel is somewhat shifting, and the results are therefore only approximate. The gage heights also seem to be affected by backwater from the main Humboldt.

Discharge measurements of North Fork of Humboldt River near Halleck, Nev., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 14	Nicholas and Porter	43	121	4.70	286
June 21	E. A. Porter	41	139	5.30	349
June 30	La Rue and Porter	41	120	5.10	278
July 18	E. A. Porter	39	53	4.10	102
August 16	.....do	27	20	3.05	22
1908.					
March 16	E. A. Porter	39	49	3.70	81
May 8	.....do	24	20	2.90	16
July 17	.....do	22	11	3.10	9

[a] This station has heretofore been referred to as "near Elburz, Nev."

Daily gage height, in feet, of North Fork of Humboldt River near Halleck, Nev., for 1907 and 1908.

[A. R. Blevins and F. C. Engel, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	3.2	3.4	4.2	5.2	4.9	4.3	5.4	3.5	2.8	2.8	3.0	2.9
2	3.2	3.5	4.0	5.4	4.8	4.3	5.3	3.5	2.8	2.8	3.0	2.95
3	3.2	3.6	4.0	5.5	4.75	4.4	5.3	3.6	2.8	2.7	3.0	3.0
4	3.2	3.75	4.0	5.6	4.7	4.8	5.3	3.5	2.9	2.6	3.05	3.05
5	3.2	3.9	4.0	5.7	4.6	5.4	5.3	3.5	3.0	2.5	3.05	3.1
6	3.2	3.95	4.1	5.5	4.6	5.8	5.4	3.4	3.0	2.6	3.1	3.15
7	3.2	4.5	4.2	5.4	4.5	6.1	5.4	3.4	2.9	2.7	3.1	3.2
8	3.2	4.7	4.3	5.3	4.5	6.5	5.3	3.3	2.9	2.8	3.1	3.2
9	3.2	4.7	4.5	5.4	4.5	6.6	5.1	3.3	2.9	2.8	3.15	3.2
10	3.2	4.7	4.3	5.6	4.4	6.3	4.8	3.2	2.9	3.0	3.1	3.2
11	3.2	4.7	4.2	5.6	4.5	6.1	4.7	3.2	2.8	3.1	3.1	3.2
12	3.2	4.7	4.1	5.8	4.5	6.1	4.5	3.2	2.8	3.1	3.1	3.25
13	3.2	4.75	4.0	5.9	4.6	6.1	4.4	3.1	2.8	3.1	3.1	3.25
14	3.2	4.75	4.0	6.0	4.7	6.4	4.3	3.1	2.8	3.1	3.1	3.3
15	3.2	4.75	3.9	6.4	4.7	6.6	4.3	3.1	2.8	3.1	3.1	3.3
16	3.2	4.75	3.9	6.5	4.6	6.6	4.2	3.0	2.8	3.15	3.1	3.3
17	3.2	.....	3.9	6.7	4.4	6.6	4.2	3.0	2.7	3.15	3.1	3.3
18	3.2	.....	3.9	6.8	4.3	6.1	4.1	2.9	2.8	3.15	3.1	3.25
19	3.2	.....	4.1	6.8	4.3	5.8	4.1	2.9	2.9	3.15	3.1	3.25
20	3.2	.....	4.5	6.8	4.3	5.5	4.0	2.8	2.9	3.15	3.1	3.2
21	3.2	.....	4.7	6.6	4.3	5.3	4.0	2.8	2.8	3.2	3.1	3.2
22	3.2	.....	5.6	6.2	4.4	5.2	3.9	2.8	2.7	3.2	3.1	3.2
23	3.2	.....	6.0	6.0	4.6	5.4	3.9	2.7	2.7	3.2	3.1	3.2
24	3.2	4.75	6.2	5.8	4.7	5.9	3.8	2.8	2.8	3.2	3.1	3.25
25	3.2	4.8	5.9	5.5	5.0	5.9	3.8	2.8	2.8	3.2	3.1	3.25
26	3.2	4.8	5.6	5.3	5.2	5.8	3.7	2.8	2.8	3.2	3.05	3.3
27	3.2	4.7	5.5	5.1	5.1	5.6	3.7	2.8	2.8	3.15	3.0	3.3
28	3.2	4.5	5.3	5.1	5.0	5.5	3.7	2.8	2.8	3.1	3.0	3.3
29	3.2	.....	5.1	5.0	4.9	5.3	3.7	2.8	2.75	3.1	2.95	3.3
30	3.2	.....	5.2	4.9	4.6	5.2	3.6	2.8	2.7	3.0	2.9	3.3
31	3.3	.....	5.2	.....	4.4	.....	3.6	2.8	.....	3.0	.....	3.3
1908.												
1	3.35	3.2	3.4	3.4	3.1	2.9	4.0	2.7	2.4	2.4	3.0	.....
2	3.35	3.3	3.45	3.4	3.05	3.0	3.7	2.7	2.4	2.4	3.0	.....
3	3.4	3.3	3.4	3.5	3.0	3.0	3.5	2.7	2.4	2.45	3.0	.....
4	3.4	3.4	3.3	3.45	3.0	3.1	3.3	2.6	2.4	2.45	3.0	.....
5	3.4	3.35	3.35	3.45	2.9	3.3	3.3	2.6	2.4	2.45	3.0	.....
6	3.4	3.4	3.3	3.45	2.8	3.3	3.2	2.6	2.4	2.5	3.0	.....
7	3.4	3.4	3.3	3.45	2.7	3.3	3.0	2.6	2.5	2.5	3.0	.....
8	3.4	3.4	3.3	3.4	2.8	3.3	3.0	2.6	2.6	2.5	3.0	.....
9	3.4	3.4	3.25	3.4	3.0	3.5	2.9	2.6	2.6	2.5	.....	.....
10	3.4	3.4	3.2	3.35	2.9	3.45	2.8	2.6	2.55	2.5	.....	.....
11	3.4	3.4	3.2	3.2	3.0	3.5	2.8	2.6	2.5	2.5	.....	.....
12	3.4	3.3	3.25	3.1	3.0	3.65	3.0	2.6	2.5	2.5	.....	.....
13	3.4	3.25	3.3	3.15	3.0	3.8	3.0	2.6	2.5	2.5	.....	.....
14	3.4	3.2	3.4	3.15	3.0	4.0	3.1	2.6	2.45	2.55	.....	3.0
15	3.4	3.3	3.6	3.2	3.0	4.4	3.1	2.6	2.4	2.55	.....	3.0
16	3.4	3.4	3.7	3.2	3.0	4.6	3.1	2.6	2.4	2.55	.....	3.1
17	3.4	3.3	4.0	3.2	3.0	4.9	3.1	2.6	2.4	2.55	.....	3.1
18	3.4	3.25	4.1	3.2	3.0	5.3	3.1	2.6	2.4	2.6	.....	3.1
19	3.4	3.3	3.8	3.2	2.95	5.5	3.0	2.5	2.4	2.6	.....	3.1
20	3.3	3.25	3.7	3.3	2.95	5.7	3.0	2.55	2.4	2.6	.....	3.1
21	3.2	3.2	3.6	3.25	2.9	5.5	3.0	2.6	2.4	2.7	.....	3.0
22	3.2	3.2	3.55	3.25	2.95	5.0	3.0	2.6	2.4	2.8	.....	3.0
23	3.15	3.25	3.5	3.3	3.0	4.8	3.0	2.6	2.4	2.8	.....	3.0
24	3.2	3.2	3.45	3.25	3.0	4.5	2.8	2.6	2.4	2.8	.....	3.0
25	3.2	3.25	3.4	3.2	3.0	4.3	2.8	2.6	2.4	2.8	.....	3.0
26	3.2	3.3	3.4	3.2	2.9	4.3	2.8	2.6	2.4	2.95	.....	3.0
27	3.2	3.3	3.45	3.25	2.8	4.0	2.8	2.55	2.4	3.0	.....	3.1
28	3.2	3.3	3.5	3.2	2.7	4.9	2.75	2.5	2.4	3.0	.....	3.1
29	3.25	3.4	3.4	3.15	2.7	4.7	2.7	2.4	2.4	3.0	.....	3.2
30	3.2	.....	3.4	3.15	2.7	4.6	2.7	2.4	2.4	3.0	.....	3.3
31	3.2	.....	3.45	.....	2.8	.....	2.7	2.4	.....	3.0	.....	3.4

NOTE.—Ice conditions December 29 to 31, 1908, and possibly at other times.

Rating tables for North Fork of Humboldt River near Halleck, Nev.

JANUARY 1 TO MAY 31, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.20	27	4.20	144	5.20	460	6.20	810
3.30	34	4.30	165	5.30	495	6.30	845
3.40	42	4.40	189	5.40	530	6.40	880
3.50	51	4.50	217	5.50	565	6.50	915
3.60	61	4.60	250	5.60	600	6.60	950
3.70	72	4.70	285	5.70	635	6.70	985
3.80	84	4.80	320	5.80	670	6.80	1,020
3.90	97	4.90	355	5.90	705		
4.00	111	5.00	390	6.00	740		
4.10	126	5.10	425	6.10	775		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1906–7, and is not well defined.

JUNE 1 TO AUGUST 31, 1907.

2.70	8	3.70	61	4.70	194	5.70	452
2.80	11	3.80	70	4.80	216	5.80	484
2.90	14	3.90	80	4.90	238	5.90	516
3.00	18	4.00	90	5.00	260	6.00	550
3.10	23	4.10	102	5.10	284	6.20	618
3.20	28	4.20	114	5.20	310	6.40	690
3.30	33	4.30	126	5.30	336	6.60	762
3.40	38	4.40	140	5.40	364		
3.50	44	4.50	156	5.50	392		
3.60	52	4.60	174	5.60	422		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during 1906–7, and is fairly well defined above gage height 2.9 feet.

SEPTEMBER 1, 1907, TO JUNE 20, 1908.

2.50	4	3.40	46	4.30	185	5.20	395
2.60	6	3.50	56	4.40	205	5.30	420
2.70	8	3.60	68	4.50	225	5.40	445
2.80	11	3.70	81	4.60	245	5.50	470
2.90	15	3.80	95	4.70	270	5.60	500
3.00	19	3.90	111	4.80	295	5.70	530
3.10	24	4.00	128	4.90	320		
3.20	30	4.10	146	5.00	345		
3.30	37	4.20	165	5.10	370		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during 1907–8 and the general form of previous curves, and is well defined between gage heights 2.9 feet and 3.7 feet.

JUNE 21 TO DECEMBER 31, 1908.

2.40	0.5	3.30	16	4.20	113	5.10	325
2.50	1.0	3.40	21	4.30	130	5.20	355
2.60	1.5	3.50	28	4.40	148	5.30	385
2.70	2	3.60	36	4.50	167	5.40	420
2.80	3	3.70	46	4.60	190	5.50	455
2.90	4	3.80	56	4.70	215	5.60	490
3.00	6	3.90	68	4.80	240	5.70	530
3.10	9	4.00	82	4.90	265		
3.20	12	4.10	97	5.00	295		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on one discharge measurement made in July, 1908, and the general form of previous curves, and is only approximate.

Monthly discharge of North Fork of Humboldt River near Halleck, Nev., for 1907 and 1908.

[Drainage area, 1,020 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.	
1907.							
January	34	27	27.2	0.027	0.03	1,670	D.
February	320	42	244	.239	.25	13,600	C.
March	810	97	283	.278	.32	17,400	C.
April	1,020	355	663	.650	.73	39,500	D.
May	460	165	263	.258	.30	16,200	C.
June	762	126	479	.470	.52	28,500	C.
July	364	52	170	.167	.19	10,500	C.
August	52	8	23.1	.023	.03	1,420	C.
September	19	8	12.0	.012	.01	714	C.
October	30	4	20.7	.020	.02	1,270	C.
November	27	15	18.5	.018	.02	1,100	C.
December	.....	.....	20.0	.020	.02	1,230	D.
The year	1,020	4	185	.182	2.44	133,000	
1908.							
January	.....	.....	20.0	.020	.02	1,230	D.
February	.....	.....	30.0	.029	.03	1,730	D.
March	146	30	55.5	.054	.06	3,410	C.
April	51	24	36.6	.036	.04	2,180	C.
May	24	8	16.1	.016	.02	990	C.
June	530	15	168	.165	.18	10,000	C.
July	82	2	10.6	.010	.01	652	C.
August	2	.5	1.35	.0003	.001	83.0	D.
September	1.5	.5	.67	.00066	.001	39.9	D.
October	6	.5	2.26	.0022	.003	139	D.
November	6	6	6.0	.0059	.007	357	D.
December	9	6	7.0	.0069	.008	430	D.
The year	530	.5	29.5	.029	.38	21,200	

NOTE.—Discharges interpolated February 17 to 23, 1907, and November 9 to December 13, 1908; estimated on account of ice conditions December, 1907, January and February, 1908.

SOUTH FORK OF HUMBOLDT RIVER NEAR ELKO, NEV.

This station, which was established August 29, 1906, to determine the amount of water available for storage, is located about 12 miles southwest of Elko, Nev., 6 miles above the mouth of the river, and is above the proposed reservoir site of the United States Reclamation Service. As the station is below all tributaries the records show the total run-off from the basin of the South Fork.

The river freezes during two or three months of the winter, the ice probably reaching a considerable thickness, but information as to winter conditions is very meager.

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. The channel at the station is somewhat shifting. During 1908 the gage heights were affected by the raising of a diversion dam below. As sufficient measurements have not yet been made to indicate the extent of these changes the published estimates of discharge are only approximate.

Discharge measurements of South Fork of Humboldt River near Elko, Nev., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 15	Nicholas and Porter	50	113	3.80	383
June 22	E. A. Porter	47	193	5.70	1,040
July 19	do	47	138	4.10	576
August 17	do	45	53	2.20	82
November 28	do	44	40	1.80	48
1908.					
March 17	E. A. Porter	48	83	2.90	166
May 9	do	47	70	2.80	121
July 16	do	48	86	3.50	203

Daily gage height, in feet, of South Fork of Humboldt River near Elko, Nev., for 1907 and 1908.

[James Cowling, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1.1	.....	1.6	3.5	3.35	3.95	5.65	3.5	1.9	1.9	1.9	1.8
2	1.1	.....	1.6	3.35	3.3	4.25	5.75	3.4	1.8	1.9	1.9	1.8
3	1.1	.....	1.6	3.55	3.05	5.05	5.7	3.3	1.8	1.9	1.8	1.8
4	1.1	.....	1.5	3.45	2.9	5.6	5.9	3.15	1.8	1.9	1.8	1.8
5	1.1	.....	1.55	3.4	3.0	5.9	6.1	2.9	1.9	1.9	1.8	1.8
6	1.1	.....	1.85	3.35	3.0	5.95	5.85	2.75	1.9	1.8	1.8	1.8
7	1.1	.....	1.95	3.15	3.0	6.05	5.55	2.65	1.9	1.8	1.8	1.8
8	1.1	.....	1.9	3.05	3.0	6.35	5.3	2.45	1.9	1.7	1.8	1.9
9	1.1	.....	1.8	3.0	3.1	6.2	5.05	2.4	1.9	1.7	1.8	1.9
10	1.1	.....	1.7	3.15	3.1	5.95	4.8	2.45	1.8	1.7	1.8	1.9
11	1.1	.....	1.7	3.35	3.2	5.7	4.75	2.4	1.8	1.8	1.8	1.9
12	1.1	.....	1.75	3.6	3.85	5.55	4.85	2.35	1.8	1.85	1.7	1.9
13	1.1	.....	1.75	3.95	4.1	6.0	4.85	2.4	1.8	2.0	1.7	1.9
14	1.1	.....	1.65	4.1	4.05	6.2	4.45	2.35	1.7	1.9	1.7	1.9
15	1.1	.....	1.65	4.5	3.85	6.2	4.3	2.3	1.7	1.9	1.7	1.9
16	1.1	.....	1.65	4.7	3.7	6.15	4.15	2.3	1.7	1.8	1.7	1.9
17	1.1	.....	2.55	4.45	3.85	6.2	4.05	2.25	1.7	1.8	1.7	1.9
18	1.1	.....	2.75	4.15	3.95	6.25	3.9	2.15	1.7	1.8	1.7	1.9
19	1.1	.....	2.9	3.95	4.3	5.85	3.95	2.05	1.7	1.8	1.7	1.9
20	1.1	.....	3.15	3.75	4.6	5.55	3.95	2.0	1.7	1.7	1.7	1.9
21	1.1	.....	3.3	3.55	4.7	5.6	3.85	2.0	1.8	1.7	1.7	1.9
22	1.1	.....	3.5	3.4	4.8	5.65	3.85	1.9	1.8	1.7	1.7	1.9
23	1.1	.....	3.35	3.4	4.7	5.7	3.7	1.8	1.8	1.7	1.7	1.9
24	1.1	.....	3.15	3.3	4.8	5.7	3.6	1.8	1.8	1.7	1.8	1.9
25	1.1	.....	3.1	3.3	4.8	5.6	3.6	1.8	1.7	1.7	1.8	1.9
26	1.1	1.7	3.0	3.3	4.5	5.55	3.95	1.8	1.7	1.7	1.8	1.9
27	.....	1.65	2.95	3.4	4.15	5.5	3.65	1.8	1.7	1.7	1.8	2.0
28	.....	1.55	3.0	3.4	4.1	5.35	3.7	1.9	1.7	1.7	1.8	2.0
29	.....	.....	3.0	3.35	3.95	5.25	3.55	1.9	1.85	1.75	1.8	2.0
30	.....	.....	3.35	3.3	3.9	5.15	3.5	1.9	1.9	1.85	1.8	1.9
31	.....	.....	3.35	.....	4.05	.....	3.45	1.9	.....	1.9	.....	1.9
1908.												
1	1.9	2.2	2.15	2.35	2.4	3.75	4.5	2.5	2.0	2.1	2.2	2.3
2	1.9	2.3	2.05	2.3	2.5	4.0	4.5	2.5	2.0	2.1	2.2	2.3
3	1.9	2.3	2.0	2.3	2.5	3.95	4.55	2.5	2.0	2.1	2.2	2.3
4	1.9	2.3	2.0	2.3	2.5	3.85	4.55	2.5	2.0	2.2	2.2	2.3
5	1.9	2.3	2.0	2.2	2.5	4.0	4.65	2.5	2.0	2.2	2.2	2.3
6	1.9	2.3	2.0	2.2	2.65	4.0	4.55	2.5	2.0	2.2	2.2	2.3
7	1.9	2.3	2.0	2.2	2.8	4.0	4.45	2.4	2.05	2.0	2.2	2.3
8	1.9	2.3	1.9	2.2	2.8	4.15	4.25	2.4	2.25	2.0	2.2	2.3
9	1.9	2.3	1.95	2.2	2.8	4.35	4.15	2.4	2.2	2.05	2.2	2.3
10	1.9	2.3	1.95	2.2	2.7	4.45	3.95	2.35	2.1	2.1	2.2	2.3
11	1.9	2.3	1.95	2.2	2.7	4.65	3.75	2.2	2.1	2.1	2.2	2.3
12	1.9	2.1	2.05	2.35	2.6	4.85	3.65	2.1	2.1	2.1	2.2	2.3
13	1.9	2.0	2.05	2.45	2.6	5.0	3.85	2.1	2.1	2.1	2.2	2.3
14	1.9	2.0	2.15	2.55	2.5	5.3	3.75	2.0	2.1	2.1	2.2	2.3
15	2.0	2.0	2.25	2.6	2.5	5.5	3.6	2.0	2.1	2.1	2.3	2.3

32606—IRR 250—10——7

Daily gage height, in feet, of South Fork of Humboldt River near Elko, Nev., for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
16	2.1	2.25	2.45	2.6	2.6	5.6	3.55	2.1	2.0	2.1	2.3	2.3
17	2.1	2.2	2.95	2.6	2.6	5.75	3.45	2.2	2.0	2.1	2.3	2.3
18	2.2	2.2	2.9	2.6	2.6	5.7	3.35	2.2	2.0	2.1	2.3	2.3
19	2.2	2.2	2.75	2.7	2.6	5.45	3.3	2.1	2.0	2.1	2.3	2.3
20	2.3	2.2	2.7	2.7	2.75	5.1	3.25	2.0	2.0	2.1	2.3	2.3
21	2.3	2.05	2.6	2.75	2.7	4.7	3.2	2.0	2.0	2.1	2.3	2.3
22	2.4	2.0	2.55	2.8	2.85	4.45	3.3	2.0	2.0	2.1	2.3	2.3
23	2.5	2.1	2.5	2.8	3.0	4.3	3.25	2.0	2.0	2.1	2.3	2.3
24	2.5	2.2	2.5	2.7	3.0	4.2	3.15	2.0	2.0	2.1	2.3	2.3
25	2.5	2.25	2.5	2.7	3.0	4.3	3.05	2.0	2.0	2.1	2.3	2.3
26	2.3	2.4	2.45	2.5	3.1	4.45	3.0	2.0	2.0	2.1	2.3	2.3
27	2.3	2.35	2.4	2.35	3.2	4.5	2.95	2.0	2.1	2.1	2.3	2.3
28	2.3	2.25	2.4	2.35	3.25	4.6	2.9	2.0	2.1	2.2	2.3	2.3
29	2.2	2.25	2.4	2.3	3.3	4.6	2.85	2.0	2.1	2.2	2.3	2.3
30	2.2	.....	2.4	2.3	3.35	4.5	2.7	2.0	2.1	2.2	2.3	2.3
31	2.2	.....	2.4	.....	3.45	.....	2.6	2.0	.....	2.2	.....	2.3

NOTE.—The gage was washed out January 27 and reestablished February 26, 1907, about 1,000 feet upstream. Probable ice conditions during the greater part of December, 1907. Ice conditions January 1 to February 21 and November 25 to December 31, 1908. A diversion dam was put in about January 16, 1908, and raised May 5 to 6 and May 22, 1908. This affected the gage readings considerably.

Rating tables for South Fork of Humboldt River near Elko, Nev.

JANUARY 1 TO 26, 1907.

[1906 table used. Gage height 1.10 feet=18 second-feet.]

FEBRUARY 26, 1907, TO JANUARY 15, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.50	20	2.60	148	3.70	402	4.80	732
1.60	27	2.70	166	3.80	428	4.90	766
1.70	34	2.80	186	3.90	456	5.00	800
1.80	43	2.90	208	4.00	484	5.20	868
1.90	53	3.00	232	4.10	514	5.40	936
2.00	64	3.10	256	4.20	544	5.60	1,004
2.10	75	3.20	280	4.30	574	5.80	1,072
2.20	87	3.30	304	4.40	604	6.00	1,140
2.30	100	3.40	328	4.50	634	6.20	1,208
2.40	114	3.50	352	4.60	666	6.40	1,276
2.50	130	3.60	376	4.70	698		

NOTE.—This table is not applicable for ice or obstructed channel conditions. It is based on 5 discharge measurements made during 1907, and is fairly well defined between gage heights 2.0 feet and 6.0 feet. Below gage height 2.0 feet the rating curve is very uncertain.

JANUARY 16 TO MAY 6, 1908.

1.90	33	2.20	62	2.50	98	2.80	146
2.00	42	2.30	73	2.60	113	2.90	166
2.10	52	2.40	85	2.70	129	3.00	186

NOTE.—This table is not applicable for ice conditions. It is based on one discharge measurement made during 1908 and the form of the 1907 curve, and is not well defined. The channel was obstructed during this period by a diversion dam below.

MAY 7 TO 21, 1908.

2.50	78	2.60	91	2.70	105	2.80	121

NOTE.—This table is not applicable for ice conditions. It is based on one discharge measurement made during the period covered, and is fairly well defined. The diversion dam below was raised about May 6, changing the rating.

Rating tables for South Fork of Humboldt River near Elko, Nev.—Continued.

MAY 23 TO DECEMBER 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.00	15	2.90	95	3.80	268	4.70	502
2.10	21	3.00	110	3.90	292	4.80	532
2.20	27	3.10	126	4.00	316	4.90	562
2.30	34	3.20	144	4.10	340	5.00	594
2.40	42	3.30	162	4.20	366	5.20	658
2.50	50	3.40	182	4.30	392	5.40	726
2.60	59	3.50	203	4.40	418	5.60	796
2.70	70	3.60	224	4.50	444	5.80	868
2.80	82	3.70	246	4.60	472		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on one discharge measurement made during 1908, and is well defined only for medium stages in midsummer. For low water it is only approximate. The last change in the diversion dam noted by the observer occurred on May 22, and raised the gage height 0.3 foot or about the same as the difference between this and the previous table. The dam has been assumed to remain constant until the end of the year.

Monthly discharge of South Fork of Humboldt River near Elko, Nev., for 1907 and 1908.

