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SURFACE WATER SUPPLY

OF THE

GREAT BASIN DRAINAGE

1906

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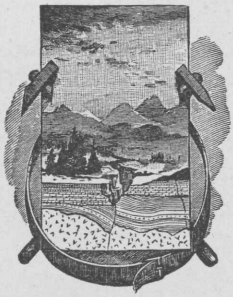

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E. C. La Rue, Thomas Grieve, Jr., and Henry Thurtell,
District hydrographers.

INTRODUCTION.

SCOPE OF WORK.

The water supply of the United States is of more importance to the life and pursuits of the people than any other natural resource. In the arid States the limit of agricultural development is determined by the amount of water available for irrigation, while in all parts of the country the increase in the population of cities and towns makes necessary additional water supplies for domestic and industrial uses, in procuring which both the quantity and the quality of the water that may be obtained must be considered. The location of manufacturing plants may depend largely on the water-power facilities and on the character of the water. The notable advances made in the electric transmission of power have led to the utilization of water powers for the operation of manufacturing establishments, railroads, and municipal lighting plants, many of which are at some distance from the places at which the power is developed.

The intelligent establishment and maintenance of enterprises or industries that depend on the use of water demands a thorough knowledge of the flow of the streams and an understanding of the conditions affecting that flow. This knowledge should be based on data showing both the total flow and the distribution of the flow throughout the year, in order that normal fluctuations may be provided for. As the flow of a stream is variable from year to year, estimates of future flow can be made only from a study of observations covering several years. The rapid increase in the development of the water

[a] This report contains information similar to that published for previous years under the title "Report of Progress of Stream Measurements."

resources of the United States has caused a great demand by engineers for information in regard to the flow of streams, as it is now generally realized that the failure of many large power, irrigation, and other projects has been due to the fact that the plans were made without sufficient trustworthy information in respect to the water supply.

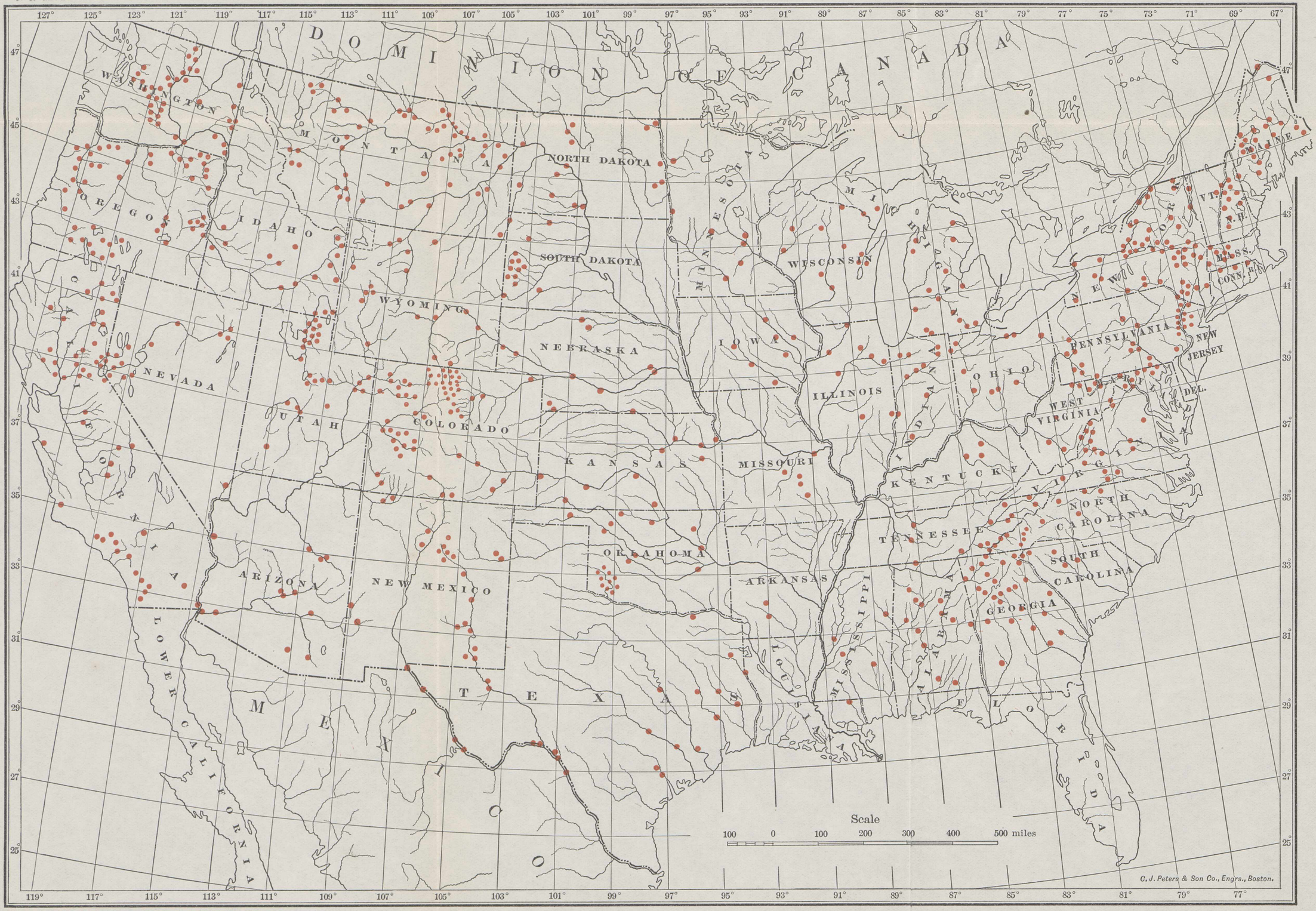
Owing to the broad scope of these hydrographic investigations and the length of time they should cover in order that the records may be of greatest value, it is in general impossible for private individuals to collect the necessary data, and as many of the streams traverse more than one State this work does not properly fall within the province of the State authorities. The United States Geological Survey has, therefore, by means of specific appropriations by Congress, for several years systematically made records of stream flow, with the view of ultimately determining all the important features governing the flow of the principal streams of the country. In carrying out this plan stations are established on the streams and maintained for a period long enough to show their regimen or general behavior. When a record that is sufficient for this purpose has been obtained for any stream, the work on that stream is discontinued. The order in which the streams are measured is determined by the degree of their importance.

During 1906 the regimen of flow was studied at about 700 stations distributed along the various rivers throughout the United States, as shown on Pl. I. In addition to these records data in regard to precipitation, evaporation, water power, and river profiles were obtained in many sections of the country.

These data have been assembled by drainage areas and are published in a series of fourteen Water-Supply and Irrigation Papers, Nos. 201 to 214, inclusive, each of which pertains to the surface water resources of a group of adjacent areas. In these papers are embodied not only the data collected in the field, but also the results of computations based on these data and other information that has a direct bearing on the subject, such as descriptions of basins and the streams draining them, utility of the water resources, etc. The list follows.

Water-Supply and Irrigation Papers on surface water supply, 1906.

201. Surface water supply of New England, 1906. (Atlantic coast of New England drainage.)
202. Surface water supply of the Hudson, Passaic, Raritan, and Delaware river drainages, 1906.
203. Surface water supply of the Middle Atlantic States, 1906. (Susquehanna, Gunpowder, Patapsco, Potomac, James, Roanoke, and Yadkin river drainages.)
204. Surface water supply of the Southern Atlantic and Eastern Gulf States, 1906. (Santee, Savannah, Ogeechee, and Altamaha rivers, and eastern Gulf of Mexico drainages.)
205. Surface water supply of the Ohio and lower eastern Mississippi river drainages, 1906.



MAP OF UNITED STATES SHOWING LOCATION OF PRINCIPAL RIVER STATIONS MAINTAINED DURING 1906.

206. Surface water supply of the Great Lakes and St. Lawrence River drainages, 1906.
207. Surface water supply of the upper Mississippi River and Hudson Bay drainages, 1906.
208. Surface water supply of the Missouri River drainage, 1906.
209. Surface water supply of the lower western Mississippi River drainage, 1906.
210. Surface water supply of the western Gulf of Mexico and Rio Grande drainages, 1906.
211. Surface water supply of the Colorado River drainage above Yuma, 1906.
212. Surface water supply of the Great Basin drainage, 1906.
213. Surface water supply of California, 1906. (The Great Basin and Pacific Ocean drainages in California and Colorado River drainage below Yuma.)
214. Surface water supply of the North Pacific Coast, 1906.

The records at most of the stations discussed in these reports extend over a series of years. An index of the reports containing such records up to and including 1903 has been published in Water-Supply Paper No. 119. The following table gives, by years and primary drainage basins, the numbers of the papers on surface water supply published from 1901 to 1906:

Numbers of Water-Supply Papers containing results of stream measurements, 1901–1906.[a]

	1901.	1902.	1903.	1904.	1905.	1906.
	No.	*No.*	*No.*	*No.*	*No.*	*No.*
Atlantic coast of New England drainage	65 75	82	97	124	165	201
Hudson, Passaic, Raritan, and Delaware river drainages	65 75	82	97	125	166	202
Susquehanna, Gunpowder, Patapsco, Potomac, James, Roanoke, and Yadkin river drainages	65 75	82 83	97 98	126	167	203
Santee, Savannah, Ogeechee, and Altamaha rivers and eastern Gulf of Mexico drainages	65 75	83	98	127	168	204
Ohio and lower eastern Mississippi river drainages	65 75	83	98	128	169	205
Great Lakes and St. Lawrence River drainages	65	83	97	129	170	206
Hudson Bay and upper eastern and western Mississippi River drainages	65 66 75	83 84 85	98 99 100	128 130	171	207
Missouri River drainage	66 75	84	99	130 131	172	208
Meramec, Arkansas, Red, and lower western Mississippi river drainages	66 75	84	99	131	173	209
Western Gulf of Mexico and Rio Grande drainages	66 75	84	99	132	174	210
Colorado River drainage, above Yuma	66 75	85	100	133	175	211
The Great Basin drainage	66 75	85	100	133	176	212
The Great Basin and Pacific Ocean drainages in California, and Colorado River drainage, below Yuma	66 75	85	100	134	177	213
North Pacific Coast drainage	66 75	85	100	135	178	214

[a] Reports containing data for years prior to 1901 are noted in the series list at the end of this paper.

DEFINITIONS.

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 quantity 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.

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

The "miner's inch" is the quantity of water that passes through an orifice 1 inch square under a head which varies locally. It has been 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. There is a convenient relation between the second-foot and the acre-foot: One second-foot flowing for twenty-four hours will deliver 86,400 cubic feet, or approximately 2 acre-feet.

EXPLANATION AND USE OF TABLES.

For each regular gaging station are given, as far as available, the following data:

1. Description of station.
2. List of discharge measurements.
3. Gage-height table.
4. Rating table.
5. Table of monthly and yearly discharges and run-off.
6. Tables showing discharge and horsepower and the number of days during the year when the same are available.

The descriptions of stations give such general information about the locality and equipment as would enable the reader to find and use the station, and they also give, as far as possible, a complete history of all the changes that have occurred since the establishment of the station that would be factors in using the data collected.

The discharge-measurement table gives the results of the discharge measurements made during the year, including the date, name of the

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. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. At most stations the gage is read in the morning and in the evening.

The discharge measurements and gage heights are the base data from which the other tables are computed. In cases of extensive development it is expected that engineers will use these original data in making their calculations, as the computations made by the Survey are based on the data available at the time they are made and should be reviewed and, if necessary, revised when additional data are available.

The rating table gives the discharge in second-feet corresponding to various stages of the river as given by the gage heights. It is published to enable engineers to determine the daily discharge in case this information is desired.

In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest, and it is the flow as given in the rating table for that mean gage height. As the gage height is the mean for the day, there might have been short periods when the water was higher and the corresponding discharge 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 for each second during the month. Upon this the computations for the remaining columns, which are defined on page 4, are based.

The values in the table of monthly discharge are intended 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.

In most work where data in regard to flow are used the regimen of flow is of primary importance. Therefore for the principal stations tables have been prepared showing the horsepower that can be developed at various rates of flow, and the length of time that these rates of flow and the corresponding horsepower are available. These tables have been prepared on a basis of 80 per cent efficiency on the turbines, and the horsepower per foot of fall is given in order that the reader can determine the horsepower for any fall.

In the computations sufficient significant figures have been used so that the percentage of error in the tables will not in general exceed 1 per cent. Therefore, most of the values in the tables are given to only three significant figures. In making the various computations Thatcher's slide rule, Crelle's tables, and computation machines have been generally used.

In order to give engineers an idea of the relative value of the various data notes in regard to accuracy are given as far as possible. This accuracy depends on the general local conditions at the gaging stations and the amount of data collected. Every effort possible is made to so locate the stations that the data collected will give a high degree of accuracy. This is not always possible, but it is considered better to publish rough values with explanatory notes rather than no data.

In the accuracy notes the following terms have been used, indicating the probable accuracy, in per cent, of the mean monthly flow. As these values are mean values, the error in the value for the flow of any individual day may be much larger.

Excellent indicates that the mean monthly flow is probably accurate to within 5 per cent; good, to within 10 per cent; fair, to within 15 per cent; approximate, to within 25 per cent.

CONVENIENT EQUIVALENTS.

Following is a table 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-feet.
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.

FIELD METHODS OF MEASURING STREAM FLOW.

The methods used in collecting these data and in preparing them for publication are given in detail in Water-Supply Papers No. 94 (Hydrographic Manual, U. S. Geol. Survey) and No. 95 (Accuracy of Stream Measurements). In order that those who use this report may readily become acquainted with the general methods employed, the following brief descriptions are given:

Streams may be divided, with respect to their physical conditions, into three classes: (1) Those with permanent beds; (2) those with beds which change only during extreme low or high water; and (3) those with constantly shifting beds. In determining the daily flow special methods are necessary for each class. The data on which the determinations are based and the methods of collecting them are, however, in general the same.

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, (3) by measurements of the velocity of the current and of the area of the cross section. The method chosen for any case 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.

Weir method.—When funds are available and the conditions are such that sharp-crested weirs can be erected, these offer the best facilities for determining flow. If dams are suitably situated and constructed, they may be utilized for obtaining reliable measurements of flow. The conditions necessary to insure good results may be divided into two classes: (1) Those relating to the physical characteristics of the dam itself, and (2) those relating to the diversion and use of water around and through the dam.

The physical requirements are as follows: (*a*) Sufficient height of dam, so that backwater will not interfere with free fall over it; (*b*) absence of leaks of appreciable magnitude; (*c*) topography or abutments which confine the flow over the dam at high stages; (*d*) level crests which are kept free from obstructions caused by floating logs or ice; (*e*) crests of a type for which the coefficients to be used in $Q = c\ b\ h^{\frac{3}{2}}$, or some similar standard weir formula, are known (see Water-Supply Papers Nos. 180 and 200[a]); (*f*) either no flashboards or exceptional care in reducing leakage through them and in recording their condition.

Preferably there should be no diversion of water through or around the dam. Generally, however, the dam is built for purposes of power or navigation, and part or all of the water flowing past it is diverted for such uses. This water is measured and added to that passing over the dam. To insure accuracy in such determinations of flow, the amount of water diverted should be reasonably constant. Furthermore, it should be so diverted that it can be measured, either by a weir, a current meter, or a simple system of water wheels which are of standard make, or which have been rated as meters under working conditions and so installed that the gate openings, the heads under which they work, and their angular velocities may be accurately observed.

The combination of physical conditions and uses of the water should be such that the determinations of flow will not involve, for a critical stage of considerable duration, the use of a head on a broad-crested dam of less than 6 inches. Moreover, when all other conditions are good, the cooperation of the owners or operators of the plant is still essential if reliable results are to be obtained.

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[a] Water-Supply Paper No. 200 replaces No. 150, the edition of which has been exhausted.

A gaging station at a weir or dam has the general advantage of continuity of record through the period of ice and floods and the disadvantages of uncertainty of coefficient to be used in the weir formula and of complications in the diversion and use of the water.

Velocity method.—The determination of the quantity of water flowing past a certain section of a stream at a given time is termed a discharge measurement. This quantity is the product of two factors—the mean velocity and the area of the cross section. The mean velocity is a function of surface slope, wetted perimeter, roughness of bed, and the channel conditions at, above, and below the gaging section. The area depends on the contour of the bed and the fluctuations of the water surface. The two principal ways of measuring the velocity of a stream are by floats and current meters.

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. Their essential requirements are practically the same, whether the velocity is determined by meters or floats. They are located, as far as possible, where the channel is straight both above and below the gaging section; where there are no cross currents, backwater, or boils; where the bed of the stream is reasonably free from large projections of a permanent character, and where the banks are high and subject to overflow only at flood stages. The station must be so far removed from the effects of tributary streams and of dams or other artificial obstructions that the gage height shall be an index of the discharge.

Certain permanent or semipermanent structures, usually referred to as "equipment," are generally pertinent to a gaging station. These are a gage for determining the fluctuations of the water surface, bench marks to which the datum of the gage is referred, permanent marks on a bridge or a tagged line indicating the points of measurement, and, where the current is swift, some appliance (generally a secondary cable) to hold the meter in position in the water. As a rule the stations are located at bridges if the channel conditions are satisfactory, as from them the observations can more readily be made and the cost of the equipment is small.

The floats in common use are the surface, subsurface, and tube or rod floats. A corked bottle with a flag in the top and weighted at the bottom makes one of the most satisfactory surface floats, as it is affected but little by wind. In case of flood measurements good results can be obtained by observing the velocity of floating cakes of ice or débris. In case of all surface-float measurements coefficients must be used to reduce the observed velocity to the mean velocity. The subsurface and tube or rod floats are intended to give directly the mean velocity in the vertical. Tubes give excellent results when the channel conditions are good, as in canals.

In measuring velocity by a float, observation is made of the time taken by the float to pass over the "run," a selected stretch of river from 50 to 200 feet long. In each discharge measurement a large number of velocity determinations are made at different points across the stream, and from these observations the mean velocity for the whole section is determined. This may be done by plotting the mean positions of the floats, as indicated by the distances from the bank, as ordinates and the corresponding times as abscissas. A curve through these points shows the mean time of run at any point across the stream, and the mean time for the whole stream is obtained by dividing the area bounded by this curve and its axis by the width. The length of the run divided by the mean time gives the mean velocity.

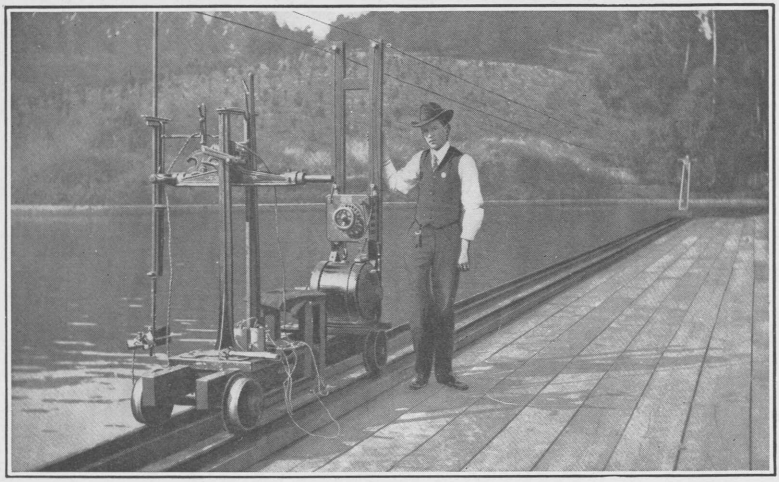
The area used in float measurements is the mean of the areas at the two ends of the run and at several intermediate sections.

The essential parts of the current meters in use are a wheel of some type, so constructed that the impact of flowing water causes it to revolve, and a device for recording or indicating the number of revolutions. The relation between the velocity of the moving water and the revolutions of the wheel is determined for each meter. This rating is done by drawing the meter through still water for a given distance at different speeds and noting the number of revolutions for each run. From these data a rating table is prepared which gives the velocity per second for any number of revolutions.

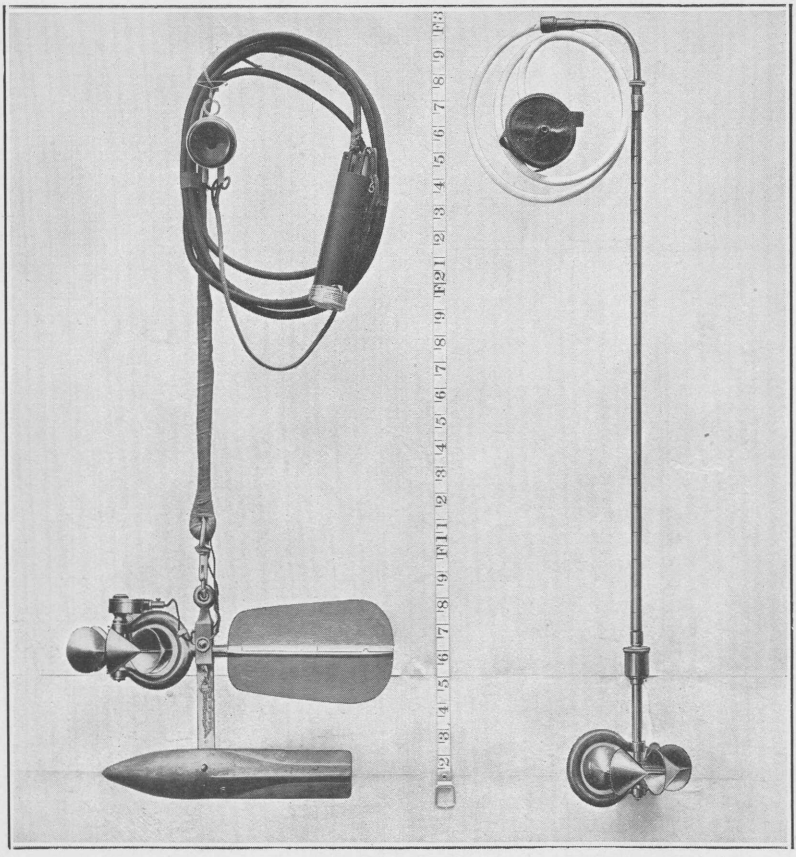
Many kinds of current meters have been constructed. They may, however, be classed in two general types—those in which the wheel is made up of a series of cups, as the Price, and those having a screw-propeller wheel, as the Haskell. Each meter has been developed for use under some special condition. In the case of the small Price meter, shown in Pl. II, *B*, which has been largely developed and extensively used by the United States Geological Survey, an attempt has been made to get an instrument which could be used under practically all conditions.

Current-meter measurements may be made from a bridge, cable, boat, or by wading, and gaging stations may be classified in accordance with such use. Fig. 1 shows a typical cable station.

In making the measurement an arbitrary number of points are laid off on a line perpendicular to the thread of the stream. The points at which the velocity and depth are observed are known as measuring points, and are usually fixed at regular intervals, varying from 2 to 20 feet, depending on the size and condition of the stream. Perpendiculars dropped from the measuring points divide the gaging section into strips. For each strip or pair of strips the mean velocity, area, and discharge are determined independently, so that conditions existing



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



B. PRICE CURRENT METERS.

in one part of the stream may not be extended to parts where they do not apply.

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

The three principal multiple-point methods in general use are the vertical velocity-curve; 0.2 and 0.8 depth; and top, bottom, and mid-depth.

In the vertical velocity-curve method a series of velocity determinations are made in each vertical at regular intervals, usually from 0.5 to 1 foot apart. By plotting 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. On account of the length of time required to

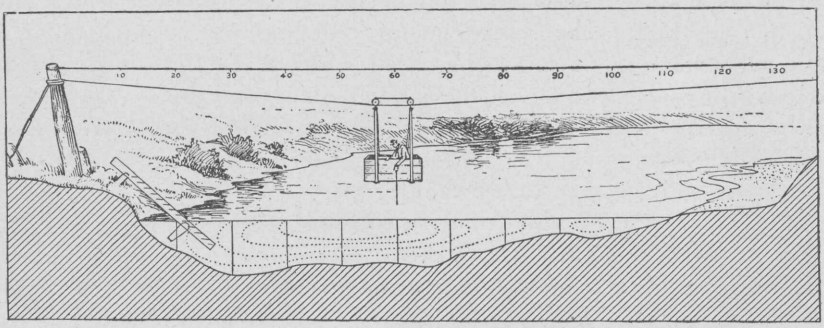


FIG. 1.—Cable station, showing section of river, car, gage, etc.

make a complete measurement by this method, its use is 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 of the depth, and the mean of the velocities at these two points is taken as the mean velocity for that vertical. 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 of the depth will give (closely) the mean velocity in the vertical. Actual observations under a wide range of conditions show that this second multiple-point method gives the mean velocity very closely for open-water conditions, and moreover the indications are that it holds nearly as well for ice-covered rivers.

In the third multiple-point method the meter is held at mid-depth, at 0.5 foot below the surface, and at 0.5 foot above the bottom, and the mean velocity is determined by dividing by 6 the sum of the top

velocity, four times the mid-depth velocity, and the bottom velocity. This method may be modified by observing at 0.2, 0.6, and 0.8 depth.

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.

Extensive experiments by vertical velocity-curves show that the thread of mean velocity generally occurs at from 0.5 to 0.7 of the total depth. In general practice the thread of mean velocity is considered to be at 0.6 depth, at which point the meter is held in a majority of the measurements. 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.

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 from 0.85 to 0.95, depending on the stage, velocity, and channel conditions. The higher the stage the larger the coefficient. This method is specially adapted for flood measurements, or when the velocity is so great that the meter can not be kept at 0.6 depth.

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.

The area, which is the other factor in the velocity method of determining the discharge of a stream, depends on the stage of the river, which is observed on the gage, and on the general contour of the bed of the stream, which is determined by soundings. The soundings are usually taken at each measuring point at the time of the discharge measurement, either by using the meter and cable or by a special sounding line or rod. For streams with permanent beds standard cross sections are usually taken during low water. These sections serve to check the soundings which are taken at the time of the measurements, and from them any change which may have taken place in the bed of the stream can be detected. They are also of value in obtaining the area for use in computations of high-water measurements, as accurate soundings are hard to obtain at high stages.

In computing the discharge measurements from the observed velocities and depths at various points of measurement, the measuring section is divided into elementary strips, as shown in fig. 1, and the mean velocity, area, and discharge are determined separately for either

a single or a double strip. The total discharge and the area are the sums of those for the various strips, and the mean velocity is obtained by dividing the total discharge by the total area.

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 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, the thickness and character of the ice, etc.

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 No. 187.

OFFICE METHODS OF COMPUTING RUN-OFF.

There are two principal methods of determining run-off, depending on whether or not the bed of the stream is permanent.

For stations on streams with permanent beds the first step in computing the run-off is the construction of a rating table, which shows the discharge corresponding to any stage of the stream. This rating table is applied to the record of stage to determine the amount of water flowing. The construction of the rating table depends on the method used in measuring flow.

For a station at a weir or dam the basis for the rating table is some standard weir formula. The coefficients to be used in its application depend on the type of dam and other conditions near its crest. After inserting in the weir formula the measured length of crest and the assumed coefficient the discharge is computed for various heads and the rating table constructed.

The data necessary for the construction of a rating table for a velocity-area station are the results of the discharge measurements, which include the record of stage of the river at the time of measurement, the area of the cross section, the mean velocity of the current, and the quantity of water flowing. A thorough knowledge of the conditions at and in the vicinity of the station is also necessary.

The construction of the rating table depends on the following laws of flow for open, permanent channels: (1) The discharge will remain constant so long as conditions at or near the gaging station remain constant; (2) the discharge will be the same whenever the stream is at a given stage if the change of slope due to the rise and fall of the stream be neglected; (3) the discharge is a function of and increases gradually with the stage.

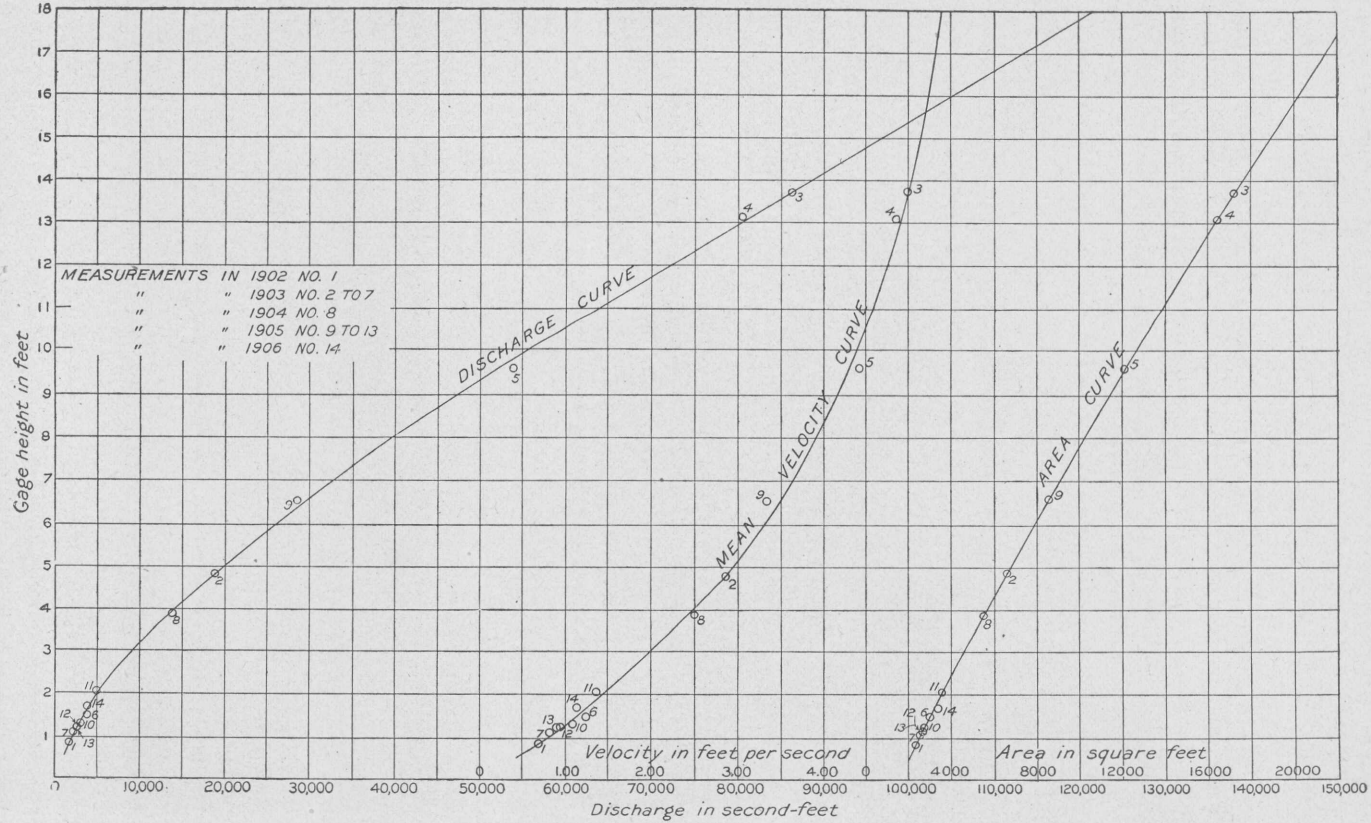


FIG. 2.—Discharge, area, and mean-velocity curves for Potomac River at Point of Rocks, Md.

The plotting of results of the various discharge measurements, using gage heights as ordinates, and discharge, mean velocity, and area as abscissas, will define curves which show the discharge, mean velocity, and area corresponding to any gage height. For the development of these curves there should be, therefore, a sufficient number of discharge measurements to cover the range of the stage of the stream. Fig. 2 shows a typical rating curve with its corresponding mean-velocity and area curves.

As the discharge is the product of two factors, the area and the mean velocity, any change in either factor will produce a corresponding change in the discharge. Their curves are therefore constructed in order to study each independently of the other.

The area curve can be definitely determined from accurate soundings extending to the limits of high water. It is always concave toward the horizontal axis or on a straight line, unless the banks of the stream are overhanging.

The form of the mean-velocity curve depends chiefly on the surface slope, the roughness of the bed, and the cross section of the stream. Of these, the slope is the principal factor. In accordance with the relative changes of these factors the curve may be either a straight line, convex or concave toward either axis, or a combination of the three. From a careful study of the conditions at any gaging station the form which the vertical velocity-curve will take can be predicted, and it may be extended with reasonable certainty to stages beyond the limits of actual measurements. Its principal use is in connection with the area curve in locating errors in discharge measurements and in constructing the rating table.

The discharge curve is defined primarily by the measurements of discharge, which are studied and weighted in accordance with the local conditions existing at the time of each measurement. The curve may, however, best be located between and beyond the measurements by means of curves of area and mean velocity. The discharge curve under normal conditions is concave toward the horizontal axis and is generally parabolic in form.

In the preparation of the rating table the discharge for each tenth or half tenth on the gage is taken from the curve. The differences between successive discharges are then taken and adjusted according to the law that they shall either be constant or increasing.

The determination of daily discharge of streams with changeable beds is a difficult problem. In case there is a weir or dam available, a condition which seldom exists on streams of this class, the discharge can be determined by its use. In case of velocity-area stations frequent discharge measurements must be made if the determinations of flow are to be other than rough approximations. For stations with beds which shift slowly or are materially changed only during floods

rating tables can be prepared for periods between such changes and satisfactory results obtained with a limited number of measurements, provided that some of them are taken soon after the change occurs. For streams with continually shifting beds, such as the Colorado and Rio Grande, discharge measurements should be made every two or three days and the discharges for intervening days obtained either by interpolation modified by gage height or by Professor Stout's method, which has been described in full in the Nineteenth Annual Report of the United States Geological Survey, Part IV, page 323, and in the Engineering News of April 21, 1904. This method, or a graphical application of it, is also much used in determining the flow at stations where the bed shifts but slowly.

