SURFACE WATER SUPPLY

OF

WESTERN GULF OF MEXICO AND RIO GRANDE DRAINAGES

1906

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CONTENTS.

ILLUSTRATIONS.

SURFACE WATER SUPPLY OF GULF OF MEXICO AND RIO GRANDE DRAINAGES, 1906.[a]

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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

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

[b] The data in this report were collected as follows: In the eastern portion under the direction of Prof. T. U. Taylor, of the University of Texas; in the western portion under the direction of W. B. Lamb. The stations on the Rio Grande proper were maintained by the International (Water) Boundary Commission, under the direction of W. W. Follett, consulting engineer.

The data were prepared for publication under the direction of John C. Hoyt, assisted by R. H. Bolster, J. E. Stewart, F. F. Henshaw, and H. D. Padgett.

7

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.

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 drainage, 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 10, 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-foot.
100 United States gallons per minute for one day equal 0.442 acre-foot.
1,000,000 United States gallons per day equal 1.55 second-feet.
1,000,000 United States gallons equal 3.07 acre-feet.
1,000,000 cubic feet equal 22.95 acre-feet.

1 acre-foot equals 325,850 gallons.

1 inch deep on 1 square mile equals 2,323,200 cubic feet.

1 inch deep on 1 square mile equals 0.0737 second-foot per year.

1 foot equals 0.3048 meter.

1 mile equals 1.60935 kilometers.

1 mile equals 5,280 feet.

1 acre equals 0.4047 hectare.

1 acre equals 43,560 square feet.

1 acre equals 209 feet square, nearly.

1 square mile equals 2.59 square kilometers.

1 cubic foot equals 0.0283 cubic meter.

1 cubic foot equals 7.48 gallons.

1 cubic foot of water weighs 62.5 pounds.

1 cubic meter per minute equals 0.5886 second-foot.

1 horsepower equals 550 foot-pounds per second.

1 horsepower equals 76.0 kilogram-meters per second.

1 horsepower equals 746 watts.

1 horsepower equals 1 second-foot falling 8.80 feet.

$1\frac{1}{3}$ horsepower equal about 1 kilowatt.

To calculate water power quickly: $\dfrac{\text{Sec.-ft.} \times \text{fall in feet}}{11}$ = 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
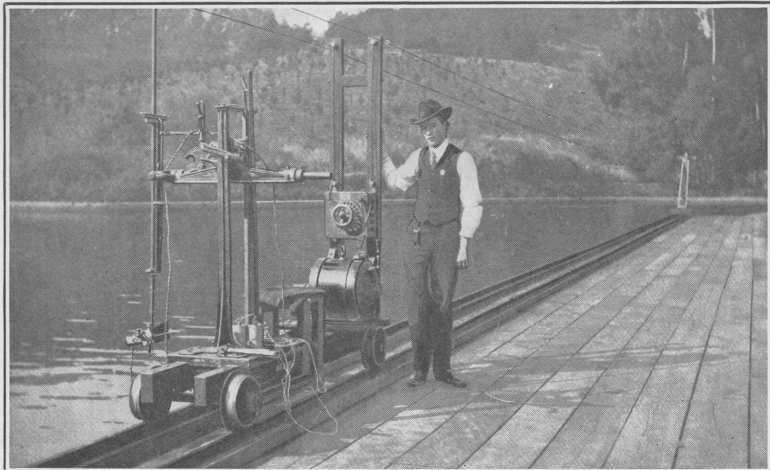
A. CURRENT-METER RATING STATION, LOS ANGELES, CAL.
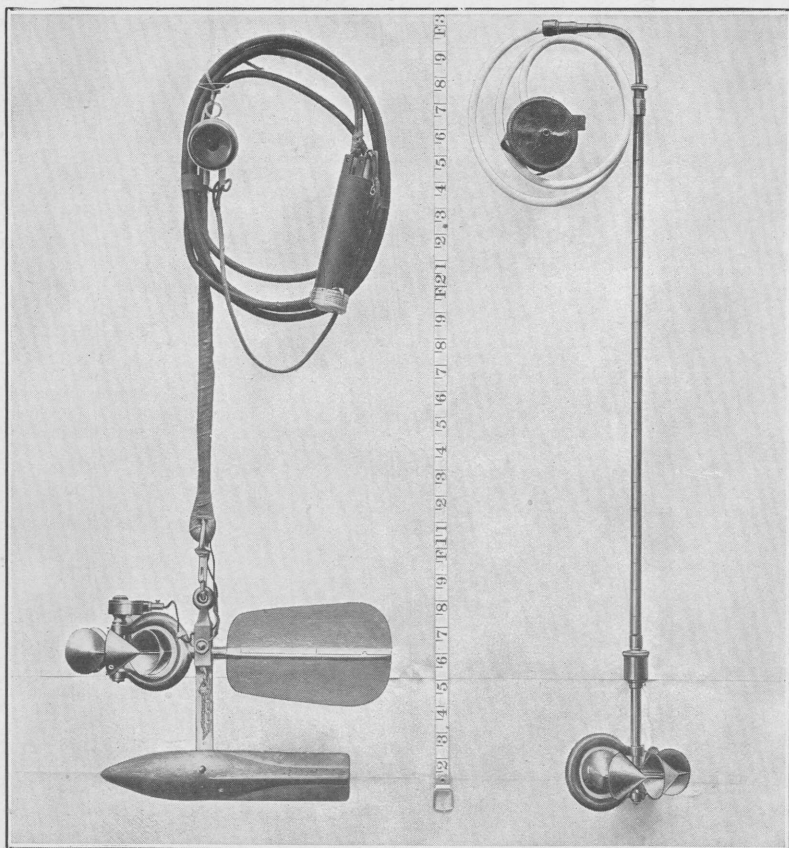
B. PRICE CURRENT METERS.

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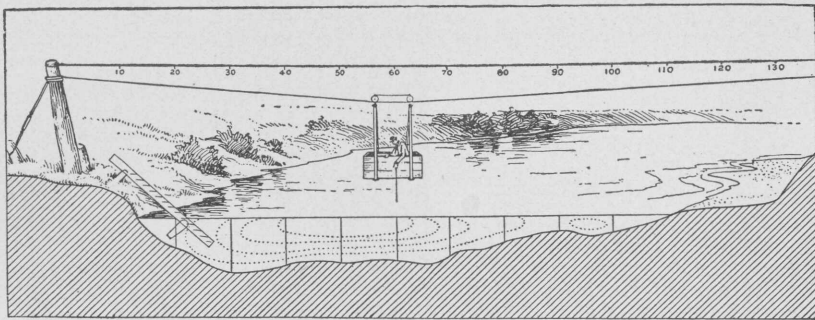
Fig. 1.—Cable station, showing section of river, car, gage, etc.

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 sub-surface 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.

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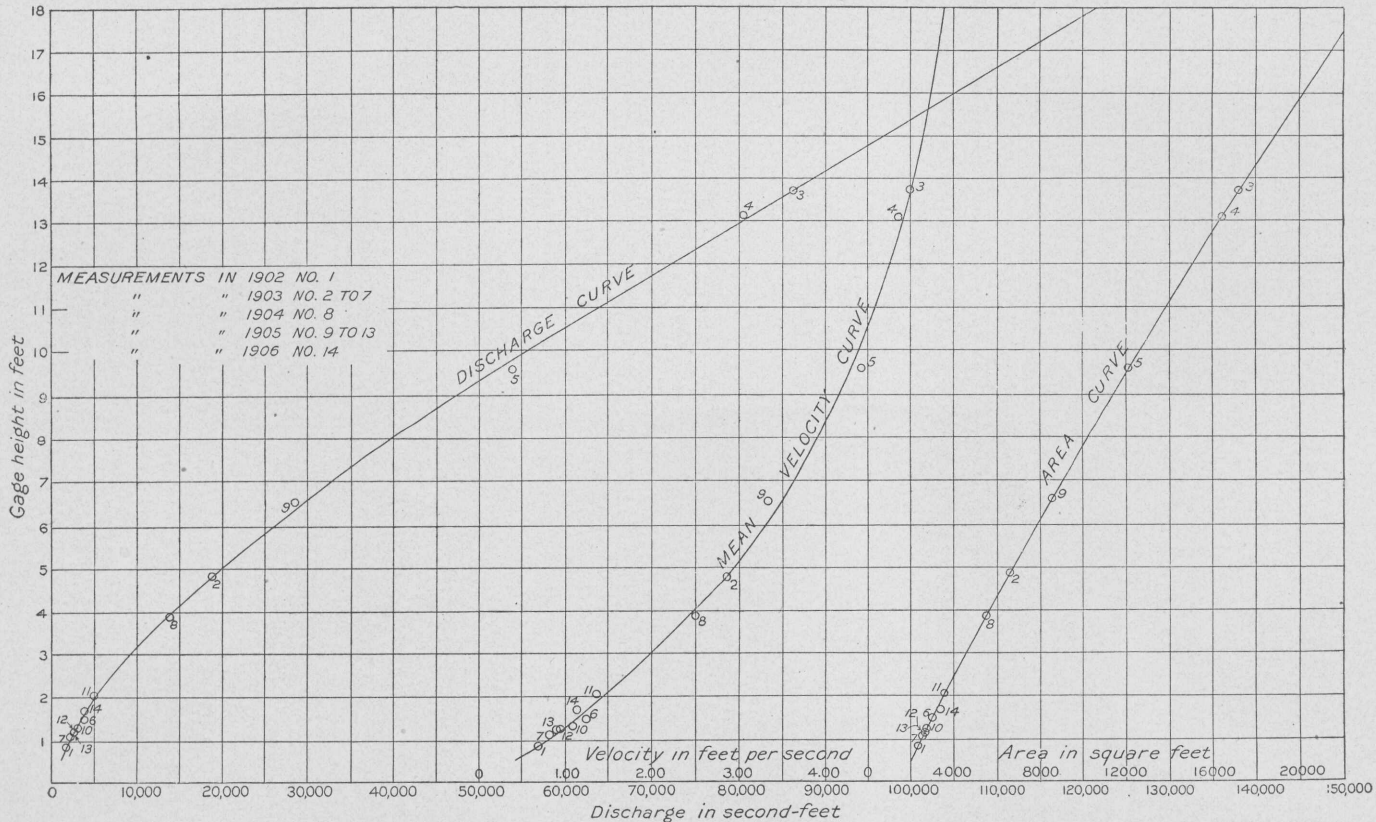
FIG. 2.—Discharge, area, and mean-velocity curves for Potomac River at Point of Rocks, Md.

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.

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WESTERN GULF OF MEXICO DRAINAGE.

SABINE RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Sabine River has its headwaters in Collin and Hunt counties, Tex., flows in a southeasterly direction to the State line, then south, forming the boundary between Texas and Louisiana, and empties into Sabine Lake, an arm of the Gulf, near Orange, Tex. The small tributaries in eastern Texas support many small water mills, and the Sabine itself is navigable for several hundred miles. The drainage area of the Sabine in Texas above Orange is 7,500 square miles and its total drainage area above Orange in Louisiana and Texas is 10,400 square miles.

SABINE RIVER NEAR LONGVIEW, TEX.

This station was established January 1, 1904, at the bridge of the International and Great Northern Railroad, about 3 miles southwest of Longview Junction, Tex. During 1906 the gage was read by P. H. Gray. The conditions at the station and the bench marks

are described in Water-Supply Paper No. 174, page 13, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Sabine River near Longview, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	31.3	23.4	23.3	26.4	17.9	19.9	7.9	11.1	10.0	10.9	7.1	12.2
2	30.8	24.0	21.7	26.4	15.4	13.2	8.6	11.1	8.5	10.5	6.9	12.7
3	30.3	24.3	20.7	26.4	13.6	14.1	8.6	11.1	8.0	10.2	6.3	12.9
4	29.7	24.2	19.9	26.8	12.4	15.8	8.8	10.8	7.2	9.9	6.9	12.4
5	28.6	23.2	19.0	27.2	12.5	14.1	8.3	10.8	7.3	9.7	7.0	11.4
6	27.1	21.0	16.8	27.5	13.8	13.0	7.7	11.2	8.2	9.4	7.2	10.2
7	25.4	17.6	14.0	27.8	14.7	14.1	7.2	10.9	8.5	9.0	6.8	9.7
8	23.8	14.1	13.4	27.8	15.8	15.6	7.0	10.5	9.5	8.1	6.9	9.0
9	22.6	12.3	13.9	27.5	16.4	17.3	6.9	9.8	9.8	8.1	7.1	8.7
10	22.6	11.7	14.1	26.4	17.1	19.0	6.9	9.1	10.0	8.3	6.9	8.4
11	21.0	11.3	13.9	25.7	16.2	20.4	7.2	8.6	11.2	7.3	6.6	8.2
12	20.6	11.1	13.9	24.2	16.2	20.7	7.3	7.0	10.4	7.2	7.1	8.1
13	20.2	13.2	14.6	22.8	16.3	21.4	7.3	7.4	10.6	6.5	7 1	8.1
14	19.7	17.8	15.4	22.3	14.2	21.0	7.3	7.7	10.1	8.9	7.1	8.4
15	19.0	19.8	16.0	21.2	13.2	19.7	7.1	8.5	9.7	9.5	7.0	8.7
16	17.0	20.0	16.2	20.3	13.0	13.9	7.1	8.4	9.5	9.8	7.0	15.9
17	15.0	20.2	14.9	19.4	13.0	9.4	7.4	9.0	10.6	10.5	6.9	22.0
18	13.6	21.0	12.8	16.9	12.9	8.5	9.6	9.6	10.2	12.4	6.9	23.0
19	13.0	22.1	11.8	13.9	12.8	8.2	10.6	11.7	10.0	14.3	7.0	23.8
20	12.7	23.4	11.8	12.4	12.2	8.0	10.2	12.0	9.8	15.3	7.1	23.4
21	12.5	24.6	11.4	13.4	13.4	7.7	9.7	11.9	9.7	16.8	7.3	24.6
22	14.2	25.7	11.2	14.7	15.7	7.9	8.9	11.3	8.5	17.0	7.6	25.9
23	15.1	27.5	11.1	14.5	17.7	8.3	10.4	10.4	8.4	16.1	7.9	26.0
24	15.5	27.0	11.4	13.9	19.7	8.2	11.5	10.0	7.2	13.4	8.3	27.2
25	16.2	27.3	11.5	13.4	20.9	7.9	10.8	9.8	7.0	13 0	7.6	30.0
26	17.2	27.3	11.4	13.6	23.0	8.0	9.9	10.2	7.0	10.8	8.1	30.7
27	18.2	26.5	15.4	14.9	24.2	8.3	9.1	10.5	7.0	9.3	8.7	30.7
28	19.2	24.9	21.7	15.9	24.7	7.8	8.5	11.1	6.9	8.3	9.7	30.4
29	20.4		26.5	16.6	25.0	7.8	15.0	11.5	6.3	7.8	10.6	29.8
30	21.4		27.0	17.1	24.4	7.5	16.5	11.9	6.2	7.6	11.2	28.8
31	22.6		27.0		22.4		13.7	10.1		7.4		27.4

Rating table for Sabine River near Longview, Tex., for 1905–6.

Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
6.30	74	7.60	251	8.90	483	11.40	1,001	22.00	4,230
6.40	85	7.70	267	9.00	502	11.60	1,045	23.00	4,776
6.50	97	7.80	283	9.20	540	11.80	1,090	24.00	5,400
6.60	109	7.90	300	9.40	580	12.00	1,136	25.00	6,112
6.70	122	8.00	317	9.60	620	13.00	1,366	26.00	6,900
6.80	135	8.10	335	9.80	660	14.00	1,605	27.00	7,746
6.90	148	8.20	353	10.00	700	15.00	1,850	28.00	8,700
7.00	162	8.30	371	10.20	742	16.00	2,103	29.00	9,860
7.10	176	8.40	389	10.40	784	17.00	2,366	30.00	11,200
7.20	190	8.50	407	10.60	826	18.00	2,640	31.00	12,670
7.30	205	8.60	426	10.80	869	19.00	2,938	32.00	14,300
7.40	220	8.70	445	11.00	913	20.00	3,310		
7.50	235	8.80	464	11.20	957	21.00	3,746		

NOTE.—The above table is based on 26 discharge measurements made during 1904–5 and is well defined below gage height 22.0 feet.

Monthly discharge of Sabine River near Longview, Tex., for 1906.

[Drainage area, 2,900 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...................	13,200	1,250	4,520	278,000	1.56	1.80
February...................	8,200	935	4,400	244,000	1.52	1.58
March...................	7,750	935	2,540	156,000	0.876	1.01
April...................	8,490	1,230	4,420	263,000	1.52	1.70
May...................	6,110	1,180	2,580	159,000	0.890	1.03
June...................	3,940	235	1,490	88,700	0.514	.57
July...................	2,230	148	564	34,700	0.194	.22
August...................	1,140	162	747	45,900	0.258	.30
September................	957	63	480	28,600	0.166	.19
October...................	2,370	97	837	51,500	0.289	.33
November................	957	74	256	15,200	0.088	.10
December................	12,200	335	4,370	269,000	1.51	1.74
The year................	13,200	74	2,270	1,630,000	.782	10.57

SABINE RIVER AT LOGANSPORT, LA.

This station was established December 27, 1905, at the bridge of the Houston, East and West Texas Railway. The drainage area above this point is practically all in Texas.

The channel is straight for 400 feet above and 4,000 feet below the station. The current is sluggish at low stages. The right bank is low, wooded, and liable to overflow; the left is high, and does not overflow. The flood plain is not very wide, and the conditions are favorable for accurate measurements. There is but one channel at low stages, but at high water the piers of the bridge divide the stream into several channels. The highest flood on record (gage height 41.2 feet) occurred in 1884.

Discharge measurements are made from the railroad bridge. The initial points for soundings are the face of the west abutment and the east face of each pier. The section under each span of the bridge is treated as a distinct channel.

The gage is marked off on the downstream side of a pier of the highway bridge, which is 200 feet above the railroad bridge. It is near the west bank. A boxed chain gage which is attached to the upstream railing of the highway bridge is also used. Gage heights for 1903 to 1905 were furnished by the United States Weather Bureau. The datum of the Weather Bureau gage is 2.00 feet above that of the Geological Survey, and the gage heights have been reduced to the latter datum. The bench mark is a railroad spike driven into the north side of a tree 150 feet from the low-water edge on the east bank between the railroad and highway bridges; elevation, 50.54 feet. The reference point is the top of the tie at the foot of hip vertical of the Pratt truss, north side, east end; elevation, 52.90 feet. Elevations refer to the datum of the Geological Survey gage.

Discharge measurements of Sabine River at Logansport, La., for 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 20	T. U. Taylor	153	2,120	12.9	2,280
June 16	do			15.5	3,500
July 6	do	130	1,130	6.1	530
December 30	do			22.0	6,830

Daily gage height, in feet, of Sabine River at Logansport, La., for 1903–1906.

1903.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.0	7.0	6.4	3.0	6.3	5.6	17	18.8	5.1	3.7	12.0	6.3	6.1
2	7.4	9.5	6.0	3.0	6.2	5.6	18	18.8	5.1	3.6	11.7	6.1	5.7
3	8.5	11.5	5.7	3.0	6.1	5.4	19	18.8	5.4	3.5	11.2	6.0	5.2
4	9.9	13.5	5.4	3.0	6.0	5.4	20	18.9	5.6	3.4	10 5	6.0	5.1
5	11.3	14.4	5.0	3.5	5.8	5.3	21	19.0	6.8	3.3	9.5	6.0	5.0
6	13.6	14.9	4.5	5.5	5.6	5.3	22	19.3	8.0	3.3	8.8	6.0	5.0
7	15.4	15.1	4.2	6.6	5.4	5.2	23	19.5	10.0	3.3	8.5	6.0	5.0
8	16.0	13.4	4.2	7.6	5.2	5.2	24	19.9	12.0	3.3	8.2	5.9	5.0
9	16.0	11.4	4.0	8.5	5.2	5.2	25	19.9	12.0	3.2	7.6	5.8	5.6
10	16.2	10.0	4.0	10.0	5.5	5.1	26	18.5	11.6	3.1	7.0	5.7	6.0
11	16.5	8.2	4.0	10.6	6.0	5.0	27	14.9	10.2	3.1	7.0	5.7	6.0
12	17.0	6.8	3.9	11.0	7.0	5.4	28	10.4	9.2	3.0	6.9	5.7	6.0
13	17.2	6.0	3.8	11.3	7.4	5.8	29	7.7	8.0	3.0	6.8	5.6	6.0
14	17.7	5.7	3.7	11.5	7.6	6.2	30	6.5	7.5	3.0	6.6	5.6	6.0
15	18.1	5.4	3.7	11.7	7.2	6.3	31	6.0	6.8		6.4		6.0
16	18.6	5.1	3.7	11.8	6.8	6.4							

1904.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.0	8.3	8.5	12.5	11.4	5.0	7.0	7.0	2.4	3.2	2.1	3.0
2	5.9	8.0	8.0	13.0	10.0	5.0	7.2	6.6	2.4	3.2	2.1	3.0
3	5.8	7.6	7.4	13.2	8.2	5.0	8.0	6.2	2.2	3.0	2.2	3.0
4	5.7	7.0	7.0	13.4	8.0	5.0	8.4	5.6	2.2	2.8	2.6	3.0
5	5.6	6.5	6.6	13.0	9.0	4.6	9.6	5.0	2.4	2.8	2.6	3.0
6	5.5	6.0	6.4	12.9	9.2	4.2	10.2	4.8	2.6	2.8	2.6	3.0
7	5.5	5.5	6.2	12.2	10.2	4.0	10.2	6.6	2.4	2.8	2.6	3.0
8	5.4	5.2	6.0	14.5	10.0	4.6	10.4	6.4	2.4	2.8	2.6	3.0
9	5.3	5.0	5.9	18.8	10.2	5.6	10.2	5.6	2.4	2.7	2.6	2.8
10	5.2	5.4	5.7	20.0	11.0	7.0	9.6	5.4	2.6	2.7	2.6	2.8
11	5.1	5.5	5.4	20.2	12.0	10.2	9.2	4.6	2.8	2.7	2.6	2.8
12	5.0	5.5	5.2	20.4	12.8	12.4	8.2	4.6	3.0	2.8	2.6	2.8
13	4.9	5.4	5.0	20.6	13.4	14.2	7.6	4.8	3.6	2.8	2.6	2.8
14	4.8	5.3	5.0	19.8	13.8	15.4	7.0	4.6	4.4	2.8	2.6	2.8
15	4.7	5.1	5.0	19.2	14.0	16.3	6.6	4.4	4.8	2.8	2.6	2.8
16	4.6	5.0	5.0	18.4	14.2	16.2	6.0	5.2	4.8	2.7	2.6	2.8
17	4.5	5.0	5.0	17.6	14.3	15.8	5.4	5.4	4.6	2.7	2.6	2.8
18	4.4	5.0	5.0	17.8	14.6	15.4	5.0	5.2	4.4	2.7	2.7	2.6
19	4.4	5.4	5.2	17.6	14.8	15.4	4.6	5.0	4.2	2.8	2.6	2.6
20	4.4	5.6	5.5	17.8	15.0	15.6	4.2	4.8	4.0	2.8	2.8	2.6
21	4.4	6.5	5.8	18.2	15.2	15.8	4.0	4.4	4.0	2.8	3.0	2.6
22	4.5	8.8	6.0	18.6	15.4	16.0	3.8	4.0	4.4	2.8	2.9	2.6
23	4.6	10.2	8.8	18.8	15.2	15.6	4.0	3.8	4.6	2.7	2.9	2.6
24	4.9	11.0	11.0	19.4	13.4	13.8	6.0	3.4	4.5	2.7	2.9	2.8
25	5.3	12.2	11.3	19.6	10.6	11.4	6.6	3.4	4.4	2.7	2.9	3.0
26	6.0	11.6	11.0	19.8	8.4	10.0	7.0	3.2	4.3	2.8	3.0	4.0
27	6.8	11.2	11.0	20.0	6.6	8.6	7.6	3.2	4.2	2.4	3.3	22.0
28	7.0	10.2	11.4	20.2	6.2	7.4	8.0	2.8	3.8	2.3	3.3	27.0
29	7.4	9.3	12.0	19.6	5.6	7.0	8.2	2.8	3.6	2.2	3.3	28.8
30	7.8		12.3	16.2	5.2	6.8	8.0	2.6	3.4	2.1	3.4	28.6
31	8.5		12.5		5.0		7.6	2.6		2.1		27.8

Daily gage height, in feet, of Sabine River at Logansport, La., for 1903–1906— Continued.

1905.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	26.0	18.0	22.0	23.0	28.0	33.2	21.0	28.6	5.6	4.2	8.8	9.0
2	24.6	15.0	20.5	22.8	27.8	33.6	22.4	27.7	5.8	4.0	9.0	9.2
3	22.0	13.5	18.0	23.6	27.4	33.5	23.2	26.6	6.2	4.0	9.3	11.5
4	17.8	12.0	16.4	25.0	27.0	32.8	24.0	25.7	6.4	4.1	9.5	12.0
5	13.0	10.0	15.3	25.2	26.8	32.0	24.0	24.8	6.4	4.3	9.2	13.0
6	10.4	9.0	14.6	24.8	26.4	31.5	24.8	24.0	6.2	4.7	9.6	12.8
7	10.2	10.5	12.0	25.0	26.2	30.6	25.0	23.0	5.8	4.9	11.8	12.2
8	8.6	13.0	9.8	25.0	26.6	29.8	24.8	22.8	5.4	4.8	13.6	11.8
9	8.4	17.5	15.0	24.8	26.4	29.0	25.3	22.2	5.4	4.9	13.5	11.0
10	7.8	20.0	21.0	24.5	26.2	28.5	25.7	22.0	5.4	5.0	19.2	10.8
11	8.0	21.5	25.8	24.0	26.8	27.8	26.0	21.5	5.0	4.8	20.2	11.0
12	9.2	22.4	28.5	24.0	27.6	27.0	26.2	20.2	5.0	4.8	20.6	11.0
13	11.0	23.0	28.8	23.8	29.0	26.6	26.6	17.6	5.0	4.7	20.2	10.6
14	12.6	22.5	28.0	22.8	30.0	25.7	26.0	13.8	4.6	4.6	19.8	13.8
15	13.2	22.0	26.8	23.6	30.8	24.0	26.2	11.0	4.5	4.6	18.9	17.7
16	13.0	21.5	25.0	24.0	31.6	24.0	26.4	11.0	4.5	4.3	18.0	20.0
17	13.2	18.8	23.5	23.8	32.0	22.2	27.4	8.6	4.4	4.4	17.3	21.0
18	12.6	16.5	21.8	24.0	32.8	17.6	28.0	7.7	4.4	4.4	15.5	21.5
19	10.8	18.2	21.0	25.0	32.9	13.0	31.3	7.2	4.8	4.5	14.0	22.6
20	11.2	23.0	21.2	25.6	32.8	10.5	31.0	7.0	6.0	4.3	13.8	23.8
21	12.4	25.5	21.6	26.0	32.5	10.0	30.0	7.1	6.0	4.2	12.6	25.0
22	12.4	25.5	22.0	26.9	32.7	10.4	30.2	7.3	5.8	4.0	12.4	25.8
23	12.2	26.5	21.8	26.6	33.6	10.8	30.0	7.8	6.2	4.0	12.2	27.0
24	12.0	26.8	23.6	26.9	34.8	13.0	30.4	7.5	6.2	4.1	13.9	27.8
25	11.2	26.4	24.0	27.5	35.7	15.3	30.7	6.0	5.8	6.6	14.4	28.0
26	9.8	26.8	24.5	27.8	35.8	17.5	30.6	6.2	5.6	10.0	14.0	28.3
27	8.8	25.0	23.8	27.6	35.4	18.5	32.3	5.8	5.3	12.1	13.5	28.2
28	8.6	23.5	23.5	27.5	34.6	19.0	32.0	5.4	4.8	11.8	12.0	28.0
29	12.0		23.0	27.5	34.0	19.7	31.3	5.4	4.6	11.3	11.0	27.8
30	13.2		24.4	28.0	33.2	20.2	30.6	5.0	4.3	9.8	10.0	26.9
31	15.4		24.0		33.0		29.7	5.2		9.0		27.2

1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	28.0	21.8	20.4	29.2	12.8	18.0	9.0	19.0	7.8	4.8	6.4	7.2
2	29.5	20.6	20.8	29.7	13.3	18.6	8.6	19.8	8.0	5.1	5.8	8.0
3	30.7	19.7	21.0	29.0	13.7	21.4	8.4	20.3	8.0	5.3	5.5	8.6
4	31.2	19.0	21.0	28.6	13.8	22.6	8.2	19.8	7.8	5.0	5.2	9.0
5	31.6	19.2	21.2	28.0	14.0	22.4	7.0	17.4	7.8	4.8	4.8	9.4
6	31.2	19.6	21.0	27.0	14.0	22.8	6.8	15.0	8.0	4.5	4.8	9.4
7	31.0	19.8	20.7	26.6	15.8	22.6	6.8	15.8	8.0	4.5	4.7	9.3
8	30.8	20.0	19.0	25.8	16.0	21.7	6.6	17.0	8.0	4.5	4.6	9.2
9	30.5	20.2	18.2	25.0	16.6	20.0	6.6	11.6	7.6	4.5	4.6	8.8
10	30.0	20.0	17.0	24.6	17.0	18.0	6.4	10.4	7.4	4.3	4.6	8.2
11	29.2	19.3	15.5	24.0	16.6	16.6	6.2	9.0	7.6	4.2	4.5	8.0
12	28.5	18.5	13.0	23.7	16.0	15.6	6.6	8.3	7.8	4.1	4.5	7.4
13	26.7	15.4	12.8	23.8	15.4	14.0	7.0	7.0	7.8	4.1	4.4	7.0
14	26.0	17.0	12.5	24.0	14.2	15.2	7.2	7.0	8.7	4.3	4.3	6.7
15	25.0	17.2	12.7	23.8	13.6	15.0	7.0	6.6	9.0	6.8	4.3	6.5
16	24.0	17.8	12.7	23.5	13.8	15.6	7.0	6.4	8.8	11.0	4.3	8.3
17	22.4	18.5	12.9	23.6	14.0	15.8	7.2	6.2	8.5	13.2	4.2	14.7
18	22.0	18.8	13.5	23.0	15.8	16.0	8.0	6.6	8.6	13.4	5.1	19.4
19	21.5	19.0	13.8	22.7	17.0	13.6	8.3	6.8	8.6	13.2	6.0	21.0
20	20.0	19.5	13.6	22.0	17.2	11.0	8.0	7.2	8.3	13.1	6.0	22.7
21	18.2	19.0	13.0	21.2	16.6	10.2	8.2	8.4	8.3	13.0	6.1	23.6
22	20.6	19.0	11.8	19.0	14.8	9.4	7.8	9.0	8.2	12.7	6.4	24.4
23	23.8	18.8	10.2	17.2	14.0	8.2	8.0	9.2	7.8	12.8	6.2	24.6
24	29.0	18.6	10.0	14.0	14.2	8.0	8.0	9.0	7.5	13.0	6.0	24.0
25	30.2	19.2	9.8	13.3	14.8	8.3	8.4	8.8	8.2	12.9	5.8	23.7
26	29.8	19.6	9.6	13.9	16.0	8.6	8.8	8.5	8.5	12.6	5.8	22.1
27	29.0	20.0	10.0	14.0	16.0	9.6	9.0	8.2	7.7	12.4	6.0	22.2
28	27.6	20.2	18.2	13.0	17.0	11.8	8.7	8.0	6.3	11.1	5.6	21.8
29	26.0		23.6	12.8	17.0	10.2	10.0	8.0	5.1	10.2	5.9	21.0
30	24.5		25.7	12.6	17.6	9.4	15.0	7.6	4.9	8.7	6.5	22.0
31	23.0		28.0		18.0		18.0	7.6		7.4		22.3

Rating table for Sabine River at Logansport, La., for 1903–1906.

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	105	3.60	208	5.20	388	9.00	1.145	24.00	8,070
2.20	110	3.70	217	5.40	418	10.00	1,420	25.00	8,720
2.30	115	3.80	226	5.60	449	11.00	1.720	26.00	9,380
2.40	121	3.00	235	5.80	481	12.00	2,040	27.00	10,050
2.50	127	4.10	245	6.00	515	13.00	2,390	28.00	10,730
2.60	133	4.10	255	6.20	551	14.00	2,770	29.00	11,420
2.70	139	4.20	265	6.40	587	15.00	3,180	30.00	12,120
2.80	146	4.30	276	6.60	624	16.80	3,620	31.00	12,830
2.90	153	4.40	287	6.80	662	17.00	4,090	32.00	13,550
3.00	160	4.50	298	7.00	700	18.00	4,590	33.00	14,270
3.10	167	4.60	310	7.20	740	19.00	5,120	34.00	15,000
3.20	175	4.70	322	7.40	780	20.00	5,670	35.00	15,740
3.30	183	4.80	334	7.60	821	21.00	6,240	36.00	16,490
3.40	191	4.90	347	7.80	863	22.00	6,830		
3.50	199	5.00	360	8.00	905	23.00	7,440		

NOTE.—The above table is based on four discharge measurements made during 1906. Discharges for 1906 computed from this table may be considered reasonably close above gage height 6.0 feet. All discharges below 6.0 feet are provisional and subject to revision. It has been assumed that conditions of flow remained constant from July 1, 1903, to date, but this may not be true.

Monthly discharge of Sabine River at Logansport, La., for 1903–1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
1903.				
July	5,610	515	3,460	213,000
August	3,220	374	1,310	80,600
September	587	160	252	15,000
October	2,040	160	1,050	64,600
November	821	388	530	31,500
December	587	360	445	27,400
The period				432,000
1904.				
January	1,020	287	448	27,500
February	2,110	360	811	46,600
March	2,210	360	894	55,000
April	6,010	2,110	4,420	263,000
May	3,350	360	1,880	116,000
June	3,760	245	1,810	108,000
July	1,540	226	808	49,700
August	700	133	341	21,000
September	334	110	213	12,700
October	175	105	141	8,670
November	191	105	142	8,450
December	11,300	133	1,730	106,000
The year	11,300	105	1,140	823,000
1905.				
January	9,380	863	2,520	155,000
February	9,920	1,140	5,900	328,000
March	11,300	1,360	6,850	421,000
April	10,700	7,320	8,880	528,000
May	16,300	9,510	12,600	775,000
June	14,700	1,420	7,950	473,000
July	13,800	6,240	10,400	640,000
August	11,100	360	3,810	234,000
September	587	276	423	25,200
October	2,070	245	562	34,600
November	6,010	1,090	2,940	175,000
December	10,900	1,140	5,700	350,000
The year	16,300	245	5,710	4,140,000
1906.				
January	13,300	4,690	10,000	615,000
February	6,710	3,350	5,200	289,000
March	10,700	1,310	4,060	250,000
April	11,900	2,250	7,110	423,000
May	4,590	2,320	3,370	207,000
June	7,320	905	3,520	209,000
July	4,590	551	1,050	64,600
August	5,840	551	1,900	117,000
September	1,140	347	877	52,200
October	2,540	255	1,220	75,000
November	605	265	413	24,600
December	8,460	605	3,820	235,000
The year	13,300	255	3,540	2,560,000

NECHES RIVER AT EVADALE, TEX.

A gaging station was established on Neches River at Evadale July 1, 1904. It is located at the bridge of the Gulf, Beaumont and Kansas City Railway. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 15, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Neches River, at Evadale, Tex, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	19.3	19.2	17.4	18.2	15.6	12.4	12.0	15.2	8.7	8.2	12.5	9.4
2	19.5	19.7	17.4	18.6	15.8	12.3	11.7	15.9	8.5	8.2	12.2	9.3
3	19.6	19.9	17.3	18.6	16.4	12.3	11.3	16.2	8.3	8.4	11.7	9.2
4	19.7	19.8	17.1	18.3	16.7	12.8	10.9	16.4	8.1	8.7	11.3	9.2
5	19.9	19.6	17.0	17.8	17.0	13.2	10.9	16.1	7.9	10.0	11.1	9.2
6	20.2	19.5	16.9	17.5	17.3	13.4	10.6	16.0	7.7	10.9	11.1	9.3
7	20.4	19.4	16.9	16.9	17.5	13.5	10.2	15.9	7.6	11.7	10.7	9.5
8	20.5	19.3	16.8	16.7	17.4	13.4	10.0	15.7	7.5	12.3	10.3	9.7
9	20.6	19.2	16.7	16.6	17.2	13.3	10.2	15.5	7.8	11.0	10.1	9.8
10	20.7	18.0	16.6	16.4	17.1	13.5	10.4	15.1	8.2	10.5	10.0	10.3
11	20.9	17.8	16.5	16.4	17.2	13.7	10.5	14.7	8.5	9.8	9.7	11.5
12	21.0	17.5	16.4	16.5	17.4	14.0	10.6	14.5	9.3	9.2	9.2	12.3
13	21.1	17.3	16.3	16.8	17.1	14.2	10.7	14.5	9.9	10.9	8.9	13.2
14	21.1	17.1	16.3	16.9	16.7	14.5	11.5	14.5	9.9	12.7	8.7	13.5
15	21.0	17.5	16.3	17.2	16.4	14.7	11.5	14.4	9.7	14.7	8.5	12.5
16	20.9	18.0	16.2	17.6	15.9	14.7	10.5	13.6	9.3	16.5	8.3	13.3
17	20.8	18.3	16.1	17.3	15.1	14.5	10.2	13.3	9.0	17.9	8.2	14.1
18	20.7	18.2	15.6	18.7	15.6	14.2	10.7	13.1	8.6	19.7	8.0	14.6
19	20.5	18.1	15.9	18.4	14.0	13.8	11.2	12.5	8.3	19.9	8.2	15.5
20	20.1	18.0	16.6	17.9	13.6	13.5	12.9	11.9	8.1	20.0	8.4	16.2
21	19.8	17.9	17.8	17.3	13.3	13.1	13.5	11.3	7.9	19.7	8.6	17.5
22	19.5	17.7	17.7	17.0	13.1	12.8	14.5	11.0	7.6	19.2	8.9	17.0
23	19.2	17.6	17.7	16.5	13.1	12.4	15.2	10.5	7.4	18.1	9.3	16.1
24	18.9	17.5	17.8	16.1	13.1	11.3	14.9	9.9	8.0	15.8	9.5	16.0
25	18.7	17.5	17.1	15.9	13.0	10.2	14.3	9.6	8.4	14.7	9.7	15.6
26	18.9	17.5	16.2	15.6	12.9	9.9	13.9	9.5	8.9	14.3	10.0	15.2
27	19.1	17.5	14.8	15.4	12.8	9.9	13.8	9.4	9.5	14.0	10.0	15.1
28	19.1	17.4	14.2	15.4	12.7	11.7	13.3	9.3	9.1	13.7	9.8	15.0
29	19.1		15.9	15.3	12.7	12.2	12.9	9.2	8.7	13.5	9.6	15.1
30	19.1		17.2	15.4	12.6	12.3	13.7	9.0	8.2	13.2	9.5	15.2
31	19.2		17.8		12.5		14.5	8.8		12.8		15.2

Rating table for Neches River at Evadale, Tex., 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.*
7.40	560	8.50	787	9.60	1,047	11.40	1,578	16.00	4,350
7.50	580	8.60	809	9.70	1,072	11.60	1,650	17.00	5,410
7.60	600	8.70	831	9.80	1,098	11.80	1,724	18.00	6,660
7.70	620	8.80	854	9.90	1,124	12.00	1,800	19.00	8,270
7.80	640	8.90	877	10.00	1,150	12.20	1,880	20.00	10,100
7.90	660	9.00	900	10.20	1,204	12.40	1,966	21.00	12,090
8.00	680	9.10	924	10.40	1,260	12.60	2,056	22.00	14,300
8.10	701	9.20	948	10.60	1,318	12.80	2,150		
8.20	722	9.30	972	10.80	1,378	13.00	2,248		
8.30	743	9.40	997	11.00	1,442	14.00	2,790		
8.40	765	9.50	1,022	11.20	1,509	15.00	3,480		

NOTE.—The above table is based on seven discharge measurements made during 1904–5 and is fairly well defined.

Monthly discharge of Neches River at Evadale, Tex., for 1906.

[Drainage area, 8,200 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	12,300	7,760	10,100	621,000	1.23	1.42
February	9,910	5,520	7,210	400,000	0.879	0.92
March	6,380	2,910	5,090	313,000	0.621	0.72
April	7,760	3,720	5,490	327,000	0.670	0.75
May	6,000	2,010	3,980	245,000	0.485	0.56
June	3,250	1,120	2,400	143,000	0.293	0.33
July	3,640	1,150	1,940	119,000	0.237	0.27
August	4,750	854	2,600	160,000	0.317	0.37
September	1,120	560	790	47,000	0.096	0.11
October	10,100	722	3,630	223,000	0.443	0.51
November	2,010	680	1,110	66,000	0.135	0.15
December	6,000	948	2,680	165,000	0.327	0.38
The year	12,300	560	3,920	2,830,000	.478	6.49

TRINITY RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Trinity River rises in a network of small streams in the counties of Montague, Jack, Wise, Denton, and Parker, Tex., but their combined flow above Dallas is not sufficient to keep the bottom or bed of the stream moist in dry times. Below Dallas the Trinity flows through a wooded country, and consequently it is not subject to sudden floods with their quick run-offs.

TRINITY RIVER AT DALLAS, TEX.

This station was established December 28, 1905, at the Commerce Street Bridge, Dallas, Tex.

The channel is straight for 800 feet above and 100 feet below the station. The current is sluggish at low water. The right bank is low, partially cleared below the station, and during high water is subject to overflow; the left bank is high and does not overflow. The bed of the stream is composed of clay.

Discharge measurements are made from the Commerce Street Bridge or from the Texas and Pacific Railroad bridge a short distance upstream.

A standard chain gage is fastened to the downstream handrail of the Commerce Street Bridge; length of chain, 58.70 feet. The bench mark is the top of the window sill at the south window of the west side of the building of the Oliver Plow Company; elevation, 54.25 feet. The reference point is the top of the floor of the Commerce Street Bridge, under the downspout of the gage box; elevation, 53.40 feet. The reference point on the Texas and Pacific Railroad bridge is the top of the tie in the mid-panel of the bridge, upstream side; elevation, 55.95 feet. Elevations refer to the datum of the gage. This reference point is reported to be 422.00 feet above mean low tide.

Discharge measurements of Trinity River at Dallas, Tex., in 1906.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
1906.		*Feet.*	*Sec.-ft.*	1906.		*Feet.*	*Sec.-ft.*
May 6	R. J. Williams	32.6	13,000	May 10	R. J. Williams	19.4	3,270
May 6	do	32.2	11,500	May 10	do	16.9	2,320
May 7	do	31.2	9,500	May 10	do	12.9	1,350
May 7	do	29.5	7,550	May 11	do	11.3	1,080
May 7	do	27.3	6,000	May 11	do	10.0	896
May 8	do	25.8	5,140	May 12	do	9.1	770
May 8	do	25.0	4,790	June 23	T. U. Taylor	8.1	597
May 8	do	23.4	4,420	July 2	do	4.5	286
May 9	do	22.3	4,100	December 29	do	4.0	205

Daily gage height, in feet, of Trinity River at Dallas, Tex., for 1903–1906.

