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SURFACE WATER SUPPLY
OF
HUDSON, PASSAIC, RARITAN, AND DELAWARE RIVER DRAINAGES

1906

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DISTRICT HYDROGRAPHERS

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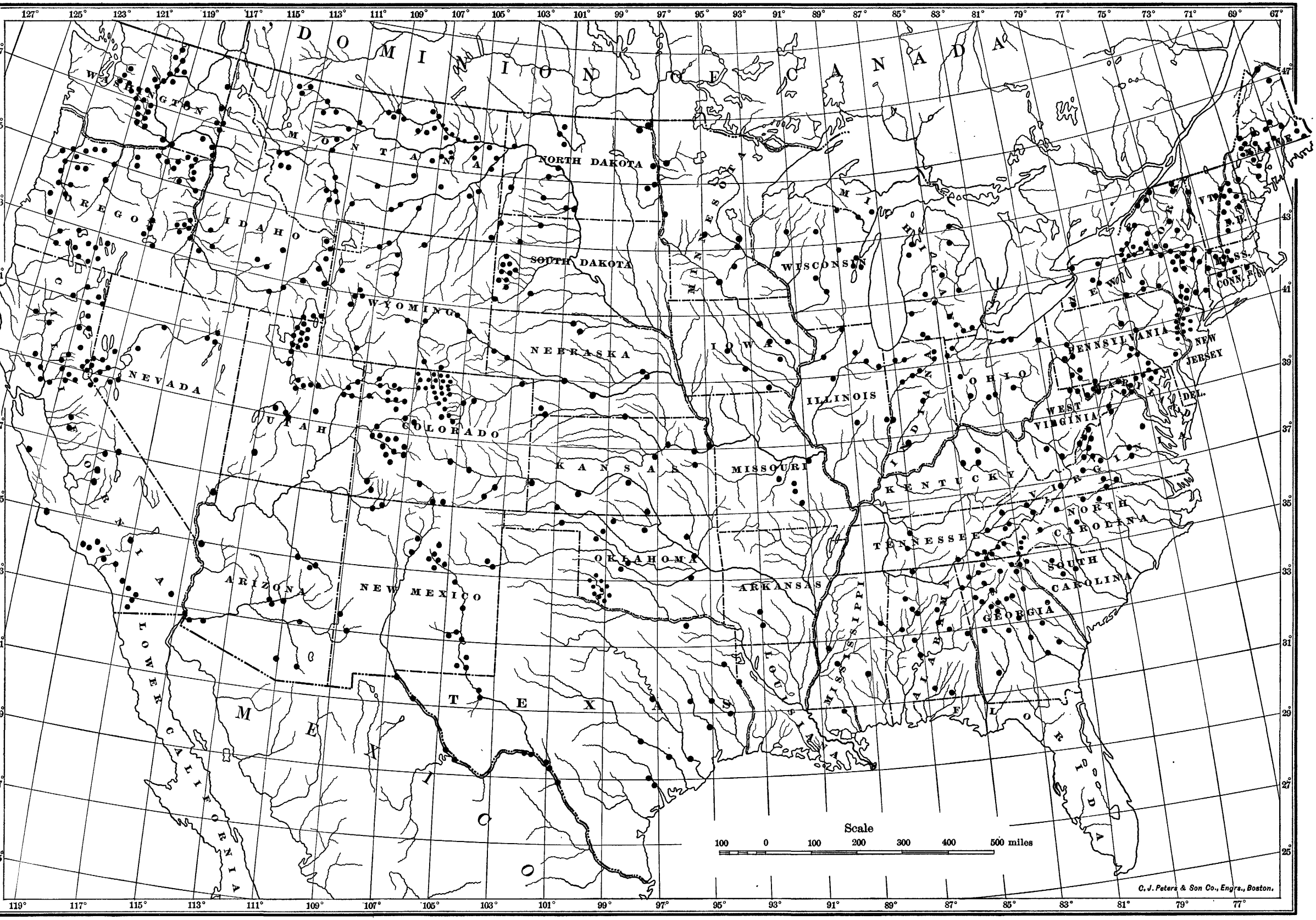

MAP OF UNITED STATES SHOWING LOCATION OF PRINCIPAL RIVER STATIONS MAINTAINED DURING 1906.

SURFACE WATER SUPPLY OF THE HUDSON, PASSAIC, RARITAN, AND DELAWARE RIVER DRAINAGES, 1906.[a]

H. K. Barrows and N. C. Grover,
District Hydrographers.[b]

INTRODUCTION.

SCOPE OF WORK.

The water supply of the United States is of more importance to the life and pursuits of the people than is 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 demand 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,

[a] The work in New York was under the direction of Mr. R. E. Horton for the first half of the year. During the last half of the year it was under the direction of Mr. H. K. Barrows, and assistance was rendered throughout the year by C. C. Covert. The work outside of New York State was carried on under the direction of Mr. N. C. Grover, assisted by members of the computing section.

[b] Computations were made and the data prepared for publication under the direction of John C. Hoyt, assisted by R. H. Bolster, F. F. Henshaw, Robert Follansbee, and H. D. Padgett.

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 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, the name of the hydrographer, the width and area of cross section, the gage height, and the discharge in second-feet.

The table of daily gage heights gives the daily fluctuations of the surface of the river as found from the mean of the gage readings taken each day. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. At most stations the gage is read in the morning and in the evening.

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

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

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

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

In most work where data in regard to flow are used the regimen of flow is of primary importance. Therefore for the principal stations tables have been prepared showing the horsepower that can be

developed at various rates of flow, and the length of time that these rates of flow and the corresponding horsepower are available. These tables have been prepared on a basis of 80 per cent efficiency on the turbines, and the horsepower per foot of fall is given in order that the reader can determine the horsepower for any fall.

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

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

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

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

CONVENIENT EQUIVALENTS.

Following is a table of convenient equivalents for use in hydraulic computations:

1 second-foot equals 40 California miner's inches (law of March 23, 1901).
1 second-foot equals 38.4 Colorado miner's inches.
1 second-foot equals 40 Arizona miner's inches.
1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,272 gallons for one day.
1 second-foot equals 6.23 British imperial gallons per second.
1 second-foot for one year covers 1 square mile 1.131 feet, or 13.572 inches deep.
1 second-foot for one year equals 31,536,000 cubic feet.
1 second-foot equals about 1 acre-inch per hour.
1 second-foot for one day covers 1 square mile 0.03719 inch deep.
1 second-foot for one 28-day month covers 1 square mile 1.041 inches deep.
1 second-foot for one 29-day month covers 1 square mile 1.079 inches deep.
1 second-foot for one 30-day month covers 1 square mile 1.116 inches deep.
1 second-foot for one 31-day month covers 1 square mile 1.153 inches deep.
1 second-foot for one day equals 1.983 acre-feet.
1 second-foot for one 28-day month equals 55.54 acre-feet.
1 second-foot for one 29-day month equals 57.52 acre-feet.

1 second-foot for one 30-day month equals 59.50 acre-feet.
1 second-foot for one 31-day month equals 61.49 acre-feet.
100 California miner's inches equal 15.7 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: $\frac{\text{Sec.-ft.} \times \text{fall in feet}}{11}$ = net horsepower on water-wheel, realizing 80 per cent of theoretical power.

FIELD METHODS OF MEASURING STREAM FLOW.

The methods used in collecting these data and in preparing them for publication are given in detail in Water-Supply Papers No. 94 (Hydrographic Manual, U. S. Geological 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; (3) those with constantly shifting beds. In determining the daily flow, special methods are necessary for each class. The data upon which these

determinations are based and the method 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 the area of the cross section. The method chosen for any case depends upon 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 the 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

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

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.

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

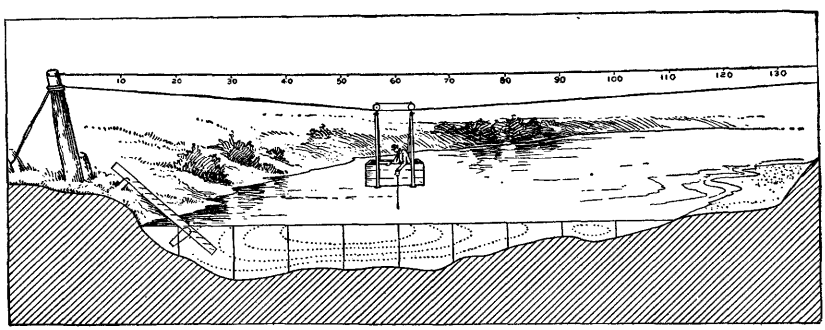

FIG. 1.—Cable station, showing section of river, car, gage, etc.

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

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

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

In the other principal single-point method the meter is held near the surface, usually 1 foot below, or low enough to be out of the effect of the wind or other disturbing influences. This is known as the subsurface method. The coefficient for reducing the velocity taken at the subsurface to the mean has been found to be from 0.85 to 0.95, depending upon 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 upon 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 upon 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 upon the type of dam and other conditions near its crest. After inserting in the weir formula the measured length of crest and 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 upon 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 upon 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.

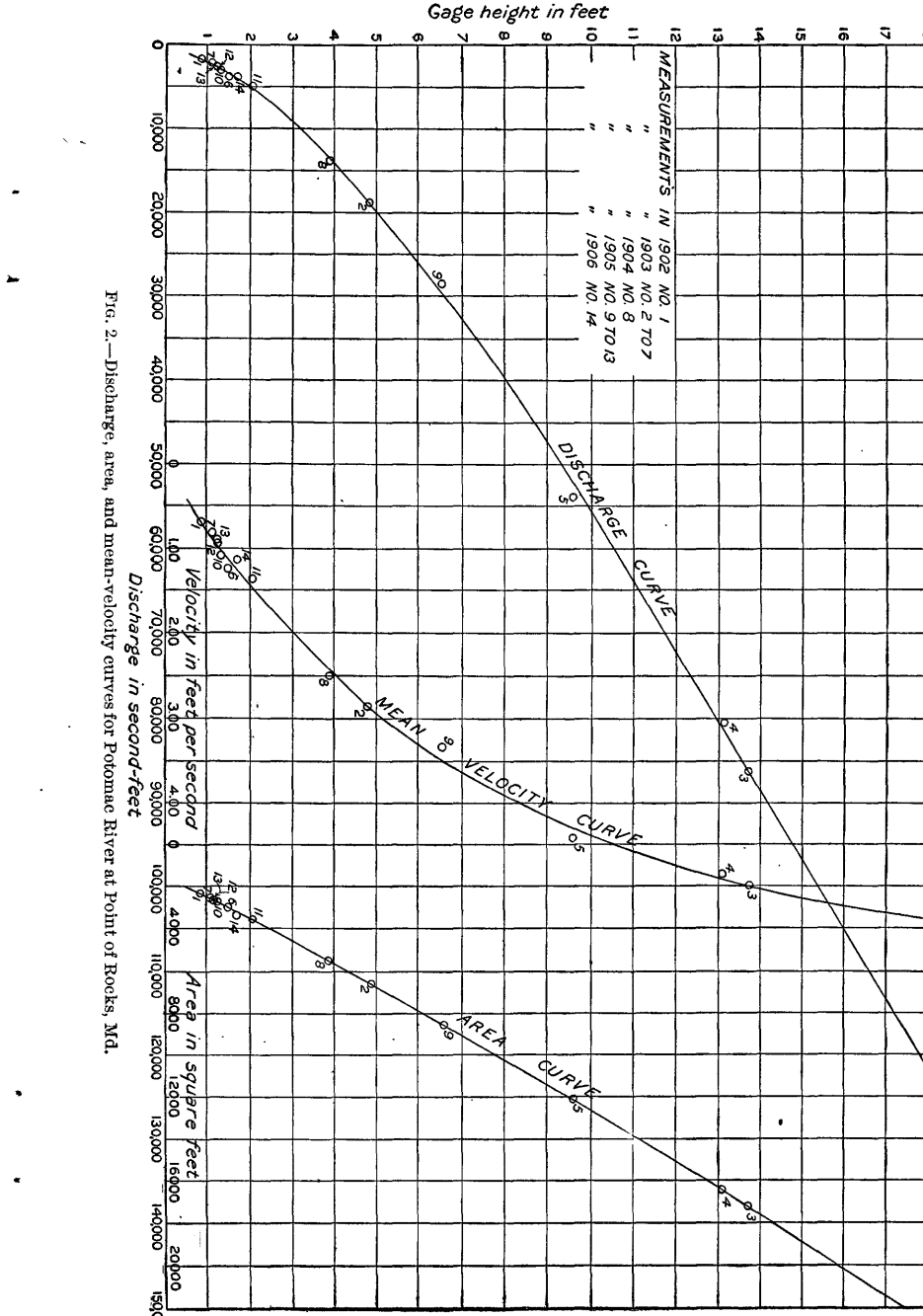

FIG. 2.—Discharge, area, and mean-velocity curves for Potomac River at Point of Rocks, Md.

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

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

The determination of daily discharge of streams with changeable beds is a difficult problem. In case there is a weir or dam available, a condition which seldom exists on streams of this class, the discharge can be determined by its use. In case of velocity-area stations frequent discharge measurements must be made if the determinations of flow are to be other than rough approximations. For stations with beds which shift slowly, or are materially changed only during floods, rating tables can be prepared for periods between such changes and satisfactory results obtained with a limited number of measurements, provided that some of them are taken soon after the change occurs. For streams with continually shifting beds, such as the Colorado and Rio Grande, discharge measurements should be made every two or three days and the discharge 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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Assistance has been rendered or records furnished by the following, to whom special acknowledgment is due:

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HUDSON RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

The principal sources of Hudson River lie in the wildest portion of the Adirondack Mountains, in Essex County, northeastern New York. A number of branches, any one of which might possibly be considered the main stream, form its upper waters; but if the highest collected and permanent body of water be assumed as the true head, then the

source of the Hudson becomes Lake Tear-of-the-Clouds, which lies at an elevation of 4,322 feet above tide, in the center of the triangle formed by Mounts Marcy and Skylight and Gray Peak.