[Drainage area, 1,150 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.	
1907.							
January	.....	.....	18.0	0.016	0.02	1,100	D.
February	.....	.....	25.0	.022	.02	1,390	D.
March	364	20	143	.124	.14	8,790	C.
April	698	232	376	.327	.36	22,400	B.
May	732	208	450	.391	.45	27,700	B.
June	1,260	470	1,030	.896	1.00	61,300	B.
July	1,170	340	649	.564	.65	39,900	B.
August	352	43	118	.103	.12	7,260	B.
September	53	34	42.2	.037	.04	2,510	C.
October	64	34	42.9	.037	.04	2,640	C.
November	53	34	40.1	.035	.04	2,390	C.
December	.....	.....	40.7	.035	.04	2,500	D.
The year	1,260	.....	248	.216	2.92	180,000	
1908.							
January	.....	.....	46.1	.040	.05	2,830	D.
February	85	.....	51.9	.045	.05	2,990	D.
March	176	33	77.8	.068	.08	4,780	D.
April	146	62	93.6	.081	.09	5,570	D.
May	192	78	112	.097	.11	6,890	C.
June	850	257	486	.423	.47	28,900	C.
July	487	59	245	.213	.25	15,100	B.
August	50	15	27.1	.024	.03	1,670	D.
September	30	15	18.0	.016	.02	1,070	D.
October	27	15	21.9	.019	.02	1,350	D.
November	34	27	29.9	.026	.03	1,780	D.
December	.....	.....	25.0	.022	.03	1,540	D.
The year	850	15	103	.089	1.23	74,400	

NOTE.—Discharges estimated January 27 to February 25, 1907; estimated on account of ice conditions December 8, 1907 to February 21, 1908, and November 25 to December 31, 1908.

SIERRA NEVADA DRAINAGE AREA.

PRINCIPAL STREAMS.

The Sierra Nevada drainage area includes the western part of Nevada, the eastern part of California, and a small part of south-central Oregon. The principal rivers of the area are Truckee River, discharging into Pyramid and Winnemucca lakes; Walker River, flowing into Walker Lake; Carson River, emptying into Carson Sink; Susan River, which flows into Honey Lake; and Owens River, discharging into Owens Lake.

TRUCKEE RIVER BASIN.

DESCRIPTION.

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 more than 6,000 feet above sea, 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, saline bodies of water without outlets. From the lake 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 three 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.

PORTION OF LAKE TAHOE.

Three power plants have been installed on the Truckee: The Farad (Mystic), Fleish, and Washoe plants, with an emergency plant near Reno, Nev. (See Pl. V, *B*.) 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. (See Pl. V, *A*.)

Almost all of 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.

The following gaging stations have been maintained in the Truckee River basin:

Lake Tahoe at Tahoe, Cal., 1900–1901, 1907–8.
Truckee River at Tahoe, Cal., 1895, 1900–1908.
Truckee River near Boca, Cal., 1890.
Truckee River at Nevada-California state line, 1899–1908.
Truckee River near Laughtons, Nev., 1890.
Truckee River at Reno, Nev., 1906–1908.
Truckee River near Essex, Nev., 1889.
Truckee River at Vista, Nev., 1890–91, 1899–1907.
Truckee River at Derby dam, Nev., 1907–8.
Truckee River near Wadsworth, Nev., 1902–1905.
Lake Winnemucca Inlet near Wadsworth, Nev., 1902–1905.
Donner Creek near Truckee, Cal., 1902–1908.
Prosser Creek near Hobart Mills, Cal., 1903–4, 1907–8.
Prosser Creek near Boca, Cal., 1889–90, 1902–3.
Independence Creek below Independence Lake, Cal., 1902–1906.
Little Truckee River at Pine Station and Starr, Cal., 1903–1908.
Little Truckee River near Boca Cal., 1890.
Steamboat Creek at Steamboat Springs, Nev., 1900–1901.

LAKE TAHOE AT TAHOE, CAL.

Lake Tahoe lies on the boundary between Nevada and California, at an elevation of 6,225 feet above sea level, and has an area of 124,000 acres, or about 193 square miles. It is the largest body of water at so high an elevation in the United States. (See Pl. IV.)

Records of the height of the lake have been kept to determine its fluctuation and the approximate amount of water drawn from storage.

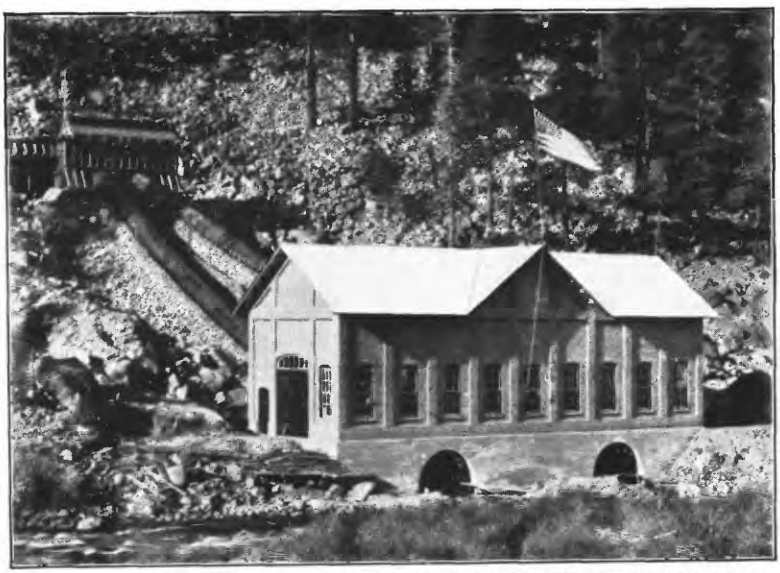
Daily gage height, in feet, of Lake Tahoe at Tahoe, Cal., for 1907 and 1908.

[J. U. Haley, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1						4.95		5.67				2.80
2					4.30	5.00	5.65	5.65	4.88		3.44	2.78
3							5.70	5.65			3.42	2.76
4								5.63			3.40	
5								5.60		3.90	3.38	
6				3.85					4.80		3.36	
7									4.78			
8				3.90	4.42				4.75			
9						5.18	5.72		4.73			
10							5.74		4.71	3.85	3.30	
11				3.88			5.73	5.42		3.83	3.28	2.90
12							5.73			3.82	3.25	2.90
13							5.75	5.40		3.80	3.22	2.90
14				3.95	4.60		5.76	5.37		3.80	3.20	2.90
15				4.00	4.58	5.40	5.76	5.35		3.78		
16					4.58		5.75	5.33		3.76		
17				4.05	4.60	5.40	5.76	5.32		3.74		2.88
18				4.10	4.64	5.42	5.76	5.30	4.40	3.70		
19						5.42		5.26		3.68	3.05	
20					4.70	5.42		5.25		3.66	3.00	2.90
21				4.10	4.72	5.43	5.73	5.24	4.33	3.64		
22				4.13			5.72	5.20	4.30		2.97	2.88
23				4.13	4.76	5.50	5.72	5.16	4.30			2.86
24				4.17	4.77	5.50	5.71	5.15		3.62	2.90	
25				4.20	4.80	5.52	5.72	5.10				
26						5.53	5.71	5.10	4.23			
27				4.24		5.55	5.70	5.08	4.20			
28							5.70			3.54		
29					4.85		5.69				3.83	2.88
30				4.30	4.88		5.69		4.10	3.50	2.80	
31					4.90		5.69					
1908.												
1	2.90								1.83	1.39	1.10	.90
2									1.80		1.10	
3									1.80		1.10	
4									1.80	1.31	1.10	
5									1.79	1.30	1.10	.90
6	2.80		2.25						1.78	1.28	1.10	.90
7			2.25	1.90						1.27	1.10	.85
8				1.90						1.26	1.06	
9	2.82		2.20					2.34	1.70	1.25	1.02	
10			2.15					2.32	1.73	1.25	1.00	
11	2.80		2.15					2.30	1.70	1.23	1.00	.80
12			2.10	1.90				2.27	1.70	1.20	1.00	.80
13			2.10	1.90					1.70	1.19	1.00	.80
14		2.48	2.10						1.70		1.00	
15		2.45	2.10	1.95							1.00	
16	2.72		2.10	1.95						1.25	.95	.80
17	2.70		2.10	1.95				2.15	1.60		.92	
18			2.10	2.00				2.15			.92	
19			2.10					2.10			.90	
20			2.10					2.10				.70
21								2.10	1.57			.70
22			2.05					2.08	1.56			
23	2.70							2.05		1.15		
24		2.25						2.03			1.00	.65
25		2.24						2.01				.62
26		2.20						2.00	1.50	1.20		
27									1.45	1.20		.62
28			1.90						1.45	1.20	.90	
29									1.40		.90	
30									1.40	1.15	.90	
31								1.82		1.12		

NOTE.—No records were obtained in January to March, 1907, and May to July, 1908. The gage was not read at other times when the lake was rough.

A. FALLS OF LITTLE TRUCKEE RIVER, ONE-HALF MILE BELOW WEBBER LAKE, CALIFORNIA.



B. POWER HOUSE OF TRUCKEE RIVER GENERAL ELECTRIC COMPANY AT MYSTIC, CAL.

TRUCKEE RIVER AT TAHOE, CAL.

This station, which is located at Tahoe, Cal., about one-fourth mile below the outlet of Lake Tahoe, was established June 17, 1900, to determine the total outflow of the lake and its value as a storage reservoir—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 15 or 20 second-feet, or the amount of leakage through the dam.

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 of Truckee River at Tahoe, Cal., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 22	Nicholas and Porter	83	297	3.50	879
June 27	E. A. Porter	128	460	4.10	1,250
1908.					
June 17	E. A. Porter	46	26	.60	19
July 8	M. B. Kennedy	78	155	1.90	328

Daily gage height, in feet, of Truckee River at Tahoe, Cal., for 1907 and 1908.

[J. U. Haley, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.9	2.9	3.0	3.2	3.3	3.6	4.1	4.25	4.05	4.05	3.7	3.2
2	2.9	2.9	3.0	3.2	3.3	3.65	4.1	4.25	4.1	4.0	3.7	3.2
3	2.9	2.9	3.0	3.2	3.3	3.65	4.1	4.25	4.1	2.2	3.7	3.2
4	2.9	3.0	3.0	3.2	3.3	3.65	4.1	4.25	4.1	3.75	3.65	3.2
5	2.9	3.0	3.0	3.2	3.3	3.65	4.1	4.25	4.1	4.0	3.65	3.2
6	2.9	3.0	3.0	3.2	3.3	3.65	4.1	4.25	4.1	4.0	3.6	3.2
7	2.9	3.0	3.0	3.2	3.3	3.65	4.2	4.25	4.1	4.0	.....	3.2
8	2.9	3.0	3.0	3.2	3.35	3.65	4.2	4.25	4.05	4.0	3.5	3.2
9	2.9	3.0	3.0	3.2	3.35	3.7	4.2	4.25	4.05	4.0	3.5	3.3
10	2.9	3.0	3.0	3.2	3.35	3.8	4.2	4.25	4.1	4.0	3.5	3.3
11	2.9	3.0	3.0	3.2	3.35	3.9	4.2	4.1	4.1	3.65	3.5	3.3
12	2.9	3.0	3.0	3.2	3.4	3.95	4.2	4.1	4.1	4.0	3.5	3.3
13	2.9	3.0	3.0	3.2	3.4	4.0	4.3	4.0	4.05	4.0	3.5	3.3
14	2.9	3.0	3.0	2.65	3.45	4.0	4.3	4.1	4.05	3.95	3.5	3.3
15	2.9	3.0	3.0	2.9	3.45	4.0	4.3	4.1	4.0	3.95	3.5	3.3
16	2.9	3.0	3.0	3.2	3.45	3.95	4.3	4.1	4.0	3.95	3.45	3.3
17	2.9	3.0	3.0	3.2	3.45	3.95	4.3	4.05	3.9	3.9	3.45	3.2
18	2.9	3.0	3.0	3.2	3.45	3.95	4.3	4.05	3.95	3.85	3.45	3.2
19	2.9	3.0	3.0	3.2	3.45	4.0	4.3	4.1	4.0	3.85	3.4	3.2
20	2.9	3.0	3.0	3.2	3.5	4.0	4.3	4.1	4.0	3.85	3.4	3.2
21	2.9	3.0	3.2	3.2	3.5	4.0	4.25	4.1	4.0	3.8	3.35	3.2
22	2.9	3.0	3.2	3.2	3.5	4.0	4.25	4.05	4.0	3.8	3.35	3.2
23	2.9	3.0	3.2	3.2	3.5	4.0	4.25	4.1	4.0	3.8	3.3	3.2
24	2.9	3.0	3.2	3.2	3.5	4.0	4.25	4.1	4.1	3.8	3.3	3.2
25	2.9	3.0	3.2	3.2	3.5	4.0	4.25	4.05	4.1	3.75	3.3	3.2
26	2.9	3.0	3.2	3.2	3.6	4.0	4.25	4.05	4.1	3.75	3.3	3.2
27	2.9	3.0	3.2	3.2	3.6	4.1	4.25	4.05	4.1	3.75	3.25	3.2
28	2.9	3.0	3.2	3.2	3.6	4.1	4.25	4.1	4.1	3.75	3.25	3.1
29	2.9	.....	3.2	3.3	3.6	4.1	4.25	4.1	4.05	3.75	3.2	3.1
30	2.9	.....	3.2	3.3	3.6	4.1	4.25	4.1	4.05	3.7	3.2	3.1
31	2.9	.....	3.2	.....	3.6	.....	4.25	4.1	.....	3.7	.....	3.1

Daily gage height, in feet, of Truckee River at Tahoe, Cal., for 1907 and 1908—Cont'd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	3.1	3.0	2.75	2.25	1.0	0.75	0.95	2.35	2.15	2.0	1.85	1.85
2	3.1	3.0	2.75	2.25	1.0	1.0	.95	2.35	2.15	2.0	1.85	1.85
3	3.1	3.0	2.75	2.25	1.0	1.0	.95	2.1	2.15	2.0	1.85	1.85
4	3.1	2.95	2.75	2.25	1.0	1.0	.95	2.1	2.0	2.0	1.85	1.85
5	3.1	2.95	2.75	2.25	1.0	1.0	.95	2.1	2.0	2.0	1.85	1.85
6	3.1	2.95	2.75	2.25	1.0	1.0	.95	2.35	2.15	2.0	1.85	1.8
7	3.1	2.95	2.75	2.25	1.0	1.0	1.8	2.35	2.15	2.1	1.85	1.8
8	3.1	2.9	2.75	1.7	1.0	1.0	1.8	2.35	2.15	2.1	1.85	1.8
9	3.1	2.9	2.75	1.7	1.1	1.0	1.2	2.35	2.1	2.1	1.8	1.75
10	3.1	2.85	2.7	1.7	1.1	.6	1.7	2.35	2.1	2.1	1.8	1.75
11	3.1	2.85	2.7	1.7	1.1	.6	1.7	2.35	2.1	2.1	1.8	1.75
12	3.1	2.85	2.7	1.7	.65	.6	1.7	2.35	2.1	2.05	1.8	1.7
13	3.05	2.85	2.7	1.3	.65	.6	1.7	2.35	2.1	2.05	1.8	1.7
14	3.05	2.85	2.7	1.3	.65	.6	1.7	2.35	2.1	2.05	1.8	1.7
15	3.05	2.8	2.7	1.3	.7	.6	1.7	2.35	2.1	1.95	1.8	1.7
16	3.05	2.8	2.7	1.3	.7	.6	1.7	2.35	2.1	2.0	1.8	1.7
17	3.0	2.8	2.7	1.3	.7	.6	1.9	2.3	2.1	2.0	1.8	1.7
18	3.0	2.8	2.7	1.0	.7	.6	1.9	2.3	2.1	2.0	1.8	1.75
19	3.0	2.8	2.7	1.0	.7	.6	1.9	2.3	2.1	1.95	1.8	1.75
20	3.0	2.8	2.7	1.0	.7	.6	1.9	2.25	2.1	1.95	1.8	1.75
21	3.0	2.75	2.7	1.0	.75	.6	2.35	2.25	2.1	1.95	1.8	1.75
22	3.0	2.75	2.65	1.0	.75	.6	2.35	2.25	2.1	1.95	1.8	1.7
23	3.0	2.75	2.65	1.0	.75	.95	2.35	2.25	2.05	1.9	1.8	1.7
24	3.0	2.75	2.65	1.0	.75	.95	2.35	2.25	2.05	1.9	1.8	1.7
25	3.0	2.7	2.65	1.0	.75	.95	2.35	2.25	2.05	1.9	1.8	1.7
26	3.0	2.7	2.65	1.0	.75	.95	2.35	2.25	2.05	1.9	1.8	1.7
27	3.0	2.7	2.6	1.0	.75	.95	2.35	2.2	2.05	1.9	1.8	1.7
28	3.0	2.7	2.6	1.0	.75	.95	2.35	2.2	2.05	1.9	1.8	1.7
29	3.0	2.75	2.25	1.0	.75	.95	2.35	2.2	2.05	1.9	1.8	1.65
30	3.0	.....	2.25	1.0	.75	.95	2.35	2.2	2.05	1.9	1.8	1.65
31	3.0	.....	2.25	.....	.75	.....	2.35	2.15	.....	1.85	.....	1.65

NOTE.—These gage heights are affected by the raising and lowering of the gates at the regulating dam Probably no ice conditions.

Rating tables for Truckee River at Tahoe, Cal.

FOR 1905 TO 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.20	453	2.80	659	3.40	902	4.00	1,182
2.30	485	2.90	697	3.50	946	4.10	1,234
2.40	518	3.00	736	3.60	991	4.20	1,288
2.50	552	3.10	776	3.70	1,037	4.30	1,344
2.60	586	3.20	817	3.80	1,084		
2.70	622	3.30	859	3.90	1,132		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 12 discharge measurements made during 1905 to 1907, and is fairly well defined.

FOR 1908.

0.30	0	1.10	110	1.90	327	2.70	612
.40	3	1.20	133	2.00	360	2.80	652
.50	9	1.30	157	2.10	393	2.90	692
.60	19	1.40	182	2.20	427	3.00	733
.70	33	1.50	209	2.30	462	3.10	775
.80	49	1.60	237	2.40	498	3.20	817
.90	67	1.70	266	2.50	535	3.30	859
1.00	88	1.80	296	2.60	573		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 2 discharge measurements made during 1908 and earlier measurements at high stages, and is not well defined.

Monthly discharge of Truckee River at Tahoe, Cal., for 1907 and 1908.

[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.	
1907.							
January	697	697	697	1.34	1.54	42,900	B.
February	736	697	732	1.41	1.47	40,700	B.
March	817	736	765	1.47	1.70	47,000	A.
April	859	604	806	1.55	1.73	48,000	A.
May	991	859	919	1.77	2.04	56,500	A.
June	1,230	991	1,130	2.18	2.43	67,200	A.
July	1,340	1,230	1,300	2.50	2.88	79,900	A.
August	1,320	1,180	1,250	2.41	2.78	76,900	A.
September	1,230	1,130	1,210	2.33	2.60	72,000	A.
October	1,210	453	1,100	2.14	2.47	67,600	A.
November	1,040	817	925	1.78	1.99	55,000	A.
December	859	776	823	1.59	1.83	50,600	B.
The year	1,340	453	971	1.87	25.43	704,000	
1908.							
January	775	733	752	1.45	1.67	46,200	B.
February	733	612	666	1.28	1.38	38,300	B.
March	632	444	596	1.15	1.33	36,600	A.
April	444	88	212	.408	.46	12,600	A.
May	110	26	56.8	.109	.13	3,490	A.
June	88	19	53.9	.104	.12	3,210	A.
July	480	78	311	.599	.69	19,100	A.
August	480	393	453	.873	1.01	27,900	A.
September	410	360	390	.751	.84	23,200	A.
October	393	312	354	.682	.79	21,800	A.
November	312	296	300	.578	.64	17,900	A.
December	312	252	278	.536	.62	17,100	B.
The year	775	19	369	.710	9.68	267,000	

NOTE.—The accuracy of winter records is probably not affected by ice conditions.

TRUCKEE RIVER AT NEVADA-CALIFORNIA STATE LINE.

This station, which is located at the state line, 17 miles west of Reno, Nev., was established September 1, 1899, to determine the quantity of water available for use in the Reno or Truckee Valley.

The station is below all tributaries which have their headwaters in the Sierra Nevada divide, and is above all diversions.

The gage is located at Farad, 2½ miles above the measuring section. The flow is probably unaffected by ice. The channel is somewhat shifting, requiring rerating after each high-water period. Flood measurements are made with difficulty owing to the high velocities of the current. Records are fairly reliable.

Discharge measurements of Truckee River at Nevada-California state line, in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 25	E. A. Porter	105	487	5.30	3,860
June 1	do	100	597	6.10	5,910
July 16	do	92	433	4.40	2,420
August 11	do	92	347	3.60	1,630
September 29	do	89	304	3.10	1,210
1908.					
March 11	E. A. Porter	82	262	2.70	874
April 3	do	85	278	2.90	924
April 24	La Rue and Porter	86	298	3.00	1,120
June 3	E. A. Porter	82	276	2.80	915
July 10	M. B. Kennedy	79	222	2.30	438
July 22	E. A. Porter	81	216	2.40	604
October 7	do	78	184	2.10	404

Daily gage height, in feet, of Truckee River at Nevada-California state line, for 1907 and 1908.

[W. E. Chubbuck, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.65	2.9	3.1	4.2	5.6	6.15	5.25	4.05	3.4	3.2	3.1	2.8
2	2.65	3.7	3.1	4.3	5.7	6.15	5.1	3.95	3.4	3.3	3.1	2.8
3	2.7	3.8	3.1	4.3	5.7	6.05	5.25	3.95	3.4	3.2	3.1	2.8
4	2.7	3.95	3.1	4.2	5.55	6.05	5.4	3.85	3.45	2.45	3.1	2.8
5	2.7	4.05	3.15	4.2	5.15	5.9	5.05	3.85	3.4	3.2	3.0	2.9
6	2.7	3.8	3.15	4.0	5.1	5.75	5.0	3.8	3.4	2.4	3.0	3.0
7	2.6	3.7	3.1	4.1	5.2	5.55	4.95	3.8	3.4	2.4	2.75	3.0
8	2.65	3.4	3.1	4.2	5.15	5.25	4.8	3.75	3.4	2.4	2.7	2.9
9	2.65	3.35	3.1	4.3	5.3	5.25	4.8	3.7	3.4	3.1	2.9	2.9
10	2.7	3.3	3.1	4.9	5.6	5.25	4.75	3.65	3.4	3.25	3.0	2.9
11	2.7	3.25	3.0	5.2	6.0	5.45	4.75	3.6	3.4	3.0	3.0	3.0
12	2.65	3.25	3.1	5.5	5.7	5.5	4.75	3.6	3.4	3.2	3.0	3.0
13	2.7	3.25	3.05	6.15	5.15	4.95	4.55	3.55	3.4	3.2	3.0	3.0
14	2.7	3.25	3.0	7.0	5.0	4.8	4.5	3.5	3.35	3.2	3.0	3.0
15	2.7	3.25	3.05	5.9	5.2	4.65	4.5	3.6	3.3	3.2	2.95	3.0
16	2.7	3.25	3.1	5.5	5.45	4.5	4.45	3.6	3.3	3.2	3.0	2.9
17	2.65	3.2	5.35	5.65	5.65	4.45	4.4	3.55	3.3	3.2	3.0	2.9
18	2.65	3.2	11.5	5.8	5.9	4.55	4.4	3.5	3.3	3.15	2.9	2.9
19	2.6	3.2	8.1	6.0	6.3	4.7	4.4	3.5	3.3	3.15	2.8	2.8
20	2.65	3.15	7.3	6.0	6.15	5.0	4.4	3.5	3.3	3.15	2.8	2.8
21	2.6	3.2	6.25	5.8	5.75	5.0	4.25	3.5	3.3	3.15	2.9	2.8
22	2.65	3.3	5.85	5.85	5.55	5.2	4.15	3.5	3.3	3.15	2.9	2.75
23	2.65	3.25	4.75	6.15	5.2	5.15	4.2	3.45	3.3	3.15	2.9	2.7
24	2.6	3.25	4.3	6.3	5.2	4.9	4.15	3.4	3.3	3.2	2.9	2.8
25	2.6	3.25	4.25	6.2	5.2	4.75	4.1	3.4	3.3	3.2	2.9	2.8
26	2.6	3.2	4.2	6.15	5.2	4.8	4.1	3.4	3.3	3.15	2.9	2.9
27	2.7	3.2	4.05	6.1	5.3	5.0	4.2	3.65	3.3	3.25	2.9	3.25
28	2.9	3.2	4.0	6.0	5.45	5.25	4.2	3.4	3.25	3.2	2.9	3.1
29	2.85	.....	4.0	5.85	5.6	5.15	4.2	3.4	3.2	3.15	2.9	2.8
30	2.85	.....	4.0	5.65	5.75	5.15	4.15	3.4	3.2	3.1	2.85	2.8
31	2.85	.....	4.1	.....	6.05	.....	4.1	3.4	.....	3.1	.....	2.75
1908.												
1	2.8	2.9	2.8	2.9	3.4	2.85	2.4	2.4	2.2	2.15	2.05	2.05
2	2.8	2.8	2.8	2.9	3.45	2.8	2.3	2.4	2.2	2.1	2.1	2.05
3	2.8	3.0	2.8	2.9	3.1	2.7	2.25	2.6	2.2	2.1	2.1	2.1
4	2.8	2.8	2.8	3.05	2.95	2.65	2.2	2.2	2.15	2.2	2.0	2.1
5	2.8	2.8	2.8	3.15	2.9	2.75	2.3	2.2	2.1	2.05	2.0	2.1
6	2.8	2.8	2.75	3.25	3.0	2.8	2.2	2.2	2.0	2.05	2.0	2.1
7	2.8	2.8	2.7	3.05	3.2	2.9	2.2	2.4	2.2	2.1	2.05	2.05
8	2.8	2.8	2.7	2.8	2.95	3.05	2.3	2.4	2.2	2.2	2.1	2.1
9	2.85	2.8	2.8	2.95	2.8	3.05	2.35	2.4	2.2	2.2	2.1	2.0
10	2.85	2.8	2.8	3.1	2.8	3.1	2.3	2.4	2.15	2.2	2.1	1.9
11	2.9	2.8	2.7	3.35	2.8	3.05	2.35	2.35	2.2	2.15	2.1	1.95
12	2.9	2.8	2.7	3.55	2.8	2.95	2.4	2.4	2.2	2.15	2.05	1.95
13	2.85	2.75	2.8	3.65	2.65	3.1	2.35	2.4	2.2	2.2	2.0	2.05
14	3.0	2.7	2.9	3.7	2.65	3.15	2.3	2.3	2.2	2.2	2.0	2.1
15	2.9	2.7	3.0	3.6	2.7	2.95	2.25	2.4	2.2	2.5	2.05	1.95
16	2.9	2.7	3.1	3.45	2.65	2.9	2.15	2.4	2.25	2.45	2.0	2.0
17	2.9	2.8	3.15	3.2	2.65	2.85	2.2	2.35	2.2	2.3	2.05	2.0
18	2.9	2.7	3.25	3.25	2.6	2.75	2.2	2.3	2.25	2.25	2.0	2.0
19	2.9	2.7	3.2	3.4	2.75	2.6	2.15	2.3	2.2	2.2	2.0	2.0
20	2.9	2.7	3.25	3.6	2.65	2.6	2.25	2.3	2.15	2.15	2.1	2.0
21	3.0	2.7	3.35	3.8	2.65	2.7	2.15	2.3	2.15	2.15	2.15	2.0
22	2.9	2.7	3.2	3.45	2.7	2.45	2.45	2.3	2.1	2.1	2.2	2.0
23	2.9	2.7	3.2	3.25	2.75	2.4	2.45	2.25	2.1	2.1	2.2	2.0
24	2.9	2.7	3.35	3.05	2.9	2.55	2.4	2.3	2.15	2.05	2.1	1.95
25	2.9	2.7	3.5	3.05	3.05	2.6	2.4	2.3	2.1	2.1	2.1	1.95
26	2.9	2.75	3.3	3.05	3.1	2.6	2.45	2.3	2.1	2.05	2.05	2.0
27	2.9	2.8	3.25	3.15	2.95	2.5	2.4	2.2	2.1	2.05	2.05	2.0
28	2.9	2.8	3.15	3.25	2.9	2.4	2.4	2.15	2.1	2.15	2.05	2.05
29	2.9	2.8	3.0	3.35	3.1	2.4	2.45	2.15	2.2	2.05	2.05	2.0
30	2.9	.....	3.1	3.4	3.05	2.45	2.4	2.25	2.15	1.95	2.1	2.05
31	2.9	.....	2.95	.....	3.0	.....	2.65	.....	.....	2.1	.....	2.1

Rating tables for Truckee River at Nevada-California state line.