COOPERATION AND ACKNOWLEDGMENTS.

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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. Its western border is the Sierra Nevada, its northern the Columbia plateaus, its eastern the Rocky Mountains and the Colorado plateaus, while its 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, which are separated by broad valleys varying considerably in altitude. In the southern part the valleys are low, Death Valley being below sea level,

while in the north the valleys have a general elevation of from 4,000 to 5,000 feet. The intervening highlands often 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. With the exception of 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 Sierras, 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 a few favored spots where irrigation is practiced, the region in general is a desert. Over the larger part of the area the annual precipitation is less than 10 inches, but it is greater on the bordering high lands, especially on the Sierra Nevada, where it is over 40 inches. 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 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 possibly to 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 1906 are given in the following pages.

WASATCH MOUNTAINS DRAINAGE.

PRINCIPAL STREAMS.

The Wasatch Mountains drainage area includes the western half of Utah and small portions of Idaho and Wyoming. The headwaters of the various streams lie either in the Wasatch Mountains or in the plateaus to the south, and they drain either 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 watersheds, but in the mountain courses maintain perennial flows. On reaching the main valley they are extensively 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 OF BASIN.

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 again 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 they are generally short and confined to steep, narrow canyons. There are no marshes, extensive meadows, or forests, but a few small lakes lie near the head of the river. Numerous small springs and the melting snow which comprises the greater part of the precipitation are the chief sources of supply. 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, narrow canyon, with occasional small, 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 is a sluggish stream, traversing the west side of Cache Valley in a well-defined channel, which 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. The former has its source in the Bear River Range, and drains a rough country of limestone 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 about 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, being returned to the river at Collinston. From 10 to 30 second-feet reach 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.

BEAR LAKE AT FISHHAVEN, IDAHO.

This station was established October 5, 1903. It is located at Fishhaven, Idaho, on the west shore of Bear Lake, about 4 miles north of the Idaho-Utah State line. It is on land used as a summer resort, owned by G. C. Gray, of Montpelier, Idaho, and is immediately south of the summer resort known as Nelsons Camp. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 19.

Daily gage height, in feet, of Bear Lake at Fishhaven, Idaho, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1							17	1.9					
2						3.4	18						
3							19					3.3	
4							20						
5		1.9			3.0		21				2.8		
6							22						
7	1.85			2.4			23		2.0				3.5
8			2.05				24	1.9					
9						3.5	25						
10							26					3.4	
11							27						
12					3.2		28		2.0		2.8		
13							29						
14		1.95		2.6			30						3.5
15							31						
16						3.55							

BEAR RIVER AT DINGLE, IDAHO.

This station was established May 9, 1903. It is located in a cut made by the Oregon Short Line Railroad Company one-fourth mile east of the Dingle railroad station and about 250 feet south of the track. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 20, where are given also references to publications that contain data for previous years.

Discharge measurements of Bear River at Dingle, Idaho, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 25[a]	W. G. Swendsen	88	159	4.61	212
May 30	H. S. Kleinschmidt	122	609	7.40	2,690
August 17	Thos. Grieve, jr.	107	188	3.90	276

[a] Ice 1.2 feet thick at the gage.

Daily gage height, in feet, of Bear River at Dingle, Idaho, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	3.5	.....	5.5	5.0	7.55	5.45	4.3	4.4	4.0	4.0	4.2
2	.....	.....	.....	5.2	5.0	7.55	5.45	4.3	4.4	4.0	4.0	4.2
3	3.7	.....	.....	5.2	4.9	7.6	5.4	4.25	4.4	3.95	4.0	4.1
4	.....	3.4	4.4	5.2	4.9	7.6	5.3	4.2	4.4	3.95	4.0	4.0
5	.....	.....	.....	5.2	5.0	7.45	5.3	4.2	4.5	3.95	3.95	4.0
6	3.1	.....	.....	5.0	5.2	7.2	5.4	4.2	4.55	3.95	4.0	4.0
7	.....	3.1	.....	5.2	5.2	7.0	5.4	4.2	4.55	3.95	4.0	4.0
8	.....	.....	4.4	5.3	5.2	7.0	5.1	4.2	4.5	3.9	4.0	4.0
9	.....	.....	.....	5.0	5.2	6.95	5.1	4.2	4.4	3.9	4.0	4.0
10	3.3	3.4	.....	5.0	5.3	6.9	5.2	.....	4.4	3.9	4.0	4.0
11	.....	.....	.....	5.0	5.4	6.95	5.1	4.1	.....	3.9	4.0	4.0
12	.....	.....	4.6	5.1	5.55	6.8	5.1	4.05	4.25	3.9	4.0	4.05
13	.....	.....	.....	5.2	5.8	6.6	5.1	4.0	4.2	3.9	3.95	4.1
14	3.7	4.0	.....	5.1	6.0	6.55	5.2	4.0	4.2	3.9	4.0	4.05
15	.....	.....	.....	5.1	6.2	6.6	5.2	4.0	4.2	3.9	4.0	4.2
16	.....	.....	4.6	5.0	6.4	6.6	5.1	3.9	4.2	3.9	4.0	4.3
17	4.0	.....	.....	5.0	6.7	.....	5.3	.....	4.2	3.9	4.0	4.0
18	.....	.....	.....	5.0	6.7	6.75	5.2	3.9	4.2	3.9	3.95	4.2
19	.....	4.5	4.5	5.0	6.55	6.8	5.0	3.85	4.2	3.9	3.8	4.1
20	4.0	.....	.....	5.2	6.45	6.8	4.9	4.1	4.15	3.9	.....	4.1
21	.....	.....	.....	5.2	6.3	6.8	4.75	4.2	4.15	3.9	3.95	4.1
22	.....	4.6	4.6	5.2	6.3	6.8	4.7	4.3	4.15	3.9	4.5	4.1
23	3.8	.....	.....	5.3	6.25	6.7	4.7	4.5	4.1	3.9	4.1	4.2
24	.....	.....	.....	5.3	6.3	6.5	4.7	4.4	4.1	3.8	.....	4.0
25	.....	4.6	4.7	5.3	6.45	6.3	4.5	4.45	4.1	3.85	4.2	4.2
26	.....	.....	.....	5.3	6.6	6.15	4.5	4.6	4.0	3.9	4.2	4.1
27	.....	.....	.....	5.3	6.8	6.1	4.5	4.65	.....	3.95	3.9	4.1
28	3.65	4.6	4.4	5.25	7.0	5.95	4.5	4.6	4.0	3.9	3.85	4.1
29	.....	.....	.....	5.2	7.2	5.7	4.4	4.5	4.0	3.9	3.9	4.1
30	.....	.....	5.6	5.1	7.4	5.6	4.3	4.45	4.0	3.95	4.0	4.1
31	.....	.....	5.65	.....	7.5	.....	4.3	4.4	.....	4.0	.....	.....

NOTE.—Ice conditions January 1 to March 30 and November 22 to December 31. Ice thicknesses were recorded as follows:

Thickness of ice.

Date.	Thickness.	Date.	Thickness.
	Feet.		*Feet.*
January 10, 17, and 20	0.8	February 25 and 28	1.2
January 23	1.0	March 4, 8, 12, 16, and 19	1.0
January 28	.9	March 22 and 25	.8
February 1	.8	March 28	.6
February 4	1.0	March 30	(a)
February 7	1.1	November 22	(a)
February 10 and 14	1.2	December 23	(b)
February 19 and 22	1.0		

[a] Ice gorged.

[b] Ice 0.5 foot thick.

Rating table for Bear River at Dingle, Idaho, for 1904–1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.10	60	3.90	260	4.70	590	5.50	1,020	6.60	1,910
3.20	75	4.00	295	4.80	635	5.60	1,085	6.80	2,090
3.30	90	4.10	330	4.90	685	5.70	1,155	7.00	2,275
3.40	110	4.20	370	5.00	740	5.80	1,230	7.20	2,455
3.50	135	4.30	410	5.10	790	5.90	1,300	7.40	2,635
3.60	160	4.40	455	5.20	840	6.00	1,375	7.60	2,815
3.70	190	4.50	495	5.30	895	6.20	1,550	7.80	2,995
3.80	225	4.60	540	5.40	955	6.40	1,730	8.00	3,175

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 13 discharge measurements made during 1903–1906, and is well defined between gage heights 3.50 feet and 7.40 feet. Above gage height 6.10 feet the rating curve is a tangent, the difference being 90 per tenth.

Monthly discharge of Bear River at Dingle, Idaho, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
April	1,020	740	825	49,100
May	2,720	685	1,480	91,000
June	2,820	1,080	2,050	122,000
July	988	410	732	45,000
August	565	242	385	23,700
September	517	295	389	23,100
October	295	225	266	16,400
November 1–21	295	225	287	12,000
The period				382,000

BEAR RIVER NEAR PRESTON, IDAHO.

This station was established October 11, 1889. It is located about 6 miles from Preston, Idaho, 10 miles north of the Idaho-Utah boundary line and about 300 feet below the county road crossing at the old bridge of the Oregon Short Line Railroad. The data collected at this station are of extreme importance as showing the amount of water that passes from Idaho into Utah and will be of great value in the final adjudication of water rights on the stream. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 22, where are given also references to publications that contain data for previous years.

Discharge measurements of Bear River near Preston, Idaho, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 24	W. G. Swendsen	184	320	1.27	584
April 12	H. S. Kleinschmidt	198	695	3.41	2,450
May 23	Thos. Grieve, jr	201	772	3.79	3,110
July 28	do	191	397	1.54	687

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

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.40	1.25	2.70	3.20	4.45	2.78	1.38	1.85	1.30	1.30	1.30
2	.....	1.35	1.20	2.70	3.12	4.40	2.68	1.30	1.85	1.05	1.55	1.55
3	.....	1.35	1.20	2.55	2.95	4.40	2.58	1.28	1.85	1.04	1.55	1.36
4	.....	1.30	1.20	2.50	3.00	4.42	2.52	1.22	1.80	1.04	1.55	1.07
5	.....	1.40	1.20	2.58	3.00	4.48	2.50	1.20	1.80	1.04	1.55	1.07
6	2.90	1.35	1.22	2.62	2.95	4.70	2.42	1.15	1.75	1.04	1.55	1.07
7	.....	1.52	1.22	2.90	2.90	4.68	3.32	1.10	1.75	1.04	1.55	1.07
8	.....	1.68	1.25	3.35	2.90	4.58	2.22	1.10	1.75	1.24	1.55	1.07
9	.....	1.40	1.30	3.42	2.90	4.50	2.30	1.05	1.75	1.45	1.55	1.07
10	.....	1.20	1.30	3.60	2.90	4.48	2.28	1.00	1.75	1.45	1.55	1.07
11	.....	1.12	1.30	3.60	2.90	4.38	2.22	1.00	1.75	1.24	1.55	1.07
12	3.00	1.05	1.30	3.40	2.90	4.25	2.18	1.00	1.70	1.04	1.55	1.07
13	.....	1.05	1.30	3.40	3.28	4.12	2.10	.95	1.65	1.04	1.55	1.07
14	.....	1.05	1.30	3.52	3.40	4.05	2.10	.90	1.68	1.04	1.55	1.07
15	.....	1.05	1.30	3.65	3.82	4.00	2.10	.90	1.70	1.04	1.55	1.07
16	.....	1.12	1.30	3.70	3.88	3.95	2.08	.85	1.60	1.04	1.55	1.07
17	.....	1.20	1.35	3.82	3.80	3.85	2.00	.85	1.06	1.04	1.55	1.07
18	.....	1.20	1.35	3.72	3.80	3.80	1.95	.85	1.06	1.04	1.07	1.07
19	.....	1.38	1.60	3.70	3.80	3.72	1.88	.85	1.30	1.04	1.07	1.07
20	1.60	1.35	1.60	3.62	3.80	3.68	1.80	.85	1.55	1.04	1.07	1.07
21	1.60	1.35	1.40	3.60	3.80	3.52	1.75	.90	1.55	1.04	1.07	1.07
22	1.62	1.30	1.40	3.52	3.80	3.32	1.70	.95	1.30	1.04	1.07	1.07
23	1.35	1.25	1.55	3.50	3.80	3.30	1.65	1.02	1.05	1.04	1.07	1.07
24	1.30	1.25	1.90	3.50	3.85	3.30	1.60	1.05	1.05	1.04	1.07	1.07
25	1.25	1.25	2.25	3.45	4.00	3.32	1.60	1.06	1.05	1.04	1.07	1.07
26	1.30	1.25	2.15	3.42	4.20	3.28	1.60	1.68	1.05	1.04	1.07	1.75
27	1.35	1.25	1.90	3.40	4.42	3.18	1.60	1.72	1.05	1.04	1.07	1.08
28	1.40	1.25	1.92	3.32	4.52	3.08	1.58	1.78	1.05	1.04	1.05	1.75
29	1.30	.....	1.95	3.20	4.50	2.98	1.52	1.85	1.55	1.04	1.05	1.41
30	1.28	.....	1.98	3.20	4.60	2.88	1.48	1.85	1.55	1.04	1.05	1.36
31	1.40	.....	2.20	.....	4.52	.....	1.40	1.85	.....	1.04	.....	1.65

NOTE.—River frozen January 1 to 19, February 7 to 10, and November 18 to 27. January 13 the ice was 1.15 feet thick, and the stream was nearly filled with needle ice.

Rating table for Bear River near Preston, Idaho, for 1905–6.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.50	158	1.20	418	1.90	855	2.60	1,510	3.60	2,840
.60	186	1.30	468	2.00	935	2.70	1,630	3.80	3,150
.70	217	1.40	522	2.10	1,020	2.80	1,750	4.00	3,470
.80	251	1.50	580	2.20	1,110	2.90	1,870	4.20	3,800
.90	288	1.60	642	2.30	1,205	3.00	1,990	4.40	4,140
1.00	328	1.70	708	2.40	1,300	3.20	2,260	4.60	4,480
1.10	371	1.80	779	2.50	1,400	3.40	2,540		

NOTE.—The above table is applicable only for open-channel conditions. It is based upon discharge measurements made during 1904–1906, and is well defined.

Monthly discharge of Bear River near Preston, Idaho, for 1906.

[Drainage area, 4,500 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January 20-31	655	443	523	12,400	0.116	0.05
February	695	350	459	25,500	.102	.11
March	1,160	418	607	37,300	.135	.16
April	3,180	1,400	2,430	145,000	.540	.60
May	4,480	1,870	2,870	176,000	.638	.74
June	4,650	1,850	3,350	199,000	.744	.83
July	2,430	522	1,020	62,700	.227	.26
August	817	270	428	26,300	.095	.11
September	817	350	603	35,900	.134	.15
October	551	345	368	22,600	.082	.09
November	611	350	496	29,500	.110	.12
December	744	358	420	25,800	.093	.11
The period	4,650	270	1,180	798,000	.262	3.33

NOTE.—The open-channel rating was applied to the frozen periods without correction, and the above values are liable to further error during the winter period owing to uncertainty regarding the ice conditions.

BEAR RIVER NEAR COLLINSTON, UTAH.

This station was established July 1, 1889. It is located 6 miles from Collinston station on the Oregon Short Line Railroad, about one-fourth mile below the electric-power plant in Bear River Canyon, and is at the lower end of the canyon separating Cache and Great Salt Lake valleys, at a point below all diversion from the stream. It shows the amount of unappropriated water that is discharged as waste into Great Salt Lake. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 25, where are given also references to publications that contain data for previous years.

Discharge measurements of Bear River near Collinston, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 22	W. G. Swendsen	272	598	2.05	1,490
May 23	Thos. Grieve, jr	288	1,120	4.30	4,420
June 20	do	290	1,180	4.35	4,660
July 26	do	268	305	1.25	621

Daily gage height, in feet, of Bear River near Collinston, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.35	1.4	1.85	3.05	3.8	5.75	3.15	.....	2.1	.....	.....	1.9
2	.....	1.45	1.75	3.4	3.75	5.85	3.0	.....	.....	.....	.....	.....
3	1.4	1.45	1.7	3.5	3.5	5.55	2.85	.....	.....	.....	1.85	.....
4	1.4	1.45	1.6	3.25	3.8	5.45	2.7	.....	.....	.....	.....	.....
5	1.4	1.45	1.65	3.05	3.55	5.5	2.55	.....	.....	.....	.....	.....
6	.....	1.5	1.65	3.1	3.6	5.5	2.45	.....	.....	1.65	.....	.....
7	1.3	1.4	1.7	3.2	3.65	5.5	2.3	.....	.....	.....	.....	.....
8	1.2	1.35	1.7	3.25	3.55	5.55	2.1	.....	1.95	.....	.....	2.1
9	1.2	1.35	1.75	3.55	3.55	5.6	1.95	.....	.....	.....	.....	.....
10	1.15	1.4	1.8	3.85	3.55	5.45	1.85	.....	.....	.....	1.9	.....
11	1.2	1.4	1.95	3.85	3.6	5.3	2.1	.....	.....	.....	.....	.....
12	1.25	1.45	1.95	4.05	3.6	5.1	1.95	.....	.....	.....	.....	.....
13	1.25	1.45	2.55	3.95	3.7	4.95	1.9	.....	.....	1.65	.....	.....
14	1.3	1.5	2.7	3.85	3.95	4.9	1.8	.....	.....	.....	.....	.....
15	1.35	1.6	2.3	3.85	4.1	4.85	1.75	.....	2.25	.....	.....	2.05
16	.....	1.8	.....	3.9	4.3	4.75	1.7	.....	.....	.....	.....	.....
17	1.3	2.0	1.85	4.0	4.5	4.75	1.65	.....	.....	.....	1.95	.....
18	.....	.....	1.8	4.15	4.5	4.7	1.55	.....	.....	.....	.....	.....
19	1.2	.....	1.8	4.25	4.45	4.5	1.55	.....	.....	.....	.....	.....
20	1.15	.....	1.8	4.25	4.35	4.35	1.55	.....	.....	1.7	.....	.....
21	1.15	2.15	1.8	4.2	4.25	4.15	1.5	.....	.....	.....	.....	.....
22	1.8	2.1	1.85	4.15	4.25	3.95	.....	.....	1.8	.....	.....	2.0
23	1.65	2.0	2.1	4.1	4.2	3.85	.....	2.3	.....	.....	.....	.....
24	1.6	1.95	2.45	4.2	4.2	3.65	.....	.....	.....	.....	1.75	.....
25	1.55	1.95	3.3	4.25	4.25	3.5	.....	2.2	.....	.....	.....	.....
26	1.6	1.9	3.8	4.3	4.35	3.45	1.25	.....	.....	.....	.....	.....
27	1.75	1.8	3.55	4.25	4.4	3.35	.....	.....	.....	1.8	.....	.....
28	1.5	1.8	3.3	4.05	4.7	3.3	.....	.....	.....	.....	.....	.....
29	1.45	.....	3.05	3.75	4.95	3.25	.....	.....	1.65	.....	.....	2.25
30	1.4	.....	2.9	3.55	5.25	3.15	.....	.....	.....	.....	.....	.....
31	1.4	.....	2.9	.....	5.55	.....	.....	.....	.....	.....	.....	.....

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

Rating table for Bear River near Collinston, Utah, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.10	550	1.90	1,315	2.70	2,190	3.50	3,250	4.60	4,960
1.20	620	2.00	1,420	2.80	2,300	3.60	3,390	4.80	5,300
1.30	705	2.10	1,530	2.90	2,420	3.70	3,530	5.00	5,640
1.40	805	2.20	1,640	3.00	2,550	3.80	3,670	5.20	5,980
1.50	905	2.30	1,750	3.10	2,690	3.90	3,820	5.40	6,320
1.60	1,005	2.40	1,860	3.20	2,830	4.00	3,980	5.60	6,660
1.70	1,105	2.50	1,970	3.30	2,970	4.20	4,300	5.80	7,000
1.80	1,210	2.60	2,080	3.40	3,110	4.40	4,620	.....	.....

NOTE.—The above table is applicable only for open-channel conditions. It is based upon discharge measurements made during 1904–1906, and is well defined.

Monthly discharge of Bear River near Collinston, Utah, for 1906.

[Drainage area, 6,000 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	1,210	585	783	48,100	0.130	0.15
February	1,580	755	1,100	61,100	.183	.19
March	3,670	1,000	1,700	105,000	.283	.33
April	4,460	2,620	3,700	220,000	.617	.69
May	6,580	3,250	4,210	259,000	.702	.81
June	7,080	2,760	5,090	303,000	.848	.95
July 1–21	2,760	905	1,530	63,700	.255	.20
The period	.....	.....	.....	1,060,000	.....	.....

NOTE.—Values for January and February may be slightly affected by ice.

LOGAN RIVER NEAR LOGAN, UTAH.

Logan River rises on the west slope of 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. 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 stream has numerous small tributaries, all short and swift. Temple Fork and South Fork, which enter the river about 10 and 15 miles, respectively, above the gaging station, are perennial streams and furnish from one-third to one-fourth of the total flow. Blacksmith Fork comes in below the gaging station. There is no storage on the stream at present. The entire flow, after being utilized to furnish power at two electric plants near the mouth of the canyon, is used 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. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 28, where are given also references to publications that contain data for previous years.

About May 1, 1906, this station was moved by the Telluride Power Company to a point about 400 feet downstream. The gage is a 4 by 6 inch timber graduated to feet and tenths. It is set in an inclined position and is directly under the cable.

The description of the channel conditions, etc., is practically the same as given for the old station.

Discharge measurements of Logan River, near Logan, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1906.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 23	W. G. Swendsen	39	46.5	1.83	102
April 11	H. S. Kleinschmidt	67	68.0	2.24	244
May 5	do	46	95.0	2.80	587
May 23	Thos. Grieve, jr	60	130	3.27	779
June 21	do	63	130	3.30	779
July 27	do	48	77.4	2.53	268

Daily gage height, in feet, of Logan River near Logan, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.80	1.83	1.82	2.05	2.45	3.45	3.10	2.43	2.33	2.19	2.10	2.15
2	1.75	1.85	1.83	2.02	2.48	3.40	3.10	2.40	2.33	2.20	2.08	2.10
3	1.85	1.84	1.80	1.97	2.60	3.40	3.10	2.40	2.33	2.30	2.10	2.15
4	1.85	1.75	1.85	1.93	2.70	3.42	3.08	2.40	2.32	2.22	2.05	2.25
5	1.85	1.82	1.79	1.85	2.78	3.42	3.02	2.38	2.31	2.20	2.08	2.20
6	1.83	1.75	1.74	2.04	2.80	3.50	3.00	2.88	2.30	2.15	2.20	2.15
7	1.83	1.72	1.75	2.09	2.78	3.42	2.90	2.35	2.30	2.15	2.10	2.15
8	1.83	1.78	1.78	2.15	2.85	3.40	2.80	2.35	2.30	2.20	2.00	2.15
9	1.86	1.84	1.78	2.20	2.98	3.38	2.85	2.32	2.29	2.20	2.00	2.15
10	1.89	1.84	1.79	2.20	3.02	3.35	2.90	2.32	2.28	2.20	2.10	2.15
11	1.85	1.66	1.80	2.22	3.10	3.40	2.83	2.32	2.25	2.15	2.00	2.15
12	1.90	1.82	1.80	2.20	3.18	3.52	2.80	2.32	2.25	2.15	2.00	2.15
13	1.83	1.84	1.90	2.20	3.08	3.55	2.80	2.32	2.25	2.13	2.10	2.15
14	1.85	1.85	1.80	2.21	3.08	3.57	2.75	2.48	2.25	2.13	2.30	2.15
15	1.70	1.85	1.85	2.20	3.10	3.60	2.70	2.30	2.28	2.10	2.30	2.10
16	1.83	1.86	1.73	2.23	3.00	3.60	2.70	2.28	2.23	2.00	2.00	2.10
17	1.86	1.85	1.73	2.32	2.90	3.55	2.70	2.28	2.23	2.05	2.10	2.10
18	1.88	1.85	1.77	2.45	2.85	3.50	2.65	2.25	2.23	2.05	1.90	2.10
19	1.93	1.86	1.79	2.42	2.87	3.45	2.60	2.28	2.21	2.20	1.90	2.15
20	2.08	1.77	1.79	2.45	3.00	3.42	2.60	2.30	2.20	2.00	2.00	2.20
21	1.70	1.78	1.80	2.45	3.03	3.40	2.58	2.55	2.20	2.00	2.00	2.15
22	1.73	1.79	1.80	2.52	3.10	3.40	2.55	2.60	2.30	2.10	2.10	2.15
23	1.90	1.83	1.81	2.47	3.13	3.38	2.55	2.45	2.30	2.20	2.05	2.10
24	1.85	1.74	1.81	2.48	3.40	3.35	2.52	2.43	2.22	2.50	2.10	2.10
25	1.83	1.85	1.93	2.55	3.41	3.20	2.52	2.39	2.21	2.20	2.20	2.10
26	1.83	1.80	1.93	2.47	3.40	3.18	2.50	2.38	2.21	2.20	2.20	2.20
27	1.83	1.84	1.93	2.40	3.60	3.20	2.50	2.38	2.21	2.20	2.20	2.15
28	1.85	1.81	1.90	2.38	3.80	3.22	2.48	2.37	2.19	2.20	2.20	2.20
29	1.80	.....	1.93	2.37	3.70	3.15	2.45	2.35	2.18	2.15	2.20	2.15
30	1.79	.....	2.00	2.42	3.55	3.13	2.45	2.34	2.20	2.20	2.15	2.15
31	1.80	.....	2.00	.....	3.50	.....	2.45	2.33	.....	2.10	.....	.....

NOTE.—Stream does not freeze at this point during winter months; 5 second-feet were flowing into the river from the canal November 14 to December 31.

Rating table for Logan River near Logan, Utah, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.60	30	2.10	194	2.60	410	3.10	672	3.60	964
1.70	60	2.20	232	2.70	460	3.20	728	3.70	1,026
1.80	92	2.30	274	2.80	510	3.30	786	3.80	1,088
1.90	124	2.40	318	2.90	562	3.40	844		
2.00	158	2.50	362	3.00	616	3.50	904		

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 6 discharge measurements made during 1906 and is fairly well defined.

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

[Drainage area, 218 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	187	60	104	6,400	0.477	0.55
February	111	66	95	5,280	.436	.45
March	158	70	102	6,270	.468	.54
April	386	108	263	15,600	1.21	1.35
May	1,090	340	663	40,800	3.04	3.50
June	964	689	843	50,200	3.87	4.32
July	672	340	476	29,300	2.18	2.51
August	552	253	312	19,200	1.43	1.65
September	287	224	256	15,200	1.17	1.30
October	362	158	218	13,400	1.00	1.15
November	274	124	193	11,500	.885	.99
December	253	194	212	13,000	.972	1.12
The year	1,090	60	311	226,000	1.43	19.43

These discharges do not include the flow of Logan, Hyde Park, and Smithfield canal, which diverts water above the station.

BLACKSMITH FORK NEAR HYRUM, UTAH.

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

The gaging station was established July 19, 1900, near the tollgate in the mouth of the canyon near Hyrum, Utah, which is the nearest post-office. The station was discontinued December 31, 1902, and reestablished May 16, 1904, about 1,000 feet downstream from the tollgate and 800 feet above the Hyrum city electric-power plant. A station is also maintained at the power-plant race. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 31, where are given also references to publications contain data for previous years.

Discharge measurements of Blacksmith Fork near Hyrum, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1906.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 18	W. G. Swendsen	32.5	21.6	3.33	35
May 5	H. S. Kleinschmidt	40	54.7	4.08	184
May 23	Thos. Grieve, jr	40	51.3	3.90	150
June 21	do	39	46.6	3.85	116
July 22	do	38	37.4	3.59	72

Daily gage height, in feet, of Blacksmith Fork near Hyrum, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.3	3.3	3.4	3.5	3.9	4.4	3.7	3.6	3.6	3.5	3.4	3.3
2	3.3	3.3	3.4	3.4	3.9	4.4	3.7	3.6	3.6	3.5	3.4	3.3
3	3.3	3.4	3.3	3.4	3.9	4.3	3.7	3.6	3.6	3.5	3.4	3.3
4	3.4	3.4	3.3	3.4	4.1	4.2	3.7	3.6	3.6	3.5	3.4	3.3
5	3.4	3.3	3.3	3.4	4.1	4.1	3.7	3.6	3.5	3.5	3.4	3.3
6	3.4	3.3	3.3	3.4	4.1	4.2	3.7	3.6	3.5	3.5	3.4	3.3
7	3.3	3.3	3.3	3.4	4.1	4.3	3.6	3.6	3.5	3.5	3.4	3.3
8	3.3	3.3	3.3	3.7	4.1	4.3	3.6	3.6	3.5	3.5	3.4	3.3
9	3.3	3.3	3.3	3.8	4.2	4.2	3.6	3.5	3.5	3.5	3.4	3.3
10	3.4	3.3	3.3	3.8	4.2	4.1	3.6	3.5	3.5	3.5	3.4	3.3
11	3.3	3.3	3.35	3.7	4.2	4.1	3.6	3.5	3.5	3.5	3.4	3.4
12	3.4	3.3	3.35	3.7	4.2	4.1	3.6	3.5	3.5	3.5	3.4	3.4
13	3.4	3.3	3.3	3.7	4.2	4.1	3.6	3.5	3.5	3.5	3.4	3.4
14	3.3	3.3	3.3	3.6	4.2	4.1	3.6	3.5	3.5	3.5	3.4	3.4
15	3.4	3.3	3.3	3.6	4.2	3.9	3.6	3.5	3.5	3.5	3.3	3.4
16	3.4	3.3	3.3	3.6	4.2	3.9	3.6	3.5	3.5	3.5	3.3	3.4
17	3.3	3.3	3.3	3.8	4.2	3.9	3.6	3.5	3.5	3.5	3.3	3.4
18	3.4	3.3	3.3	3.8	4.1	3.9	3.6	3.5	3.5	3.5	3.3	3.4
19	3.4	3.3	3.3	3.9	3.9	3.9	3.6	3.5	3.5	3.5	3.3	3.4
20	3.3	3.3	3.3	3.9	4.1	3.9	3.6	3.7	3.5	3.5	3.3	3.4
21	3.4	3.3	3.3	4.2	3.9	3.9	3.6	3.7	3.5	3.45	3.3	3.4
22	3.4	3.3	3.3	4.2	3.9	3.9	3.6	3.7	3.5	3.45	3.3	3.4
23	3.3	3.3	3.3	4.2	3.9	3.8	3.6	3.7	3.5	3.45	3.3	3.4
24	3.3	3.3	3.3	4.2	3.8	3.8	3.6	3.6	3.5	3.45	3.3	3.4
25	3.3	3.3	3.3	3.9	3.8	3.8	3.6	3.6	3.5	3.45	3.3	3.4
26	3.4	3.3	3.4	3.8	3.9	3.8	3.6	3.5	3.5	3.45	3.3	3.4
27	3.4	3.3	3.4	3.8	4.1	3.7	3.6	3.5	3.5	3.4	3.3	3.4
28	3.3	3.4	3.4	3.8	4.2	3.7	3.6	3.5	3.5	3.4	3.3	3.4
29	3.3	.....	3.4	3.8	4.5	3.7	3.6	3.5	3.5	3.4	3.3	3.4
30	3.3	.....	3.4	3.9	4.5	3.7	3.6	3.5	3.5	3.4	3.3	3.4
31	3.3	.....	3.5	.....	4.5	.....	3.6	3.5	.....	3.4	.....	3.4

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

Rating table for Blacksmith Fork near Hyrum, Utah, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.20	18	3.60	75	4.00	163	4.40	273	4.80	402
3.30	29	3.70	94	4.10	189	4.50	304	4.90	.....
3.40	42	3.80	115	4.20	216	4.60	336	.....	.....
3.50	57	3.90	138	4.30	244	4.70	369	.....	.....

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 7 discharge measurements made during 1905-6 and is well defined.

Monthly discharge of Blacksmith Fork near Hyrum, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	42	29	34.9	2,150
February	42	29	30.4	1,690
March	57	29	33.3	2,050
April	216	42	108	6,430
May	304	115	191	11,700
June	273	94	167	9,940
July	94	75	78.7	4,840
August	94	57	67.6	4,160
September	75	57	59.4	3,530
October	57	42	53.2	3,270
November	42	29	35.0	2,080
December	42	29	37.8	2,320
The year	304	29	74.7	54,200

BLACKSMITH FORK POWER PLANT RACE, NEAR HYRUM, UTAH.

This station was established May 16, 1904, for the purpose of ascertaining the amount of water diverted around the regular gaging station at the tollgate and thus determining the total flow of the stream at that point. It is located about 600 feet down the canyon road from the tollgate at the mouth of the canyon, about 200 feet below the head of the canal or race, and about 500 feet south of the river station. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 33, where are given also references to publications that contain data for previous years.