The river flows rather irregularly southward until it reaches the northern boundary of Saratoga County, when it makes a sharp turn and flows eastward for about 12 miles by general course, passing through the mountains and forming, as it cuts across the rocky strata, several falls of great height and beauty. At Sandy Hill, just below Glens Falls, it makes another abrupt turn and flows southward, continuing in this direction until it empties into New York Bay.

From Lake Tear-of-the-Clouds to the mouth of the river the distance by water is probably about 300 miles. The total area drained is 13,370 square miles. The river is tidal to Troy, which is also at the head of navigation.

The fall in the upper portion of the course is very rapid, amounting to about 64 feet per mile from Lake Tear-of-the-Clouds to North Creek, a distance of about 52 miles. From the mouth of North Creek to the mouth of the Sacondaga the descent is nearly 14 feet per mile, distributed among rapids which diminish in frequency as the Sacondaga is approached. In the succeeding 26 miles to Fort Edward the river descends 418 feet more, but of this 175 feet is comprised in the three abrupt pitches at Palmer, Glens, and Bakers falls, while most of the remainder occurs in the rapids between Jessups Landing and the oxbow above Glens Falls. Between Glens Falls and Troy nearly the entire fall of the river is utilized for the development of water power.

The tributaries of the Hudson are numerous, and many of them are large and important. Indian River, Schroon River, and the Sacondaga unite with the main stream above Glens Falls, and between the latter point and Troy it receives Batten Kill, Fish Creek, Hoosic River, and the Mohawk. The tributaries below Troy include Catskill, Esopus, and Rondout creeks, and Wallkill River from the west, and Kinderhook Creek, Jansen Kill, Wappinger Creek, Fishkill Creek, and Croton River from the east.

Mohawk River, the largest of the tributary streams, rises in the sandy hills south of Booneville, in western New York, about 40 miles from the east end of Lake Ontario. Its uppermost tributaries are fed by large springs, and in addition the stream receives considerable water brought in from the adjacent Black River drainage basin for the supply of the Black River and Erie canals.

The Mohawk flows southward until it reaches the city of Rome, at which point it turns to the east, flowing across the State in a course a little east of south until it enters the Hudson at Cohoes, a few miles above Troy. It has a length by actual course of 140 to 145 miles, and a drainage area, measured at the mouth, of 3,470 square miles.

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Above Rome the Mohawk flows through a deep gorge in shale rock; from Rome eastward to Little Falls the valley is deeply filled with alluvial deposits, and the flood plains on either side become submerged during freshets, thus acting to some extent as storage reservoirs. At Little Falls the river cuts through a rocky gorge, whose walls rise precipitously 500 or 600 feet.

Below Rome the fall of the river is small and rather uniform, being made up of long, quiet reaches with slight riffles; but at Little Falls this uniformity is broken, and the stream descends in a succession of falls about 45 feet in less than half a mile. The average fall between Rome and the lower aqueduct at Crescent, a distance of 110.7 miles, is 2.43 feet per mile; thence to the level of slack water above Troy dam there is a further descent of 149.5 feet in 4.4 miles, but of this 105 feet is included in the improved power at Cohoes.

The principal tributaries of the Mohawk below the source are successively, Oriskany, West Canada, East Canada, and Schoharie creeks.

The Erie Canal runs parallel to the Mohawk through most of its course below Rome and derives a part of its water supply from the river. Feeder dams for purposes of diversion are located on the river at Delta, Rome, Little Falls, Rocky Rift, and Rexford Flats. A dam at Oriskany Creek also diverts into the canal a portion of the flow of that tributary, as well as waters brought into the Mohawk basin from storage reservoirs located in the upper drainage basin of Chenango River near Hamilton, N. Y. There is also a diversion dam near the mouth of Schoharie Creek, the largest tributary of the Mohawk.

The annual precipitation in the Hudson River basin, as determined by observations at twelve or more stations, is about 37 inches, but the amount is undoubtedly much greater in the elevated country near the headwaters.

The flow of the upper Hudson is controlled to some extent during the dry season by the use of Indian Lake storage reservoir, and the facilities for storage works in this part of the basin are unsurpassed. The entire region is dotted with ponds and lakes, many of them of large size and fed from extensive drainage areas. Saratoga Lake serves as a regulator of Fish Creek, and there is a small reservoir at the headwaters of the Hoosic. Storage is also extensively developed in the basin of Croton River for the purpose of supplying the city of New York with water. The flow of the Mohawk above the gaging stations at Little Falls and Dunsbach Ferry is modified during the season of canal navigation, extending from about May 1 to December 1.

Except that of the Delaware, the basin of the Hudson contains a greater population in proportion to its size than any other important river basin in the United States. This population is largely concentrated along the great highway of traffic which follows the valley of the Mohawk from the west and then continues down the lower Hudson.

HUDSON RIVER AT FORT EDWARD, N. Y.

This station was established in 1895, in connection with the upper Hudson storage surveys. It is located at the dam of the International Paper Company. A new and accurate profile of the crest of the dam, obtained in 1906, has been used to determine the discharge. The conditions at the station are described in the annual reports of the State engineer and surveyor of New York, and in Water-Supply Paper No. 166, page 18, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Hudson River at Fort Edward, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8,392	9,962	6,343	10,763	12,006	10,837	7,940	3,662	2,175	3,143	3,168	3,843
2	7,569	5,937	5,338	10,532	12,637	7,723	13,065	3,174	3,756	2,738	3,293	5,902
3	5,740	5,586	4,351	10,147	13,658	8,529	11,354	4,229	5,006	2,616	1,693	4,355
4	5,674	5,548	10,572	10,579	13,275	8,782	9,046	1,685	2,904	2,882	4,274	4,016
5	6,434	5,995	12,421	12,110	13,280	5,845	10,672	3,563	1,931	2,409	2,630	2,366
6	5,461	4,139	10,709	11,517	12,959	4,781	9,208	4,030	5,124	2,063	2,207	2,803
7	8,703	3,876	10,058	10,339	12,639	5,140	5,913	3,634	3,493	3,840	2,763	3,887
8	6,266	4,425	9,309	10,070	11,629	6,287	7,351	2,870	2,215	2,653	2,660	3,382
9	3,891	4,348	8,632	10,579	12,386	7,105	6,728	2,630	4,091	2,493	2,738	3,289
10	3,469	2,160	7,264	9,358	11,376	10,262	5,156	2,432	3,871	2,291	1,320	3,051
11	3,154	6,080	6,858	8,217	11,054	11,356	5,240	1,666	2,813	2,616	4,091	2,099
12	3,540	5,492	6,534	8,383	9,389	12,976	4,841	769	2,739	2,368	2,904	2,520
13	2,200	4,054	6,229	8,968	9,550	9,126	4,552	2,468	2,728	1,472	3,478	2,396
14	6,030	4,548	4,520	10,741	12,384	7,977	2,188	2,354	2,259	3,588	2,127	2,565
15	5,740	4,590	4,327	22,379	14,774	7,171	5,642	1,694	1,816	2,491	2,930	2,881
16	4,351	3,775	4,253	23,026	11,753	2,262	5,865	1,512	3,233	2,409	3,025	1,972
17	4,742	1,493	2,083	27,046	9,556	5,865	3,744	1,602	2,697	2,572	1,459	4,991
18	4,640	6,984	5,672	27,687	10,087	9,108	3,311	830	2,638	2,572	6,534	3,994
19	3,720	4,821	4,779	27,687	9,642	8,533	3,238	4,091	2,616	2,409	4,140	3,950
20	1,726	4,343	3,881	28,467	9,837	8,442	2,289	2,284	2,904	1,871	4,260	3,419
21	6,374	3,730	3,208	27,023	8,618	7,237	870	3,644	2,885	2,235	6,346	3,744
22	7,397	4,371	3,490	25,000	7,890	5,928	324	3,092	1,756	6,951	7,034	3,364
23	8,014	5,795	3,705	26,796	5,238	4,892	4,226	3,707	4,091	4,245	8,521	5,604
24	14,158	5,498	2,216	24,096	7,253	8,180	2,892	3,634	3,456	3,781	7,0:9	5,845
25	18,047	6,984	5,139	20,824	7,981	8,910	2,718	1,896	2,867	3,787	7,115	2,235
26	17,080	8,069	3,429	17,726	8,076	6,816	2,325	1,546	2,225	3,146	7,789	3,825
27	14,350	7,640	3,764	14,875	9,979	6,172	2,026	4,924	2,742	2,412	6,203	2,390
28	13,788	7,274	4,916	11,009	14,811	4,353	1,116	3,512	2,823	4,823	6,268	2,718
29	12,314	.....	9,163	11,523	14,342	3,818	4,187	3,405	1,823	6,555	7,464	2,906
30	12,197	.....	9,556	11,517	12,637	1,674	4,743	2,910	3,504	3,953	7,539	1,841
31	9,872	.....	9,746	.....	12,384	.....	3,515	3,549	.....	3,522	.....	4,343

Monthly discharge of Hudson River at Fort Edward, N. Y., for 1906.

[Drainage area, 2,800 square miles.]

Month.	Discharge in second-feet			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	18,000	1,730	7,580	2.71	3.12
February	9,960	1,490	5,270	1.88	1.96
March	12,400	2,080	6,210	2.22	2.56
April	28,500	8,220	16,300	5.82	6.49
May	14,800	5,240	11,100	3.96	4.56
June	13,000	1,670	7,200	2.57	2.87
July	13,100	324	5,040	1.80	2.08
August	4,920	769	2,810	1.00	1.15
September	5,120	1,760	2,970	1.06	1.18
October	6,950	1,470	3,130	1.12	1.29
November	8,520	1,320	4,440	1.59	1.77
December	5,900	1,840	3,440	1.23	1.42
The year	28,500	324	6,290	2.25	30.45

HUDSON RIVER AT MECHANICSVILLE, N. Y.

A record of the flow of Hudson River at Mechanicsville has been kept by the Duncan Company since December, 1888. The record includes two daily readings of the depth on the crest of the dam and a continuous record of the run of the water wheels in the adjoining paper mill. The accompanying tables, computed by Mr. R. P. Bloss, the engineer of the company, show the daily and monthly mean flow at Mechanicsville. The conditions at the station are described in Water-Supply Paper No. 166, page 20, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Hudson River at Mechanicsville, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	9,079	10,307	7,212	15,894	14,105	14,947	7,238	4,753	3,441	3,470	4,318	6,571
2	7,066	9,631	7,176	14,263	12,941	13,222	13,393	4,647	2,324	2,879	4,134	5,492
3	6,614	6,768	7,064	12,720	16,631	11,554	12,086	4,067	1,581	3,155	3,944	6,363
4	7,207	3,924	23,939	12,882	15,984	10,675	9,450	4,251	3,511	3,189	2,447	4,443
5	8,548	6,599	13,643	15,297	15,863	8,895	10,816	3,092	3,284	3,166	3,770	4,479
6	6,303	5,939	11,157	15,338	16,306	8,107	9,440	4,049	3,012	2,735	3,499	3,635
7	6,575	6,276	10,672	15,276	14,111	8,342	8,880	4,126	4,313	1,431	3,457	5,315
8	7,388	6,187	10,050	12,398	12,750	8,232	5,853	4,160	3,906	3,342	3,535	5,208
9	5,861	6,470	10,443	13,956	12,957	8,246	6,399	3,801	2,414	3,121	3,398	4,029
10	5,609	6,770	9,943	14,230	10,155	10,567	6,118	3,695	3,438	2,942	3,228	3,690
11	5,804	4,317	7,814	14,544	13,017	12,781	6,000	2,610	3,248	2,878	2,150	4,447
12	5,818	5,822	9,130	14,110	12,465	14,395	6,032	2,468	3,308	2,868	3,814	3,737
13	7,685	5,690	7,487	13,704	10,145	10,110	5,773	3,989	3,161	2,745	4,256	4,444
14	5,820	5,548	7,021	16,309	1_,722	8,608	5,432	3,912	2,753	872	4,589	4,312
15	7,204	6,222	7,432	21,897	12,701	8,273	3,069	3,160	2,797	2,879	3,740	4,579
16	6,132	5,883	6,008	40,279	13,615	8,379	4,765	3,308	620	2,818	3,751	4,723
17	7,600	5,484	6,391	33,922	11,419	7,487	4,979	2,926	3,314	2,414	3,958	5,969
18	6,599	5,183	4,109	33,159	11,087	9,928	5,399	2,562	3,063	2,869	2,724	5,954
19	6,297	7,418	6,455	31,888	10,877	9,928	4,672	585	3,086	2,837	7,038	5,258
20	5,818	6,101	6,159	31,522	8,964	8,925	4,395	2,872	3,108	2,858	7,782	5,306
21	4,929	6,014	5,668	31,104	8,573	7,699	3,770	2,540	3,097	3,116	7,347	4,777
22	9,849	12,280	5,694	29,575	8,507	6,907	187	2,976	3,108	5,711	8,535	5,729
23	11,564	10,643	5,670	29,046	7,545	6,780	4,025	3,279	2,328	5,086	8,632	4,096
24	22,043	9,426	5,129	28,147	7,514	10,152	4,585	3,318	6,497	4,467	8,549	4,386
25	20,426	7,817	2,830	23,723	8,079	10,185	4,449	3,343	3,321	4,224	5,903	4,582
26	17,912	13,489	4,993	20,240	9,600	8,243	3,811	2,451	3,246	4,400	7,658	4,778
27	17,119	10,842	11,405	18,732	12,348	7,600	3,855	4,486	3,032	4,251	6,976	4,454
28	13,925	17,155	16,972	16,488	26,892	6,849	3,794	4,737	3,233	3,153	6,572	4,440
29	14,137	.....	15,979	12,718	27,833	6,369	1,738	4,410	3,166	5,371	7,149	3,997
30	10,972	.....	13,063	14,514	20,204	6,302	3,865	4,054	1,435	4,709	6,964	5,348
31	10,564	.....	14,364	.....	18,135	.....	4,927	3,333	.....	4,508	.....	6,348

Monthly discharge of Hudson River at Mechanicsville, N. Y., for 1906.