APRIL 16, 1906, TO MARCH 16, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.60	645	3.00	920	3.40	1,240	3.80	1,605
2.70	710	3.10	995	3.50	1,325	3.90	1,700
2.80	780	3.20	1,075	3.60	1,415	4.00	1,800
2.90	850	3.30	1,155	3.70	1,510	4.10	1,900

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1906 and the form of the previous curve, and is fairly well defined above gage height 3.0 feet.

MARCH 17, 1907, TO MAY 31, 1908.

1.70	300	3.10	1,213	4.50	2,620	6.80	6,060
1.80	346	3.20	1,302	4.60	2,740	7.00	6,420
1.90	394	3.30	1,393	4.70	2,860	7.20	6,780
2.00	444	3.40	1,486	4.80	2,990	7.40	7,160
2.10	496	3.50	1,580	4.90	3,120	7.60	7,540
2.20	551	3.60	1,676	5.00	3,250	7.80	7,920
2.30	610	3.70	1,772	5.20	3,530	8.00	8,300
2.40	673	3.80	1,870	5.40	3,810	9.00	10,300
2.50	740	3.90	1,970	5.60	4,100	10.00	12,300
2.60	810	4.00	2,070	5.80	4,400	11.00	14,300
2.70	884	4.10	2,180	6.00	4,720	12.00	16,300
2.80	961	4.20	2,290	6.20	5,040		
2.90	1,042	4.30	2,400	6.40	5,380		
3.00	1,126	4.40	2,510	6.60	5,720		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on discharge measurements made during 1903 to 1908, and is well defined between gage heights 1.9 feet and 5.0 feet. Above gage height 5.0 feet the rating table is only approximate.

JUNE 1 TO DECEMBER 31, 1908.

1.90	310	2.20	470	2.50	670	2.80	920
2.00	360	2.30	530	2.60	750	2.90	1,020
2.10	410	2.40	600	2.70	830	3.00	1,126

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during the period and on earlier high-water measurements, and is fairly well defined above gage height 2.1 feet. Above gage height 3.0 feet it is the same as the previous table.

Monthly discharge of Truckee River at Nevada-California state line, for 1907 and 1908.

[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.	
1907.							
January	850	645	702	0.735	0.85	43,200	B.
February	1,850	850	1,220	1.28	1.33	67,800	B.
March	15,300	920	2,590	2.71	3.12	159,000	C.
April	6,420	2,070	3,880	4.06	4.53	231,000	B.
May	5,210	3,250	3,980	4.17	4.81	245,000	B.
June	4,960	2,560	3,570	3.74	4.17	212,000	A.
July	3,810	2,180	2,720	2.85	3.29	167,000	A.
August	2,120	1,490	1,680	1.76	2.03	103,000	A.
September	1,530	1,300	1,430	1.50	1.67	85,100	A.
October	1,390	673	1,200	1.26	1.45	73,800	A.
November	1,210	884	1,080	1.13	1.26	64,300	A.
December	1,350	884	1,040	1.09	1.26	64,000	B.
The year	15,300	645	2,090	2.19	29.77	1,520,000	

Monthly discharge of Truckee River at Nevada-California state line, for 1907 and 1908—Continued.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1908.							
January	1,130	961	1,020	1.07	1.23	62,700	B
February	1,130	884	938	.982	1.06	54,000	B.
March	1,580	884	1,140	1.19	1.37	70,100	B.
April	1,870	961	1,360	1.42	1.58	80,900	B.
May	1,530	810	1,040	1.09	1.26	64,000	B.
June	1,260	600	893	.935	1.04	53,100	B.
July	790	440	550	.576	.66	33,800	B.
August	750	440	544	.570	.66	33,400	B.
September	500	360	448	.469	.52	26,700	B.
October	670	335	445	.466	.54	27,400	B.
November	470	360	394	.413	.46	23,400	B.
December	410	310	370	.387	.45	22,800	B.
The year	1,870	310	762	.797	10.83	552,000	

NOTE.—The open channel rating has been applied throughout the year; values for the winter period are liable to be somewhat too large on account of ice.

TRUCKEE RIVER AT VISTA, NEV.

This station, which is located 7 miles east of Reno and one-fourth mile from Vista railroad station, was established August 18, 1899, to determine the amount of water available below the Truckee Valley for use of the main canal of the Truckee-Carson project, which takes water from the river about 16 miles below.

The gage has been washed out, replaced, and moved several times. The gage used April 16 to December 31, 1907, has no determined relation to previous gages, as it was in a different location. Measurements in 1907 were made at a cable below the railroad bridge where the gage was located, and were referred to a gage at the cable as well as to the regular gage.

Discharge measurements of Truckee River at Vista, Nev., in 1907.

Date.	Hydrographer.	Width.	Area of action.	Gage height.		Discharge.
				At bridge.[a]	At cable.	
		Feet.	*Sq. ft.*	*Feet.*	*Feet.*	*Sec.-ft.*
May 11	La Rue and Porter	125	910	10.50	9.40	4,640
June 19	E. A. Porter	121	772	9.00	8.10	2,960
July 17	do	120	725	9.00	7.85	2,790
August 10	do	120	542	7.80	6.90	1,530

[a] Observer's readings for the day.

Daily gage height, in feet, of Truckee River at Vista, Nev., for 1907.

[P. Fay, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct	Nov.	Dec.
1	5.3	6.6	5.9	.....	10.8	10.8	9.8	8.3	7.5	7.4	7.6	7.1
2	5.3	6.6	5.9	.....	10.7	11.0	9.7	8.1	7.6	7.5	7.5	7.0
3	5.3	6.3	5.9	.....	10.6	11.0	9.7	8.0	7.6	7.5	7.5	7.0
4	5.3	6.3	5.9	.....	10.5	11.0	10.0	8.0	7.7	7.2	7.4	7.0
5	5.3	7.0	6.0	.....	10.2	11.0	9.9	8.0	7.7	7.3	7.4	7.0
6	5.2	7.6	6.0	.....	9.8	10.8	9.7	8.0	7.7	7.3	7.4	7.1
7	5.2	6.9	6.0	.....	9.7	10.6	9.5	8.0	7.6	7.7	7.2	7.3
8	5.2	6.4	5.9	.....	9.6	10.3	9.4	7.9	7.5	7.6	7.1	7.3
9	5.2	6.4	5.9	.....	10.0	11.0	9.2	7.8	7.5	7.0	7.3	7.1
10	5.3	6.2	6.0	.....	10.2	11.0	9.2	7.8	7.5	7.3	7.4	7.1
11	5.2	6.2	6.0	.....	10.5	10.8	9.1	7.8	7.4	7.2	7.4	7.3
12	5.2	6.2	5.9	.....	10.5	10.6	9.1	7.8	7.4	7.2	7.3	7.3
13	5.2	6.2	5.8	.....	10.2	10.3	9.0	7.5	7.3	7.3	7.3	7.3
14	5.2	6.2	5.8	.....	9.9	10.0	8.9	7.5	7.3	7.4	7.3	7.3
15	4.9	6.1	5.8	.....	9.9	9.6	8.9	7.5	7.3	7.4	7.2	7.3
16	5.5	6.1	5.8	.....	9.9	9.3	8.9	7.5	7.3	7.3	7.2	7.2
17	5.5	6.0	5.9	11.9	10.2	9.1	9.0	7.5	7.3	7.4	7.2	7.1
18	5.5	6.0	.....	11.4	10.5	9.0	9.0	7.5	7.3	7.4	7.3	7.1
19	5.5	6.0	.....	11.4	11.0	9.0	8.7	7.4	7.3	7.5	7.2	7.1
20	5.4	6.0	.....	11.5	10.8	9.3	8.8	7.4	7.3	7.4	7.2	7.1
21	5.4	6.1	.....	11.0	10.5	9.4	8.6	7.4	7.3	7.4	7.1	7.0
22	5.4	6.2	.....	10.8	10.4	9.9	8.6	7.4	7.2	7.5	7.1	7.0
23	5.4	6.1	.....	11.0	10.1	9.7	8.5	7.4	7.2	7.4	7.1	7.0
24	5.3	6.2	.....	11.4	10.0	9.5	8.5	7.4	7.2	7.4	7.1	7.0
25	5.2	6.2	.....	11.6	10.0	9.3	8.5	7.4	7.2	7.5	7.1	7.1
26	5.2	6.1	.....	11.5	10.0	9.4	8.5	7.4	7.2	7.6	7.1	7.2
27	5.2	6.0	.....	11.5	10.0	9.5	8.5	7.5	7.2	7.8	7.0	7.3
28	6.0	5.9	.....	11.4	10.0	9.6	8.5	7.6	7.2	8.0	7.0	7.5
29	6.7	.....	.....	11.1	10.1	9.8	8.6	7.5	7.2	7.7	7.0	7.5
30	5.5	.....	.....	11.0	10.3	9.8	8.5	7.4	7.2	7.6	7.0	7.1
31	6.8	.....	.....	.....	10.5	.....	8.3	7.5	.....	7.6	.....	7.1

NOTE.—The gage was washed out March 19, 1907. On April 17 the observer recommenced readings by measuring from the top of the west abutment of the railroad bridge. The gage heights after that are referred to this point, assumed elevation 20.0 feet. Readings for August to December are somewhat uncertain, but comparisons with records at the Derby dam station tend to confirm them.

Rating tables for Truckee River at Vista, Nev.

JANUARY 1 TO MARCH 17, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.90	775	5.70	1,220	6.50	1,755	7.30	2,440
5.00	825	5.80	1,280	6.60	1,830	7.40	2,540
5.10	875	5.90	1,345	6.70	1,910	7.50	2,640
5.20	930	6.00	1,410	6.80	1,990	7.60	2,740
5.30	985	6.10	1,475	6.90	2,080	7.70	2,849
5.40	1,040	6.20	1,540	7.00	2,170		
5.50	1,100	6.30	1,610	7.10	2,260		
5.60	1,160	6.40	1,680	7.20	2,350		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on discharge measurements made during 1904–1906, and is well defined below gage height 8.0 feet.

Rating tables for Truckee River at Vista, Nev.—Continued.

APRIL 17 TO DECEMBER 31, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
7.00	980	8.20	1,980	9.40	3,290	10.60	4,790
7.10	1,050	8.30	2,080	9.50	3,410	10.70	4,920
7.20	1,120	8.40	2,180	9.60	3,530	10.80	5,050
7.30	1,190	8.50	2,280	9.70	3,650	10.90	5,180
7.40	1,260	8.60	2,380	9.80	3,770	11.00	5,310
7.50	1,340	8.70	2,490	9.90	3,890	11.20	5,580
7.60	1,420	8.80	2,600	10.00	4,010	11.40	5,860
7.70	1,510	8.90	2,710	10.10	4,140	11.60	6,140
7.80	1,600	9.00	2,820	10.20	4,270	11.80	6,420
7.90	1,690	9.10	2,930	10.30	4,400	12.00	6,700
8.00	1,780	9.20	3,050	10.40	4,530		
8.10	1,880	9.30	3,170	10.50	4,660		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1908, and is fairly well defined above gage height 7.8 feet.

Monthly discharge of Truckee River at Vista, Nev., for 1907.

[Drainage area, 1,520 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	1,990	775	1,060	0.697	0.80	65,200	B.
February	2,740	1,340	1,620	1.07	1.11	90,000	B.
March 1–17	1,410	1,280	1,350	.888	.56	45,500	B.
April 17–30	6,560	5,050	5,750	3.78	1.97	160,000	A.
May	5,310	3,530	4,320	2.84	3.27	266,000	A.
June	5,310	2,820	4,100	2.70	3.01	244,000	A.
July	4,010	2,080	2,840	1.87	2.16	175,000	A.
August	2,080	1,260	1,480	.974	1.12	91,000	A.
September	1,510	1,120	1,250	.822	.92	74,400	A.
October	1,780	980	1,300	.855	.99	79,900	A.
November	1,420	980	1,140	.750	.84	67,800	B.
December	1,340	980	1,090	.717	.83	67,000	B.
The period						1,430,000	

NOTE.—Open-channel rating applied throughout the year; discharges for winter months may be somewhat too large on account of ice.

TRUCKEE RIVER AT DERBY DAM, NEV.

This station, which is located about 2 miles east of Clarks, Nev., three-fourths mile above the Reclamation Service diversion dam for the main canal of the Truckee-Carson project (see Pl. VI), 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. This station replaces the station at Vista, giving practically the same record. Results obtained at this station are good.

DIVERSION DAM ON TRUCKEE RIVER, TRUCKEE-CARSON PROJECT, NEVADA.

Discharge measurements of Truckee River at Derby dam, Nev., in 1908 and 1909.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 4	E. A. Porter	102	241	5.05	911
March 19	do	116	346	5.75	1,430
April 4	do	106	276	5.40	1,040
April 23	La Rue and Porter	102	266	5.30	1,000
May 5	E. A. Porter	98	223	4.95	764
May 29	do	96	202	4.65	679
July 3	do	90	112	3.67	246
July 20	do	90	96	3.52	187
October 6	do	94	136	4.00	397
1909.					
January 20	E. A. Porter		762	9.2	4,030
January 21	do		908	10.2	4,900
January 28	do		371	6.2	1,660

Daily gage height, in feet, of Truckee River at Derby dam, Nev., for 1907 and 1908.

[Roy Harling, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.[a]							1907.[a]						
1	8.5	6.6	6.1	5.7	5.7	4.45	16	7.5	5.7	5.6	5.4	4.9	4.5
2	8.4	6.4	6.1	5.75	5.6	4.45	17	7.4	5.7	5.55	5.4	4.4	5.15
3	8.5	6.4	6.1	5.75	5.4	4.4	18	7.3	5.7	5.6	5.45	4.4	5.15
4	8.7	6.35	6.1	5.65	5.4	4.4	19	7.3	5.7	5.6	5.45	4.5	5.2
5	8.6	6.35	6.1	5.8	5.4	4.5	20	7.3	5.8	5.6	5.45	4.5	5.2
6	8.3	6.3	6.0	5.45	5.5	4.5	21	7.2	5.8	5.65	5.45	4.5	5.0
7	8.25	6.3	6.0	4.85	5.5	4.5	22	7.05	5.8	5.6	5.4	4.5	5.0
8	8.2	6.2	5.9	4.9	5.3	4.45	23	6.85	5.7	5.6	5.45	4.6	5.0
9	8.0	6.05	5.85	5.0	5.3	4.5	24	6.85	5.7	5.6	5.45	4.5	4.9
10	8.2	6.0	5.7	5.6	5.1	5.15	25	6.85	5.75	5.7	5.5	4.45	4.8
11	8.0	5.95	5.6	5.5	4.8	5.15	26	6.85	5.8	5.6	6.1	4.45	5.0
12	8.0	5.9	5.6	5.4	4.8	5.2	27	6.85	5.9	5.6	6.3	4.5	5.2
13	7.9	5.8	5.6	5.4	4.85	5.2	28	6.2	6.2	5.6	6.4	4.5	5.4
14	7.8	5.8	5.65	5.4	4.85	5.0	29	6.95	5.6	5.6	6.4	4.5	.....
15	7.7	5.75	5.65	5.4	4.85	4.45	30	6.85	5.65	5.6	6.1	4.45	.....
							31	6.7	5.7	.....	5.7	.....	.....

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	5.8	5.1	5.0	5.4	5.2	4.7	3.8	5.1	3.7	3.9	4.1	3.9
2	5.8	5.2	5.0	5.3	5.25	4.45	3.7	.....	3.6	3.85	4.15	4.0
3	5.6	5.1	5.0	5.3	5.1	4.35	3.65	4.6	3.6	3.9	4.1	4.05
4	5.5	5.1	5.0	5.4	4.95	4.4	3.65	4.4	3.6	4.0	4.0	4.1
5	5.5	5.1	5.0	5.55	4.75	4.35	3.6	3.8	3.6	4.1	3.9	4.15
6	5.3	5.1	5.0	5.75	4.7	4.4	3.5	3.5	3.65	4.0	3.9	4.1
7	5.2	5.15	5.0	5.55	4.85	4.6	3.5	3.4	3.5	3.95	4.0	4.05
8	5.6	5.2	5.0	5.4	4.8	4.8	3.4	3.85	3.6	3.9	4.0	4.0
9	5.6	5.1	5.0	5.35	4.7	4.9	3.7	3.85	3.65	4.0	4.05	4.0
10	5.65	5.05	5.0	5.45	4.6	4.8	4.3	3.9	3.65	3.95	4.05	4.0
11	5.65	5.05	5.0	5.6	4.45	4.75	3.65	3.75	3.7	3.95	4.0	3.9
12	5.65	5.05	5.0	6.1	4.65	4.7	3.65	3.7	3.7	4.0	4.0	3.9
13	5.5	4.9	5.05	6.0	4.65	5.0	3.85	3.65	3.7	4.0	4.0	4.0
14	5.4	4.9	5.2	6.0	4.6	5.5	4.5	3.85	3.7	4.1	4.0	4.0
15	5.35	4.9	5.35	6.05	4.45	5.1	3.9	3.95	3.75	4.2	4.0	4.0
16	5.2	4.9	5.45	5.65	4.45	4.9	3.8	3.85	3.8	4.7	3.9	3.95
17	5.15	5.0	5.55	5.35	4.35	4.7	3.65	3.75	3.95	4.35	4.0	3.9
18	5.15	4.9	5.65	5.3	4.35	4.5	3.6	3.7	4.0	4.25	3.95	3.9
19	5.15	4.9	5.75	5.6	4.35	4.4	3.6	3.65	4.0	4.2	3.95	3.9
20	5.2	4.9	5.75	5.8	4.4	4.3	3.5	3.6	3.9	4.2	4.0	3.95

[a] Gage heights for November and December and possibly for other periods were read from a temporary gage set by the observer and are somewhat uncertain.

Daily gage height, in feet, of Truckee River at Derby dam, Nev., for 1907 and 1908—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec
21	5.2	5.0	5.75	6.1	4.35	4.4	3.4	3.7	3.85	4.15	4.1	4.0
22	5.4	5.0	5.75	5.9	4.35	4.3	3.3	3.6	3.8	4.15	4.15	4.0
23	5.4	4.9	5.75	5.3	4.3	4.3	3.85	3.6	3.75	4.1	4.1	4.05
24	5.4	4.9	5.9	5.0	4.3	4.2	4.05	3.65	3.75	4.1	4.1	4.05
25	5.3	4.9	6.0	4.9	4.7	4.15	3.95	3.7	3.75	4.1	4.05	4.0
26	5.2	4.9	6.2	4.8	4.8	4.15	3.9	3.65	3.8	4.1	4.0	4.0
27	5.3	4.9	6.0	4.85	4.85	4.1	4.0	3.65	3.85	4.05	4.0	4.0
28	5.3	5.0	5.8	5.0	4.65	3.75	3.95	3.65	3.85	4.05	4.0	4.0
29	5.2	5.05	5.5	5.05	4.65	3.75	4.4	3.6	3.8	4.0	4.0	4.0
30	5.1	.....	5.5	5.15	4.9	3.9	4.55	3.6	3.85	4.0	3.9	3.95
31	5.1	.....	5.5	.....	4.8	.....	5.2	3.6	.....	4.0	.....	3.95

Rating table for Truckee River at Derby dam, Nev., for July 1, 1907, to December 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec. ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.30	120	4.50	600	5.70	1,280	6.90	2,150
3.40	150	4.60	650	5.80	1,345	7.00	2,230
3.50	180	4.70	700	5.90	1,410	7.20	2,390
3.60	215	4.80	750	6.00	1,480	7.40	2,550
3.70	250	4.90	800	6.10	1,550	7.60	2,710
3.80	290	5.00	855	6.20	1,625	7.80	2,870
3.90	330	5.10	910	6.30	1,700	8.00	3,030
4.00	370	5.20	970	6.40	1,775	8.20	3,190
4.10	415	5.30	1,030	6.50	1,850	8.40	3,360
4.20	460	5.40	1,090	6.60	1,925	8.60	3,530
4.30	505	5.50	1,150	6.70	2,000	8.80	3,700
4.40	550	5.60	1,215	6.80	2,075		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 12 discharge measurements made during 1908–9, and is well defined between gage heights 3.5 feet and 10.3 feet.

Monthly discharge of Truckee River at Derby dam, Nev., for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
July	3,620	1,620	2,700	166,000	A.
August	1,920	1,220	1,450	89,200	A.
September	1,550	1,180	1,310	78,000	A.
October	1,780	775	1,210	74,400	A.
November	1,280	550	798	47,500	B.
December	1,280	550	825	50,700	C.
The period	.....	.....	.....	506,000	
1908.					
January	1,340	910	1,080	66,400	B.
February	970	800	858	49,400	B.
March	1,620	855	1,100	67,600	A.
April	1,550	750	1,140	67,800	A.
May	1,000	505	679	41,800	A.
June	1,150	270	602	35,800	A.
July	970	120	317	19,500	A.
August	910	150	310	19,100	A.
September	370	180	270	16,100	A.
October	700	310	405	24,900	A.
November	438	330	378	22,500	A.
December	438	330	368	22,600	B.
The year	1,620	120	626	454,000	

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 was established October 23, 1902, to determine the amount of water available for storage in Donner Lake for use on the Truckee-Carson project, is located 150 feet below the dam of the Donner Creek Ice Company and 1½ miles west of Truckee, Cal., and below the mouth of Cold Creek, the principal tributary.

The record is considered reliable. It 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.

Discharge measurements of Donner Creek near Truckee, Cal., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 22	Nicholas and Porter	40	111	3.90	384
June 28	E. A. Porter	40	85	3.25	218
July 26	do	36	56	2.40	84
August 13	do	36	39	2.00	30
1908.					
May 12	E. A. Porter	38	70	2.70	138
July 7	M. B. Kennedy	38	59	2.15	58
October 16	E. A. Porter	.....	.....	1.20	*a* 3.4

a Discharge estimated.

Daily gage height, in feet, of Donner Creek near Truckee, Cal., for 1907 and 1908.