1903.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.8	5.7	2.8	9.9	8.3	2.0	17	4.1	4.3	1.8	4.1	2.2	1.8
2	7.9	4.3	2.5	21.5	10.2	2.0	18	3.8	4.1	1.8	3.8	2.1	1.9
3	17.7	3.8	2.4	23.5	7.3	2.0	19	3.2	3.6	1.9	3.5	2.1	2.4
4	22.6	3.3	2.4	20.6	5.1	2.1	20	3.1	3.2	1.9	3.4	2.1	2.2
5	25.6	3.1	2.5	18.5	4.2	2.1	21	3.3	3.1	1.9	3.1	2.1	2.1
6	31.5	2.9	2.2	21.1	3.8	2.0	22	3.2	3.0	1.9	2.8	2.1	2.1
7	32.1	2.9	2.4	23.9	3.5	2.0	23	3.3	2.8	1.9	2.8	2.1	2.2
8	27.8	2.8	2.2	18.5	3.2	1.9	24	3.0	2.8	1.9	2.7	2.1	2.3
9	20.2	2.7	2.2	15.5	2.9	1.9	25	3.1	2.7	1.9	2.6	2.1	2.4
10	11.1	2.5	2.1	12.2	2.7	1.9	26	3.0	2.8	1.8	2.3	2.0	2.4
11	6.5	2.5	2.1	11.0	2.7	1.9	27	2.9	2.7	1.8	2.3	2.0	2.3
12	5.8	2.4	2.1	9.3	2.6	1.9	28	2.9	2.7	1.8	2.3	2.0	2.2
13	5.4	2.4	2.0	6.5	2.5	1.8	29	2.8	2.6	2.3	2.3	2.0	2.2
14	6.5	2.5	1.9	5.8	2.5	1.8	30	3.7	2.5	3.1	2.2	2.0	2.1
15	5.5	4.6	1.8	4.2	2.3	1.8	31	8.0	2.6		3.5		2.1
16	4.3	4.7	1.8	4.1	2.2	1.8							

1904.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.3	2.9	2.0	4.1	6.2	5.5	8.5	3.8	2.3	2.7	5.2	2.3
2	2.3	2.8	2.0	3.5	6.8	9.4	7.1	3.7	2.3	2.4	4.3	2.3
3	2.2	2.8	2.0	3.2	5.2	10.7	4.4	3.8	2.5	3.0	3.7	2.3
4	2.2	2.7	1.9	2.9	15.1	20.9	3.8	3.8	2.7	2.8	3.4	2.2
5	2.2	2.8	1.9	3.2	23.0	24.5	3.8	3.9	2.9	2.7	3.2	2.2
6	2.1	5.2	1.9	7.5	17.8	23.8	6.3	3.9	6.2	2.5	2.9	2.5
7	2.1	6.1	1.9	6.8	19.5	20.1	4.5	5.1	6.9	2.5	2.8	2.4
8	2.3	4.8	1.9	14.6	21.8	17.9	3.8	10.4	3.4	2.5	2.7	2.4
9	2.2	4.1	1.9	18.0	15.1	16.1	3.2	7.3	4.4	2.4	2.6	2.3
10	2.1	3.7	1.8	24.8	13.2	14.8	2.9	6.2	6.8	2.5	2.4	2.3
11	2.1	3.4	1.8	25.9	8.3	12.1	2.8	5.7	6.6	2.4	2.4	2.3
12	2.1	3.1	1.8	14.2	7.2	19.4	2.6	6.3	4.9	2.3	2.4	2.2
13	2.1	2.9	1.9	7.1	6.1	20.0	2.7	7.6	3.9	2.3	2.4	2.2
14	2.1	2.5	2.2	6.3	4.5	16.7	2.5	6.8	3.4	2.4	2.4	2.2
15	2.1	2.4	2.3	5.5	3.2	11.8	2.1	5.9	3.2	2.3	2.6	2.2
16	2.1	2.4	2.1	4.9	3.1	10.9	2.2	4.8	6.0	2.1	2.5	2.4
17	2.1	2.3	3.5	7.1	3.0	8.5	2.1	3.6	7.9	2.1	2.4	2.4
18	2.0	2.3	6.8	4.3	13.8	6.3	2.0	3.2	6.5	2.2	2.4	2.4
19	2.0	2.2	5.4	3.9	8.1	5.3	2.7	3.0	4.6	2.3	2.3	2.3
20	2.0	2.2	14.5	3.2	5.2	4.6	2.4	2.9	3.7	2.3	2.6	2.3
21	2.2	2.2	21.0	2.9	4.9	4.1	2.2	2.8	3.3	2.3	2.4	2.2
22	2.5	2.1	24.7	2.7	4.5	3.7	2.5	2.7	3.8	2.2	2.4	2.4
23	5.7	2.1	17.2	3.0	4.2	6.2	2.4	2.7	3.1	2.3	2.3	2.4
24	5.6	2.1	10.1	3.6	4.0	6.0	4.0	2.5	2.9	2.2	2.3	2.4
25	5.1	2.1	5.2	4.1	3.6	7.7	3.6	2.5	2.8	2.9	2.2	2.4
26	4.2	2.1	24.8	3.9	3.5	6.3	2.8	2.4	2.5	3.4	2.2	2.3
27	3.1	2.0	27.0	3.6	3.7	4.6	2.4	2.5	2.5	11.2	2.4	2.3
28	2.7	2.0	24.0	3.4	6.8	3.8	2.3	2.2	2.4	12.8	2.4	2.2
29	3.4	2.0	10.2	3.9	4.1	4.1	2.2	2.6	2.9	6.2	2.3	2.2
30	4.5		7.5	4.1	4.9	9.4	2.1	2.4	3.0	3.9	2.3	2.2
31	3.7		5.6		6.6		2.2	2.3		6.5		2.2

Daily gage height, in feet, of Trinity River at Dallas, Tex., for 1903–1906—Continued.

1905.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.3	2.6	3.5	5.4	24.5	13.7	6.4	7.7	3.2	3.0	3.5	5.1
2	2.3	2.6	3.3	14.5	26.7	8.4	5.6	6.8	3.3	3.0	3.4	4.8
3	2.2	2.5	3.2	27.2	23.2	7.8	5.4	6.4	3.6	12.1	3.3	4.3
4	2.2	2.5	3.2	29.3	10.3	6.9	18.1	5.9	3.3	19.2	3.1	4.3
5	2.2	2.5	3.3	27.5	8.9	7.4	21.0	5.7	3.3	15.6	3.5	4.3
6	2.3	2.6	3.2	18.2	7.9	6.7	19.4	5.4	3.2	13.6	3.5	4.2
7	2.3	2.9	3.2	15.1	7.3	6.1	22.6	4.9	3.0	12.5	5.0	4.2
8	2.3	3.2	4.1	15.9	12.9	5.9	24.5	5.0	3.2	7.7	5.0	4.2
9	2.4	3.5	8.1	17.0	14.6	5.7	28.3	4.8	3.1	5.6	7.1	4.1
10	2.9	6.1	11.3	17.5	10.2	5.1	30.2	5.4	3.3	4.7	19.2	4.0
11	3.8	3.5	9.1	12.5	7.5	5.2	32.1	5.3	5.4	4.4	25.0	3.8
12	10.5	3.5	6.2	10.6	21.4	5.1	33.8	4.9	6.5	4.0	27.2	3.9
13	6.8	4.1	5.9	8.4	27.3	5.0	32.1	4.6	4.2	3.7	23.7	9.3
14	3.8	4.7	5.6	6.7	31.5	5.1	28.0	4.6	6.2	3.6	15.2	22.6
15	3.5	3.7	5.2	5.9	34.4	5.1	21.1	6.3	5.2	3.4	14.0	26.1
16	3.2	3.6	8.2	5.6	32.5	14.3	11.5	6.2	6.3	3.3	11.5	27.3
17	2.9	3.2	9.2	5.3	29.7	12.0	8.3	5.3	6.6	3.5	9.7	18.4
18	2.8	3.2	16.8	4.9	22.9	5.2	7.4	4.8	5.6	3.3	7.5	9.8
19	2.8	4.9	24.0	5.8	15.8	6.3	7.4	4.8	5.0	3.2	6.0	12.2
20	2.9	8.1	21.3	15.7	9.8	6.1	8.7	4.4	4.3	3.8	5.5	15.5
21	2.9	6.6	12.1	11.0	24.3	5.2	6.9	4.3	3.9	3.6	5.1	24.1
22	2.8	5.9	10.8	10.1	28.5	10.9	8.4	4.2	3.7	4.3	4.8	25.3
23	2.6	5.3	9.8	8.3	34.6	11.2	19.5	10.2	3.5	6.5	4.8	23.2
24	2.5	5.0	7.1	14.6	34.8	7.5	26.9	7.6	3.3	5.1	4.7	13.9
25	2.5	4.9	7.3	28.9	33.0	6.9	28.5	5.4	3.3	4.7	9.3	10.2
26	2.5	4.3	6.1	32.0	30.8	6.4	28.6	4.7	3.2	6.2	9.4	7.8
27	2.4	4.0	5.6	31.2	25.4	5.8	27.8	4.4	3.0	4.8	7.2	6.4
28	2.4	3.6	5.1	26.7	20.2	24.2	23.1	4.1	3.0	4.4	6.0	6.1
29	2.5	......	8.8	20.1	19.8	21.5	16.5	3.9	3.5	4.3	5.8	5.9
30	2.5	......	9.4	18.8	20.7	8.2	11.7	3.6	3.1	4.0	5.3	5.8
31	2.4	......	5.7	......	12.4	......	9.2	3.2	......	3.8	......	6.9

1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.7	5.6	6.9	7.3	6.4	9.4	5.5	17.5	6.8	5.7	4.2	5.0
2	7.0	5.4	8.6	6.5	9.4	12.6	5.5	11.5	5.2	5.3	4.2	4.8
3	7.9	5.4	11.3	6.0	24.4	25.4	5.3	8.3	10.3	5.2	4.2	4.8
4	11.3	5.4	9.3	6.3	28.2	29.0	5.2	6.7	9.2	5.0	4.2	4.8
5	15.2	5.2	7.7	6.0	32.0	30.9	5.0	6.0	21.1	4.8	4.3	4.7
6	11.5	5.2	6.8	6.7	32.8	31.6	4.7	7.5	26.1	4.8	4.3	4.7
7	8.5	5.4	8.3	14.7	30.9	30.8	4.7	15.4	27.1	5.0	4.3	4.5
8	7.5	5.3	17.5	11.5	26.8	27.7	4.7	16.2	21.5	4.9	4.2	4.5
9	6.3	5.0	16.1	9.1	23.1	25.1	4.7	16.9	19.3	4.7	4.2	4.5
10	5.8	5.0	9.8	8.4	18.8	24.3	5.0	11.1	16.7	4.6	4.3	4.4
11	6.7	4.8	8.2	7.9	11.1	24.0	5.1	10.9	14.4	4.5	4.2	4.4
12	6.9	4.8	7.8	7.0	9.2	22.6	11.4	24.6	11.4	4.3	4.1	4.4
13	6.9	21.2	7.2	10.5	8.9	17.1	7.6	28.6	17.3	4.3	4.1	4.6
14	7.0	27.5	7.0	15.5	8.0	10.4	9.0	29.3	15.0	4.3	4.1	4.6
15	6.9	27.3	6.8	10.6	15.4	9.0	7.8	29.3	12.9	4.0	4.1	4.8
16	6.5	18.3	6.7	8.9	28.5	8.6	7.3	24.6	10.3	4.6	4.1	5.8
17	6.4	9.9	6.5	6.9	32.0	8.6	15.2	14.4	8.9	5.2	4.1	7.7
18	6.2	8.6	6.5	6.5	34.9	8.5	22.2	11.6	7.6	5.9	4.1	8.9
19	5.9	8.2	6.9	6.5	34.6	7.9	24.5	13.8	7.6	5.3	4.3	7.8
20	5.6	12.5	7.1	6.5	31.6	7.3	13.1	11.5	6.9	5.0	4.4	7.3
21	6.2	23.1	7.1	19.6	26.9	7.3	9.8	10.0	6.3	5.0	4.4	6.8
22	6.4	25.2	6.8	24.1	27.1	14.0	7.7	10.2	5.9	4.9	4.4	6.2
23	6.3	17.5	6.5	21.0	26.8	8.1	7.3	9.4	5.7	4.9	4.5	5.6
24	6.1	11.3	6.3	12.3	24.3	6.9	7.3	8.0	5.5	4.8	4.8	5.3
25	6.1	11.0	6.9	8.8	17.8	6.5	7.2	7.2	7.8	4.8	5.3	5.2
26	6.1	9.5	13.8	7.8	24.7	7.0	19.8	6.8	15.8	4.6	6.2	5.0
27	6.2	7.9	14.7	7.2	24.0	8.6	24.3	6.7	14.5	4.5	6.4	4.6
28	6.9	7.4	7.7	6.7	17.7	7.5	25.4	6.0	9.3	4.5	6.1	4.1
29	6.3	......	6.7	6.7	14.5	6.3	22.9	5.9	7.4	4.5	5.8	4.0
30	6.2	......	5.9	6.4	12.6	5.9	25.6	5.6	6.3	4.3	5.4	4.5
31	6.0	......	8.5	......	10.3	......	26.4	5.4	......	4.3	......	4.8

Rating table for Trinity River at Dallas, Tex., for 1903–1906.

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.*
1.80	105	3.30	183	4.80	284	7.60	557	21.00	3,460
1.90	110	3.40	189	4.90	292	7.80	581	22.00	3,800
2.00	115	3.50	195	5.00	300	8.00	605	23.00	4,160
2.10	120	3.60	201	5.20	318	9.00	735	24.00	4,540
2.20	125	3.70	207	5.40	336	10.00	875	25.00	4,960
2.30	130	3.80	213	5.60	354	11.00	1,030	26.00	5,410
2.40	135	3.90	219	5.80	372	12.00	1,200	27.00	5,910
2.50	140	4.00	225	6.00	390	13.00	1,390	28.00	6,500
2.60	145	4.10	232	6.20	410	14.00	1,590	29.00	7,180
2.70	150	4.20	239	6.40	430	15.00	1,810	30.00	8,050
2.80	155	4.30	246	6.60	450	16.00	2,040	31.00	9,250
2.90	160	4.40	253	6.80	470	17.00	2,290	32.00	11,000
3.00	165	4.50	260	7.00	490	18.00	2,550	33.00	13,190
3.10	171	4.60	268	7.20	512	19.00	2,830	34.00	15,530
3.20	177	4.70	276	7.40	534	20.00	3,130	35.00	18,000

NOTE.—The above table is based on seventeen discharge measurements made during 1906 and is well defined between gage heights 4.0 feet and 33.0 feet. There is more or less uncertainty in applying this table to gage heights prior to 1906, because of the lack of definite information concerning the permanency of the gaging section. This must be determined by future measurements.

Monthly discharge of Trinity River at Dallas, Tex., for 1903–1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
1903.				
July	11,200	155	1,620	99,600
August	363	135	180	11,100
September	171	105	120	7,140
October	4,500	125	1,100	67,600
November	905	115	200	11,900
December	135	105	118	7,260
The period				205,000
1904.				
January	363	115	159	9,780
February	400	115	163	9,380
March	5,910	105	1,080	66,400
April	5,360	150	758	45,100
May	4,160	165	892	54,800
June	4,740	207	1,380	82,100
July	670	115	195	12,000
August	935	125	264	16,200
September	593	130	245	14,600
October	1,350	120	228	14,000
November	318	125	152	9,040
December	140	125	130	7,990
The year	5,910	105	470	341,000
1905.				
January	950	125	185	11,400
February	618	140	242	13,400
March	4,540	177	779	47,900
April	11,000	292	2,780	165,000
May	17,500	523	5,460	336,000
June	4,620	300	811	48,300
July	15,000	336	3,970	244,000
August	905	177	340	20,900
September	450	165	239	14,200
October	2,890	165	501	30,800
November	6,020	171	1,050	62,500
December	6,080	213	1,450	89,200
The year	17,500	171	1,480	1,080,000
1906.				
January	1,860	354	535	32,900
February	6,200	284	1,480	82,200
March	2,420	381	733	45,100
April	4,580	390	993	59,100
May	17,800	430	5,370	330,000
June	10,200	381	2,690	160,000
July	5,610	276	1,600	98,400
August	7,420	336	1,830	113,000
September	5,960	318	1,510	89,800
October	381	225	285	17,500
November	430	232	270	16,100
December	722	225	332	20,400
The year	17,800	225	1,470	1,060,000

TRINITY RIVER AT RIVERSIDE, TEX.

This station was established on Trinity River at Riverside, Tex., in December, 1902, at the bridge of the International and Great Northern Railroad. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 17, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Trinity River at Riverside, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.1	20.7	28.6	15.2	23.7	27.7	14.8	17.0	12.2	11.1	9.6	13.7
2	33.6	19.5	27.7	17.0	23.6	30.2	15.4	17.9	11.2	12.3	9.3	14.2
3	36.0	18.0	26.7	18.0	20.9	30.7	15.2	18.4	11.2	13.1	9.1	14.1
4	36.3	17.2	25.8	18.7	18.6	31.5	14.3	18.9	11.2	13.1	9.1	13.7
5	36.6	16.7	24.9	18.8	17.1	32.2	13.3	19.3	13.0	12.2	9.0	12.7
6	36.6	16.0	23.7	19.0	15.8	32.8	12.1	19.8	13.5	11.3	9.0	11.7
7	36.3	15.7	21.0	18.3	15.9	33.2	11.2	20.5	13.5	10.5	8.9	11.1
8	35.5	15.2	18.2	17.7	18.7	33.5	10.8	20.6	12.5	10.1	8.8	10.5
9	34.3	15.4	16.2	17.4	20.4	33.6	10.4	20.6	11.3	9.8	8.8	10.2
10	33.0	14.2	15.5	18.0	20.9	33.6	10.4	20.7	12.7	8.6	8.7	10.0
11	30.7	13.7	15.1	18.4	21.3	33.3	9.9	20.8	15.0	8.4	8.6	9.7
12	26.6	13.2	14.7	19.1	21.7	32.9	13.7	21.1	16.4	8.2	8.6	8.6
13	21.7	17.2	15.0	19.7	22.1	32.4	10.4	20.7	17.4	8.1	8.5	8.5
14	18.5	22.6	16.0	21.0	22.3	32.0	10.2	19.7	18.0	8.2	8.5	8.5
15	16.9	27.0	16.8	20.5	22.7	31.7	12.2	18.4	18.2	9.9	8.5	8.4
16	16.2	29.7	16.4	19.5	23.1	31.5	12.0	16.9	18.5	11.3	8.4	10.0
17	15.8	29.5	15.6	17.5	23.6	31.4	11.8	15.9	18.1	11.8	8.4	14.2
18	15.3	28.3	14.7	16.0	24.1	31.0	14.0	16.7	17.2	11.5	8.4	20.2
19	14.7	27.2	14.0	16.0	24.8	30.6	14.9	17.4	16.0	11.3	8.4	22.5
20	14.1	26.7	13.6	16.5	25.6	30.0	14.4	18.2	15.0	11.7	8.4	23.2
21	14.7	26.7	13.2	16.5	26.6	29.4	13.3	18.7	14.4	12.0	8.4	23.7
22	26.5	27.1	12.9	15.5	27.4	28.8	12.3	19.1	13.7	12.2	8.3	24.2
23	31.2	27.5	12.6	14.6	28.4	28.2	13.4	19.5	13.0	11.9	8.3	25.1
24	29.5	28.3	12.5	14.0	28.0	27.2	16.0	19.6	11.7	11.4	8.5	25.9
25	25.7	28.8	12.4	14.2	28.2	25.0	17.0	19.8	11.3	11.1	8.6	27.0
26	22.2	28.2	12.3	15.0	28.2	19.7	17.5	20.2	11.2	10.9	8.7	28.4
27	20.7	28.2	12.2	16.2	27.3	15.2	17.2	20.5	11.4	10.7	8.8	29.7
28	21.1	27.9	12.2	17.4	28.3	15.2	15.7	20.7	10.8	10.5	9.0	30.7
29	21.5		12.7	18.1	27.6	15.2	14.4	20.3	10.7	10.3	10.1	31.7
30	21.7		12.7	21.4	27.1	14.6	17.2	18.4	10.5	10.1	12.2	32.4
31	21.5		13.7		27.1		16.0	15.1		9.9		32.6

Monthly discharge of Trinity River at Riverside, Tex., for 1906.

[Drainage area, 16,000 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	22,800	3,700	13,200	812,000	0.825	0.95
February	16,400	3,100	10,300	572,000	0.644	.67
March	15,400	2,460	5,840	359,000	0.365	.42
April	9,290	3,630	6,240	371,000	0.390	.44
May	15,200	4,930	11,200	689,000	0.700	.81
June	19,900	4,060	15,500	922,000	0.969	1.08
July	6,220	1,100	3,450	212,000	0.216	.25
August	9,040	4,420	7,450	458,000	0.466	.54
September	6,980	1,430	3,530	210,000	0.221	.25
October	3,030	386	1,650	101,000	0.103	.12
November	2,460	441	660	39,300	0.041	.05
December	19,000	471	7,400	455,000	0.462	.53
The year	22,800	386	7,200	5,200,000	.450	6.11

NOTE.—The above discharges are liable to large error for low and medium stages, owing to the inconsistent data on which they are based.

BRAZOS RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

This river has its source in the Staked Plains region of western Texas in Hale and Lamb counties, flows in a general southeasterly direction, and empties into the Gulf of Mexico south of the mouth of Trinity River. In its upper stretches, above Young County, it flows through flat plains, and is unreliable for power purposes. Its drainage basin is entirely within the State of Texas.

BRAZOS RIVER AT WACO, TEX.

This station was established September 14, 1898, at the suspension bridge on Bridge street, Waco, Tex. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 19, where are given also references to publications that contain data for previous years. During 1906 the gage was read twice each day by W. J. Cassaday.

Daily gage height, in feet, of Brazos River at Waco, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	3.0	3.0	2.85	3.45	5.95	4.0	5.5	4.1	4.5	3.9	3.6
2	3.5	3.0	3.0	2.8	3.25	8.4	4.0	5.4	4.0	4.5	3.8	3.6
3	3.6	2.95	3.0	2.85	3.3	12.0	4.5	5.0	4.0	4.4	3.7	3.5
4	3.75	2.9	3.0	2.85	10.25	16.15	4.5	4.7	4.5	4.4	3.7	3.5
5	3.6	2.9	2.9	2.85	9.55	17.40	4.1	4.6	7.5	4.2	3.7	3.5
6	3.6	2.9	2.95	3.1	8.1	19.8	3.8	5.8	8.2	4.2	3.7	3.4
7	3.6	2.9	3.2	3.15	7.45	17.7	3.6	5.2	7.6	4.1	3.5	3.3
8	3.55	2.9	3.3	3.0	6.55	13.25	3.4	5.2	9.1	4.1	3.5	3.2
9	3.5	2.9	3.1	2.95	5.95	12.55	3.3	4.9	7.7	4.1	3.5	3.2
10	3.5	2.9	3.05	2.9	5.1	11.55	3.3	8.2	7.0	4.0	3.4	3.2
11	3.5	2.85	3.0	2.9	5.05	10.50	3.2	7.8	6.6	4.0	3.4	3.2
12	3.4	2.95	3.0	2.9	4.4	8.85	4.2	9.1	6.1	3.9	3.4	4.1
13	3.4	5.75	3.0	2.9	4.45	6.70	5.4	10.8	5.8	3.9	3.4	4.3
14	3.4	4.95	3.0	2.9	4.50	5.90	5.1	9.7	5.5	3.9	3.3	4.3
15	3.35	4.7	2.9	2.9	4.2	5.55	4.6	10.0	5.4	3.8	3.3	7.5
16	3.2	4.2	2.9	2.85	4.25	5.35	4.1	9.2	5.1	3.8	3.3	6.6
17	3.2	4.1	2.9	2.8	5.8	5.4	6.2	8.0	5.1	3.8	3.2	5.4
18	3.15	4.05	2.9	3.4	6.6	4.95	5.6	7.6	5.5	3.7	3.2	5.1
19	3.1	3.95	2.9	3.6	6.05	4.8	7.5	7.2	5.4	3.7	3.2	4.6
20	3.1	3.8	2.9	3.75	6.05	4.8	8.4	6.5	5.5	3.7	3.2	4.5
21	3.2	3.6	2.85	4.5	5.9	4.45	9.5	5.9	5.3	6.5	3.2	4.5
22	3.35	3.5	2.8	4.75	5.35	4.5	7.7	6.0	5.3	6.0	3.2	4.4
23	3.3	3.4	2.9	4.2	5.15	4.4	10.4	5.5	5.0	5.6	3.1	4.1
24	3.15	3.55	2.85	3.95	6.45	4.15	8.0	5.5	4.9	5.3	3.5	4.1
25	3.1	3.45	2.8	3.75	9.55	4.2	7.6	5.2	5.5	5.0	3.4	4.0
26	3.1	3.2	2.8	2.95	7.4	4.6	7.4	5.0	5.0	4.6	3.4	3.9
27	3.05	3.1	2.8	2.8	9.1	4.6	6.5	4.7	5.2	4.3	3.5	3.9
28	3.0	3.05	2.85	2.8	9.65	4.7	6.3	4.6	5.5	4.0	3.7	3.9
29	3.0		3.15	3.5	7.6	4.25	5.9	4.4	5.1	4.1	3.7	3.9
30	3.0		3.15	3.55	6.95	3.9	5.5	4.3	5.0	4.0	3.7	3.8
31	3.0		3.00		6.25		5.2	4.1		4.0		3.7

Rating table for Brazos River at Waco, Tex., for 1905–6.

Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.80	284	3.80	900	4.80	1,795	6.60	4,055	11.00	12,510
2.90	323	3.90	980	4.90	1,900	6.80	4,345	12.00	14,900
3.00	365	4.00	1,065	5.00	2,005	7.00	4,645	13.00	17,450
3.10	410	4.10	1,150	5.20	2,225	7.20	4,955	14.00	20,200
3.20	460	4.20	1,235	5.40	2,455	7.40	5,275	15.00	23,180
3.30	520	4.30	1,320	5.60	2,700	7.60	5,605	16.00	26,400
3.40	590	4.40	1,410	5.80	2,955	7.80	5,945	17.00	29,850
3.50	665	4.50	1,500	6.00	3,220	8.00	6,300	18.00	33,500
3.60	740	4.60	1,595	6.20	3,490	9.00	8,190	19.00	37,500
3.70	820	4.70	1,695	6.40	3,770	10.00	10,260	20.00	41,700

NOTE.—The above table is based on discharge measurements made during 1900–1905 and is well defined.

Monthly discharge of Brazos River at Waco, Tex., for 1906.

[Drainage area, 30,800 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	860	365	548	33,700	0.018	0.02
February	2,890	304	733	40,700	0.024	0.02
March	520	284	352	21,600	0.011	0.01
April	1,740	284	547	32,500	0.018	0.02
May	10,800	490	3,970	244,000	0.129	0.15
June	40,900	980	8,610	512,000	0.280	0.31
July	11,100	460	3,090	190,000	0.100	0.12
August	12,000	1,150	4,020	247,000	0.131	0.15
September	8,390	1,060	3,020	180,000	0.098	0.11
October	3,910	820	1,400	86,100	0.046	0.05
November	980	460	640	38,100	0.021	0.02
December	5,440	460	1,270	78,100	0.041	0.05
The year	40,900	284	2,350	1,700,000	.076	1.03

BRAZOS RIVER AT RICHMOND, TEX.

This station was established January 1, 1903, and was discontinued June 30, 1906. It is located at the bridge of the Southern Pacific Railroad. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 21, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Brazos River at Richmond, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	6.4	3.3	5.7	2.4	3.1	8.1	17	3.7	3.5	2.8	5.4	3.9	7.2
2	6.3	3.2	5.4	2.5	5.0	7.3	18	3.5	10.5	2.8	7.0	3.7	6.5
3	6.3	3.2	5.1	2.7	4.9	6.5	19	3.3	9.6	2.8	5.8	3.6	6.2
4	6.2	3.2	4.0	2.9	4.7	5.6	20	3.2	8.3	2.7	4.4	3.5	5.3
5	6.1	3.1	3.8	3.0	4.3	9.0	21	3.2	7.9	2.7	3.4	3.3	5.2
6	6.1	3.4	3.6	2.9	4.3	14.0	22	4.7	7.5	2.5	3.4	4.9	4.6
7	5.6	3.5	3.4	2.8	4.7	17.1	23	5.4	7.1	2.4	3.2	4.8	4.3
8	5.3	3.8	3.2	2.7	5.4	19.5	24	6.1	7.1	2.4	3.1	4.6	4.3
9	4.0	3.4	3.2	2.7	8.3	21.2	25	5.9	6.9	2.5	4.0	4.5	4.1
10	4.1	3.1	3.0	2.7	7.0	18.4	26	6.0	6.4	2.4	4.6	4.5	4.0
11	4.3	2.9	3.0	2.6	6.5	16.1	27	6.0	6.2	2.4	4.3	9.0	3.9
12	4.3	2.7	2.9	2.4	5.8	14.2	28	5.1	5.9	2.3	3.8	11.0	4.1
13	4.3	2.7	2.8	2.3	5.1	12.1	29	5.3		2.3	3.6	9.5	4.3
14	4.1	2.7	2.8	2.3	4.7	10.5	30	4.1		2.3	3.3	9.5	4.3
15	4.0	3.1	2.8	2.3	4.4	9.2	31	3.4		2.3		9.5	
16	3.9	3.2	2.8	2.4	4.1	8.1							

Rating table for Brazos River at Richmond, Tex., for 1905-6.

Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.30	1,290	3.40	2,180	4.50	3,310	6.00	5,120	8.00	7,950
2.40	1,360	3.50	2,270	4.60	3,420	6.20	5,380	8.20	8,250
2.50	1,430	3.60	2,370	4.70	3,530	6.40	5,660	8.40	8,550
2.60	1,500	3.70	2,470	4.80	3,640	6.60	5,940	8.60	8,850
2.70	1,580	3.80	2,570	4.90	3,760	6.80	6,220	8.80	9,160
2.80	1,660	3.90	2,670	5.00	3,880	7.00	6,500	9.00	9,480
2.90	1,740	4.00	2,770	5.20	4,120	7.20	6,780	10.00	11,120
3.00	1,820	4.10	2,870	5.40	4,360	7.40	7,060	11.00	13,020
3.10	1,910	4.20	2,980	5.60	4,600	7.60	7,350	12.00	15,270
3.20	2,000	4.30	3,090	5.80	4,860	7.80	7,650	13.00	17,590
3.30	2,090	4.40	3,200						

Note.—The above table is based on discharge measurements made during 1902-1905 and is well defined, Above gage height 13.0 feet the rating curve is a tangent, the difference being 240 per tenth.

Monthly discharge of Brazos River at Richmond, Tex., for 1906.

[Drainage area, 44,000 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	5,660	2,000	3,780	232,000	0.086	0.10
February	12,000	1,580	4,120	229,000	0.094	0.10
March	4,730	1,290	1,950	120,000	0.044	0.05
April	6,500	1,290	2,260	134,000	0.051	0.06
May	13,000	1,910	4,810	296,000	0.109	0.13
June	37,300	2,670	10,900	649,000	0.248	0.28
The period				1,660,000		

LAMPASAS SPRINGS AT LAMPASAS, TEX.

Sulphur Fork of Lampasas River rises in the town of Lampasas in two springs, the Hancock and the Hanna. Hancock Spring is about 1 mile S. 30° W. from the court-house, on the east bank of a fork of the Sulphur. The Hanna Spring is in the city of Lampasas and is about one-fourth mile N. 20° E. from the court-house. Around the head of the spring a pool about 60 feet in diameter has been constructed of stone and cement. The water issues from this over an inclined apron and can be diverted to a large bath house or permitted to run off through an underground conduit, across which boxes have been fitted, with the top omitted, so that the stream is visible and can be measured. The Hanna Spring is strongly impregnated with sulphur.

Discharge measurements of the Hancock and Hanna springs, Lampasas, Tex.

Date.	Hydrographer.	Discharge.	
		Hancock.[a]	Hanna.
December, 1900.	T. U. Taylor	10.3	4.0
December, 1901.	....do	11.0	1.5
August, 1902	....do	7.6	1.4
February, 1906.	....do	8.1	1.6

[a] These measurements include the flow of the spring and the small discharge of the stream.

The joint discharge of these streams is used within 2 miles of the town of Lampasas for three power plants, which are fully described in Water-Supply Paper No. 105.

COLORADO RIVER (OF TEXAS) DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Colorado River rises in the extreme western portion of Texas, within a few miles of the eastern boundary of New Mexico, flows in a general southeasterly direction, and empties into the Gulf of Mexico in Matagorda County. The drainage area above Austin is 37,000 square miles and above Columbus 40,000 square miles; it includes the corner of New Mexico. Its main tributaries are the Concho, the San Saba, and the Llano. The Concho has a reliable flow and contributes a greater amount of water than the Colorado at their junction. The Concho furnishes water for irrigation and water power, and supports, in Irion and Tom Green counties, some excellent irrigation systems, described in Water-Supply Paper No. 71. San Saba and Llano rivers are described in the same paper.

The Colorado at Austin emerges from a canyon. From Austin to the Gulf it traverses a rather flat country, where its waters are utilized for many power plants, and are extensively used for rice irrigation in Colorado, Wharton, and Matagorda counties.

COLORADO RIVER AT AUSTIN, TEX.

This station was established December 21, 1897. It was originally located at the dam near Austin, Tex., and on the failure of this dam was removed to the Congress Avenue Bridge, south of the city. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 24, where are given also references to publications that contain data for previous years.

Discharge measurements of Colorado River at Austin, Tex., in 1906.

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 8	Carl Blucher	8.1	25,800	June 9	H. H. Fox	4.9	7,440
June 8	....do	7.5	20,500	June 10	....do	4.5	5,820
June 9	....do	5.5	10,400	June 11	....do	3.9	4,020
June 9	....do	4.9	7,430				

Daily gage height, in feet, of Colorado River at Austin, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.1	0.9	0.9	1.3	1.4	1.8	2.6	3.1	3.2	2.3	1.8	1.2
2	1.1	.9	.9	1.3	1.4	1.8	2.6	2.8	3.1	2.2	1.8	1.2
3	1.1	.8	.9	1.3	1.3	1.8	2.5	2.7	3.2	2.2	1.8	1.2
4	1.1	.9	.9	1.3	1.3	1.7	3.0	2.5	3.3	2.2	1.7	1.2
5	1.0	.9	.9	1.4	1.4	1.7	2.9	2.5	3.6	2.1	1.6	1.3
6	1.0	1.0	1.0	1.5	1.4	2.8	3.4	2.5	7.9	1.9	1.5	1.3
7	1.0	.9	.9	1.5	1.4	11.3	3.4	2.4	8.4	1.8	1.5	1.2
8	1.0	.9	.9	1.5	1.3	8.1	3.9	2.4	7.1	1.6	1.4	1.2
9	1.0	.9	.9	1.4	1.3	5.5	4.3	2.4	5.2	1.6	1.2	1.4
10	1.0	.9	.9	1.4	1.2	4.5	4.4	5.6	3.8	1.5	1.2	2.8
11	.9	.9	.9	1.3	1.2	3.9	4.8	14.8	3.7	1.5	1.1	2.6
12	.9	.9	1.0	1.4	1.1	3.2	4.5	19.5	3.6	1.5	1.0	2.5
13	.9	.9	1.0	1.4	1.1	2.9	4.4	16.3	8.3	1.5	1.0	2.5
14	.9	1.5	1.0	1.3	1.2	2.7	5.8	11.1	8.1	1.4	.9	2.5
15	.9	1.4	1.0	1.3	1.3	2.4	5.6	7.4	8.0	1.4	.9	2.6
16	.9	1.4	.9	1.2	1.3	2.2	5.3	5.1	8.2	1.4	1.0	2.6
17	.9	1.3	.9	1.3	1.4	2.0	5.2	9.6	8.1	1.4	1.0	2.9
18	1.0	1.2	.9	2.5	1.3	2.0	4.1	10.3	7.3	1.4	.9	2.9
19	1.0	1.2	.9	2.8	1.3	2.0	5.8	7.1	7.1	1.4	1.1	2.6
20	1.0	1.3	.9	3.2	1.3	1.8	5.8	5.8	5.4	1.4	1.2	2.4
21	1.0	1.3	.9	3.3	1.7	1.8	5.7	4.2	5.1	1.4	1.2	2.4
22	1.0	1.2	.9	3.3	1.6	1.9	5.8	4.1	4.8	1.3	1.1	2.4
23	1.0	1.1	.9	3.2	1.6	1.9	5.6	4.1	4.5	1.2	1.1	2.3
24	1.0	1.0	1.0	2.6	2.0	1.7	5.4	3.0	4.1	1.2	1.6	2.3
25	1.0	.9	1.0	2.3	2.8	1.6	5.4	3.8	3.8	1.1	1.7	2.0
26	1.0	.9	.9	2.2	4.3	1.5	5.0	3.8	3.8	1.1	1.8	2.0
27	1.0	.8	.9	2.0	5.4	1.5	4.3	3.5	3.5	1.1	1.5	1.9
28	1.0	.8	2.2	1.8	3.8	1.5	3.8	3.4	2.7	1.1	1.5	1.8
29	1.0		2.1	1.7	3.4	1.5	3.4	3.3	2.6	1.1	1.5	1.7
30	.9		1.6	1.4	3.2	1.5	3.3	3.0	2.5	1.1	1.5	1.5
31	.9		1.4		3.1		2.9	3.1		1.1		1.5

Rating table for Colorado River at Austin, Tex., for 1905–6.

Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.	Gage height.	Dis- charge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.80	175	1.90	790	3.00	2,260	4.20	5,170
0.90	195	2.00	885	3.10	2,450	4.40	5,810
1.00	220	2.10	990	3.20	2,650	4.60	6,510
1.10	250	2.20	1,105	3.30	2,860	4.80	7,270
1.20	290	2.30	1,225	3.40	3,070	5.00	8,080
1.30	340	2.40	1,345	3.50	3,290	5.20	8,920
1.40	400	2.50	1,470	3.60	3,530	5.40	9,760
1.50	470	2.60	1,605	3.70	3,780	5.60	10,600
1.60	540	2.70	1,750	3.80	4,040	5.80	11,440
1.70	620	2.80	1,910	3.90	4,310	6.00	12,280
1.80	700	2.90	2,080	4.00	4,580	6.20	13,130

NOTE.—The above table is based on discharge measurements made during 1904–1906 and is well defined between gage heights 0.8 feet and 6.0 feet. Above gage height 6.1 feet the rating curve is a tangent, the difference being 430 per tenth.

Monthly discharge of Colorado River at Austin, Tex., for 1906.

[Drainage area, 37,000 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	250	195	217	13,300	0.0059	.01
February	470	175	247	13,700	0.0067	.01
March	1,100	195	273	16,800	0.0074	.01
April	2,860	290	912	54,300	0.025	.03
May	9,760	250	1,250	76,900	0.034	.04
June	35,100	470	3,350	199,000	0.090	.10
July	11,400	1,470	6,320	389,000	0.171	.20
August	70,300	1,340	12,600	775,000	0.341	.39
September	22,600	1,470	9,650	574,000	0.261	.29
October	1,220	250	511	31,400	0.014	.02
November	700	195	399	23,700	0.011	.01
December	2,080	290	999	61,400	0.027	.03
The year	70,300	175	3,060	2,230,000	.083	1.14

COLORADO RIVER AT COLUMBUS, TEX.

This station was established in December, 1902, at the highway bridge east of Columbus. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 27, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Colorado River at Columbus, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.1	6.6	7.0	7.5	7.8	11.0	10.0	8.5	9.0	8.5	7.5	6.9
2	7.1	6.6	7.0	7.1	7.5	10.5	9.0	8.2	8.6	8.4	7.5	6.9
3	7.0	6.6	6.9	6.85	7.5	10.0	8.5	8.1	8.6	8.4	7.4	6.9
4	7.0	6.6	6.8	6.7	7.1	9.4	8.0	8.3	8.6	8.4	7.4	6.7
5	7.0	6.6	6.8	6.6	7.1	8.4	7.6	8.0	8.6	8.0	7.4	6.5
6	6.9	6.6	6.8	6.55	7.1	8.0	7.4	8.3	8.5	8.0	7.4	6.8
7	6.9	6.6	6.8	6.5	7.0	8.0	8.0	7.9	13.0	8.0	7.4	6.9
8	6.9	6.6	6.8	6.5	7.0	15.8	7.7	7.6	16.0	8.0	7.3	6.9
9	6.8	6.6	6.8	6.4	6.9	22.5	7.5	7.7	14.2	8.0	7.3	7.0
10	6.8	6.6	6.8	6.4	6.9	20.5	7.4	8.6	14.9	8.0	7.3	7.0
11	6.8	6.6	6.8	6.4	6.7	14.0	7.3	23.7	13.2	8.0	7.3	7.0
12	6.8	6.6	6.8	6.4	6.5	11.8	7.2	28.0	12.2	8.0	7.2	7.0
13	6.8	14.25	6.8	6.4	6.5	11.0	7.2	30.2	14.2	8.0	7.2	7.0
14	6.8	16.25	6.7	6.7	6.5	10.0	7.2	32.0	18.0	7.9	7.2	7.1
15	6.8	10.6	6.7	6.8	6.5	10.5	7.7	33.5	15.1	7.9	7.2	7.1
16	6.7	9.4	6.7	6.8	6.5	9.0	10.7	24.2	13.5	7.8	7.0	7.2
17	6.7	7.9	6.7	6.9	6.4	8.5	12.4	26.2	11.8	7.8	6.9	8.2
18	6.6	7.5	6.7	7.0	6.4	8.0	15.2	23.0	11.7	7.8	7.2	8.1
19	6.6	7.5	6.7	7.05	6.3	8.0	11.8	16.0	11.4	7.7	7.2	8.1
20	6.6	7.4	6.6	7.1	6.3	7.8	11.4	14.8	11.2	7.7	7.2	8.1
21	6.8	7.3	6.6	7.15	6.3	7.6	10.4	13.7	11.0	7.7	7.2	8.1
22	7.6	7.3	6.6	7.35	6.3	7.6	14.0	12.6	10.5	7.7	7.0	8.2
23	6.8	7.15	6.5	7.4	6.3	7.4	14.2	12.0	10.0	7.7	7.1	8.0
24	6.7	7.1	6.5	7.2	6.2	7.4	11.8	11.6	10.0	7.6	7.1	8.0
25	6.6	7.1	6.5	7.0	7.0	7.2	11.6	11.2	9.5	7.6	7.0	7.8
26	6.6	7.1	6.5	7.0	8.0	7.1	10.0	10.7	9.0	7.6	7.1	7.6
27	6.5	7.1	6.5	6.9	9.0	7.0	9.6	10.3	9.0	7.5	7.0	7.0
28	6.5	7.1	6.5	6.9	9.0	7.0	9.2	10.0	9.0	7.5	7.0	6.5
29	6.5		8.5	7.0	10.0	10.0	8.8	9.8	9.0	7.5	7.0	6.4
30	6.6		10.85	7.5	11.8	12.4	8.5	9.6	8.5	7.5	7.0	6.4
31	6.6		8.7		11.6		9.2	9.3		7.5		6.2

Rating table for Colorado River at Columbus, Tex., for 1904–1906.

Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
6.20	880	7.50	1,580	8.80	2,430	12.00	4,850	25.00	22,200
6.30	930	7.60	1,640	8.90	2,500	13.00	5,710	26.00	24,070
6.40	980	7.70	1,700	9.00	2,570	14.00	6,610	27.00	25,980
6.50	1,030	7.80	1,760	9.20	2,710	15.00	7,590	28.00	27,920
6.60	1,080	7.90	1,820	9.40	2,850	16.00	8,660	29.00	29,860
6.70	1,130	8.00	1,880	9.60	2,990	17.00	9,860	30.00	31,800
6.80	1,180	8.10	1,940	9.80	3,130	18.00	11,140	31.00	33,740
6.90	1,230	8.20	2,010	10.00	3,270	19.00	12,520	32.00	35,680
7.00	1,280	8.30	2,080	10.20	3,410	20.00	13,970	33.00	37,620
7.10	1,340	8.40	2,150	10.40	3,570	21.00	15,470	34.00	39,560
7.20	1,400	8.50	2,220	10.60	3,730	22.00	17,030		
7.30	1,460	8.60	2,290	10.80	3,890	23.00	18,700		
7.40	1,520	8.70	2,360	11.00	4,050	24.00	20,420		

NOTE.—The above table is based on discharge measurements made during 1902–1905 and is well defined

Monthly discharge of Colorado River at Columbus, Tex., for 1906.

[Drainage area, 40,000 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	1,640	1,030	1,180	72,600	0.030	0.03
February	8,960	1,080	1,890	105,000	.047	.05
March	3,930	1,030	1,300	79,900	.032	.04
April	1,580	980	1,220	72,600	.030	.03
May	4,690	880	1,570	96,500	.039	.04
June	17,900	1,280	3,780	225,000	.094	.10
July	7,790	1,400	3,080	189,000	.077	.09
August	38,600	1,640	9,640	593,000	.241	.28
September	11,100	2,220	4,430	264,000	.111	.12
October	2,220	1,580	1,800	111,000	.045	.05
November	1,580	1,230	1,400	83,300	.035	.04
December	2,010	880	1,420	87,300	.036	.04
The year	38,600	880	2,730	1,980,000	.068	.91

SAN SABA RIVER NEAR SAN SABA, TEX.

This station was established December 30, 1904, 1 mile northwest of the town of San Saba, Tex. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 29, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of San Saba River near San Saba, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.8	7.8	7.8	7.5	7.6	7.8	7.4	7.6	7.8	7.7	7.6	7.8
2	7.8	7.8	7.8	7.5	7.7	7.8	7.4	7.6	7.8	7.7	7.6	7.8
3	7.8	7.8	7.8	7.5	7.7	7.8	7.4	8.3	7.8	7.7	7.6	7.8
4	7.8	7.8	7.8	7.5	7.7	7.9	7.4	7.8	10.1	7.7	7.6	7.8
5	7.7	7.8	7.8	7.5	7.6	7.8	7.4	7.9	9.2	7.6	7.6	7.8
6	7.7	7.8	7.8	7.5	7.6	7.8	7.4	8.2	9.8	7.6	7.6	7.8
7	7.7	7.8	7.8	7.5	7.6	7.8	7.4	31.7	10.0	7.6	7.6	7.7
8	7.7	7.8	7.8	7.6	7.6	7.8	7.4	11 3	8.6	7.6	7.6	7.7
9	7.7	7.8	7.8	7.6	7.6	7.8	7.4	9.1	8.2	7.6	7.6	7.7
10	7.7	7.8	7.8	7.6	7.6	7.7	7.4	8.8	8.1	7.5	7.6	7.7

Daily gage height, in feet, of San Saba River near San Saba, Tex., for 1906—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11	7.8	7.8	7.8	7.6	7.6	7.7	7.4	8.2	8.0	7.5	7.6	7.7
12	7.8	7.8	7.8	7.6	7.6	7.7	13.6	8.3	7.9	7.5	7.6	7.7
13	7.8	7.8	7.8	7.6	7.5	7.7	14.5	10.1	8.3	7.6	7.6	7.7
14	7.8	7.8	7.8	7.6	7.5	7.6	8.6	10.1	8.2	7.6	7.6	7.8
15	7.8	7.8	7.8	7.5	7.5	7.6	7.4	8.5	7.9	7.6	7.6	7.8
16	7.8	7.8	7.7	7.5	7.5	7.5	7.5	8.5	7.8	7.7	7.6	7.7
17	7.9	7.8	7.7	7.5	7.5	7.5	7.6	8.2	7.8	7.7	7.6	7.8
18	7.9	7.8	7.6	7.6	7.5	7.5	7.6	8.0	7.8	7.7	7.6	7.7
19	7.9	7.8	7.6	7.7	7.4	7.5	7.6	8.0	7.8	7.7	7.6	7.7
20	7.9	7.8	7.6	7.7	7.4	7.4	7.7	8.0	7.8	7.7	7.6	7.7
21	7.8	7.8	7.6	7.7	7.5	10.3	8.1	8.0	7.8	7.7	7.6	7.7
22	7.8	7.8	7.6	7.7	7.5	7.6	8.0	8.1	7.7	7.7	7.6	7.7
23	7.8	7.8	7.6	7.7	8.1	7.5	7.8	8.1	7.7	7.7	7.6	7.7
24	7 8	7.8	7.6	7.6	12.9	7.5	7.8	8.0	7.7	7.7	7.6	7.7
25	7.8	7.8	7.6	7.6	8.8	7.5	7.8	7.9	8.2	7.6	7.6	7.7
26	7.8	7.8	7.6	7.6	9.0	7.5	7.8	7.9	7.9	7.6	7.7	7.7
27	7.8	7.8	7.6	7.6	9.3	7.4	7.8	7.9	7.8	7.6	7.7	7.7
28	7.8	7.8	7.5	7.6	8.7	7.4	7.8	7.8	7.8	7.6	7.8	7.7
29	7.8		7.5	7.6	8.2	7.4	7.6	7.8	7.7	7.6	7.8	7.7
30	7.8		7.5	7.6	7.5	7.4	7.6	7.8	7.7	7.6	7.8	7.7
31	7.8		7.5		7.5		7.6			7.6		7.7

LLANO RIVER.