[Drainage area, 4,500 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec. ft. per sq. mile.	Depth in inches.
January	22,000	4,930	9,310	2.07	2.39
February	17,200	3,920	7,650	1.70	1.77
March	23,900	2,830	9,000	2.00	2.31
April	40,300	12,400	20,600	4.58	5.11
May	27,800	7,510	13,400	2.98	3.44
June	14,900	6,300	9,290	2.06	2.30
July	13,400	187	5,780	1.28	1.48
August	4,750	585	3,480	.773	.89
September	6,500	620	3,070	.682	.76
October	5,710	872	3,370	.749	.86
November	8,630	2,150	5,120	1.14	1.27
December	6,570	3,640	4,870	1.08	1.24
The year	40,300	187	7,910	1.76	23.82

INDIAN LAKE RESERVOIR AT INDIAN LAKE, NEW YORK.

A record of the stage of water in Indian Lake reservoir, located in the upper Hudson River basin, as described in preceding reports, has been continued. The conditions at the station are described in Water-Supply Paper No. 166, page 24, where are given also references to publications that contain data for previous years.

Daily gage height, in feet, of Indian Lake reservoir, at Indian Lake, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.42	31.75	23.83	15.54	28.33	32.50	34.25	32.71	26.83	16.75	10.04	6.83
2	33.50	31.58	23.54	15.33	28.83	32.42	34.50	32.58	26.58	16.42	9.83	6.67
3	33.58	31.42	23.25	15.17	29.25	32.33	34.62	32.54	26.42	16.17	9.67	6.50
4	33.67	31.25	23.00	15.17	29.67	32.25	34.62	32.50	26.25	15.92	9.50	6.75
5	33.75	30.92	22.92	15.33	30.08	32.33	34.58	32.42	26.08	15.67	9.29	7.00
6	33.79	30.75	22.58	15.58	30.38	32.42	34.62	32.33	25.92	15.42	9.08	7.08
7	33.83	30.46	22.29	15.75	30.67	32.50	34.58	32.25	25.42	15.08	8.92	7.25
8	33.88	30.17	22.00	15.92	30.92	32.67	34.58	32.13	25.00	14.75	8.75	7.50
9	33.92	29.92	21.67	16.04	31.12	32.83	34.54	32.00	24.92	14.50	8.58	7.75
10	33.71	29.62	21.33	16.17	31.33	32.92	34.50	31.92	24.17	14.25	8.42	7.92
11	33.50	29.33	21.00	16.33	31.50	32.42	34.50	31.83	23.75	14.00	8.25	8.08
12	33.29	29.00	20.67	16.50	31.75	32.50	34.46	31.71	23.33	13.75	8.13	8.17
13	33.08	28.67	20.33	16.67	32.00	32.58	34.42	31.58	22.92	13.50	8.00	8.25
14	32.92	28.33	20.00	16.92	32.25	32.62	34.42	31.42	22.58	13.25	7.83	8.33
15	32.75	28.00	19.79	17.67	32.46	32.67	34.38	31.29	22.21	13.00	7.62	8.00
16	32.58	27.71	19.42	18.67	32.67	32.75	34.33	31.21	21.83	12.75	7.50	7.75
17	32.42	27.42	19.21	19.50	32.62	32.88	34.29	31.13	21.50	12.50	7.38	7.58
18	32.17	27.08	19.00	20.50	32.58	33.00	34.25	31.00	21.08	12.25	7.25	7.42
19	32.00	26.83	18.67	21.50	32.50	33.08	34.21	30.83	20.67	12.00	7.25	7.25
20	31.83	26.58	18.33	22.58	32.38	33.17	34.17	30.58	20.33	12.00	7.25	7.00
21	31.75	26.33	18.00	23.58	32.25	33.21	34.13	30.29	20.00	11.88	7.21	6.83
22	31.67	26.08	17.79	24.58	32.17	33.33	33.92	29.92	19.62	11.67	7.25	6.67
23	31.75	25.67	17.42	25.50	32.08	33.42	33.83	29.58	19.25	11.50	7.25	6.50
24	32.08	25.42	17.25	25.96	32.08	33.50	33.67	29.17	18.92	11.25	7.29	6.33
25	32.33	25.08	17.00	26.42	32.17	33.58	33.42	28.83	18.58	11.21	7.25	6.17
26	32.42	24.75	16.75	26.83	32.33	33.62	33.29	28.50	18.25	11.08	7.21	6.00
27	32.42	24.42	16.58	27.17	32.54	33.67	33.17	28.25	17.92	10.96	7.17	5.83
28	32.33	24.08	16.33	27.42	32.67	33.75	33.08	28.00	17.58	10.88	7.08	5.67
29	32.21	.....	16.08	27.67	32.75	33.83	33.00	27.67	17.25	10.67	7.00	5.50
30	32.08	.....	15.92	28.00	32.67	33.92	32.92	27.33	17.00	10.54	6.92	5.33
31	31.96	.....	15.75	.....	32.58	.....	32.83	27.08	.....	10.25	.....	5.29

NOTE.—The reservoir gates were open during the greater portion of the year, the closed period being as follows: January 1 to 7, April 5 to May 11, July 4 to 18, December 5 to 13.

HOOSIC RIVER AT BUSKIRK, N. Y.

This station was established September 25, 1903, at the highway bridge in Buskirk village. The conditions and the bench marks are described in Water-Supply Paper No. 166, page 25, where are given also references to publications that contain data for previous years.

Discharge measurements of Hoosic River at Buskirk, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec. ft.*
February 10[a]	Covert & Weeks	130	576	3.90	709
August 3	C. C. Covert	126	377	1.90	336
August 22	do	126	377	1.86	328
October 10	do	115	328	1.50	171

[a] River frozen over, average thickness of ice 0.54 foot; considerable needle ice. Gage height to bottom of ice, 3.26 feet.

Daily gage height, in feet, of Hoosic River at Buskirk, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.52	2.68	2.60	3.55	2.95	3.52	2.42	2.50	1.60	1.55	1.85	2.42
2	2.50	2.68	2.70	3.32	3.32	3.15	2.35	2.12	1.55	1.55	1.80	2.25
3	2.55	3.75	2.65	3.25	4.20	3.10	2.95	2.08	1.48	1.60	1.72	2.28
4	2.62	3.82	8.05	3.30	3.50	2.90	2.80	2.02	1.85	1.50	1.65	3.45
5	2.82	4.00	4.15	4.25	3.05	2.65	2.75	2.10	1.75	1.55	1.75	3.40
6	2.80	3.58	3.25	4.28	3.15	2.92	2.55	2.05	1.68	1.48	1.88	3.65
7	2.52	3.80	3.05	3.85	3.15	2.58	2.42	2.02	1.65	1.30	1.68	5.90
8	2.68	3.68	2.55	3.38	2.95	3.10	2.20	2.02	1.65	1.38	1.80	4.35
9	2.40	3.70	2.92	3.80	3.25	3.22	2.28	1.85	1.40	1.35	1.70	4.60
10	2.50	3.70	2.65	3.88	4.05	4.05	2.25	1.90	1.55	1.80	1.65	4.95
11	4.22	3.52	2.45	4.45	3.42	4.25	2.22	1.98	1.52	1.90	1.72	4.60
12	3.95	3.65	2.50	4.35	3.20	3.40	2.08	2.10	1.52	1.92	2.50	4.40
13	3.42	3.65	2.30	4.25	3.02	2.90	2.10	2.05	1.55	1.82	2.25	4.75
14	2.82	3.68	2.45	4.48	3.45	2.72	1.98	1.90	1.62	1.68	2.20	4.42
15	2.65	3.68	2.35	8.90	3.02	2.65	1.78	1.80	1.62	1.72	1.88	4.50
16	2.48	3.55	2.40	9.35	2.90	2.52	1.78	1.65	1.48	1.68	1.90	5.55
17	2.88	3.60	2.35	6.10	2.78	2.62	1.95	1.65	1.38	1.60	1.85	5.38
18	2.60	3.32	2.10	5.38	2.72	2.82	2.85	1.50	1.30	1.60	1.82	4.70
19	2.55	3.52	2.30	5.08	2.58	2.58	2.30	1.40	1.40	1.60	4.30	4.45
20	2.32	3.60	2.28	4.90	2.58	2.50	2.15	1.52	1.28	2.52	3.42	4.38
21	3.02	3.85	2.25	4.48	2.48	2.50	2.00	1.70	1.40	3.05	3.15	4.75
22	3.70	6.85	2.22	4.28	2.35	2.32	2.02	1.80	1.55	2.48	3.35	4.90
23	5.38	3.95	2.20	4.05	2.28	2.40	2.10	1.82	1.85	2.22	3.28	.....
24	6.50	3.40	2.25	3.80	2.30	4.30	2.40	1.75	1.98	2.12	3.15	.....
25	4.15	3.25	2.00	3.70	2.35	3.18	2.18	1.62	1.75	2.00	2.70	.....
26	3.58	4.85	2.35	3.40	2.52	2.55	1.90	1.52	1.62	2.28	2.60	.....
27	3.32	3.45	6.60	3.25	4.40	2.45	1.92	1.60	1.70	2.10	2.50	.....
28	3.05	2.65	5.55	3.15	8.59	2.30	1.82	2.02	1.65	2.02	2.52	.....
29	2.92	.....	3.90	2.95	6.55	2.32	1.80	1.82	1.65	2.22	2.40	.....
30	2.82	.....	3.60	2.95	4.82	2.40	2.00	1.75	1.48	1.95	2.40	.....
31	2.78	.....	3.80	.....	4.10	.....	2.50	1.65	.....	2.08	.....	.....

NOTE.—Ice conditions January 10–13: River frozen over solid at bridge February 1 to 22; ice from 0.3 to 0.75 foot thick. Ice went out of river during night of February 22. No ice in river during March except anchor ice. Anchor ice January 1, 2, 7, and 26, February 10 and 11, March 15, 16, and 19.

Ice conditions in December: Anchor ice running from December 3 to 8. December 9 gage height was to ice surface; December 17 the river was frozen over solid, and records were discontinued. Ice went out of river December 31.

During the frozen period of January and February readings were taken to water surface through hole cut in ice; for December readings were to top of ice.

Rating table for Hoosic River at Buskirk, N. Y., for 1903–1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.20	74	2.40	642	3.60	1,614	5.60	4,040
1.30	106	2.50	704	3.70	1,716	5.80	4,320
1.40	140	2.60	769	3.80	1,822	6.00	4,600
1.50	176	2.70	837	3.90	1,930	6.20	4,890
1.60	216	2.80	909	4.00	2,040	6.40	5,180
1.70	260	2.90	985	4.20	2,265	6.60	5,480
1.80	308	3.00	1,065	4.40	2,495	6.80	5,780
1.90	359	3.10	1,149	4.60	2,735	7.00	6,080
2.00	412	3.20	1,236	4.80	2,985	8.00	7,630
2.10	467	3.30	1,326	5.00	3,240	9.00	9,230
2.20	524	3.40	1,419	5.20	3,500	10.00	10,880
2.30	582	3.50	1,515	5.40	3,770		

NOTE.—The above table is applicable only for open-channel conditions. It is based on discharge measurements made during 1903–1906, and is fairly well defined between gage heights 1.6 feet and 7.0 feet.

Monthly discharge of Hoosic River at Buskirk, N. Y., for 1906.

[Drainage area, 579 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January[a]	5,330	.....	1,150	1.99	2.29
February[b]	.....	.....	1,030	1.78	1.85
March	7,710	412	1,330	2.30	2.65
April	9,810	1,020	2,580	4.46	4.98
May	8,570	570	1,610	2.78	3.20
June	2,380	582	1,030	1.78	1.99
July	1,020	298	545	.941	1.08
August	704	140	339	.585	.67
September	401	100	214	.370	.41
October	1,110	106	357	.617	.71
November	2,380	74	600	1.04	1.16
December[c]	.....	.....	.....	.....	.....

[a] Ice conditions January 10 to 13; discharge estimated 600 second-feet. Assumed that anchor ice did not materially affect the flow.

[b] Ice conditions February 1 to 22; discharge estimated 700 second-feet February 1 to 21, and 4,000 second-feet February 22 on the assumption that there was more or less back water due to ice conditions.

[c] A comparison of the flow at this station from December 1 to 22 with that of the Mohawk River at Dunsbach Ferry Bridge indicates that the mean flow for December was less than 750 second-feet.

NOTE:—Values are rated as follows: January, good; February, fair; March to November, excellent.