[W. O. Blinn, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1.3	1.75	2.05	3.55	3.75	4.4	3.8	2.25	2.2	1.7	1.4	1.2
2	1.3	2.5	2.3	3.5	3.8	4.6	3.75	2.2	2.2	1.6	1.4	1.2
3	1.3	2.85	2.1	3.6	3.8	4.55	3.8	2.2	2.15	1.6	1.4	1.2
4	1.25	2.75	2.1	3.6	3.65	4.6	3.7	2.15	2.1	1.6	1.4	1.25
5	1.2	2.7	2.1	3.4	3.6	4.3	3.55	2.15	2.1	1.6	1.9	1.3
6	1.2	2.6	2.2	3.25	3.55	4.25	3.45	2.1	2.1	1.6	1.8	1.35
7	1.2	2.45	2.5	3.2	3.6	4.1	3.25	2.1	2.1	1.6	1.7	1.45
8	1.25	2.4	2.4	3.15	3.6	3.9	3.25	2.1	2.1	1.6	1.45	1.5
9	1.35	2.3	2.3	3.15	3.7	3.85	3.1	2.05	2.0	1.6	1.3	1.5
10	1.4	2.25	2.5	3.25	3.95	4.0	3.1	2.0	2.0	1.6	1.3	1.7
11	1.45	2.2	2.4	3.3	4.05	4.25	3.15	2.0	2.0	1.6	1.3	1.2
12	1.5	2.1	2.2	3.4	3.9	3.85	2.95	2.0	2.0	1.6	1.55	1.2
13	1.6	2.1	2.0	3.55	3.75	3.65	2.8	2.0	2.0	1.6	1.7	1.6
14	1.65	2.1	1.85	3.7	3.65	3.55	2.75	2.0	2.0	1.6	1.5	1.5
15	1.75	2.1	2.05	3.65	3.65	3.45	2.7	2.0	2.0	1.6	1.4	1.5
16	1.7	2.1	2.1	3.5	3.75	3.3	2.7	2.0	1.9	1.6	1.4	1.5
17	1.75	2.1	3.25	3.55	3.8	3.2	2.75	2.0	1.85	1.6	1.4	1.45
18	1.75	2.1	5.5	3.6	4.95	3.3	2.75	2.1	1.8	1.6	1.3	1.45
19	1.7	2.1	4.8	3.6	4.5	3.4	2.65	2.1	1.8	1.6	1.35	1.4
20	1.7	2.1	4.6	3.7	4.35	3.45	2.65	2.1	1.8	1.6	1.35	1.3
21	1.7	2.15	4.2	3.65	4.0	3.4	2.55	2.1	1.7	1.6	1.3	1.35
22	1.6	2.2	3.95	3.7	4.15	3.5	2.45	2.1	1.7	1.3	1.35	1.5
23	1.6	2.1	3.75	3.8	3.75	3.4	2.4	2.05	1.7	1.3	1.6	1.5
24	1.6	2.1	3.35	3.8	3.85	3.35	2.4	2.0	1.7	1.3	1.6	1.45
25	1.65	2.2	3.55	3.85	3.85	3.2	2.45	2.0	1.7	1.3	1.6	1.45
26	1.65	2.2	3.55	3.85	3.75	3.1	2.35	2.0	1.7	1.3	1.2	1.9
27	1.6	2.1	3.2	3.85	3.8	3.15	2.35	2.0	1.7	1.3	1.2	1.9
28	1.75	2.1	3.15	3.8	4.0	3.4	2.4	2.0	1.7	1.3	1.2	1.8
29	1.75	.....	3.4	3.8	4.1	3.65	2.4	2.0	1.7	1.4	1.2	1.75
30	1.65	.....	3.8	3.75	4.15	3.8	2.35	2.15	1.7	1.4	1.2	1.55
31	1.6	.....	3.95	.....	4.3	.....	2.3	2.2	.....	1.4	.....	1.35

Daily gage height, in feet, of Donner Creek near Truckee, Cal., for 1907 and 1908—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1.45	1.95	1.8	2.3	3.15	2.8	2.3	1.6	1.3	1.3	1.2	1.3
2	1.4	1.9	1.9	2.3	3.05	2.75	2.3	1.6	1.3	1.3	1.2	1.4
3	1.45	2.0	1.85	2.3	2.95	2.65	2.3	1.6	1.7	1.3	1.2	1.4
4	1.35	1.95	1.9	2.3	3.05	2.7	2.3	1.55	1.55	1.3	1.2	1.3
5	1.5	2.0	1.9	2.4	2.9	2.7	2.3	1.5	1.35	1.3	1.2	1.4
6	1.45	1.95	1.9	2.4	2.8	2.7	2.2	1.5	1.3	1.3	1.2	1.4
7	1.7	2.0	1.85	2.5	2.75	2.7	2.15	1.5	1.3	1.2	1.2	1.3
8	1.7	1.95	1.8	2.5	3.05	2.85	2.1	1.5	1.3	1.1	1.2	1.3
9	1.6	1.9	1.85	2.55	2.85	2.85	2.1	1.5	1.3	1.1	1.2	1.4
10	1.6	1.85	1.9	2.6	2.85	2.85	2.1	1.45	1.3	1.1	1.2	1.3
11	2.0	1.9	1.9	2.8	2.65	2.8	2.05	1.4	1.3	1.1	1.2	1.35
12	2.0	1.75	1.9	2.8	2.75	2.8	2.05	1.4	1.3	1.1	1.2	1.35
13	1.95	1.85	1.9	3.1	2.65	2.9	2.0	1.4	1.3	1.1	1.2	1.3
14	1.9	1.9	1.9	3.0	2.7	2.85	2.0	1.4	1.3	1.1	1.2	1.3
15	1.85	1.8	2.0	3.0	2.7	2.8	2.0	1.4	1.3	1.15	1.2	1.3
16	1.7	1.75	2.0	2.95	2.65	2.75	1.9	1.3	1.3	1.2	1.2	1.3
17	1.75	1.75	2.15	2.9	2.6	2.7	1.9	1.3	1.3	1.15	1.2	1.3
18	1.8	1.85	2.2	2.9	2.7	2.65	1.9	1.3	1.3	1.1	1.2	1.55
19	1.6	1.8	2.2	2.9	2.7	2.6	1.85	1.3	1.3	1.1	1.2	1.8
20	1.6	1.8	2.2	3.25	2.65	2.55	1.8	1.3	1.3	1.1	1.2	1.7
21	1.75	1.7	2.25	3.2	2.6	2.65	1.8	1.3	1.3	1.1	1.3	1.7
22	1.8	1.75	2.25	3.0	2.65	2.35	1.75	1.4	1.3	1.1	1.5	1.7
23	1.9	1.85	2.25	2.95	2.8	2.45	1.7	1.3	1.3	1.1	1.6	1.7
24	1.75	1.8	2.3	2.9	2.9	2.55	1.7	1.3	1.3	1.1	1.6	1.7
25	1.8	1.8	2.3	2.85	3.05	2.55	1.6	1.3	1.3	1.1	1.5	1.7
26	1.85	1.8	2.3	2.9	2.95	2.5	1.65	1.3	1.3	1.1	1.3	1.7
27	1.95	1.7	2.3	3.0	3.0	2.4	1.65	1.3	1.3	1.1	1.3	1.7
28	2.05	1.8	2.3	3.05	2.9	2.35	1.65	1.3	1.3	1.1	1.3	1.7
29	2.0	1.85	2.3	3.1	3.0	2.35	1.65	1.3	1.3	1.1	1.3	1.7
30	2.05	.....	2.3	3.15	2.9	2.3	1.65	1.3	1.3	1.1	1.3	1.45
31	2.1	.....	2.3	.....	2.8	.....	1.6	1.3	.....	1.1	.....	1.4

NOTE.—The sudden fluctuations in stage are caused by the raising and lowering of the gates of the dam at the outlet of Donner Lake. The river was frozen January 1 to 17, 1908, and probably at other times.

Rating tables for Donner Creek near Truckee, Cal.

MAY 1, 1906, TO MARCH 17, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.20	15	1.80	45	2.40	111	3.00	217
1.30	19	1.90	53	2.50	126	3.10	239
1.40	23	2.00	62	2.60	142	3.20	261
1.50	27	2.10	72	2.70	159	3.30	284
1.60	32	2.20	84	2.80	177		
1.70	38	2.30	97	2.90	196		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during 1906 and the form of the previous curve, and is not well defined.

MARCH 18 TO DECEMBER 31, 1907.

1.20	5	2.30	64	3.40	252	4.50	588
1.30	7	2.40	76	3.50	276	4.60	626
1.40	9	2.50	90	3.60	302	4.70	664
1.50	11	2.60	104	3.70	328	4.80	702
1.60	14	2.70	118	3.80	356	4.90	740
1.70	18	2.80	134	3.90	384	5.00	780
1.80	22	2.90	150	4.00	414	5.20	860
1.90	28	3.00	168	4.10	444	5.40	940
2.00	34	3.10	186	4.20	478	5.60	1,020
2.10	42	3.20	206	4.30	512		
2.20	52	3.30	228	4.40	550		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1907, and is not well defined.

Rating tables for Donner Creek near Truckee, Cal.—Continued.

JANUARY 1 TO DECEMBER 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.10	2	1.70	26	2.30	75	2.90	157
1.20	4	1.80	32	2.40	86	3.00	175
1.30	7	1.90	39	2.50	98	3.10	194
1.40	11	2.00	47	2.60	111	3.20	214
1.50	15	2.10	56	2.70	126	3.30	235
1.60	20	2.20	65	2.80	141		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 6 discharge measurements made during 1907-8, and is fairly well defined between gage heights 1.2 feet and 4.0 feet.

Monthly discharge of Donner Creek near Truckee, Cal., for 1907 and 1908.

[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.	
1907.							
January	42	15	29.9	0.997	1.15	1,840	C.
February	186	42	92.5	3.08	3.21	5,140	C.
March	980	49	239	7.97	9.19	14,700	B.
April	370	196	296	9.87	11.01	17,600	A.
May	760	289	392	13.1	15.10	24,100	A.
June	626	186	349	11.6	12.94	20,800	A.
July	356	64	158	5.27	6.08	9,720	A.
August	58	34	40.1	1.34	1.54	2,470	B.
September	52	18	29.9	.997	1.11	1,780	B.
October	18	7	12.1	.403	.46	744	C.
November	28	5	10.3	.343	.38	613	C.
December	28	5	11.2	.373	.43	689	D.
The year	980	5	138	4.61	62.60	100,000	
1908.							
January	56	9	30.7	1.02	1.18	1,890	C.
February	47	26	35.9	1.20	1.29	2,060	C.
March	75	32	54.3	1.81	2.09	3,340	B.
April	224	75	145	4.83	5.39	8,630	A.
May	204	111	147	4.90	5.65	9,040	A.
June	157	75	120	4.00	4.46	7,140	A.
July	75	20	44.0	1.47	1.70	2,700	A.
August	20	7	10.9	.363	.42	670	B.
September	26	7	8.1	.270	.30	482	B.
October	7	2	3.2	.107	.12	197	C.
November	20	4	6.4	.213	.24	381	C.
December	32	7	15.4	.513	.59	947	C.
The year	224	2	51.7	1.72	23.43	37,500	

NOTE.—The open-channel rating has been applied throughout the year; discharges for the winter period are liable to be too large on account of ice.

PROSSER CREEK NEAR HOBART MILLS, CAL.

This 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, to determine the amount of water available for storage near the headwaters of the stream. It was discontinued October 15, 1904, and reestablished September 23, 1907, some miscellaneous measurements having been made at this point in the meantime.

The section is permanent, but results are considerably affected by ice. No measurements have yet been obtained at extreme low stages.

Discharge measurements of Prosser Creek near Hobart Mills, Cal., in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 12[a]	E. A. Porter			3.52	114
June 16[a]	do	60	66	3.70	138
July 7[b]	M. B. Kennedy	53	52	3.30	74
October 16[b]	E. A. Porter	54	44	3.10	47

[a] Measured at bridge. [b] Measured at cable.

Daily gage height, in feet, of Prosser Creek near Hobart Mills, Cal., for 1907 and 1908.

[E. A. Curtis, observer.]

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1907.					1907.				
1		3.0	3.0	3.0	16		3.0	3.0	3.1
2		3.1	3.0	3.0	17		3.0		3.1
3		3.0		3.0	18		3.0	3.0	3.1
4		3.0	3.0	3.1	19		3.0	3.0	3.1
5		3.0	3.0	3.1	20			3.0	3.1
6			3.0	3.1	21		3.0	3.0	3.1
7		3.0	3.0		22		3.0	2.9	
8		3.0	3.0		23	3.0	3.0	2.9	3.1
9		3.0	3.0	3.1	24	3.0	3.1		3.1
10		3.0		3.1	25	3.0	3.1	2.9	3.1
11		3.0	3.0	3.1	26	3.0	3.1	2.9	3.2
12		3.0	3.0	3.1	27	3.0		2.9	3.2
13			3.0	3.1	28	2.9	3.0	2.9	3.1
14		3.0	3.0	3.1	29		3.0	2.9	
15		3.0	3.0		30	2.9	3.0	2.9	3.5
					31		3.0		3.7

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	3.7	3.4		3.8	3.95	3.9	3.45	2.6	2.55	2.9	2.8	3.05
2	3.7		2.9	3.8	3.85	3.8	3.45	2.6	2.65	2.8	2.8	3.0
3	3.7	3.0	2.9	3.8	3.85	3.85	3.55	2.55	2.65	2.85	2.85	2.95
4	2.9	3.0	2.9	4.0	3.8	3.9	3.55	2.55	2.6	2.9	2.8	2.9
5		3.0	2.9		3.75	4.0	3.45	2.6	2.7	2.85	2.8	2.9
6	3.6	3.0	2.8	3.9	3.9	4.0	3.45	2.55	2.65	2.9	2.8	3.0
7	3.5	2.9	2.8	3.8	3.9	4.0	3.35	2.55	2.65	2.9	2.8	3.05
8	3.7	2.9		3.8	3.9	3.95	3.35	2.45	2.6	2.9	2.8	3.2
9	3.7		3.0	3.9	3.85	4.0	3.25	2.45	2.7	2.85	2.8	3.1
10	3.1	3.0	3.5	3.9	3.85	3.9	3.35	2.45	2.7	2.9	2.8	3.0
11	3.9	3.2	3.3	3.9	3.95	3.95	3.35	2.45	2.8	2.9	2.85	3.0
12		3.0	3.2		3.9	4.1	3.55	2.4	2.8	2.9	2.85	3.05
13	3.9	3.0	3.0	3.9	3.75	4.05	3.35	2.45	2.85	2.9	2.8	3.0
14	3 9	3.0	3.0	3.9	3.7	4.0	3.25	2.5	2.85	3.05	2.8	3.0
15	3.7	3.0		4.0	3.8	3.8	3.15	2.45	2.9	3.9	2.85	3.05
16	3.6		3.8	4.0	3.75	3.75	3.05	2.55	2.9	3.25	2.85	3.05
17	3.0	2.8	3.9	4.0	3.9	3.75	2.95	2.55	2.9	3.0	2.85	3.0
18	3.0	2.9	4.0	3.9	3.8	3.75	2.9	2.65	2.9	2.95	2.8	3.0
19		3.0	3.9		3.95	3.6	2.85	2.55	2.9	2.9	2.8	3.0
20	3.0	2.9	3.9	4.0	3.85	3.75	2.95	2.55	2.85	2.9	2.8	3.0
21	3.0	2.9	3.8	4.0	3.85	3.85	2.9	2.55	2.8	2.85	3.05	3.0
22	3.1	3.0		4.0	3.95	3.75	2.85	2.6	2.8	2.85	3.1	3.0
23	3.1		3.7	4.0	3.9	3.65	2.9	2.55	2.85	2.9	3.1	3.0
24	3.3	2.9	3.8	4.0	3.95	3.65	2.85	2.55	2.9	2.9	3.05	3.1
25	3.3	2.9	3.8	3.7	4.0	3.5	2.75	2.55	2.9	2.85	3.0	3.15
26		2.9	3.8		3.9	3.55	2.85	2.6	2.8	2.85	3.0	3.05
27	3.0	2.9	4.0	3.8	3.95	3.55	2.85	2.55	2.85	2.9	3.0	3.05
28	2.9	2.9	4.0	3.8	4.0	3.5	2.8	2.6	2.9	2.85	3.0	3.15
29	3.3	2.7		3.7	3.9	3.5	2.75	2.6	2.8	2.8	3.15	3.15
30	3.4		3.7	3.8	3.75	3.5	2.7	2.6	2.9	2.8	3.1	3.05
31	3.4		3.7		3 85		2.65	2.55		2.8		3.05

NOTE.—Ice conditions December 1 to 31, 1907, January 1 to February 15, and December 24 to 31, 1908.

Rating table for Prosser Creek near Hobart Mills, Cal., for 1907 and 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.40	10	2.90	33	3.40	88	3.90	178
2.50	14	3.00	39	3.50	105	4.00	197
2.60	18	3.10	48	3.60	122	4.10	216
2.70	22	3.20	60	3.70	140	4.20	236
2.80	27	3.30	74	3.80	159	4.30	256

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during 1908–9, and is well defined between gage heights 3.0 feet and 4.0 feet. Below gage height 3.0 feet it is approximated, and discharges based on it are subject to revision.

Monthly discharge of Prosser Creek near Hobart Mills, Cal., for 1907 and 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
September 23–30	39	33	36.8	584	B.
October	48	39	40.3	2,480	B.
November	39	33	37.0	2,200	B.
December	.....	.....	33.0	2,030	D.
The period	.....	.....	.....	7,290	
January	.....	.....	33.0	2,030	D.
February	.....	.....	32.8	1,890	D.
March	197	27	108.0	6,640	A.
April	197	140	176.0	10,500	A.
May	197	140	172.0	10,600	A.
June	216	105	158.0	9,400	A.
July	114	20	58.1	3,570	A.
August	20	10	15.6	959	D.
September	33	16	26.9	1,600	C.
October	178	27	37.9	2,330	B.
November	54	27	33.3	1,980	B.
December	.....	.....	40.3	2,480	D.
The year	216	10	74.3	54,000	

NOTE.—Discharges estimated for ice periods and interpolated on days when gage was not read.

LITTLE TRUCKEE RIVER AT PINE STATION AND 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 station was established June 25, 1903, to obtain data for the United States Reclamation Service as to the quantity of water available for storage at Independence and Webber lakes and along the course of the stream, and also for power development. (See Pl. V, *A*.) It was originally located at Bruhn's mill, or Pine station, on the Boca and Loyalton Railroad. On January 1, 1908, it was moved 2 miles upstream to Starr, Cal., which is about 5 miles north of Boca, the nearest post-office. The flow is practically the same at both places. The station is below all tributaries except Dry Creek.

Results at Pine station have been poor on account of shifting channel, but the station at Starr promises to give good results. The creek freezes during parts of the winter.

Discharge measurements of Little Truckee River at Pine station, Cal., in 1907.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 3	E. A. Porter	93	194	3.20	1,010
July 5	do	87	171	2.30	789
July 27	do	82	101	1.70	306
August 21	do	49	62	.95	125

Daily gage height, in feet, of Little Truckee River at Pine station, Cal., for 1907.

[S. Wallace, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.05	1.45	1.35	2.1	3.3	3.35	2.6	1.5	0.8	0.7	0.95	0.7
2	1.05	1.8	1.4	2.15	3.25	3.35	2.45	1.45	.8	.7	.9	.75
3	1.05	1.75	1.35	2.1	3.15	3.3	2.5	1.4	.8	.7	.9	.75
4	.9	1.8	1.35	2.1	3.05	3.3	2.6	1.3	.8	.7	.9	.7
5	1.0	1.85	1.35	2.05	2.85	3.2	2.45	1.3	.85	.7	.85	.7
6	1.25	1.8	1.35	2.05	2.85	3.1	2.4	1.25	.85	.65	.85	.75
7	1.4	1.8	1.3	2.15	2.8	3.05	2.35	1.3	.9	.8	.85	.85
8	1.25	1.7	1.3	2.3	2.8	2.75	2.3	1.25	.9	.8	.8	.95
9	1.55	1.6	1.3	2.5	2.9	2.7	2.25	1.25	.8	.75	.8	1.0
10	1.5	1.5	1.25	2.9	3.15	2.75	2.15	1.2	.8	.75	.75	1.0
11	1.5	1.55	1.25	3.1	3.3	3.25	2.05	1.15	.8	.75	.7	.95
12	1.4	1.55	1.2	3.25	3.1	2.85	2.1	1.1	.75	.7	.7	1.0
13	1.5	1.5	1.35	3.4	2.8	2.6	2.05	1.1	.75	.7	.7	.9
14	1.65	1.5	1.2	3.7	2.7	2.3	2.15	1.05	.7	.7	.7	.8
15	1.65	1.5	1.25	3.55	2.8	2.2	2.05	1.05	.7	.7	.7	1.0
16	1.8	1.5	1.3	3.3	2.95	2.1	2.0	1.0	.7	.7	.7	1.0
17	1.9	1.45	2.35	3.35	3.05	2.1	1.95	1.0	.7	.7	.....	.9
18	1.8	1.45	4.05	3.5	3.15	2.2	1.9	1.0	.7	.7	.....	.95
19	1.75	1.45	3.65	3.6	3.4	2.25	1.95	.95	.7	.7	.....	1.0
20	1.75	1.5	3.4	3.5	3.3	2.35	1.9	.9	.7	.75	.....	1.05
21	1.7	1.5	2.95	3.4	3.0	2.5	1.85	.9	.7	.75	.....	.9
22	1.6	1.55	2.7	3.5	2.95	2.7	1.65	.9	.7	.75	.....	.85
23	1.55	1.5	2.35	3.65	2.75	2.6	1.65	.9	.65	.7	.....	.9
24	1.6	1.5	2.3	3.65	2.7	2.5	1.65	.9	.65	.8	.....	.95
25	1.55	1.55	2.35	3.65	2.75	2.25	1.85	.85	.65	.8	.....	.8
26	1.45	1.5	2.25	3.6	2.75	2.3	1.7	.85	.65	.8	.....	1.0
27	1.4	1.35	2.15	3.55	2.75	2.4	1.75	.85	.65	.9	.....	1.5
28	1.5	1.35	2.1	3.45	2.85	2.65	1.8	.85	.65	.85	.....	1.1
29	1.45	.....	1.95	3.35	2.9	2.55	1.85	.85	.7	.8	.....	.85
30	1.4	.....	1.95	3.3	3.05	2.55	1.75	.8	.7	.9	.....	.95
31	1.4	.....	2.0	.....	3.15	.....	1.6	.8	.....	1.0	.....	.9

NOTE.—The observer made no ice notes; the river was probably frozen during parts of January and December.

Rating tables for Little Truckee River at Pine station, Cal.

JANUARY 1, 1906, TO JUNE 19, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.70	55	1.60	237	2.50	640	3.40	1,160
.80	67	1.70	271	2.60	695	3.50	1,225
.90	80	1.80	309	2.70	750	3.60	1,290
1.00	94	1.90	351	2.80	805	3.70	1,355
1.10	110	2.00	395	2.90	860		
1.20	129	2.10	440	3.00	920		
1.30	152	2.20	490	3.10	980		
1.40	178	2.30	540	3.20	1,040		
1.50	206	2.40	590	3.30	1,100		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 4 discharge measurements made during 1906 and the form of the 1905 curve, and is not well defined.

Rating tables for Little Truckee River at Pine station, Cal.—Continued.

JUNE 20 TO DECEMBER 31, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.60	78	1.50	247	2.40	635	3.30	1,195
.70	90	1.60	276	2.50	695	3.40	1,260
.80	103	1.70	306	2.60	755	3.50	1,325
.90	117	1.80	340	2.70	815	3.60	1,390
1.00	133	1.90	385	2.80	875	3.70	1,455
1.10	151	2.00	430	2.90	935	3.80	1,520
1.20	172	2.10	475	3.00	1,000	3.90	1,585
1.30	195	2.20	525	3.10	1,065	4.00	1,650
1.40	220	2.30	580	3.20	1,130		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 2 discharge measurements made during 1907 and the form of previous curves, and is well defined below gage height 2.0 feet.

Monthly discharge of Little Truckee River at Pine station, Cal., for 1907.

[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	351	80	204	1.23	1.42	12,500	C.
February	330	165	229	1.38	1.44	12,700	C.
March	1,560	129	417	2.51	2.89	25,600	B.
April	1,360	418	974	5.87	6.55	58,000	B.
May	1,160	750	908	5.47	6.31	55,800	B.
June	1,130	440	761	4.58	5.11	45,300	B.
July	755	276	461	2.78	3.20	28,300	B.
August	247	103	149	.898	1.04	9,160	B.
September	117	84	95.4	.575	.64	5,680	B.
October	133	84	97.3	.586	.68	5,980	B.
November	125	90	96.9	.584	.65	5,770	C.
December	247	90	122	.735	.85	7,500	C.
The year	1,560	80	376	2.27	30.78	272.000	

NOTE.—Discharge estimated November 17 to 30. The open-channel rating has been applied throughout the year; discharges for January, February, and December are liable to be too large on account of ice.

Discharge measurements of Little Truckee River at Starr, Cal., in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 18	E. A. Porter	85	92	1.80	292
July 9	M. B. Kennedy	53	55	1.20	126
October 17	E. A. Porter	45	41	.80	56

Daily gage height, in feet, of Little Truckee River at Starr, Cal., for 1908.