Llano River drains the territory east of Sonora and northeast of Rocksprings and joins the Colorado about 20 miles southeast of the town of Llano. The South Llano is fed by large springs whose joint discharge has measured 90 second-feet at Junction at the minimum stage. In Kimble County alone on the South Llano there are some fifteen small irrigation plants, and at Junction an irrigation plant on a large scale has begun operations. Its plan is to take the water from the South Llano and irrigate several thousand acres near Junction.

The waters of the North Llano at low stages are utilized by small irrigation plants before they get to Junction. Between Junction and Llano, in dry times, the water is subject to great evaporation, and loses at least one-third before it reaches the upper part of Llano County.

A measurement taken at Hedwigs Hill on June 15, 1906, by S. P. Finch gave a total discharge of 65 second-feet. At the town of Llano the water is utilized in a power plant, which supports the city water supply and a small mill. A full description of this and other power plants on the Llano is given in Water-Supply Paper No. 105.

BARTONS SPRINGS NEAR AUSTIN, TEX.

These springs are located about 2 miles from Austin and are similar in behavior and in flow to the Comal, San Felipe, and San Marcos. They respond in flow to the rainfall in the Edwards Plateau, but this response is always delayed for some months. The variation in the flow of these springs is shown in the following table:

Discharge measurements of Bartons Springs near Austin, Tex., 1894-1906.

	Sec.-ft.		Sec.-ft.
1894	17	June, 1902	19
1895	25	August, 1902	19
March, 1898	20	June, 1903	69
May, 1898	30	June, 1904	43
August, 1900	69	July, 1905	65
December, 1900	33	June, 1906	24

GUADALUPE RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Guadalupe River rises in the southern-central part of Texas, flows southeastward, and empties into San Antonio Bay. During the summer of 1902 its discharge was the least in its observed history, causing much loss above New Braunfels, where half a dozen power plants were forced to shut down or to run on short time. The flow at this time was so low that special efforts were made to obtain measurements at several points along its course.

The Guadalupe, while it is the best water-power stream in Texas, has a drainage area above Cuero of only 5,100 square miles. Its efficiency is due almost entirely to the water received from the Comal at New Braunfels. Below New Braunfels the largest tributary is San Marcos River.

GUADALUPE RIVER NEAR CUERO, TEX.

This station was established December 26, 1902. The original location was at the dam at Carl Buchel's power house, 3 miles north of Cuero, Tex. As it proved impossible to measure flood discharges at this point, a new station was established in July, 1903, at the bridge of the San Antonio and Aransas Pass Railroad 3 miles west of Cuero. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 31, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Guadalupe River near Cuero, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.2	6.1	6.3	6.2	6.2	6.0	5.9	6.0	6.1	6.0	6.0	5.9
2	6.2	6.2	6.2	6.2	6.4	5.9	5.8	6.0	6.0	6.0	6.1	6.0
3	6.2	6.2	6.2	6.2	6.2	5.9	5.7	6.0	6.0	6.0	6.0	6.0
4	6.2	6.2	6.2	6.2	6.3	5.8	5.9	6.1	6.0	6.0	6.0	6.0
5	6.3	6.2	6.2	6.1	6.1	5.8	6.4	6.0	5.9	6.0	6.0	6.0
6	6.2	6.1	6.2	6.1	5.9	5.7	7.1	6.0	5.9	6.1	5.9	6.1
7	6.3	6.1	6.2	6.2	6.1	5.6	5.9	6.1	5.9	6.1	5.9	6.1
8	6.2	6.1	6.2	6.3	6.0	5.5	6.1	6.0	5.9	6.0	6.0	6.1
9	6.2	6.1	6.3	6.3	6.0	5.5	6.0	6.0	6.0	6.0	6.0	6.1
10	6.2	6.2	6.3	6.3	6.1	5.6	6.0	6.0	6.0	6.0	6.0	6.1
11	6.1	6.3	6.3	6.3	6.0	5.7	6.1	6.0	6.0	6.0	6.0	6.0
12	6.1	6.3	6.3	6.3	6.0	5.7	6.0	6.0	6.0	5.9	6.0	6.0
13	6.2	6.3	6.3	6.3	6.0	5.7	6.0	6.2	6.0	5.8	5.9	6.1
14	6.2	6.4	6.3	6.3	6.0	5.6	6.0	6.1	6.0	5.9	5.9	6.0
15	6.2	17.0	6.3	6.4	6.0	5.7	5.9	6.0	6.1	5.9	6.0	6.0

Daily gage height, in feet, of Guadalupe River near Cuero, Tex., for 1906—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16	6.2	11.1	6.2	6.8	6.0	5.6	6.1	6.0	6.1	6.0	5.9	6.0
17	6.3	9.8	6.3	6.4	6.0	5.6	6.0	6.0	6.1	6.0	6.0	6.0
18	6.3	8.0	6.2	6.4	6.0	5.5	6.1	6.0	6.0	6.0	6.0	6.1
19	6.2	7.6	6.1	6.3	6.1	5.5	6.0	6.1	6.4	6.0	6.0	6.1
20	6.3	7.0	6.2	6.5	6.0	5.4	6.1	6.0	6.4	6.0	6.0	6.1
21	6.2	6.8	6.2	7.1	5.8	5.5	6.2	6.1	6.4	6.0	6.0	6.1
22	6.2	6.5	6.2	6.7	5.7	5.6	6.0	6.1	6.3	6.1	5.9	6.1
23	6.2	6.4	6.2	6.5	5.8	5.6	6.0	6.0	6.3	6.0	5.8	6.1
24	6.2	6.2	6.2	6.3	5.9	5.5	6.1	6.0	6.3	5.9	6.0	6.1
25	6.3	6.3	6.2	6.2	6.8	5.5	6.0	6.1	6.3	6.0	5.9	6.1
26	6.3	6.3	6.3	6.1	7.8	7.0	6.0	6.2	6.2	6.0	5.9	6.1
27	6.3	6.3	6.3	6.1	8.4	7.0	5.9	6.1	6.2	6.0	5.9	6.2
28	6.2	6.3	6.3	6.0	6.9	6.8	6.0	6.1	6.1	5.9	6.0	6.2
29	6.2		6.3	6.0	6.5	6.6	6.0	6.0	6.0	6.0	6.0	6.2
30	6.2		6.3	6.4	6.2	6.5	6.0	6.1	6.0	6.0	6.0	6.1
31	6.2		6.3		6.2		6.0	6.1		6.0		6.2

Rating table for Guadalupe River near Cuero, Tex., 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.*
5.40	370	6.60	790	7.80	1,210	9.00	1,630	11.40	2,470
5.50	405	6.70	825	7.90	1,245	9.20	1,700	11.60	2,540
5.60	440	6.80	860	8.00	1,280	9.40	1,770	11.80	2,610
5.70	475	6.90	895	8.10	1,315	9.60	1,840	12.00	2,680
5.80	510	7.00	930	8.20	1,350	9.80	1,910	13.00	3,030
5.90	545	7.10	965	8.30	1,385	10.00	1,980	14.00	3,400
6.00	580	7.20	1,000	8.40	1,420	10.20	2,050	15.00	3,800
6.10	615	7.30	1,035	8.50	1,455	10.40	2,120	16.00	4,200
6.20	650	7.40	1,070	8.60	1,490	10.60	2,190	17.00	4,650
6.30	685	7.50	1,105	8.70	1,525	10.80	2,260		
6.40	720	7.60	1,140	8.80	1,560	11.00	2,330		
6.50	755	7.70	1,175	8.90	1,595	11.20	2,400		

NOTE.—The above table is based on one discharge measurement made during 1905 and measurements prior to 1904. It is well defined.

Monthly discharge of Guadalupe River near Cuero, Tex., for 1906.

[Drainage area, 5,100 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	685	615	656	40,300	0.129	0.15
February	4,650	615	968	53,800	.190	.20
March	685	615	666	41,000	.131	.15
April	965	580	691	41,100	.135	.15
May	1,420	475	664	40,800	.130	.15
June	930	370	520	30,900	.102	.11
July	965	475	595	36,600	.117	.13
August	650	580	597	36,700	.117	.13
September	720	545	614	36,500	.120	.13
October	615	510	575	35,400	.113	.13
November	615	510	568	33,800	.111	.12
December	650	545	606	37,300	.119	.14
The year	4,650	370	643	464,000	0.126	1.69

COMAL RIVER AT NEW BRAUNFELS, TEX.

Comal River has its source in the numerous big springs that issue from the foothills west of New Braunfels, Tex. The joint discharge of these forms Comal River at the junction of Comal Springs Creek and Comal Creek. The water from the head springs naturally flows down Comal Springs Creek, but a gravel dam deflects part of this flow into the Landa mill race, whose waters rejoin Comal Creek about 4 miles above the highway bridge north of the court-house. The following table shows the result of current-meter measurements on Comal River at various times:

Discharge measurements of Comal River at New Braunfels, Tex., 1895–1906.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-ft.	
1895	C. C. Babb	328	At highway bridge.
1898	T. U. Taylor	320	Do.
1899	....do	310	In park.
1900	....do	374	Do.
1901	....do	343	Do.
1902	....do	333	Do.
1903	....do	412	In park (recent rains).
1904	....do	375	In park.
1905	....do	390	Do.
1906	....do	386	Do.

SAN MARCOS RIVER AT SAN MARCOS, TEX.

San Marcos River rises about 1 mile northeast of the town of San Marcos and flows into Guadalupe River near the town of Gonzales. Its source is in several large springs, now submerged by a lake created by the dam of the San Marcos Water Company. There are five power plants on the San Marcos within a distance of 6 miles of lake. Below the lake there are many irrigation plants, all of which derive their water from the river by means of pumps operated by water power or by engines.

The following discharge measurements have been made:

Discharge measurements on San Marcos River.

Year.	Hydrographer.	Discharge.	Locality.
		Sec.-ft.	
1894	C. C. Babb	150	International and Great Northern Railroad bridge.
1895	....do	89	1 mile northeast of San Marcos.
1899	T. U. Taylor		
1900	....do	150	Westerfield ford.
1903	....do	153	Do.
1906	....do	145	Do.

SAN ANTONIO RIVER DRAINAGE BASIN.

SAN ANTONIO RIVER AT SAN ANTONIO, TEX.

San Antonio River rises about 3 miles north of the mission of San Fernando, the geographic center of the city of San Antonio. San Pedro Creek rises in San Pedro Park and has maintained a flow of 9 second-feet for several years. It joins San Antonio River just below the city and above the Hot Wells, where many of the measurements are made.

San Antonio River has gone through the same experience as many of the big springs. About 1885 it began to fail, and by the latter part of 1897 had entirely ceased above the city. It regained its former efficiency in 1900, shortly after the celebrated flood (Water-Supply Paper No. 105), but in two years the discharge dropped again to a third of the discharge in 1900. There is no doubt that the river and the artesian wells have the same underground source. The following table shows the discharge measurements that have been made on this stream:

Discharge measurements of San Antonio River at San Antonio, Tex., 1895–1906.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-ft.	
December, 1895	C. C. Babb	40	Upper canal.
November, 1896	....do	41	Do.
December, 1897	T. U. Taylor	0	Lower canal.
December, 1897	....do	11	Hot Wells.
March, 1898	....do	0	Lower canal.
March, 1898	....do	9	Hot Wells.
June, 1899	....do	0	Lower canal.
June, 1899	....do	10	Hot Wells.
September, 1900	....do	103	Lower canal.
September, 1900	....do	125	Hot Wells.
October, 1901	....do	41	Do.
March, 1904	....do	65	Do.
June, 1904	....do	61	Do.
September, 1905	....do	117	Do.
June, 1906	....do	54	Do.

NUECES RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

The main forks of Nueces River rise in the eastern part of Edwards County, Tex., and flow southward through the rugged mountains of the Edwards Plateau, uniting with the west fork about 14 miles from Uvalde and about 6 miles above the crossing of the Southern Pacific Railroad. The main fork is fed by springs and carries perpetually running water from its source, a few miles north of Vance, to its junction with the west fork at the foot of the Edwards Plateau. At about the junction of the branches the flow sinks into gravel beds, locally reappearing in big clear pools at points where the gravel has been washed off from the solid bed-rock bottom. Four or five

miles below the Southern Pacific Railroad bridge flowing water again appears, the stream along its lowland course being fed by numerous springs.

Near the post-office of Barksdale the main fork is joined by Pulliam Creek, which in dry times has a small discharge at its mouth, amounting to perhaps 5 second-feet.

The larger part of the discharge of the main fork below Barksdale comes from the prong by Vance. From Vance to the point where it debouches from the Edwards Plateau it is fed by many springs that rise in the banks or in the many abutting canyons. The largest of these is Camp Woods Spring, whose discharge on April 10, 1906, was found to be 3 second-feet.

The following discharge measurements were made on the Nueces and its tributaries in 1906:

Discharge measurements in Nueces River basin, 1906.

Date.	Stream.	Hydrographer.	Discharge.	Location.
			Sec.-ft.	
April 6.........	Nueces.....................	T. U. Taylor.............	39	Laguna.
April 6.........	.....do....................	.....do.................	46	Shoe Peg Mountain.
April 6.........	.....do....................	.....do.................	24	Barksdale.
April 10........	Camp Woods..............	.....do.................	3	Near Barksdale.

In Edwards County, in the watershed of the Nueces and its tributaries, there are fifteen small irrigation plants that derive their water directly from the river and its tributaries or from springs that issue from the foothills a short distance from the main stream. The water of the Nueces is of the best quality for irrigation and affords rich returns where the dam and farm are so located that the occasional torrential floods can not destroy them.

Below Barksdale other irrigation plants derive their water by ditch or pump from the Nueces. The Fern Lake Company has a tract of nearly 200 acres near Montell that is irrigated by ditch from the river itself, while a short distance below Montell the irrigation plant derives its water from Montell Creek. Still farther down the river J. J. Dodson has installed a modern pump-irrigation plant and is prepared to irrigate about 150 acres by pump irrigation.

The Nueces offers excellent opportunities for the installation of a big ditch irrigation system. Between Uvalde and the Dodson plant there are several thousand acres of rich land that could be brought to ditch by the construction of a dam across the Nueces.

Between the Southern Pacific Railroad and the International and Great Northern Railroad very few attempts have been made to use the water of the Nueces for irrigation purposes. At Cotulla many excellent irrigation plants have been installed, and Bermuda and other onions are successfully raised.

LEONA RIVER AT UVALDE, TEX.

The flow of Leona River is variable, and the river has often stopped flowing altogether near Uvalde. It was dry in 1885, but soon revived and continued flowing till 1893, when it again ceased for a time. Its history at the brickyard crossing, 1½ miles below the town on the road to Pearsall, is given in the following table:

Discharge measurements of Leona River at Uvalde, Tex., 1885–1906.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-ft.	
1885			Flowed.
1893			Did not flow.
December, 1895	C. C. Babb	11	
June, 1899	T. U. Taylor		Do.
September, 1900	do	5	
March, 1904	do	22	
August, 1905	do	13	
April, 1906	do	7	

RIO GRANDE DRAINAGE BASIN.

DESCRIPTION OF BASIN.

The source of the Rio Grande is in the snow masses of the high peaks of the continental divide in Hinsdale and Mineral counties in southwestern Colorado. The main stream flows in an easterly direction for about 75 miles, receiving numerous tributaries from the mountainous region through which it passes. At Del Norte the stream channel leaves a narrow canyon-like valley and enters the San Luis Valley. From Del Norte the general course is southeasterly for about 75 miles to a point 20 miles east of Antonito, where it crosses the Colorado-New Mexico State line. Four miles above the State line the river enters a canyon, locally known as Rio Grande canyon, and continues through it to a point a short distance below Embudo, N. Mex., where the canyon walls retreat rapidly, especially on the west side, giving room for a border of irregular hills between the higher mesa walls and the flood plain adjacent to the river. This is the beginning of Espanola Valley, about 3 or 4 miles in width, which extends about 25 miles to White Rock Canyon, through which the Rio Grande flows for 30 miles. Again the canyon walls recede, and the river enters Albuquerque Valley, which averages from 1 to 3 miles in width to about Socorro, N. Mex. Throughout its course in New Mexico the general direction of the Rio Grande is southward to El Paso; thence it is southeasterly to the Gulf of Mexico.

From the high mountains which surround this basin come a large number of small streams, some of which unite into creeks of considerable size, while others sink and gradually disappear into the coarse soil of the valley bottom. Below Del Norte few streams of importance enter the river with the exception of the Chama in New Mexico and

the Pecos in Texas, as nearly all those which issue from the mountains lose their water, except in flood periods, in the sandy plains before they reach the main channel. Rio Conchos is the principal tributary from the Mexican side.

The limited data on precipitation collected by the United States Weather Bureau show the mean annual rainfall to be 25 inches in the mountainous portion of the drainage. This diminishes to 10 inches in the foothills and lower portions of the drainage.

The determination of the amount of water in the Rio Grande is of importance, both on account of its use in irrigation and from its bearing upon interstate and international distribution of water. Most of the New Mexico and Texas stations down to Eagle Pass are maintained by the United States section of the International (Water) Boundary Commission. The data for the following stations have been collected by W. W. Follett, consulting engineer for the Commission, and have been furnished through the courtesy of Gen. Anson Mills, Commis sioner.

Rio Grande near San Marcial, N. Mex.
Rio Grande near El Paso, Tex.
Rio Grande above Presidio, Tex.
Rio Grande below Presidio, Tex.
Rio Grande near Langtry, Tex.
Rio Grande at Eagle Pass, Tex.
Pecos River near Moorhead, Tex.
Devils River near Devils River Station, Tex. (two stations).

On account of the shifting character of the river beds at the International (Water) Boundary stations, no rating tables have been prepared. The estimated monthly discharges are from daily discharges computed by Mr. Follett directly from the discharge measurements.

The five stations from Laredo down (Laredo, Roma, Brownsville, Salado, near Guerrero, and San Juan at Santa Rosalie Ranch) are maintained by the Mexican section of the Commission.

RIO GRANDE PROPER.

RIO GRANDE NEAR DEL NORTE, COLO.

Measurements and observations were begun in the vicinity of Del Norte in 1889 by George T. Quinby, the object being to obtain the flow of the river before water was diverted for the agricultural region of San Luis Valley, and by comparison with the figures obtained at Embudo to acquire data as to the effect of the numerous ditches taking out water between the two points. The river 25 miles above Del Norte flows out of the canyon at Wagon Wheel Gap. Little water, however, is diverted until the edge of the San Luis Valley is reached, the largest canal heading near the town of Del Norte. During freshets the river divides into a number of channels, making it

difficult to obtain measurements near town. In order to avoid the expense of establishing a station during time of high water, the first measurements—those about June 1—were made from several bridges crossing the numerous branches. The results were not wholly satisfactory, and June 25 a station was established above the branches. Later a locality about 2 miles farther up was chosen. Records are continuous for a period of sixteen years.

The station is about 2 miles west of Del Norte, above the main canal taking water from the Rio Grande, and is above all the irrigating ditches of importance. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 36, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande near Del Norte, Colo., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq.ft.*	*Feet.*	*Sec.-ft.*
April 2	R. I. Meeker	130	156	1.15	383
April 29	do	144	332	2.42	1,470
May 24	Murphy & Meeker	163	718	4.90	5,000
June 13	R. I. Meeker	167	948	6.30	7,730
October 25	do	136	238	1.70	741

Daily gage height, in feet, of Rio Grande near Del Norte, Colo., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1.0	1.0	1.15	1.2	2.25	4.2	3.5		1.45	2.35	
2	1.0	1.0	1.1	1.15		4.5		2.1			1.75
3	1.0	1.0	1.1	1.2	2.1	4.4	3.3		1.45	2.3	
4	1.0	1.0	1.1	1.1		4.1		2.0			1.75
5	1.0	1.0	1.0	1.1	3.1	4.5	3.1		1.4	2.2	
6	1.0	1.0	1.0	1.2		5.25		1.95			1.65
7	1.0	1.0	1.05	1.3	3.5	5.35	2.9		1.2	2.0	
8	1.0	1.0	1.1	1.4		4.95		1.8			1.6
9	1.0	1.0	1.1	1.35	4.1	5.2	2.6		1.2	1.9	
10	1.0	1.0	1.1			5.7		1.7			1.55
11	1.0	1.15	1.0	1.6	4.35	6.0	2.9		1.15	1.8	
12	1.0	1.25	1.0			6.2		1.65			1.5
13	1.0	1.4	0.9	1.5	3.7	6.35	2.7		1.2	1.7	
14	1.0	1.5	1.0			6.15		1.7			1.5
15	1.0	1.6	1.0	1.75	3.45	6.0	3.05		1.6	1.7	
16	1.0	1.65	1.0			6.0		1.6			1.45
17	1.0	1.7	1.05	2.0	4.5	5.9	2.55		1.7	1.75	
18	1.0	1.7	0.9			5.4		1.6			1.4
19	1.0	1.75	1.0	2.3	5.4	4.9	2.4		1.7	1.7	
20	1.0	1.8	1.05			4.6		1.6			1.2
21	1.0	1.7	1.0	2.5	5.9	4.4	2.3		1.65	1.65	
22	1.0	1.7	1.1			4.3		1.6			1.2
23	1.0	1.7	1.1	3.2	5.7	4.3	2.35		1.6	1.7	
24	1.0	1.6	1.1		4.9	4.15		1.65			1.05
25	1.0	1.4	1.1	3.1	4.3	3.7	2.85		1.65	1.7	
26	1.0	1.4	1.1		3.9	3.55		1.6			1.0
27	1.0	1.4	1.1	2.7	4.1	3.5	2.75		2.5	1.75	
28	1.0	1.3	1.1		4.3	3.45		1.6			1.0
29	1.0	1.2	1.1	2.45	4.3	3.35	2.7		2.4	1.7	
30	1.0		1.0		4.15	3.45		1.5			1.05
31	1.0		1.1		4.05		2.25			1.75	

Rating table for Rio Grande near Del Norte, Colo., 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	280	1.80	840	2.70	1,795	3.60	3,000	5.00	5,260
1.00	320	1.90	930	2.80	1,920	3.70	3,150	5.20	5,600
1.10	365	2.00	1,025	2.90	2,050	3.80	3,300	5.40	5,960
1.20	415	2.10	1,120	3.00	2,180	3.90	3,460	5.60	6,320
1.30	470	2.20	1,220	3.10	2,310	4.00	3,620	5.80	6,680
1.40	530	2.30	1,325	3.20	2,440	4.20	3,940	6.00	7,040
1.50	600	2.40	1,435	3.30	2,580	4.40	4,260	6.20	7,400
1.60	675	2.50	1,550	3.40	2,720	4.60	4,580	6.40	7,760
1.70	755	2.60	1,670	3.50	2,860	4.80	4,920		

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

Monthly discharge of Rio Grande near Del Norte, Colo., for 1906.

[Drainage area, 1,400 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	320	320	320	19,700	.229	.26
February	840	320	521	28,900	.372	.39
March	390	280	344	21,200	.246	.28
April	2,440	365	1,090	64,900	.779	.87
May	6,860	1,120	3,830	236,000	2.74	3.16
June	7,670	2,650	4,970	296,000	3.55	3.96
July	2,860	1,270	1,880	116,000	1.34	1.54
August	1,200	582	775	47,700	.554	.64
September	1,550	390	719	42,800	.514	.57
October	1,380	715	891	54,800	.636	.73
November	798	320	546	32,500	.390	.44
The period				960,000		

NOTE.—Values are rated as excellent.

RIO GRANDE NEAR LOBATOS, COLO.

This station was established June 28, 1899, at the State highway bridge at a point near the Colorado-New Mexico State line, about 10 miles east of Lobatos post-office and in T. 33 N., R. 11 E., and 13 miles east of Antonio, the nearest railroad station. The record of flow is of importance because of the proposed Government irrigation project near Engle, N. Mex., and also because it gives the discharge of the river at the Colorado State line, and includes practically all of the Colorado drainage. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 39, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande near Lobatos, Colo., in 1905–6.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1905.		*Feet*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 21	R. I. Meeker	234	433	2.45	801
June 23	do	249	1,030	4.25	3,340
July 26 a	do	207	188	1.12	67
September 22	do	200	166	1.00	46
1906.					
May 1	do	239	564	2.80	1,260
May 23	do	259	1,430	5.80	6,220
June 14	do	259	1,620	6.50	7,740
October 26	do	211	506	2.60	1,000

a Made by wading.

Daily gage height, in feet, of Rio Grande near Lobatos, Colo., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	2.2	2.4	2.6	1.5	2.85	3.85	2.9	2.85	1.6	3.0	2.7
2	2.2	2.4	2.6	1.5	2.65	3.65	2.8	2.7	1.6	3.0	2.7
3	2.2	2.4	2.6	1.4	2.6	4.0	2.9	2.6	1.6	2.9	2.8
4	2.2	3.0	2.6	1.4	2.7	4.0	2.9	2.55	1.6	2.8	2.75
5	2.2	3.0	2.3	1.4	2.7	4.0	2.9	2.5	1.6	2.75	2.7
6	2.2	3.0	2.3	1.4	3.1	4.15	3.0	2.4	1.6	2.7	2.7
7	2.2	3.0	2.0	1.4	3.45	4.55	3.0	2.4	1.6	2.6	2.6
8	2.2	3.0	1.8	1.4	3.6	4.85	3.0	2.3	1.6	2.6	2.6
9	2.2	3.0	1.8	1.4	4.05	4.9	3.0	2.25	1.6	2.55	2.6
10	2.2	3.0	1.8	1.4	4.25	4.95	3.1	2.2	1.6	2.55	2.6
11	2.2	2.95	1.8	1.4	4.55	5.15	3.2	2.15	1.6	2.4	2.5
12	2.2	2.9	1.8	1.75	4.7	5.45	3.2	2.1	1.6	2.35	2.5
13	2.3	2.9	1.8	1.9	4.6	5.9	3.2	2.1	1.6	2.25	2.5
14	2.3	2.9	1.8	1.8	4.3	6.4	3.3	2.0	1.6	2.15	2.5
15	2.3	2.8	1.8	1.7	4.0	6.65	3.3	2.0	1.6	2.1	2.5
16	2.3	2.8	1.8	1.75	3.9	6.7	3.4	1.9	1.6	2.1	2.5
17	2.3	2.8	1.8	1.8	3.9	6.75	3.45	1.85	1.6	2.1	2.55
18	2.3	2.8	1.8	1.9	3.9	6.55	3.3	1.75	1.7	2.1	2.6
19	2.4	2.8	1.8	2.05	4.3	6.3	3.2	1.65	1.85	2.1	2.65
20	2.4	2.8	1.8	2.25	4.8	5.85	3.1	1.6	1.85	2.1	2.4
21	2.4	2.8	1.8	2.45	5.2	5.15	2.95	1.55	1.9	2.25	2.3
22	2.4	2.8	1.8	2.65	5.3	4.55	2.8	1.5	1.9	2.35	2.3
23	2.4	2.8	1.8	2.95	5.55	4.3	2.7	1.5	2.0	2.45	2.3
24	2.4	2.8	1.8	3.45	6.0	4.05	2.6	1.6	2.05	2.5	2.3
25	2.4	2.8	1.8	3.7	5.85	3.85	2.6	1.6	2.15	2.6	
26	2.4	2.6	1.8	3.7	5.45	3.6	2.6	1.6	2.35	2.6	
27	2.4	2.6	1.8	3.55	5.45	3.25	2.7	1.6	2.4	2.7	
28	2.4	2.6	1.8	3.35	4.0	3.05	2.7	1.6	2.5	2.7	
29	2.4		1.8	3.15	3.9	2.9	3.0	1.6	2.8	2.7	
30	2.4		1.75	3.0	3.85	2.9	3.1	1.6	3.0	2.75	
31	2.4		1.6		3.9		3.0	1.6		2.7	

Rating table for Rio Grande near Lobatos, Colo., 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	45	2.00	475	3.00	1,470	4.00	2,900	6.00	6,700
1.10	65	2.10	550	3.10	1,590	4.20	3,240	6.20	7,120
1.20	90	2.20	630	3.20	1,710	4.40	3,590	6.40	7,540
1.30	120	2.30	715	3.30	1,840	4.60	3,950	6.60	7,960
1.40	155	2.40	805	3.40	1,980	4.80	4,320	6.80	8,380
1.50	195	2.50	900	3.50	2,120	5.00	4,700	7.00	8,800
1.60	240	2.60	1,000	3.60	2,270	5.20	5,080	8.00	10,900
1.70	290	2.70	1,110	3.70	2,420	5.40	5,470	9.00	13,000
1.80	345	2.80	1,230	3.80	2,580	5.60	5,870		
1.90	400	2.90	1,350	3.90	2,740	5.80	6,280		

NOTE.—The above table is applicable only for open-channel conditions. It is based on discharge measurements made during 1905–6 and is well defined between gage heights 1.0 foot and 6.5 feet.

Monthly discharge of Rio Grande near Lobatos, Colo., for 1905–6.

[Drainage area, 7,700 square miles.]

Month.	Discharge in second-feet.			Total in acre-feet.	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
1905.						
January	1,000	1,000	1,000	61,500	0.130	0.15
February	1,290	1,170	1,230	68,300	.160	.17
March	1,710	475	898	55,200	.117	.13
April	1,840	405	773	46,000	.100	.11
May	11,700	1,840	5,690	350,000	.739	.85
June	13,100	1,470	7,220	430,000	.938	1.05
July	1,350	90	272	16,700	.035	.04
August	290	90	163	10,000	.021	.02
September	90	45	64.4	3,830	.0084	.01
October	195	45	102	6,270	.013	.02
November	405	120	229	13,600	.030	.03
December	630	405	546	33,600	.071	.08
The year	13,100	45	1,520	1,100,000	.197	2.66
1906.						
January	805	630	720	44,300	.094	.11
February	1,470	805	1,240	68,900	.161	.17
March	1,000	240	453	27,900	.059	.07
April	2,420	155	761	45,300	.099	.11
May	6,700	1,000	3,330	205,000	.432	.50
June	8,280	1,350	4,370	260,000	.568	.63
July	2,050	1,000	1,470	90,400	.191	.22
August	1,290	195	503	30,900	.065	.07
September	1,470	240	423	25,200	.055	.06
October	1,470	550	923	56,800	.120	.14
November 1–24	1,230	715	954	45,400	.124	.11
The period				900,000		

NOTE.—Values are rated as follows: May and June, 1905, and May to July, 1906, excellent; remaining months 1905–6, good.

RIO GRANDE NEAR SAN MARCIAL, N. MEX.

August 8, 1889, a station was established near San Marcial and a measurement was made which gave a discharge of 19 second-feet. Soon after this date, however, the river gage was destroyed and the locality abandoned until January 29, 1895, when the station was reestablished at the bridge of the Atchison, Topeka and Santa Fe Railway, 1 mile south of San Marcial, N. Mex. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 43, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande near San Marcial, N. Mex., in 1906.

[By George W. King and D. H. Armstrong.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 2	106	6.5	125	June 29	629	8.4	2,811
January 5	148	7.0	282	July 2	447	7.9	1,713
January 8	131	6.8	241	July 5	550	8.5	2,314
January 11	164	7.2	283	July 8	684	8.8	2,722
January 14	198	7.2	514	July 11	529	8.4	2,188
January 17	468	7.9	1,249	July 14	494	8.4	1,926
January 20	486	7.9	1,312	July 17	525	8.5	2,271
January 23	305	7.1	613	July 20	605	8.9	3,010
January 26	296	7.2	487	July 23	414	8.2	1,667
January 29	327	7.4	803	July 26	292	8.0	1,170
January 31	250	7.1	648	July 29	236	7.9	1,074
February 3	241	7.3	623	July 31	319	8.4	1,429
February 6	252	7.5	703	August 3	309	8.3	1,470
February 9	246	7.4	633	August 6	365	8.5	1,360
February 12	268	7.7	794	August 9	289	8.3	1,094
February 15	286	7.8	874	August 12	170	7.9	627
February 18	238	7.6	778	August 15	141	7.7	526
February 21	365	7.7	721	August 18	107	7.6	422
February 24	296	7.6	658	August 21	112	7.6	222
February 27	355	7.6	779	August 24	83	7.3	156
March 3	246	7.4	678	August 27	115	7.7	295
March 6	270	7.6	692	August 30	98	7.5	184
March 9	256	7.5	579	September 2	94	7.5	174
March 12	289	7.6	751	September 5	52	7.0	70
March 15	342	7.8	980	September 8	31	6.7	41
March 18	391	7.9	1,030	September 11	18	6.2	10
March 21	287	7.8	785	September 25	23	6.4	13
March 24	203	7.7	516	September 28	1,035	9.3	4,434
March 27	319	7.9	742	September 30	386	7.5	1,149
March 30	578	8.5	2,204	October 3	365	7.5	1,234
April 3	282	7.7	1,207	October 6	329	7.7	1,382
April 6	301	8.0	1,445	October 9	285	7.8	1,177
April 9	344	8.1	1,432	October 12	250	7.7	909
April 12	365	8.2	1,727	October 15	252	7.7	1,001
April 15	537	8.7	2,142	October 18	273	7.8	877
April 18	467	8.5	2,660	October 22	292	7.9	1,077
April 21	808	9.3	3,423	October 25	322	8.1	1,387
April 24	805	9.5	4,382	October 28	342	8.2	1,070
April 27	1,354	9.8	5,691	October 31	329	8.3	1,405
April 30	1,194	9.5	5,256	November 3	414	8.5	1,550
May 3	927	9.0	4,149	November 6	349	8.4	1,617
May 6	965	9.0	4,395	November 9	453	8.5	1,546
May 9	1,410	10.0	7,381	November 12	340	8.5	1,486
May 12	1,893	10.4	9,075	November 15	298	8.5	1,423
May 15	2,126	10.3	10,448	November 20	303	8.4	1,235
May 18	1,845	10.1	9,649	November 26	249	8.0	898
May 20	1,827	10.4	8,951	November 29	304	8.1	1,015
May 22	1,796	10.9	10,799	December 2	388	8.5	1,386
May 25	1,861	10.8	10,157	December 5	364	8.5	1,730
May 28	1,523	10.6	9,211	December 8	435	8.7	1,892
May 31	1,487	9.55	6,513	December 11	401	8.5	1,553
June 3	1,198	9.1	5,316	December 14	331	8.4	1,405
June 7	1,063	9.3	5,297	December 17	290	8.4	1,193
June 10	1,080	9.4	5,435	December 20	194	7.9	731
June 13	1,095	9.8	6,115	December 23	187	8.0	687
June 16	1,425	10.3	8,353	December 26	331	8.3	966
June 19	1,579	10.7	8,476	December 29	225	8.2	966
June 23	1,225	9.7	6,346	December 31	273	8.4	1,114

Daily gage height, in feet, of Rio Grande near San Marcial, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.5	7.35	7.55	7.8	9.4	9.35	8.0	8.75	7.45	7.4	8.3	8.6
2	6.5	7.45	7.5	7.5	9.6	9.2	7.9	8.5	7.5	7.3	8.4	8.5
3	6.6	7.3	7.45	7.7	9.2	9.1	8.0	8.3	7.25	7.55	8.5	8.4
4	6.7	7.3	7.4	7.85	9.1	9.25	8.3	8.4	7.05	7.7	8.4	8.45
5	7.0	7.3	7.45	8.0	8.95	9.1	8.5	8.5	7.0	7.7	8.5	8.55
6	7.0	7.5	7.6	8.0	9.0	9.15	8.35	8.5	6.8	7.7	8.4	9.1
7	6.9	7.3	7.65	7.95	9.5	9.3	8.5	8.3	6.7	7.85	8.4	9.35
8	6.8	7.35	7.55	8.0	9.9	9.3	8.7	8.3	6.7	7.85	8.45	8.85
9	6.8	7.4	7.5	8.1	9.9	9.3	8.6	8.3	6.55	7.8	8.5	8.6
10	7.0	7.5	7.5	7.95	10.1	9.4	8.55	8.2	6.35	7.8	8.4	8.5
11	7.2	7.55	7.6	8.05	10.2	9.45	8.4	8.2	6.2	7.75	8.5	8.5
12	7.0	7.7	7.6	8.2	10.5	9.65	8.35	7.9	5.95	7.7	8.5	8.4
13	7.1	7.7	7.45	8.15	10.55	9.85	8.4	7.85	....	7.7	8.5	8.5
14	7.2	7.8	7.55	8.25	10.45	9.95	8.4	7.8	....	7.7	8.5	8.4
15	7.4	7.8	7.75	8.55	10.3	10.3	8.4	7.7	....	7.7	8.5	8.4
16	7.65	7.75	7.8	8.55	10.1	10.35	8.5	7.95	....	7.75	8.5	8.5
17	7.9	7.7	7.75	8.45	10.1	10.45	8.4	7.9	....	7.9	8.5	8.4
18	7.95	7.6	7.9	8.5	10.1	10.6	8.45	7.6	....	7.8	8.5	8.15
19	8.0	7.55	8.0	8.65	10.1	10.65	8.5	7.7	....	7.8	8.4	8.1
20	7.9	7.6	7.9	8.8	10.4	10.4	8.7	7.6	....	7.8	8.45	7.95
21	7.7	7.7	7.8	9.2	10.7	10.1	8.55	7.6	....	7.85	8.4	7.9
22	7.5	7.55	7.75	9.45	10.9	9.95	8.4	7.6	....	7.9	8.25	8.0
23	7.2	7.6	7.8	9.45	10.9	9.65	8.25	7.5	....	8.0	8.0	8.0
24	7.1	7.6	7.7	9.5	10.8	9.3	8.2	7.3	....	8.0	7.9	8.15
25	7.2	7.55	7.8	9.55	10.8	9.1	8.1	7.05	6.4	8.1	8.0	8.3
26	7.2	7.5	7.9	9.95	10.75	9.0	8.0	7.5	6.75	8.1	8.0	8.3
27	7.1	7.6	7.9	9.85	10.6	8.75	8.0	7.75	6.95	8.2	8.1	8.25
28	7.2	7.5	8.55	9.55	10.5	8.45	7.9	7.7	10.4	8.2	8.05	8.25
29	7.4	....	8.6	9.3	10.0	8.35	7.9	7.65	7.85	8.3	8.1	8.2
30	7.3	....	8.5	9.4	9.8	8.15	8.2	7.5	7.45	8.4	8.2	8.3
31	7.1	....	8.2	....	9.5	....	8.4	7.55	....	8.3	....	8.4

NOTE.—No flow September 13 to 24 inclusive.

Daily discharge, in second-feet, of Rio Grande near San Marcial, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	155	715	790	1,260	4,970	5,980	1,950	1,940	170	1,110	1,410	1,480
2	a 125	720	760	1,110	5,380	5,590	a1,710	1,675	a 175	1,070	1,480	a 1,390
3	155	a 625	a 730	a1,210	a 4,560	a5,320	1,810	a1,470	125	a1,270	a1,550	1,420
4	185	625	620	1,330	4,430	5,560	2,110	1,480	80	1,380	1,520	1,560
5	a 280	625	610	1,450	4,210	5,060	a2,310	1,490	a 70	1,380	1,650	a 1,770
6	280	a 705	a 690	a1,450	a 4,390	5,050	2,110	a1,360	50	a1,380	a1,620	3,500
7	260	615	750	1,380	5,890	a5,300	2,310	1,095	40	1,410	1,570	4,500
8	a 240	625	630	1,390	7,080	5,300	a2,580	1,095	a 40	1,310	1,560	2,120
9	240	a 635	a 580	a1,430	a 7,080	5,300	2,450	a1,095	30	a1,180	a1,550	1,750
10	260	685	580	1,380	7,800	5,430	2,390	975	20	1,110	1,450	1,600
11	a 285	710	750	1,530	8,230	5,520	a2,190	975	a 10	1,010	1,510	a 1,550
12	300	a 795	a 750	a1,730	a 9,370	5,860	2,030	a 625	5	a 910	1,490	1,450
13	405	795	580	1,690	10,080	a6,240	2,010	600	0	940	1,470	1,510
14	a 515	875	700	1,770	10,340	6,820	a1,930	575	0	970	1,450	a1,400
15	720	a 875	920	a2,020	a10,450	8,020	1,990	a 525	0	a1,000	1,420	1,330
16	980	850	980	2,250	9,780	a8,500	2,210	660	0	970	1,400	1,340
17	1,250	825	920	2,400	9,710	8,440	a2,110	615	0	1,020	1,380	a1,190
18	1,320	a 780	a1,030	a2,660	a 9,650	8,530	2,180	a 420	0	a 880	1,360	960
19	1,390	710	1,110	2,800	8,850	a8,330	2,270	405	0	910	1,250	915
20	a1,310	700	950	2,940	a 8,950	7,840	a2,640	290	0	940	a1,280	a 780
21	1,130	a 720	a 790	a3,320	10,060	7,200	2,340	a 220	0	1,010	1,240	690
22	950	630	680	3,910	a10,800	6,880	2,050	220	0	a1,080	1,110	730
23	a 700	660	690	4,100	10,700	a6,200	a1,760	200	0	1,210	900	a 685
24	560	a 660	a 520	a4,380	10,250	5,150	1,610	a 155	0	1,250	720	825
25	540	670	630	4,670	a10,160	4,590	1,390	105	a 15	a1,390	900	965
26	a 485	680	740	6,000	9,890	4,330	a1,170	240	50	1,250	a900	a 965
27	525	a 780	a 740	5,840	9,330	3,680	1,170	a 320	70	1,210	990	955
28	645	720	2,330	5,190	a 8,910	2,930	a1,070	295	9,070	a1,070	960	980
29	a 805	....	2,450	4,690	7,630	a2,710	1,070	270	1,790	1,250	a1,010	a 965
30	755	....	a2,200	4,970	7,130	2,310	a1,280	a 185	1,060	1,430	1,100	1,040
31	a 650	....	1,470	....	a 6,380	....	1,450	210	....	a1,410	....	a 1,115

aDates of measurements.

Monthly discharge of Rio Grande near San Marcial, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	1,390	125	594	36,496
February	875	615	715	39,689
March	2,450	520	925	56,866
April	6,000	1,110	2,742	163,140
May	10,800	4,210	8,143	500,707
June	8,530	2,310	5,799	345,064
July	2,640	1,070	1,924	118,314
August	1,940	105	703	43,210
September	9,070	0	429	25,527
October	1,430	880	1,152	70,830
November	1,650	720	1,307	77,752
December	4,500	685	1,401	86,142
The year	10,800	0	2,153	1,563,737

RIO GRANDE NEAR EL PASO, TEX.

This station was located at the pumping house of the smelter company, 3 miles north of El Paso, Tex. The bed of the stream at that point is composed of mud and is constantly shifting and changing. May 1, 1897, the station was placed under the charge of W. W. Follett, consulting engineer, International (Water) Boundary Commission, and by him removed 1 mile farther up the river to Courchesne's limekiln. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 49, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande near El Paso, Tex., in 1906.