MOHAWK RIVER AT LITTLE FALLS, N. Y.

This station is located at the lower (Gilbert's) dam at Little Falls, N. Y. The conditions are described in Water Supply Paper No. 166, page 28, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Mohawk River at Little Falls, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	July.	Day.	Jan.	Feb.	Mar.	Apr.	May.	July.
1	3,560	2,590	1,820	6,410	2,160	574	17	2,690	1,060	1,140	10,730	1,770	903
2	3,470	1,590	1,660	4,830	1,810	1,120	18	2,240	1,140	1,130	8,790	1,570	1,040
3	2,080	839	1,520	3,130	5,910	3,560	19	2,290	1,210	921	6,880	1,400	810
4	1,990	1,210	5,810	3,580	5,820	4,960	20	1,960	1,210	914	6,520	842	704
5	3,790	1,270	5,000	5,450	4,270	3,570	21	3,030	2,910	1,020	6,950	796	600
6	3,820	1,110	5,000	5,380	3,860	2,620	22	6,780	5,240	1,140	7,620	649	496
7	2,610	1,100	3,590	4,300	2,320	1,500	23	10,690	4,980	921	7,140	684	741
8	2,080	1,100	2,610	3,240	1,710	725	24	16,700	5,190	1,020	4,740	766	701
9	1,480	1,180	2,420	2,630	2,090	1,760	25	14,200	4,930	958	3,210	684	626
10	1,480	1,190	2,730	3,020	2,040	2,820	26	8,450	5,400	1,100	2,400	734	653
11	1,620	1,210	2,180	5,020	1,980	3,400	27	5,920	5,290	5,960	3,120	3,290	549
12	2,080	1,070	1,780	5,950	1,460	2,150	28	4,260	3,400	11,010	2,540	4,920	587
13	2,270	1,140	1,590	5,380	1,480	1,090	29	2,770	.....	10,900	3,220	3,510	427
14	2,230	1,220	1,350	5,420	4,590	726	30	2,130	.....	7,950	2,410	2,030	729
15	2,080	1,180	1,150	12,100	3,700	725	31	2,530	.....	7,620	.....	1,170	1,270
16	2,070	1,220	1,030	12,020	1,980	905							

NOTE.—January 24 and 25, discharge approximate.

Monthly discharge of Mohawk River at Little Falls, N. Y., for 1906.

[Drainage area, 1,310 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	16,700	1,480	4,040	3.08	3.55
February	5,400	839	2,220	1.70	1.77
March	11,000	914	3,060	2.34	2.70
April	12,100	2,400	5,470	4.18	4.66
May	5,910	649	2,320	1.77	2.04
July	4,960	427	1,390	1.06	1.22

MOHAWK RIVER AT DUNSBACH FERRY BRIDGE, NEW YORK.

This station was established March 12, 1898, for the primary purpose of checking a system of levels for the United States Board of Engineers on Deep Waterways, by D. J. Howell, civil engineer, who has furnished the earlier portion of the record. The station is located at the dam of the West Troy Water Company, one-fifth mile above Dunsbach Ferry Bridge, 9 miles from the mouth of the river. The conditions at the station are described in Water Supply Paper No. 166, page 29, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Mohawk River at Dunsbach Ferry Bridge, New York, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7,181	4,757	4,841	20,351	5,440	5,921	4,191	1,871	1,641	1,411	3,101	6,681
2	5,617	3,591	4,191	14,691	5,660	5,061	8,721	1,871	1,411	1,411	2,931	6,171
3	3,897	2,931	3,981	11,861	11,374	4,191	7,941	1,871	1,411	1,641	2,761	5,701
4	3,507	2,271	30,723	10,681	14,430	3,591	5,701	1,761	1,301	1,411	2,761	3,261
5	5,407	2,601	19,779	14,691	11,507	3,261	5,061	1,641	1,181	1,301	2,601	2,601
6	7,857	2,101	13,160	15,031	9,841	3,261	4,841	1,761	951	1,181	2,431	2,601
7	7,097	2,271	10,804	16,401	8,721	3,761	3,981	2,761	1,066	1,181	2,101	3,761
8	4,977	2,761	7,845	11,861	6,681	3,261	3,261	2,431	1,181	1,521	1,981	4,621
9	2,847	2,761	6,931	9,561	5,701	3,101	2,761	2,271	1,066	1,641	1,871	4,191
10	2,347	2,761	6,681	9,281	5,701	3,261	2,601	1,981	951	1,787	1,981	3,431
11	2,677	2,601	6,171	15,711	6,421	4,977	3,761	1,871	841	1,787	2,101	3,101
12	3,347	2,761	5,491	22,041	5,921	5,617	5,271	1,521	841	2,017	2,431	3,101
13	4,537	2,761	4,411	21,309	5,271	5,187	3,981	1,411	841	2,517	3,261	3,431
14	5,187	2,601	3,761	18,131	5,061	3,794	3,261	1,411	841	2,347	3,431	3,101
15	4,537	2,761	3,431	24,621	7,681	3,196	3,101	1,181	841	2,187	3,761	2,931
16	4,537	2,761	3,460	36,541	6,681	4,841	2,761	1,181	841	1,897	3,591	3,761
17	4,757	2,431	3,261	26,661	5,271	6,681	2,761	1,181	786	1,787	3,101	9,001
18	4,537	2,431	3,101	22,251	4,621	9,561	2,271	1,181	731	1,787	2,931	8,721
19	4,327	2,431	3,101	18,871	4,191	8,721	2,101	1,066	730	1,871	6,171	7,431
20	3,897	2,761	2,761	17,081	3,761	7,681	1,981	951	730	2,101	17,421	6,421
21	4,107	3,101	2,601	16,061	3,261	5,701	1,871	1,066	730	3,761	13,421	5,271
22	7,597	6,931	2,271	15,371	3,101	3,981	1,871	1,181	896	6,681	12,801	3,761
23	19,897	17,761	2,101	15,031	2,761	3,591	1,871	1,181	1,301	5,271	10,961	3,761
24	29,937	12,801	2,389	13,421	2,601	3,431	1,641	1,521	1,521	3,261	8,721	3,761
25	25,327	11,861	2,347	10,681	2,431	3,101	1,641	1,521	1,761	2,761	7,181	3,431
26	16,997	14,041	2,347	8,721	2,431	3,101	1,641	1,521	1,761	2,931	5,921	3,261
27	12,717	10,961	3,431	7,681	2,761	2,761	1,411	1,761	1,641	3,101	6,171	2,931
28	9,197	6,931	47,850	6,931	21,461	2,761	1,411	1,981	1,411	3,101	6,421	2,761
29	7,097	.....	24,360	6,421	18,131	2,601	1,641	2,101	1,521	3,101	6,931	2,761
30	4,977	.....	21,777	5,921	12,171	2,271	1,641	1,871	1,521	3,261	7,431	2,931
31	4,977	.....	25,737	.....	7,681	.....	1,871	1,761	.....	3,431	.....	3,591

Monthly discharge of Mohawk River at Dunsbach Ferry, New York, for 1906.

[Drainage area, 3,440 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	29,900	2,350	7,610	2.21	2.55
February	17,800	2,100	4,980	1.45	1.51
March	47,800	2,100	9,200	2.67	3.08
April	36,500	5,920	15,500	4.51	5.03
May	21,500	2,430	7,060	2.05	2.36
June	9,560	2,270	4,410	1.28	1.43
July	8,720	1,410	3,190	.927	1.07
August	2,760	951	1,630	.474	.55
September	1,760	730	1,140	.331	.37
October	6,680	1,180	2,430	.706	.81
November	17,400	1,870	5,290	1.54	1.72
December	9,000	2,600	4,270	1.24	1.43
Total	47,800	730	5,560	1.62	21.91

NOTE.—Values for this station are in general considered as good, although occasionally during the winter months the flow is obstructed by ice, causing temporary errors greater than 10 per cent.

ORISKANY CREEK, AT COLEMAN, N.Y.

A station was established, June 5, 1901, at Wood Road Bridge, 1 mile above the village of Oriskany, and was discontinued November 30, 1904, a new station having been established at Coleman, 1 mile upstream, where a cableway was erected for use in making current-meter measurements during high water. Observations at the cable station were begun August 13, 1904, and discontinued April 30, 1906. The conditions at the latter station and the bench marks are described in Water-Supply Paper No. 166, page 31, where are given also references to publications that contain data for previous years.

The following discharge measurement was made September 17, 1906:

Width, 75 feet; area, 79 square feet; gage height, 0.49 foot; discharge, 110 second-feet.

Daily gage height, in feet, of Oriskany Creek, at Coleman, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	Day.	Jan.	Feb.	Mar.	Apr.	May.
1	1.78	1.60	1.30	2.05	1.02	17	1.70	1.32	0.82	1.48	.....
2	1.78	1.32	1.30	1.88	1.05	18	1.72	1.52	1.22	1.35	.....
3	1.70	1.28	1.10	1.62	.....	19	1.75	1.48	0.92	1.60	.....
4	2.25	1.20	2.95	1.80	.....	20	1.52	1.15	1.20	1.52	.....
5	2.10	1.35	1.78	2.75	.....	21	3.05	3.55	1.18	1.48	.....
6	1.95	1.25	1.32	2.35	.....	22	3.15	2.15	1.08	1.55	.....
7	1.58	1.48	1.48	2.00	.....	23	2.85	2.02	1.40	1.42	.....
8	1.90	1.45	1.32	1.85	.....	24	3.45	1.75	1.15	1.38	.....
9	1.78	1.50	1.32	1.95	.....	25	2.15	1.82	1.10	1.25	.....
10	1.95	1.32	1.22	2.65	.....	26	1.45	2.05	1.20	1.18	.....
11	2.70	1.10	1.22	2.65	.....	27	1.45	1.50	3.30	1.20	.....
12	2.00	1.58	1.20	2.35	.....	28	1.65	1.05	2.50	1.15	.....
13	1.90	1.50	1.15	2.02	.....	29	1.48	.....	2.10	1.12	.....
14	1.65	1.40	1.12	1.92	.....	30	1.70	.....	2.35	1.20	.....
15	1.65	1.38	1.05	2.80	.....	31	1.70	.....	2.95	.....	.....
16	1.50	1.20	1.22	2.10	.....						

NOTE.—Ice conditions from January 1 to March 20 approximately; thickness varied from 0.1 foot to 1 foot; creek frozen over most of the time.

STARCH FACTORY CREEK NEAR NEW HARTFORD, N. Y.

A gaging weir was erected on this creek above the head of the former Savage reservoir May 26, 1903. The conditions at the station are described in Water-Supply Paper No. 166, page 33, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Starch Factory Creek, near New Hartford,[a] N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.27	1.41	0.97	5.00	1.41	1.29	2.34	0.47	0.39	1.01	1.53	5.95
2	2.65	.97	.97	4.45	4.82	1.29	1.41	.39	.31	.91	1.35	2.72
3	2.34	.86	1.29	5.57	31.0	1.29	1.06	.47	.39	.64	1.17	2.34
4	3.76	.97	4.28	13.95	5.38	1.06	2.34	.47	.39	.43	1.06	1.78
5	5.38	1.06	2.06	16.56	12.43	.86	1.29	.47	.31	3.76	.97	1.78
6	3.59	.97	5.19	11.47	4.28	.86	.86	.47	.31	1.92	.97	5.47
7	2.95	.97	2.50	6.75	3.59	.86	.75	.47	.31	4.64	.86	5.28
8	2.34	.97	2.06	6.97	2.65	2.34	.64	.47	.31	1.41	.75	2.20
9	2.20	1.06	2.50	4.64	2.65	2.06	2.80	.39	.31	1.35	.75	1.53
10	2.06	.97	2.06	18.76	2.50	3.43	2.34	.39	.31	1.23	1.29	1.85
11	1.92	.97	1.29	34.2	1.78	1.78	2.06	.39	.31	1.71	1.53	1.71
12	2.34	.97	1.29	31.8	1.53	1.17	1.06	.39	.31	1.59	1.99	1.41
13	2.20	1.06	1.29	27.8	3.93	.86	.86	.39	.31	1.23	1.92	1.29
14	1.78	1.29	1.29	32.5	4.82	.86	.75	.39	.39	1.01	2.06	1.53
15	2.20	1.17	1.06	46.0	2.50	.75	.64	.39	.31	.86	1.78	13.45
16	3.93	1.06	.97	13.95	1.78	3.59	.64	.31	.31	.75	1.85	7.61
17	2.95	1.06	.97	7.61	1.53	3.27	.86	.31	.31	.75	2.20	3.59
18	2.95	1.17	1.06	5.00	2.06	1.78	.75	.31	.31	.75	[b]133.00	2.20
19	2.65	1.17	1.06	4.28	1.53	1.41	.75	.31	.31	.75	12.19	1.47
20	2.65	1.41	1.06	3.27	1.29	1.06	.64	.64	.31	10.40	7.19	1.29
21	83.40	55.8	1.06	2.95	1.06	1.06	.56	.64	.47	3.10	13.19	1.59
22	51.00	8.69	1.06	5.00	.86	.86	.47	.47	.47	1.85	7.82	1.71
23	70.70	4.28	.86	3.10	.86	.86	.39	.39	.86	1.47	5.38	1.47
24	17.20	6.97	.86	2.65	.75	.86	.39	.39	.64	1.23	4.45	1.29
25	4.28	8.25	.97	2.50	.86	.75	.39	.39	.47	4.64	3.27	1.23
26	2.65	4.64	4.64	2.06	.75	.75	.39	.31	.39	1.99	3.35	1.06
27	2.20	2.06	150.6	1.78	53.3	.64	.39	2.65	.47	1.47	4.45	1.06
28	1.78	1.41	13.45	1.53	6.15	.56	.39	.64	.39	1.99	6.05	1.17
29	1.06	.....	17.37	1.41	3.93	.86	.39	.47	.39	1.85	3.67	1.35
30	1.06	.....	31.7	2.06	2.95	1.41	.47	.39	1.29	1.48	3.51	2.80
31	1.78	.....	17.0	.....	1.65	.....	.47	.39	.....	1.53	.....	54.70

[a] Daily discharge does not include diversion from drainage basin of Graefenberg Creek.
[b] Approximate.