[S. Wallace, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.2	0.9	0.8	1.5	2.1	1.9	1.45	0.6	0.45	0.55	0.7	0.75
2	1.2	1.0	.9	1.6	2.4	1.9	1.35	.65	.45	.55	.7	.8
3	1.15	.9	.9	1.6	2.0	1.8	1.35	.65	.4	.55	.7	.75
4	1.05	1.0	1.0	1.85	1.85	1.7	1.3	.6	.4	.6	.7	.7
5	1.0	1.0	.95	1.95	1.8	1.75	1.3	.6	.4	.55	.7	.65
6	1.0	.95	1.0	1.8	1.95	1.85	1.25	.6	.45	.55	.7	.65
7	1.0	.9	1.0	1.7	2.1	1.95	1.2	.55	.45	.55	.7	.55
8	1.05	.95	.95	1.85	2.0	2.0	1.2	.55	.5	.55	.65	.7
9	1.0	.9	1.0	1.9	1.85	2.0	1.2	.6	.45	.55	.65	.7
10	1.15	.9	1.0	2.0	1.8	2.05	1.05	.55	.45	.55	.7	.55
11	1.3	.85	1.0	2.05	1.75	2.05	1.0	.55	.45	.55	.65	.75
12	1.3	.75	1.0	2.15	1.8	2.0	1.1	.6	.5	.55	.65	.8
13	1.3	.75	1.0	2.25	1.7	2.2	1.0	.7	.5	.55	.65	.75
14	1.3	.8	1.0	2.35	1.75	2.1	.95	.7	.5	.55	.65	.65
15	1.25	.8	1.2	2.35	1.7	2.0	.9	.7	.5	1.25	.6	.70
16	1.15	1.0	1.2	2.25	1.8	1.95	.9	.6	.5	1.0	.6	.85
17	1.15	.9	1.45	2.05	1.7	1.9	.85	.55	.55	.8	.55	.9
18	1.2	.8	1.55	2.1	1.6	1.75	.8	.5	.55	.7	.55	.9
19	1.1	.9	1.6	2.2	1.75	1.75	.8	.5	.55	.7	.55	.95
20	1.2	.9	1.6	2.4	1.6	1.75	.8	.5	.55	.7	.6	.95
21	.9	.9	1.65	2.4	1.65	1.7	.75	.45	.5	.75	.75	.95
22	.9	.8	1.65	2.3	1.7	1.6	.7	.45	.5	.7	.75	1.0
23	.9	.8	1.7	2.1	1.8	1.5	.7	.45	.5	.75	.75	1.05
24	.9	.85	1.8	2.0	1.95	1.5	.7	.45	.6	.75	.6	1.05
25	1.05	.85	1.85	1.9	2.1	1.65	.65	.45	.55	.75	.75	.9
26	1.05	.9	1.8	1.95	2.2	1.6	.65	.45	.55	.7	.7	.95
27	.9	.9	1.7	2.0	2.0	1.5	.65	.4	.55	.8	.85	.9
28	.85	.9	1.7	2.05	2.0	1.45	.65	.45	.55	.7	.85	.9
29	.8	.8	1.8	2.1	2.05	1.4	.6	.45	.55	.7	.85	.85
30	.9	.....	1.6	2.1	2.05	1.55	.6	.45	.55	.7	.8	1.05
31	.95	.....	1.6	.....	1.95	.....	.6	.45	.....	.7	.....	1.05

NOTE.—Ice conditions January 1 to 20, 25 to 28, and December 15 to 31.

Rating table for Little Truckee River at Starr, Cal., for January 1 to December 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.40	14	1.00	83	1.60	221	2.20	473
.50	22	1.10	100	1.70	255	2.30	523
.60	31	1.20	120	1.80	292	2.40	573
.70	42	1.30	141	1.90	331	2.50	625
.80	55	1.40	165	2.00	376		
.90	68	1.50	192	2.10	423		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 3 discharge measurements made during 1908, and is well defined between gage heights 0.8 foot and 1.8 feet.

Monthly discharge of Little Truckee River at Starr, Cal., for 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	.....	.....	67.6	4,160	C.
February	83	48	65.9	3,790	C.
March	312	55	162	9,960	A.
April	573	192	316	23,600	A.
May	573	221	332	20,400	A.
June	473	165	297	17,700	A.
July	178	31	79.5	4,890	B.
August	42	14	26.0	1,600	B.
September	31	14	21.9	1,300	C.
October	130	26	40.7	2,500	B.
November	62	26	41.0	2,440	B.
December	.....	.....	38.7	2,380	C.
The year	573	14	131	94,700	

NOTE.—Discharge estimated January 1 to 20, 25, 26, and December 15 to 31, on account of ice conditions.

CARSON RIVER BASIN.

DESCRIPTION.

The Carson River basin includes that area which lies south of Lake Tahoe and between the Walker and Truckee river basins. Carson River is formed by its West and East forks, which rise in the extreme eastern part of California in a rugged and mountainous country heavily timbered with fir and pine, and flow northeastward to their union near the town of Gardnerville, Nev. From this point the river flows northward to Carson City, thence eastward through a rough and barren chain of hills and valleys, and finally discharges into the Carson Sink. The river is about 120 miles long, falling in this distance about 1,900 feet.

The water of the Carson is derived entirely from the snowfall and run-off from the high mountains. The basin contains no lakes, but many ideal reservoir sites are available near the headwaters and along the main river. These sites have been thoroughly investigated by the United States Reclamation Service and others interested.

Several fertile valleys lie along the course of this river and much land is unutilized for lack of water.

The minimum flow is all appropriated and the distribution of the water each year is the cause of much dissatisfaction. During the early spring and summer months the river is a raging torrent, but in the later summer the discharge is barely sufficient to supply the irrigation demand. By building reservoirs in the mountains this condition could be greatly improved and the waters of the two forks so controlled that the average daily flow would be greatly increased.

Good power sites are available along both forks of the river, but are at present wholly undeveloped.

Within the period for which records are available the wettest year was 1907 and the driest year 1905. The rate of run-off in these two years was three to one.

The following is a list of the stations maintained in the Carson River basin:

East Fork of Carson River at Rodenbah's ranch, near Gardnerville, Nev., 1900–1907.
East Fork of Carson River at Horseshoe Bend, near Gardnerville, Nev., 1908.
Carson River near Empire, Nev., 1900–1908.
Carson River near Hazen, Nev., 1908.
West Fork of Carson River at Woodfords, Cal., 1900–1908.

EAST FORK OF CARSON RIVER NEAR GARDNERVILLE, NEV.

This station, which was established October 17, 1900, at Rodenbah's ranch, about 5 miles southeast of Gardnerville, proved unsatisfactory, and on March 27, 1908, a new station was established at a place known as Horseshoe Bend, about 9 miles south of Gardnerville and 3 miles above the old station. This point is below all tributaries and

above all diversions. Measuring conditions are favorable, the section is permanent, and results are good.

Discharge measurements of East Fork of Carson River near Gardnerville, Nev., in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 27	E. A. Porter	85	83.6	2.90	259
April 16	do	89	144	3.50	517
May 15	do	87	121	3.28	410
June 21	do	91	144	3.50	517
July 24	do	82	52	2.53	130
August 4	M. B. Kennedy	82	60	2.50	139

Daily gage height, in feet, of East Fork of Carson River near Gardnerville, Nev., for 1908.

[C. L. Berryhill, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.9	2.6	2.5	2.9	3.9	3.5	3.2	2.5	2.5	2.5	2.4	2.4
2	3.9	2.5	2.4	2.8	3.7	3.4	3.1	2.6	2.5	2.5	2.4	2.4
3	3.9	2.6	2.4	2.8	3.6	3.4	3.1	2.7	2.5	2.5	2.4	2.4
4	3.9	2.5	2.5	2.9	3.5	3.4	3.1	2.6	2.5	2.5	2.4	2.4
5	4.1	2.6	2.6	3.0	3.7	3.5	3.1	2.5	2.5	2.5	2.4	2.4
6	3.7	2.6	2.5	3.0	3.8	3.6	3.1	2.5	2.5	2.5	2.4	2.4
7	3.6	2.7	2.4	3.0	3.9	3.7	3.1	2.5	2.5	2.5	2.4	2.4
8	3.6	2.6	2.5	2.9	3.5	3.7	3.0	2.5	2.5	2.5	2.4	2.4
9	3.7	2.7	2.6	2.9	3.4	3.8	3.0	2.5	2.5	2.5	2.4	2.4
10	3.7	2.6	2.6	3.0	3.3	4.1	2.9	2.5	2.5	2.5	2.4	2.4
11	3.5	2.6	2.6	3.3	3.5	4.0	2.9	2.5	2.5	2.4	2.4	2.4
12	3.1	2.7	2.7	3.4	3.5	3.8	3.0	2.5	2.5	2.4	2.4	2.4
13	3.0	2.6	2.7	3.6	3.5	4.2	2.9	2.5	2.5	2.4	2.4	2.4
14	2.8	2.6	2.7	3.8	3.4	3.7	2.9	2.5	2.5	2.4	2.4	2.5
15	2.8	2.7	2.7	3.5	3.3	3.6	2.8	2.5	2.5	2.7	2.4	2.5
16	2.7	2.7	2.7	3.5	3.2	3.6	2.8	2.5	2.5	2.5	2.4	2.4
17	2.7	2.6	2.8	3.4	3.2	3.6	2.7	2.5	2.5	2.5	2.4	2.4
18	2.7	2.5	2.7	3.6	3.3	3.5	2.7	2.5	2.5	2.4	2.4	2.4
19	2.8	2.6	2.7	3.8	3.3	3.5	2.7	2.5	2.5	2.4	2.4	2.3
20	2.8	2.6	2.8	3.9	3.4	3.5	2.6	2.5	2.5	2.4	2.4	2.4
21	2.7	2.5	2.8	3.9	3.4	3.4	2.6	2.5	2.5	2.4	2.4	2.5
22	2.7	2.5	2.8	3.7	3.5	3.4	2.6	2.5	2.5	2.4	2.4	2.5
23	2.7	2.5	2.7	3.5	3.5	3.4	2.6	2.5	2.5	2.4	2.4	2.4
24	2.8	2.6	2.8	3.3	3.6	3.2	2.5	2.5	2.5	2.4	2.4	2.5
25	2.9	2.5	2.7	3.2	3.7	3.2	2.5	2.5	2.5	2.4	2.4	2.5
26	2.8	2.6	3.0	3.5	3.8	3.2	2.5	2.5	2.5	2.4	2.5	2.5
27	2.8	2.4	2.9	3.6	3.7	3.3	2.5	2.5	2.5	2.4	2.5	2.5
28	2.9	2.5	2.9	3.8	3.8	3.2	2.5	2.5	2.5	2.4	2.4	2.5
29	2.7	2.4	2.9	3.9	3.9	3.2	2.5	2.5	2.5	2.4	2.4	2.5
30	2.7	.....	2.9	3.9	3.9	3.2	2.5	2.5	2.5	2.4	2.4	2.4
31	2.6	.....	2.9	.....	3.8	.....	2.5	2.5	.....	2.4	.....	2.4

NOTE.—Gage heights for January 1 to March 26 were observed at the old station at Rodenbah's ranch and have been reduced to readings at the new station by the approximate relation determined by simultaneous observations. Ice conditions December 18 to 31.

Rating table for East Fork of Carson River near Gardnerville, Nev., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.30	82	2.80	213	3.30	420	3.80	675
2.40	104	2.90	250	3.40	470	3.90	730
2.50	128	3.00	290	3.50	520	4.00	790
2.60	154	3.10	330	3.60	570	4.10	860
2.70	182	3.20	375	3.70	620	4.20	940

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 6 discharge measurements made during 1908, and is well defined between gage heights 2.5 feet and 3.5 feet.

Monthly discharge of East Fork of Carson River near Gardnerville, Nev., for 1908.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January	860	154	372	22,900	C.
February	182	104	148	8,510	C.
March	290	104	183	11,300	C.
April	730	213	470	28,000	A.
May	730	375	555	34,100	A.
June	860	375	539	32,100	A.
July	375	128	221	13,600	A.
August	182	128	131	8,060	A.
September	128	128	128	7,620	A.
October	182	104	116	7,130	A.
November	128	104	106	6,310	A.
December	128	82	111	6,820	C.
The year	860	82	257	186,000	

NOTE.—The open-channel rating has been applied throughout the year; discharges for the winter months are liable to be too large on account of ice conditions.

CARSON RIVER AND BRUNSWICK MILL POWER CANAL NEAR EMPIRE, NEV.

This station, which was established October 21, 1900, was originally located three-fourths mile east of Brunswick Mill and 2½ miles east of Empire, Nev. This 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 no discharges can be computed from this time until June 7, 1907, when a new gage was moved to the county bridge at Brunswick Mill, 500 feet below. All gage heights since that time refer to the same datum. 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 water is now used to pump water for irrigation, although formerly it was used to run a stamp mill.

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.

Good results have been obtained on the river, but the gage in the canal is within the influence of backwater from the mill and is an index of the discharge for only a part of the time. Discharges for the canal are therefore only approximate. Ice interferes with records at times during the winter.

Discharge measurements of Carson River near Empire, Nev., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 7	E. A. Porter	96	739	[a]8.50	3,300
July 14	do	93	616	7.30	1,880
August 1	do	106	595	6.45	1,000
August 9	do	100	473	5.30	604
August 23	do	82	319	4.30	262
1908.					
March 23	E. A. Porter	100	390	4.60	396
April 13	do	124	518	5.30	601
April 25	La Rue and Porter	119	445	4.82	412
May 5	E. A. Porter	122	484	5.15	557
May 16	do	118	454	4.90	430
June 29	do	113	376	4.25	245
October 13 [b]	do			2.50	32

[a] Gage height from gage on crest of dam 3.70 feet. [b] Measurement made by wading.

Daily gage height, in feet, of Carson River near Empire, Nev., for 1907 and 1908.

[David Lloyd, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	3.9	4.6	3.4	.....	2.4	3.3	8.0	6.4	4.3	3.7	4.1	4.0
2	3.3	4.7	3.4	.....	2.3	3.5	8.1	6.4	4.3	3.5	4.0	4.0
3	3.3	4.6	3.6	.....	2.3	3.6	7.9	6.3	4.3	3.5	4.0	4.1
4	3.4	4.4	3.7	.....	2.4	3.8	7.8	6.2	4.3	3.5	4.0	4.1
5	3.4	4.9	3.9	.....	2.5	3.9	8.1	6.1	4.3	3.5	4.1	4.1
6	3.3	4.7	4.2	.....	2.4	4.0	8.1	6.0	4.2	3.4	4.1	4.1
7	3.3	4.3	3.7	.....	2.3	8.6	8.1	5.9	4.2	3.6	4.1	4.5
8	3.3	4.1	3.5	.....	2.3	8.2	7.7	5.8	4.2	3.9	4.1	4.9
9	3.3	4.0	3.4	.....	2.4	8.0	7.7	5.5	4.2	3.9	4.1	4.6
10	3.2	4.0	3.6	.....	2.4	7.8	7.6	5.3	4.1	3.9	4.1	4.4
11	3.1	4.0	3.8	.....	2.6	7.8	7.5	5.1	4.1	3.9	4.1	4.6
12	3.0	3.9	3.7	2.2	2.8	8.1	7.5	5.0	4.1	3.9	4.2	4.7
13	2.8	3.8	3.6	2.4	2.8	8.4	7.4	4.9	4.0	3.9	4.2	4.9
14	2.8	3.9	3.7	2.6	2.5	7.9	7.4	4.9	4.0	3.9	4.2	4.7
15	2.7	3.8	3.7	2.8	2.3	7.6	7.3	4.8	4.0	3.9	4.2	4.4
16	2.8	3.8	3.8	2.6	2.4	7.3	7.2	4.7	3.9	3.9	4.1	4.3
17	2.7	3.8	5.2	2.3	2.6	7.0	7.1	4.7	3.9	3.9	4.1	4.3
18	2.6	3.7	7.3	2.3	2.8	7.0	6.9	4.6	3.9	3.9	4.1	4.3
19	2.6	3.7	.....	2.4	3.1	7.0	6.9	4.6	3.8	3.9	4.1	4.3
20	2.7	3.7	.....	2.5	3.3	7.2	6.9	4.5	3.8	3.9	4.1	4.3
21	2.8	3.7	.....	2.5	3.4	7.3	6.9	4.5	3.8	3.9	4.1	4.2
22	2.8	3.7	.....	2.5	3.1	7.4	6.7	4.4	3.8	3.9	4.1	4.2
23	2.8	3.7	.....	2.5	2.9	7.7	6.7	4.4	3.8	4.0	4.1	4.3
24	3.0	3.7	.....	2.5	2.6	7.7	6.6	4.3	3.7	4.0	4.1	4.3
25	3.1	3.6	.....	2.6	2.4	7.4	6.6	4.3	3.7	4.0	4.1	4.3
26	3.3	3.6	.....	2.6	2.5	7.4	6.7	4.2	3.7	4.1	4.1	4.3
27	3.3	3.5	.....	2.6	2.6	7.4	6.6	4.2	3.7	4.2	4.1	4.7
28	4.0	3.5	.....	2.6	2.7	7.6	6.5	4.2	3.7	4.3	4.0	4.8
29	5.5	.....	.....	2.6	2.8	7.7	6.5	4.2	3.7	4.2	4.0	4.6
30	5.2	.....	.....	2.6	2.9	8.0	6.6	4.2	3.7	4.1	4.0	4.3
31	4.5	.....	.....	.....	3.1	.....	6.5	4.3	.....	4.1	.....	4.3
1908.												
1	4.3	4.2	4.2	4.3	5.3	5.3	4.1	2.3	2.2	2.7	3.4	3.4
2	4.2	4.2	4.2	4.3	5.6	5.1	3.9	2.3	2.3	2.7	3.3	3.4
3	4.2	4.2	4.2	4.3	5.5	5.0	3.8	2.4	2.2	2.7	3.2	3.5
4	4.2	4.2	4.2	4.3	5.4	4.8	3.7	2.4	2.2	2.7	3.1	3.5
5	4.2	4.2	4.2	4.2	5.2	4.8	3.6	2.4	2.2	2.8	3.1	3.6
6	4.2	4.2	4.2	4.2	5.0	4.8	3.6	2.4	2.2	2.8	3.1	3.7
7	4.2	4.2	4.2	4.3	5.1	4.8	3.5	2.4	2.3	2.8	3.1	3.7
8	4.3	4.2	4.1	4.4	5.5	4.9	3.4	3.4	2.3	2.8	3.1	3.6
9	4.3	4.2	4.1	4.4	5.3	4.9	3.3	2.4	2.4	2.7	3.1	3.6
10	4.3	4.2	4.1	4.3	5.5	4.9	3.2	2.4	2.3	2.6	3.1	3.5

Daily gage height, in feet, of Carson River near Empire, Nev., for 1907 and 1908—Con.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
11	4.3	4.3	4.2	4.2	5.3	5.0	3.1	2.3	2.3	2.6	3.2	3.4
12	4.3	4.3	4.2	4.2	5.1	5.0	3.0	2.4	2.3	2.6	3.2	3.4
13	4.3	4.3	4.2	5.0	4.9	5.1	3.5	2.3	2.3	2.5	3.2	3.4
14	4.3	4.1	4.3	5.3	4.9	5.1	4.0	2.4	2.3	2.7	3.2	3.4
15	4.3	4.1	4.3	5.5	5.0	5.1	3.6	2.3	2.3	2.8	3.2	3.4
16	4.3	4.1	4.5	5.4	4.9	5.1	3.3	2.3	2.4	3.0	3.2	3.7
17	4.3	4.1	4.6	5.2	4.9	5.0	3.1	2.2	2.4	3.3	3.3	3.7
18	4.3	4.1	4.7	5.0	4.9	5.0	3.0	2.2	2.5	3.1	3.3	3.5
19	4.3	4.1	4.8	5.2	4.7	4.8	.....	2.3	2.5	3.1	3.3	3.6
20	4.3	4.1	4.7	5.4	4.9	4.6	.....	2.3	2.5	3.0	3.3	3.5
21	4.3	4.1	4.7	5.6	4.9	4.4	.....	2.2	2.5	3.0	3.3	3.2
22	4.3	4.1	4.6	5.4	5.0	4.5	.....	2.2	2.5	2.9	3.3	3.1
23	4.3	4.1	4.6	5.4	5.2	4.4	.....	2.2	2.5	3.0	3.3	3.1
24	4.6	4.1	4.6	5.3	5.3	4.3	.....	2.2	2.5	3.0	3.4	3.1
25	4.5	4.2	4.6	5.2	5.5	4.2	.....	2.2	2.5	3.0	3.3	3.1
26	4.4	4.1	4.7	4.9	5.5	4.3	2.4	2.2	2.5	2.8	3.4	3.1
27	4.3	4.1	4.7	4.9	4.9	4.3	2.4	2.2	2.6	3.1	3.3	3.1
28	4.3	4.1	4.7	4.9	5.0	4.4	2.3	2.2	2.6	3.2	3.4	3.0
29	4.3	4.1	4.5	5.2	5.0	4.3	2.3	2.2	2.6	3.3	3.3	2.9
30	4.3	.....	4.4	5.0	5.1	4.1	2.3	2.2	2.7	3.3	3.3	2.8
31	4.3	.....	4.3	.....	5.3	.....	2.3	2.2	.....	3.2	.....	2.7

NOTE.—Gage heights January 1 to March 18, 1907, are from the old gage; April 12 to June 6 they are from gage on crest of dam; after June 7, 1907, they are from gage at bridge. Ice conditions December 16 to 21, 1908, and probably at other times.

Rating tables for Carson River near Empire, Nev.

JANUARY 1, 1906, TO MARCH 18, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.60	173	3.70	554	4.80	1,230	5.90	2,045
2.70	197	3.80	603	4.90	1,300	6.00	2,120
2.80	223	3.90	654	5.00	1,370	6.20	2,270
2.90	251	4.00	708	5.10	1,445	6.40	2,420
3.00	281	4.10	765	5.20	1,520	6.60	2,570
3.10	313	4.20	825	5.30	1,595	6.80	2,720
3.20	347	4.30	890	5.40	1,670	7.00	2,870
3.30	384	4.40	955	5.50	1,745	7.20	3,020
3.40	423	4.50	1,020	5.60	1,820	7.40	3,170
3.50	464	4.60	1,090	5.70	1,895		
3.60	508	4.70	1,160	5.80	1,970		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on discharge measurements made during 1902 to 1906, and is well defined.

JUNE 7, 1907, TO DECEMBER 31, 1908.

2.20	17	3.50	118	4.80	410	6.20	1,100
2.30	22	3.60	130	4.90	445	6.40	1,220
2.40	27	3.70	143	5.00	480	6.60	1,360
2.50	32	3.80	158	5.10	520	6.80	1,500
2.60	38	3.90	175	5.20	560	7.00	1,660
2.70	44	4.00	195	5.30	600	7.20	1,820
2.80	51	4.10	215	5.40	650	7.40	2,000
2.90	58	4.20	235	5.50	700	7.60	2,180
3.00	65	4.30	260	5.60	750	7.80	2,370
3.10	73	4.40	285	5.70	800	8.00	2,570
3.20	82	4.50	315	5.80	860	8.20	2,770
3.30	94	4.60	345	5.90	920	8.40	2,970
3.40	106	4.70	375	6.00	980	8.60	3,170

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 12 discharge measurements made during 1907-8, and is fairly well defined.

Monthly discharge of Carson River near Empire, Nev., for 1907 and 1908.

[Drainage area 988 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.	
1907.							
January	1,740	173	444	0.449	0.52	27,300	C.
February	1,300	464	717	.726	.76	39,800	B.
March 1-18	4,000	423	791	.801	.54	28,200	B.
June 7-30	3,170	1,660	2,240	.....	.....	107,000	B.
July	2,670	1,290	1,880	.....	.....	116,000	B.
August	1,220	235	539	.....	.....	33,100	A.
September	260	143	193	.....	.....	11,500	A.
October	260	106	175	.....	.....	10,800	A.
November	235	195	214	.....	.....	12,700	A.
December	445	195	288	.....	.....	17,700	A.
The period	.....	.....	.....	.....	.....	404,000	C.
1908.							
January	345	235	260	.....	.....	16,000	C.
February	260	215	227	.....	.....	13,100	C.
March	410	215	293	.....	.....	18,000	B.
April	750	235	444	.....	.....	26,400	A.
May	750	375	546	.....	.....	33,600	A.
June	600	215	400	.....	.....	23,800	A.
July	215	22	84.5	.....	.....	5,200	B.
August	27	17	21.5	.....	.....	1,320	B.
September	44	17	27.0	.....	.....	1,610	B.
October	94	32	59.0	.....	.....	3,630	B.
November	106	73	87.9	.....	.....	5,230	B.
December	143	44	95.3	.....	.....	5,800	C.
The year	750	17	212	.....	.....	154,000	

NOTE.—These estimates do not include the flow of the power canal which has diverted water past the station since April 12, 1907. See below for records on the canal.

Discharge measurements of Brunswick Mill power canal near Empire, Nev., in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 13	E. A. Porter	16	45.7	3.60	28.5
April 25	La Rue and Porter	13	21.4	1.60	33.1
May 5	E. A. Porter	13	21.4	1.60	33.1
July 26	....do	.....	27.2	2.00	28.3
October 13	....do	.....	.....	3.20	47.4

NOTE.—Gage heights of most of these measurements were affected by backwater from the mill.

Daily gage height, in feet, of Brunswick Mill power canal near Empire, Nev., for 1908.