Discharge measurements of Blacksmith Fork power plant race near Hyrum, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1906.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 18	W. G. Swendsen	12.5	25.8	4.72	76
May 5	H. S. Kleinschmidt	13.4	28.5	4.90	88
June 21	Thos. Grieve, jr	14.0	26.2	4.95	91

Daily gage height, in feet, of Blacksmith Fork power plant race near Hyrum, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.7	4.7	4.8	4.0	4.9	4.9	4.5	4.9	4.9	4.8	4.7	4.7
2	4.7	4.7	4.7	4.0	4.9	4.9	4.5	4.9	4.9	4.8	4.7	4.7
3	4.7	4.8	4.7	4.0	4.9	4.9	4.5	4.9	4.9	4.8	4.7	4.6
4	4.7	4.8	4.7	4.0	4.9	4.5	4.5	4.9	4.9	4.8	4.7	4.6
5	4.9	4.7	4.7	4.0	4.9	5.1	4.5	4.9	4.9	4.8	4.7	4.6
6	4.8	4.7	4.7	4.9	4.9	5.1	4.5	4.9	4.9	4.8	4.7	4.6
7	4.7	4.7	4.7	4.0	4.9	5.1	4.5	4.9	4.9	4.8	4.7	4.6
8	4.7	4.7	4.7	4.8	4.9	4.9	4.5	4.9	4.9	4.8	4.7	4.6
9	4.7	4.7	4.7	4.8	4.5	4.9	4.9	4.9	4.9	4.8	4.7	4.6
10	4.6	4.7	4.7	4.8	4.5	4.9	4.9	4.9	4.9	4.8	4.7	4.6
11	4.8	4.7	4.75	4.8	4.5	4.9	4.9	4.9	4.9	4.8	4.7	4.7
12	4.8	4.7	4.75	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.7	4.7
13	4.8	4.7	4.7	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.7	4.7
14	4.8	4.7	4.7	4.1	4.9	4.9	4.9	4.9	4.8	4.8	4.7	4.7
15	4.9	4.7	4.7	4.1	4.9	4.9	4.9	4.9	4.8	4.8	4.6	4.7
16	4.9	4.7	4.7	4.1	4.9	4.9	4.9	4.9	4.8	4.8	4.6	4.7
17	4.8	4.7	4.7	4.1	4.9	4.9	4.9	4.9	4.8	4.8	4.6	4.7
18	4.9	4.7	4.7	4.1	4.9	4.9	4.9	4.9	4.8	4.8	4.6	4.7
19	4.9	4.7	4.7	4.1	4.5	4.9	4.9	4.9	4.8	4.8	4.6	4.7
20	4.9	4.7	4.7	4.1	4.9	4.9	4.9	4.9	4.8	4.8	4.6	4.7
21	4.7	4.7	4.7	4.9	4.8	4.9	4.9	4.9	4.8	4.8	4.7	4.7
22	4.8	4.7	4.7	4.9	4.8	4.9	4.9	4.9	4.8	4.8	4.7	4.7
23	4.7	4.7	4.7	4.9	4.8	4.9	4.9	4.9	4.8	4.8	4.7	4.7
24	4.7	4.7	4.7	4.9	4.8	4.5	4.9	4.9	4.8	4.8	4.7	4.7
25	4.7	4.7	4.9	4.9	4.8	4.5	4.9	4.9	4.8	4.8	4.7	4.7
26	4.8	4.7	4.9	4.9	4.8	4.5	4.9	4.9	4.8	4.8	4.7	4.7
27	4.8	4.7	4.9	4.9	4.9	4.5	4.9	4.9	4.8	4.8	4.7	4.6
28	4.7	4.8	4.9	4.9	4.9	4.5	4.9	4.9	4.8	4.8	4.7	4.6
29	4.7	.....	4.9	4.9	4.9	4.5	4.9	4.9	4.8	4.8	4.7	4.6
30	4.7	.....	5.0	4.9	4.9	4.5	4.9	4.9	4.8	4.8	4.7	4.6
31	4.7	.....	5.0	.....	4.9	.....	4.9	4.9	.....	4.8	.....	4.6

NOTE.—Little or no ice forms in the stream.

Rating table for Blacksmith Fork power-plant race near Hyrum, Utah, for 1905–6.

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	25	4.30	44	4.60	66	4.90	88
4.10	31	4.40	51	4.70	73	5.00	96
4.20	37	4.50	58	4.80	80	5.10	104

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 11 discharge measurements made during 1904–1906 and is fairly well defined.

Monthly discharge of Blacksmith Fork power-plant race near Hyrum, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	88	66	77.7	4,780
February	80	73	73.8	4,100
March	96	73	77.3	4,750
April	88	25	60.5	3,600
May	88	58	82.6	5,080
June	104	58	81.6	4,860
July	88	58	80.3	4,940
August	88	88	88.0	5,410
September	88	80	83.5	4,970
October	80	80	80.0	4,920
November	73	66	71.6	4,260
December	73	66	70.1	4,310
The year	104	25	77.2	56,000

WEBER RIVER BASIN.

DESCRIPTION OF BASIN.

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, entirely 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. There are 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 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 ranges 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 248 square 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 watershed of 205 square miles. Gaging stations are maintained near the mouth of Chalk and Lost creeks.

Between Croyden and Plain City the stream flows in a well-defined channel through a comparatively narrow, steep canyon, with occasional stretches of narrow valley containing irrigated farming lands. The rock is a porous and badly fissured sandstone and conglomerate, with but 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 the Morgan Valley, through which the Weber flows. After leaving the Wasatch Range the Weber enters the 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 extent,

in the western slopes of the Wasatch Range. The main stream and its numerous short 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.

There are at present no storage reservoirs on the Weber, but a number of possibilities exist.

WEBER RIVER NEAR OAKLEY, UTAH.

This station was established October 22, 1904. It is located approximately 200 feet south of the main canyon road, about 3 miles above Oakley, Utah, and is above all diversions to the Kamas prairie region. The object of the station is to determine the amount of water available for diversion through the low Kamas Pass into Provo River, which is a part of the reclamation scheme in the development of the Weber River project. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 36, where are given also references to publications that contain data for previous years.

Discharge measurements of Weber River near Oakley, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 9	W. G. Swendsen	48.5	38.6	5.10	[a]71.9
May 31	H. S. Kleinschmidt	51	146	5.95	768
August 11	Thos. Grieve, jr	46	74	4.50	127

[a] Ice 1.55 feet thick, gage height to top of ice 5.50 feet.

Daily gage height, in feet, of Weber River near Oakley, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1				4.2	4.85	5.9	5.95	4.6	4.7	4.25	4.2	4.6
2				4.2	4.9	6.1	5.9	4.65	4.7	4.25	4.2	4.5
3	5.25	4.5	4.05	4.2	5.0	6.1	5.9	4.65	4.65	4.25	4.2	4.45
4				4.2	5.2	6.2	5.8	4.6	4.6	4.25	4.2	.....
5				4.15	5.4	6.4	5.85	4.6	4.6	4.25	4.2	4.4
6	4.8			4.2	5.5	6.5	5.85	4.55	4.5	4.25	4.2	.....
7				4.2	5.6	6.2	5.7	4.5	4.5	4.25	4.2	.....
8				4.25	5.7	6.0	5.7	4.5	4.45	4.25	4.2	4.15
9				4.3	5.9	6.05	5.6	4.5	4.45	4.25	4.2	.....
10	5.1	5.1	4.1	4.4	6.0	6.2	5.55	4.5	4.4	4.25	4.15	.....
11				4.5	6.2	6.8	5.55	4.45	4.4	4.2	4.15	.....
12				4.45	6.4	7.3	5.4	4.45	4.4	4.2	4.15	4.15
13				4.45	6.1	8.0	5.45	4.7	4.4	4.2	4.15	.....
14				4.5	6.0	.....	5.35	4.55	4.4	4.2	4.15	.....
15				4.55	5.9	7.2	5.3	4.4	4.4	4.2	4.15	4.05
16	4.7			4.6	5.7	7.7	5.3	4.4	4.4	4.2	4.15	.....
17		4.1		4.7	5.6	6.9	5.25	4.4	4.4	4.2	4.15	.....
18			4.0	4.8	5.6	6.7	5.25	4.4	4.4	4.2	4.1	.....
19				4.85	5.9	6.7	5.2	4.4	4.4	4.2	4.1	4.2
20				4.9	6.2	6.4	5.2	4.9	4.4	4.15	4.15	.....
21				5.0	6.4	6.5	5.15	4.9	4.4	4.15	4.2	.....
22				5.2	6.5	6.4	5.1	5.1	4.4	4.15	4.25	4.15
23				5.55	6.5	6.3	5.0	4.9	4.35	4.15	4.25	.....
24		4.05	4.25	5.5	6.6	6.2	4.95	4.7	4.35	4.15	4.3	.....
25				5.2	6.2	5.8	4.8	4.6	4.35	4.2	4.3	.....
26				5.0	6.1	5.9	4.8	4.6	4.35	4.2	.....	4.15
27	4.65			4.7	6.2	5.9	4.75	4.6	4.25	4.2	4.4	.....
28				4.7	6.7	6.05	4.7	4.55	4.25	4.2	4.3	.....
29				4.8	6.3	5.9	4.65	4.55	4.25	4.2	4.5	4.15
30				4.8	6.2	5.85	4.6	4.4	4.25	4.2	4.6	.....
31			4.2	.....	6.0	.....	4.6	4.4	.....	4.2	.....	.....

NOTE.—Ice conditions, January 1 to March 30, with average ice thickness of about 1.0 foot; November 19 to December 2, with a maximum thickness of 1.0 foot; and December 15 to 25. River free of ice December 3 to 14, and December 26 to 31.

Rating table for Weber River near Oakley, Utah, for 1905–6.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.00	46	4.80	209	5.50	490	6.20	917	6.90	1,490
4.10	58	4.90	241	5.60	542	6.30	990	7.00	1,580
4.20	73	5.00	275	5.70	597	6.40	1,066	7.20	1,760
4.30	90	5.10	312	5.80	655	6.50	1,145	7.40	1,940
4.40	109	5.20	352	5.90	716	6.60	1,227	7.60	2,120
4.50	130	5.30	395	6.00	780	6.70	1,312	7.80	2,300
4.60	154	5.40	441	6.10	847	6.80	1,400	8.00	2,480
4.70	180								

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 10 discharge measurements made during 1904–6 and is well defined between gage heights 4.0 and 6.0 feet.

Monthly discharge of Weber River near Oakley, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
April	516	66	182	10,800
May	1,310	225	760	46,700
June	2,480	655	1,150	68,400
July	748	154	419	25,800
August	312	109	153	9,410
September	180	82	116	6,900
October	82	66	74.8	4,600
November 1–19	73	58	68.5	2,580
The period				175,000

WEBER RIVER NEAR CROYDEN, UTAH.

This station was established February 1, 1905. It is located about 1½ miles west of the town of Croyden, one-fourth mile below the junction of Lost Creek and Weber River, about three-fourths mile up the river from Croyden station on the Union Pacific Railroad, and 10 miles down the river from the town of Echo, just below the narrow canyon at the lower end of Henefer Valley.

The station is important as showing the amount of water available for storage in the Henefer basin, about 2 miles above the station, the development of which is a part of the reclamation scheme on the Weber River project. The winter records will be of special value, since the entire winter flow of the stream is at present discharged as waste into Great Salt Lake. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 38, where are given also references to publications that contain data for previous years.

Discharge measurements of Weber River near Croydon, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 8	W. G. Swendsen	91	87.1	1.75	154
April 29	H. S. Kleinschmidt	93	157	2.48	515
May 12	do	106	355	4.40	2,080
June 15	Thos. Grieve, jr	110	439	4.90	2,640
August 9	do	91	85.5	1.64	152

Daily gage height, in feet, of Weber River near Croydon, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.6	1.8	1.9	3.2	2.87	4.22	3.0	1.72	2.15	1.8	1.82	1.74
2	1.6	1.75	1.8	2.6	2.86	4.0	3.2	1.85	2.35	1.89	1.9	1.72
3	1.65	1.7	1.8	2.5	2.89	4.1	3.3	1.83	2.4	1.8	1.87	1.8
4	1.7	1.8	1.85	2.2	3.15	4.1	3.1	1.82	2.2	1.68	1.86	1.85
5	1.7	1.75	1.85	2.25	3.6	4.3	2.9	1.84	2.15	1.79	1.83	1.9
6	1.6	1.7	1.8	2.35	3.64	5.0	2.8	1.81	2.1	1.8	1.85	1.91
7	1.7	1.7	1.85	2.5	3.66	4.9	2.75	1.7	2.05	1.78	1.87	1.92
8	1.7	1.6	1.85	2.98	3.68	4.35	2.7	1.71	2.0	1.79	1.9	1.9
9	1.78	1.65	1.9	3.1	3.8	4.15	2.68	1.7	2.0	1.68	1.87	1.89
10	1.6	1.65	1.95	2.85	3.9	4.3	2.65	1.67	2.0	1.75	1.86	1.9
11	1.6	1.7	1.9	2.95	4.1	4.4	2.5	1.66	2.0	1.76	1.85	2.04
12	1.6	1.75	1.9	2.9	4.1	4.8	2.45	1.65	2.0	1.75	1.82	2.2
13	1.6	1.75	2.2	2.65	4.09	5.3	2.4	1.67	1.95	1.75	1.83	2.02
14	1.65	1.8	2.1	2.6	4.1	5.4	2.4	1.65	2.0	1.76	1.82	1.9
15	1.7	1.9	2.1	2.65	4.0	5.0	2.4	1.65	1.93	1.78	1.84	1.73
16	1.7	2.0	1.9	2.7	3.8	4.45	2.35	1.67	2.0	1.77	1.84	1.7
17	1.7	1.85	1.85	2.85	3.7	4.5	2.3	1.67	2.0	1.76	1.85	1.78
18	1.75	1.85	1.85	3.1	3.55	4.45	2.2	1.67	2.0	1.75	1.8	1.8
19	2.1	1.85	1.85	3.05	3.6	4.0	2.15	1.75	1.98	1.76	1.73	1.89
20	2.0	1.8	1.8	3.05	3.9	3.9	2.1	2.0	1.9	1.77	1.74	1.9
21	2.0	1.85	1.9	3.15	4.0	3.75	2.0	2.5	1.98	1.76	1.78	1.8
22	1.9	1.8	2.0	3.35	4.2	3.7	1.95	2.65	1.98	1.75	1.9	1.75
23	1.8	1.8	2.2	3.5	4.15	3.68	1.9	2.67	1.89	1.73	1.74	1.85
24	1.8	1.8	2.45	3.55	4.1	3.5	1.9	2.4	1.87	1.75	1.79	1.87
25	1.85	1.85	3.1	3.35	4.3	3.0	1.89	2.3	1.89	1.8	1.8	1.88
26	1.8	1.85	3.2	3.2	3.8	3.0	1.87	2.25	1.8	1.8	1.89	1.89
27	1.8	1.8	3.0	3.15	4.4	3.1	1.85	2.2	1.8	1.79	1.85	2.1
28	1.8	1.9	2.65	3.0	4.8	3.15	1.79	2.15	1.8	1.8	1.87	2.05
29	1.8	.....	2.62	2.9	5.2	3.5	1.68	2.1	1.79	1.78	1.86	2.0
30	1.75	.....	2.75	2.85	4.8	3.1	1.69	2.05	1.78	1.79	1.79	1.9
31	1.8	.....	2.6	.....	4.55	.....	1.7	2.1	.....	1.78	.....	1.89

NOTE.—Flow during the winter period was probably not greatly affected by ice conditions.

Rating tables for Weber River, near Croydon, Utah.

FEBRUARY 1, 1905, TO MARCH 31, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.40	50	1.80	160	2.20	319	2.60	541	3.00	820
1.50	73	1.90	195	2.30	368	2.70	605	3.10	900
1.60	99	2.00	233	2.40	422	2.80	673	3.20	985
1.70	128	2.10	274	2.50	480	2.90	745	3.30	1,070

APRIL 1, 1906, TO DECEMBER 31, 1906.[b]

1.50	110	2.20	368	2.90	782	3.60	1,348	4.60	2,318
1.60	138	2.30	418	3.00	856	3.70	1,438	4.80	2,524
1.70	166	2.40	472	3.10	930	3.80	1,528	5.00	2,732
1.80	202	2.50	526	3.20	1,008	3.90	1,620	5.20	2,940
1.90	240	2.60	584	3.30	1,090	4.00	1,716	5.40	3,152
2.00	280	2.70	646	3.40	1,174	4.20	1,916		
2.10	322	2.80	712	3.50	1,260	4.40	2,116		

[a] This table is applicable only for open-channel conditions. It is based upon 8 discharge measurements made during 1905 and first quarter of 1906, and is well defined.

[b] This table is applicable only for open-channel conditions. It is based upon 4 discharge measurements made during 1906 and the form of the previous curve, and is well defined.

Monthly discharge of Weber River near Croydon, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	274	99	145	8,920
February	233	99	157	8,720
March	985	160	327	20,100
April	1,300	368	802	47,700
May	2,940	754	1,660	102,000
June	3,150	856	1,850	110,000
July	1,090	160	474	29,100
August	627	152	268	16,500
September	472	195	280	16,700
October	236	177	192	11,800
November	240	177	215	12,800
December	368	166	236	14,500
The year	3,150	99	550	399,000

WEBER RIVER NEAR PLAIN CITY, UTAH.

This station was established in 1903 under the direction of the State engineer of Utah, and was maintained under his direction until May 14, 1905, when it was taken up by the United States Geological Survey with the stipulation that the expense of daily gage readings should be defrayed by the State. It is located at the Plain City and West Weber highway bridge, about 10 miles west of Ogden, on the main road leading to Plain City and West Weber, below all points of diversion from and inflow to the stream.

The station is important as showing the amount of water discharged by the stream into Great Salt Lake, information necessary to the adjudication of water rights on the Ogden and Weber rivers. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, p. 41.

Discharge measurements of Weber River near Plain City, Utah, for 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 28	W. G. Swendsen	124	824	10.2	2,040
May 14	H. S. Kleinschmidt	139	1,280	13.8	3,510
June 1	do	131	1,640	16.3	4,630
June 14	Thos. Grieve, jr.	133	1,460	14.9	4,090
June 27	do	115	432	6.9	729
July 16	do	93	151	4.0	139
August 11	do	36	14.8	2.6	10.5

Daily gage height, in feet, of Weber River near Plain City, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	5.0	5.6	10.2	10.1	16.3	7.8	2.8	5.3	4.3	5.1	5.5
2	.....	5.0	5.4	9.8	9.9	16.8	7.5	2.7	5.7	4.2	5.2	5.5
3	4.6	4.9	5.3	9.0	9.8	16.0	7.3	2.7	6.0	4.1	5.2	5.5
4	.....	4.9	5.3	8.0	10.3	15.6	6.8	2.7	5.5	4.1	5.2	5.5
5	.....	4.8	5.4	8.2	12.7	15.2	6.4	2.7	5.2	4.1	5.2	5.5
6	4.2	4.7	5.5	8.2	12.2	15.0	5.9	2.6	5.1	4.1	5.2	5.5
7	.....	4.7	5.4	8.3	12.4	16.0	5.6	2.6	4.9	4.2	5.1	5.5
8	.....	4.8	5.3	9.2	12.4	15.8	5.3	2.6	4.8	4.2	5.1	5.5
9	.....	4.9	5.3	9.9	12.8	15.5	5.2	2.6	4.7	4.3	5.1	5.6
10	4.3	5.0	5.5	10.6	13.0	14.7	5.1	2.6	4.5	4.3	5.1	5.6
11	.....	4.9	5.7	10.2	13.2	14.0	4.9	2.6	4.4	4.3	5.1	5.4
12	.....	4.8	6.3	9.8	13.8	14.2	4.8	2.6	4.4	4.3	5.0	5.3
13	4.9	4.8	7.4	9.1	14.4	14.4	4.5	2.6	4.3	4.3	5.0	5.2
14	.....	4.9	6.8	9.1	13.6	14.7	4.2	2.6	4.3	4.2	5.0	5.1
15	.....	5.1	6.3	9.2	12.5	14.6	4.0	2.6	4.4	4.2	5.0	5.0
16	.....	5.3	6.1	9.8	12.2	13.8	3.9	2.6	4.5	4.3	5.0	5.0
17	5.2	5.3	5.8	10.9	11.4	13.1	3.5	2.6	4.6	4.3	5.1	5.1
18	.....	5.3	5.8	11.8	10.6	12.5	3.3	2.6	4.6	4.4	5.1	5.2
19	.....	5.3	5.8	12.1	10.8	10.9	3.1	2.6	4.6	4.5	5.2	5.2
20	7.4	5.4	5.9	11.6	11.0	10.4	3.0	3.2	4.6	4.6	5.2	5.2
21	.....	5.5	6.0	11.9	11.6	9.7	2.9	6.7	4.6	4.7	5.3	5.3
22	.....	5.5	6.0	12.4	11.8	9.3	2.9	8.5	4.6	4.7	5.3	5.3
23	.....	5.4	7.3	13.1	11.6	8.9	2.9	8.0	4.6	4.8	5.3	5.3
24	5.3	5.3	7.5	13.4	11.4	8.5	2.9	7.3	4.6	4.8	5.3	5.3
25	.....	5.3	10.7	12.5	11.3	8.3	2.8	6.2	4.6	4.8	5.3	5.3
26	.....	5.3	11.5	11.9	12.0	8.1	2.8	6.1	4.5	4.9	5.3	5.9
27	5.1	5.4	11.1	10.7	12.7	8.0	2.8	5.9	4.5	4.9	5.4	7.5
28	.....	5.4	10.3	10.2	14.7	8.3	2.9	5.9	4.4	5.0	5.4	6.9
29	.....	.....	9.3	10.0	16.0	8.1	2.9	5.8	4.4	5.0	5.4	6.1
30	.....	.....	9.2	10.0	16.0	7.8	2.8	5.7	4.3	5.0	5.5	5.7
31	.....	5.4	.....	9.4	.....	17.3	.....	2.8	5.5	.....	5.1	.....	5.6

NOTE.—Ice conditions January 1 to 30. Gage readings during the frozen period were taken to the surface of the water.

Rating table for Weber River near Plain City, Utah, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.60	10	3.50	70	4.40	185	5.60	395	7.40	905
2.70	14	3.60	80	4.50	200	5.80	440	7.60	975
2.80	18	3.70	90	4.60	215	6.00	490	7.80	1,045
2.90	23	3.80	102	4.70	230	6.20	540	8.00	1,115
3.00	28	3.90	114	4.80	245	6.40	595	9.00	1,500
3.10	34	4.00	128	4.90	260	6.60	655	10.00	1,895
3.20	40	4.10	142	5.00	275	6.80	715	11.00	2,310
3.30	50	4.20	156	5.20	315	7.00	775	12.00	2,740
3.40	60	4.30	170	5.40	355	7.20	835	13.00	3,180

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 7 discharge measurements made during 1906, and is well defined.

Monthly discharge of Weber River near Plain City, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
February	375	230	299	16,600
March	2,520	335	830	51,000
April	3,360	1,120	2,060	123,000
May	5,150	1,810	2,940	181,000
June	4,920	1,040	3,000	179,000
July	1,040	18	241	14,800
August	1,300	10	240	14,800
September	490	170	238	14,200
October	295	142	199	12,200
November	375	275	313	18,600
December	940	275	388	23,900
The period				649,000

PROVO RIVER BASIN.

DESCRIPTION OF BASIN.

Provo River has its source 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 there is but little soil in any portion 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. There are no extensive forests, meadows, or marshes. In the canyons the stream receives numerous short and swift tributaries, deriving their principal supply from springs, but a part also from the melting of the snow, which covers portions of the high mountains during the entire year. The highest peaks reach elevations of about 13,000 feet.

Heber Valley, which comprises an area of about 20 square miles, is an irrigated farming district, composed of a deposit of loose bowlders, gravel, and soil, very porous. Most of the water comes from the main stream, though a part is received from small creeks which 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.

There are a few lakes at the head of the river, but they are so small that they probably have little effect in regulating the flow. There is no storage on the stream at present, but a few possibilities exist which will doubtless be developed in the future, as the entire stream, after being used at the mouth of the canyon for the development of power, is now utilized on lands in the vicinity of Utah Lake, and the supply is altogether insufficient.

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

This station was established March 1, 1905. It is located about three-fourths of a mile up the river from Upper Falls, a station on the Provo Canyon branch of the Rio Grande Western Railway, about 4 miles above the mouth of the canyon and 800 feet south of the canyon road, in J. W. Slick's pasture. It is about one-half mile above the Telluride Power Company's dam and above all diversions into Utah Lake Valley. The object of the station is the collection of data concerning the amount of water passing from the river into this valley. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 50.

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

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	Thos. Grieve, jr	80	244	5.40	993
June 13	do	96	396	7.00	1,762
July 7	do	71	156	4.20	402

Daily gage height, in feet, of Provo River above Telluride Company's dam, near Provo, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug	Sept.	Oct.	Nov.	Dec.
1	3.8	3.8	4.0	4.65	4.5	6.2	4.45	3.85	4.0	3.9	4.1	3.8
2	4.0	3.8	3.9	4.4	4.5	5.7	4.45	3.9	4.05	3.9	4.05	3.8
3	4.1	3.7	3.9	4.55	4.5	5.35	4.45	3.9	4.05	3.8	4.05	3.8
4	3.8	3.7	3.95	4.1	4.6	5.4	4.45	3.95	4.05	3.8	4.0	4.1
5	3.85	3.7	3.85	4.1	4.8	5.4	4.4	3.9	4.05	3.8	4.0	4.15
6	3.9	3.65	3.8	4.1	5.0	5.5	4.4	3.85	4.0	3.9	4.05	4.0
7	3.9	3.5	3.85	4.15	4.1	6.4	4.35	3.8	4.0	3.9	4.0	4.0
8	4.25	3.7	3.85	4.25	4.9	5.7	4.3	3.8	4.0	3.9	4.0	4.0
9	4.25	3.6	3.9	4.35	5.0	5.3	4.15	3.8	4.0	3.9	3.95	4.0
10	5.0	3.7	3.95	4.5	5.3	5.5	4.1	3.8	3.95	3.9	3.95	4.05
11	4.0	3.85	4.0	4.5	5.4	5.35	3.95	3.75	3.95	3.9	3.95	4.1
12	3.75	3.75	4.8	4.5	6.2	6.3	3.9	3.75	3.95	3.9	3.9	4.15
13	3.8	3.75	4.5	4.35	6.3	6.7	3.9	3.75	3.95	3.9	3.9	4.3
14	.....	3.8	4.2	4.3	5.7	7.1	3.95	3.7	4.0	3.9	3.95	4.1
15	4.1	3.9	4.1	4.4	5.4	6.7	4.0	3.7	4.0	3.9	3.95	3.9
16	3.95	4.0	3.8	4.45	5.3	6.5	3.95	3.7	4.0	3.85	3.95	3.9
17	4.0	3.9	3.9	4.6	5.2	6.5	3.95	3.7	4.0	3.85	4.0	4.0
18	3.95	3.9	3.95	4.8	5.0	6.0	3.9	3.7	4.0	3.8	4.0	4.0
19	4.6	4.1	3.8	4.8	5.1	5.8	3.9	3.75	4.0	3.8	3.8	4.0
20	4.6	4.0	3.9	4.75	5.6	5.6	3.9	4.08	4.0	3.8	3.7	4.0
21	4.5	4.0	3.95	4.8	5.8	5.4	3.9	3.95	3.95	3.8	3.9	3.9
22	3.75	4.0	4.1	4.9	6.0	5.3	3.9	4.15	3.9	3.8	3.9	3.9
23	3.9	3.9	4.2	5.1	6.1	5.2	4.0	4.0	3.95	3.8	4.0	3.9
24	3.95	3.9	4.55	5.0	6.1	5.2	4.0	3.95	3.9	3.8	4.0	4.0
25	3.9	3.9	4.85	4.9	6.1	5.3	3.95	3.9	3.9	3.8	4.0	4.0
26	3.8	3.9	4.5	4.8	6.8	5.4	3.95	3.95	3.85	3.8	4.0	4.4
27	3.8	3.85	4.4	4.7	6.3	5.8	3.95	3.9	3.9	3.85	3.9	4.45
28	3.8	3.95	4.4	4.6	6.2	5.6	3.9	3.9	3.9	3.85	3.9	4.2
29	3.8	.....	4.3	4.6	6.4	4.65	3.9	3.95	3.9	3.9	3.9	4.1
30	3.7	.....	4.4	4.55	6.2	4.5	3.8	3.9	3.9	3.9	3.8	4.0
31	3.65	.....	4.5	.....	5.7	.....	3.8	3.95	.....	3.9	.....	4.05

NOTE.—Ice conditions January 1-15. River assumed to be clear of ice after January 15.

Rating table for Provo River above Telluride Power Company's dam, near Provo, Utah, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.50	100	4.30	442	5.10	814	5.80	1,146	6.50	1,480
3.60	142	4.40	486	5.20	862	5.90	1,194	6.60	1,526
3.70	184	4.50	530	5.30	912	6.00	1,242	6.70	1,576
2.80	226	4.60	576	5.40	958	6.10	1,288	6.80	1,626
3.90	268	4.70	622	5.50	1,004	6.20	1,336	6.90	1,776
4.00	310	4.80	670	5.60	1,050	6.30	1,384	7.00	1,826
4.10	354	4.90	718	5.70	1,098	6.40	1,432	7.10	1,876
4.20	398	5.00	766						

NOTE.—The above table is applicable only for open-channel conditions. It is based upon 5 discharge measurements made during 1906 and is fairly well defined.

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

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January 16–31	576	163	303	9,620
February	354	100	238	13,200
March	694	226	370	22,800
April	814	354	556	33,100
May	1,630	354	999	61,400
June	1,880	530	1,110	66,000
July	508	226	337	20,700
August	376	184	251	15,400
September	332	247	297	17,700
October	268	226	249	15,300
November	354	184	290	17,300
December	508	226	327	20,100
The period				313,000

PROVO RIVER AT MOUTH OF CANYON, NEAR PROVO, UTAH.

This station was established July 27, 1889, and was discontinued June 30, 1906. It was located about 6 miles north of Provo, about 1,000 feet above Olmstead station, on the Provo Canyon branch of the Rio Grande Western Railway, and 1,200 feet above the power house of the Telluride Power Company. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 53, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Provo River at mouth of canyon, near Provo, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	3.35	3.60	4.05	4.90	4.95	.....	17	3.91	3.95	4.05	4.92	5.52	6.15
2	3.80	3.68	3.90	4.70	4.80	.....	18	4.05	3.90	4.05	5.15	5.40	5.95
3	3.62	3.60	3.85	4.55	4.82	.....	19	5.15	4.12	3.95	5.12	5.50	5.92
4	3.71	3.52	3.88	4.45	5.00	5.80	20	4.90	4.08	4.10	5.10	5.92	5.90
5	3.66	3.55	3.82	4.28	5.18	6.02	21	4.38	4.20	4.02	5.25	6.10	5.75
6	3.61	3.56	3.85	4.28	5.32	6.50	22	4.00	4.08	4.25	5.40	6.20	5.68
7	3.31	3.55	3.80	4.35	5.32	6.12	23	3.92	3.95	4.60	5.40	6.25	5.55
8	3.60	3.55	3.95	4.42	5.40	5.80	24	4.04	3.88	4.95	5.40	6.30	5.50
9	3.46	3.54	4.02	4.65	5.42	5.68	25	3.95	4.00	5.28	5.30	6.32	5.25
10	3.65	3.70	4.15	4.85	5.65	5.90	26	3.91	3.92	5.50	5.20	6.08	5.05
11	3.65	3.55	4.05	4.90	5.82	6.15	27	3.91	3.90	4.90	5.00	6.42	5.10
12	3.70	3.61	5.15	4.82	6.25	6.50	28	3.75	3.98	4.82	4.95	6.58	5.18
13	3.78	3.50	4.68	4.70	6.50	7.02	29	3.55	.....	4.70	4.95	6.60	5.10
14	4.00	3.70	4.40	4.55	5.90	6.78	30	3.62	.....	4.65	4.90	6.18	5.08
15	3.99	3.95	4.22	4.60	5.72	6.45	31	3.69	.....	4.45	.....	5.92	.....
16	4.12	4.05	4.08	4.80	5.55	6.15							

NOTE.—Slight ice conditions during January.

HOBBLE CREEK BASIN.

HOBBLE CREEK, NEAR SPRINGVILLE, UTAH.

Hobble Creek rises on the western slope of the Wasatch Mountains and flows in a general southwesterly direction to Utah Lake. There is little overlying soil and but a scanty growth of timber or 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. There are no tributaries of importance, but short, intermittent streams, each of which is confined to a steep, narrow canyon, enter all along the course. There are no storage reservoirs, lakes, or marshes to control the flood discharge, which occurs in the spring as the result of melting snow. The entire normal summer flow is used for irrigation, but the diversion takes place for the most part at the mouth of the canyon below the gaging station.

The station was established March 23, 1904. It is located about 1 mile above the mouth of the canyon, 4 miles southeast of Springville, Utah, 600 feet northeast of the head of Mapleton Canal, and about 1,200 feet southwest of the Springville electric power plant. The conditions and the bench marks are described in Water-Supply Paper No. 176, page 58, where are given also references to publications that contain data for previous years.