[By W. L. Follett and J. Smith.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 1	179	6.2	235	April 2	552	8.2	1,283
January 4	140	5.95	163	April 5	426	7.5	752
January 7	144	6.0	176	April 8	457	7.75	936
January 10	147	6.0	177	April 11	396	7.5	742
January 13	172	6.3	240	April 14	528	8.2	1,146
January 16	173	6.3	242	April 17	649	8.55	1,468
January 18	292	7.25	552	April 20	534	8.05	1,168
January 21	425	7.45	84+	April 23	690	8.7	1,706
January 24	458	7.65	977	April 26	727	8.8	1,865
January 27	349	7.05	559	April 28	884	9.5	2,855
January 30	328	7.0	516	April 30	1,094	10.0	3,475
February 2	312	7.0	526	May 3	1,076	9.8	3,696
February 5	264	6.9	435	May 6	853	9.3	2,760
February 8	291	7.0	496	May 9	808	9.55	2,909
February 11	334	7.3	597	May 12	1,325	10.6	4,832
February 14	371	7.4	717	May 15	1,245	11.45	5,901
February 17	411	7.6	823	May 18	1,581	11.95	7,329
February 20	345	7.3	634	May 20	1,368	11.55	6,388
February 23	327	7.2	555	May 23	1,428	11.8	7,135
February 26	315	7.1	517	May 26	1,460	12.3	8,312
March 2	308	7.0	515	May 29	1,447	12.45	8,140
March 5	274	6.9	427	June 1	1,032	11.25	5,848
March 8	246	6.9	394	June 4	946	10.55	4,473
March 11	255	6.9	403	June 7	998	10.0	4,357
March 14	191	6.7	270	June 10	815	10.0	3,701
March 17	185	6.8	280	June 13	768	10.25	3,733
March 20	298	7.25	553	June 16	1,062	11.0	4,843
March 23	287	7.1	497	June 19	1,161	11.5	5,875
March 26	233	6.8	355	June 22	1,207	11.85	6,500
March 29	189	6.6	237	June 25	821	10.95	4,801
March 31	452	8.05	1,100	June 28	626	9.9	3,069

Discharge measurements of Rio Grande near El Paso, Tex., in 1906—Continued.

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
June 30	534	9.3	2,126	October 1	419	8.3	1,155
July 3	518	8.75	1,450	October 3	216	7.3	579
July 6	449	8.65	1,334	October 6	216	7.15	464
July 9	663	9.0	1,938	October 9	317	7.45	650
July 12	827	9.4	2,682	October 12	290	7.4	685
July 15	598	8.7	1,586	October 15	225	7.15	542
July 18	631	8.85	1,771	October 18	214	7.05	506
July 21	527	8.8	1,686	October 21	228	7.15	528
July 24	434	8.8	1,509	October 24	218	7.1	526
July 27	320	8.1	1,056	October 27	263	7.6	849
July 29	308	8.0	995	October 30	208	7.1	493
July 31	268	7.9	678	November 2	247	7.4	758
August 3	448	8.6	1,328	November 5	331	7.85	1,178
August 6	441	8.6	1,513	November 8	411	8.1	1,136
August 9	324	8.0	1,144	November 11	435	8.1	1,243
August 12	361	8.0	747	November 14	334	8.1	1,150
August 15	332	7.7	504	November 18	303	7.9	1,011
August 18	167	7.0	393	November 21	302	8.1	1,106
August 21	140	6.8	291	November 24	349	8.0	1,013
August 24	139	6.6	251	November 27	223	7.6	545
August 27	77	6.0	122	November 29	221	7.6	638
August 30	211	7.35	577	December 2	316	8.1	999
September 2	100	6.3	160	December 5	792	10.35	3,899
September 5	42	5.75	63	December 8	338	8.45	1,507
September 8	28	5.4	37	December 11	414	8.5	1,565
September 11	16	5.1	18	December 14	282	8.3	1,106
September 14	16	5.0	19	December 17	330	8.25	1,212
September 17	9	4.95	10	December 20	373	8.0	1,166
September 20	8	4.95	8	December 23	290	7.5	775
September 24	8	5.0	7	December 26	288	7.2	598
September 27	11	4.8	12	December 29	351	7.75	942
September 30	97	6.0	156	December 31	342	7.8	812

Daily gage height, in feet, of Rio Grande near El Paso, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.15	6.9	7 0	8.4	10.0	11.4	9.1	8.0	6.5	8.45	7.4	8.05
2	6.05	6.95	7.0	8.25	9.8	10.95	8.9	8.2	6.25	7.6	7.4	8.1
3	6.0	7.0	7.0	8.05	9.8	10.7	8.7	8.7	6.05	7.3	7.6	8.1
4	5.95	7.0	7.0	8.2	9.65	10.55	8.4	9.35	5.9	7.3	7.9	8.2
5	5.9	6.95	6.9	8.1	9.45	10.45	8.55	9.8	5.75	7.15	7.85	10.2
6	6.0	7.0	6.85	7.5	9.3	10.3	8.6	8.7	5.65	7.1	7.85	9.6
7	6.0	7.05	6.85	7.5	9.35	10.0	8.55	8.4	5.6	7.3	7.9	8.7
8	6.0	6.95	6.9	7.8	9.3	9.85	8.9	8.1	5.45	7.4	8.1	8.45
9	6.0	6.95	7.25	7.7	9.5	9.9	9.05	8.25	5.4	7.45	8.2	8.85
10	6.0	7.2	7.05	7.6	9.95	9.95	9.1	8.6	5.3	7.5	8.15	8.8
11	6.15	7.3	6.85	7.55	10.35	10.0	9.2	8.55	5.15	7.5	8.1	8.5
12	6.2	7.25	6.7	7.6	10.55	10.15	9.35	8.05	5.1	7.4	8.1	8.4
13	6.3	7.2	6.7	8.05	10.6	10.25	9.2	7.95	5.1	7.4	8.1	8.3
14	6.3	7.4	6.7	8.2	11.0	10.65	8.85	7.9	5.05	7.3	8.1	8.3
15	6.3	7.4	6.7	8.05	11.4	10.8	8.75	7.7	5.0	7.15	8.0	8.3
16	6.3	7.4	6.7	8.3	11.7	10.95	8.65	7.4	5.0	7.2	7.95	8.2
17	6.3	7.55	6.8	8.55	11.9	11.2	8.75	7.15	4.95	7.15	7.85	8.2
18	7.2	7.5	6.7	8.35	11.95	11.35	8.85	6.9	4.95	7.05	7.95	8.1
19	7.15	7.45	7.2	8.1	11.65	11.45	9.15	6.65	4.95	7.0	8.0	8.0
20	7.35	7.3	7.3	8.05	11.55	11.55	8.75	6.9	4.95	6.95	8.1	8.0
21	7.6	7.3	7.25	8.2	11.6	11.65	8.9	6.7	4.95	7.05	8.1	7.8
22	7.85	7.2	7.3	8.6	11.65	11.85	8.8	6.8	4.9	6.8	8.05	7.8
23	7.8	7.2	7.15	8.7	11.75	11.45	8.9	7.4	5.15	6.9	7.9	7.55
24	7.75	7.1	6.95	8.9	12.05	11.3	8.8	6.55	5.1	7.0	7.95	7.35
25	7.5	7.1	6.8	8.8	12.2	10.9	8.4	6.45	5.0	7.3	8.0	7.3
26	7.35	7.05	6.8	8.8	12.35	10.6	8.2	6.2	4.9	7.35	7.8	7.2
27	7.05	7.1	6.7	9.2	12.5	10.2	8.1	6.0	4.85	7.55	7.6	7.3
28	7.0	7.0	6.7	9.5	12.5	9.8	8.1	6.05	4.85	7.6	7.4	7.25
29	7.0		6.6	9.9	12.45	9.5	8.0	7.1	5.8	7.5	7.5	7.75
30	7.0		6.65	10.0	12.4	9.35	7.95	7.25	5.9	7.2	7.8	7.7
31	6.95		7.5		11.9		7.9	6.8		7.25		7.8

Daily discharge, in second-feet, of Rio Grande near El Paso, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	a220	455	485	1,520	3,680	a6,120	1,880	775	260	a1,245	760	960
2	190	a490	a515	a1,340	3,480	5,260	1,630	960	a150	755	a760	a1,000
3	175	515	515	1,170	a3,700	4,770	a1,390	a1,430	115	a580	950	1,000
4	a165	510	515	1,280	3,420	a4,470	1,040	2,400	90	580	1,220	1,080
5	150	a470	a425	a1,210	3,040	4,580	1,220	3,080	a65	465	a1,180	a3,670
6	175	500	385	750	a2,760	4,600	a1,280	a1,610	55	a435	1,100	2,770
7	a175	530	375	750	2,740	a4,300	1,160	1,390	50	555	1,060	1,740
8	175	a470	a395	a970	2,520	3,880	1,760	1,200	40	620	a1,140	a1,510
9	175	440	610	900	a2,810	3,740	a2,030	a1,230	35	a650	1,250	2,070
10	a175	565	490	820	3,640	a3,610	2,120	1,440	30	700	1,250	1,990
11	210	a595	a370	a780	4,370	3,560	2,310	1,380	a20	720	a1,240	a1,560
12	220	585	290	800	a4,740	3,690	a2,590	a805	20	a685	1,210	1,380
13	a240	575	280	1,060	4,830	a3,730	2,370	705	25	685	1,180	1,200
14	240	a715	a270	1,150	5,330	4,320	1,740	665	a20	630	a1,150	a1,110
15	240	715	270	1,060	a5,840	4,550	1,660	a505	20	a540	1,080	1,150
16	a240	715	270	1,260	6,610	a4,770	1,520	455	15	560	1,040	1,120
17	240	a795	a280	a1,470	7,190	5,250	1,650	415	a10	540	970	a1,170
18	a520	760	270	1,350	a7,330	5,560	a1,770	a355	10	a505	a1,030	1,140
19	540	730	520	1,200	6,630	a5,770	2,280	245	10	495	1,060	1,110
20	730	a635	a580	a1,170	a6,390	5,960	1,600	340	a10	485	1,110	a1,170
21	a945	630	555	1,290	6,540	6,140	a1,840	a250	10	a505	a1,110	1,010
22	1,110	560	580	1,630	6,690	a6,500	1,630	290	10	425	1,060	930
23	1,080	a555	a520	a1,710	a6,990	5,740	1,720	530	20	460	960	a810
24	a1,045	500	425	1,930	7,730	5,450	a1,510	a240	a15	490	a980	685
25	870	510	355	1,850	8,080	a4,720	1,250	220	10	655	970	655
26	765	a485	a355	a1,870	a8,460	4,220	1,120	165	10	690	760	a600
27	a560	515	295	2,430	8,700	3,560	a1,060	a120	a15	a820	a550	660
28	525	455	295	a2,850	8,490	a2,910	1,060	130	15	850	470	630
29	520		a235	3,350	a8,140	2,440	a990	495	125	780	a550	a940
30	a515		265	a3,470	8,040	a2,210	830	a545	a140	a565	760	815
31	480		a770		7,040		a680	410		585		810

a Dates of measurements.

Monthly discharge of Rio Grande near El Paso, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	1,110	150	439	26,995
February	795	440	571	31,686
March	770	235	412	25,309
April	3,470	750	1,480	88,046
May	8,700	2,520	5,676	348,992
June	6,500	2,210	4,548	270,625
July	2,590	680	1,571	96,575
August	3,080	120	799	49,150
September	260	10	47	2,817
October	850	425	621	38,192
November	1,250	470	997	59,326
December	3,670	600	1,240	76,255
The year	8,700	10	1,533	1,113,968

RIO GRANDE ABOVE PRESIDIO, TEX.

This station was established April 4, 1900, by the International (Water) Boundary Commission. It was 9 miles above Presidio and above the mouth of Rio Conchos, one of the principal tributaries of the Rio Grande, and about 200 miles below El Paso. The station was in a straight stretch of the river, but in the bight of a long bend. In 1903 the river began to erode a cut-off across this bend, and the spring flood of 1905 deepened this channel to such an extent that

more water passed through it than through the station, and it became necessary to abandon the location. In September, 1905, the station was moved 8 miles farther upstream and rebuilt. Its location is far enough above the mouth of Rio Conchos to be free from the effects of backwater from that stream. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 54, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande above Presidio, Tex., in 1906.

[By James P. Hague and F. X. Dougherty.]

Date.	Area of section.	Gage height.	Dis- charge.	Date.	Area of section.	Gage height.	Dis- charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft*
January 3	171	3.9	423	July 11	324	4.5	718
January 6	165	3.8	398	July 14	387	5.1	1,169
January 10	129	3.6	286	July 17	367	4.9	995
January 14	107	3.4	236	July 20	395	5.1	1,136
January 17	130	3.35	223	July 23	327	4.6	850
January 20	124	3.3	206	July 26	301	4.35	695
January 24	163	3.75	364	July 29	287	4.3	651
January 28	225	4.3	597	August 1	265	4.3	616
January 31	231	4.45	660	August 4	277	4.4	645
February 3	241	4.2	505	August 7	395	5.2	1,213
February 6	214	4.1	437	August 10	470	5.4	1,527
February 9	215	4.1	426	August 13	377	5.0	943
February 13	224	4.2	530	August 16	350	4.6	827
February 16	237	4.3	586	August 19	205	4.2	441
February 19	214	4.2	538	August 22	168	3.9	348
February 22	229	4.15	504	August 25	265	4.35	639
February 25	230	4.3	510	August 28	410	4.9	1,178
March 4	196	4.1	434	August 31	224	3.8	411
March 11	187	4.1	437	September 3	158	3.7	337
March 16	176	3.95	338	September 6	138	3.6	296
March 19	172	3.9	321	September 9	112	3.3	201
March 22	155	3.8	280	September 12	95	3.1	143
March 25	152	3.7	239	September 15	91	3.0	123
March 28	163	3.8	278	September 18	81	2.9	86
March 31	171	3.9	347	September 21	118	3.3	186
April 3	171	3.9	269	September 24	94	3.0	126
April 6	255	4.3	583	September 27	64	2.8	75
April 9	288	4.4	685	September 30	55	2.6	56
April 12	228	4.2	484	October 3	53	2.6	59
April 15	210	4.1	480	October 6	38	2.4	36
April 18	256	4.2	557	October 9	134	3.65	317
April 21	302	4.5	738	October 12	112	3.5	241
April 24	296	4.5	779	October 15	175	4.0	428
April 27	337	4.8	1,047	October 18	151	3.7	364
April 30	432	5.1	1,278	October 21	136	3.6	327
May 3	848	6.2	2,676	October 24	154	3.6	322
May 6	716	6.1	2,394	October 27	139	3.5	291
May 9	549	5.7	2,051	October 30	118	3.5	287
May 12	521	5.6	1,908	November 2	199	3.9	528
May 15	840	6.3	3,045	November 5	157	3.8	408
May 18	972	6.7	3,675	November 8	178	3.9	487
May 21	1,263	7.2	4,978	November 11	251	4.3	680
May 24	1,298	7.2	5,105	November 14	329	4.6	1,002
May 27	1,320	7.3	5,688	November 17	262	4.4	812
May 30	1,357	7.4	5,946	November 19	238	4.3	692
June 2	1,613	7.75	7,294	November 23	260	4.35	724
June 5	1,183	7.3	5,854	November 26	272	4.4	780
June 8	864	6.5	3,994	November 29	237	4.3	671
June 11	766	6.2	3,203	December 2	204	3.9	464
June 14	698	6.1	2,935	December 5	337	4.5	965
June 17	767	6.25	3,380	December 8	382	4.6	1,103
June 20	811	6.65	3,722	December 11	437	5.4	1,576
June 23	968	7.2	4,998	December 14	392	5.3	1,431
June 26	1,262	7.5	6,334	December 17	346	5.0	1,057
June 29	854	6.95	4,178	December 20	308	4.8	904
July 2	585	6.05	2,248	December 23	301	4.7	863
July 5	526	5.5	1,734	December 26	260	4.5	696
July 8	367	4.6	878	December 29	223	4.3	547

Daily gage height, in feet, of Rio Grande above Presidio, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.0	4.55	4.1	3.85	5.4	7.65	6.3	4.3	3.75	2.6	3.8	4.1
2	4.0	4.3	4.2	3.9	5.8	7.7	6.05	4.25	4.5	2.6	3.85	3.95
3	3.95	4.2	4.15	3.85	6.15	7.8	6.7	4.35	3.85	2.6	3.9	3.8
4	3.85	4.15	4.15	3.85	6.2	7.6	5.65	4.4	4.05	2.55	3.8	3.85
5	3.8	4.15	4.1	3.8	6.15	7.25	6.05	5.9	3.65	2.5	3.8	4.35
6	3.8	4.15	4.1	4.25	6.1	7.1	6.35	4.7	3.6	2.45	3.8	4.5
7	3.8	4.05	4.15	4.5	6.0	6.8	5.6	5.3	3.45	2.4	3.8	4.55
8	3.8	4.1	4.05	4.5	5.9	6.5	4.6	5.8	3.45	3.6	4.05	4.55
9	3.7	4.15	4.1	4.4	5.75	6.35	4.5	5.8	3.35	3.65	4.3	6.0
10	3.65	4.2	4.1	4.35	5.6	6.25	4.55	5.55	3.25	3.5	4.3	5.8
11	3.6	4.15	4.05	4.35	5.6	6.2	4.75	5.5	3.2	3.4	4.3	5.35
12	3.55	4.25	3.95	4.25	5.6	6.2	6.25	5.0	3.15	3.5	4.35	5.45
13	3.5	·4.25	3.95	4.25	5.8	6.15	5.35	5.25	3.1	3.65	4.55	5.6
14	3.45	4.25	3.95	4.15	6.1	6.15	5.2	5.15	3.1	3.7	4.6	5.35
15	3.4	4.2	·3.95	4.05	6.35	6.2	5.05	4.95	3.0	4.0	4.5	5.35
16	3.45	4.3	3.95	4.1	6.4	6.25	4.95	4.55	3.3	3.8	4.4	5.2
17	3.35	4.3	3.9	4.1	6.55	6.25	4.95	4.55	3.0	3.7	4.35	5.05
18	3.35	4.3	3.9	4.2	6.75	6.4	5.65	4.45	2.9	3.7	4.25	4.9
19	3.4	4.2	3.9	4.45	6.95	6.6	5.2	4.3	2.95	3.6	4.25	4.8
20	3.35	4.2	3.85	4.45	7.15	6.65	5.2	4.2	3.15	3.6	4.45	4.8
21	3.35	4.15	3.8	4.5	7.2	6.75	5.0	4.0	3.2	3.55	4.35	4.8
22	3.45	4.15	3.75	4.7	7.3	6.95	4.95	3.85	3.1	3.55	4.35	4.8
23	3.5	4.3	3.7	4.6	7.3	7.15	4.65	3.95	3.0	3.65	4.35	4.7
24	3.7	4.3	3.7	4.5	7.2	7.35	4.5	3.9	3.0	3.6	4.5	4.75
25	3.8	4.25	3.7	4.45	7.2	7.4	4.3	4.2	3.2	3.5	4.45	4.6
26	3.9	4.25	3.75	4.55	7.2	7.5	4.35	4.1	2.9	3.5	4.45	4.55
27	4.1	4.2	3.8	4.85	7.25	7.55	4.15	6.4	2.8	3.55	4.4	4.5
28	4.3	4.15	3.8	5.15	7.45	7.25	4.4	4.65	2.75	3.5	4.35	4.4
29	4.45	......	3.95	5.15	7.45	7.05	4.35	4.15	2.7	3.55	4.35	4.35
30	4.55	......	3.95	5.1	7.4	6.6	4.3	4.1	2.65	3.5	4.3	4.3
31	4.45	......	3.95	......	7.35	......	4.25	3.8	......	3.45	......	4.25

Daily discharge, in second-feet, of Rio Grande above Presidio, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	480	715	435	300	1,660	7,070	2,780	a615	375	55	470	570
2	470	565	475	295	2,170	a7,280	a2,250	600	930	60	a500	490
3	a445	505	455	250	a2,610	7,680	3,550	630	a450	a60	520	410
4	410	475	a455	250	2,640	6,950	1,860	a645	545	50	420	450
5	400	470	435	230	2,510	a5,730	a2,280	2,190	325	45	a410	a850
6	a400	a465	435	a545	a2,390	5,400	2,880	860	a295	a40	410	965
7	390	405	455	785	2,310	4,700	1,780	a1,370	250	35	410	1,035
8	380	425	415	785	2,220	a4,000	a880	2,150	250	295	560	a1,035
9	330	a450	435	a685	a2,090	3,610	770	2,150	a215	a315	680	2,500
10	a305	490	435	635	1,910	3,340	790	a1,760	185	260	680	2,190
11	285	480	a415	635	1,910	a3,200	a920	1,670	170	220	680	a1,530
12	270	540	365	a535	a1,910	3,200	2,650	940	a155	a240	a730	1,610
13	260	a555	355	540	2,230	3,070	1,420	a1,190	145	295	950	1,750
14	a245	555	350	495	2,720	a3,070	a1,270	1,090	145	315	1,000	a1,480
15	235	530	345	440	a3,120	a3,230	1,130	925	a125	a430	a900	1,460
16	245	a585	a340	480	3,200	a3,380	1,040	a775	210	385	810	1,280
17	a225	585	320	480	3,440	a3,380	a1,040	775	115	365	750	a1,110
18	225	585	320	a555	a3,810	3,510	1,740	680	a85	a365	630	980
19	240	a540	a320	705	4,330	3,680	1,250	a535	95	325	630	905
20	a225	535	300	705	4,850	a3,720	a1,250	440	145	325	a840	a905
21	225	510	280	a740	a4,980	3,950	1,080	380	a160	a310	740	905
22	260	a505	a260	915	5,280	4,410	1,050	a335	145	310	730	865
23	275	555	240	850	5,320	a4,890	880	380	125	340	720	905
24	a345	530	a240	a780	a5,100	5,590	790	350	a125	a320	a870	780
25	385	a490	a240	740	5,210	5,890	665	a540	175	290	820	a735
26	430	490	260	825	5,320	a6,330	a695	580	100	290	820	695
27	515	470	280	a1,090	5,560	6,310	520	3,580	a75	a305	a780	620
28	a595	450	a280	1,320	6,080	5,240	740	a1,000	70	290	720	a585
29	660	......	345	1,320	6,080	a4,480	a695	650	65	305	720	545
30	700	......	355	a1,280	a5,950	3,410	665	615	a60	a285	a670	510
31	a660	......	a365	......	5,820	......	635	a410	......	270	......	......

a Dates of meter measurements.

Monthly discharge of Rio Grande above Presidio, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	700	225	371	22,840
February	715	405	516	28,671
March	475	240	355	21,828
April	1,320	230	673	40,046
May	6,080	1,660	3,701	227,564
June	7,680	3,070	4,657	277,091
July	3,550	520	1,353	83,197
August	3,580	335	994	61,111
September	930	60	210	12,516
October	430	35	251	15,461
November	1,000	410	686	40,800
December	2,500	410	1,018	62,588
The year	7,680	35	1,232	893,713

RIO GRANDE BELOW PRESIDIO, TEX.

This station was established April 8, 1900, by the International (Water) Boundary Commission. It is 6 miles below Presidio, and is also below the mouth of Rio Conchos, and about 215 miles below El Paso. It is at the west end of the canyon section of the Rio Grande. The discharge at this station minus the discharge at the station above Presidio, Tex., is the discharge of Rio Conchos, except at rare intervals, when some rain water enters the Rio Grande from the north. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 58, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande below Presidio, Tex., in 1906.

[By James P. Hague and F. X. Dougherty.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	Feet.	Sec.-ft.		Sq. ft.	Feet.	Sec.-ft.
January 2	1,116	7.75	2,730	April 10	655	6.6	1,042
January 5	1,033	7.45	2,225	April 13	613	6.4	940
January 9	978	7.3	1,838	April 16	576	6.2	774
January 13	964	7.3	1,800	April 19	654	6.7	1,006
January 16	873	7.0	1,580	April 22	720	7.0	1,223
January 19	849	7.0	1,583	April 25	652	6.7	1,032
January 22	813	6.9	1,436	April 28	770	7.2	1,572
January 26	783	6.8	1,326	May 1	850	7.45	1,867
January 29	839	7.1	1,580	May 4	966	8.2	2,725
February 2	775	6.9	1,410	May 7	843	8.2	2,792
February 5	881	7.85	2,845	May 10	781	8.0	2,205
February 8	951	8.4	4,423	May 13	898	8.25	3,026
February 11	1,118	8.9	5,750	May 16	1,045	8.4	3,657
February 14	1,021	8.55	4,760	May 19	1,213	8.7	4,367
February 17	1,118	9.0	5,834	May 22	1,130	9.0	4,759
February 20	1,215	8.9	5,776	May 25	1,145	9.2	5,039
February 23	1,261	8.75	5,163	May 28	1,134	9.35	5,802
March 3	1,065	7.8	2,904	May 31	1,227	9.5	6,339
March 7	942	7.6	2,274	June 3	1,270	9.7	6,831
March 10	915	7.3	1,984	June 6	1,093	9.3	5,415
March 14	756	7.0	1,611	June 9	872	8.8	4,084
March 17	739	7.0	1,647	June 12	782	8.6	3,491
March 20	648	6.6	1,207	June 15	770	8.6	3,417
March 23	607	6.35	891	June 18	864	9.0	4,248
March 26	581	6.3	842	June 21	922	9.1	4,668
March 29	600	6.35	899	June 24	987	9.5	5,189
April 1	572	6.2	779	June 27	1,083	9.7	5,716
April 4	499	6.0	635	June 30	1,013	9.5	5,235
April 7	715	7.0	1,169	July 3	864	9.05	4,505

Discharge measurements of Rio Grande below Presidio, Tex., in 1906—Continued.

Date.	Area of section.	Gage height.	Dis-charge.	Date.	Area of section.	Gage height.	Dis-charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
July 6	1,162	10.1	6,491	October 4	1,303	8.1	2,719
July 9	1,676	11.0	9,921	October 7	1,198	7.65	2,337
July 12	1,415	9.9	7,872	October 10	1,515	8.6	4,604
July 15	1,527	10.45	8,892	October 13	1,186	7.6	1,694
July 18	2,975	13.45	17,568	October 16	1,203	7.6	1,643
July 21	2,585	11.9	14,468	October 19	1,180	7.6	1,711
July 24	2,787	13.0	16,062	October 22	1,107	7.4	1,300
July 27	2,872	12.85	16,802	October 26	1,150	7.5	1,283
July 30	1,982	10.4	10,849	October 28	1,151	7.5	1,284
August 2	2,439	11.55	13,920	October 31	1,150	7.45	1,252
August 5	2,737	13.15	16,023	November 3	1,138	7.5	1,317
August 8	3,150	13.4	18,709	November 7	1,135	7.5	1,329
August 11	2,874	12.95	16,828	November 9	1,127	7.5	1,303
August 14	2,325	11.2	13,372	November 12	1,164	7.6	1,596
August 17	2,436	11.4	13,663	November 15	1,151	7.7	1,680
August 20	2,286	10.9	12,700	November 18	1,118	7.55	1,434
August 23	2,381	11.75	13,815	November 21	1,119	7.6	1,477
August 26	2,706	13.3	16,000	November 24	1,167	7.65	1,598
August 29	4,833	14.85	*a*25,887	November 28	1,097	7.6	1,483
September 1	2,598	12.5	15,386	November 30	1,098	7.6	1,485
September 4	2,502	11.9	14,489	December 3	962	7.4	1,147
September 7	2,274	10.25	11,966	December 6	1,062	7.6	1,448
September 10	1,980	9.4	7,441	December 9	1,092	8.2	2,578
September 14	1,815	9.0	6,439	December 12	1,062	7.95	2,279
September 16	1,740	8.6	4,720	December 15	1,012	7.9	2,094
September 19	1,800	8.8	5,861	December 18	977	7.8	1,889
September 22	1,580	8.25	3,067	December 21	958	7.7	1,789
September 25	1,652	8.75	5,079	December 24	934	7.7	1,724
September 28	1,783	8.8	5,646	December 27	852	7.6	1,347
October 1	1,490	8.5	4,428	December 30	800	7.5	1,171

a Includes overflow section.

Daily gage height, in feet, of Rio Grande below Presidio, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.0	7.3	8.0	6.2	7.45	9.6	9.35	10.65	12.7	8.5	7.45	7.55
2	7.8	6.9	7.9	6.15	7.8	9.55	9.25	11.55	13.05	8.2	7.45	7.5
3	7.65	6.85	7.8	6.1	8.15	9.6	9.35	11.55	12.55	8.2	7.45	7.45
4	7.6	7.35	7.85	6.05	8.25	9.6	9.1	11.9	11.85	8.15	7.4	7.4
5	7.45	7.85	7.75	6.05	8.75	9.45	9.45	13.1	11.55	8.0	7.45	7.55
6	7.4	8.15	7.7	7.45	9.25	9.2	10.0	13.5	11.4	7.9	7.5	7.6
7	7.4	8.4	7.6	7.2	8.55	8.95	8.45	14.2	10.75	7.7	7.5	7.7
8	7.4	8.45	7.45	6.95	8.15	8.85	11.45	13.65	9.95	7.7	7.5	7.65
9	7.3	8.7	7.35	6.85	8.05	8.8	11.4	15.15	9.6	8.05	7.55	8.15
10	7.3	9.3	7.25	6.65	7.95	8.8	11.05	14.4	9.4	8.65	7.6	8.15
11	7.3	9.05	7.2	6.45	7.85	8.7	10.3	13.35	9.35	8.0	7.6	8.0
12	7.3	9.05	7.1	6.4	7.8	8.6	9.9	13.75	9.2	7.6	7.6	7.95
13	7.25	8.85	7.1	6.45	8.25	8.55	10.55	12.5	9.15	7.6	7.7	8.0
14	7.15	8.6	7.0	6.45	8.25	8.55	10.4	11.2	9.05	7.8	7.7	8.0
15	7.05	8.55	7.0	6.45	8.3	8.6	10.6	14.3	8.85	7.85	7.7	7.95
16	7.0	8.75	6.95	6.25	8.4	8.6	12.4	13.65	8.6	7.7	7.65	7.95
17	7.0	9.0	6.95	6.4	8.45	9.1	13.0	11.5	9.0	7.75	7.6	7.85
18	7.0	9.05	6.75	6.7	8.45	9.05	13.25	11.7	9.2	7.65	7.55	7.8
19	7.0	8.8	6.65	6.7	8.75	9.05	12.55	11.5	9.55	7.6	7.6	7.8
20	7.0	8.9	6.55	6.75	8.9	9.2	12.9	11.1	9.3	7.6	7.6	7.8
21	7.0	9.45	6.5	6.7	9.1	9.15	11.95	11.05	8.45	7.6	7.6	7.75
22	6.95	9.15	6.45	7.0	9.1	9.25	11.25	11.4	9.15	7.55	7.6	7.7
23	6.9	8.8	6.35	7.0	9.1	9.45	12.8	11.75	9.15	7.55	7.6	7.7
24	6.9	8.85	6.3	6.85	9.2	9.5	13.05	12.4	9.25	7.5	7.65	7.7
25	6.8	8.65	3.3	6.75	9.25	9.55	13.9	12.9	8.95	7.5	7.65	7.7
26	6.8	8.45	6.3	6.75	9.4	9.75	14.25	14.15	8.85	7.5	7.6	7.65
27	6.85	8.25	6.3	7.1	9.4	9.75	12.95	16.4	8.45	7.5	7.6	7.6
28	7.05	8.1	6.35	7.25	9.35	9.7	10.85	16.5	8.85	7.45	7.6	7.55
29	7.2		6.35	7.35	9.5	9.55	10.5	14.9	8.5	7.45	7.6	7.5
30	7.05		6.3	7.25	9.5	9.45	10.4	14.4	8.75	7.5	7.6	7.5
31	7.05		6.25		9.5		10.55	13.85		7.45		7.5

Daily discharge, in second-feet, of Rio Grande below Presidio, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,450	2,010	3,280	a 780	a1,870	6,590	4,970	11,480	a16,080	a4,430	1,250	1,400
2	a2,890	a1,410	3,090	745	2,270	6,460	4,810	13,920	a17,310	3,150	1,250	1,310
3	2,560	1,340	2,900	710	2,670	a6,590	a 4,970	13,020	16,080	3,150	a1,250	a1,230
4	2,470	2,090	2,900	a 670	a2,820	6,480	4,600	13,170	a14,410	a2,930	1,180	1,150
5	a2,220	2,850	2,670	670	3,850	5,950	5,260	a15,870	13,950	2,630	1,250	1,370
6	2,100	3,710	2,510	1,620	4,870	a5,150	a 6,300	17,970	13,720	2,550	1,320	a1,450
7	2,080	4,420	a2,270	a1,370	a3,490	4,480	3,520	21,340	a12,730	a2,380	a1,330	1,640
8	2,060	a4,550	2,120	1,155	2,630	4,220	a11,000	a19,700	10,420	2,460	1,320	1,540
9	a1,840	5,210	2,020	1,125	2,370	a4,080	a10,880	26,980	8,740	3,290	a1,380	a2,480
10	1,830	6,790	a1,920	a1,060	a2,090	4,080	10,010	23,230	a 7,440	a4,720	1,500	2,520
11	1,820	a6,140	1,860	965	1,920	3,780	8,610	a18,500	7,320	2,860	1,550	2,340
12	1,810	6,140	1,740	940	1,880	a3,490	a 7,870	20,030	6,940	1,690	a1,600	a2,280
13	a1,760	5,610	1,730	a 970	a3,030	3,340	9,080	16,770	6,820	a1,690	1,686	2,310
14	1,690	a4,900	a1,610	970	3,120	3,320	8,800	a13,370	a 6,570	2,180	1,680	2,270
15	1,620	4,760	1,620	970	3,330	a3,420	a 9,320	22,670	5,800	2,280	a1,680	a2,160
16	a1,580	5,240	1,580	a 810	a3,660	3,420	14,530	20,650	a 4,720	a1,890	1,590	2,140
17	1,580	a5,830	a1,590	865	3,770	4,460	16,260	a13,970	6,080	2,040	1,510	1,980
18	1,580	6,030	1,370	1,005	3,770	a4,350	a16,980	14,570	6,760	1,810	a1,430	a1,890
19	a1,580	5,430	1,260	a1,005	a4,490	4,430	15,770	14,100	a 8,010	a1,710	1,480	1,890
20	1,580	a5,780	a1,150	1,040	4,750	4,870	16,470	a13,170	7,060	1,710	1,480	1,890
21	1,580	7,190	1,090	1,005	5,130	a4,800	a14,570	12,900	3,830	1,710	a1,480	a1,840
22	a1,520	6,310	a1,020	a1,220	a5,010	4,880	13,520	13,350	a 3,070	a1,500	1,490	1,770
23	1,440	a5,290	890	1,220	4,930	5,230	a13,810	6,090	1,550	1,550	1,510	a1,740
24	1,440	5,420	840	1,120	5,120	a5,190	a16,210	14,730	6,470	1,390	a1,600	a1,720
25	1,330	4,900	840	a1,060	a5,180	5,320	19,160	15,440	a 5,630	1,340	1,590	1,640
26	a1,330	4,380	a 840	1,060	5,710	5,850	20,400	a18,550	5,520	a1,280	1,500	1,490
27	1,370	3,860	840	1,460	5,830	a5,720	a17,100	36,700	4,460	1,280	1,490	a1,350
28	1,540	3,470	900	a1,620	a5,800	5,720	11,940	37,400	a 5,800	a1,250	a1,480	1,260
29	a1,670		a 900	1,720	6,280	a5,360	11,090	a26,240	4,750	1,250	1,480	1,180
30	1,540		860	1,620	6,310	5,120	a10,850	23,190	5,500	1,280	a1,490	a1,170
31	1,540		820		a6,340		11,210	20,440		a1,250		1,170

a Dates of measurements.

Monthly discharge of Rio Grande below Presidio, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	3,450	1,330	1,819	111,868
February	6,790	1,340	4,681	259,954
March	3,280	820	1,646	101,217
April	1,720	670	1,085	64,562
May	6,340	1,880	4,009	246,526
June	6,590	3,320	4,872	289,884
July	20,400	3,520	11,349	697,845
August	37,400	11,480	18,620	1,144,919
September	17,310	3,070	8,269	492,059
October	4,720	1,250	2,149	132,159
November	1,680	1,180	1,461	86,916
December	2,520	1,150	1,728	106,255
The year	37,400	670	5,141	3,734,164

RIO GRANDE NEAR LANGTRY, TEX.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is located one-half mile south of Langtry station, on the Southern Pacific Railroad, and is about 440 miles below El Paso, Tex., at the east end of the canyon section of the Rio Grande, and a short distance to the west of the mouth of Pecos River, one of the principal tributaries of the Rio Grande. The con-

ditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 63, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande near Langtry, Tex., in 1906.

[By E. E. Winter.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 5	847	2.1	2,804	July 11	1,732	5.65	8,253
January 9	771	1.8	2,406	July 14	1,454	4.8	6,406
January 13	714	1.6	2,222	July 17	1,376	4.65	5,876
January 17	669	1.4	2,031	July 20	2,703	9.0	17,815
January 22	621	1.2	1,614	July 25	2,571	8.55	17,200
January 25	600	1.2	1,580	July 29	3,780	12.3	29,261
January 29	574	1.1	1,489	August 2	1,728	5.1	8,362
February 2	664	1.3	1,817	August 8	3,821	12.7	29,087
February 7	650	1.3	1,766	August 12	5,386	16.5	43,637
February 12	1,085	2.9	4,282	August 14	3,463	11.5	25,516
February 17	1,098	2.9	3,867	August 17	2,515	8.3	16,640
February 22	1,368	3.9	6,053	August 21	1,742	5.45	9,722
February 26	1,269	3.3	4,911	August 25	2,767	9.3	18,726
March 2	987	2.6	3,299	August 30	4,625	15.35	35,002
March 7	896	2.0	2,855	September 3	3,266	10.45	22,588
March 12	757	1.6	2,185	September 7	2,098	7.0	11,790
March 16	672	1.3	1,843	September 11	1,427	4.7	6,683
March 21	605	1.0	1,473	September 17	1,151	3.5	4,771
March 25	580	0.9	1,410	September 20	1,061	3.0	3,783
March 28	556	0.8	1,301	September 25	1,088	3.0	3,907
April 7	565	0.7	1,356	September 28	1,091	3.1	4,246
April 11	629	1.1	1,619	October 2	1,190	3.1	4,107
April 15	573	0.7	1,311	October 6	1,123	3.0	3,949
April 19	588	0.75	1,335	October 10	901	2.4	2,772
April 23	585	0.7	1,242	October 15	846	2.3	2,608
April 27	593	0.95	1,488	October 18	903	2.4	2,454
May 2	646	1.2	1,746	October 22	830	2.0	2,191
May 7	815	1.95	2,851	October 25	744	1.9	2,015
May 10	801	1.9	2,771	October 28	703	1.85	1,907
May 14	828	1.9	2,839	November 2	776	1.7	1,862
May 19	985	2.7	3,440	November 7	759	1.7	1,837
May 23	1,045	2.85	4,110	November 10	747	1.7	1,849
May 28	1,110	3.1	4,271	November 15	747	1.7	1,850
June 2	1,270	3.4	6,130	November 19	818	1.9	2,193
June 7	1,237	3.4	6,016	November 23	800	1.85	2,111
June 11	1,055	2.9	3,945	November 28	810	1.95	2,095
June 15	916	2.4	2,991	December 2	863	1.9	2,169
June 20	920	2.3	2,952	December 6	838	1.8	2,029
June 23	1,057	2.7	3,474	December 10	797	1.75	1,860
June 28	1,083	3.0	3,875	December 14	965	2.3	2,757
July 1	1,077	2.9	3,731	December 17	918	2.3	2,592
July 9	1,302	3.95	4,788	December 29	855	1.9	2,240

Daily gage height, in feet, of Rio Grande near Langtry, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.5	1.3	2.7	0.65	1.2	3.3	2.85	5.45	13.3	3.1	1.7	2.2
2	2.3	1.3	2.6	0.65	1.3	3.4	2.65	5.05	11.6	3.25	1.7	1.9
3	2.2	1.3	2.55	0.7	1.4	3.65	2.5	5.1	10.25	3.55	1.7	1.9
4	2.15	1.3	2.35	0.7	1.75	5.25	2.35	6.2	9.15	3.15	1.7	1.9
5	2.05	1.3	2.2	0.7	1.9	3.5	2.2	7.7	8.5	3.05	1.7	1.8
6	2.0	1.3	2.05	0.7	1.75	3.45	2.65	8.55	7.4	2.95	1.7	1.8
7	1.95	1.3	2.0	0.7	1.95	3.3	2.6	10.95	7.0	2.85	1.7	1.75
8	1.9	1.3	1.9	0.7	1.9	3.1	3.0	12.8	6.5	2.7	1.7	1.75
9	1.8	1.5	1.9	0.7	1.9	3.15	3.85	14.3	6.1	2.55	1.7	1.7
10	1.7	1.55	1.8	1.55	1.9	2.9	3.75	15.45	5.35	2.4	1.7	1.75
11	1.65	2.0	1.7	1.05	1.9	2.85	5.75	19.5	4.6	2.4	1.7	1.95
12	1.6	2.85	1.55	0.85	1.9	2.65	5.65	17.25	4.4	2.3	1.7	2.5
13	1.6	3.1	1.4	0.75	1.9	2.55	5.4	14.8	4.0	2.3	1.7	2.35
14	1.6	3.4	1.35	0.7	1.9	2.45	5.45	11.5	3.95	2.3	1.7	2.3
15	1.55	3.5	1.3	0.7	1.9	2.4	5.3	9.3	3.75	2.3	1.7	2.3
16	1.4	3.15	1.3	0.7	1.95	2.35	4.1	8.25	3.6	2.4	1.7	2.3
17	1.4	2.9	1.25	0.75	2.1	2.3	4.8	8.3	3.5	2.4	1.8	2.25
18	1.4	2.9	1.1	0.75	2.75	2.25	7.4	7.35	3.25	2.35	1.9	2.3
19	1.3	3.1	1.1	0.75	2.8	2.2	8.25	6.4	3.1	2.2	1.9	2.25
20	1.25	3.7	1.1	0.7	2.75	2.3	9.0	5.6	3.0	2.15	1.9	2.1

Daily gage height, in feet, of Rio Grande near Langtry, Tex., for 1906—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21	1.25	3.9	1.05	0.7	2.55	2.4	9.1	5.4	3.0	2.1	1.9	2.0
22	1.2	3.9	1.0	0.7	2.7	2.55	9.2	5.55	3.0	2.0	1.85	2.0
23	1.2	3.9	1.0	0.7	2.85	2.7	8.6	7.25	3.1	1.95	1.85	1.95
24	1.2	3.75	1.0	0.75	2.85	2.95	8.35	9.45	3.1	1.9	1.9	1.9
25	1.2	3.55	0.9	0.8	2.9	2.75	8.6	9.3	3.0	1.9	1.9	1.9
26	1.2	3.15	0.8	0.8	3.0	2.8	8.7	9.9	3.2	1.9	1.9	1.9
27	1.1	2.9	0.8	0.95	3.0	2.9	9.2	10.6	3.35	1.85	1.95	1.9
28	1.1	2.8	0.8	0.95	3.15	3.0	10.7	11.8	3.25	1.85	1.95	1.9
29	1.1		0.7	1.5	3.2	3.5	10.7	12.35	3.1	1.75	2.0	1.9
30	1.1		0.7	2.65	3.2	3.2	7.5	15.15	3.1	1.7	1.95	1.8
31	1.2		0.7		3.25		6.75	14.3		1.7		1.75

Daily discharge, in second-feet, of Rio Grande near Langtry, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,700	1,750	3,650	1,180	1,750	5,670	3,670	9,100	29,680	4,180	1,830	2,600
2	3,250	1,820	3,300	1,200	a1,890	a6,130	3,430	a8,260	25,450	a4,400	a1,860	2,170
3	3,030	1,810	3,260	1,270	2,040	6,730	3,250	8,360	a21,960	5,000	1,860	2,170
4	2,920	1,800	3,110	1,300	2,550	10,570	3,070	11,360	18,520	4,240	1,850	2,170
5	a2,740	1,790	3,000	1,320	2,780	6,260	2,900	15,460	16,480	4,040	1,850	2,030
6	2,670	1,780	2,890	1,340	2,550	6,140	3,390	17,770	13,040	a3,850	1,840	a2,030
7	2,600	1,770	a2,850	a1,360	a2,850	a5,820	3,330	24,310	a11,790	3,650	a1,840	1,930
8	2,540	1,770	2,680	1,360	2,770	5,150	3,760	a29,360	10,680	3,360	1,840	1,910
9	a2,410	2,080	2,680	1,360	2,770	4,980	a4,680	35,220	9,790	3,070	1,850	1,810
10	2,310	2,160	2,510	2,160	a2,770	4,210	4,570	39,620	8,130	a2,770	a1,850	a1,860
11	2,270	2,860	2,340	a1,580	2,790	a3,850	a8,460	57,890	a6,520	2,770	1,850	2,190
12	2,220	4,200	2,130	1,430	2,800	3,470	8,250	a46,640	6,200	2,610	1,850	3,080
13	a2,220	4,680	1,960	1,350	2,820	3,280	7,710	47,470	5,560	2,610	1,850	2,840
14	2,220	5,280	1,900	1,310	a2,840	3,090	a7,820	a25,540	5,480	2,610	1,850	a2,760
15	2,170	5,480	1,840	a1,310	2,840	a2,990	7,500	19,410	5,160	a2,610	a1,850	2,700
16	2,030	4,540	a1,840	1,310	2,880	2,970	5,100	16,500	4,920	2,660	1,850	2,650
17	a2,030	3,870	1,780	1,340	2,990	2,950	6,290	a16,640	a4,770	2,560	2,020	a2,550
18	1,980	3,870	1,600	1,340	3,480	2,930	13,410	14,330	4,280	a2,380	a2,190	2,590
19	1,840	4,300	1,590	a1,340	a3,640	2,910	15,750	12,020	3,980	2,230	a2,190	2,550
20	1,750	5,620	1,590	1,300	3,630	a2,950	a17,810	10,080	a3,780	2,240	2,190	2,420
21	1,700	6,050	a1,530	1,280	3,320	3,080	18,260	a9,600	3,800	2,260	2,190	2,330
22	a1,610	6,050	1,470	1,260	3,710	3,270	18,700	9,960	3,830	a2,190	2,110	2,330
23	1,600	6,050	1,470	a1,240	a4,110	a3,470	15,950	13,930	4,010	2,100	a2,110	2,280
24	1,590	5,760	1,470	1,290	4,040	3,800	16,450	19,080	4,040	2,020	2,150	2,240
25	a1,580	5,380	a1,410	1,340	4,070	3,540	a17,350	a18,730	a3,910	a2,010	2,120	2,240
26	1,580	4,640	1,300	1,340	4,200	3,600	17,650	20,340	4,290	2,010	2,080	2,240
27	1,490	4,190	1,300	a1,490	4,140	3,730	19,150	22,220	4,590	1,920	2,130	2,240
28	1,490	4,010	a1,300	1,490	a4,390	3,870	24,040	25,450	a4,490	a1,910	a2,100	2,240
29	a1,490		1,200	2,100	4,740	5,070	a24,040	26,930	4,250	1,800	2,180	a2,240
30	1,490		1,200	3,350	4,970	4,350	14,050	a34,460	4,250	1,770	2,100	2,140
31	1,580		1,200		5,320		11,800	32,170		1,890		2,090

a Dates of measurements.