[David Lloyd, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.6	3.0	2.0	2.0	1.9	3.7	3.8	1.6
2	.....	1.7	2.9	2.1	2.0	1.8	3.9	3.7	1.6
3	.....	1.7	2.6	2.1	3.8	1.7	4.0	3.8	1.7
4	.....	1.7	2.6	2.0	3.8	1.9	4.0	1.9	1.7
5	.....	1.7	2.8	2.0	2.6	1.8	4.2	1.9	1.6
6	.....	1.7	2.6	2.0	3.2	1.6	4.2	1.9	1.8
7	.....	1.7	2.6	1.9	3.5	1.9	4.1	1.8	1.7
8	.....	1.7	2.7	1.9	3.2	2.6	4.0	3.1	1.6
9	.....	1.7	2.5	1.9	3.2	3.0	3.9	3.2	1.8
10	.....	1.7	2.6	2.0	3.6	1.6	3.8	3.4	1.8
11	.....	1.7	2.8	2.0	3.0	1.6	3.8	3.1	1.7
12	.....	1.7	2.9	1.9	3.7	1.6	3.9	3.0	1.8
13	.....	1.7	3.0	1.8	3.2	2.0	3.9	3.2	1.8
14	1.8	1.7	3.0	1.8	3.6	1.8	3.9	3.4	1.8
15	1.8	2.0	3.0	1.9	2.7	2.1	4.0	3.3	1.8
16	1.8	2.0	2.9	1.8	2.8	1.9	4.1	3.4	1.7
17	1.8	1.7	2.9	1.9	2.0	2.7	4.4	3.3	1.8
18	1.8	1.8	2.8	1.9	1.8	2.6	4.1	3.4	1.7
19	1.8	1.8	2.9	2.0	1.8	2.7	4.2	3.4	1.8
20	1.8	1.8	2.6	1.9	1.8	3.6	4.3	3.3	1.8
21	1.8	1.9	2.6	1.9	1.1	3.5	4.3	3.4	1.7
22	1.8	1.9	2.0	1.9	.7	3.5	4.2	2.1	1.8
23	1.7	1.6	2.0	2.4	.8	3.5	4.3	2.2	1.6
24	1.7	2.9	3.0	2.4	1.0	3.6	4.2	1.7	1.7
25	1.7	3.0	3.0	2.4	.8	3.5	4.1	1.8	1.8
26	1.7	3.0	2.5	2.0	1.1	3.5	2.7	1.6	1.7
27	1.7	3.0	2.5	2.0	.8	3.6	3.8	1.8	1.6
28	1.7	3.0	2.9	2.1	.9	3.8	3.7	1.7	1.6
29	1.6	3.0	1.9	2.1	2.0	3.7	3.7	1.6	1.4
30	1.6	3.0	2.0	1.6	1.0	3.8	3.8	1.6	1.5
31	.....	3.1	.....	1.6	2.1	.....	3.8	.....	1.4

NOTE.—Many of these gage heights were affected by backwater.

Monthly discharge of Brunswick power canal near Empire, Nev., for 1908.

Month.	Discharge in second-feet (mean).	Run-off (total in acre-feet).
April 13–30	31	1,110
May	33	2,030
June	33	1,960
July	28	1,720
August	25	1,540
September	35	2,080
October	45	2,770
November	45	2,680
December	37	2,280
The period		18,200

NOTE.—These discharges have been estimated partly from such gage heights as seem to be unaffected by backwater, and partly by interpolation between measurements, and are approximate. The discharge of the canal seems to remain fairly constant, and was probably about the same for 1907.

CARSON RIVER NEAR HAZEN, NEV.

This station, which is located about 16 miles south of Hazen and above Truckee canal chute, was established January 12, 1908, to determine the amount of water from Carson River available for storage in connection with the Truckee-Carson project of the United States Reclamation Service. A reservoir of about 100,000 acre-feet

capacity will be erected at this point to 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. Sufficient measurements have not yet been made to define a rating curve for this station.

Discharge measurements of Carson River near Hazen, Nev., in 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
July 17	M. B. Kennedy	.....	100	2.60	134
October 21	E. A. Porter	96	91	2.40	73

Daily gage height, in feet, of Carson River near Hazen, Nev., for 1908.

[Fred Foster, observer.]

Day.	May.	June.	July.	Oct.	Nov.	Dec.	Day.	May.	June.	July.	Oct.	Nov.	Dec.
1	3.5	3.6	2.9	.....	2.5	2.6	16	3.5	3.5	2.6	2.2	2.45	2.65
2	3.5	3.55	2.9	.....	2.5	2.6	17	3.5	3.5	2.6	2.2	2.45	2.65
3	3.6	3.5	2.8	.....	2.5	2.6	18	3.4	3.5	2.6	2.3	2.5	2.75
4	3.65	3.45	2.7	.....	2.5	2.6	19	3.35	3.45	2.5	2.3	2.5	2.65
5	3.7	3.35	2.7	2.0	2.5	2.6	20	3.3	3.45	2.5	2.3	2.5	2.5
6	3.6	3.3	2.7	2.0	2.5	2.6	21	3.3	3.35	2.5	2.4	2.5	2.5
7	3.5	3.35	2.7	2.0	2.5	2.6	22	3.4	3.25	2.4	2.4	2.5	2.5
8	3.55	3.3	2.7	2.0	2.5	2.6	23	3.4	3.1	2.4	2.3	2.5	2.5
9	3.6	3.3	2.7	2.1	2.5	2.6	24	3.5	3.5	2.3	2.3	2.5	2.5
10	3.7	3.3	2.7	2.1	2.5	2.6	25	3.5	3.0	2.3	2.3	2.55	2.6
11	3.55	3.3	2.7	2.1	2.5	2.6	26	3.6	3.0	2.25	2.3	2.55	2.65
12	3.5	3.35	2.6	2.2	2.45	2.6	27	3.7	3.0	2.2	2.4	2.6	2.8
13	3.4	3.4	2.6	2.2	2.45	2.6	28	3.6	3.0	2.1	2.4	2.6	2.75
14	3.4	3.5	2.7	2.2	2.45	2.6	29	3.55	3.0	2.0	2.4	2.6	2.75
15	3.5	3.5	2.6	2.2	2.45	2.65	30	3.45	3.0	.....	2.5	2.6	2.6
							31	3.5	.....	.....	2.5	.....	2.65

NOTE.—The river was dry or standing in pools July 30 to October 4; gage heights estimated October 5 to 24. River frozen or slush ice running, November 25 to December 31. Gage was probably affected only part of the time.

WEST FORK OF CARSON RIVER NEAR WOODFORDS, CAL.

West Fork of Carson River rises in Alpine County, Cal., flows in a general northerly direction, and unites with East Fork in Douglas County, Nev.

The gaging station, which is located about three-fourths mile above the post-office at Woodfords, Cal., and 200 feet from the main road between Woodfords and Blue Lake, was established October 18, 1900, to determine the flow of the stream available for storage. On May 18, 1907, the gage and bench mark were washed out, and on June 8 the gage was reestablished at the same location.

The stream bed is permanent but is very uneven, and the current is very rough. The measurements prior to 1907, though scattering, give a fairly well-defined curve. Sufficient measurements have not yet been referred to the new gage to define a rating curve. The extent of ice conditions during the winter is not definitely known.

Discharge measurements of West Fork of Carson River near Woodfords, Cal., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 8	E. A. Porter	40	137	4.30	684
July 9	do	38	131	4.00	578
August 3	do	29	80	2.90	229
1908.					
June 26	E. A. Porter	29	68	2.07	137
July 25	do	27	44	1.00	55
August 31	M. B. Kennedy	26	45	[a] 1.40	46
October 12	E. A. Porter	25	31	.90	31

[a] Gage height uncertain; may have been 1.04.

NOTE.—Gage heights of all measurements refer to the datum of gage used after June 8, 1907.

Daily gage height, in feet, of West Fork of Carson River near Woodfords, Cal., for 1907 and 1908.

[Miss Bernice Merrill, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	.....	2.85	3.2	3.45	4.9	.....	.....	3.1	2.2	.....	1.55	1.25
2	.....	3.3	3.15	3.5	4.8	.....	.....	3.2	2.2	.....	1.5	1.2
3	.....	3.3	3.1	3.55	4.8	.....	.....	3.2	2.1	.....	1.5	1.2
4	.....	3.35	3.2	3.55	4.9	.....	.....	3.2	2.1	.....	1.5	1.3
5	.....	3.4	3.2	3.6	4.9	.....	.....	3.0	2.1	1.5	1.5	1.35
6	.....	3.5	3.2	3.7	5.0	.....	.....	3.0	2.0	1.5	1.5	1.5
7	.....	3.45	3.2	3.75	5.0	.....	.....	3.0	2.0	1.5	1.5	1.65
8	.....	3.3	3.2	3.75	4.9	4.1	.....	3.0	2.0	1.5	1.6	1.6
9	2.9	3.2	3.2	3.85	4.95	4.2	3.9	2.9	2.0	1.5	1.55	1.7
10	2.8	3.2	.....	3.95	5.0	4.4	3.7	2.9	2.0	1.5	1.55	1.8
11	2.8	3.3	.....	4.3	5.0	4.0	3.9	2.8	2.0	1.45	1.5	1.75
12	2.85	3.35	3.15	4.6	5.0	3.9	3.8	2.8	.....	1.5	1.55	1.7
13	2.8	3.35	3.1	4.8	5.0	4.1	3.6	2.8	.....	1.5	1.55	1.6
14	2.8	3.3	3.1	5.0	5.2	4.0	3.5	2.8	.....	1.5	1.55	1.5
15	2.8	3.3	3.0	4.85	5.6	3.9	3.4	2.7	.....	1.5	1.5	1.5
16	2.75	3.3	3.05	5.0	5.8	3.8	3.4	2.75	.....	1.55	1.5	1.55
17	2.7	3.3	4.0	4.9	6.6	3.9	3.4	2.6	.....	1.55	1.45	1.5
18	2.7	3.2	4.75	4.8	.....	4.0	3.5	2.6	.....	1.5	1.4	1.5
19	2.7	3.15	4.7	5.2	.....	4.2	3.6	2.5	.....	1.55	1.4	.....
20	2.75	3.1	4.4	5.1	.....	4.1	3.6	2.4	.....	1.6	1.3	.....
21	2.75	3.2	4.2	4.9	.....	4.0	3.8	2.4	.....	1.6	1.25	.....
22	2.75	3.25	4.1	5.0	.....	3.9	3.9	2.4	.....	1.55	1.3	1.55
23	2.7	3.2	.....	5.1	.....	4.0	3.7	2.3	.....	1.5	1.4	1.5
24	2.7	3.2	.....	5.35	.....	4.2	3.6	2.3	.....	1.7	1.4	1.55
25	2.7	3.25	3.8	5.6	.....	4.3	3.6	2.2	.....	1.75	1.5	1.6
26	2.75	3.2	3.8	5.2	.....	4.4	3.4	2.1	.....	1.8	1.5	1.6
27	2.85	3.2	3.7	5.0	.....	4.5	3.3	2.1	.....	1.75	1.4	1.9
28	2.85	3.2	3.65	4.9	.....	5.0	3.5	2.1	.....	1.6	1.3	1.85
29	2.8	.....	3.5	5.0	.....	5.2	3.4	2.1	.....	1.6	1.2	1.85
30	2.75	.....	3.5	4.9	.....	5.1	3.2	2.0	.....	1.55	1.2	1.8
31	2.75	.....	3.45	.....	.....	.....	3.0	2.0	.....	1.55	.....	1.8
1908.												
1	1.8	1.5	1.5	2.1	3.0	2.5	.....	4.2	1.0	1.0	1.15	1.0
2	1.7	1.5	1.45	2.1	3.0	2.5	1.9	3.5	1.0	1.0	1.2	1.0
3	1.75	1.45	1.4	2.2	3.05	2.55	1.9	1.5	1.0	.95	1.1	1.0
4	1.45	1.45	1.4	2.2	3.0	2.6	1.8	1.3	.95	1.0	1.1	1.1
5	1.5	1.45	1.4	2.2	2.9	2.5	1.8	1.3	.95	1.0	1.1	1.0
6	1.5	1.5	1.45	2.25	2.9	2.5	1.8	1.2	1.0	1.1	1.0	1.1
7	1.45	1.45	1.45	2.2	2.8	2.5	1.7	1.2	.9	1.0	1.0	1.1
8	1.45	1.4	1.5	2.25	2.9	2.5	1.65	1.2	.9	1.05	1.0	1.05
9	1.5	1.4	1.55	2.3	2.8	2.45	1.5	1.25	.95	1.05	1.1	1.0
10	1.45	1.4	1.55	2.35	2.8	2.5	1.5	1.2	1.0	1.1	1.0	1.0

Daily gage height, in feet, of West Fork of Carson River near Woodfords, Cal., for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
11	1.45	1.4	1.5	2.35	2.7	2.5	1.4	1.15	1.1	.....	0.95	1.0
12	1.5	1.4	1.55	2.4	2.75	2.5	1.35	1.1	1.1	1.15	.9	1.1
13	1.4	1.4	1.55	2.45	2.65	2.5	1.4	1.1	1.1	1.2	.9	1.1
14	1.4	1.4	1.6	2.4	2.65	2.45	1.35	1.1	.95	1.2	1.0	1.05
15	1.4	1.45	1.7	2.45	2.65	2.4	1.3	1.0	1.0	1.3	1.0	1.0
16	1.4	1.4	1.8	2.5	2.6	2.35	1.2	1.0	1.0	1.9	.95	.95
17	1.4	1.4	1.8	2.5	2.6	2.3	1.0	1.15	1.0	1.5	.9	95
18	1.4	1.35	1.8	2.5	2.55	2 3	1.0	1.1	1.0	1.25	.9	1.0
19	1.4	1.35	1.8	2.55	2.5	2.35	.9	1.1	1.05	1.25	.9	.95
20	1.45	1.4	1.9	2.6	2.5	2.35	(a)	1.1	1.05	1.2	.95	1.8
21	1.4	1.45	1.9	2.6	2.55	2.3	(a)	1.0	1.0	1.25	1.0	1.7
22	1.45	1.45	1.95	2.6	2.5	2.3	(a)	1.1	.95	1.25	1.0	1.0
23	1.45	1.5	1.9	2.7	2.6	2.2	(a)	1.1	.95	1.25	1.1	1.0
24	1.4	1.5	1.95	2.8	2.55	2.1	.95	1.15	.9	1.2	1.0	1.1
25	1.4	1.5	1.95	2.7	2.5	2.0	1.0	1.15	.9	1.2	.95	1.15
26	1.4	1.5	1.95	2.65	2.5	1.95	1.0	1.1	.9	1.2	.8	1.15
27	1.45	1.6	2.0	2.7	2.5	1.9	1.1	1.1	.95	1.1	.8	1.1
28	1.5	1.65	2.0	2.8	2.5	1.9	1.2	1.1	.9	1.1	.9	1.0
29	1.5	1.6	2.0	2.9	2.55	1.85	1.2	1.1	.95	1.15	.9	1.0
30	1.5	.....	2.0	3.0	2.6	1.9	1.1	1.05	.95	1.2	.95	1.0
31	1.5	.....	2.0	.....	2.5	.....	1 1	1.0	.....	1 15	.....	1 1

[a] Gage out of water.

NOTE.—The gage was washed out May 18, 1907, and replaced at a different datum June 8.

Rating table for West Fork of Carson River near Woodfords, Cal., from January 1, 1906, to May 17, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.70	69	3.70	226	4.70	535	5.70	960
2.80	79	3.80	251	4.80	570	5.80	1,010
2.90	90	3.90	277	4.90	610	5.90	1,060
3.00	102	4.00	305	5.00	650	6.00	1,110
3.10	115	4.10	335	5.10	690	6.10	1,165
3.20	129	4.20	365	5.20	730	6.20	1,220
3.30	145	4.30	395	5.30	775	6.30	1,275
3.40	163	4.40	430	5.40	820	6.40	1,330
3.50	182	4.50	465	5.50	865	6.50	1,390
3.60	203	4.60	500	5.60	910	6.60	1,450

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on discharge measurements made during 1902 to 1906, and is well defined.

Monthly discharge of West Fork of Carson River near Woodfords, Cal., for 1907.

Month.	Discharge in second-feet.			Run-off (total in acre-feet.)	Accuracy.
	Maximum.	Minimum.	Mean.		
January 9–31	90	69	76	3,460	C.
February	182	84	139	7,720	B.
March	552	102	211	13,000	B.
April	910	172	502	29,900	B.
May 1–17	1,450	570	718	24,200	B.

WALKER RIVER BASIN.

DESCRIPTION.

Walker River 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 60 miles beyond enters Walker Lake. The length of the river is about 120 miles, in which distance its fall is about 1,600 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 Walker River to the Carson. 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.

Only three gaging stations have been maintained for any great length of time in the Walker River drainage basin, and these were discontinued July 31, 1908, owing to lack of funds.

The stations are as follows:

East Fork of Walker River near Yerington, Nev., 1902–1908.
Walker River near Nordyke, Nev., 1895.
Walker River near Wabuska, Nev., 1902–1908.
West Fork of Walker River near Coleville, Cal., 1902–1908.

Very reliable estimates of flow of the river can be obtained by adding the run-off of the two forks.

EAST FORK OF WALKER RIVER NEAR YERINGTON, NEV.

This station, which was established October 6, 1902, to determine the quantity of flow available for storage and irrigation, was located at Ross ranch, about 10 miles southeast of Yerington, Nev., near the junction with West Fork. The station was discontinued July 31, 1908.

The stream bed is of shifting sand and clay, and satisfactory results could not be obtained with the small number of measurements that could be made. Information as to ice conditions is meager. The datum of the gage remained unchanged.

Discharge measurements of East Fork of Walker River near Yerington, Nev., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 13	E. A. Porter	93	285	4.70	1,030
July 12	do	84	301	4.82	1,110
August 6	do	82	203	4.10	685
August 27	do	77	139	3.30	408
1908.					
April 18	E. A. Porter	67	69	2.50	137

Daily gage height, in feet, of East Fork of Walker River near Yerington, Nev., for 1907 and 1908.

[I. A. Strosnider, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.9	2.9	2.6	3.0	3.6	3.9	4.8	4.3	3.3	2.5	2.9	2.3
2	2.9	2.9	2.6	3.0	3.6	4.05	4.8	4.3	3.2	2.5	2.9	2.4
3	3.0	3.0	2.6	3.0	3.6	4.1	4.9	4.3	3.2	2.4	2.9	2.4
4	3.0	3.05	2.6	2.9	3.6	4.2	5.0	4.2	3.2	2.4	2.8	2.4
5	3.0	3.15	2.7	2.9	3.7	4.2	a5.1	4.2	3.1	2.4	2.8	2.4
6	3.0	3.35	2.7	2.8	3.7	4.3	5.0	4.1	3.1	2.4	2.8	2.4
7	3.0	3.65	2.7	2.8	3.7	4.3	5.0	4.05	3.1	2.4	2.8	2.3
8	2.9	3.8	2.7	2.8	3.7	4.4	4.95	4.0	3.0	2.5	2.7	2.3
9	2.9	3.6	2.7	2.8	3.8	4.4	4.9	4.0	3.0	2.5	2.7	2.3
10	2.8	3.4	2.7	2.9	3.8	4.5	4.9	3.9	3.0	2.5	2.7	2.3
11	2.7	3.2	2.8	2.9	3.9	4.4	4.8	3.9	3.0	2.5	2.7	2.3
12	2.7	3.0	2.8	2.9	3.9	4.35	4.8	3.8	3.0	2.5	2.6	2.2
13	2.6	3.0	2.8	2.9	3.8	4.3	4.7	3.8	2.9	2.6	2.6	2.2
14	2.6	2.9	2.8	3.0	3.75	4.2	4.7	3.7	2.9	2.6	2.6	2.2
15	2.5	2.9	2.8	3.0	3.65	4.1	4.6	3.7	2.9	2.6	2.6	2.2
16	2.5	2.8	2.8	3.0	3.6	4.0	4.6	3.6	2.9	2.6	2.5	2.2
17	2.4	2.8	2.8	3.0	3.6	3.95	4.5	3.6	2.9	2.6	2.5	2.2
18	2.4	2.8	3.8	3.1	3.7	3.85	4.5	3.6	2.9	2.6	2.5	2.2
19	2.4	2.5	a6.0	3.1	3.75	3.8	4.4	3.6	2.9	2.7	2.5	2.3
20	2.4	2.7	a5.4	3.2	3.95	3.8	4.5	3.6	2.8	2.7	2.5	2.3
21	2.4	2.7	4.9	3.2	4.0	3.9	4.5	3.5	2.8	2.7	2.4	2.3
22	2.4	2.7	3.7	3.3	4.0	4.0	4.5	3.5	2.7	2.7	2.4	2.3
23	2.45	2.7	3.45	3.4	3.9	4.1	4.6	3.5	2.7	2.7	2.4	2.3
24	2.5	2.6	3.4	3.4	3.9	4.1	4.6	3.5	2.7	2.7	2.4	2.4
25	2.5	2.6	3.3	3.4	3.9	4.2	4.6	3.5	2.6	2.7	2.4	2.4
26	2.6	2.6	3.2	3.5	3.8	4.3	4.5	3.4	2.6	2.8	2.3	2.4
27	2.6	2.6	3.2	3.5	3.8	4.4	4.5	3.4	2.6	2.8	2.3	2.4
28	2.7	2.6	3.1	3.5	3.8	4.5	4.4	3.4	2.5	2.8	2.3	2.4
29	2.7	.....	3.1	3.5	3.7	4.6	4.4	3.4	2.5	2.8	2.3	2.5
30	2.8	.....	3.0	3.6	3.7	4.7	4.4	3.3	2.5	2.8	2.3	2.5
31	2.8	.....	3.0	.....	3.8	.....	4.4	3.3	.....	2.8	.....	2.5

a Water over top of gage; gage height estimated.

Daily gage height, in feet, of East Fork of Walker River near Yerington, Nev., for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1908.								1908.							
1....	2.5	2.5	2.5	2.9	2.3	2.1	2.0	16....	2.6	2.4	3.2	2.6	2.0	2.1	2.3
2....	2.5	2.5	2.5	2.9	2.2	2.0	2.0	17....	2.6	2.4	3.3	2.6	2.0	2.1	2.2
3....	2.5	2.5	2.5	2.9	2.2	2.0	2.0	18....	2.6	2.4	3.3	2.6	2.0	2.1	2.2
4....	2.5	2.5	2.5	2.9	2.1	2.0	2.0	19....	2.6	2.4	3.3	2.6	2.0	2.1	2.3
5....	2.5	2.5	2.5	2.8	2.1	2.0	2.1	20....	2.6	2.4	3.3	2.6	2.0	2.0	2.3
6....	2.6	2.5	2.6	2.8	2.0	2.0	2.1	21....	2.6	2.4	3.2	2.5	2.0	2.0	2.4
7....	2.6	2.5	2.6	2.8	2.0	2.0	2.1	22....	2.6	2.4	3.2	2.5	2.0	2.0	2.4
8....	2.6	2.5	2.6	2.8	2.0	2.0	2.2	23....	2.6	2.5	3.2	2.5	2.0	2.0	2.4
9....	2.6	2.5	2.6	2.8	2.0	2.1	2.3	24....	2.6	2.6	3.2	2.5	2.0	2.0	2.4
10....	2.6	2.5	2.7	2.7	2.0	2.1	2.45	25....	2.6	2.7	3.2	2.4	2.0	2.0	2.5
11....	2.6	2.5	2.7	2.7	2.0	2.1	2.5	26....	2.5	2.7	3.2	2.4	2.0	2.0	2.5
12....	2.6	2.4	2.8	2.7	2.0	2.2	2.5	27....	2.5	2.6	3.1	2.4	2.1	2.0	2.6
13....	2.6	2.4	2.8	2.7	2.0	2.2	2.5	28....	2.5	2.6	3.1	2.4	2.1	2.1	2.6
14....	2.6	2.4	2.9	2.7	2.0	2.1	2.4	29....	2.5	2.5	3.1	2.3	2.1	2.0	2.7
15....	2.6	2.4	3.1	2.7	2.0	2.1	2.4	30....	2.5	.....	3.0	2.3	2.1	2.0	2.7
								31....	2.5	.....	3.0	.....	.....	.....	2.7

Rating tables for East Fork of Walker River near Yerington, Nev.

JANUARY 1 TO MARCH 18, 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.40	108	2.80	192	3.20	308	3.60	460
2.50	126	2.90	218	3.30	344	3.70	500
2.60	146	3.00	246	3.40	381	3.80	540
2.70	168	3.10	276	3.50	420		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 2 discharge measurements made during 1906 and the form of the subsequent curve, and is fairly well defined.

MARCH 19, 1907, TO JULY 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.00	55	2.90	240	3.80	585	4.70	1,030
2.10	69	3.00	270	3.90	630	4.80	1,080
2.20	83	3.10	305	4.00	680	4.90	1,130
2.30	99	3.20	340	4.10	730	5.00	1,180
2.40	117	3.30	375	4.20	780	5.20	1,280
2.50	137	3.40	410	4.30	830	5.40	1,380
2.60	160	3.50	450	4.40	880	5.60	1,480
2.70	185	3.60	495	4.50	930	5.80	1,580
2.80	212	3.70	540	4.60	980	6.00	1,700

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 5 discharge measurements made during 1907–8, and is fairly well defined above gage height 2.5 feet.

Monthly discharge of East Fork of Walker River near Yerington, Nev., for 1907 and 1908.