Discharge measurements of Hobble Creek near Springville, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
July 3	Thos. Grieve, jr	18.5	17.8	1.95	66.1
August 7	do	17.5	16.1	1.55	19.2

Daily gage height, in feet, of Hobble Creek near Springville, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.25	.....	1.7	2.5	2.5	1.85	1.65	1.55	1.5	1.55	.....
2	1.25	.....	.....	1.7	2.5	2.45	1.85	1.6	1.6	1.5	1.55	.....
3	.....	1.2	.....	1.6	2.7	2.4	1.9	1.6	1.6	1.5	1.5	1.5
4	.....	.....	.....	1.55	3.3	2.35	1.9	1.6	1.55	1.55	.....	.....
5	.....	1.2	1.35	1.55	3.8	2.35	1.85	.....	1.55	1.55	1.5	1.5
6	.....	.....	.....	1.6	4.0	2.45	1.85	1.55	1.55	1.55	1.45	.....
7	1.25	1.2	1.25	1.7	3.7	.....	1.85	1.5	1.55	1.5	1.5	1.55
8	.....	.....	.....	1.88	3.7	2.3	1.85	1.55	1.55	1.5	.....	.....
9	.....	1.2	1.25	2.1	3.8	2.25	1.85	1.55	.....	1.45	.....	.....
10	1.25	.....	1.3	2.35	3.9	2.25	1.8	1.55	1.55	1.4	.....	.....
11	.....	.....	1.3	2.5	3.9	.....	1.8	1.55	1.55	1.45	1.5	1.55
12	1.25	.....	1.35	2.35	.....	2.2	1.75	.....	.....	1.45	1.5	.....
13	.....	1.2	.....	2.45	4.0	2.2	1.75	1.5	1.55	1.5	1.5	.....
14	.....	.....	1.35	2.4	3.4	2.2	1.75	1.55	1.55	.....	1.5	.....
15	.....	.....	.....	2.6	3.4	2.15	1.75	1.55	1.55	1.5	1.5	1.5
16	1.3	.....	.....	2.62	3.3	2.15	1.75	1.5	.....	1.5	.....	.....
17	.....	1.3	1.3	3.35	3.2	2.15	1.75	1.55	1.6	1.5	1.5	.....
18	.....	1.3	.....	4.0	3.1	2.15	1.75	1.55	1.55	1.55	.....	1.55
19	1.35	1.3	1.3	3.9	3.2	2.1	1.75	.....	1.5	1.55	1.45	.....
20	.....	1.25	1.3	3.6	.....	2.0	1.75	1.7	1.5	.....	1.45	.....
21	1.3	.....	1.35	3.85	3.2	.....	1.7	1.7	1.55	.....	1.5	1.55
22	.....	.....	1.35	.....	3.0	1.95	1.6	1.65	1.55	1.5	.....	.....
23	1.3	1.3	1.35	3.9	3.0	.....	1.6	1.6	1.55	1.5	.....	.....
24	.....	1.3	1.4	3.3	2.9	.....	1.6	1.6	1.55	1.5	1.5	.....
25	1.25	1.3	1.45	3.0	2.7	1.9	1.55	1.55	1.55	1.5	.....	1.55
26	.....	1.25	1.55	2.7	2.7	1.85	1.65	1.55	1.55	1.5	1.5	.....
27	1.2	1.3	1.6	2.5	2.8	1.85	1.65	1.55	1.55	1.5	.....	1.55
28	.....	.....	1.65	2.5	3.0	1.9	1.65	1.5	1.55	.....	.....	.....
29	.....	.....	1.6	.....	2.8	1.8	.....	1.55	1.55	1.5	.....	1.55
30	1.25	.....	1.6	2.45	2.6	.....	1.6	1.57	1.4	1.5	1.5	.....
31	.....	.....	1.65	.....	2.6	.....	1.6	1.55	.....	1.5	.....	.....

SPANISH FORK BASIN.

DESCRIPTION OF BASIN.

Spanish Fork rises in the Wasatch Mountains and flows northwestward into Utah Lake. The area is generally barren, with but 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 are Diamond Fork and Thistle Creek, which enter about 8 and 10 miles, respectively, above the gaging station, and which, like the main stream, occupy steep narrow canyons. The normal flow comes largely from springs, scattered over the entire basin; the flood discharge is direct surface run-off from melting snow.

There are no storage reservoirs on the stream and but little of the flow is diverted above the gaging station at Spanish Fork; the entire normal flow is, however, diverted at the mouth of the canyon, immediately below the station, and used for irrigating lands near Utah Lake.

SPANISH FORK NEAR SPANISH FORK, UTAH.

This station was established May 23, 1900, and reestablished March 26, 1903. It is located 600 feet above the dam of the East Bench Irrigation Company, 5 miles southeast of Spanish Fork, and 300 feet southwest of the main line of the Rio Grande Western Railway.

Records at this station are of importance in connection with the Strawberry Valley storage reservoir project, under a plan to divert water from that basin into Spanish Fork near its head and carry it to distribution canals below. The conditions and the bench marks are described in Water-Supply Paper No. 176, page 60, where are given also references to publications that contain data for previous years.

Discharge measurements of Spanish Fork near Spanish Fork, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1906.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 20	W. G. Swendsen	34.5	23.4	1.49	75.8
February 4	do	35.5	27.3	1.48	69.6
March 3	do	34.5	25.5	1.40	57.5
March 22	do	36.1	32.5	1.55	109
April 28	H. S. Kleinschmidt	39.5	73.4	2.40	343
May 10	do	48.0	122	3.74	801
May 19	Thos. Grieve, jr	46.0	125	3.74	693
June 2	do	40.0	94.5	2.85	472
June 12	do	39.0	80.0	2.50	338
July 3	do	38.0	45.5	1.70	177
August 7	do	37.0	30.4	1.40	96
October 17	do	37.0	27.5	1.25	90

Daily gage height, in feet, of Spanish Fork near Spanish Fork, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.45	1.45	1.55	2.0	2.5	2.8	1.75	1.45	1.35	1.25	1.25	1.25
2	1.55	1.4	1.5	2.0	2.45	2.8	1.7	1.4	1.5	1.25	1.25	1.3
3	1.4	1.4	1.4	1.8	2.6	2.75	1.7	1.4	1.45	1.25	1.25	1.3
4	1.4	1.45	1.5	1.6	3.05	2.8	1.7	1.4	1.35	1.25	1.3	1.4
5	1.4	1.5	1.45	1.8	3.5	2.85	1.7	1.35	1.35	1.25	1.3	1.35
6	1.5	1.5	1.45	1.8	3.6	2.85	1.65	1.35	1.35	1.25	1.3	1.3
7	1.4	1.5	1.4	2.2	3.58	2.65	1.65	1.35	1.35	1.25	1.3	1.25
8	1.5	1.45	1.45	2.2	3.9	2.6	1.6	1.3	1.35	1.25	1.3	1.25
9	1.5	1.45	1.5	2.2	3.9	2.5	1.6	1.3	1.35	1.25	1.3	1.25
10	1.4	1.45	1.6	2.4	4.4	2.55	1.6	1.3	1.35	1.25	1.3	1.25
11	1.35	1.5	2.2	2.5	4.4	2.5	1.55	1.3	1.3	1.25	1.3	1.25
12	1.4	1.5	2.25	2.4	4.5	2.5	1.55	1.3	1.3	1.25	1.25	1.25
13	1.4	1.5	2.25	2.2	4.5	2.45	1.5	1.3	1.3	1.25	1.25	1.4
14	1.45	1.5	1.6	2.25	3.9	2.45	1.5	1.4	1.3	1.25	1.25	1.25
15	1.4	1.55	1.5	2.4	3.9	2.4	1.6	1.35	1.35	1.25	1.25	1.1
16	1.4	1.55	1.45	2.45	3.85	2.35	1.55	1.35	1.45	1.25	1.25	1.1
17	1.4	1.5	1.5	2.8	3.8	2.2	1.5	1.35	1.35	1.25	1.25	1.1
18	1.4	1.55	1.5	3.2	3.8	2.12	1.6	1.35	1.35	1.25	1.2	1.1
19	1.55	1.6	1.3	3.1	3.8	2.05	1.55	1.4	1.35	1.25	1.15	1.2
20	1.55	1.45	1.45	3.0	3.95	2.0	1.5	1.65	1.3	1.25	1.2	1.25
21	1.4	1.55	1.5	3.0	4.0	1.9	1.5	1.45	1.3	1.25	1.2	1.25
22	1.4	1.5	1.6	3.1	3.9	1.85	1.5	1.5	1.3	1.2	1.2	1.25
23	1.4	1.5	2.0	3.3	3.65	1.85	1.5	1.4	1.3	1.2	1.2	1.25
24	1.45	1.45	2.35	3.25	3.6	1.85	1.65	1.35	1.3	1.2	1.2	1.25
25	1.5	1.5	2.8	2.9	3.35	1.8	1.5	1.35	1.3	1.25	1.25	1.25
26	1.45	1.45	2.3	2.75	3.2	1.8	1.5	1.35	1.3	1.25	1.25	1.4
27	1.5	1.5	2.0	2.55	3.25	1.8	1.45	1.35	1.3	1.25	1.25	1.5
28	1.45	1.5	1.9	2.5	3.3	1.8	1.45	1.35	1.3	1.25	1.25	1.4
29	1.45	.....	1.8	2.55	3.2	1.8	1.45	1.35	1.3	1.25	1.25	1.35
30	1.5	.....	1.9	2.5	3.1	1.8	1.45	1.3	1.25	1.25	1.25	1.3
31	1.45	.....	2.0	.....	2.85	.....	1.4	1.4	.....	1.25	.....	1.3

Daily discharge, in second-feet, of Spanish Fork near Spanish Fork, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	68	68	89	233	368	456	169	112	96	81	81	81
2	89	57	78	233	354	454	158	104	120	81	81	88
3	57	57	57	177	393	426	158	104	112	81	81	88
4	57	68	80	122	515	439	158	104	96	81	88	104
5	57	78	70	177	637	452	158	96	96	81	88	96
6	78	78	74	177	665	452	148	96	96	81	88	88
7	57	78	74	288	658	398	148	96	96	81	88	81
8	78	68	75	288	743	385	138	88	96	81	88	81
9	78	68	85	288	742	358	138	88	96	81	88	81
10	57	68	110	344	874	372	138	88	96	81	88	81
11	48	78	278	372	874	358	129	88	88	81	88	81
12	57	78	292	344	907	358	129	88	88	81	81	81
13	57	78	294	288	905	344	120	88	88	81	81	104
14	68	78	116	302	743	344	120	104	88	81	81	81
15	57	89	93	344	741	331	138	96	96	81	81	62
16	57	89	80	357	747	318	129	96	112	81	81	62
17	57	78	94	455	724	277	120	96	96	81	81	62
18	57	89	95	567	722	257	138	96	96	81	74	62
19	89	100	53	538	720	240	129	104	96	81	68	74
20	89	68	84	510	750	227	120	148	88	81	74	81
21	57	89	96	510	765	203	120	112	88	81	74	81
22	57	78	123	538	740	192	120	120	88	74	74	81
23	57	78	233	594	672	192	120	104	88	74	74	81
24	68	68	328	580	660	192	148	96	88	74	74	81
25	78	78	455	483	593	180	120	96	88	81	81	81
26	68	68	316	442	555	180	120	96	88	81	81	104
27	78	78	233	385	570	180	112	96	88	81	81	120
28	68	78	215	372	585	180	112	96	88	81	81	104
29	68	.....	177	382	560	180	112	96	88	81	81	96
30	78	.....	215	368	533	180	112	88	81	81	81	88
31	68	.....	233	.....	467	.....	104	104	.....	81	.....	88

NOTE.—Daily discharge obtained by indirect method for shifting channels March 3 to May 19 Two rating curves were used for the periods preceding and following March 3 and May 19, respectively.

Monthly discharge of Spanish Fork near Spanish Fork, Utah, for 1906.

[Drainage area, 670 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec-ft. per sq. mile.	Depth in inches.
January	89	48	66.4	4,080	0.099	0.11
February	100	57	76.0	4,220	.113	.12
March	455	53	158	9,720	.236	.27
April	594	122	369	22,000	.551	.61
May	907	354	661	40,600	.987	1.14
June	456	180	304	18,100	.454	.51
July	169	104	132.0	8,120	.197	.23
August	148	88	99.5	6,120	.149	.17
September	120	81	93.6	5,570	.139	.16
October	81	74	80.3	4,940	.120	.14
November	88	68	81.0	4,820	.121	.14
December	120	62	84.7	5,210	.126	.15
The year	907	48	184.0	134,000	.274	3.75

SPANISH FORK NEAR LAKE SHORE, UTAH.

This station was established December 10, 1903, at the highway bridge on the road between Spanish Fork and Lake Shore, about 3 miles west of Spanish Fork. In May, 1904, it was reestablished at a point about 800 feet above the bridge.

As the entire normal summer flow is diverted at a point above, the station is maintained only during the spring and winter, the object being the determination of the amount of water discharged by Spanish Fork into Utah Lake.

The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 63, where are given also references to publications that contain data for previous years.

Discharge measurements of Spanish Fork near Lake Shore, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 20	W. G. Swendsen	27.0	26.5	4.53	72.2
February 3	do	27.0	25.6	4.48	65.3
March 2	do	30.0	31.3	4.50	83.1
March 23	do	37.5	60.9	5.41	181
April 28	H. S. Kleinschmidt	52.0	123	7.25	352
June 12	Thos. Grieve, jr	24.0	10.0	4.20	12.6

Daily gage height, in feet, of Spanish Fork near Lake Shore, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Nov.	Dec.
1	.....	4.40	4.53	5.35	7.2	6.05	4.35	4.70
2	4.30	4.35	4.48	5.3	7.15	5.87	4.40	4.90
3	.....	4.48	4.45	5.2	7.35	5.7	4.40	4.90
4	.....	4.42	4.50	5.0	7.90	5.5	4.40	4.10
5	4.25	4.42	4.48	5.05	9.25	5.47	4.40	4.10
6	.....	4.40	4.43	5.1	9.50	5.9	4.40	5.00
7	.....	4.40	4.44	5.82	9.35	5.75	4.45	5.00
8	.....	4.38	4.50	5.92	9.35	5.5	4.45	5.00
9	.....	4.35	4.58	6.0	9.35	5.45	4.50	5.00
10	.....	4.40	5.30	6.3	8.90	5.0	4.55	5.00
11	.....	4.41	5.92	6.25	9.00	4.9	4.55	5.00
12	4.50	4.50	5.48	6.0	8.30	4.7	4.55	5.00
13	.....	4.47	6.15	5.95	10.25	4.3	4.55	5.10
14	4.80	4.48	4.81	6.0	9.20	4.05	4.50	5.10
15	4.40	4.48	4.15	6.2	8.45	3.7	4.50	5.10
16	4.35	4.50	4.05	7.0	8.25	.....	4.50	5.00
17	4.40	4.40	4.10	7.5	8.50	4.35	4.50	4.90
18	4.40	4.45	4.20	7.7	8.00	4.0	4.50	4.90
19	4.52	4.60	4.15	7.72	8.00	.....	4.50	4.90
20	4.57	4.48	4.45	7.75	8.20	.....	4.50	4.90
21	4.57	4.48	4.50	7.95	9.00	.....	4.50	4.90
22	4.28	4.50	4.53	8.4	8.45	.....	4.50	4.90
23	4.50	4.52	5.42	8.8	8.05	.....	4.50	4.80
24	4.40	4.50	5.90	8.4	7.70	.....	4.50	4.90
25	4.40	4.45	6.90	8.6	7.35	.....	4.50	4.90
26	4.37	4.41	6.10	7.7	7.20	.....	4.50	5.20
27	4.38	4.48	5.53	7.4	6.80	.....	4.50	5.20
28	4.41	4.45	5.58	7.25	7.15	.....	4.70	5.10
29	4.40	.....	5.40	7.35	7.30	.....	4.70	5.10
30	4.40	.....	5.38	7.4	6.90	.....	4.70	5.00
31	4.40	.....	5.47	.....	6.50	.....	.....	5.00

NOTE.—Flow probably slightly affected by ice conditions during winter months.

Daily discharge, in second-feet, of Spanish Fork near Lake Shore, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Nov.	Dec.
1	49	58	85	177	345	200	19	36
2	50	54	82	170	339	180	21	50
3	48	64	79	161	362	163	21	50
4	48	61	84	142	408	145	21	10
5	46	62	84	147	532	139	21	10
6	50	62	77	152	552	177	21	57
7	53	62	80	220	536	161	23	57
8	56	61	86	228	534	134	23	57
9	56	58	94	236	532	123	26	57
10	59	63	163	264	491	74	28	57
11	62	64	222	260	500	58	28	57
12	66	73	182	236	433	34	28	57
13	79	69	245	231	611	17	28	65
14	92	74	119	236	513	8	26	65
15	58	74	58	255	443	3	26	65
16	54	76	52	329	422	0	26	57
17	58	67	56	375	445	18	26	50
18	58	72	64	395	398	6	26	50
19	68	87	61	397	397	.....	26	50
20	72	75	88	400	416	.....	26	50
21	72	75	94	420	488	.....	26	50
22	49	79	97	460	435	.....	26	50
23	66	81	181	496	397	.....	26	42
24	58	80	226	460	366	.....	26	50
25	58	76	319	478	333	.....	26	50
26	56	73	245	395	318	.....	26	74
27	56	81	193	367	280	.....	26	74
28	59	77	198	352	322	.....	36	65
29	58	.....	180	361	326	.....	36	65
30	58	.....	179	364	280	.....	36	57
31	58	.....	186	.....	242	.....	.....	57

NOTE.—Total flow of river diverted for irrigation June 19 to October 31. Daily discharge obtained by indirect method for shifting channels. Open-channel rating applied during winter period which may give results which are somewhat too large.

Monthly discharge of Spanish Fork near Lake Shore, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	92	46	59.0	3,630
February	87	54	69.9	3,880
March	319	52	134	8,240
April	496	142	305	18,100
May	552	242	419	25,800
June	200	00	54.7	3,250
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	36	19	26.0	1,550
December	74	10	52.9	3,250
The year	552	0	93.4	67,700

SEVIER RIVER BASIN.

DESCRIPTION OF BASIN.

Sevier River rises in the northwestern part of Kane County, in southern Utah, flows northeastward to a point near Gunnison, northwestward nearly to Leamington, and then turns sharply to the southwest and discharges into Sevier Lake.

Tributary streams are few, San Pitch River and Salina Creek being the most important. The San Pitch joins the main stream

about 3 miles above the gaging station, but since its flow is used for irrigation and is completely controlled by storage reservoirs, it furnishes little of the supply. Salina Creek, which enters about 15 miles above the station, is subject to rapid run-off and during flood seasons carries an immense amount of sediment.

There is considerable irrigation from the Sevier above Gunnison, and a few small storage reservoirs control the flood discharge.

SEVIER RIVER NEAR GUNNISON, UTAH.

This station was established June 29, 1900. It is located at the wagon bridge over the Sevier about 4 miles west of Gunnison, on the road to Westview precinct. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 65, where are given also references to publications that contain data for previous years.

Discharge measurements of Sevier River near Gunnison, Utah, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 25	H. S. Kleinschmidt	60	210	3.52	563
May 21	C. Tanner	78	404	5.65	1,770
May 29	Thos. Grieve, jr	79	519	6.27	2,530
July 17	do	42	126	.95	42

Daily gage height, in feet, of Sevier River near Gunnison, Utah, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.38	.....	2.90	3.50	5.7	3.80	.....	2.00	2.60	2.40	2.72
2	.....	2.38	.....	2.80	3.60	5.66	3.70	.....	2.00	2.58	2.46	2.76
3	.....	2.38	1.60	2.74	3.74	5.62	3.70	2.00	2.02	2.54	2.44	2.80
4	2.06	2.38	.....	2.72	3.76	5.40	3.70	1.90	2.04	2.54	2.40	2.80
5	.....	2.38	1.46	2.70	3.80	5.36	.....	1.90	2.22	2.52	2.42	2.86
6	.....	2.38	1.74	2.90	3.86	5.10	3.68	1.84	2.30	2.50	2.40	2.86
7	2.08	2.38	1.82	3.30	3.90	5.06	3.62	1.80	2.30	2.42	2.36	2.84
8	.....	2.38	1.86	3.20	3.84	4.96	3.62	1.80	2.30	2.30	2.36	2.90
9	.....	2.38	2.02	3.22	3.94	4.70	3.62	1.76	2.20	2.80	2.34	2.90
10	4.16	2.40	2.06	3.24	4.04	4.72	3.00	1.70	2.20	2.26	2.34	2.86
11	.....	2.50	2.78	3.26	4.10	4.80	2.70	1.64	2.10	2.22	2.36	2.84
12	.....	2.62	2.78	3.14	4.26	4.72	.....	1.75	1.96	2.20	2.30	2.82
13	.....	2.80	2.72	3.16	4.56	4.78	.....	1.70	1.90	2.06	2.30	2.82
14	4.00	2.90	2.58	3.06	4.56	4.70	.....	1.70	1.90	2.02	2.30	2.82
15	.....	2.82	2.40	3.02	4.76	4.68	.....	1.72	1.90	2.00	2.32	2.80
16	.....	2.82	.....	3.04	4.90	4.66	.....	1.72	2.06	2.04	2.30	2.80
17	.....	2.76	2.20	3.20	5.10	4.66	.95	1.70	2.42	2.06	2.32	2.80
18	.....	2.74	2.28	3.22	5.30	4.64	1.00	1.64	2.40	2.10	2.32	2.80
19	.....	2.50	2.24	3.20	5.44	4.50	1.20	1.70	2.40	2.14	.....	2.82
20	3.70	2.50	2.24	3.24	5.60	4.20	1.12	1.90	2.44	2.12	2.34	2.82
21	.....	2.46	2.38	3.24	5.72	4.10	1.14	2.12	2.44	2.16	2.30	2.86
22	3.00	2.40	2.44	3.26	5.86	3.90	1.22	2.20	2.40	2.20	2.34	2.84
23	.....	2.20	2.50	3.40	5.90	3.78	1.24	2.20	2.60	2.20	2.34	2.80
24	2.46	2.20	2.56	3.44	6.00	3.60	1.32	2.90	2.60	2.18	2.46	2.80
25	2.44	2.08	2.70	3.50	6.06	3.46	1.24	3.10	2.60	2.20	2.60	2.82
26	2.40	2.20	2.76	3.44	6.20	3.40	1.20	2.90	2.60	2.22	2.60	2.80
27	2.40	2.00	2.84	3.34	.....	3.18	1.34	2.50	2.60	2.22	2.60	.....
28	.....	2.00	2.90	3.34	6.34	3.10	1.34	2.36	2.60	2.24	2.64	.....
29	2.40	.....	2.92	3.36	.....	3.04	1.34	2.26	2.62	2.26	2.66	2.84
30	.....	.....	2.92	3.52	6.04	2.90	.....	2.26	2.62	2.26	2.66	2.84
31	.....	.....	2.90	.....	5.86	.....	.....	2.20	.....	2.28	.....	2.84

NOTE.—Ice conditions January 1-19. Ice about 0.4 foot thick.

SEVIER RIVER NEAR MARYSVALE, UTAH.

This station was established February 18, 1906. It is located about 200 yards from the main wagon road at Peter Pitt's ranch, about 6 miles above Marysvale, which is the nearest railway station.

The channel is straight for about 200 feet above the station and 100 feet below. The right bank, which is rather low, is covered with willows; the left has gentle slope and is clean. Neither bank is subject to overflow. The current is sluggish. The bed of the stream is composed of clay and may change during flood stages. Discharge measurements are made from a car on a cable marked at 5-foot intervals with red paint. The initial point for soundings is the inner face of the cable support on the left bank.

The gage, which is read by Mr. Peter Pitts, is a 4 by 4-inch post, graduated to feet and tenths, set in a vertical position directly under the cable.

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

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 24	H. S. Kleinschmidt	55	221	4.85	673.0
July 19	Thos. Grieve, jr	49	128	3.94	260.0

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

Day.	Feb.	Mar.	Apr.	May.	June.	Day.	Feb.	Mar.	Apr.	May.	June.
1	.....	2.78	2.60	5.00	7.27	17	.....	2.50	3.00	.....	5.40
2	.....	2.60	2.70	4.80	6.97	18	2.73	2.55	3.25	.....	5.30
3	.....	2.40	2.60	4.70	6.77	19	.....	2.50	3.40	.....	5.10
4	.....	2.45	2.60	4.70	6.65	20	.....	2.45	3.60	.....	4.95
5	.....	2.45	2.55	4.90	6.52	21	2.70	2.52	3.75	.....	4.80
6	.....	2.35	2.55	5.20	6.52	22	2.70	2.55	4.00	.....	4.70
7	.....	2.32	2.80	5.40	6.55	23	2.50	2.55	4.30	8.57	4.40
8	.....	2.40	2.95	5.55	6.52	24	2.50	2.60	4.70	8.47	4.20
9	.....	2.40	2.90	5.80	6.17	25	2.50	2.80	5.00	8.42	4.00
10	.....	2.50	2.90	.....	6.00	26	2.50	3.05	5.10	8.17	3.80
11	.....	2.50	2.90	.....	6.00	27	2.55	3.00	5.00	7.87	3.75
12	.....	2.55	2.90	.....	6.17	28	2.60	2.80	4.90	7.85	3.65
13	.....	2.50	2.90	.....	5.90	29	.....	2.70	4.90	7.92	3.60
14	.....	2.60	2.80	.....	5.90	30	.....	2.70	5.10	7.97	3.40
15	.....	2.60	2.80	.....	5.60	31	.....	2.65	.....	7.59	.....
16	.....	2.60	2.90	.....	5.50						

NOTE.—May 10–22 water was over the top of the gage rod.

BEAVER CREEK DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Beaver Creek with its tributaries, North, South, and Indian creeks, rises on the western slope of the Tushar Mountains, and flows in a westerly direction to Minersville, thence northerly until its waters are lost in the sands.

Measurements were made of these streams in 1906 by Mr. J. F. Hoyt, in connection with an investigation of the water resources of the valley for irrigation purposes.

BEAVER CREEK NEAR BEAVER, UTAH.

This was a temporary station established June 15 and discontinued September 22, 1906. It was located at the mouth of Pink Stone Hollow, 5 miles east of Beaver, Utah.

Discharge measurements of Beaver Creek near Beaver, Utah, in 1906.

Month.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 13	5.35	612
July 2	4.00	164
August 14	3.35	78
August 25	3.28	62

Daily gage height, in feet, of Beaver Creek near Beaver, Utah, for 1906.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	.....	4.0	3.6	3.2	17	4.95	3.65	3.3	3.2
2	.....	3.95	3.55	3.25	18	4.8	3.65	3.3	3.2
3	.....	3.95	3.5	3.2	19	4.75	3.6	3.3	3.2
4	.....	3.95	3.4	3.2	20	4.65	3.6	3.4	3.2
5	.....	3.9	3.4	3.2	21	4.62	3.55	3.55	3.1
6	.....	3.9	3.4	3.2	22	4.55	3.55	3.5	3.1
7	.....	3.85	3.4	3.15	23	4.5	3.55	3.35	.....
8	.....	3.8	3.4	3.15	24	4.4	3.55	3.3	.....
9	.....	3.8	3.4	3.15	25	4.35	3.5	3.3	.....
10	.....	3.8	3.35	3.1	26	4.3	3.45	3.3	.....
11	.....	3.75	3.35	3.1	27	4.3	3.45	3.25	.....
12	.....	3.75	3.35	3.1	28	4.25	3.55	3.25	.....
13	.....	3.75	3.3	3.1	29	4.12	3.5	3.25	.....
14	.....	3.75	3.3	3.1	30	4.08	3.4	3.25	.....
15	5.2	3.7	3.3	3.1	31	.....	3.5	3.35	.....
16	5.1	3.7	3.3	3.2					

Rating table for Beaver Creek near Beaver, Utah, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.10	52	3.60	103	4.10	183	4.50	269	4.90	399
3.20	59	3.70	117	4.20	202	4.60	297	5.00	439
3.30	68	3.80	132	4.30	222	4.70	328	5.10	482
3.40	78	3.90	148	4.40	244	4.80	362	5.20	528
3.50	90	4.00	165						

NOTE.—This table is based on 4 discharge measurements and is not well defined.

Monthly discharge of Beaver Creek near Beaver, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
June (15–30)	528	179	300	9,520
July	165	78	117	7,190
August	103	63	74.8	4,600
September (1–22)	63	52	56.1	2,450
The period	.....	.....	.....	23,800

BEAVER CREEK NEAR MINERSVILLE, UTAH.

The following measurement was made June 21, 1906, at the county bridge, 1½ miles east of Minersville. During the late summer Minersville Canal diverts most of the flow of the creek 200 feet above the bridge.

Area, 64 square feet; discharge, 211 second-feet.

MINERSVILLE CANAL AT MINERSVILLE, UTAH.

This was a temporary station established June 21 and discontinued September 21, 1906. It was located at the old flour mill flume, three-fourths of a mile east of Minersville.

The gage was fastened to the north side of the flume with the zero coinciding with the bottom.

The following measurements were made during 1906:

June 21....Gage height..1.50 feet; discharge, 41 second-feet.
August 21....Gage height..0.93 foot; discharge, 32.5 second-feet.

Daily gage height, in feet, of Minersville Canal near Minersville, Utah, for 1906.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1		1.6	0.9	1.4	17			0.9	1.15
2		1.6		1.5	18		1.1		1.1
3		1.6	.9	1.4	19			.9	1.05
4				1.4	20		1.1		
5		1.6	.9	1.4	21	1.6		.9	1.0
6		1.6		1.35	22	1.6	1.1	1.0	
7		1.6	.9	1.35	23			1.1	
8		1.6		1.35	24	1.5	1.1	1.3	
9		1.6	.9	1.35	25	1.6		1.3	
10		1.6		1.3	26	1.6	1.1	1.3	
11			.9	1.3	27	1.6		1.3	
12		1.1		1.3	28		1.0	1.3	
13			.9	1.3	29	1.6		1.3	
14		1.1		1.3	30	1.6	.9	1.3	
15			.9	1.3	31			1.3	
16		1.1		1.15					

Monthly discharge of Minersville Canal near Minersville, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
June (21–30)	43	41	42.7	847
July	43	32	37.3	2,290
August	38	32	33.7	2,070
September (1–21)	41	33	37.6	1,570
The period				6,780

NOTE.—These values are based on very meager data and are only approximate.

NORTH FORK OF NORTH CREEK NEAR BEAVER, UTAH.

This was a temporary station established June 16 and discontinued September 27, 1906. It was located one-half mile east of T. J. Shy's fence along the wagon road and 8 miles northeast of Beaver.

Discharge measurements of North Fork of North Creek near Beaver, Utah, in 1906.

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 23	2.80	32.2
August 18	2.25	3.6
August 27	2.25	3.6

Daily gage height, in feet, of North Fork of North Creek, near Beaver, Utah, for 1906.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	.....	2.0	2.2	2.25	17	2.9	2.3	2.0	2.1
2	.....	2.6	2.2	2.32	18	2.8	2.2	2.18	2.1
3	.....	2.6	2.2	2.22	19	2.8	2.2	2.1	2.1
4	.....	2.6	2.1	2.35	20	3.0	2.0	2.2	2.1
5	.....	2.6	2.1	2.36	21	2.9	2.2	2.3	2.1
6	.....	2.5	2.1	2.35	22	2.9	2.2	2.3	2.1
7	.....	2.5	2.1	2.34	23	2.8	2.1	2.3	2.1
8	.....	2.5	2.1	3.24	24	2.6	2.2	2.3	2.1
9	.....	2.5	2.1	3.25	25	2.7	2.2	2.3	2.2
10	.....	2.5	2.1	2.0	26	2.6	2.2	2.4	2.2
11	.....	2.5	2.1	1.9	27	2.6	2.2	2.3	2.2
12	.....	2.4	2.0	1.95	28	2.6	2.2	2.3	.....
13	.....	2.4	2.0	1.9	29	2.6	1.9	2.3	.....
14	.....	2.4	2.0	1.9	30	2.6	1.9	2.32	.....
15	.....	2.4	2.0	1.9	31	.....	1.9	2.3	.....
16	3.0	2.4	2.0	1.9					

Monthly discharge of North Fork of North Creek, near Beaver, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
June (16–30)	52	17	29.9	890
July	17	.2	6.8	418
August	7.7	.5	2.7	166
September (1–27)	84	.2	8.3	445
The period	.....	.....	.....	1,910

NOTE.—These values are based on very meager data and are only approximate.

SOUTH FORK OF NORTH CREEK, NEAR BEAVER, UTAH.

This was a temporary station established June 16 and discontinued September 27, 1906. It was located 100 feet east of "The Narrows" of South Fork Canyon, 8 miles northeast of Beaver, Utah.

Discharge measurements of South Fork of North Creek, near Beaver, Utah.

	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 23	3.40	90
August 18	2.25	17.3
August 27	2.20	16.1

Daily gage height, in feet, of South Fork of North Creek, near Beaver, Utah, for 1906.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1		3.1	2.4	2.32	17	3.6	2.7	2.5	2.3
2		3.1	2.4	2.32	18	3.6	2.7	2.4	2.2
3		3.1	2.3	2.22	19	3.6	2.6	2.4	2.2
4		3.1	2.3	2.35	20	3.7	2.4	3.5	2.2
5		3.9	2.3	2.35	21	3.7	2.4	2.45	2.2
6		2.8	2.3	2.34	22	3.6	2.3	2.4	2.2
7		2.8	2.4	2.34	23	3.4	2.4	2.4	2.3
8		2.8	2.4	2.34	24	3.2	2.4	2.4	2.3
9		2.8	2.4	2.35	25	3.1	2.4	2.4	2.3
10		2.8	2.4	2.25	26	3.0	2.4	2.4	2.3
11		2.8	2.4	2.24	27	2.9	2.4	2.2	2.3
12		2.8	2.4	2.25	28	3.0	2.4	2.3	
13		2.8	2.6	2.25	29	2.9	2.4	2.3	
14		2.7	2.5	2.25	30	2.8	2.4	2.3	
15		2.7	2.5	2.25	31		2.4		
16	3.8	2.7	2.4	2.25					

Monthly discharge of South Fork of North Creek, near Beaver, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
June 16–30	152	39	88.1	2,620
July	168	18	37.6	2,310
August	102	16	23.4	1,390
September 1–27	19	16	17.5	937
The period				7,260

NOTE.—These values are based on meager data and are only approximate.

SOUTH CREEK, NEAR BEAVER, UTAH.

This was a temporary station established June 18 and discontinued September 18, 1906. It was located 900 feet east of Cox Brothers' ranch house and 8 miles southeast of Beaver.

	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 18	1.20	26.8
July 6	.70	6.8
July 31	.51	2.8
August 25	.45	3.1

INDIAN CREEK, NEAR BEAVER, UTAH.

This was a temporary station established June 26 and discontinued August 31, 1906. It was located 190 feet above the head of Beaumont ditch and 12 miles north of Beaver.

Discharge measurements of Indian Creek, near Beaver, Utah.