Monthly discharge of Rio Grande near Langtry, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	3,700	1,490	2,132	131,107
February	6,050	1,750	3,763	208,979
March	3,650	1,200	2,044	125,653
April	3,350	1,180	1,455	86,558
May	5,320	1,750	3,305	203,187
June	10,570	2,910	4,361	259,497
July	24,040	2,900	10,732	659,881
August	57,890	8,260	22,200	1,365,044
September	29,680	3,780	8,588	511,002
October	5,000	1,770	2,762	169,845
November	2,190	1,830	1,981	117,878
December	3,080	1,810	2,310	142,056
The year	57,890	1,200	5,469	3,980,687

RIO GRANDE BELOW MOUTH OF DEVILS RIVER, TEXAS.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is alongside the Southern Pacific Railroad track, about a mile below the mouth of Devils River and about 480 miles below El Paso. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 67, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande below mouth of Devils River, Texas, in 1906.

[By E. E. Winter.]

Date.	Area of section.	Gage height.	Dis- charge.	Date.	Area of section.	Gage height.	Dis- charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 3	1,416	5.0	4,998	July 6	1,717	5.05	5,102
January 6	1,319	4.7	4,004	July 13	2,527	7.7	11,302
January 11	1,220	4.4	3,413	July 15	2,441	7.4	10,179
January 16	1,186	4.2	3,287	July 19	3,019	9.15	14,831
January 19	1,258	4.1	3,522	July 23	3,023	9.2	15,803
January 23	1,201	4.0	3,068	July 27	3,221	9.85	17,609
January 27	1,202	4.0	3,049	July 31	2,870	8.25	13,835
January 31	1,199	4.0	3,072	August 5	3,017	8.65	16,206
February 6	1,415	4.1	3,109	August 10	4,100	13.15	31,760
February 10	1,313	4.0	3,300	August 15	3,640	12.3	27,543
February 16	1,803	5.7	6,889	August 19	3,067	8.65	18,228
February 21	1,889	6.3	8,315	August 23	3,307	9.8	20,486
February 25	1,812	6.0	7,900	August 31	4,333	14.2	33,982
February 28	1,803	5.6	7,157	September 6	3,353	9.0	18,633
March 6	1,354	4.65	4,066	September 10	2,783	7.5	13,123
March 9	1,299	4.2	4,076	September 15	2,162	6.05	8,168
March 15	1,207	3.95	3,342	September 18	1,987	5.8	6,944
March 20	1,148	3.8	2,995	September 22	2,333	6.1	8,374
March 24	1,137	3.65	2,739	September 26	2,233	5.9	8,452
March 27	1,150	3.5	2,600	September 30	1,944	5.5	6,549
March 31	1,124	3.3	2,505	October 5	1,790	5.2	5,495
April 10	1,125	3.25	2,496	October 9	1,606	4.7	4,386
April 14	1,151	3.4	2,597	October 13	1,572	4.5	4,258
April 18	1,115	3.3	2,529	October 17	1,570	4.5	4,296
April 22	1,119	3.2	2,459	October 21	1,513	4.3	3,707
April 26	1,167	3.3	2,548	October 24	1,528	4.2	3,946
April 30	1,873	5.7	6,337	October 27	1,462	4.1	3,721
May 5	1,288	4.0	3,477	October 31	1,387	4.0	3,384
May 9	1,452	4.45	4,525	November 6	1,364	3.95	3,030
May 12	1,408	4.3	4,061	November 9	1,353	3.95	3,023
May 17	1,307	4.05	3,523	November 14	1,340	4.0	3,171
May 22	1,514	4.65	4,534	November 17	1,332	4.0	3,194
May 26	1,621	5.2	5,117	November 22	1,316	3.95	3,031
May 30	1,657	5.3	5,559	November 26	1,332	4.0	3,162
June 6	2,095	6.6	8,597	November 30	1,306	4.05	3,247
June 9	1,734	5.4	5,622	December 4	1,578	4.1	3,631
June 14	1,559	4.7	4,509	December 9	1,546	4.2	3,610
June 19	1,602	4.8	4,755	December 12	1,610	4.6	4,196
June 22	1,656	4.8	5,119	December 16	1,607	4.8	4,258
June 27	1,708	5.0	5,112	December 20	1,579	4.6	4,279
June 30	1,761	5.6	5,704	December 31	1,540	4.1	3,793

Daily gage height, in feet, of Rio Grande, below mouth of Devils River, Texas, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.35	4.2	5.25	3.3	4.0	5.5	5.55	7.4	13.2	5.4	3.95	4.1
2	5.2	4.2	5.1	3.25	3.8	5.6	5.1	7.05	12.55	5.15	3.95	4.2
3	4.95	4.1	4.9	3.3	3.9	6.5	5.0	7.05	11.15	5.7	3.95	4.2
4	4.85	4.15	4.8	3.35	4.0	6.9	4.6	7.8	10.65	5.35	3.95	4.1
5	4.8	4.1	4.75	3.4	3.95	6.7	4.35	8.65	9.45	5.15	3.95	4.1
6	4.75	4.1	4.6	3.35	4.0	6.3	4.65	9.3	9.0	5.0	3.95	4.1
7	4.65	4.05	4.45	3.35	4.2	5.85	5.7	11.9	8.9	4.95	3.95	4.1
8	4.55	4.0	4.35	3.4	4.4	5.6	7.0	11.3	8.6	4.85	3.95	4.1
9	4.45	4.0	4.25	3.35	4.5	5.4	7.75	12.8	7.95	4.7	3.95	4.2
10	4.4	4.0	4.15	3.5	4.6	5.25	7.25	13.6	7.5	4.6	3.95	4.45
11	4.4	4.25	4.1	3.7	4.45	5.1	7.95	18.65	7.25	4.55	3.95	4.65
12	4.35	5.0	4.05	3.55	4.3	5.1	7.75	23.85	6.9	4.5	3.95	4.7
13	4.3	5.4	4.0	3.45	4.25	4.85	7.65	19.0	6.6	4.55	4.0	4.9
14	4.2	5.65	4.0	3.4	4.2	4.7	7.05	13.5	6.3	4.65	4.0	5.0
15	4.2	5.9	3.95	3.3	4.15	4.65	7.55	12.4	6.05	4.5	4.0	4.9
16	4.2	5.65	3.9	3.25	4.1	4.85	6.8	10.5	5.9	5.05	4.0	4.8
17	4.2	5.45	3.85	3.3	4.05	4.85	6.8	9.85	5.8	4.55	4.0	4.8
18	4.2	5.4	3.85	3.3	4.2	4.7	8.0	10.2	5.7	4.45	3.95	4.75
19	4.1	5.45	3.8	3.3	4.8	4.8	9.1	8.05	5.65	4.5	3.95	4.65
20	4.1	6.0	3.8	3.3	5.0	5.1	9.5	6.35	5.8	4.35	3.95	4.6
21	4.1	6.3	3.7	3.25	4.6	4.8	9.7	6.85	6.05	4.3	3.95	4.5
22	4.05	6.4	3.7	3.2	4.7	4.8	10.35	7.7	6.4	4.2	3.95	4.4
23	4.0	6.25	3.7	3.2	4.85	4.75	9.95	9.1	6.3	4.2	3.95	4.4
24	4.0	6.1	3.6	3.2	4.95	4.8	9.1	10.65	5.6	4.2	3.95	4.3
25	4.0	6.0	3.6	3.3	5.0	4.9	9.45	10.75	5.5	4.2	4.0	4.3
26	4.0	5.8	3.5	3.3	5.2	4.9	9.8	9.85	5.95	4.15	4.0	4.3
27	4.0	5.65	3.5	3.3	5.2	5.0	10.0	12.05	5.95	4.1	4.0	4.3
28	4.0	5.5	3.45	3.4	5.25	5.0	10.05	12.8	6.0	4.1	4.0	4.3
29	4.0	....	3.35	3.55	5.25	5.1	11.75	12.45	5.7	4.0	4.05	4.2
30	4.0	....	3.3	5.85	5.	5.6	9.2	13.5	5.45	4.0	4.05	4.15
31	4.0	....	3.3	....	5.4	....	8.15	14.2	....	4.0	....	4.1

Daily discharge in second-feet of Rio Grande below mouth of Devils River, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6,170	3,440	6,020	2,510	3,480	6,030	5,650	10,180	31,030	6,200	3,240	3,400
2	5,670	3,420	5,540	2,470	3,150	6,270	5,160	9,130	29,110	5,320	3,200	3,640
3	a4,830	3,190	4,890	2,520	3,310	8,370	5,050	9,130	24,980	7,250	3,100	3,710
4	4,500	3,260	4,500	2,560	3,480	9,310	4,600	12,440	23,500	6,020	3,120	a3,630
5	4,330	3,130	4,400	2,600	a3,400	8,840	4,330	a16,210	19,960	a5,380	3,070	3,590
6	a4,170	a3,110	a3,920	2,570	3,480	a7,850	a4,660	18,450	a18,630	5,050	a3,030	3,560
7	3,910	3,110	3,920	2,570	3,950	6,730	6,620	27,440	18,270	4,940	3,030	3,520
8	3,710	3,110	4,070	2,620	4,420	6,110	9,660	25,370	17,100	4,720	3,020	3,490
9	3,510	3,200	a4,220	2,580	4,680	a5,620	11,420	30,550	14,770	a4,390	3,020	a3,610
10	3,410	a3,300	3,930	a2,700	4,990	5,380	10,250	a34,460	a13,120	4,250	3,030	3,970
11	a3,410	3,820	3,780	2,860	4,520	5,140	11,890	74,860	12,270	4,220	3,040	4,270
12	3,380	5,410	3,630	2,720	a4,000	5,140	11,420	121,660	11,070	4,190	3,050	a4,400
13	3,350	6,250	3,490	2,640	3,950	4,750	a11,190	78,010	10,040	a4,300	3,100	4,800
14	3,290	6,780	3,490	a2,600	3,850	a4,510	9,540	34,400	9,020	4,570	a3,170	4,900
15	3,290	7,310	a3,340	2,520	3,740	4,420	a10,580	a28,000	a8,170	4,280	3,170	4,580
16	a3,290	a6,790	3,220	2,480	3,630	4,830	8,580	22,950	7,430	5,390	3,180	a4,260
17	3,430	6,490	3,110	2,520	a3,520	4,840	8,580	21,300	6,940	a4,400	a3,190	4,360
18	3,580	6,390	3,110	a2,520	3,790	4,550	11,780	22,190	a6,640	4,150	3,070	4,370
19	a3,520	6,490	3,000	2,520	5,050	a4,700	a14,700	a15,720	6,490	4,200	3,000	a4,280
20	3,450	7,670	a3,000	2,520	5,430	5,480	16,230	8,600	7,120	3,850	3,050	a4,280
21	3,390	a8,310	2,820	2,490	4,490	5,000	17,030	10,320	8,170	a3,710	3,040	4,150
22	3,230	8,520	2,820	a2,460	a4,640	a5,120	20,280	13,250	a9,570	3,650	a3,030	4,020
23	a3,070	8,290	2,820	2,460	4,820	4,980	a18,720	a18,080	9,390	3,800	a3,000	4,040
24	3,070	8,000	a2,690	2,460	4,880	5,000	15,520	23,100	6,810	a3,950	3,050	3,910
25	3,060	7,900	2,690	2,550	4,830	5,080	16,490	23,410	6,630	3,950	3,150	3,940
26	3,050	7,530	2,600	a2,550	a5,120	5,020	17,470	20,640	a8,690	3,840	a3,100	3,970
27	a3,050	7,250	a2,600	2,550	5,170	a5,110	a18,200	27,400	8,690	a3,720	3,100	4,000
28	3,050	a6,970	2,570	2,640	5,340	5,110	18,450	29,700	8,930	3,690	3,100	4,020
29	3,060	....	2,520	2,640	5,390	5,210	18,450	28,610	7,500	3,450	3,250	3,890
30	3,070	....	2,500	a6,640	a5,560	a5,710	16,730	31,840	a6,310	3,420	a3,250	3,840
31	a3,070	....	a2,500	....	5,800	....	a13,680	a33,980	....	a3,380	....	3,790

a Dates of measurements,

Monthly discharge of Rio Grande below mouth of Devils River, Tex., for 1906.

Month	Discharge in second-feet.			Total in acre-feet.
	Maxi- mum.	Mini- mum.	Mean.	
January	6,170	3,050	3,625	222,883
February	8,520	3,110	5,661	314,380
March	6,020	2,500	3,476	213,759
April	6,640	2,4C0	2,706	161,038
May	5,800	3,150	4,385	269,593
June	9,310	4,420	5,676	337,726
July	28,450	4,330	12,352	759,491
August	121,660	8,600	28,432	1,748,192
September	31,030	6,310	12,547	746,598
October	7,250	3,380	4,442	273,104
November	3,250	3,020	3,112	185,157
December	4,900	3,400	4,006	246,327
The year	121,660	2,460	7,535	5,478,248

RIO GRANDE AT EAGLE PASS, TEX.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is a half mile above the highway bridge between Eagle Pass, Tex., and Ciudad Porfirio Diaz, Mexico, and about 540 miles below El Paso. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 71, where are given also references to publications that contain data for previous years.

Discharge measurements of Rio Grande at Eagle Pass, Tex., in 1906.

[By J. K. Wilson.]

Date.	Area of section.	Gage height.	Dis- charge.	Date.	Area of section.	Gage height.	Dis- charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 3	2,460	3.6	5,553	April 24	1,486	2.0	2,011
January 7	2,296	3.4	4,9C6	April 27	1,554	2.1	2,373
January 10	2,394	3.3	5,333	April 30	1,692	2.3	2,865
January 14	2,411	3.0	5,209	May 4	1,818	2.5	3,566
January 17	2,284	3.0	4,785	May 6	2,040	2.7	4,538
January 20	2,213	2.9	4,809	May 9	2,134	3.0	4,830
January 23	2,230	2.8	4,692	May 12	2,083	3.0	4,615
January 26	2,214	2.8	4,618	May 15	1,838	2.9	4,213
January 29	2,097	2.8	4,217	May 18	1,820	2.8	4,005
January 31	2,085	2.7	4,029	May 22	1,857	3.1	5,216
February 3	2,052	2.8	4,099	May 25	1,935	3.4	5,805
February 6	2,094	2.8	3,984	May 28	2,052	3.6	5,933
February 9	2,065	2.8	4,274	May 31	2,135	3.8	6,862
February 13	2,308	3.7	7,528	June 3	2,256	3.9	7,611
February 16	2,234	4.1	7,942	June 7	2,464	4.3	9,140
February 20	2,199	3.7	7,642	June 10	2,283	3.9	7,794
February 23	2,362	4.4	10,023	June 13	2,286	3.7	6,996
February 26	2,351	4.1	9,087	June 16	2,144	3.2	5,745
February 28	2,226	3.9	7,854	June 19	2,070	3.2	5,209
March 3	2,229	3.45	7,317	June 22	2,072	3.2	5,235
March 6	2,082	3.1	5,355	June 25	2,005	3.1	4,949
March 9	1,961	3.0	4,458	June 28	2,135	3.35	6,088
March 12	1,973	2.8	4,288	June 30	2,164	3.4	6,343
March 17	1,932	2.6	3,886	July 3	2,290	3.4	6,839
March 25	1,780	2.3	3,137	July 7	2,545	4.0	8,359
March 28	1,697	2.2	2,982	July 10	3,465	6.15	16,725
March 31	1,654	2.0	2,680	July 13	3,796	6.5	19,380
April 3	1,590	2.0	2,403	July 16	3,524	6.1	16,960
April 6	1,684	2.0	2,724	July 19	3,874	6.9	22,023
April 9	1,653	2.0	2,620	July 22	4,671	7.8	27,782
April 12	1,582	2.0	2,410	July 25	3,972	7.3	21,642
April 15	1,539	2.0	2,297	July 28	4,559	7.85	26,671
April 18	1,539	2.0	2,227	July 31	3,068	6.2	15,372
April 21	1,533	2.0	2,248	August 3	3,373	5.7	15,936

Discharge measurements of Rio Grande at Eagle Pass, Tex., in 1906—Continued.

Date.	Area of section.	Gage height.	Dis-charge.	Date.	Area of section.	Gage height.	Dis-charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
August 9	5,532	9.4	35,310	October 19	2,131	3.3	5,944
August 13	11,182	18.5	a160,652	October 22	2,081	3.3	5,376
August 15	7,189	10.6	a 57,445	October 25	1,951	3.2	4,856
August 17	5,384	8.4	28,179	October 28	1,986	3.2	4,571
August 20	4,185	6.8	19,109	October 31	1,939	3.1	4,337
August 23	4,020	6.25	16,150	November 3	1,946	3.0	4,366
August 26	5,447	8.2	30,007	November 9	2,092	2.9	4,691
August 28	6,810	10.2	a 53,527	November 12	2,049	2.9	4,453
August 31	7,488	11.0	a 57,830	November 15	2,074	3.0	4,357
September 3	6,620	10.2	a 52,734	November 18	2,143	2.9	4,506
September 5	5,262	8.15	27,058	November 21	2,088	3.0	4,492
September 7	4,011	7.1	18,616	November 24	2,127	3.0	4,598
September 10	4,012	6.35	17,290	November 27	2,232	3.1	4.829
September 13	3,323	5.5	13,007	November 30	2,282	3.2	4,971
September 16	3,088	4.85	12,087	December 3	2,328	3.3	5,243
September 20	2,978	4.7	10,648	December 6	2,335	3.2	5,239
September 23	3,102	5.3	15,474	December 10	2,356	3.3	5,169
September 27	2,836	4.8	11,670	December 13	2,418	3.5	6,191
September 30	3,066	4.6	10,534	December 16	2,455	3.55	6,422
October 3	2,633	4.0	10,492	December 19	2,369	3.4	5,852
October 6	2,451	3.9	8,906	December 22	2,243	3.4	5,458
October 9	2,428	3.8	8,897	December 26	2,017	3.2	5,214
October 12	2,194	3.5	6.542	December 29	2,037	3.0	5,454
October 16	2,198	3.4	6,711	December 31	1,992	2.9	5,148

a Velocity by floats.

Daily gage height, in feet, of Rio Grande at Eagle Pass, Tex., for 1906

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.7	2.85	3.8	2.0	3.8	3.85	3.8	6.25	11.35	4.15	3.1	3.2
2	3.65	2.9	3.7	2.0	2.6	3.9	3.6	5.85	10.85	4.1	3.0	3.25
3	3.65	2.85	3.45	2.0	2.35	3.9	3.4	5.7	10.0	4.0	3.0	3.3
4	3.6	2.8	3.35	2.0	2.35	5.1	3.4	5.6	9.2	3.9	3.0	3.3
5	3.6	2.8	3.2	2.0	2.6	5.85	3.2	6.1	8.15	3.9	3.0	3.3
6	3.5	2.8	3.25	2.0	2.7	4.65	3.2	6.75	8.05	3.85	3.0	3.2
7	3.4	2.8	3.4	2.0	2.7	4.3	4.1	8.6	7.15	3.8	3.0	3.1
8	3.3	2.8	3.1	2.0	3.0	4.2	5.5	8.9	7.1	3.8	3.0	3.1
9	3.3	2.8	2.95	2.0	3.0	3.95	6.55	9.55	6.65	3.8	2.9	3.1
10	3.3	2.7	2.9	2.0	3.0	3.9	6.4	10.35	6.3	3.75	2.9	3.25
11	3.2	2.7	2.8	2.0	3.0	3.8	6.25	10.8	6.0	3.6	2.9	3.45
12	3.2	3.05	2.8	2.0	3.0	3.7	6.45	14.0	5.7	3.5	2.9	3.5
13	3.15	3.6	2.7	2.0	2.95	3.7	6.45	19.7	5.45	3.5	2.9	3.5
14	3.0	3.8	2.7	2.0	2.9	3.6	6.4	15.0	5.15	3.75	2.75	3.4
15	3.0	4.1	2.7	2.0	2.9	3.3	6.2	10.7	4.95	3.5	3.0	3.6
16	3.0	4.15	2.7	2.0	2.75	3.2	6.0	9.45	4.85	3.4	2.9	3.55
17	3.0	3.95	2.6	2.0	2.7	3.25	6.2	8.25	4.7	3.45	2.9	3.45
18	3.0	3.85	2.6	2.0	2.8	3.25	5.95	8.3	4.7	3.35	2.9	3.4
19	2.95	3.8	2.5	2.0	3.15	3.2	7.0	7.4	4.65	3.3	3.0	3.4
20	2.9	3.7	2.4	2.0	3.5	3.4	7.25	6.8	4.7	3.3	3.0	3.4
21	2.9	3.7	2.35	2.0	3.7	3.4	7.65	6.45	4.75	3.3	3.0	3.4
22	2.9	4.5	2.3	2.0	3.1	3.2	7.85	6.25	4.85	3.3	3.0	3.4
23	2.8	4.4	2.3	2.0	3.2	3.2	8.0	6.45	5.35	3.2	3.0	3.3
24	2.8	4.2	2.3	2.0	3.35	3.1	7.4	7.9	4.8	3.2	3.0	3.3
25	2.8	4.2	2.3	2.0	3.4	3.1	7.15	8.2	4.45	3.2	3.0	3.25
26	2.8	4.15	2.3	2.0	3.6	3.3	7.65	8.0	4.7	3.2	3.05	3.2
27	2.8	3.95	2.2	2.05	3.55	3.3	7.7	8.1	4.8	3.2	3.1	3.1
28	2.8	3.9	2.2	2.25	3.6	3.35	7.9	10.25	4.85	3.15	3.2	3.1
29	2.8		2.15	2.35	3.6	3.4	8.65	9.7	4.7	3.1	3.2	3.0
30	2.7		2.1	2.3	3.65	3.4	8.4	10.25	4.5	3.1	3.25	3.0
31	2.7		2.0		3.7		6.35	10.7		3.1		2.9

Daily discharge, in second-feet, of Rio Grande at Eagle Pass, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5,860	4,290	7,730	2,590	6,860	7,170	7,880	16,430	63,530	9,520	4,420	4,970
2	5,710	4,350	7,610	2,500	3,780	7,480	7,360	15,680	59,030	10,110	4,290	5,110
3	a5,710	a4,200	a7,320	a2,400	3,270	a7,610	a6,840	c5,940	a50,230	a10,490	a4,370	a5,240
4	5,550	4,060	6,700	2,510	a3,270	12,340	6,840	410	40,210	9,700	4,450	5,310
5	5,550	4,020	5,980	2,620	4,050	15,340	6,340	18,30	a27,060	9,310	4,540	5,370
6	5,260	a3,980	a5,660	a2,720	a4,540	10,540	6,340	21,440	26,250	a8,710	4,630	a5,240
7	a4,970	4,070	5,720	2,690	4,440	a9,140	a8,750	31,120	a19,020	8,640	4,710	4,970
8	4,960	4,170	4,890	2,660	4,940	8,800	14,210	32,700	19,680	8,770	4,800	4,900
9	5,150	a4,270	a4,410	a2,620	a4,830	7,960	19,130	a36,660	18,040	a8,900	4,690	4,840
10	a5,330	4,070	4,370	2,550	4,760	a7,790	a18,230	43,860	a17,040	8,320	4,610	a5,070
11	5,290	4,070	4,290	2,480	4,690	7,420	17,510	49,930	15,530	7,330	4,530	5,680
12	5,290	5,280	a4,290	a2,410	a4,620	7,060	18,900	93,150	14,010	a6,540	a4,450	5,980
13	5,270	a7,180	4,090	2,370	4,440	a7,000	a19,080	a178,650	a12,800	6,670	4,350	a6,190
14	a5,210	7,630	4,090	2,330	4,270	6,750	18,780	114,920	12,160	7,680	3,950	6,030
15	5,070	7,940	4,090	a2,300	a4,210	6,000	17,570	a58,750	11,920	6,930	a4,360	6,480
16	4,930	a8,000	4,090	2,280	3,900	a5,750	a16,360	42,150	a12,090	a6,710	4,270	a6,420
17	a4,790	7,830	3,890	2,250	3,800	5,700	17,590	27,330	11,280	6,700	4,390	6,130
18	4,860	7,750	3,870	a2,230	a4,000	5,520	16,060	27,610	11,070	6,240	a4,510	5,940
19	4,840	7,710	3,650	2,230	4,970	a5,210	a22,660	22,510	10,660	a5,940	4,600	a5,850
20	a4,810	a7,670	3,430	2,240	5,930	5,720	24,260	a19,110	a10,650	5,750	4,600	5,720
21	4,810	7,670	3,310	a2,250	6,530	5,730	26,820	17,230	11,660	5,560	a4,600	5,590
22	4,810	10,360	3,190	2,170	a5,220	a5,230	a28,180	16,150	12,870	a5,380	4,600	a5,460
23	a4,690	a10,020	3,170	2,090	5,410	5,220	29,380	a17,570	a15,670	5,000	4,600	5,340
24	4,660	9,400	3,150	a2,010	5,740	4,960	22,740	27,880	13,020	4,930	a4,600	5,340
25	4,640	9,400	a3,140	2,060	a5,800	a4,950	a20,590	30,010	11,170	a4,860	4,600	5,270
26	a4,620	9,240	3,140	2,110	6,220	5,660	24,480	a28,590	11,720	4,760	4,710	a5,210
27	4,480	8,320	2,980	a2,270	5,940	5,810	25,220	29,300	a11,670	4,670	a4,830	5,230
28	4,350	7,850	a2,980	2,700	a5,930	a6,090	a27,070	a54,130	11,760	a4,450	4,970	5,440
29	a4,220		2,900	2,930	6,040	6,290	33,070	48,530	11,040	4,340	4,970	a5,450
30	4,030		2,830	a2,860	6,300	a6,340	31,070	52,460	a10,130	4,340	a5,040	5,400
31	4,030		2,680		a6,560		16,270	a55,680		a4,340		5,150

a Dates of measurements.

Monthly discharge of Rio Grande at Eagle Pass, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	5,860	4,030	4,960	304,959
February	10,360	3,980	6,600	366,545
March	7,730	2,680	4,311	265,071
April	2,930	2,010	2,414	143,663
May	6,860	3,270	5,008	307,954
June	15,340	4,950	7,086	421,646
July	33,070	6,340	18,567	1,141,646
August	178,650	15,410	40,610	2,497,011
September	63,530	10,130	19,432	1,156,304
October	10,490	4,340	6,825	419,683
November	5,040	3,950	4,568	271,815
December	6,480	4,840	5,494	337,825
The year	178,650	2,010	10,490	7,634,122

RIO GRANDE NEAR LAREDO, TEX.

This station was established in April, 1900, by the International (Water) Boundary Commission. It was intended to measure the river from the highway bridge connecting Laredo with Nuevo Laredo, Tamaulipas, and the gage was established on the right bank just above the bridge. Measurements were kept up by the Mexican section of the Commission for five months, but the results were so conflicting that the station was abandoned. In July, 1903, a cable

station was established by the Commission about 2 miles above Nuevo Laredo, crossing to the United States military reservation of Fort McIntosh, the cable landing just below the pump house. The station is about 670 miles below El Paso.

The river at the new section is nearly straight for one-half mile above and below the cable. The right bank is alluvial deposit, but is above high water. The left bank is the talus of a shale bluff going well above high water. The bed is shifting sand.

Discharge measurements are made by means of a cable, car, and guy wire. The initial point for soundings is the cable support on the right bank.

The gage is an inclined scantling fastened to posts and trees. Low water is about 1 foot on the gage. The highest flood recorded is 32.2 feet, on the night of June 30, 1905.

The observations during 1905 were made under the direction of the Mexican section of the International (Water) Boundary Commission. The conditions at the station are described in Water-Supply Paper No. 174, page 76.

Discharge measurements of Rio Grande near Laredo, Tex., in 1906.

[By Luis Varela.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 8	2,384	4.1	5,269	July 23	4,518	9.6	23,855
January 15	2,172	3.9	4,735	July 27	4,116	8.8	18,983
January 16	2,078	3.9	4,467	July 28	4,154	8.9	19,399
January 20	1,910	3.8	4,213	July 30	4,603	11.0	27,903
January 25	1,722	3.7	3,671	August 3	3,391	6.65	15,476
January 29	1,602	3.6	3,593	August 8	4,676	10.25	21,564
February 7	1,676	3.6	3,550	August 12	5,679	12.8	32,529
February 14	1,857	4.3	4,944	August 13	7,836	18.0	49,288
February 15	2,188	4.8	6,345	August 14	9,580	22.0	53,648
February 17	2,379	5.2	7,837	August 15	6,936	15.8	40,070
February 24	2,789	5.4	8,460	August 20	4,146	8.8	22,043
February 28	2,468	4.85	7,030	August 24	3,609	7.5	18,215
March 6	1,828	4.0	4,109	August 26	4,550	9.9	26,964
March 12	1,809	3.8	3,986	August 30	5,315	11.5	31,219
March 20	1,694	3.2	2,967	September 3	6,196	12.8	35,547
March 23	1,655	3.25	3,353	September 7	4,100	9.4	18,373
March 27	1,554	3.15	2,968	September 15	2,875	6.0	10,974
March 30	1,439	3.0	2,489	September 19	2,728	5.6	9,247
April 5	1,382	2.9	2,479	September 22	3,122	5.5	11,219
April 11	1,471	3.0	2,613	September 25	2,783	5.9	10,616
April 14	1,544	3.2	3,102	September 29	3,287	5.75	12,838
April 18	1,413	3.0	2,559	October 3	2,787	5.0	9,036
April 23	1,518	3.0	2,696	October 8	2,474	4.7	7,576
April 28	1,508	3.0	2,764	October 13	2,303	4.3	6,183
May 1	1,600	3.3	3,077	October 18	2,048	4.2	4,993
May 3	2,075	4.65	6,897	October 22	1,950	4.1	4,840
May 13	1,700	4.8	4,344	October 27	2,197	4.0	4,636
May 20	2,019	4.8	6,863	October 30	2,079	3.9	4,930
May 23	3,299	6.35	12,888	November 4	1,987	3.8	4,452
May 29	2,562	4.7	6,730	November 9	1,968	3.9	4,991
June 5	3,008	6.8	9,851	November 14	1,853	3.7	4,484
June 6	3,179	7.1	11,377	November 20	1,879	3.9	4,745
June 15	1,802	4.3	5,114	November 29	1,941	4.0	5,267
June 22	2,072	4.3	6,364	December 5	1,979	4.0	4,746
June 25	1,788	4.2	4,768	December 8	1,934	3.9	5,288
June 29	2,018	4.4	5,153	December 11	1,974	4.0	5,003
July 2	2,461	4.8	7,063	December 17	2,110	4.5	6,489
July 8	2,926	5.95	11,050	December 21	1,927	4.4	5,814
July 9	3,569	7.3	18,514	December 27	1,914	4.1	5,432
July 14	3,629	7.5	17,069	December 31	1,765	3.9	4,732
July 20	3,826	8.3	17,293				

Daily gage height, in feet, of Rio Grande near Laredo, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.0	3.5	4.75	3.0	3.15	4.8	4.65	9.8	12.9	5.65	3.9	4.0
2	4.9	3.5	4.6	2.9	4.4	4.85	4.8	7.1	14.0	5.35	3.9	4.0
3	4.85	3.5	4.5	2.9	5.0	4.95	4.9	6.9	12.75	5.0	3.85	3.9
4	4.7	3.5	4.4	2.9	5.0	5.15	5.0	6.2	12.25	5.0	3.85	4.0
5	4.45	3.5	4.35	2.9	4.75	6.65	5.25	6.8	10.85	5.1	3.9	4.0
6	4.4	3.5	4.3	2.9	4.7	6.95	4.8	7.2	9.3	4.95	3.9	4.0
7	4.35	3.6	4.2	2.9	4.8	6.25	4.8	8.15	9.3	4.75	3.95	3.9
8	4.25	3.6	4.05	2.9	4.8	5.35	5.75	10.3	8.6	4.7	3.9	3.9
9	4.2	3.6	4.0	3.0	4.8	4.95	7.2	9.7	8.3	4.65	3.9	3.95
10	4.15	3.75	3.9	3.0	4.8	4.85	8.05	11.25	8.0	4.6	3.8	3.95
11	4.1	3.8	3.85	3.05	4.8	4.65	8.0	12.0	8.05	4.5	3.85	4.0
12	4.1	3.9	3.8	3.1	4.8	4.55	8.15	13.0	7.55	4.4	3.8	4.1
13	4.0	4.05	3.7	3.2	4.8	4.5	8.25	15.9	7.0	4.35	3.8	4.2
14	4.0	4.3	3.7	3.3	4.9	4.4	7.4	21.0	6.65	4.35	3.7	4.25
15	3.9	4.8	3.6	3.4	5.2	4.3	6.85	17.5	6.1	4.5	3.7	4.3
16	3.9	5.4	3.55	3.2	5.15	4.25	6.45	12.15	5.9	4.6	3.6	4.5
17	3.85	5.2	3.5	3.2	5.0	4.15	7.3	11.3	5.8	4.5	3.6	4.5
18	3.8	5.0	3.4	3.1	5.0	4.1	7.25	9.5	5.65	4.25	3.75	4.35
19	3.8	4.95	3.4	3.05	5.6	4.1	7.4	9.75	5.55	4.3	3.8	4.3
20	3.7	4.9	3.2	3.0	4.75	4.3	7.95	8.65	5.55	4.2	3.9	4.3
21	3.65	4.85	3.2	3.0	4.7	4.3	8.45	8.65	5.65	4.25	3.9	4.4
22	3.6	5.35	3.2	3.0	4.8	4.3	8.85	9.9	5.55	4.2	3.85	4.3
23	3.6	5.4	3.15	3.0	5.85	4.2	9.55	8.75	5.8	4.05	3.95	4.25
24	3.7	5.45	3.1	3.0	5.25	4.2	9.2	7.75	6.55	4.1	4.0	4.25
25	3.6	5.3	3.1	3.0	4.95	4.2	8.8	9.3	5.8	4.1	4.0	4.3
26	3.55	5.2	3.1	3.0	4.8	4.3	8.2	9.8	5.8	4.05	3.95	4.25
27	3.5	5.05	3.05	3.0	4.7	4.35	8.8	9.7	5.7	4.0	3.95	4.05
28	3.5	4.95	3.0	3.0	4.7	4.55	8.9	9.75	5.8	3.95	3.9	4.0
29	3.55	....	3.0	3.0	4.7	4.4	10.25	11.25	5.8	4.0	4.0	3.95
30	3.4	....	3.0	3.15	4.7	4.55	10.95	11.25	5.7	3.9	4.0	3.95
31	3.5	....	3.0	....	4.7	....	10.35	12.05	....	3.95	....	3.9

RIO GRANDE NEAR ROMA, TEX.

This station was established in 1900 by the International (Water) Boundary Commission. It is near Roma, Tex., 775 miles by river below El Paso. The conditions at the station are described in Water-Supply Paper No. 176, page 78.

Discharge measurements of Rio Grande near Roma, Tex., in 1906.

[By H. P. Guerra.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 4	2,320	4.5	7,204	April 23	1,697	3.2	3,735
January 8	2,232	4.3	5,952	April 28	1,279	2.1	2,181
January 12	2,106	4.1	5,310	May 2	1,629	3.0	3,188
January 19	2,347	4.6	7,344	May 4	2,159	4.5	5,435
January 26	2,050	4.0	4,836	May 8	1,706	3.3	3,941
January 31	1,986	3.9	4,561	May 19	2,765	5.5	9,526
February 8	1,941	3.9	4,392	May 23	3,043	6.3	13,275
February 13	1,868	3.7	4,110	May 28	2,474	4.9	7,326
February 17	2,726	5.7	7,829	June 4	2,640	5.3	8,443
February 19	2,589	5.3	6,595	June 7	3,241	6.7	14,293
February 22	2,414	5.0	6,154	June 13	2,405	4.8	6,904
February 26	2,647	5.5	7,335	June 16	2,273	4.5	6,303
March 5	2,321	4.8	5,750	June 21	2,087	4.1	5,305
March 9	2,010	4.1	4,821	June 28	2,769	5.7	9,281
March 13	1,858	3.7	4,273	July 2	2,159	4.6	6,179
March 16	1,788	3.5	4,019	July 7	3,220	6.9	14,276
March 23	1,641	3.1	3,489	July 9	6,545	13.3	28,812
March 28	1,543	2.8	3,026	July 11	7,217	15.6	34,009
April 9	1,427	2.5	2,678	July 19	4,056	9.0	19,277
April 14	1,373	2.3	2,463	July 24	4,576	10.1	21,550
April 17	1,486	2.7	2,955	July 31	5,064	11.3	26,698
April 21	1,585	3.0	3,400	August 2	3,671	8.2	16,866

Discharge measurements of Rio Grande near Roma, Tex., in 1906—Continued.

Date.	Area of section.	Gage height.	Dis-charge.	Date.	Area of section.	Gage height.	Dis-charge
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
August 6	3,584	7.6	15,821	October 9	2,951	6.3	10,682
August 10	4,870	10.8	24,953	October 13	2,739	5.8	9,564
August 13	6,366	13.9	30,012	October 18	2,818	6.0	10,118
August 15	8,216	17.6	47,122	October 24	2,660	5.7	9,423
August 20	4,719	10.5	23,337	October 30	2,592	5.5	8,363
August 25	4,034	9.0	17,717	November 2	2,816	5.5	8,426
August 29	5,432	12.1	28,608	November 7	2,669	5.3	7,712
September 3	6,002	13.2	27,321	November 12	2,715	5.4	7,975
September 7	5,009	11.2	25,440	November 17	2,626	5.2	7,603
September 10	4,432	10.0	22,197	November 23	2,914	5.7	9,173
September 14	3,907	8.4	18,231	November 29	2,848	5.6	9,089
September 17	3,341	7.5	14,770	December 4	2,750	5.8	10,247
September 21	3,210	7.0	13,671	December 10	2,666	5.6	9,607
September 25	4,023	8.8	19,722	December 14	2,909	6.2	11,343
September 29	3,264	7.2	14,457	December 18	3,013	6.4	12,222
October 2	3,146	6.8	12,115	December 22	2,845	6.0	10,887
October 5	3,050	6.6	11,630	December 29	2,612	5.5	9.025

Daily gage height, in feet, of Rio Grande near Roma, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.9	3.9	5.15	2.5	2.35	4.9	4.45	9.4	12.65	7.05	5.6	5.8
2	4.8	3.8	5.0	2.4	2.9	5.15	4.6	8.1	13.25	6.8	5.45	5.8
3	4.65	3.8	5.0	2.4	2.95	5.3	4.55	7.95	13.1	6.6	5.5	5.8
4	4.55	3.8	4.9	2.4	4.4	5.35	5.35	7.8	12.8	6.75	5.45	5.75
5	4.5	4.2	4.8	2.3	3.5	5.6	5.5	7.7	12.8	6.65	5.4	5.8
6	4.45	4.2	4.55	2.3	3.1	5.95	5.7	7.9	11.7	6.85	5.4	5.8
7	4.35	4.0	4.45	2.4	3.05	6.4	6.7	8.55	11.1	6.6	5.35	5.8
8	4.25	3.9	4.25	2.4	3.25	5.45	9.6	9.35	10.65	6.45	5.3	5.8
9	4.2	3.9	4.15	2.5	3.2	5.05	13.65	10.9	10.05	6.35	5.3	5.7
10	4.2	3.9	4.05	2.5	3.3	5.0	14.7	10.75	9.65	6.25	5.35	5.65
11	4.1	3.9	3.95	2.55	3.6	4.95	15.3	11.5	9.0	6.1	5.5	5.65
12	4.1	3.8	3.9	2.5	3.7	4.9	12.95	12.25	8.95	6.0	5.4	5.7
13	4.35	3.7	3.75	2.4	3.7	4.75	13.0	13.45	8.6	5.9	5.35	5.8
14	4.2	3.8	3.65	2.35	3.7	4.6	10.3	15.95	8.45	5.8	5.3	6.0
15	4.1	3.8	3.6	2.95	3.75	4.65	9.45	17.9	7.85	5.85	5.2	6.0
16	4.25	5.45	3.5	2.7	3.7	4.5	8.85	15.35	7.7	6.0	5.2	6.1
17	4.35	5.75	3.6	2.65	3.6	4.25	9.0	12.4	7.45	5.95	5.3	6.5
18	4.45	5.75	3.45	2.6	3.9	4.2	8.75	11.0	7.25	5.85	5.35	6.3
19	4.5	5.4	3.35	2.5	4.9	4.5	9.05	10.5	7.05	5.7	5.35	6.0
20	4.4	5.15	3.3	2.6	6.4	4.5	9.05	10.6	7.5	5.6	5.45	6.0
21	4.4	5.1	3.25	2.85	5.6	4.2	9.15	10.1	7.0	5.7	5.4	6.0
22	4.35	5.0	3.2	2.8	4.5	4.65	9.7	9.2	7.15	5.7	5.5	6.0
23	4.15	5.55	3.05	3.15	5.7	4.75	10.0	8.65	9.05	5.7	5.6	5.95
24	4.0	5.75	3.0	2.8	5.65	4.55	10.1	8.55	8.65	5.65	5.5	5.85
25	4.0	5.5	3.0	2.55	4.45	4.3	9.65	9.25	8.6	5.6	5.5	5.7
26	3.95	5.45	2.9	2.45	4.05	4.35	9.1	10.2	8.4	5.6	5.65	5.7
27	3.9	5.65	2.9	2.25	4.3	4.5	9.05	10.5	6.95	5.6	5.6	5.65
28	3.9	5.2	2.8	2.15	4.85	5.55	9.3	10.0	7.15	5.6	5.6	5.6
29	3.9		2.7	2.25	4.8	4.45	9.45	11.55	7.25	5.6	5.7	5.55
30	3.9		2.6	2.3	4.75	4.35	9.75	12.2	7.15	5.55	5.8	5.5
31	3.9		2.5		4.8		11.05	12.0		5.65		5.45

RIO GRANDE NEAR BROWNSVILLE, TEX.

This station was established in 1900 by the International (Water) Boundary Commission. It is about 1 mile above Brownsville, Tex., and in front of Matamoros, Tamaulipas, and 960 miles by river below El Paso. The conditions at the station are described in Water-Supply Paper No. 174, page 81.

Discharge measurements of Rio Grande near Brownsville, Tex., in 1906.

[By P. Guerra.]