Monthly discharge of Starch Factory Creek near New Hartford, N. Y., for 1906.

[Drainage area, 3.4 square miles.]

Month.	Discharge in second-feet.			Corrected mean.[a]	Run-off.	
	Maximum.	Minimum.	Mean.		Sec.-ft. per sq. mile.	Depth in inches.
January	83.4	1.06	9.46	10.23	3.01	3.47
February	55.8	.86	4.06	4.83	1.42	1.48
March	150.6	.86	8.86	9.63	2.83	3.26
April	46.0	1.41	10.85	11.62	3.42	3.82
May	53.3	.75	5.37	6.14	1.80	2.08
June	3.59	.56	1.35	2.12	.623	.70
July	2.80	.39	.95	1.72	.506	.58
August	2.65	.31	.50	1.27	.374	.43
September	1.29	.31	.41	.48	.141	.16
October	10.40	.43	1.93	2.60	.765	.88
November	133.00	.75	7.72	8.49	2.50	2.79
December	54.70	1.06	4.38	5.15	1.51	1.74
The year	150.6	.31	4.65	5.36	1.58	21.39

[a] Includes diversion from Graefenberg Creek.

SYLVAN GLEN CREEK NEAR NEW HARTFORD, N. Y.

The weir now used, which is located at the mouth of the stream, was erected in January, 1904, by the Consolidated Water Company, of Utica, N. Y., by whom the record is furnished. The conditions at the station and the bench marks are described in Water-Supply Paper No. 166, page 36, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Sylvan Glen Creek near New Hartford, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.06	0.86	0.21	3.13	0.31	0.31	0.38	0.04	0.04	0.46	0.71	1.34
2	.76	.56	.15	2.42	3.34	.24	.15	.04	.04	.27	.44	.86
3	.66	.34	.24	3.13	7.74	.18	.10	.10	.04	.12	.38	.71
4	1.16	.27	2.75	6.26	2.75	.15	.27	.10	.04	0	.32	.61
5	1.42	.24	.96	4.59	6.75	.15	.15	.08	.04	1.26	.31	.56
6	.96	.18	.76	4.80	2.09	.15	.05	.10	.02	.56	.29	2.67
7	.76	.18	.66	3.54	1.06	.18	.05	.05	0	1.92	.22	2.34
8	.66	.18	.56	2.59	.86	2.42	.05	.05	0	.31	.20	.81
9	.66	.21	.76	1.92	.86	.42	7.25	.04	0	.42	.16	.61
10	.46	.21	.56	10.20	.66	11.08	1.16	.04	0	.46	.29	.51
11	.42	.18	.42	9.32	.42	.56	.76	.05	0	.42	.61	.51
12	.76	.21	.38	6.26	.42	.31	.34	.04	0	.34	1.42	.40
13	.76	.21	.34	4.38	2.26	.18	.15	.04	0	.21	1.11	.34
14	.56	.21	.27	4.17	1.59	.12	.15	.04	0	.15	.91	.34
15	.56	.21	.24	9.32	.76	.10	.10	.04	0	.10	.86	6.75
16	1.42	.18	.24	2.59	.42	.42	.10	.04	0	.10	.86	3.44
17	1.16	.21	.18	1.92	.34	.46	.15	.04	0	.10	.81	1.82
18	1.16	.21	.18	1.26	.56	.42	.12	.02	0	.08	12.26	.91
19	.96	.18	.15	.96	.27	.27	.10	0	0	.08	4.17	56
20	.76	.27	.15	.96	.21	.15	.05	0	0	3.97	2.09	.40
21	11.08	10.20	.15	.76	.18	.21	.05	.05	0	.86	3.97	.51
22	11.67	2.42	.15	1.59	.12	.15	.05	.04	0	.42	2.42	.51
23	14.19	1.42	.12	.96	.10	.15	.05	.04	.10	.38	2.00	.40
24	6.75	2.09	.12	.66	.10	.12	.05	.04	.05	.34	1.34	.29
25	2.42	2.42	.10	.42	.10	.10	.05	.04	.04	1.76	1.16	.22
26	1.42	2.09	.12	.34	.10	.10	.04	.04	.04	.46	1.11	.21
27	.96	.76	23.94	.27	13.84	.05	.04	.27	.04	.34	1.50	.22
28	.76	.34	4.38	.27	1.76	.05	.05	.05	.02	.76	2.42	.24
29	.56	.....	1.92	.21	1.16	.10	.04	.04	0	.86	1.34	.24
30	.56	.....	6.75	.42	.66	.21	.04	.04	.10	.86	.91	.38
31	.96	.....	3.97	.....	.42	.....	.04	.04	.....	1.16	.....	17.69

NOTE.—August 19–20, September 7–22, September 29, and October 4 channel moist; no surface flow.

Monthly discharge of Sylvan Glen Creek near New Hartford, N. Y., for 1906.

[Drainage area, 1.18 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	14.19	0.42	2.21	1.87	2.16
February	10.20	.18	.97	.822	.86
March	23.94	.10	1.67	1.42	1.64
April	10.20	.21	2.99	2.53	2.82
May	13.84	.10	1.68	1.42	1.64
June	11.08	.05	.65	.551	.61
July	7.25	.04	.39	.330	.38
August	.27	0	.05	.042	.05
September	.10	0	.02	.017	.02
October	3.97	0	.63	.534	.62
November	12.26	.16	1.55	1.31	1.46
December	17.69	.21	1.53	1.30	1.50
The year	23.94	0	1.20	1.01	13.76

GRAEFENBERG CREEK NEAR NEW HARTFORD, N. Y.

A gaging weir was erected above the inflow to Graefenberg reservoir June 7, 1903, and a standard rain gage placed on the adjoining meadow slope, some distance from trees and structures. The record of flow is furnished by the Consolidated Water Company, of Utica, N. Y. The conditions at the station are described in Water-Supply Paper No. 166, page 37, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Graefenberg Creek near New Hartford, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.24	1.10	0.91	2.22	.....	1.38	1.49	1.10	1.05	1.00	1.05	1.81
2	1.19	1.00	.91	1.92	.....	1.38	1.29	1.00	1.05	1.00	1.05	1.33
3	1.19	.91	1.10	2.45	.....	1.38	1.29	1.14	1.10	1.00	1.00	1.29
4	1.49	.91	1.54	7.64	.....	1.38	1.54	1.14	1.00	1.00	1.00	1.29
5	1.33	.96	1.43	2.72	.....	1.38	1.33	1.10	1.00	2.04	1.00	1.19
6	1.19	.91	1.98	2.65	.....	1.43	1.29	1.10	1.00	1.38	1.00	10.66
7	1.14	.91	.91	2.27	.....	1.38	1.24	1.14	1.00	1.76	.96	1.76
8	1.19	.91	1.43	2.27	.....	2.10	1.19	1.14	1.00	1.14	.96	1.29
9	1.10	1.00	1.19	1.92	.....	1.49	1.81	1.10	1.00	1.38	1.00	1.29
10	1.00	.96	.96	3.06	.....	1.54	1.49	1.10	1.00	1.19	1.05	1.38
11	1.00	.91	.91	4.64	.....	1.43	1.29	1.10	1.00	1.33	1.10	1.29
12	1.19	.91	.91	4.26	.....	1.33	1.19	1.05	1.00	1.24	1.19	1.19
13	1.05	.96	.88	2.92	.....	1.29	1.19	1.05	1.00	1.10	1.19	1.10
14	1.00	1.00	.88	2.79	.....	1.29	1.14	1.10	1.00	1.05	1.19	1.05
15	1.05	.91	.85	4.72	.....	1.29	1.10	1.05	1.00	1.00	1.19	4.10
16	1.70	.91	.85	2.45	.....	1.76	1.10	1.05	1.00	1.00	1.19	1.81
17	1.33	.91	.85	2.04	.....	1.65	1.19	1.05	1.00	1.00	1.19	1.43
18	1.19	.91	.85	1.87	.....	1.60	1.19	1.05	1.00	1.00	4.41	1.24
19	1.14	.91	.88	1.81	.....	1.43	1.14	1.05	1.00	1.00	2.16	1.10
20	1.10	1.38	.91	1.70	.....	1.33	1.10	1.29	1.10	2.27	1.60	1.05
21	4.95	5.69	.91	1.65	.....	1.33	1.10	1.14	1.05	1.29	4.88	1.24
22	4.10	1.70	.91	1.92	.....	1.33	1.00	1.05	1.00	1.19	1.81	1.19
23	6.44	1.43	.91	1.70	.....	1.33	1.10	1.05	1.29	1.14	1.60	1.14
24	1.81	1.65	.91	1.60	.....	1.29	1.10	1.05	1.05	1.05	1.49	1.19
25	1.29	1.98	.96	1.54	.....	1.29	1.00	1.05	1.00	1.70	1.38	1.10
26	1.19	1.43	1.24	1.54	.....	1.24	1.10	1.05	1.00	1.05	1.38	1.14
27	1.10	1.19	12.61	1.49	.....	1.19	1.10	1.38	1.14	1.00	1.54	1.19
28	1.10	1.00	2.86	1.49	.....	1.24	1.10	1.14	1.00	1.05	1.70	1.19
29	1.00	.....	2.10	1.49	.....	1.29	1.10	1.10	1.00	1.10	1.33	1.24
30	1.05	.....	4.80	1.60	.....	1.33	1.10	1.10	1.19	1.10	1.29	1.65
31	1.10	.....	2.27	.....	.....	.....	1.10	1.05	.....	1.10	.....	7.84

Monthly discharge of Graefenberg Creek near New Hartford, N. Y., for 1906.

[Drainage area, 0.282 square mile.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	6.44	1.00	1.58	5.60	6.46
February	5.69	.91	1.26	4.47	4.66
March	12.61	.85	1.66	5.89	6.79
April	7.64	1.49	2.48	8.79	9.81
May	.....	.....	.....	.....	.....
June	2.10	1.19	1.40	4.96	5.53
July	1.81	1.00	1.21	4.29	4.95
August	1.29	1.00	1.10	3.90	4.50
September	1.29	1.00	1.03	3.65	4.07
October	2.27	1.00	1.21	4.29	4.95
November	4.88	.96	1.50	5.32	5.94
December	10.66	1.05	1.90	6.74	7.77

WEST CANADA CREEK AT TWIN ROCK BRIDGE, NEW YORK.

A current-meter gaging station was established September 7, 1900, at Twin Rock Bridge. The drainage area of the creek above Trenton Falls is 375 square miles. Gage heights taken by George Rood and furnished by the Utica Gas and Electric Company, were used to obtain the daily discharge September 12 to 29 and November 16 to December 31, 1906. For the remainder of the year gage readings taken once a day by Frank McArthur, who is in the employ of the Consolidated Water Company of Utica, were used. These latter readings are from a tape and weight gage, and are reduced to the datum of the board gage used by Mr. Rood. The conditions at the station and the bench marks are described in Water-Supply Paper No. 166, page 41, where are given also references to publications that contain data for previous years.

Discharge measurements of West Canada Creek at Twin Rock Bridge, New York, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 9–10	Horton and Mott	175	527	3.02	412
April 17	E. F. Weeks	168	1,310	6.80	5,540
April 23	do	167	1,330	6.90	5,570
September 19	do	149	256	.37	143
Do	C. C. Covert	157	253	.35	131
October 5	E. F. Weeks	152	313	.75	265
October 23	Barrows and Covert	159	460	1.61	479

[a] Measurement made under ice cover. Average ice thickness, 1.35 feet. Gage height to under surface of ice, 1.84 feet.