	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 26	0.95	21.3
August 18	.65	4.6
August 21	.61	3.9

Daily gage height, in feet, of Indian Creek, near Beaver, Utah, for 1906.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1			0.73	17		0.79	
2		0.88		18			0.64
3				19			
4				20			
5		.85	.70	21			.70
6		.84		22			
7				23		.71	
8			.67	24			
9				25		.71	
10		.80		26	0.95		
11			.65	27		.72	.61
12				28	.92	.73	.61
13				29			
14		.78		30	.90		
15				31		.74	.63
16							

Monthly discharge of Indian Creek, near Beaver, Utah, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
June (26–30)	21	16.5	18.4	182
July	15.5	6.3	9.4	578
August	7.0	4.0	5.1	314
The period				1,070

NOTE.—These values are based on very meager data and are only approximate.

HUMBOLDT SINK DRAINAGE.

The only stream of importance draining into Humboldt Sink is Humboldt River, the basin of which is described below.

HUMBOLDT RIVER BASIN.

DESCRIPTION OF BASIN.

Humboldt River rises in the extreme northeastern part of Nevada, flows west and southwest across the structural features of the country, and enters Humboldt Lake, whence its waters find their way into Humboldt Sink. The tributaries follow the general direction of the mountain ranges and flow either to the north or to the south. During low stages the water of the river is almost wholly diverted and for the future development of the country recourse must be had to the construction of storage reservoirs.

Of the tributaries North Fork enters the stream west of Peko, Nev., and South Fork about 10 miles below Elko. Pine Creek comes in from the south near Palisade, Nev. Marys River is one of the headwater branches.

NORTH FORK OF HUMBOLDT RIVER NEAR ELBURZ, NEV.

This station was established October 10, 1902. It is located about one-fourth mile above the junction of North Fork with the main river and 150 feet below the Southern Pacific Railroad bridge. It is

2 miles west of the Southern Pacific Railroad station at Elburz. The nearest post-office is Halleck, Nev. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 70, where are given also references to publications that contain data for previous years.

Discharge measurements of North Fork of Humboldt River near Elburz, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 28	M. B. Kennedy	40	100	4.35	176
June 25	do	40	90	4.30	122
July 9	do	37	46	3.60	60
August 7	do	35	13	2.95	11.8

Daily gage height, in feet, of North Fork of Humboldt River near Elburz, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	4.0	3.8	4.5	4.6	4.5	4.2	3.0	2.5	2.5	2.55	2.85
2	3.5	4.0	3.8	4.5	4.5	4.5	4.1	3.0	2.5	2.5	2.55	2.85
3	3.5	4.0	3.8	4.4	4.5	4.5	4.0	3.0	2.5	2.5	2.55	2.9
4	3.5	4.0	3.8	4.4	4.5	4.5	4.0	3.0	2.5	2.5	2.55	2.9
5	3.5	4.0	3.8	4.4	4.5	4.4	3.9	3.0	2.5	2.5	2.55	2.95
6	3.5	4.0	3.8	4.3	4.5	4.4	3.8	2.95	2.5	2.5	2.6	2.95
7	3.5	4.0	3.8	4.3	4.4	4.3	3.7	2.9	2.5	2.5	2.6	3.0
8	3.5	4.0	3.8	4.4	4.4	4.3	3.7	2.9	2.5	2.5	2.6	3.1
9	3.5	4.0	3.8	4.5	4.35	4.3	3.65	2.85	2.5	2.5	2.65	3.1
10	3.5	4.0	3.8	5.0	4.3	4.3	3.6	2.85	2.5	2.5	2.65	3.1
11	3.5	4.0	3.8	5.4	4.2	4.2	3.6	2.85	2.5	2.5	2.65	3.15
12	3.5	4.0	3.7	5.3	4.1	4.2	3.55	2.85	2.5	2.5	2.65	3.15
13	3.5	4.0	3.7	5.2	4.1	4.1	3.5	2.85	2.5	2.5	2.65	3.2
14	3.5	4.0	3.6	5.0	4.1	4.2	3.5	2.85	2.5	2.5	2.65	3.2
15	3.6	4.0	3.6	5.0	4.0	4.2	3.45	2.8	2.5	2.5	2.7	3.2
16	3.6	4.0	3.6	5.0	4.0	4.3	3.4	2.8	2.5	2.5	2.7	3.2
17	3.8	4.0	3.6	5.0	4.1	4.3	3.4	2.8	2.5	2.5	2.7	3.2
18	3.9	4.0	3.6	4.9	4.1	4.4	3.35	2.8	2.5	2.5	2.7	3.2
19	4.0	4.0	3.6	4.9	4.1	4.6	3.35	2.8	2.5	2.5	2.7	3.2
20	4.0	4.0	3.6	5.0	4.1	4.9	3.3	2.75	2.5	2.5	2.7	3.2
21	4.0	3.9	3.7	5.0	4.1	4.9	3.3	2.75	2.5	2.5	2.7	3.2
22	4.0	3.8	3.7	5.0	4.0	4.8	3.25	2.7	2.5	2.5	2.7	3.2
23	4.0	3.8	3.8	5.0	4.0	4.7	3.25	2.65	2.5	2.5	2.7	3.2
24	4.0	3.7	3.8	4.9	4.0	4.5	3.2	2.6	2.5	2.5	2.7	3.2
25	4.0	3.7	4.0	4.85	4.0	4.3	3.2	2.6	2.5	2.5	2.75	3.2
26	4.0	3.75	4.7	4.85	4.0	4.3	3.15	2.6	2.5	2.5	2.75	3.2
27	4.0	3.8	6.4	4.8	4.1	4.25	3.1	2.6	2.5	2.5	2.8	3.2
28	4.0	3.8	4.6	4.7	4.3	4.2	3.1	2.55	2.5	2.5	2.8	3.2
29	4.0	.....	4.6	4.7	4.4	4.2	3.1	2.55	2.5	2.5	2.8	3.2
30	4.0	.....	4.5	4.6	4.5	4.2	3.1	2.5	2.5	2.5	2.85	3.2
31	4.0	.....	4.5	.....	4.5	.....	3.05	2.5	.....	2.5	.....	3.2

NOTE.—There was probably obstruction from ice during the winter months, to what extent is not known.

Rating table for North Fork of Humboldt River near Elburz, Nev., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.50	0	3.10	21	3.70	70	4.30	142	4.90	237
2.60	1	3.20	28	3.80	80	4.40	156	5.00	255
2.70	3	3.30	35	3.90	91	4.50	171	5.10	274
2.80	6	3.40	43	4.00	103	4.60	186	5.20	294
2.90	10	3.50	51	4.10	115	4.70	202	5.30	314
3.00	15	3.60	60	4.20	128	4.80	219	5.40	334

NOTE.—This table is applicable only for open-channel conditions. It is based on 4 discharge measurements made during 1906 and is not well defined.

Monthly discharge of North Fork of Humboldt River near Elburz, Nev., for 1906.

[Drainage area, 1,020 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	103	51	75.6	4,650	0.074	0.09
February	103	70	95.9	5,330	.094	.10
March	202	60	95	5,840	.093	.11
April	334	142	221	13,200	.217	.24
May	186	103	134	8,240	.131	.15
June	237	115	156	9,280	.153	.17
July	128	18	52.6	3,230	.052	.06
August	15	0	65.5	403	.0064	.01
September	0	0	0	0	.000	.00
October	0	0	0	0	.000	.00
November	8	.5	2.76	164	.0027	.003
December	28	8	23.2	1,430	.023	.03
The year	334	0	71.8	51,800	.070	.96

NOTE.—The open-channel rating table was applied throughout the year; values for winter months are liable to some error on account of ice.

SOUTH FORK OF HUMBOLDT RIVER NEAR ELKO, NEV.

This station was established August 29, 1896. It is located 10 miles southwest of the town of Elko, at Cislini's (formerly Mason's) ranch, and about 6 miles above the junction of South Fork with the main stream. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, p. 72, where are given also references to publications that contain data for previous years.

Discharge measurements of South Fork of Humboldt River near Elko, Nev., for 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 27	M. B. Kennedy	42	98	3.20	427
June 23	do	45	131	4.80	571
July 10	do	44	109	3.30	424
August 8	do	14	11.4	1.00	9.9

Daily gage height, in feet, of South Fork of Humboldt River near Elko, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Oct.	Nov.	Dec.
1	1.1	1.2	2.2	3.0	2.8	3.4	3.9	1.8	.....	1.1	1.1
2	1.1	1.2	2.0	2.9	2.7	3.4	3.9	1.8	.....	1.1	1.1
3	1.1	1.2	2.0	2.8	2.7	3.5	3.9	1.8	1.0	1.1	1.1
4	1.1	1.2	2.0	2.7	2.8	3.6	3.8	1.8	1.0	1.1	1.1
5	1.1	1.2	1.7	2.5	2.9	3.7	3.8	1.7	1.0	1.1	1.1
6	1.1	1.2	1.7	2.5	3.0	3.8	3.8	1.6	1.0	1.1	1.1
7	1.1	1.2	1.7	2.5	3.1	3.8	3.8	1.2	1.0	1.1	1.1
8	1.1	1.2	1.8	2.6	3.2	3.9	3.7	1.0	1.0	1.1	1.1
9	1.1	1.2	1.8	2.7	3.2	4.0	3.7	1.0	1.0	1.1	1.1
10	1.1	1.2	2.0	2.8	3.4	4.0	3.7	1.0	1.0	1.1	1.1
11	1.1	1.2	2.0	2.8	3.4	4.1	3.6	.....	1.0	1.1	1.1
12	1.1	1.2	2.0	2.9	3.4	4.2	3.6	.....	1.0	1.1	1.1
13	1.1	2.0	2.0	3.0	3.2	4.4	3.6	.....	1.0	1.1	1.1
14	1.1	2.0	1.9	3.0	3.1	4.5	3.6	.....	1.0	1.1	1.1
15	1.1	2.0	1.9	3.0	3.0	4.7	3.5	.....	1.0	1.1	1.1
16	1.1	2.0	1.8	3.0	3.0	5.0	3.4	.....	1.0	1.1	1.1
17	1.1	2.0	1.8	3.0	3.0	5.0	3.3	.....	1.0	1.1	1.1
18	1.1	2.1	1.8	3.0	2.9	5.0	3.2	.....	1.0	1.1	1.1
19	1.1	2.2	2.0	3.0	2.8	5.0	3.1	.....	1.0	1.1	1.1
20	1.1	2.2	2.6	3.0	2.8	5.0	3.0	.....	1.0	1.1	1.1
21	1.1	2.2	2.8	3.0	2.9	5.0	2.9	.....	1.1	1.1	1.1
22	1.1	2.2	2.8	3.0	3.0	5.0	2.8	.....	1.1	1.1	1.1
23	1.1	2.2	3.0	3.0	3.0	5.0	2.6	.....	1.1	1.1	1.1
24	1.1	2.2	3.0	3.0	3.0	5.0	2.3	.....	1.1	1.1	1.1
25	1.1	2.2	3.0	3.0	3.0	4.8	2.1	.....	1.1	1.1	1.1
26	1.1	2.2	3.0	3.0	3.0	4.8	2.0	.....	1.1	1.1	1.1
27	1.1	2.1	3.0	2.9	3.2	4.7	1.8	.....	1.1	1.1	1.1
28	1.2	2.1	2.8	2.8	3.2	4.7	1.8	.....	1.1	1.1	1.1
29	1.2	.....	2.8	2.8	3.2	4.7	1.8	.....	1.1	1.1	1.1
30	1.2	.....	2.9	2.8	3.3	4.7	1.8	.....	1.1	1.1	1.1
31	1.2	.....	3.0	.....	3.3	.....	1.8	.....	1.1	1.1	1.1

NOTE.—The river was dry August 11 to October 2.

Rating table for South Fork of Humboldt River near Elko, Nev., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.00	10	1.80	102	2.60	250	3.40	480	4.40	965
1.10	18	1.90	118	2.70	275	3.50	515	4.60	1,100
1.20	27	2.00	135	2.80	300	3.60	555	4.80	1,240
1.30	37	2.10	153	2.90	325	3.70	595	5.00	1,400
1.40	48	2.20	171	3.00	355	3.80	640		
1.50	60	2.30	190	3.10	385	3.90	685		
1.60	73	2.40	210	3.20	415	4.00	735		
1.70	87	2.50	230	3.30	445	4.20	845		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1905–6 and is not well defined.

Monthly discharge of South Fork of Humboldt River near Elko, Nev., for 1906.

[Drainage area, 1,150 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	27	18	19.2	1,180	0.017	0.02
February	171	27	101	5,610	.088	.09
March	355	87	199	12,200	.173	.20
April	355	230	320	19,000	.278	.31
May	480	275	371	22,800	.323	.37
June	1,400	480	1,020	60,700	.887	.99
July	685	102	422	25,900	.367	.42
August	102	0	20.2	1,240	.018	.02
September	0	0	0	0	.000	.00
October	18	0	12.2	750	.011	.01
November	18	18	18.0	1,070	.016	.02
December	18	18	18.0	1,110	.016	.02
The year	1,400	0	210	152,000	.183	2.47

HUMBOLDT RIVER AT PALISADE, NEV.

This station was established November 27, 1902, and discontinued October 19, 1906. It is located at the single-span highway bridge one-fourth mile from the hotel at Palisade, Nev. There is a railroad bridge about 500 feet below. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, p. 74, where are given also references to publications that contain data for previous years.

Discharge measurements of Humboldt River at Palisade, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 26	M. B. Kennedy	105	432	4.50	1,010
June 25	do	108	632	5.90	1,940
July 10	do	102	453	4.65	1,080
August 8	do	87	96	2.20	108

Daily gage height, in feet, of Humboldt River at Palisade, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	1.7	1.7	2.1	5.35	6.3	5.5	5.2	2.9	1.7	1.7
2	1.7	1.7	2.15	5.3	6.1	5.6	5.2	2.8	1.7	1.8
3	1.7	1.7	2.25	5.3	6.0	5.4	5.1	2.4	1.7	1.8
4	1.7	1.7	2.3	5.3	6.1	5.5	5.2	2.6	1.7	1.8
5	1.7	1.7	2.4	5.3	5.8	5.6	5.0	2.6	1.7	1.8
6	1.7	1.7	2.6	5.35	5.7	5.8	5.1	2.5	1.7	1.8
7	1.7	1.7	2.7	5.35	5.4	5.6	5.1	2.4	1.7	1.8
8	1.7	1.7	3.0	5.4	5.5	5.7	5.0	2.3	1.6	1.8
9	1.7	1.7	3.2	5.4	5.2	5.7	5.0	2.2	1.6	1.8
10	1.7	1.7	3.3	5.45	5.2	5.6	4.8	2.1	1.6	1.8
11	1.7	1.7	3.4	5.5	5.3	5.6	4.8	2.0	1.6	1.8
12	1.7	1.7	3.5	5.6	5.1	5.5	4.8	2.0	1.6	1.8
13	1.7	1.7	3.6	5.6	5.0	5.6	4.8	2.0	1.7	1.8
14	1.7	1.7	3.65	5.7	5.0	5.7	4.8	2.0	1.8	1.8
15	1.7	1.7	3.7	5.8	5.2	5.7	4.8	1.9	1.8	1.8
16	1.7	1.7	3.7	5.8	5.2	5.6	4.8	1.8	1.7	1.8
17	1.7	1.7	3.8	5.9	5.0	5.8	4.7	1.8	1.8	1.8
18	1.7	1.75	4.0	6.2	4.9	6.0	4.6	1.7	1.8	1.8
19	1.7	1.75	4.2	6.2	4.9	6.0	4.5	1.8	1.8	1.8
20	1.7	1.75	4.3	6.3	4.8	5.8	4.5	1.7	1.8	.....
21	1.7	1.8	4.4	6.3	4.7	5.9	4.5	1.8	1.7	.....
22	1.7	1.8	4.6	6.4	4.6	5.8	4.6	1.8	1.7	.....
23	1.7	1.8	4.8	6.2	4.7	5.8	4.4	1.8	1.7	.....
24	1.7	1.8	5.0	6.5	4.8	5.8	4.3	1.8	1.7	.....
25	1.7	1.85	5.0	6.6	4.7	5.7	4.1	1.8	1.7	.....
26	1.7	1.85	5.1	6.5	4.6	5.6	4.0	1.8	1.7	.....
27	1.7	1.9	5.1	6.6	4.9	5.4	3.8	1.8	1.7	.....
28	1.7	2.0	5.2	6.7	4.8	5.3	3.7	1.8	1.7	.....
29	1.7	.....	5.25	6.6	4.9	5.3	3.5	1.8	1.7	.....
30	1.7	.....	5.25	6.4	5.5	5.2	3.2	1.8	1.7	.....
31	1.7	.....	5.3	.....	5.5	.....	3.0	1.8	.....	.....

Rating tables for Humboldt River, at Palisade, Nev.

JANUARY 1, 1905, TO MARCH 23, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.10	34	1.80	139	2.50	308	3.20	534	3.90	807
1.20	46	1.90	159	2.60	337	3.30	570	4.00	850
1.30	59	2.00	180	2.70	367	3.40	607	4.20	940
1.40	72	2.10	203	2.80	398	3.50	645	4.40	1,030
1.50	86	2.20	227	2.90	430	3.60	684	4.60	1,120
1.60	102	2.30	253	3.00	463	3.70	724	4.80	1,220
1.70	120	2.40	280	3.10	498	3.80	765		

MARCH 24 TO OCTOBER 19, 1906.[b]

1.70	30	2.60	210	3.50	530	4.40	955	5.60	1,710
1.80	42	2.70	240	3.60	570	4.50	1,010	5.80	1,860
1.90	56	2.80	270	3.70	615	4.60	1,065	6.00	2,020
2.00	72	2.90	305	3.80	660	4.70	1,120	6.20	2,180
2.10	91	3.00	340	3.90	705	4.80	1,180	6.40	2,350
2.20	111	3.10	375	4.00	750	4.90	1,240	6.60	2,530
2.30	133	3.20	410	4.10	800	5.00	1,300		
2.40	157	3.30	450	4.20	850	5.20	1,430		
2.50	182	3.40	490	4.30	900	5.40	1,565		

[a] This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1903–5 and is fairly well defined.

[b] This table is applicable only for open-channel conditions. It is based on 4 discharge measurements made during 1906 and is not well defined.

Monthly discharge of Humboldt River at Palisade, Nev., for 1906.

[Drainage area, 5,010 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	120	120	120	7,380	0.024	0.03
February	180	120	129	7,160	.026	.03
March	1,500	203	827	50,800	.165	.19
April	2,620	1,500	1,960	117,000	.391	.44
May	2,260	1,060	1,450	89,200	.289	.33
June	2,020	1,430	1,740	104,000	.347	.39
July	1,430	340	1,060	65,200	.212	.24
August	305	30	90.9	5,420	.018	.02
September	42	20	30.7	1,830	.0061	.01
October (1–19)	42	30	41.4	1,560	.0083	.01
The period				450,000		

NOTE.—The open-channel rating table was applied throughout the year; values for winter months are liable to some error on account of ice.

HUMBOLDT RIVER NEAR GOLCONDA, NEV.

This station was established October 24, 1894. It is located 1¼ miles north of the town of Golconda, near the great northern bend of Humboldt River and below the central valley, and is about 12 miles above the mouth of Little Humboldt River. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 76, where are given also references to publications that contain data for previous years.

Discharge measurements of Humboldt River near Golconda, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 25	M. B. Kennedy	80	433	9.10	777
June 26	do	82	421	9.05	850
July 11	do	89	464	9.35	908
August 9	do	50	98	5.60	161

Daily gage height, in feet, of Humboldt River near Golconda, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								6.4	4.2	3.7		4.1
2	2.7		6.2	8.6	10.8	8.8	9.8					
3		5.4	6.3						4.2	3.6	3.7	4.1
4	2.7	5.4		8.9		8.8	9.9	6.2				
5	2.7	5.4	6.2		10.7				4.1		3.7	4.1
6	2.7			9.1		8.9		6.1		3.6		
7		5.4	6.2	9.4	10.3		9.9				3.7	
8		5.4			10.2	9.0			4.1	3.5		4.1
9	2.7			9.6	10.0	9.0	9.8					
10	2.7		6.3						4.0	3.5	3.8	4.2
11	2.7			9.8	9.7	9.1	9.7	5.6				
12	3.0	5,2	6.6		9.6				3.9		3.8	4.2
13			6.4	10.0		9.1		5.4		3.5		
14		5.4	6.6	10.4	9.5		9.6				3.8	
15	3.0				9.5			5.2	3.7	3.5		4.7
16	3.0	5.6	6.5	10.6	9.4	9.1	9.1					
17	2.7	5.8	6.5						3.7	3.5	3.8	4.8
18	3.6			10.6	9.3	9.1	8.7	4.9				
19		6.0	6.6		9.3				3.7		3.8	4.8
20						9.1		4.8		3.5		
21		6.2	6.8	10.6	9.3		7.4				3.8	
22	3.0					9.1		4.7	3.8	3.5		4.8
23	3.6	6.4	7.0	10.6	9.2	9.0	7.2					
24	3.0		7.3		9.1				3.8	3.5	3.8	4.9
25	3.5			10.9		9.0	7.1	4.6				
26	3.9	5.9	7.5	10.9	9.0				3.7		3.9	5.0
27						10.0		4.5		3.5		
28		6.1	7.9	10.9	9.0		7.0				4.0	
29					9.0			4.4	3.7	3.6		5.0
30	5.4			10.9	8.9	9.7	6.8					
31			8.4		8.8		6.6			3.6		5.1

Rating table for Humboldt River near Golconda, Nev., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.70	0	3.70	17	4.70	77	5.70	171	7.40	420
2.80	0.2	3.80	21	4.80	85	5.80	182	7.60	460
2.90	.5	3.90	26	4.90	93	5.90	194	7.80	500
3.00	1	4.00	31	5.00	102	6.00	206	8.00	540
3.10	2	4.10	36	5.10	111	6.20	231	8.20	590
3.20	3	4.20	42	5.20	120	6.40	258	8.40	640
3.30	5	4.30	48	5.30	130	6.60	286	8.60	690
3.40	7	4.40	55	5.40	140	6.80	315	8.80	740
3.50	10	4.50	62	5.50	150	7.00	345	9.00	800
3.60	13	4.60	69	5.60	160	7.20	380	10.00	1,100

NOTE.—This table is applicable only for open-channel conditions. It is based on 4 discharge measurements made during 1906 and is fairly well defined above gage height 5 feet; below this it is only roughly approximate.

Monthly discharge of Humboldt River near Golconda, Nev., for 1906.

[Drainage area, 10,800 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	140	0	20.0	1,230	0.0019	0.002
February	258	120	172	9,550	.016	.02
March	640	231	324	19,900	.030	.03
April	1,420	690	1,160	69,000	.107	.12
May	1,400	740	1,000	61,500	.093	.11
June	1,100	740	836	49,700	.077	.09
July	1,070	286	704	43,300	.065	.07
August	258	55	131	8,060	.012	.01
September	42	17	26.2	1,560	.0024	.003
October	17	10	11.4	701	.0011	.001
November	31	17	21.2	1,260	.002	.002
December	111	36	69.1	4,250	.0064	.01
The year	1,420	0	73	270,000	.034	.47

NOTE.—In January, February, and May discharges were interpolated on days when gage was not read; for other months the mean discharge of days when gage was read was taken as the mean for the month. The open-channel rating was applied throughout the year; values for the winter months are liable to some error on account of ice.

HUMBOLDT RIVER NEAR OREANA, NEV.

This station was established January 27, 1896. It is located near Oreana, Nev., about 12 miles northeast of Lovelocks. The results of the observations at this locality show the amount of water available for storage at the possible reservoir sites in the vicinity of Humboldt station, and also for the six canal systems now in operation below Oreana. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 79, where are given also references to publications that contain data for previous years.

Discharge measurements of Humboldt River near Oreana, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 24	M. B. Kennedy	100	269	4.62	586
June 27	do	100	289	4.90	625
July 12	do	100	341	5.45	807
August 10	do	100	143	3.45	261

Daily gage height, in feet, of Humboldt River near Oreana, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.4	2.45	2.35	3.4	5.65	5.25	5.5	4.25	2.5	2.1	2.5	2.25
2	2.4	2.4	2.45	3.5	5.65	5.25	5.5	4.2	2.5	2.1	2.5	2.3
3	2.35	2.4	2.5	3.55	5.7	5.9	5.2	4.1	2.5	2.2	2.5	2.3
4	2.35	2.45	2.55	3.6	5.7	5.9	5.25	3.9	2.45	2.2	2.25	2.3
5	2.35	2.5	2.55	3.85	5.7	5.9	5.2	3.85	2.45	2.1	2.15	2.35
6	2.35	2.5	2.6	3.9	5.55	5.95	5.2	3.85	2.4	2.1	2.1	2.35
7	2.35	2.45	2.6	4.0	5.65	5.9	5.3	3.8	2.4	2.05	2.1	2.35
8	2.35	2.45	2.6	4.1	5.65	4.1	5.3	3.75	2.35	2.05	2.1	2.4
9	2.4	2.4	2.65	4.1	5.7	4.5	5.3	3.75	2.35	2.0	2.1	2.65
10	2.4	2.4	2.7	4.2	5.8	4.2	5.35	3.6	2.3	2.0	2.1	2.65
11	2.4	2.4	2.7	4.25	5.85	4.25	5.35	3.6	2.3	2.1	2.1	2.65
12	2.45	2.45	2.7	4.35	5.9	4.4	5.4	3.5	2.3	2.1	2.1	2.7
13	2.5	2.4	2.7	4.4	5.9	4.4	5.45	3.35	2.3	2.1	2.1	2.75
14	2.5	2.35	2.65	4.6	5.9	4.5	5.5	3.3	2.35	2.0	2.5	2.85
15	2.55	2.35	2.65	4.65	5.85	4.0	5.5	3.2	2.35	2.0	2.5	2.9
16	2.6	2.3	2.65	4.7	5.8	4.0	5.5	3.15	2.3	2.0	2.1	2.95
17	2.7	2.2	2.65	4.8	5.5	4.2	5.4	3.5	2.25	2.0	2.1	2.95
18	2.75	2.1	2.7	4.95	5.35	4.8	5.35	3.5	2.25	2.0	2.1	2.9
19	2.8	2.1	2.7	5.0	5.2	4.85	5.35	3.0	2.2	2.0	2.1	2.85
20	2.9	2.5	2.75	5.5	5.4	4.7	5.3	2.9	2.2	2.0	2.1	2.8
21	2.9	2.5	2.75	5.1	5.5	4.7	5.2	2.9	2.25	2.1	2.15	2.75
22	2.9	2.1	2.8	5.1	5.2	5.2	5.15	2.85	2.25	2.1	2.15	2.75
23	2.9	2.1	2.85	5.15	4.9	5.4	5.1	2.7	2.2	2.1	2.15	2.7
24	2.85	2.15	2.9	5.2	4.5	5.1	5.1	2.7	2.15	2.5	2.1	2.7
25	2.85	2.15	2.95	5.25	4.55	5.1	5.0	2.6	2.2	2.0	2.35	2.65
26	2.75	2.2	3.5	5.35	4.5	5.5	4.8	2.6	2.2	2.0	2.3	2.55
27	2.7	2.2	3.2	5.4	4.8	4.5	4.55	2.65	2.1	2.0	2.3	2.5
28	2.6	2.3	3.2	5.5	5.1	4.1	4.35	2.6	2.1	2.5	2.3	2.45
29	2.4	.....	3.25	5.6	5.4	4.0	4.35	2.55	2.95	2.5	2.3	2.45
30	2.4	.....	3.25	5.65	5.3	3.9	4.3	2.55	2.5	2.5	2.25	2.45
31	2.45	.....	3.3	.....	5.3	.....	4.3	2.5	.....	2.5	.....	2.45

NOTE.—There was probably no material obstruction by ice during 1906.

Rating tables for Humboldt River near Oreana, Nev.

JANUARY 1, 1905, TO APRIL 6, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.10	0	1.70	12	2.30	82	2.90	193	3.50	335
1.20	0.5	1.80	20	2.40	98	3.00	215	3.60	360
1.30	1	1.90	29	2.50	115	3.10	238	3.70	385
1.40	2	2.00	40	2.60	133	3.20	261	3.80	412
1.50	3.5	2.10	53	2.70	152	3.30	285	3.90	440
1.60	7	2.20	67	2.80	172	3.40	310		

APRIL 7 TO DECEMBER 31, 1906.[b]

2.00	16	2.80	124	3.60	296	4.40	500	5.40	820
2.10	26	2.90	143	3.70	320	4.50	530	5.60	890
2.20	37	3.00	163	3.80	345	4.60	560	5.80	960
2.30	49	3.10	183	3.90	370	4.70	590	6.00	1,030
2.40	62	3.20	204	4.00	395	4.80	620		
2.50	75	3.30	226	4.10	420	4.90	650		
2.60	90	3.40	249	4.20	445	5.00	680		
2.70	106	3.50	272	4.30	470	5.20	750		

[a] This table is applicable only for open-channel conditions. It is based on 6 discharge measurements made during 1905 and is fairly well defined between gage heights 1.6 feet and 3.0 feet.

[b] This table is applicable only for open-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 feet. Below gage height 3 feet it is uncertain.

Monthly discharge of Humboldt River near Oreana, Nev., for 1906.

[Drainage area, 13,800 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	193	90	129	7,930	0.0094	0.01
February	115	53	87.7	4.870	.0064	.007
March	335	90	172	10,600	.012	.01
April	908	310	595	35,400	.043	.05
May	995	530	835	51,300	.060	.07
June	1,010	370	638	38,000	.046	.05
July	855	470	735	45,200	.053	.06
August	458	75	229	14,100	.017	.02
September	153	26	54.1	3,220	.0039	.004
October	75	16	30.4	1,870	.0022	.003
November	75	26	40.2	2,390	.0029	.003
December	153	43	93.2	5,730	.0068	.008
The year	1,010	16	303	221,000	.022	.30

NOTE.—The open-channel rating table was applied throughout the year; values for the winter months are liable to some error on account of ice.

SIERRA NEVADA DRAINAGE.

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, with the bodies of water into which they discharge, are the following: Truckee River into Pyramid and Winnemucca lakes, Walker River into Walker Lake, Carson River into Carson Sink, Susan River into Honey Lake, and Owens River into Owens Lake.

TRUCKEE RIVER BASIN.

DESCRIPTION OF BASIN.

Upper Truckee River rises on the eastern slopes of the Sierra Nevada, in Eldorado County, Cal., and flows northward, entering Lake Tahoe from the south. The main Truckee leaves the lake, of which it forms the outlet, at the town of Tahoe, in eastern Placer County, Cal., flows north and northeast, and discharges, in Washoe County, Nev., into Pyramid and Winnemucca lakes, which have no outflowing streams. The drainage basin is wild and mountainous, the highest peaks reaching altitudes exceeding 10,000 feet. Lake Tahoe, which lies at an elevation of 6,225 feet above sea, has an area of 193 square miles and is the largest body of fresh water in the United States at this altitude.

In the lower part of its course the Truckee receives several important tributaries, among which may be mentioned Donner and Prosser creeks and Little Truckee River, the latter uniting with the main stream at the town of Boca. Independence Creek is a branch of the Little Truckee.

TRUCKEE RIVER AT TAHOE, CAL.

This station was established June 17, 1900, with a view to ascertaining the actual overflow from Lake Tahoe and the real value of the lake as a storage reservoir. It is located at the city of Tahoe. About 500 feet from the lake there is a timber dam across the river, which has been maintained for more than twenty years for the purpose of controlling the discharge from the lake. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 88, where are given also references to publications that contain data for previous years.

Discharge measurements of Truckee River at Tahoe, Cal., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
July 2	M. B. Kennedy	75	317	2.90	785
August 4	do	74	203	2.50	552

Daily gage height, in feet, of Truckee River at Tahoe, Cal., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.4	2.0	2.1	2.25	2.4	2.45	2.9	3.0	3.2	2.0	2.95	2.7
2	1.4	2.0	2.1	2.25	2.4	2.45	2.9	3.0	3.2	2.8	2.95	2.7
3	1.4	2.0	2.1	2.25	2.4	2.45	2.9	3.0	3.2	2.7	2.95	2.7
4	1.4	2.0	2.1	2.25	2.4	2.45	2.9	.....	3.2	2.7	2.95	2.7
5	1.4	2.0	2.1	2.3	2.4	2.45	2.9	2.55	3.2	2.7	2.95	2.7
6	1.4	2.0	2.1	2.3	2.4	2.45	2.9	2.55	3.2	2.7	2.95	2.7
7	1.4	2.0	2.1	2.3	2.5	2.45	2.9	2.55	3.2	2.8	2.95	2.6
8	1.4	2.0	2.1	2.3	2.28	2.45	2.9	2.55	3.2	2.8	2.95	2.6
9	1.4	1.95	2.1	2.3	2.28	2.85	2.9	2.55	3.2	2.8	2.95	2.6
10	1.4	1.95	2.1	2.3	2.6	2.85	3.0	3.1	3.2	3.2	2.95	2.7
11	1.4	1.95	2.1	2.3	2.6	2.45	3.0	3.1	3.2	3.2	2.95	2.7
12	1.4	1.95	2.2	2.3	2.6	2.7	3.0	3.1	3.2	3.2	2.95	2.7
13	1.5	1.95	2.2	2.3	2.6	2.7	3.0	3.1	3.2	3.2	2.95	2.7
14	1.5	1.95	2.2	2.3	2.6	2.6	3.0	3.1	3.2	3.2	2.95	2.7
15	1.6	2.0	2.2	2.3	2.65	2.6	3.0	3.1	2.95	3.2	2.95	2.9
16	1.6	2.0	2.2	2.3	2.65	2.6	3.0	3.1	2.95	3.2	2.95	2.9
17	1.7	2.0	2.2	2.3	2.7	2.6	3.0	3.1	2.95	3.2	2.9	2.9
18	1.8	2.0	2.2	2.3	2.7	2.6	3.0	3.25	2.95	3.2	2.9	2.9
19	1.8	2.0	2.2	2.3	2.7	2.6	3.0	3.25	2.95	3.2	2.9	2.9
20	1.9	2.0	2.2	2.3	2.7	2.6	3.0	3.25	2.95	3.1	2.9	2.8
21	1.9	2.0	2.2	2.3	2.7	2.6	3.0	3.25	2.95	3.1	2.85	2.8
22	2.0	2.1	2.2	2.35	2.75	2.6	3.0	3.25	2.95	3.1	2.85	2.8
23	2.0	2.1	2.2	2.35	2.75	2.6	3.0	3.2	2.95	3.1	2.85	2.8
24	2.0	2.1	2.2	2.35	2.75	2.6	3.0	3.2	2.9	2.95	2.85	2.8
25	2.0	2.1	2.2	2.35	2.4	2.6	3.0	3.2	2.9	2.95	2.85	2.8
26	2.0	2.1	2.2	2.35	2.15	2.6	3.0	3.2	2.9	2.95	2.85	2.8
27	2.0	2.1	2.2	2.35	2.0	2.9	3.0	3.2	2.9	2.95	2.75	2.8
28	2.0	2.1	2.2	2.35	2.0	2.9	3.0	3.2	2.9	2.95	2.75	2.8
29	2.0	.....	2.2	2.35	2.0	2.9	3.0	3.18	2.9	2.95	2.75	2.85
30	2.0	.....	2.2	2.35	2.0	2.9	3.0	3.18	2.9	2.95	2.7	2.85
31	2.0	.....	2.25	.....	2.45	.....	3.0	3.18	.....	2.95	.....	2.9

Rating table for Truckee River at Tahoe, Cal., for 1905–6.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.30	15	1.00	139	1.70	306	2.40	518	3.10	776
.40	31	1.10	160	1.80	334	2.50	552	3.20	817
.50	47	1.20	182	1.90	363	2.60	586	3.30	859
.60	64	1.30	205	2.00	392	2.70	622		
.70	82	1.40	229	2.10	422	2.80	659		
.80	100	1.50	253	2.20	453	2.90	697		
.90	119	1.60	279	2.30	485	3.00	736		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1905–6 and the form of previous curves, and is not well defined.