Date.	Area of section.	Gage height.	Dis- charge.	Date.	Area of section.	Gage height.	Dis- charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 3	3,906	7.1	9,840	July 9	4,097	8.9	18,265
January 7	3,497	6.4	8,122	July 12	5,763	13.2	28,275
January 11	3,132	5.6	6,601	July 16	5,988	13.8	30,314
January 15	2,986	5.1	6,234	July 20	5,823	13.4	31,296
January 19	2,803	4.7	5,885	July 24	6,118	14.1	34,765
January 23	2,705	4.4	5,588	July 28	6,118	14.1	34,797
January 27	2,558	4.0	5,168	August 1	6,166	14.2	35,564
January 30	2,454	3.7	4,887	August 5	5,986	13.8	24,799
February 3	2,426	3.6	4,765	August 9	5,986	13.8	26,051
February 7	2,526	4.0	5,161	August 13	6,071	14.0	26,804
February 11	2,592	4.2	5,352	August 17	6,060	14.0	25,794
February 15	2,491	3.9	5,033	August 21	6,096	14.1	26,469
February 19	2,998	5.5	7,340	August 25	6,060	14.0	25,626
February 23	3,396	6.6	8,363	August 29	6,108	14.1	26,671
February 27	3,787	7.7	10,405	September 2	6,071	14.0	25,573
March 3	3,751	7.6	9,863	September 6	6,108	14.1	28,078
March 7	3,199	6.2	7,459	September 10	6,071	14.0	25,673
March 11	2,920	5.1	6,053	September 14	5,948	13.7	24,318
March 15	2,704	4.4	5,479	September 18	5,286	12.0	19,161
March 19	2,542	3.8	4,745	September 22	5,058	11.4	18,168
March 24	2,290	3.1	4,202	September 26	5,975	13.8	24,742
March 28	2,147	2.7	3,873	September 30	5,254	11.9	18,889
April 1	2,001	2.3	3,490	October 3	4,858	10.7	17,246
April 5	1,879	1.9	3,163	October 7	4,785	10.5	16,848
April 10	1,806	1.6	2,917	October 11	4,540	8.7	11,280
April 14	1,844	1.7	3,086	October 15	4,327	8.1	10,491
April 19	1,886	2.0	3,245	October 19	4,434	8.4	11,130
April 23	1,887	2.0	3,248	October 23	4,038	7.4	9,750
April 27	2,711	4.4	5,429	October 27	3,900	7.0	9,075
May 1	2,115	2.7	4,015	October 31	3,852	6.7	8,703
May 5	1,992	2.4	3,569	November 3	3,488	6.7	7,842
May 9	2,292	3.3	4,498	November 7	3,374	6.5	7,566
May 13	2,067	2.6	3,837	November 11	3,337	6.4	7,388
May 17	2,191	3.0	4,195	November 15	3,186	6.2	7,300
May 21	3,310	6.5	11,427	November 19	3,081	5.9	6,879
May 26	3,725	7.6	14,650	November 23	3,058	5.7	6,797
May 31	2,904	5.1	6,434	November 27	3,062	5.8	6,802
June 4	2,187	5.2	6,814	November 30	3,084	5.9	6,870
June 8	3,522	7.5	12,386	December 3	3,011	5.9	6,922
June 12	2,366	5.5	7,849	December 7	2,978	5.8	6,776
June 16	2,352	5.3	7,484	December 11	2,999	5.7	6,678
June 20	2,781	4.5	5,634	December 15	3,049	5.7	6,659
June 24	2,822	4.6	5,748	December 19	3,251	6.6	8,045
June 28	2,901	4.8	6,137	December 23	3,226	6.5	7,915
July 1	2,157	5.1	6,622	December 27	3,123	6.2	7,441
July 5	3,368	6.6	11,563	December 31	2,937	5.6	6,858

Daily gage height, in feet, of Rio Grande near Brownsville, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.35	3.6	7.9	2.3	2.65	5.2	5.4	14.2	14.0	11.4	6.8	6.0
2	7.2	3.6	7.85	2.2	2.55	5.2	4.65	14.15	14.0	11.05	6.8	6.0
3	7.1	3.6	7.5	2.1	2.5	5.2	4.5	14.15	14.0	10.55	6.75	5.9
4	6.95	3.5	7.05	2.0	2.45	5.2	4.7	14.0	14.05	10.05	6.7	5.85
5	6.8	3.5	6.85	1.9	2.4	5.3	6.0	13.7	14.1	9.85	6.6	5.8
6	6.65	3.65	6.5	1.8	2.4	5.35	7.9	12.85	14.05	10.15	6.5	5.8
7	6.45	4.05	6.25	1.7	3.1	7.15	7.3	12.45	13.95	10.45	6.5	5.8
8	6.25	4.5	5.9	1.7	3.35	7.6	5.85	13.15	13.9	10.0	6.4	5.8
9	5.95	4.5	5.55	1.6	3.25	7.85	7.9	13.65	14.0	9.15	6.4	5.8
10	5.75	4.35	5.35	1.6	2.85	5.85	12.5	14.0	14.0	8.95	6.4	5.7
11	5.65	4.2	5.15	1.6	2.65	5.65	13.1	14.0	14.0	8.75	6.4	5.7
12	5.5	4.1	4.95	1.65	2.6	5.5	13.25	14.0	14.1	8.55	6.4	5.6
13	5.4	4.0	4.75	1.7	2.6	5.5	13.4	14.0	13.95	8.35	6.35	5.6
14	5.25	4.0	4.55	1.7	2.75	5.5	13.55	14.0	13.75	8.25	6.3	5.6
15	5.1	3.9	4.35	1.7	3.2	5.4	13.7	14.0	13.55	8.05	6.2	5.7
16	5.0	3.8	4.2	1.7	3.0	5.25	13.75	14.0	13.25	7.85	6.15	6.1
17	4.9	3.8	4.05	1.9	3.05	5.05	13.8	14.0	12.55	7.8	6.05	6.3
18	4.8	4.15	3.9	2.55	3.15	4.95	13.75	14.05	11.9	8.05	5.95	6.4
19	4.7	5.3	3.8	2.2	3.2	4.65	13.65	14.1	11.5	8.4	5.9	6.6
20	4.6	6.15	3.7	2.0	3.3	4.45	13.45	14.1	11.15	8.05	5.8	6.7

Daily gage height, in feet, of Rio Grande near Brownsville, Tex., for 1906—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21	4.55	6.45	3.55	2.05	5.65	4.25	13.3	14.05	11.1	7.9	5.8	6.7
22	4.5	6.5	3.4	2.0	8.6	4.2	13.5	14.0	11.4	7.7	5.7	6.55
23	4.4	6.6	3.25	2.0	6.9	4.35	13.75	14.0	11.4	7.4	5.7	6.45
24	4.25	6.6	3.1	2.1	5.3	4.5	14.05	14.0	11.9	7.3	5.7	6.4
25	4.1	6.9	2.95	4.1	7.5	4.75	14.1	14.0	13.6	7.15	5.7	6.3
26	4.05	7.45	2.85	4.75	7.3	4.9	14.1	14.0	13.85	7.0	5.7	6.2
27	4.0	7.7	2.75	4.4	5.6	4.65	14.1	14.0	13.8	6.95	5.75	6.15
28	3.9	7.6	2.65	3.85	4.75	4.75	14.1	14.1	13.55	6.9	5.8	5.95
29	3.8		2.5	3.4	4.5	6.05	14.1	14.05	12.55	6.8	5.9	5.75
30	3.7		2.45	3.0	4.8	6.75	14.15	14.0	11.8	6.7	5.9	5.6
31	3.6		2.4		5.15		14.2	14.0		6.7		5.6

SALADO RIVER DRAINAGE BASIN.

RIO SALADO NEAR GUERRERO, TAMAULIPAS, MEXICO.

This station was established in 1900 by the International (Water) Boundary Commission. The Salado is a torrential stream entering the Rio Grande from the Mexican side about 60 miles below Laredo, or 730 miles by river below El Paso. The town of Guerrero is located on the Salado some 4 miles above its mouth, and the gaging station is 2 miles above the town. The conditions at the station are described in Water-Supply Paper No. 174, page 84.

Discharge measurements of Rio Salado near Guerrero, Tamaulipas, Mexico, in 1906.

[By D. de Lassaulx.]

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 1	1,128	2.5	358	June 1	826	1.0	114
January 5	1,115	2.4	334	June 5	73	0.6	a 45
January 9	1,099	2.3	308	June 9	72	0.3	a 33
January 14	1,075	2.2	295	June 13	72	0.0	a 20
January 18	1,074	2.2	296	June 18	62	−0.1	a 15
January 22	1,053	2.1	244	June 23	74	0.1	a 27
January 27	1,031	1.9	203	June 28	54	−0.4	a 12
February 1	1,030	1.9	210	July 3	55	−0.4	a 13
February 5	1,248	3.0	528	July 7	1,374	3.8	1,042
February 9	1,109	2.3	313	July 8	3,141	12.0	14,792
February 13	1,095	2.3	299	July 19	2,350	6.2	3,037
February 17	1,059	2.2	268	July 21	2,389	6.4	3,336
February 21	1,062	2.2	271	July 25	2,437	6.5	3,725
February 25	1,060	2.2	287	July 29	2,302	5.9	2,700
March 1	1,051	2.1	245	August 2	2,371	6.2	3,114
March 6	1,006	1.9	209	August 6	2,357	6.1	2,913
March 11	982	1.8	181	August 10	2,246	5.7	2,570
March 16	969	1.7	165	August 14	2,338	6.0	2,875
March 20	956	1.6	146	August 18	2,259	5.5	2,334
March 24	938	1.5	143	August 22	2,291	5.6	2,706
March 28	923	1.4	138	August 26	2,290	5.7	2,779
April 2	887	1.3	125	August 29	2,616	7.2	4,856
April 6	865	1.2	123	September 2	2,393	6.2	3,134
April 10	868	1.2	120	September 6	2,555	6.6	3,990
April 14	849	1.1	110	September 10	2,549	6.6	3,981
April 18	851	1.1	110	September 14	2,469	6.6	3,913
April 22	1,101	2.3	331	September 18	2,335	6.1	2,922
April 26	990	1.7	181	September 22	2,333	6.1	2,958
May 1	871	1.2	127	September 23	2,597	7.3	5,060
May 6	850	1.1	114	September 26	2,364	6.2	3,192
May 10	906	1.4	136	September 29	2,300	5.9	2,772
May 14	836	1.0	113	October 3	2,259	5.6	2,566
May 19	889	1.3	131	October 7	2,194	5.5	2,415
May 21	1,268	3.3	685	October 11	2,165	5.2	2,008
May 24	1,256	3.3	676	October 15	2,149	5.1	1,956
May 28	860	1.2	125	October 19	2,102	5.0	1,928

a Taken at rocks.

Discharge measurements of Rio Salado near Guerrero, Taumalipas, Mexico, in 1906—
Continued.

Date.	Area of section.	Gage height.	Dis-charge.	Date.	Area of section.	Gage height.	Dis-charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
October 23	2,123	5.0	1,951	November 29	1,984	4.3	1,216
October 26	2,102	4.9	1,867	December 3	1,971	4.3	1,226
October 29	2,084	4.8	1,784	December 7	1,950	4.2	1,014
November 2	2,089	4.8	1,793	December 11	1,942	4.1	1,026
November 6	2,054	4.7	1,686	December 15	1,954	4.1	1,008
November 10	2,052	4.6	1,670	December 19	1,956	4.1	1,005
November 14	2,025	4.5	1,479	December 23	1,946	4.1	991
November 18	1,989	4.4	1,287	December 26	1,921	4.0	903
November 22	2,002	4.4	1,320	December 29	1,896	3.9	832
November 26	1,976	4.3	1,204				

Daily gage height, in feet, of Rio Salado, near Guerrero, Tamaulipas, Mexico, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.5	1.9	2.05	1.4	1.2	1.0	−0.4	6.2	6.1	5.6	4.8	4.3
2	2.5	1.95	2.0	1.3	1.2	0.9	−0.4	6.15	6.15	5.6	4.75	4.3
3	2.5	2.25	2.0	1.3	1.15	0.75	−0.45	6.15	6.05	5.6	4.7	4.3
4	2.45	2.6	2.0	1.3	1.1	0.65	0.6	6.25	7.0	5.6	4.7	4.3
5	2.4	2.9	2.0	1.3	1.1	0.55	1.15	6.25	6.45	5.5	4.7	4.2
6	2.4	2.55	1.9	1.3	1.1	0.45	3.0	6.1	6.55	5.5	4.7	4.2
7	2.4	2.45	1.85	1.2	1.0	0.4	6 3	6.0	6.2	5.45	4.6	4.2
8	2.3	2.35	1.8	1.2	1.0	0.3	12 95	5.85	6.7	5.4	4.6	4.2
9	2 3	2.3	1.8	1.25	1.25	0.25	15.65	5.75	6.9	5.4	4.6	4.2
10	2.3	2.3	1.8	1.2	1.35	0.2	16.75	5.65	6.55	5.3	4.6	4.2
11	2.3	2.3	1.8	1.2	1.2	0.1	14.95	5.6	6.5	5.2	4.6	4.1
12	2 3	2.3	1.75	1.2	1.15	0.1	13.65	5.75	6.35	5.2	4.5	4.1
13	2.3	2.3	1.7	1.1	1.1	0.0	13.1	6.1	6.75	5.2	4.5	4.1
14	2.2	2.3	1.7	1.1	1.0	0 0	7.65	5.8	6.5	5.2	4.5	4.1
15	2.2	2.3	1.7	1.0	1.0	−0.05	6.7	5.65	6.45	5.1	4.5	4.1
16	2.2	2.3	1.7	1.0	0.9	−0.1	6.6	5.6	6.4	5.1	4.45	4.1
17	2.2	2.2	1.6	1.0	0.9	−0.15	6.45	5.5	6.25	5.2	4.4	4.1
18	2 2	2.2	1.6	1.1	1.0	−0 2	6.2	5.5	6.1	5.1	4.4	4.1
19	2.2	2.2	1.6	1.2	1.3	−0.05	6.3	6.0	6.65	5.0	4.4	4.1
20	2.1	2.2	1.6	1.2	2.7	0.2	6.35	6.15	6.25	5.0	4.4	4.1
21	2.1	2.2	1.6	1.4	3.2	0.25	6.55	6.3	6.1	5.0	4.4	4.1
22	2 05	2.2	1.5	2 9	3.1	0.15	7.3	5.6	6.25	5 0	4.4	4.1
23	2 0	2.2	1.5	2.75	4 0	0 05	6.95	5 85	7.05	5.0	4.3	4.0
24	1.95	2.2	1.5	2.2	3.6	−0.1	6.7	5.9	6.7	4.9	4.3	4.0
25	1.9	2.2	1.5	1.85	2.3	−0.2	6.45	5.75	6.6	4.9	4.3	4.0
26	1.9	2.1	1.5	1.6	1.7	−0.3	6.25	5.7	6.15	4.9	4.3	4.0
27	1 9	2.4	1.5	1.45	1.35	−0.4	6.1	5.6	6 0	4.9	4.3	4.0
28	1 9	2.15	1.4	1.35	1.15	−0.35	6 0	5.95	5.9	4.8	4.3	4.0
29	1 9		1.4	1.25	0 95	−0.3	5.85	6.9	5 85	4 8	4.3	3.9
30	1.9		1.4	1.2	0 8	−0.4	5 7	6.95	5.75	4 8	4.3	3.9
31	1.9		1.4		0.7		5.95	6.3		4.8		3.9

SAN JUAN RIVER DRAINAGE BASIN.

RIO SAN JUAN NEAR SANTA ROSALIA RANCH, TAMAULIPAS, MEXICO.

This station was established in 1900 by the International (Water) Boundary Commission. The San Juan is a long torrential stream entering the Rio Grande 15 miles below Roma and 790 miles by river below El Paso. Six miles above its mouth is the town of Camargo. The station was first placed 12 miles above Camargo, but in time of heavy flood in the Rio Grande backwater reached the station, and on July 14, 1902, it was moved 6 miles farther

upstream to its present location. It is now above backwater. The conditions at the station are described in Water-Supply Paper No. 174, page 87.

Discharge measurements of Rio San Juan near Santa Rosalia Ranch, Tamaulipas, Mexico, in 1906.

[By S. Jaso.]

Date.	Area of section.	Gage height.	Dis-charge.	Date.	Area of section.	Gage height.	Dis-charge.
	Sq. ft.	*Feet.*	*Sec.-ft.*		*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 4	577	3.5	487	August 11	346	2.7	310
January 9	494	3.2	374	August 14	257	2.1	146
January 14	471	3.1	317	August 17	203	1.7	81
January 19	430	2.9	259	August 19	648	4.45	1,347
January 23	391	2.7	211	August 20	3,600	20.0	16,080
January 27	375	2.6	187	August 23	1,055	6.7	2,430
January 31	369	2.5	171	August 26	652	4.45	947
February 4	979	5.8	1,711	August 28	1,962	11.65	5,642
February 8	577	3.6	510	August 29	844	5.55	1,623
February 12	548	3.5	477	September 1	509	3.65	500
February 16	498	3.2	401	September 4	853	5.55	1,644
February 20	480	3.1	347	September 6	1,586	9.65	4,560
February 25	488	3.2	366	September 7	2,236	13.6	7,223
February 27	760	4.75	994	September 10	693	4.75	1,286
March 3	626	4.0	660	September 13	476	3.55	554
March 8	541	3.4	426	September 16	356	2.8	290
March 13	494	3.2	359	September 19	351	2.8	293
March 20	415	2.6	250	September 21	488	3.75	592
March 24	416	2.6	233	September 22	401	3.3	446
March 28	399	2.5	196	September 23	1,011	7.4	2,339
March 31	358	2.3	149	September 24	3,132	21.0	9,804
April 5	339	2.1	107	September 25	3,476	22.6	12,166
April 10	319	2.0	125	September 28	936	6.85	2,284
April 14	275	1.7	72	October 1	732	4.9	1,219
April 19	271	1.7	79	October 4	789	4.95	1,330
April 22	2,457	12.5	5,968	October 5	1,063	6.6	2,272
April 23	1,345	7.25	2,826	October 7	679	4.5	966
April 27	720	4.4	877	October 10	549	3.85	610
May 3	514	3.25	412	October 13	486	3.6	499
May 8	418	2.65	245	October 16	492	3.55	492
May 14	394	2.4	203	October 17	693	4.6	1,012
May 19	749	4.5	887	October 19	608	4.1	726
May 24	465	3.0	311	October 22	476	3.4	424
May 28	365	2.25	147	October 25	436	3.15	373
May 31	308	1.9	111	October 28	429	3.0	339
June 4	256	1.5	78	October 30	697	4.65	976
June 8	236	1.3	59	October 31	581	3.95	648
June 12	226	1.2	28	November 6	477	3.4	450
June 16	212	1.1	18	November 9	591	4.0	675
June 20	591	3.7	529	November 15	485	3.6	354
June 25	928	5.45	1,834	November 18	468	3.3	288
June 27	745	4.55	1,079	November 21	393	3.0	203
July 2	278	1.7	53	November 24	401	3.0	217
July 5	2,320	12.6	6,499	December 3	441	3.1	236
July 9	375	2.65	220	December 6	429	3.0	298
July 10	1,110	6.8	2,434	December 9	415	3.0	337
July 14	403	2.75	284	December 12	410	2.9	293
July 19	299	2.15	136	December 13	750	4.75	1,004
July 23	464	3.35	464	December 15	546	3.8	533
July 27	395	2.85	311	December 19	483	3.4	411
July 30	299	2.2	153	December 22	479	3.35	401
July 31	698	4.6	1,119	December 25	459	3.2	366
August 2	1,148	6.9	2,266	December 28	432	3.1	319
August 5	442	3.2	394	December 31	410	2.9	267
August 8	847	5.4	1,865				

Daily gage height, in feet, of Rio San Juan near Santa Rosalia Ranch, Tamaulipas, Mexico, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.5	2.5	4.8	2.2	3.55	1.75	1.85	2.9	3.65	5.0	3.65	3.05
2	3.45	2.6	4.3	2.2	3.35	1.7	1.65	4.75	3.4	4.7	3.5	3.1
3	3.4	2.8	3.95	2.2	3.25	1.6	1.45	5.6	5.0	4.55	3.45	3.1
4	3.45	5.8	3.75	2.1	3.2	1.5	9.65	3.95	5.7	4.75	3.4	3.1
5	3.3	4.6	3.6	2.1	3.05	1.45	9.4	3.25	3.6	6.05	3.4	3.0
6	3.2	3.8	3.5	2.1	2.9	1.4	5.2	2.95	12.6	5.15	3.45	3.0
7	3.2	3.65	3.5	2.1	2.8	1.4	3.75	2.5	13.0	4.45	3.85	3.0
8	3.2	3.6	3.4	2.1	2.65	1.3	3.4	3.6	6.5	4.15	4.0	3.0
9	3.2	3.55	3.4	2.05	2.6	1.3	2.55	4.1	4.9	3.95	3.95	3.0
10	3.15	3.5	3.3	2.0	2.55	1.3	4.5	2.85	4.65	3.85	3.85	3.0
11	3.1	3.5	3.3	1.9	2.5	1.25	5.2	3.1	4.0	3.7	3.7	3.0
12	3.1	3.5	3.2	1.85	2.4	1.2	4.1	2.9	3.55	3.6	3.6	2.95
13	3.1	3.5	3.2	1.8	2.4	1.2	3.25	2.3	3.4	3.6	3.6	4.9
14	3.1	3.4	3.1	1.7	2.4	1.15	2.7	2.1	3.2	3.5	3.6	4.15
15	3.1	3.25	3.0	1.7	2.4	1.1	2.4	1.9	2.95	3.45	3.6	3.8
16	3.0	3.2	2.9	1.6	2.4	1.1	2.3	1.8	2.75	3.5	3.5	3.65
17	2.9	3.1	2.8	1.7	2.3	1.0	2.45	1.7	2.6	4.35	3.4	3.5
18	2.9	3.1	2.7	1.7	3.85	1.0	2.5	2.0	2.45	4.6	3.3	3.4
19	2.9	3.1	2.7	1.7	4.7	1.0	2.1	3.8	2.8	4.05	3.2	3.4
20	2.8	3.1	2.65	1.7	4.3	3.4	1.85	19.8	3.1	3.7	3.1	3.4
21	2.8	3.7	2.7	2.3	3.05	2.7	2.8	17.75	3.6	3.6	3.0	3.4
22	2.7	3.55	2.7	9.2	2.5	2.3	3.65	9.85	4.4	3.35	3.0	3.35
23	2.7	3.35	2.6	8.4	2.85	1.9	3.3	6.35	7.3	3.3	3.0	3.3
24	2.6	3.3	2.6	6.1	3.15	1.6	2.9	5.25	20.0	3.2	3.0	3.3
25	2.6	3.2	2.6	5.2	2.9	3.95	2.6	4.8	21.8	3.15	3.0	3.2
26	2.6	3.2	2.5	4.7	2.7	2.9	2.45	4.45	11.85	3.1	3.0	3.2
27	2.6	4.4	2.5	4.35	2.45	4.4	2.85	4.5	8.85	3.1	2.9	3.15
28	2.6	5.25	2.5	4.15	2.25	3.25	2.65	9.2	6.95	3.0	3.1	3.1
29	2.6		2.4	3.95	2.05	2.45	2.35	5.65	6.15	2.95	3.1	3.05
30	2.6		2.35	3.75	1.95	1.95	2.15	4.55	5.55	4.5	3.1	3.0
31	2.5		2.3		1.85		4.2	3.85		3.9		2.9

PECOS RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Pecos River rises in the northeastern part of New Mexico and flows in a general southerly direction through the southeastern part of that Territory, crossing the western prolongation of Texas, and finally entering the Rio Grande at a point about one-third way up from the mouth of that stream. It is supplied to a considerable extent by water from large springs in the limestone rocks of the region. These maintain the perennial flow of the river, the run-off from the catchment basin being irregular in character and diminishing at times to a relatively small amount.

Large irrigation works which have been constructed in the vicinity of Roswell utilize the greater part of the summer flow of the river, so that during the dry season of the year little water crosses the Texas line. Between Carlsbad and the Texas State line there are several reenforcing springs. The water that flows in the stream is largely derived from the seepage of irrigated lands above and is often heavily charged with alkaline salts. Irrigation canals have been constructed along the valley in Texas, principally near the town of Pecos, at the crossing of the Texas and Pacific Railroad. The most important of these is the Margueretta canal system. The valley is fertile, and where properly irrigated large crops are produced.

PECOS RIVER AT SANTA ROSA, N. MEX.

This station was established May 5, 1903. It was originally located at the bridge of the Chicago, Rock Island and Pacific Railway, but was moved later in the year to a point 335 feet above the railway bridge. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 93, where are given also references to publications that contain data for previous years.

Discharge measurements of Pecos River at Santa Rosa, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 8	E. Patterson	32	12	0.55	12
April 12	....do	78	77	1.70	288
April 12	....do	87	87	1.85	349
April 13	....do	87	93	1.82	333
April 30	J. M. Giles	88	106	2.00	498
April 30	....do	88	111	2.00	490
May 30	E. Patterson	90	101	2.00	423
May 30	....do	90	102	1.95	392
June 29	....do	20	10	.95	18
July 22	J. M. Giles	77	78	1.45	240
July 22	....do	77	62	1.35	183
July 23	....do	63	50	1.30	125
July 23	....do	94	156	2.35	832
July 23	....do	94	136	2.15	676
July 24	....do	76	85	1.70	348
August 13	....do	62	50	1.30	88
October 27 a	William A. Lamb	18	14	1.02	23

a Measured by wading.

Daily gage height, in feet, of Pecos River at Santa Rosa, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.6	0.6	0.6	1.6	1.9	2.0	0.8	1.7	0.9	1.3	1.1	1.5
2	.6	.6	.5	1.6	1.9	2.0	.8	1.4	.95	1.1	1.2	1.4
3	.6	.6	.5	1.6	1.9	2.0	2.5	2.3	.95	1.0	1.2	1.5
4	.6	.6	.6	1.6	2.0	2.0	1.5	1.4	.95	1.0	1.2	1.4
5	.6	.6	.5	1.7	2.0	2.0	1.3	1.6	.85	1.0	1.2	1.4
6	.6	.6	.5	1.7	2.0	2.0	.8	1.7	1.3	1.4	1.3	2.5
7	.6	.6	.5	1.7	2.0	1.9	1.5	1.9	1.1	1.5	1.3	2.1
8	.6	.5	.5	1.7	2.0	1.9	1.5	1.6	.95	1.4	1.2	1.9
9	.6	.5	.5	1.7	2.0	2.0	1.5	3.6	.85	1.3	1.2	1.7
10	.6	.5	.5	1.6	2.3	2.0	2.0	1.6	.85	1.2	1.2	1.6
11	.6	.6	.5	1.7	2.5	2.0	3.0	1.7	.85	1.2	1.2	1.7
12	.6	.6	.5	1.8	2.5	2.0	2.0	1.4	.85	1.2	1.2	1.5
13	.6	.6	.5	1.9	2.5	4.5	2.0	1.4	.85	1.1	1.2	1.5
14	.6	.6	.5	1.8	2.3	2.0	1.3	1.3	.85	1.1	1.1	1.4
15	.6	.6	.5	1.8	2.2	2.0	1.3	1.2	.9	1.1	1.1	1.4
16	.6	.6	.5	1.7	2.2	2.0	1.3	1.0	.85	1.0	1.1	1.4
17	.6	.6	.5	1.8	2.3	2.0	2.0	0.95	.85	1.1	1.1	1.3
18	.6	.6	.5	1.8	2.2	2.0	3.0	.9	.9	1.1	1.1	.9
19	.6	.6	.5	1.8	2.2	1.8	2.0	.9	.9	1.1	.85	.85
20	.6	.6	.5	1.9	2.2	1.8	2.0	.85	.85	1.0	.85	.85
21	.6	.6	.5	2.1	2.2	1.6	1.7	.85	.85	.9	1.2	.85
22	.6	.6	.5	2.0	2.2	1.6	1.4	.85	.85	.85	1.2	.85
23	.6	.6	.5	2.0	2.2	1.2	2.5	.9	.85	.85	1.2	1.0
24	.6	.6	.5	2.0	2.0	1.2	1.5	.9	.85	.85	1.2	.9
25	.6	.5	.5	2.2	2.0	1.0	1.5	.9	.85	1.1	1.2	.9
26	.6	.5	.5	2.2	2.0	1.2	1.2	.95	.95	1.1	1.1	.9
27	.6	.6	.5	2.0	2.0	1.0	1.1	.95	1.1	.9	1.2	.85
28	.6	.6	.5	2.0	2.0	.8	1.3	.95	1.0	.85	1.3	.85
29	.6		.5	2.0	2.0	.6	1.2	.95	1.3	1.0	1.2	.85
30	.6		1.1	2.0	2.0	.6	1.2	.95	1.2	1.1	1.3	.85
31	.6		1.1		2.0		2.0	.9		1.1		.85

Daily discharge in second-feet of Pecos River at Santa Rosa, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	14	14	14	250	425	423	12	320	15	88	36	160
2	14	14	10	250	425	423	12	160	18	36	58	120
3	14	14	10	250	425	423	950	740	18	22	58	160
4	14	14	14	250	480	460	245	165	18	22	58	120
5	14	14	10	288	480	460	145	260	13	22	58	120
6	14	14	10	288	480	460	12	300	88	120	88	810
7	14	14	10	288	480	395	245	425	36	160	88	520
8	14	10	10	288	480	395	245	240	18	120	58	380
9	14	10	10	288	480	460	245	1,750	13	88	58	260
10	14	10	10	250	700	460	570	240	13	58	58	205
11	14	14	10	288	830	490	1,370	280	13	58	58	260
12	14	14	10	325	830	490	570	128	13	58	58	160
13	14	14	10	370	830	2,470	570	128	13	36	58	160
14	14	14	10	325	680	490	145	88	13	36	36	120
15	14	14	10	325	603	490	145	58	15	36	36	120
16	14	14	10	275	603	490	145	22	13	22	36	120
17	14	14	10	335	680	490	570	18	13	36	36	88
18	14	14	10	335	603	530	1,370	15	15	36	36	15
19	14	14	10	335	585	390	570	15	15	36	13	13
20	14	14	10	410	585	390	570	13	13	22	13	13
21	14	14	10	550	585	270	365	13	13	15	58	13
22	14	14	10	475	585	270	195	13	13	13	58	13
23	14	14	10	475	585	80	950	15	13	13	58	22
24	14	14	10	485	440	80	245	15	13	13	58	15
25	14	10	10	620	440	32	245	15	13	36	58	15
26	14	10	10	620	440	100	100	18	18	36	36	15
27	14	14	10	485	423	32	50	18	36	15	58	13
28	14	14	10	495	423	12	125	18	22	13	88	13
29	14		10	495	423	6	85	18	88	22	58	13
30	14		85	495	423	.6	85	18	58	36	88	13
31	14		85		423		535	15		36		13

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

Monthly discharge of Pecos River at Santa Rosa, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	14	14	14	861
February	14	10	13.3	739
March	85	10	15.1	928
April	620	250	374	22,300
May	830	423	544	33,400
June	2,470	6	399	23,700
July	1,370	12	377	23,200
August	1,750	13	179	11,000
September	88	13	22.4	1,330
October	160	13	43.9	2,700
November	88	13	53.9	3,210
December	810	13	132	8,120
The year	2,470	6	181	131,000

NOTE.—Values are rated as follows: January to March and August to December, approximate; April to July, fair.

PECOS RIVER NEAR FORT SUMNER, N. MEX.

This station was established June 12, 1904, by Earl Patterson. It is located about 12 miles northwest of Fort Sumner, N. Mex., and 45 miles south of Santa Rosa, N. Mex., the nearest railway station. It was originally located 1 mile upstream from the spring, trees, and houses known as Arinosa, but was relocated July 5, 1905, near the

spring. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 95, where are given also references to publications that contain data for previous years.

Discharge measurements of Pecos River near Fort Sumner, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Dis- charge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 11	E. Patterson	108	70	1.68	84
March 27	....do	120	73	1.60	81
April 10	....do	169	132	1.94	309
May 9	....do	188	208	2.25	628
May 17	....do	185	171	2.13	596
May 31	....do	190	181	2.05	462
June 8	....do	184	152	2.04	374
June 19	....do	122	121	2.00	299
June 29	....do	133	59	1.65	85
July 6	....do	131	86	1.81	209
July 7	J. M. Giles	134	89	1.74	182
July 9	....do	200	398	2.55	2,140
July 9	....do	200	460	2.65	2,650
July 9	....do	200	407	2.40	1,970
July 10	....do	190	396	2.30	1,480
July 25	....do	105	128	2.10	320
August 11	....do	122	123	1.95	335
August 12	....do	134	121	2.05	400
September 11	Wm. A. Lamb	116	63	1.89	88
October 29	....do	120	66	1.90	106

Daily gage height, in feet, of Pecos River near Fort Sumner, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.40	1.70	1.65	1.80	1.95	2.05	1.70	2.10	1.92	2.00	1.92	2.10
2	2.45	1.75	1.65	1.85	2.05	2.20	1.62	2.02	1.95	2 02	1.95	2.02
3	2.50	1.75	1.60	1.80	1.95	2.05	2.25	2.12	1.95	2.05	1.95	2.00
4	2 30	1.70	1.60	1.95	1.95	2.25	2.58	2.22	2.02	1.98	1.95	2.02
5	2.20	1.75	1.65	1.95	2.05	2.10	1.92	2.28	2.00	2.18	1.92	2.05
6	2.30	1.75	1.65	1.95	2.00	2.00	1.88	2.38	2.00	2.02	1.92	2.50
7	2 35	1.75	1.65	1.95	2.05	2.10	1.72	2.05	1.92	2.10	1.90	2.32
8	2.20	1.80	1.70	1.90	2.20	2.00	2.85	2.00	2 00	2 00	1.95	2.02
9	2.05	1.80	1.70	1.90	2.00	2.00	2.62	2.48	1.95	2 02	1.90	2.05
10	2.20	1.75	1.70	1.90	2.15	2.10	2.22	2.02	2.00	2.02	1.92	2.12
11	1.85	1.75	1.70	1.95	2.20	2.10	1.92	1.98	1.92	2 00	1.92	2.02
12	1.80	1.75	1.65	2 00	2.25	2.10	2.28	1.92	1.90	2 00	1.90	2 02
13	1.70	1.80	1.65	2.05	2.30	2.35	2.18	1.90	1 98	1.98	1.85	1 98
14	1.70	1.70	1.65	2.10	2.30	2.40	1.78	1.92	2 00	1.88	1.82	2 00
15	1.70	1.70	1.70	2.10	2.25	2.05	1.92	1.90	2.00	1.70	1.85	2.05
16	1.70	1.70	1.65	1.95	2.30	2.00	1.92	1.90	1.95	1.82	1.88	2.10
17	1.70	1.70	1.60	1.95	2.15	2 00	1.68	1.90	1.92	1.80	1.80	2.15
18	1.65	1.70	1.70	2 05	2.20	2.05	1.90	1.82	1.98	1.82	1.80	2.10
19	1.60	1.75	1.70	2.00	2.15	2.00	2 02	1.80	1.95	1.80	1.88	2.15
20	1.70	1.70	1.70	1.95	2.25	2.05	2.02	1.80	2.00	1.82	.88	2.08
21	1.70	1.65	1.75	2.00	2.30	2.00	1.92	1.80	2.00	1.88	1.88	2.02
22	1.65	1.65	1.70	1.95	2 25	1.95	1.92	1.85	2.00	1.80	1.88	1.98
23	1.75	1.65	1.70	2 05	2 25	1.90	2 02	1.92	2.65	1.80	1.85	1.95
24	1.75	1.70	1.65	2.10	2 25	1.90	2 22	1.95	1.95	1.80	1.80	2 00
25	1.75	1.70	1.65	2.05	2.20	1.85	2.10	2.02	1.90	1.80	1.82	1.95
26	1.70	1.65	1.60	2.20	2.10	1.80	1.98	1.98	1.90	1.85	1.88	1.92
27	1.70	1.65	1.60	2.10	2 00	1.80	2 00	1.90	2 00	1.92	1.95	1.90
28	1.75	1.65	2 05	2.10	1.75	1 98	1.95	1 92	1.90	1.95	1.90	
29	1 75		1.70	2 00	2 00	1.70	2 00	1.95	1 95	1.90	1 95	1.95
30	1.80		1.75	2 00	2 00	1.70	1.95	1.90	1.90	1.92	2 00	1.92
31	1.75		1.80		2.05		1.90	1.92		1.90		1.95

Daily discharge, in second-feet, of Pecos River near Fort Sumner, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,600	130	68	220	240	460	115	425	150	170	120	280
2	1,820	165	68	245	350	720	70	320	175	190	140	200
3	2,050	165	40	198	240	440	940	450	175	220	140	180
4	1,290	130	40	360	240	800	2,100	630	240	155	140	200
5	980	165	68	360	350	500	325	760	220	360	120	225
6	1,290	165	68	340	290	340	280	1,130	220	190	120	1,000
7	1,460	165	68	340	320	480	182	410	150	270	106	590
8	980	210	95	280	540	330	3,600	345	170	170	140	200
9	610	210	95	265	265	330	2,470	1,470	130	190	106	225
10	980	165	95	265	460	455	1,200	430	170	190	120	300
11	320	165	95	345	590	455	480	370	110	170	120	200
12	270	165	68	385	680	455	1,410	250	100	180	106	200
13	170	210	68	460	860	970	890	230	155	165	75	165
14	170	130	73	540	860	1,100	230	250	170	95	60	180
15	170	130	110	495	800	370	390	230	170	50	75	225
16	170	130	73	298	920	305	390	200	130	60	95	280
17	170	130	50	298	640	305	100	200	110	60	60	340
18	130	130	120	420	740	365	290	135	155	60	60	280
19	100	165	120	350	640	300	440	120	130	60	95	340
20	170	130	120	298	860	360	440	120	170	60	95	260
21	170	95	158	350	1,000	330	225	120	170	95	95	200
22	130	95	132	298	860	270	225	160	170	60	95	165
23	215	95	132	380	860	220	335	220	1,440	60	75	140
24	215	130	98	460	860	240	490	210	130	60	60	180
25	215	130	98	380	740	195	320	280	100	60	60	140
26	170	95	81	630	540	170	195	240	100	80	95	120
27	170	68	81	460	390	170	215	165	170	120	140	106
28	215	68	150	380	540	135	235	210	110	106	140	106
29	215	......	150	320	390	115	250	210	130	106	140	140
30	210	......	172	290	390	115	205	165	100	120	180	120
31	165	......	220	......	460	......	160	150	......	106	......	140

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

Monthly discharge of Pecos River near Fort Sumner, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	2,050	100	548	33,700
February	210	68	140	7,780
March	220	40	99.2	6,100
April	630	198	357	21,200
May	1,000	240	578	35,500
June	1,100	115	393	23,400
July	3,600	70	619	38,100
August	1,470	120	342	21,000
September	1,440	100	194	11,500
October	360	50	130	7,990
November	180	60	106	6,310
December	1,000	106	240	14,800
The year	3,600	40	312	227,000

NOTE.—Values are rated as follows: January to April and August to December, approximate; May to July, fair.

PECOS RIVER NEAR ROSWELL, N. MEX.

This station was established April 24, 1903, and was discontinued June 30, 1906. It is located at the highway bridge 8 miles southeast of Roswell, N. Mex., and about 200 feet below the mouth of Hondo River. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 97, where are given also references to publications that contain data for previous years.

Discharge measurements of Pecos River near Roswell, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 14	E. Patterson	193	351	2.70	537
January 29	...do...	178	281	2.50	337
January 30	...do...	126	212	2.48	314
February 8	J. M. Giles	97	201	2.42	266
February 14	E. Patterson	160	256	2.60	310
February 23	...do...	129	199	2.40	254
March 5	...do...	111	169	2.25	202
March 15	...do...	104	118	1.90	69
March 29	...do...	75	72	2.00	94
April 7	...do...	218	461	3.00	782
April 7	E. C. Murphy	236	591	3.14	1,140
April 8	E. Patterson	130	331	2.80	575
April 25	J. M. Giles	142	209	2.83	483
April 30	E. Patterson	133	298	3.00	539
May 5	...do...	130	183	2.80	398
May 14	...do...	146	284	3.26	686
May 19	...do...	124	257	3.12	529
June 11	...do...	180	187	2.89	283
June 16	...do...	228	303	3.42	777

Daily gage height and discharge of Pecos River near Roswell, N. Mex., for 1906.

Day.	January. Gage height.	Discharge.	February. Gage height.	Discharge.	March. Gage height.	Discharge.	April. Gage height.	Discharge.	May. Gage height.	Discharge.	June. Gage height.	Discharge.
	Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1	2.4	275	2.5	335	2.3	220	2.0	94	2.9	460	2.9	330
2	2.4	275	2.5	335	2.3	220	2.0	94	2.9	460	2.9	330
3	2.4	275	2.5	335	2.2	170	2.0	94	2.9	470	3.5	930
4	2.4	275	2.5	335	2.2	170	2.0	94	2.7	325	3.3	650
5	2.4	275	2.5	335	2.2	170	2.0	94	2.7	325	3.1	460
6	2.4	275	2.5	335	2.2	170	2.2	170	2.8	400	3.1	460
7	2.5	335	2.4	275	2.2	170	3.0	830	2.8	370	2.8	260
8	2.5	335	2.4	275	2.2	170	2.7	500	2.8	370	2.7	200
9	2.5	335	2.4	275	2.2	170	2.6	415	3.4	960	2.7	190
10	2.5	335	2.4	275	2.2	170	2.4	275	3.2	700	2.7	190
11	2.6	415	2.4	275	2.2	170	2.4	250	3.1	590	2.9	300
12	2.6	415	2.4	275	2.2	170	2.4	250	3.0	470	2.9	300
13	2.7	500	2.4	275	2.2	170	2.4	250	3.0	470	2.9	300
14	2.7	500	2.5	335	2.0	94	2.4	250	3.7	1,380	3.0	380
15	2.7	500	2.5	335	2.0	94	2.4	250	3.3	740	3.9	1,000
16	2.7	500	2.5	335	1.9	69	2.6	360	3.2	620	3.4	770
17	2.6	415	2.5	335	1.9	69	2.8	520	3.2	620	3.2	550
18	2.6	415	2.5	335	1.9	69	2.8	520	3.2	620	3.0	380
19	2.5	335	2.5	335	1.9	69	3.0	730	3.3	720	3.5	890
20	2.4	275	2.5	335	1.9	69	3.0	680	3.4	850	3.2	550
21	2.4	275	2.5	335	1.9	69	3.0	680	3.2	615	2.8	250
22	2.4	275	2.4	275	1.9	69	2.8	480	3.3	720	2.7	200
23	2.4	275	2.4	275	1.9	69	3.0	680	3.3	700	2.6	150
24	2.4	275	2.4	275	2.0	94	3.0	650	3.3	700	2.5	110
25	2.4	275	2.3	220	2.0	94	2.8	460	3.3	700	2.5	110
26	2.5	335	2.3	220	2.0	94	2.8	460	3.2	590	2.5	110
27	2.5	335	2.3	220	2.0	94	2.8	415	3.1	500	2.5	110
28	2.5	335	2.3	220	2.0	94	3.0	580	3.1	500	2.7	200
29	2.5	335			2.0	94	3.0	580	3.0	400	2.5	170
30	2.5	335			2.0	94	2.9	460	3.0	400	2.5	110
31	2.5	335			2.0	94			3.0	400		

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

Monthly discharge of Pecos River near Roswell, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	500	275	343	21,100
February	335	220	297	16,500
March	220	69	123	7,560
April	830	94	406	24,200
May	1,380	325	585	36,000
June	1,600	110	385	22,900
The period				128,000

NOTE.—Values are rated as good.

PECOS RIVER NEAR DAYTON, N. MEX.

This station was established March 24, 1905, about 3 miles east of Dayton, N. Mex., 100 feet below the mouth of Penasco River and about 6 miles above McMillan dam at Lakewood, N. Mex. The gage was washed out September 6, 1905, and the station was relocated September 7, 1905, about one-half mile upstream. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 99.