Daily gage height, in feet, of West Canada Creek at Twin Rock Bridge, New York, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.86	4.08	3.05	3.88	3.87	1.69	3.89	1.86	0.69	1.58	1.80	2.05
2	3.31	3.54	2.84	3.08	3.62	1.54	4.11	1.25	.61	.98	1.66	1.80
3	2.99	2.95	2.66	2.54	5.48	1.41	3.07	1.01	.58	.78	1.51	1.55
4	3.26	3.18	3.97	2.67	5.39	1.41	2.76	.87	.99	.69	1.41	1.65
5	3.99	3.44	4.34	3.81	4.32	1.20	3.06	3.00	.86	.68	1.55	1.50
6	4.06	3.09	4.05	3.66	3.96	1.21	2.31	2.03	.73	.71	1.20	2.10
7	3.69	3.14	3.65	2.90	2.92	1.83	1.86	1.58	.67	.93	1.11	1.00
8	3.52	3.11	3.23	2.70	2.27	1.75	1.57	1.22	.61	.75	.98	1.00
9	3.21	3.14	2.97	2.44	2.14	2.54	1.51	.90	.59	1.11	.85	1.50
10	3.17	3.05	3.08	2.26	2.42	2.01	2.30	.81	1.06	1.65	.91	1.60
11	3.17	2.99	2.37	2.18	2.46	2.51	2.92	.70	.49	2.01	.97	1.55
12	3.59	2.96	2.53	2.32	2.04	1.99	2.11	.72	.50	1.93	1.51	1.40
13	3.37	2.88	2.12	2.42	2.06	1.63	1.61	1.08	.50	1.65	1.22	1.35
14	3.43	2.95	2.05	2.94	5.35	1.43	1.32	.83	.50	1.46	2.22	1.60
15	3.75	2.83	1.91	7.89	3.82	1.24	1.19	.68	.50	1.50	1.87	1.75
16	3.69	2.68	1.90	8.95	2.69	1.24	1.01	.63	.50	1.07	1.00	2.85
17	3.71	2.70	1.90	7.29	2.01	1.40	1.01	.59	.50	1.16	.70	3.35
18	3.57	2.67	1.65	6.84	2.46	2.83	.99	.55	.50	.91	1.80	2.00
19	3.46	2.74	1.65	7.06	2.39	1.97	.92	.55	.45	.82	4.00	2.60
20	3.53	2.63	1.66	7.14	2.46	1.63	.95	.51	.45	1.87	5.00	2.50
21	3.54	2.70	1.84	7.41	1.93	1.41	.78	.78	.30	2.80	3.69	2.40
22	3.95	3.73	1.81	7.36	1.72	1.41	.49	1.58	.40	2.83	3.80	2.10
23	5.93	4.18	1.64	7.49	1.61	1.63	.75	1.04	2.15	1.87	2.85	2.00
24	10.45	3.93	1.67	5.15	1.53	2.06	.72	.75	1.35	1.45	3.30	2.05
25	7.95	3.85	1.66	3.44	1.80	1.82	.71	.67	.75	1.36	3.80	2.00
26	6.36	4.25	1.68	2.78	1.87	1.49	.66	1.27	.60	2.19	2.00	1.75
27	5.59	3.86	1.83	3.73	2.03	1.28	.62	1.21	.50	2.08	2.55	2.10
28	5.13	3.54	4.69	2.80	3.77	1.08	.64	2.32	.70	2.29	2.75	1.60
29	4.52	.....	4.57	3.81	3.22	.93	1.26	1.66	.80	2.33	3.00	1.55
30	4.07	.....	4.27	3.99	2.37	1.23	1.46	1.10	.....	2.06	2.25	1.70
31	4.37	.....	4.40	.....	1.89	.....	2.26	.79	.....	2.02	.....	1.90

Rating table for West Canada Creek at Twin Rock Bridge, New York, for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.30	130	1.70	563	3.10	1,400	5.00	3,230
0.40	150	1.80	609	3.20	1,480	5.20	3,470
0.50	170	1.90	655	3.30	1,560	5.40	3,710
0.60	196	2.00	701	3.40	1,640	5.60	3,950
0.70	222	2.10	756	3.50	1,720	5.80	4,190
0.80	249	2.20	812	3.60	1,800	6.00	4,430
0.90	275	2.30	868	3.70	1,880	6.20	4,710
1.00	302	2.40	924	3.80	1,960	6.40	4,990
1.10	336	2.50	980	3.90	2,040	6.60	5,270
1.20	370	2.60	1,040	4.00	2,130	6.80	5,550
1.30	404	2.70	1,100	4.20	2,330	7.00	5,830
1.40	438	2.80	1,160	4.40	2,530	8.00	7,230
1.50	472	2.90	1,240	4.60	2,750	9.00	8,730
1.60	517	3.00	1,320	4.80	2,990	10.00	10,330

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 0.3 feet and 2.2 feet.

Monthly discharge of West Canada Creek at Twin Rock Bridge, New York, for 1906.

[Drainage area, 364 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
April	8,660	801	2,980	8.19	9.14
May	3,810	485	1,340	3.68	4.24
June	1,180	283	549	1.51	1.68
July	2,240	168	636	1.75	2.02
August	1,320	173	372	1.02	1.18
September	784	130	232	.637	.71
October	1,180	217	529	1.45	1.67
November	3,230	222	890	2.45	2.73

NOTE.—Above values are rated as approximate.

WEST CANADA CREEK AT KAST BRIDGE, NEW YORK.

This station was established May 15, 1905. It is located on the bridge opposite the railway station at Kast Bridge, New York, about 4 miles along the stream above the mouth of the creek at Herkimer. The conditions and the bench marks are described in Water-Supply Paper No. 166, page 44, where are given also references to publications that contain data for previous years.

Discharge measurements of West Canada Creek at Kast Bridge, New York, in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
April 5	D. L. Mott	196	745	30.58	2,870
September 18	E. F. Weeks	171	296	28.22	340
October 4	do	170	295	28.27	335
October 13	do	170	404	28.86	708
October 19	do	170	292	28.32	364
November 20	do	197	712	30.53	2,630
November 22	do	197	598	29.95	1,760

Daily gage height, in feet, of West Canada Creek at Kast Bridge, New York, for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	29.85	29.42	29.22	30.38	30.62	28.92	30.62	28.92	28.32	28.45	28.99	29.39
2	29.52	29.08	29.10	30.05	30.40	28.70	30.65	28.68	27.90	28.55	28.74	28.87
3	29.35	28.70	28.92	29.85	31.70	28.58	29.95	28.50	27.48	28.42	28.63	28.80
4	29.48	28.52	50.48	30.12	30.70	28.52	29.50	28.72	28.30	28.38	28.62	28.48
5	30.00	28.90	30.05	30.75	31.02	28.52	29.80	29.62	28.38	28.46	28.56	28.72
6	29.85	28.75	29.75	30.60	30.60	28.72	29.38	29.18	28.18	28.42	28.56	29.27
7	29.40	28.85	29.60	30.15	30.25	28.82	29.02	29.00	28.18	28.66	28.48	29.40
8	29.28	28.88	29.35	29.95	29.68	28.98	28.80	28.62	28.18	28.88	28.45	28.79
9	29.05	28.92	29.38	29.88	29.70	29.42	29.02	28.42	28.12	28.66	28.41	28.88
10	29.10	28.95	29.50	29.55	29.72	29.32	29.62	28.45	27.92	28.80	28.48	28.85
11	29.05	28.88	28.95	30.05	29.60	29.35	29.75	28.20	28.12	29.30	28.63	28.84
12	29.22	28.90	29.00	30.38	29.35	29.18	29.28	28.25	28.10	29.10	28.92	28.70
13	29.18	28.98	28.72	30.20	29.30	28.82	28.95	28.12	27.65	28.88	28.83	28.75
14	29.02	28.88	28.78	30.55	30.60	28.70	28.70	28.68	27.90	28.72	28.86	28.78
15	29.02	28.85	28.55	33.68	30.58	28.58	28.60	28.38	27.98	28.56	29.27	29.89
16	29.10	28.88	28.72	33.38	29.80	28.68	28.52	28.12	28.08	28.56	28.74	30.30
17	29.12	28.90	28.78	32.45	29.45	29.08	28.60	28.12	27.90	28.42	28.62	30.25
18	29.05	28.82	28.62	32.08	29.55	29.92	28.52	27.98	28.20	28.40	29.08	29.75
19	29.08	28.80	28.60	32.18	29.40	29.22	28.45	28.00	28.05	28.34	30.47	29.30
20	29.00	28.78	28.55	32.30	29.60	28.80	28.35	27.90	27.95	29.90	30.48	29.15
21	29.25	29.82	28.55	32.35	29.20	28.72	28.22	28.60	28.12	29.80	29.94	29.20
22	30.78	30.45	28.60	32.40	28.92	28.70	28.28	28.50	28.18	29.76	30.00	29.10
23	32.45	30.05	28.50	32.40	28.85	28.90	28.30	28.52	28.58	29.18	30.32	28.95
24	33.12	29.88	28.50	31.40	28.80	29.10	28.28	28.40	28.85	28.74	29.72	28.70
25	31.85	30.00	28.60	30.48	28.85	29.08	28.18	28.20	28.58	28.95	29.57	28.61
26	30.92	30.30	28.70	29.95	28.95	28.75	28.18	28.05	28.35	29.12	29.29	28.72
27	30.05	29.62	30.70	30.45	29.75	28.58	28.05	28.22	28.35	29.12	29.58	28.73
28	29.65	29.30	31.48	29.93	30.48	28.58	28.30	28.45	28.28	29.18	29.92	28.76
29	29.50	.....	30.75	30.58	30.15	28.55	28.40	28.90	28.35	29.28	29.77	28.70
30	30.48	.....	30.75	30.50	29.55	28.62	28.45	28.52	28.42	29.23	29.38	28.67
31	29.45	.....	31.20	.....	29.08	.....	29.08	28.45	.....	29.30	.....	30.35

NOTE.—Ice conditions February 2 to 21; gage heights to water surface in hole in ice. No ice at gage during December; ice along shore above and below gage from 10 to 30 feet wide and 0.15 to 0.35 foot thick.

EAST CANADA CREEK AT DOLGEVILLE, N. Y.

Observations are taken at High Falls, near Dolgeville, about 7 miles from the outlet of the stream. The gaging station is located at the dam of the Herkimer County Light and Power Company.

Information in regard to this station is contained in the annual reports of the State engineer and surveyor of New York, and in Water-Supply Paper No. 166, page 45, where are given also references to publications that contain data for previous years

Daily discharge in second-feet of East Canada Creek at Dolgeville, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	260	484	a 280	1,000	951	471	1,070	468	92	213	997	492
2	433	214	210	962	1,140	409	1,010	172	63	142	759	365
3	423	209	159	850	2,680	383	851	191	240	160	179	112
4	312	a 250	742	817	2,180	340	619	145	124	153	165	294
5	348	290	517	1,400	1,600	265	745	83	132	110	192	a 294
6	288	b 208	517	1,310	1,380	288	402	358	136	95	170	a 700
7	105	b 275	a 369	1,090	a 1,103	234	378	351	95	383	175	700
8	218	224	221	795	826	366	491	176	100	284	180	300
9	263	252	316	715	893	420	584	163	85	154	170	265
10	b 218	219	138	380	1,010	406	565	162	123	279	200	458
11	b 221	a 240	a 176	869	938	456	519	176	90	370	171	b 184
12	326	261	214	830	816	392	449	114	95	434	281	b 214
13	230	b 238	230	1,130	748	259	272	121	95	384	244	363
14	142	b 224	214	2,020	675	208	326	121	100	285	238	299
15	218	255	213	5,760	768	158	328	108	85	195	203	838
16	195	192	224	4,800	739	175	205	112	85	170	170	b 548
17	200	110	148	4,170	606	330	190	74	95	127	156	b 518
18	200	a 147	115	3,460	545	508	200	82	90	120	149	623
19	185	185	193	3,710	452	270	185	61	85	183	769	521
20	175	191	209	3,620	540	248	144	165	80	954	977	794
21	102	319	184	3,230	470	231	130	175	105	580	914	805
22	714	434	189	3,620	370	250	80	195	100	404	1,150	444
23	2,380	376	193	2,910	394	258	158	134	309	826	982	377
24	2,870	260	157	2,100	366	220	148	129	123	167	693	205
25	1,500	341	174	1,670	356	395	160	105	105	175	576	105
26	1,230	432	179	1,390	330	209	155	85	105	551	481	300
27	1,050	422	171	1,210	a 950	459	128	305	105	279	476	270
28	842	a 351	1,230	1,040	1,570	609	150	459	181	461	691	345
29	780	.....	1,290	864	826	238	245	204	146	403	658	299
30	550	.....	1,080	950	1,050	227	409	63	207	429	617	367
31	501	.....	1,430	.....	640	.....	604	200	.....	468	.....	330

a Record incomplete; values interpolated. b Crest of dam obstructed by ice.

NOTE.—Ice went out of dam April 5 to 6.

Monthly discharge at East Canada Creek at Dolgeville, N. Y., for 1906.

[Drainage area, 256 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	2,870	102	564	2.20	2.54
February	484	110	272	1.06	1.10
March	1,430	115	377	1.47	1.70
April	5,760	380	1,960	7.66	8.55
May	2,680	330	900	3.52	4.06
June	609	158	323	1.26	1.41
July	1,070	80	384	1.50	1.73
August	468	61	176	.688	.79
September	309	63	119	.465	.52
October	954	95	321	1.25	1.44
November	1,150	149	459	1.79	2.00
December	838	105	411	1.61	1.86
The year	5,760	61	522	2.04	27.70

NOTE.—Values April to November, good; January to March, fair; December, fair.

SCHOHARIE CREEK AT PRATTSVILLE, N. Y.

This station was established November 7, 1902, at the highway bridge in the village of Prattsville. During 1906 the gage was read twice each day by Edna M. Snyder. The conditions at the station and the bench marks are described in Water-Supply Paper No. 166, page 47, where are given also references to publications that contain data for previous years.

Discharge measurements of Schoharie Creek at Prattsville, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
August 25	C. C. Covert	62.5	46	4.25	[a]41
November 3	do	180	483	4.62	137

[a] Made by wading one-fourth mile below bridge.