[Drainage area, 1,160 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.	
1907.							
January	246	108	168	0.153	0.18	10,300	C.
February	540	126	243	.221	.23	13,500	B.
March	1,700	146	364	.331	.38	22,400	C.
April	495	212	312	.284	.32	18,600	B.
May	680	495	569	.517	.60	35,000	B.
June	1,030	585	779	.708	.79	46,400	B.
July	1,230	880	1,020	.927	1.07	62,700	B.
August	830	375	564	.513	.59	34,700	B.
September	375	137	240	.218	.24	14,300	B.
October	212	117	164	.149	.17	10,100	B.
November	240	99	157	.143	.16	9,340	B.
December	137	83	105	.095	.11	6,460	C.
The year	1,700	83	390	.355	4.84	284,000	
1908.							
January	160	137	152	.138	.16	9,350	C.
February	185	117	135	.123	.13	7,760	B.
March	375	137	258	.235	.27	15,900	B.
April	240	99	171	.155	.17	10,200	B.
May	99	55	61.4	.056	.06	3,780	C.
June	83	55	62.0	.056	.06	3,690	C.
July	185	55	112	.102	.12	6,890	B.
The period						57,600	

NOTE.—The open-channel rating has been applied throughout. Discharges for the winter months may be too large, on account of ice.

WALKER RIVER NEAR WABUSKA, NEV.

This station, which was located about 300 feet above the Carson and Colorado Railroad bridge, near the section house at Clever station and about 2½ miles east of Wabuska, was established July 22, 1902, to determine the amount of water flowing into Walker Lake and also the amount of water returned by seepage, as the locality is below all diversions for irrigation. The station was discontinued July 31, 1908. The gage datum has remained unchanged.

The records are unreliable because of the shifting river bed. For 1908, gage heights only are available.

Discharge measurements of Walker River near Wabuska, Nev., in 1907.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 14	E. A. Porter	148	536	5.50	1,550
July 13	do	152	673	5.80	2,410
August 7	do	141	389	4.40	1,180

Daily gage height, in feet, of Walker River near Wabuska, Nev., for 1907 and 1908.

[A. Gelmstedt, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	2.3	2.45	.....	3.1	3.75	4.65	5.65	4.4	2.4	2.0	2.6	2.2
2	2.2	2.4	.....	3.4	3.65	4.9	6.2	4.3	2.35	1.9	2.6	2.25
3	2.1	2.4	.....	3.35	3.55	5.2	6.3	4.3	2.35	2.0	2.5	2.3
4	2.0	2.4	2.4	3.3	3.85	5.45	6.15	4.2	2.3	2.0	2.35	2.25
5	2.1	2.5	2.4	3.2	4.1	5.85	6.25	4.05	2.2	2.0	2.35	2.2
6	2.1	2.65	2.4	3.1	4.2	6.15	6.5	3.8	2.2	2.0	2.45	2.3
7	2.0	2.85	2.45	3.05	4.25	6.4	6.5	3.6	2.2	2.1	2.45	2.3
8	2.0	2.8	2.45	3.0	4.25	6.35	6.35	3.5	2.1	2.15	2.3	2.25
9	2.1	2.8	2.3	2.95	4.05	5.0	6.05	3.4	2.0	2.15	2.25	2.2
10	2.1	2.6	2.3	3.0	3.95	5.6	6.0	3.35	1.85	2.2	2.3	2.3
11	2.1	2.45	2.15	3.25	3.9	5.35	5.95	3.35	1.7	2.2	2.4	2.3
12	2.1	2.5	1.9	3.5	4.15	5.35	5.8	3.2	1.55	2.25	2.4	2.35
13	2.1	2.5	1.7	3.8	4.25	5.6	5.6	3.1	1.5	2.1	2.3	2.4
14	2.05	2.5	1.8	4.05	4.1	5.5	5.7	3.0	1.4	2.0	2.3	2.4
15	2.1	2.5	1.8	4.3	3.95	5.1	5.6	3.0	1.5	1.95	2.25	2.3
16	2.1	2.45	1.85	4.25	3.85	4.8	5.5	3.1	1.5	1.9	2.2	2.3
17	2.1	2.4	1.95	4.0	3.85	4.55	5.4	3.1	1.5	1.9	2.2	2.3
18	2.1	2.4	2.25	3.8	4.05	4.35	5.35	3.2	1.45	1.9	2.25	2.2
19	1.9	2.4	4.0	3.9	4.25	4.15	5.15	3.25	1.45	2.0	2.25	2.2
20	1.9	2.35	5.6	4.0	4.5	4.1	4.95	3.05	1.55	2.05	2.3	2.2
21	2.0	2.3	6.15	4.1	4.75	4.15	4.9	2.9	1.6	2.15	2.2	2.2
22	1.9	2.25	5.1	4.1	4.85	4.4	4.75	2.95	1.6	2.2	2.2	2.2
23	1.95	2.3	4.15	4.0	4.65	4.75	4.6	2.75	1.5	2.3	2.2	2.1
24	2.1	2.3	3.7	4.05	4.45	4.9	4.55	2.55	1.5	2.4	2.2	2.15
25	2.25	2.3	3.4	4.2	4.15	4.8	4.65	2.5	1.5	2.4	2.2	2.2
26	2.3	2.25	3.25	4.1	4.15	4.55	4.7	2.45	1.4	2.4	2.2	2.3
27	2.3	2.2	3.15	4.1	4.25	4.4	4.8	2.25	1.4	2.4	2.2	2.35
28	2.35	2.25	3.1	4.0	4.25	4.5	4.75	2.35	1.5	2.5	2.3	2.4
29	2.2	.....	2.95	3.95	4.15	4.8	4.7	2.4	1.65	2.4	2.3	2.4
30	2.3	.....	2.9	3.9	4.35	5.2	4.55	2.45	1.85	2.5	2.2	2.4
31	2.4	.....	2.95	.....	4.5	.....	4.35	2.4	.....	2.55	.....	2.3

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1908.								1908.							
1	2.3	2.3	2.4	1.8	1.25	1.55	0.95	16	2.2	2.15	2.45	1.4	0.8	2.25	0.5
2	2.3	2.3	2.5	1.75	1.55	1.55	1.25	17	2.25	2.2	2.55	1.45	.8	1.95	.45
3	2.2	2.25	2.55	1.7	1.65	1.5	1.3	18	2.3	2.2	2.85	1.5	.9	1.7	.3
4	2.2	2.25	2.5	1.6	1.55	1.45	1.2	19	2.3	2.2	2.95	1.35	.9	1.25	.45
5	2.2	2.3	2.35	1.5	1.35	1.35	1.3	20	2.2	2.1	3.0	1.3	.85	1.05	.65
6	2.2	2.25	2.3	1.45	1.15	1.35	1.15	21	2.2	2.15	2.9	1.15	.9	1.05	.75
7	2.1	2.2	2.3	1.35	1.0	1.15	1.1	22	2.2	2.2	2.8	1.15	1.05	1.0	.55
8	2.15	2.25	2.3	1.15	1.15	1.0	1.0	23	2.25	2.2	2.75	1.3	1.35	1.0	.45
9	2.2	2.3	2.3	1.0	1.45	.95	1.0	24	2.3	2.25	2.6	1.15	1.4	1.0	.25
10	2.25	2.2	2.2	1.05	1.35	.95	.9	25	2.3	2.3	2.45	1.05	1.3	1.0	.2
11	2.3	2.2	2.2	1.1	1.15	1.15	1.0	26	2.3	2.3	2.3	.85	1.3	1.0	.2
12	2.3	2.2	2.2	1.15	1.05	1.35	1.0	27	2.3	2.3	2.3	.45	1.4	.9	.2
13	2.25	2.1	2.2	1.2	.95	1.6	.95	28	2.3	2.35	2.2	.2	1.4	.9	.25
14	2.2	2.1	2.2	1.25	.95	1.9	.75	29	2.3	2.4	2.05	.35	1.35	.85	.3
15	2.2	2.1	2.3	1.35	.85	2.2	.65	30	2.3	.....	2.0	.85	1.35	.85	.3
								31	2.3	.....	1.9	.....	1.4	.....	.4

Daily discharge, in second-feet, of Walker River near Wabuska, Nev., for 1906 and 1907.

Day.	1906.					1907.		
	May.	June.	July.	Aug.	Sept.	June.	July.	Aug.
1	370	540	2,470	1,870	220	950	1,970	1,220
2	350	530	2,350	1,710	210	1,110	2,410	1,150
3	380	500	2,430	1,460	210	1,330	2,650	1,150
4	460	480	2,550	1,350	205	1,510	2,540	1,080
5	540	550	2,700	1,190	180	1,810	2,620	940
6	670	720	2,880	1,150	180	2,040	2,810	790
7	900	830	3,120	1,060	155	2,250	2,810	670
8	1,150	760	3,080	1,020	130	2,210	2,700	610
9	1,180	690	3,200	1,020	105	1,190	2,460	560
10	1,290	690	3,270	950	95	1,620	2,560	540
11	1,470	970	3,240	925	90	1,430	2,530	540
12	1,630	1,300	3,040	925	90	1,430	2,410	470
13	1,560	1,630	2,800	895	90	1,620	2,250	420
14	1,430	1,930	2,780	895	100	1,550	2,330	375
15	1,360	2,210	2,880	895	100	1,250	2,250	375
16	1,360	2,250	2,920	685	100	1,040	2,170	420
17	1,240	2,250	2,900	605	100	880	2,040	420
18	1,010	2,400	2,710	595	100	890	2,000	470
19	950	2,470	2,680	580	115	765	1,850	490
20	950	2,570	2,510	630	125	735	1,700	400
21	1,090	2,600	2,310	660	135	765	1,660	335
22	1,160	2,610	2,220	630	135	915	1,550	355
23	1,160	2,610	2,200	580	135	1,150	1,440	285
24	1,050	2,670	2,480	550	135	1,260	1,360	215
25	920	2,700	2,850	475	135	1,330	1,430	200
26	800	2,610	2,930	415	135	1,150	1,470	190
27	760	2,800	2,880	365	135	1,050	1,550	135
28	700	2,760	2,850	330	135	1,120	1,510	160
29	700	2,690	2,820	290	125	1,330	1,470	175
30	700	2,600	2,450	280	125	1,620	1,320	190
31	670	.....	2,000	250	.....	.....	1,180	175

NOTE.—These discharges were obtained by the indirect method for shifting channels.

Monthly discharge of Walker River near Wabuska, Nev., for 1906 and 1907.

[Drainage area, 2,420 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.	
1906.							
May	1,630	350	966	0.399	0.46	59,400	C.
June	2,800	480	1,760	.727	.81	105,000	C.
July	3,270	2,000	2,730	1.13	1.30	168,000	C.
August	1,870	250	814	.336	.39	50,100	C.
September	220	90	134	.055	.06	7,970	C.
1907.							
June	2,250	735	1,310	.541	.60	78,000	C.
July	2,810	1,180	2,030	.839	.97	125,000	C.
August	1,220	135	500	.207	.24	30,700	D.

NOTE.—No estimates for remaining months of 1906 to 1908 could be made on account of shifting channel conditions and lack of measurements.

WEST FORK OF WALKER RIVER NEAR COLEVILLE, CAL.

This station, which was established October 5, 1902, to determine the total flow of the river above all diversions and to obtain for the

Reclamation Service reliable data concerning storage and irrigation opportunities, was discontinued July 31, 1908. The data were also used by the Nevada state engineer in adjusting water rights in Smith and Antelope valleys.

The cable was located about 1 mile east of the point where the main road from Topaz to Bridgeport crosses Lost Canyon Creek and is 600 feet from the road. The gage was about one-half mile above the cable.

The gage datum remained unchanged during the continuance of the station. The channel is permanent, the flow is apparently unaffected by ice or artificial control, and the record is good.

Discharge measurements of West Fork of Walker River near Coleville, Cal., in 1907 and 1908.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1907.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 11	E. A. Porter	62	227	4.20	1,570
July 10	do	65	268	4.75	1,980
August 4	do	57	162	3.65	1,000
August 25	do	51	109	2.80	440
1908.					
March 28	E. A. Porter	51	76	1.80	170
April 17	do	52	120	2.60	359

Daily gage height, in feet, of West Fork of Walker River near Coleville, Cal., for 1907 and 1908.

[J. S. Trumble, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1.4	1.4	1.6	2.2	3.3	4.95	5.85	3.8	2.4	1.9	1.8	1.4
2	1.3	1.4	1.5	2.1	3.3	5.1	5.85	3.7	2.4	1.8	1.7	1.4
3	1.3	1.5	1.5	2.0	3.3	5.4	5.9	3.6	2.4	1.8	1.7	1.5
4	1.3	1.6	1.6	2.0	3.4	5.45	5.85	3.4	2.4	1.8	1.7	1.5
5	1.3	1.8	1.6	2.0	3.5	5.3	5.8	3.4	2.4	1.8	1.7	1.5
6	1.3	1.8	1.6	2.0	3.4	5.3	5.75	3.4	2.4	1.8	1.7	1.5
7	1.3	1.8	1.6	2.0	3.2	4.9	5.6	3.3	2.4	1.8	1.7	1.5
8	1.4	1.7	1.6	2.0	3.1	4.5	5.3	3.2	2.4	1.8	1.7	1.5
9	1.4	1.7	1.6	2.1	3.2	4.35	4.8	3.1	2.4	1.8	1.7	1.5
10	1.4	1.6	1.6	2.2	3.3	4.3	4.75	3.1	2.4	1.8	1.7	1.5
11	1.4	1.6	1.6	2.4	3.5	4.4	4.75	3.0	2.4	1.8	1.7	1.6
12	1.4	1.6	1.7	2.3	3.5	4.1	4.65	3.0	2.4	1.8	1.7	1.6
13	1.4	1.6	1.7	2.7	3.5	4.05	4.65	3.1	2.4	1.8	1.7	1.6
14	1.3	1.6	1.8	3.2	3.5	3.45	4.6	3.2	2.3	1.7	1.6	1.5
15	1.3	1.6	1.8	3.2	3.5	3.4	4.45	3.3	2.3	1.7	1.6	1.5
16	1.3	1.6	1.8	3.2	3.6	3.2	4.45	3.4	2.3	1.7	1.6	1.5
17	1.3	1.6	2.9	3.1	3.7	2.85	4.4	3.4	2.2	1.7	1.6	1.5
18	1.3	1.5	3.8	3.1	3.9	2.9	4.35	3.4	2.1	1.7	1.8	1.5
19	1.3	1.5	4.1	3.0	4.1	3.1	4.35	3.3	2.1	1.7	1.7	1.5
20	1.4	1.5	3.9	3.1	4.0	3.2	4.2	3.2	2.0	1.7	1.6	1.5
21	1.4	1.6	3.7	3.2	4.0	3.35	4.2	3.1	2.0	1.7	1.6	1.6
22	1.4	1.6	3.5	3.2	4.0	3.45	4.25	2.9	2.0	1.7	1.6	1.6
23	1.4	1.6	3.1	3.2	4.0	4.05	4.25	2.8	2.0	1.7	1.6	1.5
24	1.4	1.5	2.4	3.2	3.9	3.95	4.4	2.7	2.0	1.7	1.6	1.5
25	1.4	1.5	2.0	3.3	3.9	4.2	4.35	2.7	1.9	1.7	1.6	1.5
26	1.4	1.6	2.0	3.3	3.9	4.35	4.35	2.6	1.9	1.8	1.5	1.5
27	1.4	1.6	2.1	3.3	3.9	4.7	4.35	2.6	1.9	1.9	1.5	1.5
28	1.5	1.6	2.1	3.3	3.9	5.2	4.45	2.6	1.9	1.9	1.5	1.6
29	1.5	.....	2.2	3.3	3.9	5.6	4.2	2.5	1.8	1.8	1.5	1.6
30	1.5	.....	2.3	3.3	4.1	5.5	4.0	2.5	1.8	1.8	1.4	1.5
31	1.4	.....	2.2	.....	4.6	.....	3.9	2.5	.....	1.8	.....	1.5

Daily gage height, in feet, of West Fork of Walker River near Coleville, Cal., for 1907 and 1908—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1908.								1908.							
1....	1.5	1.4	1.3	2.0	3.3	2.9	3.0	16....	1.5	1.5	1.8	2.7	2.6	3.2	2.5
2....	1.5	1.4	1.3	2.0	3.2	3.0	3.1	17....	1.5	1.6	1.9	2.6	2.5	3.2	2.5
3....	1.5	1.4	1.3	2.0	3.0	2.9	3.1	18....	1.5	1.7	2.0	2.6	2.5	3.1	2.5
4....	1.5	1.4	1.3	2.1	2.8	2.8	3.1	19....	1.5	1.6	2.0	2.4	2.6	3.1	2.5
5....	1.5	1.4	1.3	2.2	2.7	2.9	3.1	20....	1.5	1.5	2.0	2.1	2.6	2.9	2.5
6....	1.5	1.3	1.3	2.2	2.9	3.0	3.1	21....	1.5	1.5	2.1	2.0	2.6	2.8	2.4
7....	1.5	1.3	1.3	2.0	3.1	3.2	3.0	22....	1.5	1.4	2.1	1.8	2.7	2.8	2.4
8....	1.5	1.3	1.3	2.0	2.9	3.4	3.1	23....	1.4	1.4	2.1	1.7	2.9	2.9	2.4
9....	1.5	1.3	1.4	2.0	2.7	3.4	3.0	24....	1.4	1.4	2.2	2.0	3.0	3.0	2.4
10....	1.6	1.3	1.5	2.1	2.7	3.4	2.9	25....	1.5	1.4	2.2	2.5	3.2	3.1	2.4
11....	1.6	1.3	1.5	2.2	2.6	3.5	2.9	26....	1.5	1.4	2.1	2.6	3.2	3.1	2.5
12....	1.6	1.3	1.6	2.5	2.6	3.5	2.8	27....	1.5	1.4	2.0	2.8	3.2	3.2	2.5
13....	1.5	1.3	1.7	2.7	2.6	3.6	2.8	28....	1.5	1.4	2.0	3.0	3.1	3.2	2.5
14....	1.5	1.4	1.7	2.8	2.6	3.5	2.7	29....	1.5	1.3	1.9	3.1	3.4	3.1	2.4
15....	1.5	1.5	1.8	2.7	2.9	3.3	2.6	30....	1.4	.....	2.0	3.2	3.4	3.0	2.5
								31....	1.4	.....	2.0	.....	3.1	.....	2.4

Rating table for West Fork of Walker River near Coleville, Cal., for 1907 and 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.30	85	2.40	330	3.50	960	4.60	2,240
1.40	100	2.50	365	3.60	1,050	4.70	2,380
1.50	116	2.60	405	3.70	1,140	4.80	2,520
1.60	133	2.70	445	3.80	1,240	4.90	2,670
1.70	151	2.80	490	3.90	1,350	5.00	2,820
1.80	170	2.90	540	4.00	1,470	5.20	3,120
1.90	190	3.00	600	4.10	1,590	5.40	3,420
2.00	210	3.10	660	4.20	1,710	5.60	3,720
2.10	235	3.20	720	4.30	1,840	5.80	4,020
2.20	255	3.30	790	4.40	1,970	6.00	4,320
2.30	295	3.40	870	4.50	2,100		

NOTE.—This table is not applicable for ice or obstructed-channel conditions. It is based on 40 discharge measurements made during 1903 to 1908. It is well defined below gage height 2.2 feet and fairly well above.

Monthly discharge of West Fork of Walker River near Coleville, Cal., for 1907 and 1908.

[Drainage area, 306 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.	
1907.							
January	116	85	95.7	0.313	0.36	5,880	B.
February	170	100	132	.431	.45	7,330	B.
March	1,590	116	380	1.24	1.43	23,400	B.
April	790	210	523	1.71	1.91	31,100	B.
May	2,240	660	1,150	3.76	4.34	70,700	B.
June	3,720	515	1,960	6.41	7.15	117,000	B.
July	4,170	1,350	2,480	8.11	9.35	152,000	B.
August	1,240	365	685	2.24	2.58	42,100	B.
September	330	170	269	.879	.98	16,000	B.
October	190	151	165	.539	.62	10,100	A.
November	170	100	140	.458	.51	8,330	A.
December	133	100	119	.389	.45	7,320	B.
The year	4,170	85	675	2.21	30.13	491,000	
1908.							
January	133	100	116	.379	.44	7,130	B.
February	151	85	102	.333	.36	5,870	B.
March	265	85	165	.539	.62	10,100	A.
April	720	151	336	1.10	1.23	20,000	B.
May	870	365	548	1.79	2.06	33,700	B.
June	1,050	490	693	2.26	2.52	41,200	B.
July	660	330	460	1.50	1.73	28,300	B.
The period						146,000	

NOTE.—The open channel rating has been applied throughout; gage heights for the winter periods do not seem be affected by ice conditions.

OWENS RIVER BASIN.

Owens River rises in the Sierra Nevada in eastern California and flows southeastward parallel with this range, finally discharging its waters into Owens Lake. Its basin, which lies between the Sierra Nevada on the west and the White Mountains on the east, has a length from north to south of approximately 150 miles and a width of from 20 to 25 miles. Practically the entire flow of the river is derived from the Sierra Nevada, as it drains the eastern slope of this range from Mount Lyell on the north to a point some distance below Mount Whitney on the south.

The results of data collected in the Owens River valley in 1907–8 are contained in Water Supply Paper 251, which presents the results of all river discharge data collected in California during 1907–8.

GREAT BASIN DRAINAGE AREA IN OREGON.

DESCRIPTION.

The Great Basin drainage area in Oregon comprises about one-fourth of the State. The surface waters throughout this area drain into the natural depressions in the ground, the water either evaporating or, if the flow is sufficient, forming perennial lakes. The area is generally high and rolling. Forests, except on the borders of the basin, are small. The soil is rough, sparsely covered with grass, and is given largely to range for sheep and cattle. The rainfall throughout the basin is about 10 inches per annum.

The principal lakes are Harney, Malheur, Warner, Summer, Silver, Christmas, Goose, and Abert. With the exception of Silver Lake all are alkaline. The surface waters of this basin are very valuable for irrigation, but unfortunately are insufficient in quantity. The irrigated valley lands contiguous to the streams have been taken, and the low-water flow of the principal streams is entirely used.

The general elevation of the Great Basin in Oregon is between 4,000 and 5,000 feet. The ridges of mountains which form the rim of this basin have an approximate elevation of 7,000 feet. At Burns the elevation is 4,185; Silver Lake post-office, 4,380; Lake Abert, 4,209; and Warner Lake, 4,544.

Irrigation is almost an absolute necessity for growing anything except the hardier wheats, which have been raised with more or less success by the dry-farming process. Any extensive irrigation development will necessitate the investment of large sums of money in storage reservoirs and canal systems.

The principal streams of this basin, classified by the lakes into which they flow, are as follows: Silvies River, discharging into Malheur Lake; Donner and Blitzen River, draining the western slope

of Steins Mountain and flowing north into Malheur Lake; Silver Creek into Harney Lake; Silver, Bridge, and Bear creeks into Silver Lake; Summer Creek and Ana River into Summer Lake; and Chewaucan River into Lake Abert.

Silver Creek, in Lake County, drains the divide between the Great Basin and Klamath River drainage, flowing northward into Paulina Marsh and thence into Silver Lake, from which at high stages it overflows onto the Silver Lake Desert. From the same divide Bear Creek and Bridge Creek flow into Paulina Marsh. Ana River is a small stream, about 1½ miles long, which empties into Summer Lake, a strongly alkaline body of water. The waters of Ana River are warm and of excellent quality, as they come from subterranean depths through five large springs. The temperature of the water winter and summer is about 62° and the combined flow of the springs is about 145 second-feet. Chewaucan River rises on the opposite side of the divide from Sprague River and flows north through Chewaucan Marsh into Lake Abert.

The following gaging stations have been maintained in this drainage basin:

Silvies River near Burns, Oreg., 1903–1906 and 1908.
Silvies River near Silvies, Oreg., 1903–1905.
Silver Creek (Harney County) near Riley, Oreg., 1904–1906 and 1908.
Silver Creek (Lake County) near Silver Lake, Oreg., 1904–1907.
Bridge Creek near Silver Lake, Oreg., 1905–6.
Bear Creek near Silver Lake, Oreg., 1905–6.
Ana River near Summer Lake, Oreg., 1905.
Chewaucan River near Paisley, Oreg., 1905–1907.

In addition to these gaging stations, a few records of lake heights have been kept in Silver Lake, Summer Lake, Harney Lake, and Malheur Lake. For several of these stations, which were reestablished the latter part of December, 1908, the data are withheld until the 1909 report.

SILVER CREEK NEAR SILVER LAKE, OREG.

This station, which is located 1½ miles southwest of Silver Lake post-office, 3 miles below the mouth of the West Fork of Silver Creek, in sec. 28, T. 28 N., R. 14 E., was established December 29, 1904, at the time the Silver Lake project was under investigation by the United States Reclamation Service. The present flow of the creek during the irrigating season is entirely appropriated for irrigation, and any additional development will involve the construction of storage reservoirs.

Ice interferes with the observations during the winter months. The conditions at the station, however, are favorable for good results during the open season. Owing to lack of funds the station was

abandoned March 31, 1907, but observations were again resumed January 11, 1909. No measurements were made during 1907.

Daily gage height, in feet, of Silver Creek near Silver Lake, Oreg., for 1907

[Henry Egle, observer.]

Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.
1	0.7	1.5	2.4	11	1.1	2.8	1.2	21	1.2	2.5	5.0
2	.75	1.55	2.2	12	1.1	2.7	1.0	22	1.3	2.95	4.2
3	.8	2.8	2.0	13	1.1	2.4	1.1	23	1.3	2.9	2.2
4	.9	3.1	1.1	14	1.0	2.2	1.1	24	1.3	2.9	2.2
5	.85	5.0	1.1	15	1.0	2.2	1.6	25	1.3	3.0	2.3
6	.85	5.7	1.1	16	1.1	2.2	1.3	26	1.4	3.0	2.2
7	.85	4.1	1.5	17	1.1	2.2	2.2	27	1.4	2.9	2.1
8	.85	3.0	1.8	18	1.1	2.1	3.4	28	1.45	2.2	2.2
9	.9	2.6	1.6	19	1.1	2.2	5.1	29	1.45	.....	2.2
10	1.0	3.0	1.2	20	1.2	2.4	9.08	30	1.45	.....	2.2
								31	1.5	.....	2.8

NOTE.—Observer made no ice notes. The 1906 rating probably applies for these gage heights.

CHEWAUCAN RIVER AT PAISLEY, OREG.

This station, which was established January 4, 1905, is one-half mile above Paisley, 500 feet above Conn's mill ditch. George Conn's irrigation ditch diverts water from the left bank of the stream 2½ miles above the gaging station.

The results are of considerable value in connection with irrigation projects. The Chewaucan project was under investigation by the United States Reclamation Service in 1904 and 1905, but the data concerning the water supply were insufficient and construction has not yet been authorized. Since that time the State has entered into contract with private parties for the reclamation of about 12,000 acres to the north and west of Paisley. Owing to the inaccessibility of the station and the lack of funds the station was abandoned December 10, 1907, but observations were again resumed January 17, 1909.

The conditions at the station are favorable for good results during the open season. The channel is not stable during floods, and the high waters during April, 1907, so modified the channel that the old rating curve was not applicable and no estimates have been possible since that date. No measurements were made during 1907.

Daily gage height, in feet, of Chewaucan River at Paisley, Oreg., for 1907.

[Lula Banister, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.8	5.0	4.9	..	6.5	6.9	5.2	3.9	3.7	3.8	3.8	3.5
2	4.0	7.25	4.6	..	6.4	6.8	5.0	3.9	3.8	3.7	3.7	.....
3	3.8	6.9	4.5	..	6.4	6.6	5.0	3.9	3.6	3.6	3.7	.....
4	3.7	7.65	4.6	.	6.4	6.7	5.0	3.9	3.7	3.6	3.6	.....
5	3.9	7.0	4.6	..	6.3	6.6	5.0	3.9	3.8	3.6	3.6	.....
6	3.8	6.4	4.6	...	6.4	6.8	5.0	3.8	3.7	3.6	3.6	.....
7	3.6	6.0	4.6	...	6.3	6.9	4.9	3.7	3.6	3.6	3.6	..
8	4.9	5.5	4.6	...	6.3	6.7	4.7	...	3.5	3.5	3.6	3.6
9	5.0	5.4	4.6	..	6.6	6.6	4.6	3.6	3.5	3.5	3.6	3.6
10	5.1	5.2	4.6	7.0	6.8	6.0	4.5	3.6	3.5	3.5	3.6	3.6
11	5.0	5.0	4.5	7.0	6.8	6.9	4.5	3.6	3.5	3.6	3.6	3.7
12	4.1	5.0	4.3	7.0	6.5	6.9	4.5	3.6	3.5	3.8	3.6	3.8
13	4.3	4.9	4.3	7.0	6.5	..	4.4	3.5	3.5	3.7	3.6	3.8
14	4.4	4.9	4.2	7.0	6.4	6.3	.....	3.5	3.5	3.6	3.6	.....
15	4.6	4.9	4.3	6.9	6.3	5.9	4.3	3.5	3.5	3.6	3.6	.....
16	4.4	4.9	4.4	6.8	6.8	5.8	4.2	3.5	3.5	3.6	3.6	.....
17	4.3	4.9	5.0	6.6	6.8	5.7	...	3.4	3.5	3.6	3.5	.....
18	4.2	4.9	6.8	6.5	7.0	5.6	4.1	3.4	3.5	3.6	3.6	.....
19	4.3	4.9	6.7	6.5	7.5	5.5	4.1	3.4	3.6	3.5	3.6	....
20	4.4	4.9	5.7	6.4	7.0	6.0	4.0	3.4	3.6	3.6	3.6	.....
21	4.3	4.9	5.5	6.4	6.8	5.9	4.0	3.4	3.6	3.6	3.6	.....
22	4.2	5.0	5.3	6.5	6.5	5.8	4.1	3.4	3.6	3.6	3.7	.....
23	4.1	5.1	5.3	6.6	6.5	5.6	4.2	3.4	3.6	3.6	3.7	.....
24	4.2	5.2	5.3	6.7	6.5	5.4	4.1	3.4	3.5	3.6	3.7	.....
25	4.3	5.2	5.3	6.6	6.4	5.4	4.0	3.5	3.5	3.8	3.7	.....
26	4.4	5.3	5.2	6.7	6.5	5.3	4.0	3.5	3.5	3.8	3.7	.....
27	4.5	4.7	5.0	6.6	6.6	5.3	4.0	3.5	3.5	3.8	3.7	.....
28	...	4.9	5.3	6.5	6.7	5.3	4.0	3.5	..	3.9	3.7	.....
29	4.3	...	5.3	6.6	6.9	5.2	4.0	3.5	3.9	3.9	3.7	.....
30	4.4	..	5.4	6.4	6.9	5.0	3.9	3.5	3.8	3.8	3.6	.....
31	4.6	... ..	5.3	..	6.6	... .	3.9	3.6	..	3.8	. ..	.....

NOTE.—The river was frozen January 1 to February 1, the ice reaching a thickness of about 6 inches.

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous discharge measurements were made in the Great Basin drainage area during 1907 and 1908:

Miscellaneous measurements in Great Basin drainage area, in 1907 and 1908.

WASATCH MOUNTAINS DRAINAGE AREA.

Date.	Stream.	Tributary to—	Locality.	Discharge.
				Sec.-ft.
October 29, 1908	Spanish Fork...	Utah Lake	Above Diamond Fork..... .	44.6
Do.....	.. .do..... ..	.. .do..... ...	Opposite Castella Hot Springs.	59.4
Do..... ..	.. .do..... ..	.. do..... .. .	Half mile above U. S. Reclamation Service diversion dam.	89.6
November 6, 1908..	.. .do.....	.. .do.....	At U. S. Reclamation Service diversion dam.	81.2

SIERRA NEVADA DRAINAGE AREA.

May 21, 1908.....	Carson River.. ..	Carson Sink. ..	Towle's ranch, between Empire and Canal chute stations.	554

Miscellaneous measurements in Great Basin drainage area in 1907 and 1908—Continued.

GREAT BASIN DRAINAGE AREA IN OREGON.

Date.	Stream.	Tributary to	Locality.	Discharge.
				Sec.-ft.
August 13, 1908	Donner and Blitzen River.	Malheur Lake.	Mouth	7.0
August 28, 1907	do	do	"P" ranch	45.0
August 29, 1908	do	do	do	60.0
September 18, 1908	do	do	do	42.0
August 24, 1907	Kieger Creek	Blitzen River	Diamond post-office	9.0
August 27, 1907	McCoy Creek	Kieger Creek	2 miles above Diamond ranch.	3.5
Do	Krumbo Creek	Blitzen River	Near mouth	5.5
August 30, 1907	Bridge Creek	do	3 miles northeast of "P" ranch	12.0
August 26, 1907	Smyth Creek	Bartow Lake	3 miles above mouth	1.2
September 1, 1907	Home Creek		Drains southwest side Steens Mountain.	3.0
August 31, 1907	Roaring Springs		Southwest base Steens Mountain.	5.0
September 2, 1907	Threemile Creek		Drains southwest side Steens Mountain.	4.5
September 6, 1907	Skull Creek		do	5.0
September 9, 1907	Trout Creek	Alvord Lake	Mouth of canyon	1.3
September 10, 1907	Willow Creek	Small lake east of Alvord Lake.	5 miles southwest of White House ranch.	1.4
September 13, 1907	Alvord Creek		Drains east side Steens Mountain.	2.0
October 11, 1908	Bear Creek	Silver Lake (Lake County).	Hay's ranch	5.0
Do	Bridge Creek	do	Owsley's ranch	3.0
October 8, 1908	Silver Creek	Silver Lake	Silver Lake post-office	7.0
October 10, 1908	do	do	do	7.0
October 13, 1908	Chewaucan	Abert Lake	Paisley	25.0
Do	Drainage Canal C. L. and P. Co.	Chewaucan River	do	15.0
August 17, 1908	Silver Creek	Harney Lake	25 miles west of Riley	.5

INDEX.

A.

Page.

Accuracy, degree of 24–25
Acknowledgments to those aiding 26
Acre-foot, definition of 11
Alvord Creek at—
  Steens Mountain, Oregon:
    discharge 143
Appropriations, amount of 5
Authority for investigations, recital of 5

B.

Bear Creek at—
  Hay's ranch, Oregon:
    discharge 143
Bear River at or near—
  Collinston, Utah:
    description 37–38
    discharge 38
    discharge, monthly 40
    gage heights 38–39
    rating table 39
  Dingle, Idaho:
    description 31
    discharge 31
    discharge, monthly 33
    gage heights 31–32
    rating tables 32–33
  Preston, Idaho:
    description 33–34
    discharge 34
    discharge, monthly 36–37
    gage heights 34–35
    rating tables 36
Bear River basin:
    description 29
    gaging stations 30
    stream flow 31–51
Blacksmith Fork near—
  Hyrum, Utah:
    description 47–48
    discharge 48
    discharge, monthly 51
    gage heights 48–49
    rating tables 49
Blacksmith Fork power-plant race near—
  Hyrum, Utah:
    description 47
    discharge 50
    gage heights 50–51
    rating table 51
Bridge Creek at or near—
  Owsley's ranch, Oregon:
    discharge 143
  P ranch, Oregon:
    discharge 143
Brunswick Mill canal near—
  Empire, Nev.:
    description 123
    discharge 126
    discharge, monthly 127
    gage heights 127
Burridge, G. T., work of 26

C.

California-Nevada state line. *See* Nevada-California state line.
Carson river basin:
    description 121
    gaging stations 121
    stream flow 121–130
Carson River near—
  Empire, Nev.:
    description 123
    discharge 124
    discharge, monthly 126
    gage heights 124–125
    rating tables 125
  Hazen, Nev.:
    description 127–128
    discharge 128
    gage heights 128
  Towle's ranch, Nev.:
    discharge 142
Carson River (East Fork) near—
  Gardnerville, Nev.:
    description 121–122
    discharge 122
    discharge, monthly 123
    gage heights 122
    rating table 122
Carson River (West Fork) near—
  Woodfords, Cal.:
    description 128
    discharge 129
    discharge, monthly 130
    gage heights 129–130
    rating table 130
Castella Hot Springs, Utah:
  Spanish Fork at:
    discharge 142
Chewaucan River at—
  Paisley, Oreg.:
    description 141
    discharge 143
    gage heights 142
C., L. & P. Company canal at—
  Paisley, Oreg.:
    discharge 143

Coleville, Cal., Page.
Walker River (West Fork) near:
description 136–137
discharge 137
discharge, monthly 138
gage heights 137–138
rating table 138
Collinston, Utah,
Bear River near:
description 37–38
discharge 38
discharge, monthly 40
gage heights 38–39
rating table 39
Computing, office methods of 19–24
Cooperation, credit for 26
Croydon, Utah,
Weber River near:
description 56
discharge 56
discharge, monthly 58
gage heights 57
rating tables 58
Current meter, description of 17–18
use of 16, 18–19
views of 18
Current-meter stations, views of 16
Curves, discharge, figure showing 21

D.

Definitions, statements of terms used 11
Derby dam, Nev.,
Truckee River at:
description 110
discharge 111
discharge, monthly 112
gage heights 111–112
rating table 112
Diamond, Oreg.,
Keiger Creek at:
discharge 143
Diamond Fork, Utah,
Spanish Fork near:
discharge 142
Diamond Fork near—
Thistle, Utah:
description 78
discharge 78
discharge, daily 79
discharge, monthly 79
gage heights 78
Diamond ranch, Oregon,
McCoy Creek near:
discharge 143
Dingle, Idaho,
Bear River at:
description 31
discharge 31
discharge, monthly 33
gage heights 31–32
rating tables 32–33
Discharge, computation of 19–24
curves for 21
figure showing 21
measurement of 21
Discharge measurements, nature of 13, 14
Donner and Blitzen River at— Page
mouth:
discharge 143
P ranch:
discharge 143
Donner Creek near—
Truckee, Cal.:
description 112
discharge 113
discharge, monthly 115
gage heights 113–114
rating tables 114–115
Drainage, stream flow and 7–8
Drainage basins, list of 8

E.

Elburz, Nev., Humboldt River (North Fork) near. *See* Halleck, Nev.
Elko, Nev.,
Humboldt River (South Fork) near:
description 96
discharge 97
discharge, monthly 99
gage heights 97–98
rating tables 98–99
Empire, Nev.,
Brunswick Mill canal near:
description 123
discharge 126
discharge, monthly 127
gage heights 127
Carson River near:
description 123
discharge 124
discharge, monthly 126
gage heights 124–125
rating tables 125
Equivalents, list of 12–13

F.

Field practice, methods of 14–19
Float method, description of 17
Flood prevention, stream flow and 8
Fuller, E. S., work of 26

G.

Gage heights, nature of 13
Gaging stations, classification of 20–25
description of 16
Gardnerville, Nev.,
Carson River (East Fork) near:
description 121–122
discharge 122
discharge, monthly 123
gage heights 122
rating table 122
Golconda, Nev.,
Humboldt River near:
description 87
discharge 87
discharge, monthly 90
gage heights 88
rating tables 89

Great Basin: Page.
description 26–28
miscellaneous measurements 142–143
stream flow 31–142
Gunnison, Utah,
Sevier River near:
description 83
discharge 83
discharge, monthly 85
gage heights 84
rating table 85

H.

Halleck, Nev.,
Humboldt River (North Fork) near:
description 93
discharge 93
discharge, monthly 96
gage heights 94
rating table 95
Hay's ranch, Oregon,
Bear Creek at:
discharge 143
Hazen, Nev.,
Carson River near:
description 127–128
discharge 128
gage heights 128
Henshaw, F. F., work of 26
Hobart Mills, Cal.,
Prosser Creek near:
description 115–116
discharge 116
discharge, monthly 117
gage heights 116
rating table 117
Hobble Creek basin:
description 67–68
gaging station 68
stream flow 68–70
Hobble Creek near—
Springsville, Utah:
description 68
discharge 68
discharge, monthly 70
gage heights 68–69
rating table 70
Home Creek at—
Steens Mountain, Oregon:
discharge 143
Humboldt River near—
Golconda, Nev.:
description 87
discharge 87
discharge, monthly 90
gage heights 88
rating tables 89
Oreana, Nev.:
description 90
discharge 90
discharge, daily 92
discharge, monthly 93
gage heights 91
rating tables 92
Humboldt River (North Fork) near—
Halleck, Nev.:
description 93
discharge 93
Humboldt River (North Fork) near—Con. Page.
Halleck, Nev.—Continued.
discharge, monthly 96
gage heights 94
rating tables 95
Humboldt River (South Fork) near—
Elko, Nev.:
description 96
discharge 97
discharge, monthly 99
gage heights 97–98
rating tables 98–99
Humboldt Sink basin:
description 86
gaging stations 86–87
stream flow 87–99
Hyrum, Utah,
Blacksmith Fork near:
description 47–48
discharge 49
discharge, monthly 51
gage heights 48–49
rating table 49
Blacksmith Fork power-plant race near:
description 47
discharge 50
gage heights 50–51
rating table 51

I.

Ice, measurements under 19, 24
Investigations, authority for 5
purposes of 7–8
scope of 6–7
Irrigation, stream flow and 7

K.

Kennedy, M. B., work of 26
Kieger Creek at—
Diamond, Oreg.:
discharge 143
Krumbo Creek near—
mouth:
discharge 143

L.

Lake Shore, Utah,
Spanish Fork near:
description 76
discharge 76
discharge, daily 77
discharge, monthly 77
gage heights 77
Lake Tahoe at—
Tahoe, Cal.:
description 101
gage heights 102
La Rue, E. C., work of 26
Little Truckee River at—
Pine Station, Cal.:
description 117
discharge 118
discharge, monthly 119
gage heights 118
rating tables 118–119
Starr, Cal.:
description 117
discharge 119

Little Truckee River at—Continued. Page.
Starr, Cal.—Continued.
discharge, monthly ... 120
gage heights ... 120
rating table ... 120
Logan, Hyde Park, and Smithfield canal near—
Logan, Utah:
description ... 45
discharge ... 45
discharge, monthly ... 47
gage heights ... 45–46
rating table ... 46
Logan River near—
Logan, Utah:
description ... 40–41
discharge ... 41
discharge daily ... 43
discharge, monthly ... 44
gage heights ... 41–42
rating tables ... 42–43

M.

McCoy Creek near—
Diamond ranch, Oregon:
discharge ... 143
Marysvale, Utah,
Sevier River near:
description ... 80
discharge ... 81
discharge, monthly ... 83
gage heights ... 81–82
rating table ... 82
Mathers, J. G., work of ... 26
Miner's inch, definition of ... 11
Miscellaneous measurements:
Great Basin in Oregon ... 143
Sierra Nevada area ... 142
Wasatch Mountains area ... 142

N.

Navigation, stream flow and ... 7
Nevada, cooperation of ... 26
Nevada-California state line,
Truckee River at:
description ... 105
discharge ... 105
discharge, monthly ... 107–108
gage heights ... 106
rating tables ... 107

O.

Oakley, Utah,
Weber River near:
description ... 53
discharge ... 54
discharge, monthly ... 55–56
gage heights ... 54–55
rating table ... 55
Office practice, method of ... 19–24
Oreana, Nev.,
Humboldt River near:
description ... 90
discharge ... 90
discharge, daily ... 92

Oreana, Nev.—Continued. Page.
Humboldt River near—Continued.
discharge, monthly ... 93
gage heights ... 91
rating tables ... 92
Oregon, Great Basin drainage in:
description ... 139–140
gaging stations ... 140
miscellaneous measurements ... 143
stream flow ... 140–142
Owens River basin:
description ... 139
Owsley's ranch, Oregon,
Bridge Creek at:
discharge ... 143

P.

Padgett, H. D., work of ... 26
Paisley, Oreg.,
Chewaucan River at:
description ... 141
discharge ... 143
gage heights ... 142
C., L. & P. Company canal at:
discharge ... 143
Parker, G. L., work of ... 26
Pine station, Cal.,
Little Truckee River at:
description ... 117
discharge ... 118
discharge, monthly ... 119
gage heights ... 118
rating tables ... 118–119
Plain City, Utah,
Weber River near:
description ... 59
discharge ... 59
discharge, monthly ... 61–62
gage heights ... 59–60
rating tables ... 60–61
Porter, E. A., work of ... 26
P ranch, Oregon,
Bridge Creek near:
discharge ... 143
Donner and Blitzen River at:
discharge ... 143
Preston, Idaho,
Bear River near:
description ... 33–34
discharge ... 34
discharge, monthly ... 36–37
gage heights ... 34–35
rating tables ... 36
Prosser Creek near—
Hobart Mills, Cal.:
description ... 115–116
discharge ... 116
discharge, monthly ... 117
gage heights ... 116
rating table ... 117
Provo River basin:
description ... 62–63
gaging stations ... 63
stream flow ... 63–67

Provo River near— Page.
Provo, Utah (at mouth of canyon):
description 66
discharge, daily 67
discharge, monthly 67
rating table 66
Provo, Utah (above Telluride Power Co.'s dam):
description 63
discharge 63
discharge, monthly 65-66
gage heights 64
rating tables 65
Publications, lists of 8-11

R.

Rating curves, construction and use of 20
Rating tables, construction of 20
nature of 14
Reclamation Service, cooperation of 26
Revision, need for 25-26
Rice, R. C., work of 26
Riley, Oreg.,
Silver Creek near:
discharge 143
Roaring Springs, Oregon:
discharge 143
Run-off, computation of 19-24
definition of 11

S.

Second-foot, definition of 11
Section, changes in, estimation for 21-24
Sevier River basin:
description 79-80
gaging stations 80
stream flow 80-85
Sevier River near
Gunnison, Utah:
description 83
discharge 83
discharge, monthly 85
gage heights 84
rating table 85
Marysvale, Utah:
description 80
discharge 81
discharge, monthly 83
gage heights 81-82
rating table 82
Sierra Nevada drainage:
miscellaneous measurements 142
principal streams 100
stream flow 100-139
Silver Creek near—
Riley, Oreg.:
discharge 143
Silver Lake, Oreg.:
description 140-141
discharge 143
gage heights 141
Silver Lake, Oreg.,
Silver Creek near:
description 140-141
discharge 143
gage heights 141
Skull Creek at— Page.
Steens Mountain, Oregon:
discharge 143
Smyth Creek near—
mouth:
discharge 143
Spanish Fork at or near—
Castella Hot Springs, Utah:
discharge 142
Diamond Fork, Utah:
discharge 142
Lake Shore, Utah:
description 76
discharge 76
discharge, daily 77
discharge, monthly 77
gage heights 77
Reclamation Service dam, Utah:
discharge 142
Thistle, Utah:
description 71
discharge 71
discharge, monthly 73
gage heights 72
rating table 72
Spanish Fork, Utah:
description 73
discharge 73
discharge, monthly 75-76
gage heights 74
rating tables 75
Spanish Fork basin:
description 70-71
gaging stations 71
stream flow 71-79
Springville, Utah,
Hobble Creek near:
description 68
discharge 68
discharge, monthly 70
gage heights 68-69
rating table 70
Starr, Cal.,
Little Truckee River at:
description 117
discharge 119
discharge, monthly 120
gage heights 120
rating table 120
Steens Mountain, Oregon,
streams on:
discharge 143
Stevens, G. C., work of 26
Stevens, J. C., work of 26
Slope method, description of 14
Stream measurements, accuracy of 24-25
data of, use of 25-26
methods of 14-19
Swamps, drainage of, stream flow and 7-8

T.

Tables, explanation of 13-14
Tahoe, Cal.,
Lake Tahoe at:
description 101
gage heights 102

Tahoe, Cal.—Continued. Page.
Truckee River at:
description 103
discharge 103
discharge, monthly 105
gage heights 103 104
rating tables 104
Terms, definitions of 11
Thistle, Utah,
Diamond Fork near:
description 78
discharge 78
discharge, daily 79
discharge, monthly 79
gage heights 78
Spanish Fork at:
description 71
discharge 71
discharge, monthly 73
gage heights 72
rating table 72
Threemile Creek at—
Steens Mountain, Oregon:
discharge 143
Towle's ranch, Nev.,
Carson River at:
discharge 142
Trout Creek, Oregon:
discharge 143
Truckee, Cal.,
Donner Creek near:
description 113
discharge 113
discharge, monthly 115
gage heights 113–114
rating tables 114–115
Truckee River at—
Derby dam, Nev.:
description 110
discharge 111
discharge, monthly 112
gage heights 111–112
rating table 112
Nevada-California state line:
description 105
discharge 105
discharge, monthly 107–108
gage heights 106
rating tables 107
Tahoe, Cal.:
description 103
discharge 103
discharge, monthly 105
gage heights 103–104
rating tables 104
Vista, Nev.:
description 108
discharge 108
discharge, monthly 110
gage heights 109
rating table 109–110
Truckee River basin:
description 100–101
gaging stations 101
stream flow 101–120

U.

Utah, cooperation of 26

V. Page.

Velocity method, description of 15–19
Vista, Nev.,
Truckee River at:
description 108
discharge 108
discharge, monthly 110
gage heights 109
rating tables 109–110

W.

Wabuska, Nev.,
Walker River near:
description 134
discharge 134
discharge, daily 136
discharge, monthly 136
gage heights 135
Walker River basin:
description 131
gaging stations 131
stream flow 132–138
Walker River near—
Wabuska, Nev.:
description 134
discharge 134
discharge, daily 136
discharge, monthly 136
gage heights 135
Walker River (East Fork) near—
Yerington, Nev.:
description 132
discharge 132
discharge, monthly 134
gage heights 132–133
rating tables 133
Walker River (West Fork) near—
Coleville, Cal.:
description 136–137
discharge 137
discharge, monthly 138
gage heights 137–138
rating table 138
Wasatch Mountains drainage:
miscellaneous measurements 142
principal streams 28–29
stream flow 31–85
Water power, stream flow and 7
Water supply, stream flow and 7
Weber River basin:
description 52–53
gaging stations 53
stream flow 53–62
Weber River near—
Croydon, Utah:
description 56
discharge 56
discharge, monthly 58
gage heights 57
rating tables 58
Oakley, Utah:
description 53
discharge 54
discharge, monthly 55–56
gage heights 54–55
rating table 55

Weber River near Continued. Page.
Plain City, Utah:
description 59
discharge 59
discharge, monthly 61–62
gage heights 59–60
rating tables 60–61
Weir method, description of 14–15
White House ranch, Oregon,
Willow Creek near:
discharge 143
Williams, A. D., work of 26
Willow Creek near -
White House ranch, Oregon:
discharge 143
Wood, B. D., work of 26
Woodford, Cal., Page.
Carson River (West Fork) near:
description 128
discharge 129
discharge, monthly 130
gage heights 129–130
rating table 130
Work, division of 26

Y.

Yerington, Nev.,
Walker River (East Fork) near:
description 132
discharge 132
discharge, monthly 134
gage heights 132–133
rating tables 133

O