Discharge measurements of Pecos River near Dayton, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 11	E. Patterson	106	242	2.75	428
January 16	...do	112	275	3.10	594
January 22	J. M. Giles	88	216	2.52	329
January 22	...do	88	223	2.57	358
February 1	E. Patterson	98	222	2.85	397
February 13	J. M. Giles	94	212	2.80	394
February 13	...do	105	234	2.95	466
February 20	E. Patterson	82	202	2.65	350
February 27	J. M. Giles	78	176	2.40	295
March 3	...do	77	171	2.40	278
March 17	E. Patterson	61	112	1.80	119
March 20	...do	61	112	1.77	131
March 24	...do	61	118	1.85	142
March 29	J. M. Giles	64	122	1.80	150
April 5	Murphy and Giles	61	139	2.15	201
April 20	J. M. Giles	171	373	3.62	730
May 1	E. Patterson	162	295	3.38	544
May 4	...do	121	251	3.08	441
May 10	J. M. Giles	147	274	3.20	499
May 15	E. Patterson	161	329	3.68	713
June 6	...do	122	290	3.47	429
June 12	...do	118	196	2.73	258
June 15	...do	120	189	2.66	264
June 27	J. M. Giles	121	151	2.35	174
July 12	...do	173	674	4.53	1,510
July 12	...do	173	600	4.36	1,370
July 13	...do	127	472	4.05	1,040
July 28	...do	113	189	2.80	266
August 8	...do	121	282	3.50	510
September 5	...do	58	94	1.84	95
October 30	William A. Lamb	100	148	2.50	197

Daily gage height, in feet, of Pecos River near Dayton, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.5	2.7	2.4	1.7	3.5	3.0	2.1	2.2	2.4	2.2	2.5	4.0
2	2.9	2.7	2.4	1.7	3.3	3.0	2.1	2.0	2.0	2.4	2.5	4.7
3	2.5	2.7	2.4	1.7	3.3	3.2	2.1	2.5	1.9	2.4	2.5	4.5
4	2.6	2.7	2.4	2.1	3.1	4.0	2.0	2.6	1.9	2.3	3.4	4.3
5	2.7	2.7	2.4	2.1	3.0	3.3	2.0	3.0	1.8	2.2	2.9	4.0
6	2.5	2.7	2.3	3.7	2.9	3.4	3.65	3.4	1.8	2.2	2.9	3.8
7	2.5	2.6	2.3	3.6	2.9	3.6	3.7	3.4	1.8	2.4	2.9	3.5
8	2.6	2.5	2.3	3.6	2.8	3.2	3.3	2.6	1.7	2.4	2.9	3.4
9	2.5	2.5	2.3	3.6	3.0	3.1	3.2	2.9	1.9	2.4	2.9	4.3
10	2.5	2.6	2.3	3.4	3.2	2.7	2.9	3.1	1.8	2.4	2.9	4.3
11	2.8	2.6	2.3	3.1	3.4	3.0	5.0	3.0	1.8	2.4	2.9	4.0
12	3.0	2.7	2.3	2.8	3.5	2.9	4.6	3.9	1.7	2.4	2.9	4.0
13	2.9	2.7	2.2	2.6	3.4	2.9	4.1	3.7	1.7	2.4	2.9	3.9
14	3.4	2.7	2.3	2.7	3.5	2.8	3.7	3.4	1.6	2.7	2.9	3.7
15	2.9	2.7	2.0	2.8	3.6	2.7	4.0	3.0	1.7	2.6	2.9	3.4
16	3.4	2.7	1.9	3.3	3.8	2.7	3.6	3.0	1.7	2.7	2.9	3.4
17	2.9	2.7	1.8	3.5	3.8	2.7	4.6	2.7	1.8	2.8	2.9	3.6
18	3.1	2.7	1.8	3.5	3.7	2.7	5.8	2.6	1.8	2.6	2.9	3.8
19	3.1	2.7	1.8	3.5	3.6	2.7	3.7	2.5	2.2	2.4	3.2	3.5
20	3.1	2.7	1.8	3.5	3.5	2.7	3.8	2.4	2.6	2.4	3.5	3.5
21	2.8	2.6	1.8	3.5	3.5	2.7	3.6	2.2	2.4	2.4	3.5	3.4
22	2.5	2.4	1.8	3.8	3.5	2.7	3.4	2.1	2.2	2.4	3.5	3.2
23	2.7	2.5	1.8	3.6	3.8	2.7	3.1	2.2	2.2	2.5	3.4	2.9
24	2.7	2.5	1.8	3.4	4.0	2.7	2.8	2.0	2.0	2.5	3.3	3.4
25	2.7	2.4	1.9	3.4	4.0	2.7	2.7	2.2	2.1	2.5	3.3	3.0
26	2.7	2.4	1.9	3.4	4.0	2.7	2.0	2.4	2.1	2.6	3.4	3.0
27	2.6	2.5	1.9	3.4	4.0	2.5	3.2	2.5	2.1	2.5	3.9	3.0
28	2.6	2.4	1.8	3.4	3.6	2.4	2.8	2.6	2.4	2.7	4.0	3.4
29	2.6	......	1.8	3.4	3.6	2.3	2.6	3.0	2.3	2.6	3.9	3.1
30	2.6	......	1.8	3.5	3.2	2.2	2.0	2.3	2.3	2.5	3.8	3.2
31	2.6	......	1.8	......	3.0	......	3.1	2.6	......	2.5	......	3.3

Daily discharge, in second-feet, of Pecos River near Dayton, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	325	365	290	145	640	310	148	150	175	140	195	.760
2	500	365	280	145	515	310	148	112	112	175	195	1,230
3	325	365	278	145	515	300	148	195	100	175	195	1,080
4	365	365	278	190	440	1,000	141	217	100	157	470	950
5	410	365	278	190	420	400	141	324	90	140	295	760
6	325	365	250	780	385	425	685	468	90	140	295	650
7	325	335	250	730	385	475	725	468	90	175	295	510
8	365	315	250	730	350	360	455	217	83	175	295	470
9	325	315	250	730	420	330	405	293	100	175	295	950
10	325	335	250	630	500	250	295	357	90	175	295	950
11	450	335	250	500	575	310	2,030	324	90	175	295	750
12	540	365	250	385	625	285	1,600	760	83	175	295	760
13	500	365	225	315	575	285	1,090	612	83	175	295	705
14	750	365	250	350	625	260	725	470	77	240	295	600
15	500	365	160	385	675	260	990	324	83	217	295	480
16	750	365	142	585	815	260	645	324	83	240	295	480
17	500	365	131	680	815	260	1,600	240	90	268	295	560
18	600	365	131	680	740	260	3,000	217	90	217	295	650
19	600	365	131	680	675	260	725	195	140	175	393	510
20	600	365	131	680	615	260	810	175	217	175	510	510
21	450	335	131	680	615	260	645	140	175	175	510	470
22	325	295	131	830	615	260	510	125	140	175	510	395
23	410	315	131	725	815	260	365	140	140	195	470	295
24	410	315	131	560	1,000	260	265	112	112	195	430	470
25	410	295	150	560	1,000	260	240	140	125	195	430	325
26	410	295	150	560	1,000	260	140	175	125	217	470	325
27	365	315	150	560	1,000	215	405	195	125	195	700	325
28	365	295	150	560	675	190	268	217	175	240	760	470
29	365	......	150	560	675	175	215	324	158	217	700	357
30	365	......	150	640	400	165	240	157	158	195	650	393
31	365	......	150	......	310	......	140	217	......	195	......	430

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

Estimated monthly discharge of Pecos River near Dayton, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	750	325	439	27,000
February	365	295	342	19,000
March	290	131	194	11,900
April	830	145	530	31,500
May	1,000	310	626	38,500
June	1,000	165	308	18,300
July	3,000	140	643	39,500
August	760	112	270	16,600
September	217	77	117	6,960
October	268	140	190	11,700
November	760	195	391	23,300
December	1,230	325	599	36,800
The year	3,000	77	387	281,000

PECOS RIVER AT LAKEWOOD, N. MEX.

This station was established January 11, 1906, for the purpose of comparing the amount of water available at the McMillan reservoir with that below the Avalon dam. It shows the flow discharged from the gates of the dam, but does not include the discharge from the spillway nor any leakage from the reservoir. It is located 3 miles southeast of Lakewood and one-half mile below McMillan dam.

The channel is straight for 200 feet above and 300 feet below the gaging section. There is but one channel at all stages. Both banks are high. The bed of the river is of rock and is permanent.

Discharge measurements are made from a cable and car. The initial point for soundings is the frame supporting the cable on the right bank.

The gage was first placed at the lower side of the head-gates and gave the depth of water above the sill of the gates. It was found unsatisfactory, because the velocity was influenced by the varying head in the lake, and on February 8 a new gage was established near the lower end of the outlet canal. This gage was affected by wave action, and on May 8 was moved to about midway between the McMillan dam and the cable. This gage consists of an inclined scale fastened to the stakes, reading from 0 to 5 feet, and was read during 1906 by H. C. Holcomb. The bench mark consists of three nails driven in the pudding-stone bed rock, 38 feet below the gage; elevation, 0.67 foot above gage datum.

Discharge measurements of Pecos River at Lakewood, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 11.....	J. M. Giles.............	74	198	a 9. 50	698
January 11.....	.....do.............	74	195	a 9. 50	645
January 25.....	E. Patterson.............	81	205	a 8. 90	701
February 7.....	J. M. Giles.............	74	171	b 3. 35	477
February 7.....	E. Patterson.............	78	188	b 3. 35	534
February 14....	J. M. Giles.............	74	198	b 3. 50	684
February 20....	E. Patterson.............	80	174	b 3. 30	415
February 22....	.....do.............	74	151	b 3. 05	308
March 3.........	J. M. Giles.............	77	147	b 3. 05	290
March 20.....	E. Patterson.............	22	11	b 1. 50	5. 6
April 2.........	Brent S. Drane.............			b 1. 53	6. 5
April 8.........	.....do.............			b 1. 49	4. 0
April 11.........	.....do.............			b 1. 42	3. 0
April 14.........	.....do.............			b 1. 38	2. 0
April 21.........	J. M. Giles.............	80	325	b 4. 30	1, 160
May 8.............	.....do.............	10	10	c 0. 30	31
June 5...........	E. Patterson.............	76	185	c 2. 05	459
July 13.........	J. M. Giles.............	82	413	c 4. 50	1, 720
October 30.....	William A. Lamb.............	4	2. 4	b 1. 56	7. 9
November 30...	.....do.............	78	308	c 2. 95	917

a Gage at head-gates.   b Gage at lower end of outlet canal.   c Lower gage.

Daily gage height, in feet, of Pecos River at Lakewood, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.............		8. 9	3. 2	1. 5	3. 65	0. 3	0. 3	0. 2	0. 2	0. 2	0. 2	3. 9
2.............		8. 9	3. 2	1. 53	3. 6	. 3	. 3	. 2	. 2	. 2	. 2	4. 6
3.............		8. 8	3. 0	1. 53	3. 6	. 3	. 3	. 2	. 2	. 2	. 2	4. 75
4.............		8. 8	3. 1	1. 51	3. 55	. 3	. 3	. 2	. 2	. 2	. 2	4. 8
5.............		8. 7	3. 1	1. 51	3. 45	2. 0	. 3	. 2	. 2	. 2	. 2	4. 5
6.............		8. 7	1. 5	a 1. 5	2. 7	2. 35	. 3	. 2	. 2	. 2	. 2	4. 1
7.............		9. 0	1. 5	1. 5	2. 0	2. 7	. 3	. 2	. 2	. 2	. 2	3. 5
8.............		3. 4	1. 5	a 1. 49	0. 3	2. 65	. 3	. 2	. 2	. 2	. 2	2. 6
9.............		3. 3	1. 5	1. 48	. 3	3. 2	. 3	. 2	. 2	. 2	. 2	2. 35
10.............		3. 4	1. 5	a 1. 48	. 3	3. 0	. 3	. 2	. 2	. 2	. 2	3. 15
11.............	9. 5	3. 4	1. 5	a 1. 42	. 3	2. 7	2. 5	1. 8	. 2	. 2	. 2	3. 0
12.............	9. 5	3. 6	1. 5	1. 42	. 3	2. 2	4. 05	2. 65	. 2	. 2	. 2	2. 8
13.............	9. 4	3. 5	1. 5	1. 41	. 3	. 65	4. 4	2. 65	. 2	. 2	. 2	2. 6
14.............	9. 0	3. 6	1. 5	1. 38	. 3	. 25	4. 3	2. 6	. 2	. 2	. 2	2. 45
15.............	8. 9	3. 6	1. 5	a 1. 37	. 3	. 25	4. 0	2. 5	. 2	. 2	. 2	2. 4
16.............	9. 4	3. 6	1. 5	a 1. 36	. 3	. 25	3. 8	2. 4	. 2	. 2	. 2	2. 3
17.............	9. 5	3. 5	1. 5	1. 35	. 3	. 3	3. 8	2. 2	. 2	. 2	. 2	0. 1
18.............	9. 4	3. 5	1. 5	1. 35	. 3	. 3	4. 2	2. 0	. 2	. 2	. 2	. 1
19.............	9. 2	3. 4	1. 5	2. 3	2. 0	. 3	4. 7	0. 2	. 2	. 2	. 2	. 1
20.............	9. 1	3. 4	1. 5	4. 3	2. 85	. 3	4. 5	. 2	. 2	. 2	. 2	. 1
21.............	9. 0	3. 4	1. 5	4. 3	2. 85	. 3	3. 85	. 2	. 2	. 2	. 2	. 1
22.............	9. 0	3. 4	1. 5	4. 25	2. 85	. 3	3. 0	. 2	. 2	. 2	. 2	. 1
23.............	8. 9	3. 3	1. 5	4. 2	2. 8	. 3	0. 4	. 2	. 2	. 2	. 2	. 1
24.............	8. 9	3. 2	1. 5	4. 1	3. 25	. 3	. 4	. 2	. 2	. 2	1. 6	. 1
25.............	9. 0	3. 2	1. 5	4. 05	3. 2	. 3	. 15	. 2	. 2	. 2	1. 6	. 1
26.............	8. 9	3. 2	1. 5	4. 0	3. 15	. 3	. 2	. 2	. 2	. 2	1. 6	. 1
27.............	8. 9	3. 1	1. 5	3. 9	3. 1	. 3	. 2	2. 8	. 2	. 2	1. 6	. 1
28.............	8. 9	3. 1	1. 5	3. 8	0. 3	. 3	. 2	4. 2	. 2	. 2	2. 4	. 1
29.............	8. 8		1. 5	3. 75	. 3	. 3	. 2	3. 75	. 2	. 2	3. 0	. 1
30.............	8. 9		1. 5	3. 7	. 3	. 3	. 2	2. 8	. 2	. 2	3. 8	. 1
31.............	8. 9		1. 5		. 3		. 2	. 2		. 2		. 1

a Estimated.

NOTE.—The gates of Lake McMillan were closed from March 6 to April 19, inclusive. There was no flow past the gage except leakage from the gates. The flow of the river escaped through "gyp-holes" along the eastern shore of the lake. The gates were also closed at other times after May 28, as indicated by the low gage heights.

Rating table for Pecos River at Lakewood, N. Mex.

FEBRUARY 8, 1906, TO MAY 7, 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.*
1.35	2.0	2.00	58	2.60	182	3.20	400	3.80	755
1.40	2.5	2.10	74	2.70	210	3.30	450	3.90	830
1.50	5.0	2.20	91	2.80	241	3.40	505	4.00	910
1.60	10	2.30	110	2.90	275	3.50	560	4.10	990
1.70	19	2.40	132	3.00	313	3.60	620	4.20	1,075
1.80	30	2.50	156	3.10	355	3.70	685	4.30	1,160
1.90	43								

MAY 8, 1906, TO DECEMBER 31, 1906.[b]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
0.10	10	0.90	135	1.70	355	2.50	675	3.60	1,210
0.20	20	1.00	155	1.80	390	2.60	720	3.80	1,320
0.30	30	1.10	180	1.90	425	2.70	765	4.00	1,430
0.40	45	1.20	205	2.00	465	2.80	810	4.20	1,540
0.50	60	1.30	230	2.10	505	2.90	855	4.40	1,660
0.60	75	1.40	260	2.20	545	3.00	905	4.60	1,780
0.70	95	1.50	290	2.30	585	3.20	1,005	4.80	1,900
0.80	115	1.60	320	2.40	630	3.40	1,105		

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

Monthly discharge of Pecos River at Lakewood, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
February 8–28	620	355	500	20,800
March	400	5	62.9	3,870
April	1,160	2	351	20,900
May	1,030	30	370	22,800
June	1,000	25	216	12,900
July	1,840	15	560	34,400
August	1,540	20	314	19,300
September	20	20	20.0	1,190
October	20	20	20.0	1,230
November	1,320	20	153	9,100
December	1,900	10	582	35,800
The period				182,000

NOTE.—Values are rated as follows: February to August and December, good; November, fair. Results for September and October and all other low periods after May 1 are liable to large errors. See measurement made October 30.

LEAKAGE FROM LAKE M'MILLAN.

Measurements were made during 1906 to determine the leakage through the "gyp holes" in the bed of Lake McMillan.

Measurements of leakage from Lake McMillan, near Lakewood, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.[a]	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 5	E. C. Murphy	29	50	13.7	115
May 8	J. M. Giles	7.6	3.5	12.6	5
June 27	do	80	168	15.05	121
July 28	do	45	82	14.1	114

[a] Of Lake McMillan.

PECOS RIVER AT AVALON, N. MEX.

This station was established January 6, 1906, just below the Avalon dam, about 6 miles north of Carlsbad, N. Mex. The discharge at this point includes that at Lakewood, the flow of certain springs between the stations, the discharge of the spillways of the McMillan dam, and that portion of the leakage through the gypsum in the bottom of the reservoir[a] that returns to the river above Avalon. The figures show that the gain was 85 second-feet on April 7, just after the closing of the gates of Lake McMillan, and increased to nearly 150 second-feet from May 9 to 16. This increase was probably caused by the rise of the water in the reservoir.

The channel is straight for some distance above and below the station, and the current is moderate except at high water. The right bank is high; the left is low and liable to overflow. The bed of the river is of firm earth and loose rock and is permanent.

Measurements are made from a boat held in place by a one-fourth-inch cable. The initial point for soundings is a post on the left bank to which a tagged wire is fastened.

The gage is a scale fastened to stakes driven in the right bank, and is located about a half mile south of the dam. It was read during 1906 by J. D. McAninch. The bench mark is a permanent B. M. of the survey of the Carlsbad project, 5 feet east of the post, 1 mile south of the head-gates of the main canal, on its right bank; elevation, 3,164 feet above sea level and 26.74 feet above gage datum.

Discharge measurements of Pecos River at Avalon, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 7	E. Patterson	125	445	1.50	488
January 12	J. M. Giles	125	497	1.72	651
January 13	....do	125	487	1.65	575
January 22	E. Patterson	125	428	1.42	414
January 24	....do	121	429	1.42	421
February 20	J. M. Giles	128	454	1.45	470
February 23	....do	128	456	1.35	408
February 26	....do	128	454	1.30	375
March 2	....do	128	462	1.32	376
March 3	E. Patterson	125	430	1.25	337
March 21	....do	115	353	.72	136
March 29[b]	J. M. Giles	52	70	.78	151
April 3	E. Patterson	52	70	.79	157
April 6[a]	Lamb and Giles	53	74	.85	157
April 23	J. M. Giles	143	604	2.32	1,260
May 7	....do	56	75	.80	148
May 9	....do	56	72	.76	131
June 5	E Patterson	125	486	1.62	563
June 11	....do	140	526	1.98	884
July 14	J. M. Giles	150	652	2.75	1,690
July 15	....do	150	647	2.60	1,610
September 6	....do	59	68	.70	124
October 3	William A. Lamb	58	77	.80	163

[a] See Third Annual Report of the Reclamation Service, pp. 386–392.
[b] Measurement made by wading.

Daily gage height, in feet, of Pecos River at Avalon, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		1.45	1.3	0.8	1.9	1.0	0.9		1.5
2		1.45	1.3	.8	1.8	1.0	.9		1.4
3		1.45	1.3	.8	1.8	1.9	.9		1.4
4		1.45	1.3	.8	1.7	1.7	.9		1.2
5		1.4	1.3	.8	1.6	1.65	.9		1.0
6	1.5	1.4	1.3	.8	1.6	1.7	.9		.9
7	1.45	1.4	0.5	2.0	.85	2.0	.95		.8
8	1.5	1.4	.5	.8	.8	2.0	.95		.8
9	1.5	1.45	.5	.8	.75	2.7	.95	0.9	.7
10	1.6	1.45	.5	.8	.75	2.0	.95	.9	.7
11	1.7	1.45	.5	.8	.8	1.9	.95	1.3	.7
12	1.7	1.5	.5	.8	.8	1.85	2.5	2.2	.7
13	1.7	1.5	.6	.8	.85	.9	2.8	2.0	.6
14	1.7	1.5	.6	.8	.85	.9	2.8	2.0	.7
15	1.7	1.5	.6	.8	.85	.9	2.75	2.0	1.0
16	1.6	1.5	.6	.8	.85	.85	2.7	2.0	
17	1.6	1.5	.6	.9	.85	.85	5.6	1.8	
18	1.6	1.5	.7	.9	1.6	.85	2.7	1.6	
19	1.6	1.5	.7	1.3	1.55	.85	2.7	1.6	
20	1.6	1.5	.7	1.5	2.0	.85	2.6	1.0	
21	1.5	1.5	.7	1.6	2.0	.85	1.2	1.0	
22	1.5	1.5	.7	2.5	2.0	.85	1.15	.9	
23	1.45	1.4	.7	2.3	2.0	.9	1.1	.9	
24	1.45	1.4	.7	2.3	2.3	.85	1.0	.9	
25	1.45	1.3	.7	2.2	2.2	.9	.95	.8	
26	1.45	1.3	.7	2.2	2.2	.9	.9	.8	
27	1.45	1.3	.8	2.1	2.15	.9	.9	.9	
28	1.45	1.3	.8	2.1	2.1	1.0	.9	2.8	
29	1.45		.8	1.9	1.1	1.0	.9	2.3	
30	1.45		.8	1.9	1.0	.9	.9	2.0	
31	1.45		.8		1.0		.9	1.6	

NOTE.—For conditions at Lake McMillan affecting the flow at this station see footnote to gage heights at Lakewood, p. —.

Rating table for Pecos River at Avalon, N. Mex., 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	90	1.30	365	2.10	1,005	2.90	1,890	4.40	3,865
0.60	105	1.40	425	2.20	1,105	3.00	2,010	4.60	4,155
0.70	125	1.50	490	2.30	1,210	3.20	2,255	4.80	4,450
0.80	150	1.60	560	2.40	1,320	3.40	2,505	5.00	4,750
0.90	180	1.70	635	2.50	1,430	3.60	2,760	5.20	5,050
1.00	215	1.80	720	2.60	1,540	3.80	3,030	5.40	5,350
1.10	260	1.90	810	2.70	1,655	4.00	3,300	5.60	5,650
1.20	310	2.00	905	2.80	1,770	4.20	3,580		

NOTE.—The above table is based on twenty-three discharge measurements made during 1906 and is well defined between gage heights 0.7 foot and 2.75 feet.

Monthly discharge of Pecos River at Avalon, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January 6–31	635	458	522	26,900
February	490	365	450	25,000
March	365	90	165	10,100
April	1,430	150	487	29,000
May	1,210	138	535	32,900
June	1,660	165	408	24,300
July	5,650	180	751	46,200
August 9–31	1,770	150	573	26,100
September 1–15	490	105	219	6,520
The period				227,000

NOTE.—Values are rated as follows: January, February, and April to August, excellent; March and September, good.

PECOS RIVER AT CARLSBAD, N. MEX.

This station was established May 20, 1903, at the Green Street Bridge, Carlsbad, N. Mex., and is about 500 feet below the station of the Pecos Valley and Northeastern Railway and 2,000 feet below the Hagerman power dam. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 102, where are given also references to publications that contain data for previous years.

Discharge measurements of Pecos River at Carlsbad, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 26	E. Patterson	89	190	1. 55	529
February 6 [a]	....do	90	192	1. 49	451
February 19 [a]	J. M. Giles	90	204	1. 57	529
March 21	E. Patterson	88	136	1. 10	198
April 4	....do	88	144	1. 15	217
April 5	....do	88	142	1. 14	206
October 7 [b]	V. T. Sullivan			0. 00	18

[a] Measured from boat.　　　　[b] Estimated.

Daily gage height, in feet, of Pecos River at Carlsbad, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1. 69	1. 55	1. 34	1. 13	2. 02	1. 24	1. 23	1. 18	1. 08	1. 08	1. 10	2. 40
2	1. 68	1. 55	1. 35	1. 14	1. 95	1. 25	1. 23	1. 18	1. 05	1. 08	1. 10	2.68
3	1. 66	1. 55	1. 35	1. 15	1. 85	1. 26	1. 24	1. 19	1. 05	1. 08	1. 10	3. 20
4	1. 64	1. 54	1. 35	1. 15	1. 79	1. 29	1. 24	1. 20	1. 05	1. 08	1. 10	3. 20
5	1. 61	1. 50	1. 34	1. 16	1. 74	2. 10	1. 24	1. 20	1. 05	1. 08	1. 11	3. 15
6	1. 58	1. 50	1. 33	1. 34	1. 56	2. 22	1. 25	1. 21	1. 05	1. 07	1. 11	2. 78
7	1. 58	1. 54	1. 10	1. 17	1. 05	2 30	1. 30	1. 22	1. 02	0. 00	1. 11	2. 60
8	1. 58	1. 54	1. 04	1. 17	1. 09	2 32	1. 25	1. 22	1. 00	1. 01	1. 11	2. 32
9	1. 57	1. 53	1. 00	1. 17	1. 10	2 35	1. 25	1. 23	1. 03	1. 06	1. 11	2. 55
10	1. 54	1. 52	0. 98	1. 16	1. 11	2. 33	1. 25	1. 23	1. 03	1. 07	1. 12	2. 28
11	1. 58	1. 53	. 96	1. 15	1 12	2. 28	1. 25	1. 24	1. 03	1. 08	1. 12	2. 20
12	1. 71	1. 54	. 96	1. 15	1. 14	2. 12	2. 30	1. 97	1. 02	1. 08	1. 12	2. 18
13	1. 69	1. 58	. 97	1. 15	1. 16	1. 54	3 15	2 04	1. 03	1. 08	1. 12	2. 00
14	1. 65	1. 60	. 97	1. 15	1. 17	1. 24	3 05	2 00	1. 04	1. 08	1. 13	1. 95
15	1. 64	1. 60	. 98	1. 15	1. 18	1. 22	2. 75	1. 98	1. 03	1. 08	1. 13	1. 90
16	1. 62	1. 60	. 98	1. 15	1. 18	1. 18	2. 60	1. 95	1. 03	1. 08	1. 13	1. 82
17	1. 62	1. 60	1. 01	1. 16	1. 19	1. 17	5 00	1. 92	1. 03	1. 09	1. 13	1. 04
18	1. 60	1. 59	1. 04	1. 15	1. 22	1. 22	2 75	1. 88	1. 03	1. 09	1. 13	1. 04
19	1. 58	1. 58	1. 06	1. 18	1. 50	1. 23	3 30	1. 44	1. 03	1. 09	1. 13	1. 04
20	1. 58	1. 58	1. 07	1. 40	1. 80	1. 32	3. 25	1. 09	1. 03	1. 09	1. 13	1. 05
21	1. 56	1. 56	1. 08	2. 69	2 00	1. 24	2. 95	1 05	1. 03	1. 10	1. 13	1. 05
22	1. 56	1. 54	1. 09	2. 64	2. 11	1. 25	2 70	1 05	1. 03	1. 10	1. 13	1. 06
23	1. 55	1. 52	1. 10	2 59	2. 17	1. 24	2. 20	1 05	1. 03	1. 09	1. 19	1. 06
24	1. 55	1. 48	1. 10	2. 55	2 42	1. 25	1 28	1. 05	1 03	1. 09	1. 50	1. 06
25	1. 55	1. 51	1. 11	2. 47	2. 52	1. 25	1. 20	1. 05	1. 05	1. 10	1. 50	1. 08
26	1. 55	1. 46	1. 11	2. 40	2. 35	1. 23	1. 20	1. 05	1. 08	1. 10	1. 52	1. 08
27	1. 55	1. 43	1. 12	2 33	2 35	1 38	1. 20	1. 05	1 08	1. 10	1. 55	1. 09
28	1. 55	1. 37	1. 12	2. 26	1 28	1. 23	1. 20	2. 92	1. 08	1. 10	1. 65	1. 09
29	1. 55		1. 12	2. 18	1. 20	1. 25	1 19	2. 75	1. 08	1. 10	1. 88	1. 10
30	1. 55		1. 13	2. 10	1. 20	1. 23	1. 18	2. 20	1. 08	1. 10	2. 28	1. 10
31	1. 55		1. 13		1. 21		1. 18	1. 40		1. 10		1. 11

Rating table for Pecos River at Carlsbad, N. Mex., 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.*
0.00	18	0.90	155	1.70	610	2.50	1,275	3.60	2,340
0.10	24	1.00	190	1.80	690	2.60	1,360	3.80	2,610
0.20	31	1.10	230	1.90	770	2.70	1,445	4.00	2,900
0.30	40	1.20	275	2.00	850	2.80	1,530	4.20	3,220
0.40	51	1.30	330	2.10	935	2.90	1,615	4.40	3,570
0.50	65	1.40	390	2.20	1,020	3.00	1,700	4.60	3,940
0.60	80	1.50	455	2.30	1,105	3.20	1,890	4.80	4,350
0.70	100	1.60	530	2.40	1,190	3.40	2,100	5.00	4,800
0.80	125								

NOTE.—The above table is based on discharge measurements made during 1903–1906 and is well defined.

Monthly discharge of Pecos River at Carlsbad, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	618	485	528	32,500
February	530	372	482	26,800
March	360	176	240	14,800
April	1,440	244	580	34,500
May	1,290	210	552	33,900
June	1,150	262	511	30,400
July	4,800	266	884	54,400
August	1,630	210	499	30,700
September	222	190	207	12,300
October	230	a18	217	13,300
November	1,090	230	327	19,500
December	1,890	206	744	45,700
The year	4,800	18	481	349,000

a Low minimum caused by shutting off of water at power dam above for one day.

NOTE.—Values are rated as good.

PECOS RIVER AND MARGUERETTA FLUME NEAR PECOS, TEX.

This station was established January 1, 1898, about 6 miles above Pecos, Tex., at the flume of the Barstow Irrigation Company (old Margueretta Canal Company). The canal diverts the water from Pecos River 3 miles above the flume from the west side of the river. The water, except about 10 second-feet taken by the West Valley ditch, is carried across to the east side by a timber flume supported on pile bents. The river gage was lowered 1.0 foot March 22, 1906. All gage heights for 1906 refer to the new datum. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 105, where are given also references to publications that contain data for previous years.

Discharge measurements of Pecos River near Pecos, Tex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	Sq. ft.	Feet.	Sec.-ft.
January 1	J. M. Giles	86	319	2. 50	593
February 9	E. Patterson	132	292	2. 45	587
March 2	do	132	223	2. 08	442
March 22	do	75	71	0. 70	71
April 6	do	78	65	0. 75	78
May 2	J. M. Giles	140	281	2. 90	653
May 11	E. Patterson	70	113	1. 30	131
June 7	J. M. Giles	62	86	1. 30	125
June 8	do	62	87	1. 31	126
June 8	do	67	92	1. 38	143
June 13	E. Patterson	135	268	2. 95	640
June 14	do	135	253	2. 80	578
July 16	J. M. Giles	175	520	4. 40	1, 450
October 6	William A. Lamb	60	73	1. 20	114
December 13	do	173	375	3. 95	1, 120

Daily gage height, in feet, of Pecos River near Pecos, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2. 5	2. 4	2. 1	0. 7	3. 0	1. 4	0. 8	1. 2	3. 3	1. 3	1. 3	3. 6
2	2. 6	2. 4	2. 0	.7	2. 9	1. 3	.8	1. 2	2. 2	1. 3	1. 3	3. 6
3	2. 6	2. 4	2. 0	.7	2. 8	3. 1	.6	1. 1	1. 9	1. 3	1. 3	4. 6
4	2. 6	2. 3	2. 0	.7	2. 7	3. 2	.6	1. 0	1. 4	1. 3	1. 3	5. 0
5	2. 6	2. 4	2. 0	.7	2. 6	2. 0	.7	2. 1	1. 3	1. 3	1. 3	5. 2
6	2. 6	2. 4	1. 9	.8	2. 3	1. 3	1. 4	1. 8	1. 1	1. 2	1. 3	5. 0
7	2. 6	2. 4	1. 7	.8	2. 3	1. 55	1. 4	1. 6	1. 1	1. 3	1. 3	4. 7
8	2. 6	2. 3	1. 7	.9	2. 2	2. 35	1. 3	1. 3	1. 1	1. 3	1. 3	4. 7
9	2. 6	2. 4	1. 7	2. 0	1. 8	2. 75	1. 4	1. 3	1. 1	1. 2	1. 4	4. 4
10	2. 6	2. 4	1. 5	1. 4	1. 7	2. 7	1. 5	1. 2	1. 1	1. 2	1. 4	3. 8
11	2. 6	2. 4	1. 4	.9	1. 2	3. 0	1. 5	1. 5	1. 1	0. 9	1. 4	3. 5
12	2. 6	2. 4	1. 4	.8	1. 2	3. 2	1. 5	1. 4	.9	.9	1. 5	3. 9
13	2. 7	2. 4	1. 2	.8	1. 2	2. 95	1. 5	1. 2	.9	.9	1. 5	3. 85
14	2. 7	2. 5	1. 2	.8	1. 1	2. 75	2. 9	1. 2	.9	.9	1. 5	3. 7
15	2. 7	2. 5	1. 2	.7	1. 1	2. 35	4. 3	2. 8	.9	1. 5	1. 5	3. 5
16	2. 7	2. 5	1. 0	.7	1. 1	2. 0	4. 4	2. 8	.9	1. 5	1. 5	3. 4
17	2. 7	2. 5	1. 0	.7	1. 0	1. 45	4. 3	2. 8	.9	1. 4	1. 5	3. 4
18	2. 7	2. 5	0. 9	.8	.9	1. 3	5. 75	2. 8	.9	1. 4	1. 5	3. 4
19	2. 7	2. 5	.8	.9	.9	1. 3	4. 9	2. 7	.9	1. 3	1. 5	2. 7
20	2. 8	2. 5	.8	1. 4	.9	1. 15	4. 7	2. 6	.9	1. 4	1. 5	2. 4
21	2. 8	2. 5	.7	2. 0	.9	1. 05	4. 8	2. 2	.9	1. 4	1. 5	2. 15
22	2. 8	2. 5	.7	1. 4	1. 2	.9	4. 6	1. 5	.9	1. 4	1. 5	1. 95
23	2. 7	2. 5	.7	3. 3	2. 5	.9	4. 2	1. 3	.9	1. 4	1. 7	1. 9
24	2. 6	2. 5	.7	3. 6	2. 75	.9	3. 7	1. 1	.8	1. 4	1. 9	1. 9
25	2. 6	2. 4	.7	3. 6	2. 8	.9	2. 7	1. 1	.8	1. 4	1. 8	1. 8
26	2. 5	2. 4	.6	3. 5	2. 8	.8	2. 1	1. 1	.8	1. 4	1. 8	1. 8
27	2. 4	2. 3	.7	3. 5	3. 5	.6	2. 0	1. 9	.8	1. 4	1. 9	1. 8
28	2. 4	2. 1	.7	3. 4	3. 4	.6	1. 7	1. 6	1. 4	1. 4	2. 6	1. 8
29	2. 4		.7	3. 3	3. 3	1. 4	1. 6	1. 1	1. 5	1. 4	2. 6	1. 8
30	2. 4		.7	3. 1	2. 3	.8	1. 6	3. 2	1. 5	1. 3	2. 6	1. 8
31	2. 4		.7		1. 6		1. 5	3. 3		1. 3		1. 8

Rating table for Pecos River near Pecos, Tex.

JANUARY 1, 1906, TO APRIL 25, 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	70	1. 30	210	1. 90	385	2. 50	600	3. 10	855
0. 80	90	1. 40	235	2. 00	420	2. 60	640	3. 20	900
0. 90	110	1. 50	260	2. 10	455	2. 70	680	3. 30	950
1. 00	135	1. 60	290	2. 20	490	2. 80	720	3. 40	1,000
1. 10	160	1. 70	320	2. 30	525	2. 90	765	3. 50	1,050
1. 20	185	1. 80	350	2. 40	560	3. 00	810	3. 60	1,100

[a] This table is based on five discharge measurements made during 1906 and is well defined below gage height 2.5 feet.

Rating table for Pecos River near Pecos, Tex.—Continued.

APRIL 26, 1906, TO DECEMBER 31, 1906.[a]

0.60	10	1.50	175	2.40	440	3.30	805	4.40	1,410
0.70	25	1.60	200	2.50	475	3.40	850	4.60	1,530
0.80	40	1.70	225	2.60	510	3.50	900	4.80	1,660
0.90	55	1.80	250	2.70	550	3.60	950	5.00	1,790
1.00	70	1.90	280	2.80	590	3.70	1,005	5.20	1,930
1.10	90	2.00	310	2.90	630	3.80	1,060	5.40	2,080
1.20	110	2.10	340	3.00	670	3.90	1,115	5.60	2,230
1.30	130	2.20	370	3.10	715	4.00	1,170	5.80	2,380
1.40	150	2.30	405	3.20	760	4.20	1,290		

[a] This table is based on ten discharge measurements made during 1906 and is well defined between gage heights 1.2 feet and 4.4 feet.

Monthly discharge of Pecos River near Pecos, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	720	560	643	39,500
February	600	455	568	31,500
March	455	50	196	12,100
April	1,100	70	343	20,400
May	900	55	355	21,800
June	760	10	279	16,600
July	2,340	10	622	38,200
August	805	70	277	17,000
September	805	40	120	7,140
October	175	55	129	7,930
November	510	130	208	12,400
December	1,930	250	843	51,800
The year	2,340	10	382	276,000

NOTE.—Values are rated as follows: January and February, May to August, November and December, excellent; March, April, September, and October, good.

Discharge measurements of Margueretta Flume near Pecos, Tex., in 1905–6.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1905.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
November 11	J. M. Giles	20.5	14	0.80	32
December 6	E. Patterson	20.5	13.3	.65	21
1906.					
January 1	J. M. Giles	20.5	10	.60	20
February 9	E. Patterson	20.5	14	.75	27
March 2	do	20.5	27	1.30	64
March 22	do	20.5	39	1.90	139
April 6	do	20.5	39	1.90	144
May 2	J. M. Giles	30.5	51	2.50	237
May 11	E. Patterson	20.5	41	2.00	141
June 7	J. M. Giles	20.5	45	2.20	152
June 8	do	20.5	45	2.20	150
June 13	E. Patterson	20.5	55	2.62	202
June 14	do	20.5	55	2.60	198
July 16	J. M. Giles	20.5	41	2.00	124

Daily gage height, in feet, of Margueretta flume near Pecos, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.6	0.7	1.3	1.8	2.4	2.0	2.5	2.4	2.5	1.9	1.7	0.6
2	.6	.7	1.3	1.9	2.4	2.0	2.5	2.4	2.4	1.9	1.7	.6
3	.6	.7	1.3	1.9	2.2	2.25	2.4	2.4	2.3	1.9	1.7	.6
4	.6	.7	1.3	1.9	2.2	1.9	2.4	2.4	2.2	1.9	1.7	.6
5	.6	.7	1.7	1.9	2.3	1.7	2.4	2.45	2.2	1.9	1.7	.6
6	.6	.7	1.7	1.9	2.4	2.0	2.4	2.5	2.2	1.9	1.7	.6
7	.6	.7	1.7	1.8	2.4	2.15	2.4	2.45	2.2	1.9	1.7	.6
8	.6	.7	1.7	1.9	2.4	2.4	2.4	2.6	2.0	1.9	1.7	.6
9	.6	.7	1.7	2.2	2.3	2.4	2.4	2.6	2.0	1.8	1.7	.6
10	.6	.7	1.7	1.9	2.3	2.4	1.8	2.4	2.0	1.8	1.7	.6

Daily gage height, in feet, of Margueretta flume near Pecos, Tex., 1906—Continued.

Date.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11	0.6	0.7	1.7	1.9	2.0	2.45	1.8	2.4	2.0	1.8	1.7	0.4
12	.6	.7	1.7	1.9	1.9	2.5	1.8	2.4	2.0	1.8	0.6	.4
13	.6	.7	1.7	1.9	1.9	2.5	1.8	2.4	2.0	1.8	.6	.4
14	.6	.7	1.7	1.9	1.9	2.45	2.0	2.4	2.0	1.8	.6	.4
15	.6	.7	1.7	1.9	1.9	2.4	2.0	2.5	2.0	1.8	.6	.4
16	.6	.7	1.7	1.9	1.9	2.4	1.9	2.5	1.9	1.8	.6	.4
17	.6	.7	1.7	2.0	1.9	2.2	1.9	2.5	1.9	1.8	.6	.4
18	.7	.7	1.8	2.0	1.9	2.2	1.95	2.5	1.9	1.8	.6	.4
19	.7	.7	1.8	2.0	2.0	1.95	1.9	2.5	1.9	1.8	.6	.4
20	.7	.7	1.8	2.0	2.1	1.85	1.95	2.6	1.9	1.8	.6	.4
21	.7	.7	1.9	2.0	2.1	1.9	2.0	2.6	1.9	1.5	.6	.4
22	.7	.7	1.9	2.2	2.3	2.0	2.0	2.4	1.9	1.5	.6	.4
23	.7	.7	1.8	2.4	2.3	2.0	2.3	2.4	1.9	1.5	.6	.4
24	.7	.7	1.8	2.4	2.3	2.0	2.2	2.4	2.0	1.5	.6	.4
25	.7	.7	1.8	2.4	2.4	2.0	2.2	2.4	2.0	1.5	.6	.4
26	.7	.7	1.8	2.4	2.4	2.2	2.2	2.4	2.0	1.8	.6	.4
27	.7	.7	1.8	2.4	2.5	2.2	1.7	2.4	2.0	1.8	.6	.4
28	.7	1.3	1.8	2.4	2.5	2.2	2.2	2.35	1.0	1.8	.6	.4
29	.7		1.8	2.4	2.4	2.6	2.2	2.4	1.0	1.8	.6	.4
30	.7		1.8	2.4	2.2	2.5	2.1	2.5	1.0	1.7	.6	.4
31	.7		1.9		2.2		2.4	2.5		1.7		.4

NOTE.—These gage heights are equal to the depth of water in the flume near the lower end.

Rating table for Margueretta flume near Pecos, Tex.

NOVEMBER 17, 1905, TO MAY 24, 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.*
0.60	20	1.00	41	1.40	75	1.80	126	2.20	188
0.70	25	1.10	48	1.50	87	1.90	141	2.30	204
0.80	30	1.20	56	1.60	99	2.00	156	2.40	220
0.90	35	1.30	65	1.70	112	2.10	172		

MAY 25, 1906, TO DECEMBER 31, 1906.[b]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
0.40	12	0.90	35	1.40	70	1.90	115	2.40	173
0.50	16	1.00	41	1.50	78	2.00	125	2.50	186
0.60	20	1.10	48	1.60	87	2.10	136	2.60	200
0.70	25	1.20	55	1.70	96	2.20	148		
0.80	30	1.30	62	1.80	105	2.30	160		

[a] This table is based on eight discharge measurements made during 1905-6 and is well defined.
[b] This table is based on ten discharge measurements made during 1905-6 and is well defined between gage heights 0.6 foot and 2.5 feet. Between the measurements of May 2 and June 7, 1906, a change of conditions occurred. As nothing is known of the exact time, the change of rating tables is made half-way between these dates.

Monthly discharge of Margueretta flume near Pecos, Tex., for 1905-6.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
1905.				
November 17-30	30	30	30.0	833
December	30	20	23.1	1,420
The period				2,250

Monthly discharge of Margueretta flume near Pecos, Tex., for 1905–6—Continued.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
1906.				
January	25	20	22.3	1,370
February	65	25	26.4	1,470
March	141	65	114	7,010
April	220	126	167	9,940
May	220	141	178	10,900
June	200	96	148	8,810
July	186	96	142	8,730
August	200	166	180	11,100
September	186	41	122	7,260
October	115	78	103	6,330
November	96	20	47.9	2,850
December	20	12	14.6	898
The year	220	12	105	76,600

NOTE.—Values are rated as follows: November and December, 1905, January to March, May, and October to December, 1906, good; April and June to September, excellent.

PECOS RIVER NEAR MOORHEAD, TEX.

This station was established by the International (Water) Boundary Commission in April, 1900. It is near Moorhead, immediately above the high bridge of the Southern Pacific Railroad. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 110, where are given also references to publications that contain data for previous years.

Discharge measurements of Pecos River near Moorhead, Tex., in 1906, by E. E. Winter.