Monthly discharge of Truckee River near Tahoe, Cal., for 1906.

[Drainage area 519 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	392	229	304	18,700	0.586	0.68
February	422	378	396	22,000	.763	.79
March	469	422	443	27,200	.854	.98
April	502	469	488	29,000	.940	1.05
May	640	392	543	33,400	1.05	1.21
June	697	535	594	35,300	1.14	1.27
July	736	697	725	44,600	1.40	1.61
August	838	552	753	46,300	1.45	1.67
September	817	697	759	45,200	1.46	1.63
October	817	392	726	44,600	1.40	1.61
November	716	622	695	41,400	1.34	1.50
December	697	586	647	39,800	1.25	1.44
The year	838	229	589	428,000	1.14	15.44

NOTE.—The open-channel rating table was applied throughout the year; values for winter months are liable to some error on account of ice.

TRUCKEE RIVER AT NEVADA-CALIFORNIA STATE LINE.

This station was established September 7, 1899. It is located at the State line, 17 miles west of Reno, Nev. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 86, where are given also references to publications that contain data for previous years.

Discharge measurements of Truckee River at Nevada-California State line in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 24	C. L. Smith	72	304	2.50	759
May 23	M. B. Kennedy	90	544	4.60	2,480
June 21	do	90	648	5.30	3,140
July 3	do	90	613	4.95	2,710
July 30	do	73	334	3.10	1,000

Daily gage height, in feet, of Truckee River at Nevada-California State line for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.80	2.30	2.70	3.58	5.92	4.00	4.85	2.85	2.75	2.35	2.75	2.50
2	1.80	2.28	2.65	3.48	6.85	4.25	4.98	2.90	2.75	2.38	2.65	2.48
3	1.80	2.30	2.62	3.22	6.85	4.65	5.00	2.90	2.62	2.50	2.65	2.48
4	1.72	2.28	2.58	3.08	6.82	5.08	4.90	2.85	2.60	2.50	2.98	2 52
5	1.72	2.25	2.52	3.00	7.15	5.05	4.95	2.65	2.65	2.48	2.78	2.50
6	1.75	2.35	2.50	3.35	7.08	4.65	4.98	2.60	2.68	2.48	2.70	2.45
7	1.75	2.35	2.50	3.50	7.18	4.45	4.60	2.65	2.65	2.50	2.68	2.45
8	1.85	2.30	2.55	3.90	7.15	4.30	4.68	2.60	2.65	2.50	2.65	2.48
9	1.95	2.30	2.60	4.20	7.18	4.88	4.50	2.65	2.65	2.50	2.68	2.45
10	2.00	2.30	2.72	4.22	6.85	5.25	4.25	2.70	2.65	2.58	2.68	2.68
11	1.95	2.30	2.85	3.98	6.98	6.25	4.20	2.80	2.65	2.75	2.70	2.60
12	1.98	2.48	3.72	4.00	6.60	5.90	4.20	2.85	2.65	2.65	2.65	2.62
13	2.00	2.40	3.05	4.10	6.35	5.20	4.22	2.90	2.65	2.72	2.70	2.65
14	1.98	2.38	2.78	4.28	6.40	5.05	4.20	2.80	2.65	2.75	2.68	2.65
15	2.05	2.52	2.82	4.55	6.25	5.10	4.00	2.80	2.65	2.68	2.70	2.65
16	2.18	2.52	2.80	6.95	5.88	5.55	3.88	2.80	2.68	2.65	2.70	2.60
17	2.22	2.52	2.80	6.00	5.68	5.55	3.70	2.70	2.65	2.65	2.65	2.58
18	2.90	2.55	2.78	5.98	5.25	5.02	3.42	2.80	2.65	2.65	2.65	2.60
19	3.18	2.85	2.82	6.08	4.80	5.22	3.60	2.75	2.62	2.65	2.60	2.60
20	2.80	2.90	2.78	6.05	4.88	5.32	3.50	2.85	2.65	2.62	2.55	2.60
21	2.68	2.70	2.85	6.60	4.70	5.50	3.45	2.80	2.62	2.65	2.60	2.60
22	2.68	2.72	3.15	6.80	4.78	5.35	3.40	2.85	2.60	2.52	2.60	2.60
23	2.62	2.70	3.25	6.75	4.62	5.20	3.40	2.78	2.65	2.52	2.58	2.60
24	2.58	2.70	3.45	5.90	4.40	5.20	3.35	2.78	2.65	2.60	2.50	2.62
25	2.52	2.68	3.52	5.70	4.40	5.02	3.35	2.75	2.65	2.60	2.50	2.68
26	2.50	2.68	3.50	5.88	4.82	4.92	3.68	2.75	2.62	2.62	2.55	2.98
27	2.50	2.68	3.40	5.82	4.55	4.90	3.30	2.75	2.62	2.70	2.50	2.92
28	2.48	2.70	3.48	4.70	4.20	4.45	3.30	2.80	2.62	2.45	2.45	2.85
29	2.42	.....	3.40	4.35	4.02	4.28	3.15	2.80	2.60	2.42	2.52	2.80
30	2.35	.....	3.45	4.80	3.92	4.20	3.05	2.80	2.60	2.55	2.52	2.78
31	2.20	.....	3.90	.....	3.80	.....	3.00	2.75	.....	2.62	.....	2.75

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

JANUARY 1, 1905, to APRIL 15, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.70	300	2.60	810	3.50	1,580	4.40	2,470	5.60	3,850
1.80	346	2.75	884	3.60	1,676	4.50	2,580	5.80	4,090
1.90	394	2.80	961	3.70	1,772	4.60	2,690	6.00	4,330
2.00	444	2.90	1,042	3.80	1,870	4.70	2,800	6.20	4,570
2.10	496	3.00	1,126	3.90	1,970	4.80	2,910	6.40	4,810
2.20	551	3.10	1,213	4.00	2,070	4.90	3,020		
2.30	610	3.20	1,302	4.10	2,170	5.00	3,130		
2.40	673	3.30	1,393	4.20	2,270	5.20	3,370		
2.50	740	3.40	1,486	4.30	2,370	5.40	3,610		

APRIL 16 TO DECEMBER 31, 1906.[b]

2.30	460	3.10	995	3.90	1,700	4.70	2,500	6.00	3,950
2.40	520	3.20	1,075	4.00	1,800	4.80	2,600	6.20	4,190
2.50	580	3.30	1,155	4.10	1,900	4.90	2,710	6.40	4,430
2.60	645	3.40	1,240	4.20	2,000	5.00	2,820	6.60	4,670
2.70	710	3.50	1,325	4.30	2,100	5.20	3,040	6.80	4,920
2.80	780	3.60	1,415	4.40	2,200	5.40	3,260	7.00	5,180
2.90	850	3.70	1,510	4.50	2,300	5.60	3,480	7.20	5,440
3.00	920	3.80	1,605	4.60	2,400	5.80	3,710		

[a] This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1903–1906 and is well defined.

[b] This table is applicable only for open-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 heights 3 feet.

Monthly discharge of Truckee River at Nevada-California State line for 1906.

[Drainage area, 955 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	1,290	309	592	36,400	0.620	0.71
February	1,040	580	746	41,400	.781	.81
March	1,970	740	1,130	69,500	1.18	1.36
April	5,120	1,130	2,850	170,000	2.98	3.32
May	5,410	1,600	3,650	224,000	3.82	4.40
June	4,250	1,800	2,830	168,000	2.96	3.30
July	2,820	920	1,800	111,000	1.88	2.17
August	850	645	763	46,900	.799	.92
September	745	645	675	40,200	.707	.79
October	745	490	629	38,700	.659	.76
November	906	550	670	39,900	.702	.78
December	906	550	662	40,700	.693	.80
The year	5,410	309	1,420	1,030,000	1.48	20.12

NOTE.—The open-channel rating tables were applied throughout the year; values for the winter months are liable to some error on account of ice.

DONNER CREEK NEAR TRUCKEE, CAL.

Donner Creek flows from the east end of Donner Lake eastward into Truckee River.

The gaging station was established October 23, 1902. It is located about 150 feet below the dam of the Donner Creek Ice Company and 1½ miles west of Truckee, Cal. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 97, where are given also references to publications that contain data for previous years.

Discharge measurements of Donner Creek near Truckee, Cal., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 31	M. B. Kennedy	36	76	3.40	323
June 29	do	37	81	3.60	330
August 1	do	17	18	1.65	35

Daily gage height, in feet, of Donner Creek near Truckee, Cal., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	1.9	2.05	2.6	3.55	3.55	3.95	1.75	1.2	1.2	1.0	1.1
2	1.9	1.9	2.0	2.6	3.65	3.65	4.0	1.65	1.2	1.2	1.0	1.1
3	1.9	1.9	2.0	2.65	3.8	3.85	4.0	1.6	1.1	1.2	1.0	1.1
4	1.9	1.9	2.0	2.7	4.25	4.1	4.0	1.55	1.1	1.2	1.45	1.1
5	1.9	1.9	2.05	2.7	4.55	4.1	3.85	1.5	1.1	1.2	1.45	1.1
6	1.9	1.9	2.1	2.75	4.6	4.0	3.8	1.5	1.1	1.2	1.35	1.1
7	1.9	1.9	2.1	2.8	4.6	4.0	3.7	1.5	1.1	1.2	1.25	1.15
8	1.9	1.9	2.1	2.8	4.6	4.05	3.7	1.5	1.1	1.2	1.2	1.25
9	1.9	1.9	2.1	2.8	4.55	4.15	3.6	1.5	1.1	1.2	1.2	1.35
10	2.0	1.9	2.2	2.8	4.3	4.2	3.45	1.45	1.1	1.2	1.2	1.5
11	2.0	1.9	2.2	2.85	4.2	4.5	3.3	1.4	1.1	1.2	1.2	1.55
12	2.0	1.9	2.3	2.9	4.1	4.7	3.4	1.4	1.1	1.2	1.2	1.5
13	3.75	1.9	2.3	2.95	4.15	4.5	3.45	1.4	1.1	1.2	1.2	1.4
14	2.0	1.9	2.3	3.0	4.15	4.1	3.3	1.4	1.1	1.2	1.2	1.4
15	1.95	1.95	2.3	3.05	4.0	4.1	3.3	1.35	1.1	1.2	1.35	1.4
16	1.8	2.0	2.3	3.1	3.9	4.4	3.3	1.3	1.1	1.2	1.55	1.3
17	1.95	2.0	2.3	3.15	3.8	4.25	3.3	1.3	1.1	1.2	1.4	1.3
18	2.05	2.1	2.3	3.25	3.95	4.05	3.3	1.25	1.15	1.2	1.3	1.3
19	2.2	2.35	2.35	3.3	4.2	4.05	3.3	1.2	1.2	.....	1.3	1.2
20	2.2	2.25	2.4	3.35	4.5	4.25	3.2	1.2	1.2	.....	1.25	1.2
21	2.2	2.2	2.45	3.55	4.75	4.3	3.2	1.2	1.2	.....	1.2	1.2
22	2.15	2.2	2.5	3.6	4.65	4.2	3.1	1.2	1.2	.....	1.2	1.2
23	2.05	2.2	2.5	3.55	4.55	4.25	2.95	1.2	1.2	.....	1.2	1.35
24	2.05	2.2	2.5	3.4	4.3	4.2	2.7	1.2	1.2	.....	1.2	1.45
25	2.05	2.2	2.5	3.25	4.05	4.15	2.45	1.2	1.2	1.0	1.2	1.55
26	2.1	2.2	2.5	3.2	4.05	3.95	2.25	1.2	1.2	1.0	1.2	1.75
27	2.1	2.2	2.5	3.2	3.85	3.8	2.15	1.2	1.2	1.0	1.2	1.55
28	2.05	2.1	2.5	3.2	3.75	3.85	2.05	1.2	1.2	1.0	1.1	1.4
29	2.0	.....	2.55	3.2	3.7	3.9	2.0	1.2	1.2	1.0	1.1	1.3
30	2.0	.....	2.6	3.2	3.7	3.95	1.9	1.2	1.2	1.0	1.1	1.3
31	2.0	.....	2.6	.....	3.55	.....	1.85	1.2	.....	1.0	.....	1.3

NOTE.—The ice ponds were being filled October 19 to 24, and there was practically no flow at the station

Rating tables for Donner Creek near Truckee, Cal.

JANUARY 1, 1905, TO APRIL 30, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.70	0.0	1.40	5.7	2.00	29	2.60	86	3.20	185
.80	0.1	1.50	8.3	2.10	35	2.70	100	3.30	206
.90	.2	1.60	11.5	2.20	43	2.80	115	3.40	227
1.00	.5	1.70	15	2.30	52	2.90	131	3.50	248
1.10	1.1	1.80	19	2.40	62	3.00	148	3.60	269
1.20	2.0	1.90	24	2.50	73	3.10	166	3.70	290
1.30	3.5								

MAY 1 TO DECEMBER 31, 1906.[b]

1.00	9	1.80	45	2.60	142	3.40	307	4.20	520
1.10	12	1.90	53	2.70	159	3.50	330	4.30	550
1.20	15	2.00	62	2.80	177	3.60	354	4.40	580
1.30	19	2.10	72	2.90	196	3.70	379	4.50	610
1.40	23	2.20	84	3.00	217	3.80	405	4.60	645
1.50	27	2.30	97	3.10	239	3.90	432	4.70	680
1.60	32	2.40	111	3.20	261	4.00	460	4.80	715
1.70	38	2.50	126	3.30	284	4.10	490		

[a] This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1904–5 and is well defined.

[b] This table is applicable only for open-channel conditions. It is based on 3 discharge measurements made during 1906 and the form of the 1905 curve and is not well defined.

Monthly discharge of Donner Creek near Truckee, Cal., for 1906.

[Drainage area, 30 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	300	19	38.3	2,360	1.28	1.48
February	57	24	32.0	1,780	1.07	1.11
March	86	29	54.5	3,350	1.82	2.10
April	269	86	161	9,580	5.37	5.99
May	698	342	506	31,100	16.87	19.45
June	680	342	493	29,300	16.43	18.33
July	460	49	269	16,500	8.97	10.34
August	42	15	21.4	1,320	.713	.82
September	15	12	13.5	803	.450	.50
October[a]	15	0	11.1	682	.370	.43
November	30	9	16.3	970	.543	.61
December	42	12	20.0	1,230	.667	.77
The year	698	0	136	99,000	4.55	61.93

[a] Mean discharge estimated 7 second-feet October 19, and 5 second-feet October 24.

NOTE.—The open-channel rating was applied throughout the year; values for the winter months are liable to some error on account of ice.

TRUCKEE RIVER AT VISTA, NEV.

This station was established August 18, 1899. It is located 7 miles east of Reno, Nev., and one-fourth mile from the Southern Pacific Railroad station at Vista. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 84, where are given also references to publications that contain data for previous years.

Discharge measurements of Truckee River at Vista, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 25	C. L. Smith	113	485	5.10	896
May 22	M. B. Kennedy	120	796	8.10	3,150
June 19	do	119	862	8.50	3,290
July 5	do	120	890	8.20	3,370
July 28	do	115	561	6.00	1,420

Daily gage height, in feet, of Truckee River at Vista, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	4.8	5.0	6.7	8.2	6.8	7.8	5.4	4.9	4.7	5.2	4.9
2	4.0	4.8	5.0	6.6	8.9	7.3	8.0	5.0	4.8	4.3	5.2	4.9
3	3.9	4.8	5.0	6.3	9.4	7.3	8.0	5.1	4.8	4.6	5.1	4.9
4	4.0	4.7	5.0	5.9	9.4	8.0	8.3	5.0	4.7	4.6	5.4	4.8
5	4.0	4.7	5.0	5.7	9.7	8.4	8.3	4.7	4.7	4.6	5.8	4.9
6	4.0	4.7	5.0	6.0	9.8	8.0	8.2	4.6	4.8	4.6	5.3	4.9
7	4.0	4.7	5.0	6.5	9.9	7.4	8.0	4.5	4.7	4.7	5.2	4.9
8	4.0	4.7	5.1	7.0	9.9	7.3	8.0	4.6	4.7	4.7	5.2	5.1
9	4.1	4.7	5.2	7.4	9.8	7.7	7.8	4.6	4.7	4.7	5.2	5.0
10	4.1	4.7	5.2	7.7	9.7	8.0	7.5	4.6	4.7	4.7	5.2	5.0
11	4.2	4.7	5.4	7.4	9.6	8.5	7.3	5.0	4.7	4.9	5.2	5.7
12	4.5	4.8	5.9	7.3	9.8	9.2	7.2	4.9	4.7	5.0	5.2	5.9
13	5.4	4.8	6.0	7.4	9.6	9.0	7.2	4.9	4.7	5.0	5.2	5.5
14	5.8	4.8	5.8	7.4	9.6	8.7	7.2	4.9	4.7	5.2	5.2	5.3
15	5.0	5.0	5.4	8.0	9.3	8.6	7.2	4.8	4.9	5.0	5.2	5.3
16	5.4	5.0	5.4	8.4	8.8	8.6	7.0	4.8	4.9	5.0	5.3	5.2
17	5.7	5.0	5.4	8.6	8.0	8.9	6.5	4.8	4.9	5.0	5.2	5.2
18	7.6	5.0	5.4	8.6	8.0	8.6	6.5	4.7	4.9	5.0	5.1	5.2
19	7.5	5.0	5.4	8.6	7.8	8.6	6.2	4.7	4.8	4.9	5.0	5.2
20	6.5	5.2	5.4	8.7	8.0	8.6	6.0	4.7	4.8	4.9	5.0	5.2
21	5.6	5.4	5.3	8.9	8.0	8.6	6.0	4.9	4.8	5.0	5.0	5.1
22	5.3	5.4	5.6	9.2	8.0	8.6	5.9	4.8	4.7	5.0	5.0	5.1
23	5.4	5.4	6.0	9.3	7.6	8.6	5.8	4.8	5.2	5.0	5.0	5.2
24	5.2	5.2	6.4	9.0	7.5	8.4	6.0	4.7	4.9	5.0	5.0	5.2
25	5.1	5.1	6.7	8.6	7.3	8.4	6.0	4.7	4.8	5.0	5.0	5.3
26	5.0	5.1	6.5	8.0	8.0	8.4	6.3	4.7	4.8	5.0	5.0	5.7
27	5.0	5.1	6.3	7.9	7.4	8.3	6.5	4.8	5.0	5.2	5.0	5.7
28	5.0	5.0	6.3	7.7	7.4	7.8	6.0	4.8	4.7	5.2	5.0	5.6
29	4.9	.....	6.3	7.7	7.2	7.7	5.9	4.8	4.7	4.5	4.9	5.6
30	4.9	.....	6.3	7.8	7.0	7.5	5.7	4.8	4.7	4.9	4.9	5.3
31	4.8	.....	7.1	.....	6.8	.....	5.6	4.9	.....	5.2	.....	5.3

Rating table for Truckee River at Vista, Nev., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.90	325	4.90	775	5.90	1,345	6.90	2,080	8.80	4,080
4.00	365	5.00	825	6.00	1,410	7.00	2,170	9.00	4,320
4.10	405	5.10	875	6.10	1,475	7.20	2,350	9.20	4,560
4.20	445	5.20	930	6.20	1,540	7.40	2,540	9.40	4,820
4.30	490	5.30	985	6.30	1,610	7.60	2,740	9.60	5,080
4.40	535	5.40	1,040	6.40	1,680	7.80	2,940	9.80	5,340
4.50	580	5.50	1,100	6.50	1,755	8.00	3,160	10.00	5,600
4.60	625	5.60	1,160	6.60	1,830	8.20	3,380		
4.70	675	5.70	1,220	6.70	1,910	8.40	3,600		
4.80	725	5.80	1,280	6.80	1,990	8.60	3,840		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1904–1906 and is well defined below gage height 8 feet.

Monthly discharge of Truckee River at Vista, Nev., for 1906.

[Drainage area, 1,520 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	2,740	325	871	53,600	0.573	0.66
February	1,040	675	797	44,300	.524	.55
March	2,260	825	1,210	74,400	.796	.92
April	4,690	1,220	2,910	173,000	1.91	2.13
May	5,470	1,990	3,870	238,000	2.55	2.94
June	4,560	1,990	3,400	202,000	2.24	2.50
July	3,490	1,160	2,170	133,000	1.43	1.65
August	1,040	580	729	44,800	.480	.55
September	930	675	722	43,000	.475	.53
October	930	490	763	46,900	.502	.58
November	1,280	775	900	53,600	.592	.66
December	1,340	725	952	58,500	.626	.72
The year	5,470	325	1,610	1,170,000	1.06	14.39

NOTE.—The open-channel rating table was applied throughout the year; values for the winter months are liable to some error on account of ice.

LITTLE TRUCKEE RIVER AT PINE STATION, CAL.

Little Truckee River rises on the eastern slope of the Sierra Nevada Mountains, 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. The cable station is located about one-fourth mile upstream from Bruhn's mill, known also as Pine station. The road which follows the Little Truckee north from Boca crosses the river at a ford about 150 feet below the cable and the same distance above the gage rod. Pine station, on the Boca and Loyalton Railroad, about one-fourth of a mile distant, is the nearest railroad point. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 92, where are given also references to publications that contain data for previous years.

Discharge measurements of Little Truckee River at Pine station, Cal., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. feet.*	*Feet.*	*Sec.-feet.*
May 30	M. B. Kennedy	80	158	2.35	545
June 18	do	71	208	2.90	822
July 7	do	73	208	2.80	888
August 2	do	60	77	1.30	153

Daily gage height, in feet, of Little Truckee River at Pine station, Cal., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.30	1.68	1.05	1.92	3.06	2.45	2.74	1.32	0.78	0.70	0.82	0.90
2	1.23	1.55	1.10	1.82	3.62	2.50	2.78	1.28	.75	.70	.79	.94
3	1.28	1.60	1.12	1.73	3.55	2.64	2.85	1.22	.73	.68	.90	.92
4	1.30	1.48	1.10	1.68	3.59	3.04	2.86	1.18	.73	.68	1.32	.83
5	1.28	1.43	1.05	1.70	3.64	3.15	2.88	1.12	.73	.66	1.08	.78
6	1.28	1.45	1.05	1.85	3.64	2.92	2.82	1.10	.73	.68	.96	.92
7	1.23	1.43	1.06	2.09	3.66	2.72	2.78	1.05	.73	.68	.92	.92
8	1.18	1.40	1.12	2.30	3.62	2.82	2.75	1.04	.72	.68	.90	.88
9	1.30	1.50	1.15	2.52	3.59	3.19	2.65	1.03	.70	.65	.88	.92
10	1.30	1.43	1.22	2.49	3.56	3.49	2.50	1.12	.70	.65	.89	.98
11	1.30	1.48	1.30	2.39	3.69	3.44	2.26	1.06	.72	.65	.89	.68
12	1.30	1.40	1.40	2.40	3.42	3.69	2.26	1.02	.72	.66	.88	.90
13	1.38	1.33	2.39	2.49	3.25	3.36	2.34	.99	.72	.65	.88	1.29
14	1.50	1.30	1.20	2.60	3.21	3.19	2.32	.99	.74	.65	.88	1.32
15	1.60	1.20	1.18	2.90	3.09	3.09	2.18	.98	.75	.65	.88	1.26
16	1.83	1.39	1.30	3.02	2.80	3.45	2.19	.95	.74	.65	.90	1.24
17	2.10	1.35	1.30	3.02	2.66	3.36	2.00	.93	.73	.65	.89	1.38
18	2.98	1.28	1.30	3.14	2.74	3.01	1.94	.90	.70	.65	.88	1.24
19	3.33	1.20	1.30	3.29	2.89	3.31	1.86	.89	.70	.66	.75	1.16
20	3.20	1.33	1.19	3.42	2.94	3.21	1.80	.90	.70	.66	.88	1.05
21	3.03	1.40	1.28	3.55	2.84	3.23	1.74	.90	.69	.92	.82	1.10
22	2.83	1.38	1.48	3.62	2.81	3.25	1.55	.85	.68	.96	.83	1.12
23	2.75	1.20	1.53	3.42	2.64	3.21	1.56	.83	.68	1.00	.85	1.05
24	2.60	1.14	1.66	3.10	2.59	3.01	1.68	.82	.68	.95	.85	1.03
25	2.58	1.10	1.79	2.98	2.70	3.08	1.75	.80	.68	.94	.86	1.16
26	2.38	1.10	1.80	2.96	2.84	2.95	1.72	.80	.68	.90	.83	1.40
27	2.15	1.10	1.79	2.90	2.78	2.87	1.55	.79	.70	.86	.88	1.25
28	1.98	1.16	1.79	2.76	2.58	2.59	1.44	.78	.70	.82	.84	1.18
29	1.90	.....	1.79	2.92	2.42	2.44	1.38	.78	.70	.78	.90	1.02
30	1.83	.....	2.02	3.10	2.34	2.54	1.32	.80	.68	.78	.89	.99
31	1.80	.....	2.06	.....	2.43	.....	1.30	.80	.....	.79	.....	1.21

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

JANUARY 1, 1905, to APRIL 14, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.00	78	1.40	148	1.80	270	2.10	390	2.40	531
1.10	91	1.50	174	1.90	307	2.20	436	2.50	580
1.20	107	1.60	203	2.00	347	2.30	483	2.60	630
1.30	126	1.70	235						

APRIL 15 to DECEMBER 31, 1906.[b]

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

[a] This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1904–5 and is well defined below gage height 2.1 feet. The table has been extended beyond these limits.

[b] This table is applicable only for open-channel conditions. It is based on 4 discharge measurements made during 1906 and the form of the 1905 curve and is not well defined.

Monthly discharge of Little Truckee River at Pine Station, Cal., for 1906.

[Drainage area, 166 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	1,020	104	359	22,100	2.16	2.49
February	229	91	141	7,830	.849	.88
March	373	84	159	9,780	.958	1.10
April	1,300	229	729	43,400	4.39	4.90
May	1,350	560	972	59,800	5.86	6.76
June	1,350	610	950	56,500	5.72	6.38
July	849	152	478	29,400	2.88	3.32
August	157	65	91.9	5,650	.554	.64
September	65	53	56.7	3,370	.342	.38
October	94	50	60.9	3,740	.367	.42
November	157	66	79.7	4,740	.480	.54
December	178	65	103	6,330	.608	.71
The year	1,350	50	348	253,000	2.10	28.52

NOTE.—The open-channel rating table was applied throughout the year; values for the winter months are liable to some errors on account of ice.

INDEPENDENCE CREEK BELOW INDEPENDENCE LAKE, CAL.

Independence Creek flows from the east end of Independence Lake northeastward into Little Truckee River.

The gaging station was established October 24, 1902. It is located about one-eighth of a mile below the dam at the lower end of Independence Lake, Cal. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 94, where are given also references to publications that contain data for previous years.

The following measurement was made July 31, 1906:

Width, 16 feet; area, 25.6 square feet; gage height, 2.65 feet; discharge, 25.3 second-feet.

Daily gage height, in feet, of Independence Creek below Independence Lake, Cal., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.98	1.95	2.58	2.58	2.80	1.52	3.45	2.62	2.25	1.95	2.20	2.28
2	1.95	1.90	2.50	2.52	2.92	1.95	3.52	2.60	2.25	1.95	2.22	2.25
3	1.90	1.90	2.50	2.48	3.00	2.20	3.62	2.62	2.20	1.95	2.30	2.25
4	1.90	1.90	2.50	2.40	3.50	2.80	3.62	2.58	2.20	1.95	2.40	2.25
5	1.90	1.90	2.48	2.38	3.12	3.40	3.72	2.68	2.20	1.95	2.45	2.25
6	1.90	1.90	2.40	2.32	3.18	3.48	3.68	2.65	2.20	1.95	2.42	2.25
7	1.88	1.90	2.38	2.30	3.22	3.42	3.75	2.62	2.20	1.95	2.42	2.25
8	1.85	1.90	2.35	2.30	3.00	3.50	3.80	2.50	2.18	1.95	2.40	2.30
9	1.90	1.90	2.32	2.30	3.50	3.50	3.72	2.62	2.10	1.92	2.40	2.35
10	1.85	1.85	2.30	2.38	3.50	3.45	3.50	2.60	2.10	1.90	2.40	2.42
11	1.85	1.85	2.25	2.40	3.50	3.58	3.40	2.65	2.10	1.90	2.40	2.40
12	1.92	1.85	2.60	2.38	3.42	3.60	3.42	2.50	2.10	1.90	2.40	3.80
13	2.48	1.85	2.72	2.35	3.40	3.60	3.48	2.48	2.10	1.90	2.38	3.50
14	2.78	1.88	2.75	2.35	3.40	3.60	3.50	2.48	2.05	1.90	2.55	2.95
15	2.88	2.25	2.80	2,35	3.35	3.60	3.48	2.42	2.05	1.90	2.38	2.90
16	2.98	2.25	2.78	2.40	3.30	3.60	3.45	2.42	2.05	1.90	2.42	2.85
17	3.08	2.00	2.70	2.45	3.25	3.30	3.42	2.45	2.05	1.85	2.38	2.80
18	3.35	2.35	2.62	2.50	3.18	3.45	3.45	2.42	2.05	1.85	2.35	2.52
19	3.30	2.10	2.52	2.58	3.15	3.62	3.42	2.40	2.05	1.85	2.35	2.30
20	3.20	2.15	2.50	2.60	3.15	3.50	3.28	2.45	2.02	2.48	2.35	2.30
21	3.08	2.40	2.50	2.72	3.15	3.60	2.68	2.42	2.00	3.50	2.35	2.30
22	2.98	2.65	2.50	2.82	3.15	3.68	2.75	2.42	2.00	2.98	2.35	2.30
23	2.82	2.70	2.52	2.88	3.15	3.75	3.22	2.32	2.00	2.92	2.35	2.35
24	2.78	2.62	2.52	2.90	3.12	3.82	3.52	2.30	2.00	2.82	2.32	2.38
25	2.60	2.58	2.55	2.85	3.18	3.85	3.48	2.30	2.00	2.75	2.30	2.40
26	2.58	2.50	2.52	2.80	3.20	3.78	2.90	2.30	2.00	2.72	2.30	2.45
27	2.52	2.52	2.48	2.80	3.28	3.75	2.91	2.30	2.00	2.62	2.30	2.50
28	2.42	2.60	2.42	2.80	3.25	3.72	2.60	2.25	2.00	2.15	2.30	2.50
29	2.32	.....	2.38	2.75	3.18	3.60	2.58	2.25	2.00	2.20	2.30	2.50
30	2.12	.....	2.38	2.75	2.15	3.48	2.68	2.25	1.95	2.20	2.30	2.40
31	1.95	.....	2.52	.....	2.15	.....	2.65	2.25	.....	2.20	.....	2.18

WALKER RIVER BASIN.

DESCRIPTION OF BASIN.

Walker River is formed by two branches—East and West forks—which rise on the eastern slopes of the Sierra Nevada, in Mono County, Cal., flow in a general northerly direction, and unite in Lyon County, Nev. From the point of junction the main stream flows northward through Mason Valley, at the upper end of which it turns to the east and southeast and discharges into the north end of Walker Lake.

WEST FORK OF WALKER RIVER NEAR COLEVILLE, CAL.

This station was established October 5, 1902. The cable is 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 is about one-half mile above the cable. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 99, where are given also references to publications that contain data for previous years.