Daily gage height, in feet, of Schoharie Creek at Prattsville, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.95	4.95	5.27	5.52	5.07	5.61	4.95	4.30	4.30	4.22	4.70	4.92
2	5.00	4.90	5.27	5.37	5.01	5.46	4.70	4.35	4.30	4.20	4.60	4.90
3	5.10	4.80	5.17	5.27	4.96	5.21	4.85	4.30	4.30	4.20	4.60	5.00
4	5.20	4.80	7.85	5.37	4.96	5.08	4.95	4.30	4.30	4.20	4.60	5.00
5	5.25	4.70	5.85	6.25	4.96	5.01	4.82	4.40	4.25	4.20	4.55	5.10
6	5.05	4.70	5.37	6.62	4.91	5.31	4.65	4.40	4.20	4.20	4.50	5.55
7	5.25	4.70	5.29	5.92	5.38	5.08	4.60	4.75	4.18	4.20	4.50	5.50
8	5.45	4.72	5.22	5.72	5.41	4.94	4.52	4.90	4.18	4.20	4.50	5.10
9	5.40	4.72	5.17	5.59	5.56	5.02	4.52	4.55	4.15	4.20	4.45	5.52
10	5.38	4.80	5.17	7.67	5.38	5.25	4.52	4.45	4.15	4.28	4.45	5.60
11	5.45	4.80	5.27	7.12	5.24	5.35	4.52	4.40	4.15	4.30	4.50	5.75
12	5.60	4.80	5.27	6.22	5.16	5.05	4.45	4.32	4.15	4.30	4.58	5.60
13	5.50	4.80	5.27	6.42	5.11	4.85	4.40	4.25	4.15	4.30	4.55	5.40
14	5.50	4.90	5.27	9.57	5.06	4.85	4.38	4.25	4.18	4.22	4.55	5.40
15	5.40	4.90	5.27	7.52	5.01	4.75	4.32	4.22	4.10	4.20	4.55	5.30
16	5.40	4.90	5.27	6.87	4.96	4.82	4.30	4.20	4.10	4.20	4.75	5.30
17	5.25	4.95	5.07	6.72	4.91	5.45	4.35	4.22	4.05	4.20	4.65	5.15
18	5.10	5.00	4.77	6.42	4.86	5.50	4.42	4.20	4.08	4.20	5.68	5.10
19	5.00	4.97	4.77	6.27	4.88	5.60	4.30	4.20	4.05	4.20	7.08	5.20
20	4.95	4.92	4.82	6.17	4.84	5.42	4.35	4.12	4.08	5.68	6.22	5.30
21	5.15	4.95	4.99	6.02	4.76	5.15	4.28	4.40	4.18	5.32	6.10	5.40
22	5.38	5.99	5.02	5.82	4.78	5.18	4.25	4.45	4.40	5.18	5.95	5.20
23	5.70	6.15	5.02	5.72	4.74	5.18	4.32	4.40	4.45	4.95	5.75	5.10
24	7.05	5.87	4.99	5.57	4.71	5.08	4.35	4.30	4.32	4.80	5.45	5.10
25	5.65	5.47	4.87	5.47	4.66	4.88	4.28	4.20	4.22	6.10	5.30	5.00
26	5.40	5.97	4.87	5.37	4.71	4.78	4.22	4.20	4.20	5.50	5.18	5.00
27	5.35	5.87	8.50	5.27	6.14	4.70	4.28	4.90	4.18	5.05	5.12	5.00
28	5.20	5.39	7.32	5.17	8.16	4.62	4.28	5.10	4.20	5.00	5.10	4.90
29	5.12	.....	5.79	5.07	7.51	4.60	4.32	4.95	4.20	4.90	5.00	4.90
30	5.08	.....	5.69	5.07	6.31	4.48	4.30	4.50	4.28	4.80	5.00	5.00
31	5.00	.....	5.67	.....	5.84	.....	4.30	4.38	.....	4.72	.....	5.70

NOTE.—Ice conditions January 7–21, February 3–22, February 28–March 3, and March 20–26. Ice 0.1 to 0.5 foot thick. River frozen over from December 4 to 31. Ice from 0.30 to 0.75 foot thick. The following comparative readings were taken:

Comparative ice and water readings.

Date.	Thickness of ice at gage.	Gage reading to water surface.	Gage reading to top of ice.
	Feet.	*Feet.*	*Feet.*
December 19	0.38	5.1	5.2
December 22	.25	5.1	5.2
December 26	.83	4.9	5.0
December 29	.75	4.9	4.9

December 31 ice went out of river at station. During frozen period for January, February, and March the readings were taken to the water surface through a hole cut in the ice.

Gage readings for frozen period during December were to top of ice, with readings to water surface through a hole cut in the ice on Wednesday and Saturday of each week.

Rating table for Schoharie Creek at Prattsville, N. Y., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
4.05	14	5.10	345	6.20	1,170	7.60	2,990
4.10	18	5.20	405	6.30	1,270	7.80	3,300
4.20	28	5.30	465	6.40	1,370	8.00	3,620
4.30	42	5.40	525	6.50	1,470	8.20	3,960
4.40	61	5.50	585	6.60	1,600	8.40	4,300
4.50	85	5.60	663	6.70	1,720	8.60	4,640
4.60	125	5.70	741	6.80	1,850	8.80	4,980
4.70	165	5.80	819	6.90	1,970	9.00	5,320
4.80	205	5.90	897	7.00	2,100	9.20	5,680
4.90	245	6.00	975	7.20	2,390	9.40	6,040
5.00	285	6.10	1,070	7.40	2,680	9.60	6,400

NOTE.—The above table is applicable only for open-channel conditions. It is based on discharge measurements made during 1904–1906, and is well defined between gage heights 4.1 feet and 8.0 feet.

Monthly discharge of Schoharie Creek at Prattsville, N. Y., for 1906.

[Drainage area, 240 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
April	6,350	327	1,250	5.21	5.81
May	3,890	149	578	2.41	2.78
June	671	80	350	1.46	1.63
July	265	31	87.5	.365	.42
August	345	20	82.0	.342	.39
September	73	14	30.0	.125	.14
October	1,070	28	178	.742	.86
November	2,230	73	384	1.60	1.78

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

KINDERHOOK CREEK AT ROSSMAN, N. Y.

Kinderhook Creek is an interstate stream, having its source in the Hancock Mountains, Massachusetts. It flows southwesterly through Columbia and Rensselaer counties, N. Y., and joins Claverack Creek about 2 miles from the Hudson River, forming Stockport Creek, through which it discharges its water into the Hudson, 4 miles north of the village of Hudson.

The topography of the basin is shown on the Troy, Berlin, Pittsfield, Kinderhook, and Coxsackie sheets of the United States Geological Survey topographic atlas, from which the following drainage areas have been determined:

Drainage areas of Kinderhook Creek.

Point of measurement.	Area.	Total area.
	Sq. miles.	*Sq. miles.*
Kinderhook Creek above Garfield	39.3	39.3
Kinderhook Creek from Garfield to Wyomanock Creek	34.8	74.1
Wyomanock Creek above mouth	31.3	105.4
Kinderhook Creek from Wyomanock Creek Junction to Valatie Kill	167.2	272.6
Valatie Kill above Kinderhook Lake	37.6	.....
Kinderhook Lake	2.7	.....
Valatie Kill from Kinderhook Lake to mouth	3.9	.....
Valatie Kill above mouth	44.2	316.8
Kinderhook Creek from Valatie Kill to gaging station at Rossman	14.3	331.1
Kinderhook Creek from gaging station to Claverack Creek	6.4	337.5

The gaging station was established March 17, 1906, at the highway bridge near Rossman post-office, about 7 miles northeast of Hudson, Columbia County, N. Y., on the line of the Albany and Hudson Electric Railroad, and about one-eighth mile below Chittenden Falls and the dam of the Rossman Paper and Woven Wire Fence Mills.

A box gage of the tape and weight type is located on the upstream side of the highway bridge, 50 feet from the right-hand end; length of tape and weight, 50 feet. The gage is read morning, noon, and night by Wesley Ham. The bench mark is a ½-inch bolt painted white, driven in the downstream side of a large elm tree about 30 feet from the right-hand abutment, downstream side of bridge; elevation, 47.65 feet above zero of gage.

Information in regard to this creek is published in Supplement to New York State Engineer's Report, 1902, pages 252–256.

Discharge measurements of Kinderhook Creek at Rossman, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 16[a]	Covert and Weeks	137	149	27.05	262
March 17[b]	do	148	206	27.35	420
August 2	C. C. Covert	133	123	26.90	188
August 22[c]	do	130	195	26.67	124
October 28[b]	E. F. Weeks	147	170	27.25	319
November 2	C. C. Covert	147	187	27.29	318

[a] Some obstruction by ice. [b] Upstream side of bridge. [c] Wading about 100 feet below bridge.

Daily gage height, in feet, of Kinderhook Creek at Rossman, N. Y., for 1906.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	28.26	27.63	27.66	27.52	27.04	26.74	26.72	27.26	27.31
2	.....	28.11	27.42	27.57	27.60	27.06	26.68	26.72	27.28	27.22
3	.....	27.96	27.72	27.37	27.65	27.00	26.66	26.71	27.23	27.18
4	.....	27.87	27.57	27.27	27.49	26.97	26.69	26.74	27.05	27.12
5	.....	28.10	27.62	27.25	27.52	27.00	26.80	26.72	26.93	27.09
6	.....	28.48	27.53	28.29	27.38	26.92	26.73	26.62	26.94	27.02
7	.....	28.38	27.51	28.21	27.20	27.33	26.73	26.64	26.91	27.88
8	.....	28.09	27.48	27.84	27.08	27.30	26.65	26.51	26.92	27.77
9	.....	28.09	27.48	27.74	27.06	27.33	26.56	26.66	26.93	27.73
10	.....	28.82	28.20	27.60	27.02	26.93	26.71	26.66	26.83	27.68
11	.....	29.59	27.76	27.77	26.97	26.98	26.72	26.70	26.78	27.64
12	.....	29.17	27.60	27.59	26.85	26.82	26.68	26.73	27.29	27.47
13	.....	28.87	27.57	27.48	26.76	26.78	26.59	26.92	27.32	27.42
14	.....	28.52	27.49	27.22	26.76	26.76	26.49	26.82	27.28	27.48
15	.....	30.01	27.41	27.22	26.82	26.77	26.51	26.83	27.21	27.42
16	.....	30.63	27.32	27.22	26.70	26.72	26.44	26.82	27.24	27.40
17	27.37	29.57	27.31	27.28	26.70	26.72	26.60	26.71	27.21	27.41
18	27.33	29.01	27.42	27.28	26.72	26.70	26.52	26.73	27.17	27.42
19	27.29	28.56	27.37	27.20	26.82	26.74	26.51	26.71	28.39	27.07
20	27.29	28.41	27.23	27.16	26.75	26.51	26.52	27.20	28.24	26.97
21	27.27	28.21	27.24	27.01	26.72	26.57	26.51	28.06	28.15	26.93
22	27.28	28.10	27.24	27.15	26.50	26.58	26.52	27.79	28.10	27.11
23	27.11	28.05	27.24	26.95	26.77	26.57	26.52	27.55	27.93	27.20
24	27.03	28.20	27.24	26.68	26.71	26.57	26.69	27.34	27.78	27.03
25	27.01	28.01	27.09	26.86	26.73	26.59	26.74	27.34	27.61	27.12
26	27.12	27.87	27.07	26.89	26.78	26.70	26.72	27.32	27.48	27.04
27	28.96	27.72	26.80	26.81	26.73	26.59	26.63	27.33	27.40	27.06
28	30.01	27.69	28.39	26.79	26.67	26.80	26.67	27.20	27.42	27.05
29	28.92	27.52	28.84	26.72	26.66	26.79	26.70	27.11	27.42	27.12
30	28.56	27.54	28.31	26.72	26.72	26.80	26.50	27.22	27.34	27.13
31	28.57	.....	27.93	.....	26.84	26.80	.....	27.28	.....	28.97

NOTE.—Station is about one-fourth mile below a dam. Very little obstruction from ice, except in extreme cold weather.

CATSKILL CREEK AT SOUTH CAIRO, N. Y.

The gaging station was established July 4, 1901, at the highway bridge in village of South Cairo. The conditions and the bench marks are described in Water-Supply Paper No. 166, page 49, where are given also references to publications that contain data for previous years.

Discharge measurements of Catskill Creek at South Cairo, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 16[a]	Horton and Mott	100	190	2.82	62
June 7	C. C. Covert	160	347	3.35	267
August 24[b]	do	58	47	2.25	36
September 9[c]	do	20	14	2.10	15.4
Do.[c]	do	20	13	2.09	13.9

[a] Measurement made under ice cover, average thickness of ice 0.70 feet. Gage height to bottom of ice 2.22 feet.
[b] Made by wading 1,000 feet above bridge.
[c] Made by wading one-fourth mile below bridge.