Date.	Area of section.	Gage height.	Dis-charge.	Date.	Area of section.	Gage height.	Dis-charge.
	Sq. ft.	Feet.	Sec.-ft.		Sq. ft.	Feet.	Sec.-ft.
January 4	779	2.1	933	June 28	764	1.6	667
January 8	770	2.0	765	July 2	693	1.1	511
January 13	766	2.1	877	July 10	780	2.4	709
January 17	770	2.1	818	July 14	774	2.1	674
January 20	777	2.1	866	July 18	721	1.85	581
January 24	771	2.1	822	July 22	785	2.75	727
January 29	749	2.0	695	July 25	803	2.9	874
February 3	762	2.0	740	July 29	797	2.7	767
February 8	765	1.95	648	August 3	762	1.95	700
February 14	786	2.0	839	August 6	4,021	21.3	28,519
February 19	785	2.0	859	August 22	842	2.55	769
February 23	782	2.0	836	August 29	767	2.05	726
February 26	785	2.0	800	September 4	810	2.1	613
March 3	752	1.9	661	September 8	791	2.4	826
March 8	743	1.75	648	September 13	815	2.0	625
March 13	732	1.65	598	September 19	769	1.7	577
March 17	716	1.55	517	September 24	750	1.5	543
March 22	691	1.4	475	September 27	732	1.45	535
March 25	681	1.35	453	October 3	683	1.55	506
March 29	675	1.3	439	October 8	706	1.5	539
April 8	683	1.4	546	October 11	717	1.5	564
April 12	661	1.2	426	October 16	715	1.5	539
April 16	665	1.2	441	October 19	714	1.5	559
April 20	693	1.5	568	October 23	710	1.5	557
April 24	663	1.15	414	October 25	711	1.5	524
April 28	681	1.4	545	October 29	710	1.5	527
May 3	780	2.1	764	November 3	694	1.5	542
May 7	768	1.9	730	November 8	707	1.5	529
May 11	733	1.75	627	November 12	710	1.5	518
May 15	718	1.5	605	November 16	708	1.5	524
May 20	769	1.55	761	November 21	706	1.5	520
May 24	680	1.2	496	November 24	711	1.5	539
May 29	720	1.5	610	November 28	720	1.55	499
June 4	805	2.2	768	December 3	687	1.6	532
June 8	774	1.75	720	December 7	764	2.2	773
June 12	770	1.6	684	December 11	778	2.65	775
June 16	772	1.9	705	December 14	771	2.4	734
June 21	768	1.7	679	December 18	779	2.4	729
June 25	766	1.6	674	December 30	762	2.2	720

Daily gage height, in feet, of Pecos River near Moorhead, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.1	2.0	1.9	1.3	2.15	1.95	1.15	2.1	2.1	1.5	1.5	1.55
2	2.1	2.0	1.9	1.3	2.1	2 0	1.1	2.0	2.75	1.55	1.5	1.6
3	2.1	2.0	1.9	1.3	2.1	4.95	1.1	1.9	2.3	1.55	1.5	1.6
4	2.1	2.0	1.85	1.3	2.1	2.45	1.05	1.7	2.15	1.55	1.5	1.6
5	2.0	2.0	1.85	1.3	2.1	2.25	1.3	1.7	2.8	1.5	1.5	1.85
6	2.0	2.0	1.85	1.5	2.0	1.85	1.5	14.6	2.9	1.5	1.5	2.05
7	2.0	2.0	1.8	1.4	1.9	1.6	3.35	3.9	2.55	1.5	1.5	2.15
8	2.0	1.95	1.8	1.4	1.9	1.75	5 0	2.4	2.4	1.5	1.5	2.45
9	2.0	1.95	1.75	1.4	1.8	2.05	2.5	2.15	2.35	1.5	1.5	2 3
10	2.0	1.95	1.7	1.3	1.75	1.85	2.35	1.95	2.2	1.5	1.5	2.9
11	2.1	1.95	1.65	1.25	1.75	1.7	2.3	23.65	2.15	1.5	1.5	2.65
12	2.1	1.95	1.65	1.2	1.7	1.6	2.1	20.25	2.0	1.5	1.5	2.6
13	2.1	2.0.	1.65	1.2	1.7	1.45	2.1	4.0	2.0	1.5	1.5	2.45
14	2.1	2.0	1.6	1.2	1.55	1.4	2.1	2.65	1.9	1.5	1.5	2.4
15	2.1	2.0	1.6	1.2	1.5	1.7	2.2	2.4	1.85	1.5	1.5	2.4
16	2.1	2.0	1.6	1.2	1.45	1.9	1.95	2.05	1.75	1.5	1.5	2 35
17	2.1	2.0	1.55	1.4	1.4	1.95	2.0	2.0	1.75	1.5	1.5	2.4
18	2.1	2 0	1.55	1.3	1.35	1.95	1.85	2.0	1.7	1.5	1.5	2.4
19	2.1	2.0	1.5	1.25	1.85	1.9	2.0	2.15	1.7	1.5	1.5	2.4
20	2.1	2.0	1.5	1.4	1.65	1.8	2.45	2.5	1.65	1.5	1.5	2.4
21	2.1	2.0	1.45	1.2	1.4	1.75	2.6	2.6	1.6	1.5	1.5	2 35
22	2.1	2.0	1.4	1.2	1.4	1.6	2.75	2.55	1.6	1.5	1.5	2 3
23	2.1	2.0	1.4	1.15	1.4	1.6	3 0	2.5	1.6	1.5	1.5	2 3
24	2.1	2.0	1.4	1.15	1.25	1.55	2.9	2.4	1.5	1.5	1.5	2 3
25	2.1	2.0	1.35	1.15	1.3	1.6	2.9	2.35	1.55	1.5	1.55	2 3
26	2.1	2.0	1.35	1.2	1.45	1.4	2.9	2.2	1.5	1.5	1.55	2.3
27	2.1	2.0	1.35	1.3	1.5	1.45	2.85	8.25	1.45	1.5	1.55	2.3
28	2.1	2 0	1.3	1.4	1.4	1.55	2.7	2.5	1.55	1.5	1.55	2.2
29	2.0		1.3	1.8	1.45	1.4	2.85	2 05	1.5	1.5	1.55	2.2
30	2.0		1.3	2.05	1.55	1.2	2.4	2.1	1.5	1.5	1.55	2.2
31	2.0		1.3		1.7		2.25	2.05		1.5		2.2

Daily discharge, in second-feet, of Pecos River near Moorhead, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,000	710	700	440	925	790	525	670	730	530	530	500
2	980	725	680	450	835	810	a 510	680	800	525	535	530
3	955	a 740	a 660	460	a 765	4,340	510	a 690	670	a 505	a 540	a 530
4	a 935	730	640	470	765	a 1,090	500	650	a 625	515	540	530
5	840	720	660	480	765	850	540	650	825	510	540	630
6	815	710	680	600	745	675	580	a 18,470	855	520	535	710
7	790	700	660	540	a 730	570	2,060	1,840	835	530	530	a 750
8	a 765	a 650	a 680	a 545	720	a 720	4,400	790	a 825	a 540	a 530	810
9	775	670	650	545	670	840	730	740	800	550	530	790
10	785	690	625	485	640	770	a 705	700	725	560	525	880
11	855	715	600	455	a 630	720	700	35,570	700	a 565	525	a 775
12	865	740	600	a 425	630	a 685	675	26,940	625	·560	a 520	765
13	a 875	815	a 600	430	650	655	675	1,910	a 625	555	520	740
14	860	a 840	570	430	610	645	a 675	865	610	550	520	a 735
15	845	845	560	435	a 605	680	695	790	600	545	520	725
16	830	850	550	a 440	610	a 705	610	710	585	a 540	a 525	720
17	a 820	850	520	525	615	715	630	700	585	545	525	730
18	835	855	520	485	625	715	a 580	700	575	555	525	a 730
19	850	a 860	505	465	850	705	605	720	a 575	a 560	520	735
20	a 865	850	505	a 530	a 800	690	675	765	565	560	520	740
21	850	845	490	435	670	a 685	700	780	560	560	a 520	730
22	840	840	a 475	435	·640	675	a 725	a 770	560	555	525	720
23	830	a 835	475	415	610	675	855	765	560	a 555	530	720
24	a 820	825	475	a 415	a 515	670	845	755	a 545	540	a 540	725
25	810	810	a 455	415	530	a 675	a 875	750	550	a 525	545	725
26	795	a 800	455	440	590	655	875	735	545	525	530	730
27	785	800	455	490	610	660	850	8,870	a 535	525	515	730
28	770	800	a 545	a 545	570	a 665	770	765	555	525	a 500	710
29	a 695		a 440	785	a 590	605	a 850	a 725	545	a 525	500	715
30	695		440	935	630	545	705	730	545	525	500	a 720
31	695		440		690		675	725		530		720

a Dates of measurements.

Monthly discharge of Pecos River near Moorhead, Tex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	1,000	695	830	51,025
February	860	650	779	43,279
March	700	440	555	34,126
April	935	415	498	29,643
May	925	515	672	41,316
June	4,340	545	829	49,349
July	4,400	500	849	52,175
August	35,570	650	3,610	221,990
September	855	535	641	38,152
October	560	510	539	33,144
November	545	500	525	31,259
December	880	500	710	43,636
The year	35,570	415	920	669,094

GALLINAS RIVER NEAR LAS VEGAS, N. MEX.

This station was established August 13, 1903, at Las Vegas Hot Springs, 6 miles above Las Vegas, N. Mex. The establishment of this station was primarily for the purpose of determining the amount of water available for diversion and storage in the San Guyjuella basin about 6 miles northwest of Las Vegas. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 115, where are given also references to publications that contain data for previous years.

Discharge measurements of Gallinas River near Las Vegas, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 14	J. M. Giles	20	17	2.00	22
April 15	E. Patterson	26	35	2.30	66
April 18	do	26	39	2.45	98
April 26 a	J. M. Giles	32	45	2.57	138
April 28	do	28	40	2.50	116
May 24	E. Patterson	26	35	2.40	76
May 27	do	25	31	2.28	55
July 18 b	J. M. Giles	28	40	2.15	42
July 20 b	do	28	41	2.15	41
August 15 b	do	18	15	1.95	17

a Measurement made from bridge.   b Measurement made from trestle.

Daily gage height, in feet, of Gallinas River near Las Vegas, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.9	1.85	1.9	2.2	2.5	2.3	1.8	2.0	1.9	2.0	2.0	2.0
2	1.9	1.8	1.9	2.2	2.5	2.3	1.85	2.0	1.9	2.0	2.0	2.05
3	1.9	1.8	1.9	2.2	2.5	2.3	1.9	2.0	1.9	2.0	2.0	2.2
4	1.9	1.8	1.9	2.2	2.5	2.3	1.95	2.0	1.9	1.95	2.0	2.9
5	1.9	1.8	1.9	2.2	2.5	2.2	2.0	2.0	1.9	2.05	1.95	2.7
6	1.9	1.8	2.1	2.2	2.6	2.2	2.25	2.1	1.9	2.1	1.95	2.5
7	1.85	1.8	1.9	2.45	2.55	2.2	2.05	2.1	1.9	2.1	2.0	2.45
8	1.8	1.8	2.05	2.35	2.5	2.2	2.4	2.15	1.9	1.95	1.95	2.3
9	1.8	1.8	1.9	2.3	2.55	2.2	2.25	2.35	1.9	1.9	1.9	2.3
10	1.8	1.8	1.9	2.4	2.55	2.1	2.15	2.15	1.9	1.85	1.9	2.2
11	1.8	1.8	1.95	2.4	2.5	2.1	2.25	2.05	1.9	1.9	1.9	2.2
12	1.8	1.8	2.0	2.4	2.6	2.1	2.2	2.0	1.85	1.95	1.9	2.2
13	1.8	1.8	2.0	2.35	2.6	2.3	2.2	2.0	1.8	1.95	1.9	2.2
14	1.8	1.8	2.0	2.3	2.6	2.2	2.2	2.0	1.8	2.0	1.9	2.1
15	1.8	1.8	2.0	2.3	2.5	2.15	2.2	2.0	1.85	2.0	1.9	2.1

Daily gage height, in feet, of Gallinas River near Las Vegas, N. Mex., for 1906—Con.

Day,	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16	1.8	1.8	2.1	2.4	2.5	2.05	2.45	2.0	1.8	2.0	1.9	1.95
17	1.8	1.8	2.0	2.5	2.45	1.95	2.55	1.9	1.8	1.85	1.9	1.9
18	1.8	1.8	2.0	2.5	2.4	1.9	2.2	1.9	1.8	1.8	1.9	1.95
19	1.8	1.8	1.95	2.8	2.45	1.9	2.1	1.9	1.8	1.75	1.9	2.0
20	1.85	1.8	1.9	2.7	2.5	1.9	2.3	1.9	1.8	1.65	1.9	2.0
21	1.8	2.1	2.0	2.65	2.5	1.9	2.1	1.9	1.8	1.6	1.9	2.0
22	1.8	1.9	2.0	2.6	2.5	1.9	2.0	1.9	1.8	1.75	1.9	2.0
23	1.8	2.05	2.0	2.6	2.5	1.9	2.0	1.9	1.8	1.8	1.9	2.0
24	1.8	1.95	2.0	2.6	2.4	1.9	2.0	1.9	1.8	1.8	1.9	2.0
25	1.8	1.9	2.1	2.6	2.4	1.9	2.0	1.9	1.8	1.7	1.9	2.0
26	1.8	1.9	2.2	2.6	2.4	1.9	2.0	1.9	1.85	1.75	1.9	2.0
27	1.8	1.9	2.2	2.6	2.3	1.9	2.0	1.9	2.3	1.95	1.9	2.0
28	1.8	1.9	2.2	2.6	2.3	1.85	2.0	1.9	2.15	2.0	1.9	2.0
29	1.8		2.4	2.6	2.3	1.8	2.0	1.9	2.1	2.0	1.9	2.0
30	1.7		2.2	2.5	2.3	1.8	2.0	1.9	2.0	2.1	1.9	2.0
31	1.75		2.0		2.3		2.0	1.9		2.1		1.9

Rating table for Gallinas River near Las Vegas, N. Mex., for 1906.

Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.	Gage height.	Dis-charge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.60	2	1.90	14	2.20	47	2.50	107	2.80	200
1.70	4	2.00	22	2.30	64	2.60	134	2.90	240
1.80	8	2.10	33	2.40	84	2.70	165		

NOTE.—The above table is based on ten discharge measurements made during 1906 and is well defined between gage heights 1.9 feet and 2.6 feet.

Monthly discharge of Gallinas River near Las Vegas, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	14	4	9.2	566
February	33	8	11.1	616
March	84	14	25.9	1,590
April	200	47	98.7	5,870
May	134	64	101.0	6,210
June	64	8	31.8	1,890
July	120	8	38.5	2,370
August	74	14	21.9	1,350
September	64	8	14.7	875
October	33	2	17.0	1,050
November	22	14	15.7	934
December	240	14	45.6	2,800
The year	240	2	35.9	26,100

NOTE.—Values are rated as follows: January, February, and September to November, fair; remainder of year, good.

HONDO RIVER AT ROSWELL, N. MEX.

This station was established April 25, 1903, and was discontinued March 2, 1906. It is located at the bridge at the intersection of Main and Vegas streets, Roswell, N. Mex. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 117, where are given also references to publications that contain data for previous years.

Discharge measurements of Hondo River at Roswell, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 15.....	E. Patterson........................	18	5. 6	1. 70	6
February 3.....	......do................................	18	10. 0	2. 10	18
February 12....	......do................................	16	5. 2	1. 95	4. 9
February 19....	......do................................	4	. 8	1. 45	. 33
April 6 *a*........	E. C. Murphy.......................			1. 52	. 6

a Estimated.

Daily gage height, in feet, of Hondo River at Roswell, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.
1.............	2.5	2.2	1.4	12.............	2.45	1.75	......	23.............	2.5	1.4	......
2.............	2.5	2.2	1.4	13.............	2.35	1.9	......	24.............	2.55	1.4	......
3.............	2.4	2.2	......	14.............	2.25	1.65	......	25.............	2.6	1.4	......
4.............	2.3	2.2	......	15.............	2.1	1.65	......	26.............	2.55	1.4	......
5.............	2.15	2.25	......	16.............	2.0	1.6	......	27.............	2.55	1.4	......
6.............	2.0	2.0	......	17.............	2.3	1.5	......	28.............	2.55	1.4	......
7.............	2.3	2.0	......	18.............	2.05	1.55	......	29.............	2.5		......
8.............	2.45	1.5.	......	19.............	1.8	1.5	......	30.............	2.5	......	......
9.............	2.2	1.5	......	20.............	2.2	1.45	......	31.............	2.35	......	......
10.............	2.35	1.5	......	21.............	2.45	1.4	......				
11.............	2.3	1.5	......	22.............	2.6	1.4	......				

NOTE.—The gage was lowered 3.00 feet February 8, 1906; all gage heights for 1906 refer to the new datum.

Daily discharge, in second-feet, of Hondo River at Roswell, N. Mex., for 1906.

Day.	Jan.	Feb.	Day.	Jan.	Feb.	Day.	Jan.	Feb.
1.................	33	21	12.................	31	2.5	23.................	33	.2
2.................	33	21	13.................	27	4.5	24.................	36	.2
3.................	29	21	14.................	23	1.6	25.................	38	.2
4.................	25	21	15.................	18	1.6	26.................	36	.2
5.................	20	23	16.................	15	1.2	27.................	36	.2
6.................	15	12	17.................	25	0.6	28.................	36	.2
7.................	25	12	18.................	16	.9	29.................	33	......
8.................	31	2	19.................	8	.6	30.................	33	......
9.................	21	2	20.................	21	.4	31.................	27	......
10.................	27	2	21.................	31	.2			
11.................	25	1	22.................	38	.2			

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

Monthly discharge of Hondo River at Roswell, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January.................................	38	8	27. 3	1, 680
February.................................	23	0. 2	5. 5	305
The period.............................				1, 980

NOTE.—Values rated as approximate.

HONDO RIVER AT HONDO RESERVIOR SITE, NEW MEXICO.

This station was established March 9, 1903, at the first New Mexico reservoir dam site, 12 miles southwest of Roswell, N. Mex. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 118, where are given also references to publications that contain data for previous years.

Discharge measurements of Hondo River at Hondo reservoir site, New Mexico, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 13.....	E. Patterson.............	20	11	3.00	32
January 31.....	....do.........	23	11	3.05	31
February 9....	J. M. Giles.......	16	10	3.00	28
February 13....	E. Patterson......	18	12	3.06	30
February 24 *a* ..	....do........	13	68	2.70	9.6
April 6.........	E. C. Murphy.......	12	11•	2.98	18
April 8.........	E. Patterson.......	17	9	3.05	23
April 24........	J. M. Giles.......	16	13	2.80	28
April 28........	....do.........	16	11	2.65	20
August 6 *b*......	....do.........	14.7	5.4	2.30	5.3
December 20 ...	William A. Lamb.......	11.5	4.8	2.10	4.9

a Part of flow of river diverted into Inlet Canal about 2 miles above the station.
b Measured at Scour Gate No. 1.

Daily gage height, in feet, of Hondo River at Hondo reservoir site, New Mexico, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1..............	4.4	3.0	2.6	2.4	......	......	......	......	2.55	3.0	2.3	2.3
2..............	4.8	3.1	2.6	2.35	......	......	......	2.35	2.6	2.9	2.3	2.2
3..............	4.75	3.0	2.6	2.65	......	......	......	2.05	2.55	2.7	2.4	2.4
4..............	4.6	3.0	2.6	2.95	2.1	......	......	2.15	2.5	2.7	2.4	2.3
5..............	4.3	3.0	2.65	2.9	......	......	......	2.55	2.5	2.7	2.3	2.2
6..............	4.7	3.0	2.65	3.0	......	......	......	2.3	2.3	2.75	2.25	2.2
7..............	4.0	3.0	2.6	3.05	......	......	......		2.2	2.55	2.2	2.35
8..............	2.75	3.05	2.6	3.1	......	......	......		2.2	2.15	2.2	2.5
9..............	2.9	3.0	2.6	3.4	......	......	......		2.15	2.1	2.2	2.5
10.............	2.9	2.95	2.4	3.3	......	......	......		2.1	2.1	2.2	2.25
11.............	3.05	3.0	....	3.05	......	......	......		2.1	2.1	2.2	2.4
12.............	3.0	3.05	....	2.95	......	......	......		2.05	2.1	2.2	2.4
13.............	3.05	3.1	....	2.95	......	......	......			2.1	2.2	2.3
14.............	3.1	3.05	....	3.0	......	......	......			2.0	2.2	......
15.............	3.05	2.9	....	3.0	......	......	......			2.0	2.2	......
16.............	3.05	2.9	2.45	3.05	......	......	......			2.1	2.2	2.15
17.............	3.1	2.9	2.45	3.15	......	......	......			2.1	2.2	2.2
18.............	3.2	2.9	2.45	3.05	......	......	......			2.1	2.2	2.15
19.............	3.15	2.9	2.45	2.9	......	......	......			2.1	2.2	......
20.............	3.2	2.85	2.75	3.0	......	......	......			2.1	2.2	2.1
21.............	3.25	2.7	2.4	3.0	......	......	......			2.1	2.8	2.1
22.............	3.3	2.7	2.3	2.95	......	......	......			2.1	2.8	2.1
23.............	3.25	2.7	2.3	2.9	......	......	2.2			2.0	3.0	2.1
24.............	3.25	2.7	2.15	2.85	......	......	2.3			2.0	3.1	2.1
25.............	3.3	2.7	....	2.75	......	......	2.1			2.0	3.25	2.1
26.............	3.15	2.7	2.2	2.75	......	......	......			1.95	2.9	2.1
27.............	3.15	2.6	2.3	2.7	......	......	......	2.2		1.9	2.4	2.1
28.............	3.15	2.6	2.35	2.6	......	......	......	2.3		1.9	2.2	2.1
?9.............	3.15	....	2.35	2.55	......	......	......	2.7		1.95	......	2.1
30.............	3.15	....	2.4	2.35	......	......	3.05	3.1		2.15	2.4	2.1
31.............	3.05	....	2.35	......	......	......	2.6	....		2.3	......	2.1

Note.—The river was dry on days when the gage was not read, except from August 7 to 29. The discharge during that period was measured at Scour Gate No. 1.

Daily discharge, in second-feet, of Hondo River at Hondo reservoir site, New Mexico, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	158	28	7	2	0	0	0	0	13	39	8	9
2	200	34	7	1	0	0	0	6	15	32	8	6
3	195	28	7	7	0	0	0	1	13	21	11	13
4	180	28	7	17	3	0	0	2	11	21	11	9
5	148	28	8	15	0	0	0	13	11	21	8	6
6	190	28	8	19	0	0	0	5	5	24	6	7
7	118	28	6	22	0	0	0	....	3	15	5	12
8	19	31	6	25	0	0	0	....	3	3	5	18
9	26	28	6	44	0	0	0	....	2	2	5	18
10	26	25	2	37	0	0	0	....	2	2	5	9
11	35	28	0	27	0	0	0	....	2	2	5	14
12	32	30	0	22	0	0	0	....	1	2	5	14
13	35	32	0	22	0	0	0	....	0	2	6	10
14	38	30	0	24	0	0	0	....	0	1	6	0
15	35	22	0	29	0	0	0	....	0	1	6	0
16	35	21	3	32	0	0	0	....	0	2	6	6
17	38	21	3	38	0	0	0	....	0	2	6	7
18	44	20	3	32	0	0	0	....	0	2	6	6
19	41	20	3	30	0	0	0	....	0	2	6	0
20	44	18	10	36	0	0	0	....	0	3	6	5
21	48	11	2	36	0	0	0	....	0	3	32	5
22	52	11	1	33	0	0	0	....	0	3	32	5
23	44	11	1	34	0	0	3	....	0	2	46	5
24	44	10	0	31	0	0	5	....	0	2	54	5
25	48	10	0	26	0	0	2	....	0	2	66	5
26	37	10	0	25	0	0	0	....	0	1	39	5
27	37	7	1	23	0	0	0	....	4	1	13	5
28	37	7	1	18	0	0	0	....	6	1	6	5
29	37	....	1	16	0	0	0	....	21	1	0	5
30	37	....	2	8	0	0	0	39	45	4	13	5
31	31	....	1	....	0	....	0	15	....	8	....	5

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

Monthly discharge of Hondo River at Hondo reservoir site, New Mexico, for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January	200	19	67.4	4,140
February	34	7	21.6	1,200
March	10	0	3.10	191
April	44	1	24.4	1,450
May	3	0	0.10	6.1
June	0	0	0	0
July	5	0	0.32	19.7
August, 8 days	39	0	10.1	160
September	45	0	5.23	311
October	39	1	7.32	450
November	66	0	14.4	857
December	18	0	7.23	445
The period				9,230

NOTE.—Values are rated as approximate.

INLET CANAL AT HONDO RESERVOIR, NEAR ROSWELL, N. MEX.

This station was established August 7, 1906, for the purpose of determining the amount of water diverted into the Hondo reservoir. It is located 12 miles southwest of Roswell, just below the sand check at the lower end of the Inlet Canal.

The station is located on a curve of the channel. The bed is somewhat shifting on account of the channel being excavated

through a more or less shifting material. Both banks are high and not liable to overflow.

At low water discharge measurements are made by wading 50 feet below the gage. High-water measurements are to be made from a cable and car, which will be erected during the present season.

The gage established August 7 consists of notches cut in the vertical face of the right-hand wing wall of the sand-check gate. The graduations range from 2 to 5.5 feet. On August 25 a gage was established by the reclamation engineers. It consists of a timber graduated from 0 to 2.3 feet, fastened to the east face of the first partition from the east end of the sand-check gate. The zero rests on the sill of the gate. A separate rating curve should be used from August 25 to December 31. Observations at this station are made by John F. Boscoe, gate keeper at the Hondo reservoir.

Discharge measurements of Inlet Canal at Hondo reservoir, near Roswell, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
August 6	J. M. Giles	48	34	2.02	40
August 7	do	55	51	2.33	93
December 20	William A. Lamb	35	22	*a* 0.22	32

a Second gage.

Daily gage height, in feet, of Inlet Canal at Hondo Reservoir, near Roswell, N. Mex., for 1906.

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1		0.1			0.2	17			0.1		0.3
2		.1			.3	18			.1		.3
3		.1			.4	19			.1		.25
4		.1		0.05	.45	20			.1		.2
5		.1		.05	.75	21			.1		.25
6		.1		.05	.95	22			.1	0.1	.2
7	2.25	.05	0.05		.65	23			.1	.15	.2
8	1.95	.05	.1		.5	24			.1	.1	.2
9	2.25	.04	.1		.4	25	0.1		.1	.15	.2
10	1.9	.02	.1		.4	26	.6		.1	.2	.2
11	1.25	.04	.1		.35	27	.6	0.3	.1	.2	.2
12	0.3		.1		.35	28	.25	.35	.1	.1	.15
13			.1		.3	29	.1	.15	.1	.2	.15
14		.04	.1		.3	30	.05		.08	.15	.22
15		.02	.15		.25	31	.1		.02		.25
16			.1		.3						

NOTE.—The canal was dry on days when the gage was not read.

SCOUR GATE NO. 1, HONDO RESERVOIR, NEAR ROSWELL, N. MEX.

This station was established for the purpose of determining the amount of water flowing down Hondo River past the reservoir. It is located just below the opening of the scour gate.

Discharge measurements are made by wading at convenient points below the gate. The channel is straight below the gate and is in fair condition for measurements.

The gage consists of graduations from 0.5 to 2.5 feet, painted on the concrete wing wall at the east side of the gate opening. Observations at this station are made by John F. Boscoe, gate keeper at the Hondo Reservoir.

Discharge measurements of Scour Gate No. 1, Hondo Reservoir, near Roswell, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
August 6	J. M. Giles	14	5.4	.50	5.3
August 7	do	15.5	8.6	.70	15
August 7	do	16	11	.85	23

Daily gage height and discharge of Scour Gate No. 1, Hondo Reservoir, near Roswell, N. Mex., for 1906.

Day.	August.		September.		Day.	August.		September.	
	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1			0.3	1.6	19		0		0
2			.35	2.2	20		0		0
3			.3	1.6	21		0		0
4			.2	.8	22		0		0
5			.2	.8	23		0		0
6			.2	.8	24		0		0
7	0.6	9.5	.1	.2	25		0		0
8	.6	9.5	.1	.2	26		0		0
9	.6	9.5	.1	.2	27		0		0
10	.5	5.3	.05	.1	28		0		0
11		0	.1	.2	29		0	1.3	55
12		0		0	30	0.25	1.2		0
13		0		0	31	.5	5.3		
14		0		0					
15		0		0	Mean		1.6		2.1
16		0		0	Run-off in				
17		0		0	acre-feet,				
18		0		0	(7-31)		80		125

NOTE.—The scour gate was dry after September 30.

PENASCO RIVER NEAR DAYTON, N. MEX.

This station was established September 12, 1905, about 2 miles east and 1 mile north of Dayton and about 1 mile above the mouth of the river. The conditions at the station and the bench marks are described in Water-Supply Paper No. 174, page 121.

Discharge measurements of Penasco River near Dayton, N. Mex., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
January 11	E. Patterson	24	15	1.30	32
January 16	do	25	19	1.38	49
February 1	do	20	21	1.38	48
February 13	J. M. Giles	28	24	1.40	53
March 24	E. Patterson	20	11	1.06	10
March 29	J. M. Giles	16	8.4	1.00	8.6
April 20	do	24	19	1.30	38
May 10	do	1.5	.3	.80	0.4
October 30	William A. Lamb	9	2	1.05	2

Daily gage height, in feet, of Penasco River near Dayton, N. Mex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		1.4	1.4	1.0	1.1	0.3		0.7	0.8	0.8	1.1	1.7
2		1.4	1.3	1.0	1.1	.3		.7	.9	.8	1.1	1.0
3		1.4	1.3	1.0	1.1	.3		.8	1.0	.8	1.1	1.3
4		1.4	1.3	1.2	1.1	.1		.7	.8	.9	1.1	1.3
5		1.4	1.3	1.3	1.0			.9	.7	1.0	1.1	1.3
6		1.4	1.3	1.3	.9		0.7	.8	.6	1.0	1.1	1.3
7		1.4	1.2	1.3	.8		.8	.7	.7	1.0	1.1	1.3
8		1.4	1.2	1.3	.7		.7	.7	.9	1.0	1.1	1.3
9		1.4	1.2	1.2	.7		.7	.7	.9	1.0	1.1	1.3
10		1.4	1.2	1.2	.8		.7	.7	.8	1.0	1.1	1.3
11		1.4	1.2	1.2	.8		.7	.7	.8	1.0	1.1	1.3
12		1.5	1.1	1.2	.8		.6	.8	.7	1.0	1.1	1.3
13		1.4	1.1	1.2	.7		.5	.7	.7	1.0	1.1	1.3
14		1.4	1.1	1.2	.8		.7	.7	.8	1.0	1.1	1.3
15		1.4	1.1	1.2	.8		.7	.7	.8	1.2	1.1	1.3
16		1.4	1.1	1.3	.9		.7	.7	.7	1.1	1.1	1.3
17		1.4	1.1	1.4	.8		.8	.7	.8	1.0	1.1	1.3
18		1.	1.1	1.4	.7		.9	.7	.8	1.0	1.1	1.3
19		1.4	1.1	1.3	.7		.8	.7	.8	1.0		1.3
20		1.4	1.1	1.3	.7		.7	.7	.8	1.0	1.7	1.3
21		1.4	1.2	1.3	.7		.7	.7	.8	0.9	1.7	1.3
22	1.4	1.3	1.2	1.3	.7		.7	.7	.8	.8	1.5	1.3
23	1.3	1.4	1.2	1.3	.7		.7	.7	.8	.9	1.5	1.3
24	1.2	1.4	1.2	1.3	.7		.7	.7	.8	1.0	1.5	1.4
25	1.3	1.4	1.1	1.3	.7		.7	.7	.8	1.0	1.4	1.4
26	1.4	1.4	1.1	1.2	.6		.7	.7	1.9	1.0	1.3	1.4
27	1.4	1.4	1.1	1.2	.6		.7	2.3	1.2	1.0	1.2	1.3
28	1.4	1.4	1.1	1.3	.5		.7	1.3	2.8	1.0	1.2	1.3
29	1.4		1.0	1.2	.3		.7	.7	.8	1.0	1.2	1.3
30	1.4		1.0	1.1	.3		.7	1.0	.8	1.0	1.2	1.3
31	1.4		1.0		.3		.7	.9		1.1		1.3

NOTE.—The river was dry from June 5 to July 5, inclusive.

Rating table for Penasco River near Dayton, N. Mex., from January 1, 1906, to June 30, 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.
0.70	0	0.90	3	1.10	13	1.30	35	1.50	73
0.80	0.4	1.00	7	1.20	23	1.40	53		

NOTE.—The above table is based on eight discharge measurements made during 1906 and is fairly well defined.

Monthly discharge of Penasco River near Dayton, N. Mex., for 1906.

Month.	Discharge in second-feet.			Total in acre-feet.
	Maximum.	Minimum.	Mean.	
January 22–31	53	23	46.4	920
February	73	35	53.1	2,950
March	53	7	20.2	1,240
April	53	7	28.3	1,680
May	13	0	2.2	135
June	0	0	0	0
The period				6,920

NOTE.—Discharges have not been computed after June 30, on account of the lack of measurements. Values are rated as follows: January to April, good; May, approximate.

DEVILS RIVER DRAINAGE BASIN.

DEVILS RIVER AT DEVILS RIVER, TEX.

This station was established in April, 1900, by the International (Water) Boundary Commission. It is opposite the Southern Pacific Railroad station at Devils River.

The river is about 50 miles in length, has a perennial flow, and during flood periods is subject to great fluctuations. No good location for a gaging station exists on this stream where it would be accessible from the railroad station. The conditions at the site chosen and the bench marks are described in Water-Supply Paper No. 174, page 123, where are given also references to publications that contain data for previous years.

Discharge measurements of Devils River near Devils River, Tex., in 1906, by E. E. Winter.

Date.	Area of section.	Gage height.	Discharge.	Date.	Area of section.	Gage height.	Discharge.
	Sq.-ft.	*Feet.*	*Sec.-ft.*		*Sq.-ft.*	*Feet.*	*Sec.-ft.*
January 2	372	2.4	502	June 23	360	2.25	418
January 10	372	2.4	445	June 29	357	2.25	412
January 18	372	2.4	447	July 7	474	2.7	920
January 26	356	2.4	451	July 12	794	3.7	1,939
January 30	362	2.4	444	July 20	545	2.9	1,026
February 6	357	2.4	426	July 26	463	2.8	731
February 10	361	2.4	417	July 30	467	2.8	771
February 16	357	2.4	415	August 4	491	2.8	806
February 20	364	2.4	425	August 9	642	3.25	1,525
February 24	359	2.4	417	September 2	566	2.95	915
February 27	364	2.4	422	September 5	572	2.95	934
March 5	364	2.4	425	September 14	558	2.9	891
March 14	357	2.35	365	September 21	549	2.85	872
March 19	356	2.35	393	September 29	546	2.85	849
March 26	358	2.35	397	October 4	535	2.8	831
March 30	358	2.35	393	October 12	533	2.8	811
April 10	355	2.35	417	October 20	527	2.8	754
April 13	392	2.45	536	October 30	506	2.7	719
April 21	352	2.25	400	November 5	492	2.65	715
April 26	352	2.25	398	November 13	507	2.7	727
April 29	353	2.3	401	November 22	507	2.7	699
May 4	364	2.3	411	November 30	505	2.7	698
May 9	357	2.25	391	December 8	497	2.7	711
May 16	359	2.25	393	December 15	494	2.7	688
May 21	362	2.25	404	December 19	499	2.7	679
June 5	987	4.3	2,600	December 31	486	2.65	687
June 13	385	2.4	577				

Daily gage height, in feet, of Devils River at Devils River, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.4	2.4	2.4	2.3	2.3	2.25	2.25	3.0	2.9	2.8	2.7	2.7
2	2.4	2.4	2.4	2.3	2.3	2.25	2.25	3.05	2.95	2.8	2.7	2.7
3	2.4	2.4	2.4	2.3	2.3	3.8	2.4	2.85	3.0	2.8	2.7	2.7
4	2.4	2.4	2.4	2.3	2.3	4.9	2.5	2.8	3.2	2.8	2.7	2.7
5	2.4	2.4	2.4	2.3	2.3	4.7	2.4	2.8	3.0	2.8	2.65	2.7
6	2.4	2.4	2.4	2.3	2.3	3.4	2.45	2.8	2.95	2.8	2.65	2.7
7	2.4	2.4	2.35	2.3	2.3	2.7	2.7	2.9	2.9	2.8	2.65	2.7
8	2.4	2.4	2.35	2.3	2.25	2.6	4.8	3.65	2.9	2.8	2.65	2.7
9	2.4	2.4	2.35	2.3	2.25	2.4	6.1	3.35	2.9	2.8	2.65	2.7
10	2.4	2.4	2.35	2.35	2.25	2.4	5.5	3.0	2.9	2.8	2.65	2.7
11	2.4	2.4	2.35	2.35	2.25	2.4	4.25	4.8	2.9	2.8	2.7	2.7
12	2.4	2.4	2.35	2.45	2.25	2.4	3.85	14.3	2.9	2.8	2.7	2.7
13	2.4	2.4	2.35	2.45	2.25	2.35	3.25	9.25	2.9	2.8	2.7	2.7
14	2.4	2.4	2.35	2.45	2.25	2.3	3.0	6.05	2.9	2.95	2.7	2.7
15	2.4	2.4	2.35	2.25	2.25	2.3	2.9	3.9	2.9	2.9	2.7	2.7
16	2.4	2.4	2.35	2.25	2.25	2.3	2.85	3.55	2.85	2.85	2.7	2.7
17	2.4	2.4	2.35	2.25	2.25	2.3	3.1	3.4	2.85	2.8	2.7	2.7
18	2.4	2.4	2.35	2.25	2.25	2.35	2.95	3.35	3.0	2.8	2.7	2.7
19	2.4	2.4	2.35	2.25	2.35	2.35	2.95	3.2	3.6	2.8	2.7	2.7
20	2.4	2.4	2.35	2.25	2.3	2.3	2.9	3.2	2.95	2.8	2.7	2.7
21	2.4	2.4	2.35	2.25	2.25	2.3	2.8	3.2	2.85	2.8	2.7	2.7
22	2.4	2.4	2.35	2.25	2.25	2.3	2.8	3.15	2.85	2.8	2.7	2.7
23	2.4	2.4	2.35	2.25	2.25	2.25	2.8	3.1	2.85	2.8	2.7	2.7
24	2.4	2.4	2.35	2.25	2.25	2.25	2.8	3.0	2.85	2.8	2.7	2.7
25	2.4	2.4	2.35	2.25	2.25	2.3	2.8	3.0	2.85	2.8	2.7	2.7
26	2.4	2.4	2.35	2.25	2.25	2.3	2.8	3.0	2.85	2.75	2.7	2.7
27	2.4	2.4	2.35	2.25	2.25	2.3	2.8	3.0	2.85	2.7	2.7	2.7
28	2.4	2.4	2.35	2.25	2.25	2.25	2.75	3.0	2.85	2.7	2.7	2.7
29	2.4	....	2.35	2.3	2.25	2.25	2.75	3.0	2.85	2.7	2.7	2.7
30	2.4	....	2.35	2.3	2.25	2.25	2.8	3.0	2.8	2.7	2.7	2.65
31	2.4	....	2.35	....	2.25	....	2.75	2.95	....	2.7	....	2.65

Daily discharge in second-feet of Devils River at Devils River, Tex., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	505	440	425	350	400	400	410	1,030	865	815	725	700
2	a 500	435	425	350	405	400	410	1,100	a 915	820	725	700
3	490	435	425	355	410	2,070	580	870	970	825	730	700
4	485	430	425	355	a 410	3,260	690	a 805	1,175	a 830	730	705
5	480	430	a 425	360	410	a3,040	580	805	a 980	830	a 715	705
6	470	a 425	425	360	410	1,650	640	805	935	825	715	705
7	465	425	390	365	410	900	a 920	960	890	825	715	710
8	460	420	390	365	390	800	3,080	2,160	890	820	715	a 710
9	450	420	385	370	a 390	585	6,770	a 1,680	890	820	715	710
10	a 445	a 415	385	a 415	390	580	4,970	1,120	890	815	715	705
11	445	415	380	425	390	580	2,510	3,050	890	815	725	700
12	445	415	375	525	390	a 575	a2,100	30,000	890	a 810	725	695
13	445	415	370	a 535	390	520	1,430	14,850	890	810	a 725	690
14	445	415	a 365	535	390	470	1,140	5,580	a 890	960	725	690
15	445	415	375	400	395	470	1,030	2,140	890	900	725	a 690
16	445'	415	380	400	a 395	470	970	1,650	850	840	720	685
17	445	415	385	400	395	470	1,250	1,450	850	780	715	685
18	a 445	420	390	400	400	520	1,080	1,390	1,000	770	710	680
19	445	420	a 395	400	460	520	1,080	1,210	1.720	760	710	a 680
20	445	a 425	395	400	430	470	a1,030	1,210	970	a 755	705	680
21	450	425	395	a 400	a 405	470	895	1,210	a 870	755	700	685
22	450	420	395	400	405	470	860	1,150	870	760	a 700	685
23	450	420	395	400	405	a 420	830	1,090	865	765	700	690
24	450	a 415	395	400	405	420	800	970	865	770	700	695
25	450	415	395	400	400	465	765	970	860	780	700	700
26	a 450	420	a 395	a 400	400	465	a 730	970	855	740	700	705
27	450	a 420	395	390	400	465	740	970	855	720	700	710
28	450	420	395	380	400	415	700	970	850	720	700	715
29	445	....	395	a 400	400	a 410	710	970	a 850	720	700	720
30	a 445	....	a 395	400	400	410	770	970	810	a 720	a 700	680
31	445	....	395	....	400	....	a 720	915	....	720	....	685

a Dates of measurements.

Monthly discharge of Devils River at Devils River, Tex., for 1906.

| Month. | Discharge in second-feet. | | | Total in acre-feet. |
	Maximum.	Minimum.	Mean.	
January	505	445	456	28,036
February	440	415	421	23,405
March	425	365	395	24,307
April	535	350	401	23,871
May	460	390	403	24,754
June	3,260	400	772	45,937
July	6,770	410	1,329	81,699
August	30,000	805	2,743	168,634
September	1,720	810	926	55,121
October	960	720	793	48,783
November	730	700	713	42,417
December	720	680	697	42,833
The year	30,000	350	837	609,797

SAN FELIPE CREEK DRAINAGE BASIN.

SAN FELIPE CREEK AT DEL RIO, TEX.

San Felipe Creek rises in four large springs northeast of Del Rio and flows southward into the Rio Grande. The waters of these springs are used in two large irrigation systems, the one on the west side of the creek having been in use for many years and the one on the east having been more recently constructed. The following table shows the discharge measurements that have been taken on the combined flow of the Madre ditch and the creek just south of the bridge of the Southern Pacific Railroad:

Discharge measurements of San Felipe Creek at Del Rio, Tex., 1895–1906.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-ft.	
December, 1895	C. C. Babb	99	
March, 1899	T. U. Taylor	113	
September, 1900	do	149	Rainy season.
December, 1901	C. N. Campbell	150	After Brackett flood.
September, 1902	T. U. Taylor	115	
March, 1904	do	118	Includes 38 second-feet in ditch.
August, 1905	do	103	
April, 1906	do	72	Includes 34 second-feet in ditch.

LAS MORAS CREEK DRAINAGE BASIN.

LAS MORAS CREEK NEAR BRACKETTVILLE, TEX.

Las Moras Creek, like its sister springs of the Edwards Plateau, rises very suddenly. It is located near the twin towns of Brackettville and Fort Clark, and threads its way between the two. It flows south, supporting many irrigation systems, and finally empties into the Rio Grande 25 miles above Eagle Pass. Its flow is extremely variable, being a reflex barometer of the season preceding, and, like the Leona at Uvalde, it gives a safe index of the rainfall of the Edwards Plateau for months before. The following table shows the discharge measurements that have been taken:

Discharge measurements of Las Moras Creek near Brackettville, Tex., 1895–1906.

Date.	Hydrographer.	Discharge.	Remarks.
		Sec.-ft.	
December, 1895	C. C. Babb	21	At foot bridge, Brackettville.
June, 1899	T. U. Taylor	60	At Mulligans Bend.
September, 1900	....do	51	Do.
September, 1902	....do	11	Do.
September, 1902	....do	11	Do.
March, 1904	....do	28	Do.
August, 1905	....do	14	Do.
April, 1906	....do	18	Do.

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous discharge measurements were made in the Rio Grande drainage basin in New Mexico in 1906:

Miscellaneous measurements in Rio Grande drainage basin in New Mexico in 1906.

Date.	Stream.	Locality.	Width.	Area of section.	Discharge.
			Feet.	*Sq. ft.*	*Sec.-ft.*
June 10	Black River	Malaga	7.5	4.4	8.5
June 10	....do	Johnson's ranch, near Malaga	4.5	3.5	7.6
June 29	....do	Keenan's ranch	2.4	0.56	0.59
June 29	....do	Blue Spring ranch	5.2	3.74	3.77
August 2	....do	Above Blue Spring ranch	4.5	4.3	3.7
June 29	East ditch	Blue Spring ranch	9.5	9.3	14.4
August 2	....do	....do	10.0	12.9	15.4
June 29	Smith Branch	Tullis ranch	3.4	1.48	0.83
August 2	....do	....do	4.5	2.3	2.43
June 29	Smith ditch	....do	5.9	4.09	2.17
August 2	....do	....do	4.5	2.14	0.77
August 2	Spillway on dam	Blue Spring ranch	10.0	1.5	0.6
June 29	West ditch	....do	7.0	6.0	2.09
August 2	....do	....do	7.0	8.4	2.0
June 7	West Valley ditch	Pecos, Tex	6.0	9.0	12.0

INDEX.

CLASSIFICATION OF THE PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY.

[Water-Supply Paper No. 210.]

The publications of the United States Geological Survey consist of (1) Annual Reports; (2) Monographs; (3) Professional Papers; (4) Bulletins; (5) Mineral Resources; (6) Water-Supply and Irrigation Papers; (7) Topographic Atlas of United States, folios and separate sheets thereof; (8) Geologic Atlas of United States, folios thereof. The classes numbered 2, 7, and 8 are sold at cost of publication; the others are distributed free. A circular giving complete lists can be had on application.

Most of the above publications can be obtained or consulted in the following ways:

1. A limited number are delivered to the Director of the Survey, from whom they can be obtained, free of charge (except classes 2, 7, and 8), on application.

2. A certain number are delivered to Senators and Representatives in Congress, for distribution.

3. Other copies are deposited with the Superintendent of Documents, Washington, D. C., from whom they can be had at practically cost.

4. Copies of all Government publications are furnished to the principal public libraries in the large cities throughout the United States, where they can be consulted by those interested.

The Professional Papers, Bulletins, and Water-Supply Papers treat of a variety of subjects, and the total number issued is large. They have therefore been classified into the following series: A, Economic geology; B, Descriptive geology; C, Systematic geology and paleontology; D, Petrography and mineralogy; E, Chemistry and physics; F, Geography; G, Miscellaneous; H, Forestry; I, Irrigation; J, Water storage; K, Pumping water; L, Quality of water; M, General hydrographic investigations; N, Water power; O, Underground waters; P, Hydrographic progress reports; Q, Fuels; R, Structural materials.

Series P.—The hydrographic progress reports contain the results of stream measurements. A report is issued for every calendar year, containing the results of data collected during that year. These reports were first published as a part of the Director's annual report or as a bulletin; they are now published as water-supply and irrigation papers. The following is a list, by years, of the publications containing the progress reports of stream measurements (* means out of stock). A detailed index of these reports (1888–1903) is published as Water-Supply Paper No. 119.

1888. Tenth Annual Report, Part II*.
1889. Eleventh Annual Report, Part II*.
1890. Twelfth Annual Report, Part II*.
1891. Thirteenth Annual Report, Part III*.
1892. Fourteenth Annual Report, Part II*.
1893. Bulletin No. 131*.
1894. Bulletin No. 131*; Sixteenth Annual Report, Part II*.
1895. Bulletin No. 140*.
1896. Water-Supply Paper No. 11*; Eighteenth Annual Report, Part IV*.
1897. Water-Supply Papers Nos. 15* and 16*; Nineteenth Annual Report, Part IV*.
1898. Water-Supply Papers Nos. 27* and 28*; Twentieth Annual Report, Part IV*.
1899. Water-Supply Papers Nos. 35*, 36*, 37*, 38*, and 39*; Twenty-first Annual Report, Part IV*.
1900. Water-Supply Papers Nos. 47, 48, 49, 50, 51, and 52; Twenty-second Annual Report, Part IV.
1901. East of Mississippi River, Water-Supply Papers Nos. 65* and 75*.
      West of Mississippi River, Water-Supply Papers Nos. 66 and 75*.

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WASHINGTON, D. C.

SEPTEMBER, 1907.

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