Discharge measurements of West Fork of Walker River near Coleville, Cal., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 11	M. B. Kennedy	60	259	4.10	1,790
May 16	do	60	195	3.50	1,220
June 8	do	53	179	3.30	960
June 13	do	60	283	4.70	2,150
July 19	do	60	253	4.15	1,890
August 19	do	49	135	3.00	627

Daily gage height, in feet, of West Fork of Walker River near Coleville, Cal., in 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.1	1.3	1.4	1.6	2.9	3.0	5.1	3.3	2.2	1.5	1.5	1.3
2	1.1	1.3	1.6	1.6	3.1	3.2	5.3	3.25	2.1	1.5	1.4	1.3
3	0.9	1.3	1.4	1.6	3.1	3.4	5.45	3.1	2.1	1.5	1.4	1.3
4	1.1	1.3	1.3	1.6	3.5	3.6	5.45	3.0	2.1	1.4	1.4	1.3
5	1.1	1.3	1.3	1.6	3.8	3.7	5.4	3.0	2.0	1.4	1.5	1.3
6	1.1	1.3	1.3	1.5	3.9	3.5	5.35	3.0	2.0	1.4	1.5	1.3
7	1.1	1.3	1.3	1.5	4.0	3.3	5.25	3.1	2.1	1.4	1.5	1.4
8	1.1	1.2	1.3	1.6	4.0	3.5	5.35	3.0	2.1	1.4	1.4	1.4
9	1.1	1.2	1.3	1.7	4.1	3.5	4.9	3.0	2.0	1.4	1.4	1.4
10	1.1	1.2	1.3	2.0	4.1	4.35	4.6	2.9	2.0	1.4	1.4	1.4
11	1.1	1.2	1.4	1.9	4.1	4.8	4.7	2.9	2.0	1.4	1.4	1.4
12	1.1	1.2	1.5	1.9	3.9	5.2	4.45	2.9	2.0	1.4	1.4	1.4
13	1.2	1.2	1.4	2.0	3.9	5.2	4.45	2.9	2.0	1.4	1.4	1.4
14	1.2	1.2	1.4	2.1	3.9	4.55	5.0	2.9	2.0	1.4	1.4	1.4
15	1.2	1.2	1.3	2.2	3.7	4.8	4.6	2.8	2.2	1.4	1.4	1.4
16	1.2	1.2	1.4	2.3	3.6	5.35	4.3	2.7	2.1	1.4	1.4	1.4
17	1.2	1.2	1.4	2.5	3.5	4.9	4.45	2.6	2.0	1.4	1.4	1.4
18	1.5	1.2	1.4	2.6	3.6	4.75	4.15	2.6	1.9	1.4	1.4	1.4
19	1.5	1.2	1.4	2.7	3.8	5.15	4.0	3.0	1.8	1.4	1.3	1.3
20	1.4	1.2	1.4	2.9	3.8	5.25	4.15	2.8	1.7	1.4	1.3	1.3
21	1.3	1.2	1.5	2.9	3.8	5.15	4.1	2.6	1.7	1.4	1.3	1.3
22	1.3	1.3	1.5	3.2	3.7	5.15	4.15	2.5	1.7	1.3	1.3	1.3
23	1.3	1.3	1.5	3.1	3.5	4.9	4.4	2.4	1.7	1.4	1.3	1.3
24	1.3	1.2	1.6	3.1	3.5	4.75	4.35	2.4	1.6	1.4	1.3	1.3
25	1.2	1.3	1.6	3.0	3.5	5.15	4.35	2.2	1.5	1.4	1.4	1.4
26	1.2	1.3	1.6	2.8	3.3	4.95	4.3	2.2	1.5	1.4	1.3	1.4
27	1.2	1.3	1.5	2.9	3.3	4.45	4.25	2.2	1.5	1.4	1.3	1.5
28	1.2	1.3	1.6	2.9	3.2	4.25	3.85	2.2	1.5	1.4	1.3	1.5
29	1.3	.....	1.6	2.9	3.1	4.2	3.6	2.2	1.5	1.3	1.3	1.4
30	1.3	.....	1.7	2.7	3.0	4.25	3.55	2.2	1.5	1.4	1.3	1.4
31	1.3	.....	1.7	.....	3.0	.....	3.4	2.1	.....	1.4	.....	1.4

Rating table for West Fork of Walker River near Coleville, Cal., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.90	50	1.70	145	2.50	385	3.30	870	4.20	1,760
1.00	58	1.80	165	2.60	425	3.40	955	4.40	1,990
1.10	67	1.90	190	2.70	470	3.50	1,040	4.60	2,230
1.20	77	2.00	220	2.80	520	3.60	1,130	4.80	2,470
1.30	87	2.10	250	2.90	580	3.70	1,220	5.00	2,710
1.40	98	2.20	280	3.00	645	3.80	1,320	5.20	2,970
1.50	110	2.30	315	3.10	715	3.90	1,430	5.40	3,230
1.60	125	2.40	350	3.20	790	4.00	1,540		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1903–1906 and is fairly well defined.

Monthly discharge of West Fork of Walker River near Coleville, Cal., for 1906.

[Drainage area, 306 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	110	50	77.6	4,770	0.254	0.29
February	87	77	81.6	4,530	.267	.28
March	145	87	105	6,460	.343	.40
April	790	110	360	21,400	1.18	1.32
May	1,650	580	1,140	70,100	3.73	4.30
June	3,160	645	2,050	122,000	6.70	7.48
July	3,300	955	2,180	134,000	7.12	8.21
August	870	250	506	31,100	1.65	1.90
September	280	110	192	11,400	.627	.70
October	110	87	98.5	6,060	.322	.37
November	110	87	95.6	5,690	.312	.35
December	110	87	94.5	5,810	.309	.36
The year	3,300	50	582	423,000	1.90	25.96

NOTE.—The open-channel rating table was applied throughout the year; values for winter months are liable to error on account of ice.

EAST FORK OF WALKER RIVER NEAR YERINGTON, NEV.

This station was established October 6, 1902. It is located at Ross Ranch, about 10 miles southeast of Yerington, Nev., just above the point where the road crosses the river. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 101, where are given also references to publications that contain data for previous years.

Discharge measurements of East Fork of Walker River near Yerington, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 15	M. B. Kennedy	75	196	3.75	592
June 9	do	74	117	3.03	347
June 12	do	76	164	3.65	582
July 20	do	80	214	5.00	1,070
August 29	do	65	113	3.30	342

Daily gage height, in feet, of East Fork of Walker River near Yerington, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	2.1	2.4	2.7	2.9	2.9	4.6	4.4	3.1	2.4	2.3	2.6
2	1.9	2.1	2.4	2.6	3.0	2.8	4.5	4.25	3.1	2.4	2.3	2.6
3	1.9	2.1	2.4	2.5	3.1	2.8	4.6	4.1	3.1	2.4	2.3	2.6
4	1.9	2.1	2.4	2.4	3.1	2.8	4.7	4.0	3.0	2.4	2.3	2.6
5	1.9	2.1	2.4	2.4	3.2	2.9	4.85	3.9	3.0	2.5	2.3	2.7
6	1.9	2.1	2.4	2.4	3.4	2.9	5.0	3.8	2.9	2.5	2.3	2.7
7	1.9	2.1	2.4	2.4	3.5	3.0	5.1	3.9	2.9	2.5	2.3	2.7
8	1.9	2.1	2.4	2.4	3.5	3.1	5.4	3.9	2.9	2.5	2.3	2.7
9	1.9	2.1	2.4	2.4	3.6	3.2	5.1	3.9	2.9	2.5	2.3	2.7
10	1.9	2.1	2.4	2.5	3.7	3.3	5.1	3.9	2.8	2.5	2.3	2.8
11	1.9	2.2	2.4	2.7	3.9	3.5	5.0	3.9	2.8	2.6	2.3	2.8
12	1.9	2.2	2.4	2.6	4.0	3.6	4.95	3.9	2.8	2.6	2.3	2.8
13	2.0	2.1	2.8	2.6	3.9	3.85	4.85	3.7	2.8	2.6	2.4	2.8
14	2.0	2.1	2.8	2.5	3.6	4.0	4.8	3.7	2.8	2.6	2.4	2.8
15	2.0	2.1	2.4	2.5	3.5	4.1	4.75	3.6	2.8	2.6	2.4	2.8
16	2.0	2.1	2.4	2.5	3.4	4.2	4.7	3.6	2.8	2.5	2.4	2.8
17	2.0	2.1	2.4	2.6	3.3	4.3	4.75	3.6	2.7	2.5	2.4	2.9
18	2.25	2.2	2.3	2.6	3.2	4.5	4.7	3.75	2.7	2.5	2.4	2.9
19	2.9	2.3	2.3	2.6	3.2	4.7	4.6	3.8	2.7	2.5	2.4	2.9
20	3.6	2.3	2.3	2.6	3.2	4.7	4.6	4.0	2.7	2.5	2.4	2.9
21	3.1	2.5	2.4	2.7	3.3	4.7	4.6	4.0	2.6	2.5	2.4	2.9
22	2.7	2.45	2.5	2.8	3.3	4.8	4.6	3.8	2.6	2.5	2.4	2.9
23	2.6	2.4	2.6	2.8	3.3	4.8	4.9	3.7	2.6	2.5	2.4	2.9
24	2.5	2.4	2.85	2.8	3.2	4.8	5.0	3.6	2.5	2.5	2.4	2.9
25	2.4	2.4	3.1	2.8	3.2	4.8	4.8	3.5	2.5	2.4	2.5	2.9
26	2.2	2.4	3.1	2.8	3.3	4.8	4.9	3.5	2.5	2.4	2.5	2.9
27	2.2	2.4	3.0	2.8	3.3	4.8	4.95	3.4	2.5	2.4	2.5	2.9
28	2.2	2.4	2.7	2.9	3.3	4.95	4.85	3.3	2.4	2.4	2.5	2.9
29	2.2	.....	2.7	2.9	3.2	4.9	4.75	3.3	2.4	2.4	2.6	2.9
30	2.2	.....	2.8	2.9	3.1	4.65	4.65	3.2	2.4	2.4	2.6	2.9
31	2.2	.....	2.8	.....	3.0	.....	4.5	3.2	.....	2.4	.....	2.9

NOTE.—The river was frozen over January 1 to 12.

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

JANUARY 1 TO JULY 10, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.90	54	2.60	220	3.30	439	4.00	692	4.70	955
2.00	75	2.70	248	3.40	474	4.10	729	4.80	993
2.10	97	2.80	277	3.50	510	4.20	766	4.90	1,031
2.20	120	2.90	308	3.60	546	4.30	803	5.00	1,070
2.30	144	3.00	340	3.70	582	4.40	841	5.20	1,148
4.40	168	3.10	372	3.80	618	4.50	879	5.40	1,226
2.50	193	3.20	405	3.90	655	4.60	917		

JULY 11 TO DECEMBER 31, 1906.[b]

2.30	56	2.90	211	3.50	420	4.10	665	4.70	935
2.40	78	3.00	242	3.60	460	4.20	710	4.80	980
2.50	102	3.10	274	3.70	500	4.30	755	4.90	1,025
2.60	127	3.20	308	3.80	540	4.40	800	5.00	1,070
2.70	154	3.30	344	3.90	580	4.50	845		
2.80	182	3.40	381	4.00	620	4.60	890		

[a] This table is applicable only for open-channel conditions. It is based on 4 discharge measurements made during 1906 and is fairly well defined above gage height 2.5 feet; below this it is only approximate.

[b] This table is applicable only for open-channel conditions. It is based on 2 discharge measurements made during 1906 and is not well defined.

Monthly discharge of East Fork of Walker River near Yerington, Nev., for 1906.

[Drainage area, 1,100 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	546	54	127	7,810	0.115	0.13
February	193	97	124	6,890	.113	.12
March	372	144	210	12,900	.191	.22
April	308	168	228	13,600	.207	.23
May	692	308	457	28,100	.415	.48
June	1,050	277	690	41,100	.627	.70
July	1,230	845	987	60,700	.897	1.03
August	800	308	520	32,000	.473	.55
September	274	78	169	10,100	.154	.17
October	127	78	95.0	5,840	.086	.10
November	127	56	75.7	4,500	.069	.08
December	211	127	184	11,300	.167	.19
The year	1,230	54	322	235,000	.293	4.00

NOTE.—The open-channel rating table was applied throughout the year; values for the winter are liable to error on account of ice.

WALKER RIVER NEAR WABUSKA, NEV.

This station was established July 22, 1902, and equipped December 12, 1902. It is 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. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 103, where are given also references to publications that contain data for previous years.

Discharge measurements of Walker River near Wabuska, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 14	M. B. Kennedy	70	408	4.20	1,470
June 11	do	75	272	3.30	921
July 21	do	178	600	4.50	2,310
August 27	do	70	174	1.60	410
September 14	C. L. Smith	50	75	.80	128

Daily gage height, in feet, of Walker River near Wabuska, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.00	1.50	1.52	1.72	2.40	2.75	5.05	3.92	1.12	0.80	1.65	1.95
2	1.00	1.42	1.55	1.80	2.35	2.65	4.90	3.70	1.10	.80	1.70	1.90
3	1.05	1.40	1.50	1.80	2.42	2.58	5.00	3.35	1.10	.80	1.70	1.75
4	1.05	1.40	1.40	1.72	2.60	2.55	5.15	3.18	1.08	.90	1.70	1.70
5	1.05	1.40	1.32	1.65	2.78	2.70	5.35	2.95	1.00	1.00	1.70	1.90
6	1.05	1.40	1.22	1.52	3.00	3.00	5.55	2.90	1.00	1.20	1.75	1.90
7	1.05	1.40	1.20	1.38	3.40	3.18	5.70	2.75	.92	1.38	1.80	1.90
8	1.05	1.40	1.28	1.30	3.75	3.05	5.65	2.70	.82	1.40	1.80	2.05
9	1.05	1.40	1.30	1.32	3.80	2.92	5.80	2.70	.72	1.40	1.80	2.22
10	1.05	1.40	1.18	1.38	3.95	2.92	5.88	2.58	.68	1.40	1.80	2.32
11	1.05	1.40	1.08	1.40	4.20	3.38	5.85	2.55	.65	1.48	1.88	2.40
12	1.08	1.38	1.05	1.45	4.42	3.85	5.60	2.55	.65	1.50	1.90	2.40
13	1.15	1.20	1.38	1.55	4.32	4.30	5.30	2.50	.65	1.50	1.80	2.45
14	1.15	1.15	1.62	1.60	4.15	4.70	5.28	2.50	.70	1.48	1.80	2.35
15	1.55	1.18	1.52	1.60	4.05	5.05	5.40	2.50	.70	1.45	1.80	2.30
16	1.75	1.20	1.48	1.60	4.05	5.10	5.45	2.15	.70	1.45	1.80	2.42
17	1.85	1.30	1.40	1.70	3.88	4.95	5.22	2.00	.70	1.45	1.80	2.38
18	1.85	1.30	1.35	1.80	3.55	5.15	5.00	1.98	.70	1.45	1.80	2.30
19	1.88	1.25	1.30	1.90	3.45	5.22	4.95	1.95	.75	1.50	1.80	2.28
20	2.15	1.25	1.25	2.00	3.45	5.35	4.75	2.05	.80	1.50	1.80	2.25
21	2.30	1.35	1.20	2.05	3.65	5.38	4.50	2.10	.85	1.55	1.80	2.18
22	2.20	1.60	1.12	2.32	3.75	5.40	4.38	2.05	.85	1.55	1.80	2.10
23	2.02	1.70	1.10	2.40	3.75	5.40	4.35	1.95	.85	1.60	1.80	2.10
24	1.88	1.70	1.15	2.55	3.60	5.48	4.72	1.90	.85	1.60	1.80	2.10
25	1.80	1.65	1.58	2.65	3.40	5.50	5.22	1.75	.85	1.60	1.80	2.08
26	1.80	1.55	1.98	2.55	3.18	5.40	5.32	1.62	.85	1.60	1.90	2.00
27	1.72	1.50	2.05	2.45	3.10	5.45	5.25	1.50	.85	1.70	1.98	2.00
28	1.70	1.50	1.90	2.45	3.00	5.40	5.22	1.42	.85	1.70	2.08	2.25
29	1.62	.....	1.75	2.45	3.00	5.32	5.18	1.32	.80	1.68	2.02	2.40
30	1.55	.....	1.70	2.40	3.00	5.20	4.68	1.30	.80	1.65	1.98	2.42
31	1.50	.....	1.70	.....	2.95	.....	4.10	1.22	.....	1.65	.....	2.32

NOTE.—Ice conditions unknown. No discharges have been computed on account of the constant changes in channel and the small number of measurements.

CARSON RIVER BASIN.

DESCRIPTION OF BASIN.

Carson River has its sources on the eastern slopes of the Sierra Nevada in Alpine County, Cal. Flowing northward into Nevada, East and West forks unite near Genoa, in the upper Carson Valley. At Empire, 3 miles east of the city of Carson, the river turns to the northeast and enters a deep canyon, through which it flows for several miles, emerging into a second, smaller valley a short distance above the town of Dayton. After leaving this valley it passes through two shorter canyons and one rather large valley before entering lower Carson Valley, or Carson Sink Valley, as it is also known, and discharging its waters into Carson Sink.

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 was established October 18, 1900. It is located about three-fourths of a mile above the post-office at Woodfords, Cal., and 200 feet from the main road between Woodfords and Blue Lakes. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 106, where are given also references to publications that contain data for previous years.

Discharge measurements of West Fork of Carson River near Woodfords, Cal., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 9	M. B. Kennedy	32	180	6.70	1,520
May 18	do	38	130	5.10	695
June 5	do	40	154	5.20	764
June 16	do	37	157	5.60	899
July 17	do	30	105	4.10	373
August 16	do	30	60	3.05	108

Daily gage height, in feet, of West Fork of Carson River near Woodfords, Cal., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.4	2.85	2.5	2.85	5.7	4.4	4.6	3.4	.....	2.4	2.7	2.0
2	2.5	2.8	2.55	2.8	5.85	4.6	4.7	3.3	2.9	2.4	2.7	2.1
3	2.55	2.75	2.55	2.8	6.0	4.8	4.8	3.3	2.9	2.4	2.95	2.1
4	2.55	2.6	2.5	2.75	6.1	5.0	4.7	3.3	2.85	2.4	3.1	2.15
5	2.4	2.6	2.55	2.6	6.4	5.0	4.7	3.25	2.8	2.4	3.3	2.1
6	2.4	2.6	2.6	2.55	6.45	4.7	4.7	3.3	2.7	2.55	3.0	2.1
7	2.4	2.6	2.65	2.5	6.5	4.9	4.7	3.3	2.6	2.6	2.9	2.0
8	2.3	2.55	2.7	2.6	6.7	4.8	4.6	3.25	2.55	2.55	2.9	2.5
9	2.35	2.5	2.75	2.6	6.8	4.8	4.5	3.9	2.5	2.5	2.85	2.6
10	2.5	2.4	2.6	2.7	6.8	5.2	4.4	3.5	2.5	2.5	2.8	2.7
11	2.6	2.5	2.55	2.7	6.4	5.5	4.3	3.4	2.4	2.45	2.9	2.7
12	2.75	2.55	2.5	2.75	6.35	5.8	4.2	3.4	2.4	2.4	2.9	2.6
13	2.85	2.6	2.45	2.8	.....	5.7	4.2	3.4	2.3	2.4	3.1	2.7
14	2.9	2.7	2.4	2.9	.....	5.8	4.1	3.35	2.4	2.45	3.2	2.65
15	2.9	2.75	2.4	2.95	.....	5.8	4.0	.....	2.2	2.4	3.0	2.6
16	3.0	2.75	2.45	3.0	.....	5.7	4.0	.....	2.2	2.4	3.0	2.6
17	3.1	2.8	2.5	3.25	5.1	5.6	3.8	.....	2.2	2.45	2.9	2.55
18	3.2	2.8	2.5	3.3	.....	5.5	3.7	3.4	2.2	2.4	2.8	2.5
19	3.1	2.85	2.55	3.5	5.0	5.3	3.65	3.4	2.3	2.5	2.6	2.55
20	3.0	2.8	2.6	3.7	4.9	5.0	3.5	3.3	2.2	2.5	2.6	2.6
21	3.0	2.8	2.65	3.85	4.9	5.0	3.4	3.35	2.2	2.6	2.55	2.65
22	2.9	2.75	2.7	4.1	4.95	5.0	3.3	3.4	2.3	2.6	2.55	2.7
23	2.65	2.7	2.8	4.2	5.0	4.9	3.35	3.35	2.4	2.6	2.55	2.7
24	2.4	2.6	2.8	4.3	5.1	4.9	3.2	3.35	2.5	2.65	2.5	2.7
25	2.5	2.55	2.8	4.4	4.95	4.8	3.2	3.3	2.5	2.65	2.45	2.75
26	2.6	2.5	2.9	4.6	4.9	4.7	4.3	3.3	2.4	2.6	2.4	2.8
27	2.75	2.5	2.95	4.85	.....	4.8	3.6	3.3	2.35	2.65	2.4	2.8
28	2.8	2.5	2.95	5.1	.....	4.8	3.55	3.25	2.35	2.6	2.3	2.85
29	2.8	.....	3.0	5.3	.....	4.7	3.4	3.2	2.30	2.55	2.2	2.9
30	2.85	.....	3.0	5.5	.....	4.8	3.3	3.2	2.35	2.6	2.15	2.85
31	2.85	.....	2.9	.....	.....	.....	3.3	.....	.....	2.65	.....	2.85

Rating table for West Fork of Carson River near Woodfords, Cal., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.00	22	2.90	90	3.80	251	4.70	535	6.20	1,220
2.10	26	3.00	102	3.90	277	4.80	570	6.40	1,330
2.20	31	3.10	115	4.00	305	4.90	610	6.60	1,450
2.30	37	3.20	129	4.10	335	5.00	650	6.80	1,570
2.40	44	3.30	145	4.20	365	5.20	730		
2.50	52	3.40	163	4.30	395	5.40	820		
2.60	60	3.50	182	4.40	430	5.60	910		
2.70	69	3.60	203	4.50	465	5.80	1,010		
2.80	79	3.70	226	4.60	500	6.00	1,110		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1902–1906, and is fairly well defined.

Monthly discharge of West Fork of Carson River near Woodfords, Cal., for 1906.

[Drainage area, 70 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	129	37	72.3	4,450	1.03	1.19
February	84	44	65.3	3,630	.933	.97
March	102	44	66.5	4,090	.950	1.10
April	865	52	236	14,000	3.37	3.76
May	1,570	460	925	56,900	13.20	15.22
June	1,010	430	690	41,100	9.86	11.00
July	570	129	324	19,900	4.63	5.34
August	277	116	154	9,470	2.20	2.54
September	103	31	50.4	3,000	.720	.80
October	65	44	52.8	3,250	.754	.87
November	145	28	76.9	4,580	1.10	1.23
December	90	22	58.4	3,590	.834	.96
The year	1,570	22	231	168,000	3.30	44.98

NOTE.—Discharges have been interpolated on days when gage was not read. The open-channel rating table was applied throughout the year; values for winter months are liable to some error on account of ice.

EAST FORK OF CARSON RIVER NEAR GARDNERVILLE, NEV.

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

The gaging station was established October 17, 1900. It is located about 5 miles southeast of Gardnerville and one-half mile southwest of Rodenbah's ranch. It is within one-half mile of the main traveled road between Carson, Nev., and Bridgeport, Cal., and is about 400 feet above a bridge across the river. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 108, where are given also references to publications that contain data for previous years.

Discharge measurements of East Fork of Carson River near Gardnerville, Nev., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 10	M. B. Kennedy	103	490	[a] 5.60	2,820
May 17	do	92	352	[a] 4.75	1,610
June 6	do	92	343	[a] 4.60	1,470
June 15	do	92	457	[b] 6.45	2,400
July 18	do	84	348	[b] 5.65	1,650
August 17	do	84	194	[b] 4.05	415
September 6	C. L. Smith	85	165	[b] 3.90	182

[a] At new gage established October 8, 1905. [b] At old gage used prior to October 8. 1905.

Daily gage height, in feet, of East Fork of Carson River near Gardnerville, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.98	2.75	2.72	3.10	4.20	4.60	5.40	4.00	2.75	2.50	3.58	2.54
2	1.98	2.72	2.72	3.10	4.40	4.70	5.80	3.90	2.75	2.50	3.57	2.54
3	1.98	2.72	2.71	3.20	4.70	4.70	5.50	3.80	2.75	2.50	3.55	2.54
4	1.98	2.72	2.71	3.25	5.00	4.70	5.30	3.70	2.75	2.50	3.54	2.54
5	1.98	2.72	2.70	3.28	5.10	4.75	5.20	3.65	2.70	2.50	3.59	2.54
6	1.98	2.72	2.70	3.30	5.90	4.80	5.00	3.60	2.70	2.50	3.60	2.54
7	1.99	2.72	2.70	3.30	5.80	4.80	5.00	3.50	2.70	2.55	3.58	2.54
8	2.00	2.72	2.70	3.30	5.80	4.80	4.80	3.50	2.70	2.58	3.56	2.54
9	2.00	2.72	2.71	3.40	5.80	4.90	4.60	3.45	2.60	2.60	3.53	2.54
10	2.05	2.72	2.73	3.45	6.00	5.00	4.60	3.45	2.60	2.60	3.50	2.54
11	2.05	2.74	2.73	3.46	6.00	5.00	4.50	3.44	2.60	2.61	3.50	2.54
12	2.05	2.74	2.74	3.47	5.90	5.40	4.80	3.44	2.60	2.63	3.58	2.54
13	2.05	2.74	2.75	3.48	5.80	5.50	5.10	3.43	2.60	2.65	2.58	2.55
14	.....	2.73	2.75	3.49	5.60	5.80	4.70	3.43	2.59	2.67	2.58	2.56
15	.....	2.73	2.74	4.00	5.50	5.90	4.60	3.43	2.59	2.69	2.57	2.56
16	.....	2.73	2.74	4.00	5.50	5.90	4.60	3.42	2.58	3.00	2.56	2.54
17	.....	2.74	2.72	4.10	5.40	6.00	4.50	3.15	2.58	3.10	2.56	2.54
18	.....	2.74	2.75	4.20	5.40	6.10	4.50	3.15	2.58	3.20	2.56	2.53
19	.....	2.74	2.75	4.20	5.30	6.40	4.40	3.00	2.58	3.40	2.56	2.53
20	.....	2.74	2.77	4.40	4.80	6.40	4.40	3.00	2.56	3.50	2.55	2.53
21	2.82	2.74	2.77	4.50	4.80	6.00	4.37	2.90	2.56	3.50	2.55	2.53
22	2.80	2.73	2.79	4.60	4.60	6.20	4.35	2.90	2.56	3.70	2.55	2.53
23	2.70	2.73	2.80	4.40	4.60	6.10	4.35	2.90	2.54	3.70	2.55	2.53
24	2.70	2.74	2.81	4.30	4.40	5.50	4.43	2.90	2.54	3.70	2.55	2.53
25	2.80	2.73	2.81	4.25	4.30	6.00	4.60	2.80	2.54	3.70	2.54	2.53
26	2.80	2.72	2.80	4.15	4.30	5.60	4.90	2.80	2.53	3.65	2.54	2.53
27	2.80	2.72	2.80	3.98	4.40	5.50	4.80	2.80	2.53	3.64	2.54	2.53
28	2.75	2.72	2.80	3.96	4.50	5.20	4.70	2.70	2.51	3.63	2.54	2.53
29	2.75	.....	2.79	3.94	4.50	5.20	4.60	2.70	2.50	3.62	2.54	2.54
30	2.75	.....	2.79	4.00	4.55	5.40	4.30	2.70	2.50	3.61	2.54	2.54
31	2.75	.....	2.78	.....	4.58	.....	4.00	2.70	.....	3.59	.....	2.54

NOTE.—Ice conditions not known. Gage heights refer to new gage established October 8, 1905.

CARSON RIVER NEAR EMPIRE, NEV.

This station was established October 21, 1900. It is located about three-fourths of a mile east of Brunswick Mill and 2½ miles east of Empire, Nev. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 111, where are given also references to publications that contain data for previous years.

Discharge measurements of Carson River near Empire, Nev., by M. B. Kennedy in 1906.

Date.	Width.	Area of section.	Gage height.	Discharge.
	Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 7	90	421	6.20	2,210
May 21	90	412	5.90	2,030
June 4	88	383	5.40	1,660
June 17	89	459	6.50	2,400
July 16	90	450	5.90	2,160
July 27	88	367	5.20	1,530
August 14	78	224	3.60	475

Daily gage height, in feet, of Carson River near Empire, Nev., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.6	2.9	3.1	4.0	4.7	4.7	5.9	4.3	2.4	2.2	2.8	2.6
2	2.7	2.9	3.0	3.8	4.8	4.8	6.0	4.1	2.5	2.2	2.8	2.7
3	2.5	2.9	3.0	3.7	5.0	4.9	6.3	4.0	2.4	2.2	2.8	2.9
4	2.4	2.9	3.0	3.5	5.4	5.1	6.4	3.9	2.3	2.4	2.8	2.9
5	2.4	2.9	3.0	3.4	5.7	5.5	6.5	3.8	2.2	2.5	3.2	2.9
6	2.4	2.9	3.0	3.4	5.9	5.9	6.6	3.6	2.2	2.5	3.2	2.9
7	2.4	2.9	2.9	3.5	6.1	5.7	6.6	3.5	2.1	2.5	3.2	3.0
8	2.4	2.9	2.9	3.6	6.3	5.2	6.5	3.4	2.0	2.5	3.1	3.3
9	2.4	2.9	3.0	3.8	6.4	5.3	6.4	3.6	2.1	2.6	3.1	3.7
10	2.5	2.9	3.0	4.0	6.5	5.7	6.4	3.6	2.1	2.6	3.1	3.6
11	2.6	2.9	3.0	4.2	6.5	6.1	6.2	3.7	1.9	2.6	3.0	3.8
12	2.8	2.9	3.3	4.1	6.7	6.5	6.0	3.8	1.9	2.6	3.0	4.6
13	3.2	2.9	4.1	4.0	6.5	6.9	5.9	3.7	2.1	2.6	3.0	4.0
14	4.9	2.8	3.7	4.1	6.3	7.2	6.0	3.6	2.2	2.6	3.0	3.5
15	4.0	2.9	3.6	4.1	6.2	7.0	5.9	3.5	2.2	2.7	3.0	3.4
16	3.4	3.2	3.5	4.3	6.2	6.6	5.8	3.3	2.3	2.7	3.0	3.3
17	4.5	3.1	3.5	4.5	6.0	6.6	5.6	3.3	2.5	2.6	3.0	3.3
18	4.9	3.0	3.3	4.6	5.7	6.9	5.5	3.2	2.5	2.6	3.0	3.2
19	5.5	3.1	3.2	4.7	5.7	6.8	5.3	3.2	2.5	2.6	3.0	3.2
20	5.9	3.3	3.1	4.8	6.0	6.5	5.0	3.1	2.4	2.7	3.0	3.2
21	4.0	3.4	3.3	4.9	6.1	6.7	4.9	3.0	2.4	2.7	2.9	3.2
22	3.6	3.5	3.4	5.0	6.0	6.7	4.9	3.0	2.4	2.7	2.8	3.2
23	3.4	3.4	3.6	5.2	5.9	6.7	4.8	2.9	2.3	2.7	2.9	3.2
24	3.3	3.3	3.7	5.4	5.6	6.7	5.0	2.9	2.3	2.7	2.9	3.2
25	3.2	3.2	4.5	5.0	5.4	6.5	5.0	2.9	2.2	2.7	2.8	3.3
26	3.2	3.1	4.4	4.6	5.3	6.5	5.4	2.9	2.2	2.7	2.8	3.4
27	3.0	3.1	4.0	4.5	5.3	6.5	5.3	2.8	2.2	2.7	2.8	3.8
28	3.0	3.1	3.8	4.6	5.3	6.3	5.1	2.7	2.2	2.7	2.7	4.0
29	3.0	.....	3.6	4.7	5.1	6.1	4.9	2.7	2.2	2.7	2.6	3.9
30	2.9	.....	3.7	4.7	5.0	5.9	4.7	2.5	2.2	2.7	2.6	3.8
31	2.9	.....	3.7	.....	4.9	.....	4.5	2.4	.....	2.7	.....	3.7

Rating table for Carson River near Empire, Nev., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.90	51	2.80	223	3.70	554	4.60	1,090	5.80	1,970
2.00	63	2.90	251	3.80	603	4.70	1,160	6.00	2,120
2.10	77	3.00	281	3.90	654	4.80	1,230	6.20	2,270
2.20	93	3.10	313	4.00	708	4.90	1,300	6.40	2,420
2.30	110	3.20	347	4.10	765	5.00	1,370	6.60	2,570
2.40	129	3.30	384	4.20	825	5.20	1,520	6.80	2,720
2.50	150	3.40	423	4.30	890	5.40	1,670	7.00	2,870
2.60	173	3.50	464	4.40	955	5.60	1,820	7.20	3,020
2.70	197	3.60	508	4.50	1,020				

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1902–1906 and is well defined below gage heights 5.4 feet.

Monthly discharge of Carson River near Empire, Nev., for 1906.

[Drainage area, 988 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	2,040	129	477	29,300	0.483	0.56
February	464	223	298	16,600	.302	.31
March	1,020	251	452	27,800	.457	.53
April	1,670	423	914	54,400	.925	1.03
May	2,640	1,160	1,940	119,000	1.96	2.26
June	3,020	1,160	2,240	133,000	2.27	2.53
July	2,570	1,020	1,860	114,000	1.88	2.17
August	890	129	418	25,700	.423	.49
September	150	51	101	6,010	.102	.11
October	197	93	172	10,600	.174	.20
November	347	173	262	15,600	.265	.30
December	1,090	173	436	26,800	.441	.51
The year	3,020	51	798	579,000	.807	11.00

NOTE.—The open-channel rating table was applied throughout the year; values for winter months may be somewhat in error on account of ice.

OWENS RIVER DRAINAGE BASIN.

Owens River has its source in the Sierra Nevada, in eastern California, and flows southeastward, parallel with this range, finally discharging its waters into Owens Lake. Its basin has a length from north to south of approximately 150 miles and a width of from 20 to 25 miles; it lies between the Sierra Nevada on the west and the White Mountains on the east. Practically the entire flow 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 Owens River Valley in 1906 are contained in Water-Supply Paper No. 213, which presents the results of all the hydrographic data collected in the State of California during 1906.

GREAT BASIN DRAINAGE IN OREGON.

DESCRIPTION.

The Great Basin in Oregon comprises about one-fourth of the area 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, and the average elevation is about 4,000 feet. Forests, except on the borders of this 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 12 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 developments, but unfortunately are

insufficient. The irrigated valley lands contiguous to the streams have been taken, and the low-water flow of the principal streams is entirely used.

Investigations of the surface-water supply in this basin has been limited to the following streams, which are classified by the lakes into which they flow: Silvies River, discharging 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 Abert Lake.

MALHEUR LAKE BASIN.

MALHEUR LAKE AT THE NARROWS, OREGON.

This station was established May 14, 1903, and discontinued March 31, 1906. It is located at the highway bridge across The Narrows. The station is maintained for the purpose of obtaining data in regard to the fluctuations of the lake, which has no outlet. The gage and the bench mark are described in Water-Supply Paper No. 176, page 121, where are given also references to publications that contain data for previous years.

The following gage heights were observed in 1906:

Gage heights of Malheur Lake at The Narrows, Oregon, in 1906.

	Feet.
January 6 to March 3	3.6
March 10	3.75
March 17 and 24	3.9
March 31	4.45

SILVIES RIVER NEAR BURNS, OREG.

This station was established May 10, 1903, and was discontinued July 24, 1906. It was located about 10 miles above Burns, Oreg. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 122, where are given also references to publications that contain data for previous years.

Discharge measurements of Silvies River near Burns, Oreg., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 8	M. L. Lewis	55	396	7.40	479
May 23	do	67	544	5.30	330
June 29	Stevens and Landes	55	125	4.42	250

Daily gage height, in feet, of Silvies River near Burns, Oreg., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	2.4	2.45	2.6	10.6	10.4	9.75	4.3
2	2.45	2.45	2.6	9.8	10.0	9.4	4.0
3	2.45	2.45	2.6	9.0	9.75	8.6	3.8
4	2.45	2.45	2.6	8.8	9.5	8.5	3.6
5	2.5	2.45	2.6	9.65	9.08	9.2	3.4
6	2.5	2.45	2.6	11.5	8.6	9.3	3.4
7	2.5	2.45	2.6	13.25	7.75	9.35	3.2
8	2.5	2.5	2.6	14.4	7.2	9.5	3.1
9	2.5	2.5	2.6	14.88	7.25	9.5	3.1
10	2.5	2.5	2.6	14.9	6.85	9.2	3.0
11	2.5	2.55	2.6	14.6	6.38	9.2	3.0
12	2.5	2.6	2.6	14.4	6.35	9.0	2.9
13	2.5	2.6	2.5	14.0	6.15	8.7	2.8
14	2.5	2.6	2.5	13.9	6.15	8.0	2.6
15	2.5	2.6	2.5	14.0	6.15	7.8	2.6
16	2.6	2.6	2.5	14.15	5.9	7.1	2.6
17	2.6	2.6	2.5	14.3	5.5	7.1	2.6
18	2.6	2.6	2.5	14.08	5.5	6.8	2.6
19	2.6	2.6	2.5	13.92	5.5	6.0	2.6
20	2.6	2.6	2.5	13.82	5.5	5.7	2.6
21	2.6	2.6	2.5	13.68	5.5	5.0	2.6
22	2.6	2.6	2.6	14.0	5.5	4.7	2.6
23	2.6	2.6	2.75	13.98	5.25	4.0	2.6
24	2.6	2.6	2.8	13.7	5.15	4.0	2.6
25	2.5	2.6	3.0	13.4	5.15	4.0	.....
26	2.5	2.6	3.8	13.3	5.4	4.0	.....
27	2.5	2.6	4.1	13.0	5.6	4.3	.....
28	2.45	2.6	4.6	12.9	6.6	4.4	.....
29	2.45	.....	4.8	12.7	7.4	4.4	.....
30	2.45	.....	6.35	11.9	8.0	4.3	.....
31	2.45	.....	8.8	.....	8.6	.....	.....

Rating table for Silvies River near Burns, Oreg., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.40	11	3.50	110	4.60	209	6.40	371	8.60	569
2.50	20	3.60	119	4.70	218	6.60	389	8.08	587
2.60	29	3.70	128	4.80	227	6.80	407	9.00	605
2.70	38	3.80	137	4.90	236	7.00	425	10.00	700
2.80	47	3.90	146	5.00	245	7.20	443	11.00	810
2.90	56	4.00	155	5.20	263	7.40	461	12.00	935
3.00	65	4.10	164	5.40	281	7.60	479	13.00	1,100
3.10	74	4.20	173	5.60	299	7.80	497	14.00	1,412
3.20	83	4.30	182	5.80	317	8.00	515	15.00	2,080
3.30	92	4.40	191	6.00	335	8.20	533	16.00	3,170
3.40	101	4.50	200	6.20	353	8.40	551		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1904–6 and is not well defined for 1906.

Monthly discharge of Silvies River near Burns, Oreg., for 1906.

[Drainage area, 865 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	29	11	21.4	1,320	0.025	0.03
February	29	16	24.6	1,370	.028	.03
March	587	20	77.5	4,770	.090	.10
April	2,010	587	1,260	75,000	1.46	1.63
May	742	259	416	25,600	.481	.55
June	675	155	428	25,500	.495	.55
July (1–24)	182	29	65.8	3,130	.076	.07
The period	.....	.....	.....	137,000	.....	.....

NOTE.—The open-channel rating table was applied throughout the period; values for the winter months may be somewhat in error on account of ice.

HARNEY LAKE BASIN.

SILVER CREEK NEAR RILEY, OREG.

Silver Creek rises in the extreme northwestern part of Harney County, Oreg., and flows southeastward into the north end of Harney Lake.

The gaging station was established April 19, 1904, and discontinued July 14, 1906. It is located 12 miles above Riley, Oreg., on the Burns-Shaniko stage line, and is 6 miles below the proposed reservoir site on Silver Creek. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 125, where are given also references to publications that contain data for previous years.

Discharge measurements of Silver Creek near Riley, Oreg., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 10	M. L. Lewis	34	54	6.10	64
June 1	Lewis and Stevens	45	130	8.10	184
June 27	I. Landes	34	46	5.78	43

Daily gage height, in feet, of Silver Creek near Riley, Oreg., for 1906.

Day	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Feb.	Mar.	Apr.	May.	June.	July.
1	5.10	6.00	12.00	.....	8.00	.....	17	5.10	.....	12.30	6.00	.....	.....
2	5.10	6.50	11.00	7.30	7.90	5.60	18	5.10	5.70	12.00	6.80	6.90	.....
3	5.10	6.50	11.50	7.00	.....	5.50	19	.....	.....	12.70	5.40	6.70	.....
4	5.10	6.50	10.50	7.00	8.90	5.50	20	6.70	6.30	11.00	.....	6.50	.....
5	.....	.....	12.00	6.90	8.70	5.40	21	7.70	6.80	11.00	5.50	6.40	.....
6	5.10	7.00	11.50	.....	8.80	5.40	22	5.10	7.00	10.70	5.70	6.30	.....
7	5.10	6.00	11.00	6.70	8.70	5.30	23	5.10	7.30	.....	5.90	6.10	.....
8	5.10	6.50	12.50	6.50	8.50	.....	24	5.10	7.00	10.50	6.00	....	.....
9	5.10	5.50	.....	6.40	8.70	5.20	25	5.10	7.00	10.00	6.00	5.50	.....
10	5.10	5.90	12.30	6.30	.....	5.20	26	.....	.....	9.70	6.10	5.70	.....
11	5.10	5.90	12.00	6.10	7.80	5.10	27	7.00	7.50	9.50	.....	5.80	.....
12	.....	.....	11.30	6.00	7.50	5.10	28	7.30	8.00	8.30	5.70	5.80	.....
13	5.10	.....	11.80	.....	7.00	5.00	29	.....	7.00	8.00	7.90	5.70	.....
14	5.10	.....	11.80	6.00	6.80	5.00	30	.....	9.00	.....	8.10	.....	.....
15	5.10	.....	12.00	5.90	6.50	.....	31	.....	8.50	.....	8.10	.....	.....
16	5.10	.....	.....	6.00	6.00	.....							

Rating table for Silver Creek near Riley, Oreg., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.20	.0	5.20	25	6.10	62	7.00	113	8.80	237
4.30	0.2	5.30	29	6.20	67	7.20	125	9.00	253
4.40	.6	5.40	33	6.30	72	7.40	137	9.20	269
4.50	1.0	5.50	37	6.40	77	7.60	150	9.40	285
4.60	3	5.60	41	6.50	83	7.80	164	9.60	302
4.70	6	5.70	45	6.60	89	8.00	178	9.80	320
4.80	9	5.80	49	6.70	95	8.20	192	10.00	338
4.90	13	5.90	53	6.80	101	8.40	206	11.00	428
5.00	17	6.00	57	6.90	107	8.60	221	12.00	518
5.10	21								

NOTE.—This table is applicable only for open-channel conditions. It is based on 3 discharge measurements made during 1906 and 2 during 1905 and is fairly well defined.

Monthly discharge of Silver Creek near Riley, Oreg., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
February	157	21	38.7	2,150
March	253	37	92.5	5,690
April	581	162	435	25,900
May	185	33	82.5	5,070
June	245	37	123	7,320
July (1–14)	43	17	29.0	805
The period				46,900

NOTE.—The open-channel rating has been applied throughout the period; values for winter months are liable to some error on account of ice. Discharges have been interpolated for days on which gage was not read.

SILVER LAKE BASIN.

SILVER CREEK NEAR SILVER LAKE, OREG.

Silver Creek rises in the western part of Lake County, Oreg., flows northward to Pauline Lake and Marsh, then turns abruptly to the southeast and enters Silver Lake.

The gaging station was established December 29, 1904. It is located 0.9 mile above the county bridge, 1.6 miles southwest of Silver Lake, Oreg. The conditions at this station and the bench marks are described in Water-Supply Paper No. 176, page 127.

Discharge measurements of Silver Creek near Silver Lake, Oreg., in 1906.

Date.	Width.	Area of section.	Gage height.	Discharge.	Date.	Width.	Area of section.	Gage height.	Discharge.
	Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 9	43	175	5.52	664	May 5	34	91	3.65	288
April 9	38	130	4.48	412	May 11	25.5	61	2.45	147
April 28	31	81	3.23	219	May 23	22	35	1.45	53
April 30	32	85	3.48	258					

Daily gage height, in feet, of Silver Creek near Silver Lake, Oreg., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.85	0.95	1.0	2.2	3.4	2.15	0.9	0.7	0.7	0.65	0.65	0.4
2	.9	.9	.95	1.5	3.1	1.5	.85	.65	.7	.65	.7	.4
3	1.2	.5	.95	2.0	.....	1.5	.85	.65	.7	.65	.65	.4
4	.9	.95	.6	1.8	3.25	1.3	.8	.65	.7	.65	.65	.4
5	.85	.85	.6	2.6	3.25	1.55	.8	.65	.7	.65	.75	.7
6	.85	1.1	.7	3.5	3.0	2.0	.8	.65	.7	.65	.7	.7
7	.8	.8	.9	4.3	3.0	1.8	.8	.65	.7	.65	.7	.7
8	.8	.95	.9	4.0	2.8	2.0	.8	.65	.7	.65	.7	.7
9	.9	.95	1.05	4.95	2.8	2.0	.75	.65	.7	.65	.75	.7
10	.9	1.0	1.0	4.8	2.6	1.8	.75	.65	.75	.65	.75	.75
11	.9	1.0	1.2	4.0	2.6	1.6	.75	.65	.75	.7	.65	.7
12	.95	1.15	1.6	4.2	2.3	1.4	.75	.75	.7	.7	.65	.7
13	.9	1.15	1.6	4.8	2.0	1.4	.75	.75	.7	.65	.65	.7
14	.95	1.0	1.4	4.6	2.1	1.4	.75	.7	.7	.65	.65	.75
15	.8	1.2	1.1	3.9	2.1	1.2	.8	.65	.7	.65	.65	.75
16	1.4	1.0	1.0	4.9	1.8	1.2	.8	.65	.7	.65	.65	.6
17	1.4	.8	.85	4.6	1.6	1.01	.75	.65	.7	.65	.65	.6
18	.85	1.8	.95	4.2	1.4	.9	.75	.65	.7	.65	.65	.6
19	.95	1.6	.8	4.2	1.4	.9	.75	.7	.7	.65	.65	.6
20	.85	1.3	.95	4.0	1.4	.9	.75	.7	.7	.65	.7	.6
21	.95	1.3	.85	4.9	1.35	.9	.75	.7	.7	.65	.7	.6
22	1.2	.95	.9	4.9	1.4	.9	.75	.7	.7	.65	.7	.65
23	.9	.8	.9	4.0	1.45	.9	.75	.75	.7	.65	.65	.7
24	1.0	.8	1.2	3.5	1.3	.9	.75	.7	.7	.65	.65	1.0
25	1.0	.65	1.2	3.0	1.3	.9	.75	.7	.7	.65	.7	2.1
26	.95	.8	1.55	2.6	2.0	1.0	.7	.65	.65	.65	1.0	2.1
27	.95	1.0	1.6	4.0	1.8	1.1	.65	.7	.65	.65	.8	2.1
28	.95	.85	1.5	3.4	2.0	1.0	.65	.7	.65	.65	.65	.7
29	.9	.....	1.6	2.9	2.5	.95	.65	.7	.65	.65	.6	.65
30	.9	.....	2.1	3.5	2.0	.9	.65	.75	.65	.65	.4	.7
31	.9	.....	3.15	.....	1.85	.....	.65	.7	.....	.65	.....	.7

NOTE.—The creek was frozen at times from January 1 to April 2, the ice reaching a maximum thickness of 1.0 foot. There was also ice during the latter part of November.

Rating table for Silver Creek near Silver Lake, Oreg., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.50	7	1.46	50	2.30	120	3.20	217	4.20	380
.60	10	1.50	57	2.40	129	3.30	231	4.40	420
.70	13	1.60	64	2.50	138	3.40	245	4.60	460
.80	17	1.70	71	2.60	148	3.50	260	4.80	500
.90	21	1.80	78	2.70	158	3.60	275	5.00	540
1.00	26	1.90	86	2.80	169	3.70	290	5.20	585
1.10	31	2.00	94	2.90	180	3.80	306	5.40	635
1.20	37	2.10	102	3.00	192	3.90	323		
1.30	43	2.20	111	3.10	204	4.00	340		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1905–6 and is well defined.

Monthly discharge of Silver Creek near Silver Lake, Oreg., for 1906.

[Drainage area, 221 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per square mile.	Depth in inches.
January	50	17	24.2	1,490	0.110	0.13
February	78	7	27.8	1,540	.126	.13
March	210	10	40.4	2,480	.183	.21
April	530	57	320	19,000	1.45	1.62
May	245	43	118	7,260	.534	.62
June	107	21	45.8	2,730	.207	.23
July	21	12	15.4	947	.070	.08
August	15	12	12.8	787	.058	.07
September	15	12	12.6	750	.057	.06
October	13	12	12.1	744	.055	.06
November	26	5	12.9	768	.058	.06
December	102	5	20.5	1,260	.093	.11
The year	530	5	55.2	39,800	.250	3.38

NOTE.—The open-channel rating table was applied throughout the year; values for the winter months are probably somewhat in excess of the true discharge on account of ice.

BRIDGE CREEK NEAR SILVER LAKE, OREG.

Bridge Creek rises in western Lake County, Oreg., and flows northeastward into Silver Creek near the town of Silver Lake.

The gaging station was established January 21, 1905, and discontinued July 21, 1906. It was located at the county bridge 2 miles east of Silver Lake, Oreg. The conditions and the bench mark are described in Water-Supply Paper No. 176, page 129.

Discharge measurements of Bridge Creek near Silver Lake, Oreg., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 9	I. Landes	11	7.7	2.39	10
May 29	do	12.5	9.2	2.52	10
June 22	Stevens and Landes	19.5	14	2.74	19

Daily gage height, in feet, of Bridge Creek near Silver Lake, Oreg., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	2.60	2.60	2.50	2.31	2.89	2.65	2.73
2	2.60	2.60	2.60	2.31	3.00	2.65	2.75
3	2.60	2.60	2.50	2.30	2.98	2.66	2.75
4	2.60	2.70	2.50	2.32	2.95	2.67	2.83
5	2.60	2.70	2.50	2.32	3.00	2.70	2.85
6	2.60	2.70	2.50	2.32	2.98	2.70	2.89
7	2.70	2.80	2.50	2.32	2.98	2.75	2.85
8	2.70	2.80	2.40	2.32	3.00	2.8	2.60
9	2.70	2.80	2.40	2.33	2.90	2.83	2.59
10	2.70	2.80	2.40	2.50	2.98	2.75	2.60
11	2.70	2.80	2.50	2.50	2.80	2.75	2.58
12	2.80	2.80	2.50	2.52	2.85	2.76	2.56
13	2.80	2.80	2.60	2.45	2.80	2.76	2.56
14	2.80	2.70	2.60	2.35	2.79	2.76	2.54
15	2.80	2.70	2.60	2.33	2.83	2.76	2.40
16	2.80	2.70	2.60	2.33	2.80	2.75	2.40
17	2.80	2.80	2.60	2.34	2.85	2.78	2.30
18	2.80	2.70	2.50	2.34	2.83	2.79	2.30
19	2.80	2.70	2.40	2.35	2.80	2.80	2.28
20	2.80	2.70	2.40	2.34	2.70	2.82	2.27
21	2.70	2.70	2.40	2.34	2.68	2.82	2.27
22	2.70	2.70	2.30	2.40	2.65	2.80	.....
23	2.70	2.70	2.15	2.50	2.65	2.79	.....
24	2.60	2.70	2.20	2.65	2.64	2.75	.....
25	2.60	2.50	2.40	2.68	2.63	2.75	.....
26	2.50	2.50	2.40	2.70	2.60	2.74	.....
27	2.50	2.50	2.40	2.68	2.64	2.73	.....
28	2.60	2.60	2.40	2.60	2.64	2.70	.....
29	2.60	.....	2.50	2.80	2.63	2.72	.....
30	2.60	.....	2.50	2.85	2.64	2.70	.....
31	2.60	.....	2.50	.....	2.65	.....	.....

NOTE.—Ice conditions January 1–March 7.

Rating table for Bridge Creek near Silver Lake, Oreg., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.10	4	2.30	7	2.50	11	2.70	17	2.90	25
2.20	5	2.40	9	2.60	14	2.80	21	3.00	29

NOTE.—This table is applicable only for open-channel conditions. It is based on 3 discharge measurements made during 1906 and is not well defined.

Monthly discharge of Bridge Creek near Silver Lake, Oreg., for 1906.

Month.	Discharge in Second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	21	11	16.6	1,020
February	21	11	17.1	950
March	14	4	10.4	640
April	23	7	10.5	625
May	29	14	21.3	1,310
June	22	16	18.9	1,120
July (1–21)	25	6	14.0	583
The period	.....	.....	.....	6,250

NOTE.—No correction made in discharge for ice conditions January 1 to March 7. It is probably in excess of the true value.

BEAR CREEK NEAR SILVER LAKE, OREG.

Bear Creek rises in western Lake County, Oreg., and flows northeastward into the western side of Pauline Lake and Marsh.

The gaging station was established January 21, 1905. It is located at the county bridge 3 miles northeast of Silver Lake, Oreg. The conditions and the bench mark are described in Water-Supply Paper No. 176, page 131.

Discharge measurements of Bear Creek near Silver Lake, Oreg., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 9	I. Landes	10.5	13	4.48	27
May 29	do	17.5	22	4.87	30
June 22	Stevens and Landes	18.7	29	6.23	65

NOTE.—These measurements were made below the bridge at different sections.

Daily gage height, in feet, of Bear Creek near Silver Lake, Oreg., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	4.2	4.2	4.2	4.3	5.1	4.9	5.15
2	4.2	4.2	4.1	4.1	5.2	4.95	5.1
3	4.2	4.0	4.1	4.1	5.3	4.95	5.2
4	4.2	4.0	4.1	4.4	5.35	5.35	5.2
5	4.2	4.0	4.1	4.4	5.4	5.2	5.3
6	4.2	4.0	4.1	4.6	5.4	5.15	5.2
7	4.2	4.2	4.1	4.6	5.45	5.0	5.2
8	4.2	4.2	4.1	4.3	5.5	4.95	5.2
9	4.2	4.2	4.2	4.2	5.6	5.35	5.0
10	4.2	4.2	4.3	4.0	5.8	5.35	5.0
11	4.2	4.2	4.3	4.25	5.9	5.4	5.0
12	4.2	4.2	4.3	4.25	5.65	5.75	4.85
13	4.2	4.2	4.3	4.25	5.4	5.5	4.85
14	4.2	4.2	4.3	4.3	5.4	5.45	4.8
15	4.2	4.2	4.3	4.35	5.3	5.4	4.4
16	4.3	4.2	4.1	4.4	5.3	5.75	4.3
17	4.3	4.2	4.0	4.35	5.2	5.6	4.4
18	4.2	4.4	4.0	4.3	5.1	5.5	4.2
19	4.2	4.4	4.1	4.9	5.0	5.5	4.1
20	4.2	5.0	4.1	5.0	5.2	5.4	.....
21	4.2	5.0	4.1	5.15	5.05	5.4	.....
22	4.2	5.0	4.2	5.2	4.95	5.35	.....
23	4.2	4.4	4.2	5.2	4.7	5.2	.....
24	4.2	4.4	5.15	5.0	4.7	5.2	.....
25	4.2	4.4	5.2	4.95	5.0	5.2	.....
26	4.2	4.4	5.1	4.95	5.1	5.35	.....
27	4.2	4.4	4.6	4.9	5.1	5.5	.....
28	4.2	4.4	4.5	5.0	5.1	5.3	.....
29	4.2	.....	4.4	5.0	5.0	5.05	.....
30	4.2	.....	5.1	5.0	4.85	5.25	.....
31	4.2	.....	4.95	.....	4.9	.....	.....

NOTE.—The creek was frozen from January 1 to about March 20. The thickness of ice was measured as follows: January 5, 13, 20, and 27, February 3, 10, 17, and 24, and March 2, 1.1 feet; March 17, 0.2 foot. There was backwater from the dam of an irrigating ditch after April 19.

ABERT LAKE BASIN.

CHEWAUCAN RIVER AT PAISLEY, OREG.

Chewaucan River rises in south-central Lake County, Oreg., flows northwest, then northeast, and then southeast, and discharges into the south end of Abert Lake. The changes in course are very abrupt.

The gaging station was established January 4, 1905. It is located one-half mile above Paisley, Oreg. The conditions and the bench mark are described in Water-Supply Paper No. 176, page 133.

Discharge measurements of Chewaucan River at Paisley, Oreg., by I. Landes, in 1905–6.

Date.	Width.	Area of section.	Gage height.	Discharge.	Date.	Width.	Area of section.	Gage height.	Discharge.
1905.	*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*	1906.	*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
December 17 [a]	32	57	3.90	40	May 6	52	165	6.60	799
					May 25	47	119	5.72	462
1906.					May 26	43.5	131	5.98	547
April 6	47	147	6.17	567	May 27	42	123	5.80	480
April 7	45	136	5.90	465	June 25	40	97	5.08	293
April 25	45	136	5.98	505					

[a] Measured through ice 0.3 foot thick.

Daily gage height, in feet, of Chewaucan River at Paisley, Oreg., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.3	3.9	4.1	5.3	6.4	5.5	4.9	3.7	3.6	3.6	3.8	3.8
2	4.0	3.9	4.0	5.0	6.5	5.5	4.8	3.7	3.6	3.6	3.8	3.8
3	3.9	3.9	4.0	4.8	6.7	5.6	4.7	3.7	3.6	3.6	3.8	3.7
4	3.9	4.3	4.1	5.0	6.8	6.0	4.7	3.7	3.6	3.7	3.8	3.7
5	3.9	3.9	4.0	5.2	6.9	6.0	4.8	3.6	3.7	3.7	3.8	.....
6	3.9	4.0	4.1	5.94	6.9	6.3	4.7	3.6	3.7	3.7	3.8	4.0
7	3.9	3.9	4.1	6.0	6.8	6.0	4.7	3.6	3.7	3.7	3.9	3.9
8	3.9	3.9	4.2	6.4	6.8	5.8	4.5	3.6	3.7	3.7	3.9	3.9
9	3.9	3.9	4.3	6.5	6.9	6.0	4.5	3.6	3.7	3.7	3.8	3.9
10	3.9	3.8	4.4	6.2	7.0	5.9	4.4	3.6	3.7	3.7	.....	3.9
11	4.0	3.8	4.4	5.8	7.0	5.8	4.3	3.7	.....	3.7	3.8	4.0
12	4.0	3.8	4.0	5.7	6.9	6.0	4.3	3.7	3.8	.....	3.8	3.9
13	4.0	3.8	4.0	5.9	6.6	5.8	4.3	3.6	4.0	3.7	3.8	3.9
14	4.0	3.8	4.1	6.1	6.6	5.7	4.3	3.6	3.9	3.7	3.8	3.9
15	3.9	3.8	4.1	6.1	6.6	5.7	4.2	3.6	3.8	3.7	4.0	3.9
16	4.0	3.8	4.0	6.4	6.3	5.7	4.2	3.6	3.7	3.7	.....	3.9
17	4.1	3.8	4.0	6.5	6.1	5.6	4.3	3.6	3.7	3.7	3.8	3.9
18	4.0	4.0	4.1	6.3	6.0	5.5	4.2	3.6	3.7	3.7	3.8	3.9
19	4.1	4.1	4.1	6.5	5.9	5.5	4.1	3.6	3.7	3.7	3.8	3.9
20	4.2	4.0	4.0	6.7	5.9	5.4	4.1	3.6	3.7	3.7	3.8	3.9
21	4.3	4.1	4.2	6.7	5.9	5.3	4.0	3.6	3.7	.....	3.9	3.8
22	4.1	4.0	4.8	6.7	5.6	5.3	4.0	3.6	3.7	3.8	3.8	3.8
23	4.1	4.0	5.0	5.4	5.6	5.2	4.0	3.6	3.7	3.8	3.7	3.8
24	3.9	4.0	4.9	6.2	5.5	5.1	4.0	3.6	3.7	3.7	.....	4.0
25	3.9	3.9	5.3	6.1	5.5	5.1	3.9	3.6	3.7	3.7	3.8	4.7
26	3.8	3.9	5.3	5.8	6.1	5.4	3.8	3.6	3.7	3.7	3.8	.....
27	3.8	4.3	5.1	5.9	5.8	5.4	3.8	3.6	3.7	3.7	3.8	4.5
28	3.9	4.1	5.0	5.9	5.9	5.3	3.8	3.6	3.7	3.7	3.8	4.3
29	3.8	.....	5.2	6.0	5.7	5.1	3.7	3.6	3.6	3.7	3.8	4.1
30	3.8	.....	6.3	6.3	5.6	5.0	3.7	3.6	3.6	3.7	3.8	4.0
31	3.9	.....	6.5	.....	5.7	.....	3.7	3.6	.....	3.8	.....	3.5

NOTE.—The river was frozen, but not entirely over, January 1 to February 12, average thickness of ice, 0.5 foot; also December 15 to 31.

Rating table for Chewaucan River at Paisley, Oreg., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.50	23	4.30	112	5.10	284	5.90	503	6.70	838
3.60	29	4.40	129	5.20	309	6.00	535	6.80	890
3.70	36	4.50	148	5.30	335	6.10	569	6.90	945
3.80	45	4.60	168	5.40	361	6.20	606	7.00	1,000
3.90	56	4.70	189	5.50	387	6.30	647		
4.00	68	4.80	211	5.60	414	6.40	692		
4.10	81	4.90	235	5.70	442	6.50	739		
4.20	96	5.00	259	5.80	472	6.60	788		

NOTE.—This table is applicable only for open-channel conditions. It is based on discharge measurements made during 1905–6 and is well defined.

Monthly discharge of Chewaucan River at Paisley, Oreg., for 1906.

[Drainage area, 272 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	112	45	65.4	4,020	0.241	0.28
February	112	45	62.1	3,450	.228	.24
March	739	68	173	10,600	.636	.73
April	838	211	551	32,800	2.03	2.26
May	1,000	387	671	41,300	2.47	2.85
June	647	259	415	24,700	1.53	1.71
July	235	36	110	6,760	.405	.47
August	36	29	30.4	1,870	.112	.13
September	68	29	37.1	2,210	.136	.15
October	45	29	35.2	2,160	.129	.15
November	68	36	46.8	2,780	.172	.19
December	189	23	66.7	4,100	.245	.28
The year	1,000	23	189	137,000	.694	9.44

NOTE.—The open-channel rating table has been applied throughout the year; values for the winter months are liable to some error on account of ice. Discharges interpolated for days on which gage was not read.

MISCELLANEOUS MEASUREMENTS.

The following measurements were made of minor streams of the Great Basin, in 1906, by J. F. Hoyt and others.

Miscellaneous measurements in Great Basin in 1906.

Date.	Stream.	Locality.	Area of section.	Mean velocity.	Gage height.	Discharge.
	IN UTAH.					
1906.			*Sq. ft.*	*Feet per sec.*	*Feet.*	*Sec.-ft.*
June 4	North ditch of Nephi Irrigation Co.	¼ mile north of San Pedro depot.	5.1	1.77	.....	9.07
Aug. 3	Rating flume	Wilson canal	14.9	.95	.....	14.2
June 26	Indian Creek	Above head of T. F. & B. Co	5.3	2.97	.....	15.6
27	Wildcat Creek	E. Gillie's ranch	1.2	1.84	.....	2.25
27	Pine Creek	G. Bradshaw's ranch	3.4	2.70	1.4	9.06
28	Kesler ditch	(Containing water of Cove Creek).	.48	1.25	1.0	.61
28	North Fork Pine Creek	Below county road crossing.	1.1	1.84	.7	1.97
July 4	Hutchins and Thompson ditch.	125 feet below head	1.8	1.44	.....	2.58
4	Beaver City irrigation canal.	In flume	9.8	3.10	.....	30.3
4	Harris ditch	Beaver City canal flume	7.9	3.25	.....	25.6
4	Beaver City power canal	Near Harris ditch	5.7	2.44	.....	13.8
6	North Fork South Creek	Cox Bros. ranch	.77	.47	.....	.36
6	Birch Creek	Above mouth Lower Birch Canyon.	2.3	1.4	.....	3.28
11	A. Bayter's dug well and springs.		.42	.30	.....	.11
12	N. Green's springs	Near fence No. 48	.25	.99	.....	.25
13	G. B. and D. M. Gillie's springs.	SE. ¼, sec. 4, T. 29 S., R. 7 W.	.....	.....	.....	.82
13	2 springs forming part of Dry Creek.	On Hannah Gales's farm	1.47	.92	.....	1.35
13	2 springs forming part of Dry Creek.	In O. W. Gales's pasture	.....	.....	.....	.68
14	Farnsworth and Bastian Bros.' springs.	On Indian Creek	.....	.....	.....	.11
20	Jeddy Dean's dug well	Beaver City [a]	.26	.94	.....	.25
20	J. H. Cartwright spring	Beaver City [a]	.11	.42	.....	.05
20	W. E. Yardley's 2 springs	Beaver City [a]	.34	.67	.....	.23
20	Part of seepage water	E. Willden's yard [a]	.....	.....	.....	6.72
23	Remainder seepage water	E. Willden's yard, Beaver City. [a]	.....	.....	.....	1.30
	Total		.....	.....	.....	8.02
	Discharge of surface stream		.....	.....	.....	.06
	Seepage		.....	.....	.....	7.96
23	Irrigation ditch	Beaver City [b]	3.09	1.38	.....	4.23
23	Irrigation ditch	Beaver City [c]	2.17	1.86	.....	4.04
28	Jos. Jacksons's 2 springs	South Beaver	.53	.69	.....	.37
31	North Fork South Creek [d]	Cox Bros. ranch	.51	.50	.....	.25
31	South Fork South Creek	Cox Bros. ranch	.....	.....	.....	2.81
31	Birch Creek (Estimated)		.....	.....	.....	2.00
	Total		.....	.....	.....	5.06
Aug. 21	Datson's warm springs	1 mile east of Minersville	.....	.....	.....	.13
25	Birch Creek	Mouth Lower Birch Creek Canyon.	.....	.....	.....	.93
25	North Fork South Creek	Cox Bros. ranch	.44	.34	.....	.15
	IN OREGON.					
Apr. 8 [e]	Ana River	Summer Lake	52	.....	3.46	141
May 31	Choctoo Creek	Sycan Marsh	16	.....	.....	24
31	Coyote Creek	....do	2.9	.....	.....	4.5
31	Long Creek	....do	39	.....	.....	60
July 2 [f]	Silvies	Silvies	127	.....	3.88	80

[a] Mr. Deans's well flows rarely, even during the high water season. It is situated at the foot of a low beach in what has been a belt of marshy ground during high water seasons. In this belt are a dozen such wells and cellars discharging similar streams, some of them being given above.

[b] Ditch flows west on street 3 blocks north and 2 blocks west of W. M. & Co.'s store, measured at schoolhouse corner.

[c] Same ditch as at point 40 feet west of street 3 blocks east of Main street.

[d] This discharge is about twice the mean daily discharge, the flow almost ceasing at times.

[e] The discharge of this stream remains practically constant at 140 to 150 second-feet, as it heads in large springs; see Water-Supply Paper No. 176. p. 132.

[f] Measured from cable at station described in Water-Supply Paper No. 176. p. 122.

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