Daily gage height, in feet, of Catskill Creek at South Cairo, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.12	3.05	4.61	4.46	3.15	3.84	4.60	2.20	2.10	2.02	2.42	3.20
2	3.05	3.05	4.29	4.21	3.00	3.49	3.70	2.12	2.12	1.95	2.18	3.10
3	3.25	2.90	4.12	4.16	3.55	3.32	4.60	2.10	2.00	1.95	2.10	3.10
4	3.40	3.00	8.52	4.21	3.45	3.19	4.20	2.10	2.05	1.95	2.20	3.20
5	3.50	3.00	5.37	5.58	3.25	3.12	3.40	2.10	1.90	2.25	2.32	3.18
6	3.15	2.98	3.97	5.98	3.15	3.14	2.78	2.18	2.08	2.25	2.30	3.30
7	3.22	2.80	3.67	4.86	3.15	3.27	2.85	2.20	2.02	2.15	2.25	4.75
8	3.30	2.70	3.62	4.46	3.04	3.12	2.60	2.20	2.05	2.00	2.35	4.08
9	3.31	2.70	3.92	4.71	2.95	2.98	2.72	2.55	2.05	2.00	2.35	4.00
10	3.00	2.70	4.07	6.16	3.15	3.15	2.70	2.45	1.98	2.02	2.35	4.05
11	3.00	2.80	3.57	7.34	3.05	3.30	2.72	2.22	1.95	2.05	2.35	4.05
12	2.90	2.80	3.52	6.41	2.95	3.00	2.55	2.05	2.40	2.05	2.35	3.35
13	3.25	2.80	3.32	5.66	2.85	3.65	2.45	2.30	1.90	2.02	2.50	2.85
14	2.95	2.75	3.07	5.74	2.75	2.60	2.40	2.20	2.00	2.05	2.40	2.85
15	2.82	2.80	3.27	7.91	2.75	2.57	2.52	2.10	1.95	2.05	2.45	3.40
16	2.85	2.80	3.27	6.36	2.67	2.55	2.20	2.10	2.00	1.98	2.40	3.85
17	3.25	2.78	3.07	5.31	2.60	3.88	2.45	2.10	2.00	1.95	2.48	3.50
18	3.20	2.80	2.87	4.86	2.63	4.05	2.60	2.10	1.95	2.02	2.75	3.18
19	2.95	2.78	2.95	4.58	2.70	3.70	2.42	2.00	1.95	2.05	5.45	2.95
20	2.90	2.75	3.67	4.51	2.60	3.52	2.25	1.95	1.95	2.32	4.80	3.05
21	2.88	2.88	3.17	4.14	2.45	3.20	2.32	2.10	1.95	2.80	4.55	3.20
22	3.75	5.10	3.02	3.98	2.64	3.25	2.10	1.90	2.05	2.55	4.55	3.50
23	4.20	4.20	2.97	3.81	2.37	2.95	2.22	2.25	2.00	2.52	4.18	3.40
24	5.15	4.07	2.89	3.68	2.39	2.95	2.30	2.20	2.05	2.35	3.75	3.00
25	4.00	4.12	2.82	3.50	2.54	2.85	2.18	2.10	2.05	2.65	3.40	3.20
26	3.60	4.92	6.11	3.35	2.56	2.72	2.12	2.20	2.00	2.55	3.42	3.20
27	3.42	4.02	8.91	3.27	4.19	2.35	2.15	2.25	2.00	2.48	3.40	3.10
28	3.32	3.97	9.21	3.17	7.54	2.38	2.00	2.08	1.95	2.45	3.50	2.70
29	3.30	.....	6.34	3.05	6.49	2.45	2.00	2.35	2.05	2.45	3.42	2.80
30	3.18	.....	4.86	3.05	4.79	2.40	2.10	2.10	1.98	2.45	3.18	2.80
31	3.10	.....	5.61	.....	4.34	.....	2.18	2.10	.....	2.42	.....	3.15

NOTE.—Creek frozen over January 2 to February 22; ice thickness varied from 0.2 to 0.8 foot. Readings for this period are to water surface in hole cut in ice.
During the frozen period of December regular readings are to the top of the ice.

ESOPUS CREEK AT KINGSTON, N. Y.

This station was established July 5, 1901, at the Washington Street Bridge over Esopus Creek at Kingston. The conditions and the bench

marks are described in Water-Supply Paper No. 166, page 52, where are given also references to publications that contain data for previous years.

Discharge measurements of Esopus Creek at Kingston, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
February 15[a]	Horton and Mott	90	287	5.60	250
August 23	C. C. Covert	87	224	4.50	151

[a] Measurement made under ice cover. Average thickness of ice 0.33 foot. Gage height to bottom of ice 5.17 feet.

Daily gage height, in feet, of Esopus Creek at Kingston, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.40	6.12	6.50	8.32	6.24	7.18	5.58	4.75	4.25	4.25	5.72	5.60
2	6.12	6.05	6.47	7.99	6.11	6.82	5.65	4.52	4.04	4.08	5.52	5.50
3	5.92	5.89	6.23	7.42	6.28	6.60	5.75	4.48	4.04	4.05	5.32	5.42
4	7.05	5.42	14.55	7.28	6.20	6.16	7.25	5.05	4.28	3.98	5.18	5.25
5	7.52	5.99	9.65	7.75	6.20	5.98	5.94	5.12	4.12	3.98	5.18	5.12
6	6.90	5.59	8.27	8.63	6.04	6.10	5.66	5.70	4.12	3.98	5.05	5.62
7	6.47	5.75	7.80	8.25	6.04	5.92	5.42	5.18	4.12	3.98	4.98	6.88
8	7.20	5.75	7.39	7.85	6.00	5.68	5.12	5.50	4.02	3.88	4.88	5.84
9	7.36	5.67	7.21	7.61	6.22	5.58	5.04	5.21	3.94	4.12	4.62	5.62
10	6.55	5.62	7.00	9.33	6.69	6.10	5.35	4.75	3.78	4.02	4.85	5.92
11	6.42	5.59	6.55	11.48	6.49	5.88	5.28	4.78	4.02	4.08	4.92	6.12
12	6.72	5.56	6.57	10.67	6.27	5.68	5.05	4.75	3.92	4.08	5.88	6.00
13	7.05	5.60	6.13	9.92	6.16	5.52	4.88	4.58	3.92	4.00	5.55	5.70
14	6.42	5.60	6.17	9.55	6.11	5.34	4.80	4.48	3.98	3.92	5.30	5.68
15	6.11	5.55	6.65	16.01	5.91	5.28	4.68	4.40	3.95	3.85	5.15	5.62
16	6.21	5.36	7.41	13.75	5.86	5.92	4.62	4.38	3.94	3.86	5.20	6.53
17	6.20	5.56	6.73	11.21	5.76	7.50	4.66	4.25	3.82	3.80	5.08	6.00
18	6.10	5.22	5.97	9.85	5.65	7.42	4.84	4.22	3.95	3.75	5.08	5.99
19	5.88	5.38	6.16	9.33	5.63	8.92	4.70	4.20	3.95	3.72	7.92	5.60
20	5.70	5.41	6.46	8.93	5.51	8.85	4.52	4.15	3.95	6.88	8.02	5.35
21	5.60	5.58	6.14	8.45	5.46	7.88	4.72	4.68	4.05	7.00	7.62	6.92
22	5.85	9.21	5.54	8.05	5.36	8.52	4.75	4.98	4.32	6.25	7.60	6.52
23	7.08	7.94	5.49	7.92	5.25	7.92	4.60	4.60	5.08	5.82	7.25	5.90
24	9.55	7.36	5.44	7.80	5.23	7.59	4.68	4.55	4.52	5.60	6.68	5.35
25	8.66	7.26	5.32	7.32	5.66	7.10	4.44	4.38	4.35	8.06	6.52	5.10
26	7.92	8.21	5.29	7.04	5.39	6.61	4.44	4.55	4.18	8.45	6.38	5.88
27	7.47	7.41	5.79	6.80	5.33	6.25	4.38	4.20	4.10	7.32	6.18	5.66
28	7.07	6.84	9.09	6.62	9.25	6.05	4.28	4.62	4.00	6.72	5.95	5.69
29	6.77	.....	8.36	6.34	9.30	5.85	4.28	4.38	4.05	6.40	5.78	5.60
30	6.55	.....	8.29	6.30	9.38	5.60	4.36	4.32	4.15	6.08	5.70	5.75
31	6.45	.....	9.04	.....	7.74	.....	4.80	4.22	.....	5.82	.....	8.42

NOTE.—Ice conditions January 8–19, February 3 to March 3, March 16–26. Ice thickness varied from 0.1 to 0.5 foot. Slight ice gorging at times. Also ice conditions December 9 to 31. No ice at gage, but ice 0.1 to 0.7 foot thick above and below bridge. Ice broke up December 31. During frozen period readings were to water surface in hole cut in ice.

Rating tables for Esopus Creek at Kingston, N. Y.

OPEN-CHANNEL CONDITIONS, 1906.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.70	36	5.10	285	6.50	700	8.80	1,820
3.80	49	5.20	309	6.60	741	9.00	1,940
3.90	63	5.30	334	6.70	782	9.20	2,074
4.00	77	5.40	358	6.80	823	9.40	2,208
4.10	94	5.50	383	6.90	864	9.60	2,348
4.20	110	5.60	412	7.00	905	9.80	2,495
4.30	127	5.70	441	7.20	995	10.00	2,642
4.40	143	5.80	469	7.40	1,085	11.00	3,440
4.50	160	5.90	498	7.60	1,179	12.00	4,340
4.60	180	6.00	527	7.80	1,276	13.00	5,305
4.70	200	6.10	562	8.00	1,373	14.00	6,280
4.80	220	6.20	596	8.20	1,480	15.00	7,310
4.90	240	6.30	631	8.40	1,587	16.00	8,390
5.00	260	6.40	665	8.60	1,700		

[a] The above table is applicable only for open-channel conditions. It is based on discharge measurements made during 1901–1906 and is well defined between gage heights 3.8 feet and 11.0 feet. The extension is based on 2 measurements above 11.0 feet.

ICE PERIOD, 1906.

5.10	217	5.90	387	6.70	608	8.00	1,142
5.20	237	6.00	410	6.80	641	8.20	1,245
5.30	257	6.10	436	6.90	674	8.40	1,348
5.40	277	6.20	463	7.00	707	8.60	1,456
5.50	297	6.30	489	7.20	787	8.80	1,568
5.60	320	6.40	516	7.40	868	9.00	1,680
5.70	342	6.50	542	7.60	955		
5.80	365	6.60	575	7.80	1,048		

Monthly discharge of Esopus Creek at Kingston, N. Y., for 1906.

[Drainage area, 324 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	2,310	383	776	2.40	2.77
February	1,800	241	517	1.60	1.67
March	6,840	255	1,040	3.21	3.70
April	8,410	631	2,040	6.30	7.03
May	2,190	316	687	2.12	2.44
June	1,890	329	793	2.45	2.73
July	1,020	124	276	.852	.98
August	441	102	194	.599	69
September	280	46	94.7	.292	33
October	1,610	39	361	1.11	1.28
November	1,380	184	528	1.63	1.82
December	1,600	217	436	1.35	1.56
The year	8,410	39	645	1.99	27.00

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

ESOPUS CREEK NEAR OLIVE BRIDGE, N. Y.

During 1906 a weir for the purpose of measuring the flow of the Esopus Creek has been constructed near Olive Bridge, N. Y., by the board of water supply of the city of New York. It is located about 1 mile below the Olive Bridge post-office. The following description and discharge data have been furnished by Mr. J. Waldo Smith, chief engineer.

The weir is constructed of concrete, having a cross section similar to that experimented on in the hydraulic laboratory at Cornell University by the United States Geological Survey, in Series 30, described in Water-Supply and Irrigation Paper No. 150.

The average height of this weir above the rock on which it is founded, for its entire length, is 7.54 feet; length between abutments, 193.90 feet. In order to form a channel of approach the abutments have been extended upstream at right angles with the axis of the weir for a distance of 16 feet, and the area of the channel of approach below the crest of the weir is 1,462 square feet. The abutments extend 14 feet above the level of the crest, and it is estimated that a flow of 40,000 cubic feet per second can be taken care of.

Measurements of the head on the weir are made in a well 24 inches in diameter, situated 53 feet upstream from the crest of the weir. Water is admitted to this well through a $\frac{3}{4}$-inch pipe extending 16 feet out into the stream in which, spaced 6 inches apart, are $\frac{1}{8}$-inch holes bored vertically through the pipe. The center of this pipe is placed 18 inches above the bed of the stream. A continuous record of the head at this point is kept by means of a Friez automatic water-stage register, geared 1 to 1 and running twenty-four hours. Observations of the flow were first begun on October 17, 1906, though the automatic gage register was not installed until December 5. Prior to this latter date heads were read three times daily and reduced in the usual manner.

Computations of the discharge over this weir are made from a formula which has been deduced from the results of the experiments made by the United States Geological Survey and referred to above. During the winter the ice which forms between the wing walls which form the channel of approach is kept cut away so that there may be no change in the conditions of flow due to this cause.

The watershed of Esopus Creek above the weir is 239 square miles, as measured on the topographic maps of the United States Geological Survey.

Daily discharge, in second-feet, of Esopus Creek near Olive Bridge, N. Y., for 1906.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	.....	196	295	17	.....	1,155	372
2	.....	176	280	18	.....	1,397	388
3	.....	155	277	19	42	1,207	242
4	.....	142	331	20	663	916	284
5	.....	133	311	21	199	940	535
6	.....	121	458	22	105	972	476
7	.....	103	507	23	102	871	373
8	.....	98	216	24	77	760	209
9	.....	73	314	25	1,430	676	248
10	.....	57	368	26	630	565	276
11	.....	62	396	27	534	472	299
12	.....	91	331	28	420	410	291
13	.....	144	320	29	323	356	288
14	.....	137	306	30	268	304	319
15	.....	302	370	31	226	.....	2,004
16	.....	655	417				

Monthly discharge of Esopus Creek near Olive Bridge, N. Y., for 1906.

[Drainage area, 239 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
October 19–31	1,430	42	386	1.62	0.78
November	1,400	57	455	1.90	2.12
December	2,000	209	390	1.63	1.88

WAPPINGER CREEK NEAR WAPPINGER FALLS, N. Y.

This station was established May 19, 1903, at the first highway bridge crossing Wappinger Creek above the village of Wappinger Falls. It was discontinued July 1, 1905, but the rating tables and estimates of monthly discharge heretofore unpublished are given in the following tables. The conditions at the station and the bench marks are described in Water-Supply Paper No. 166, page 55, where are given also references to publications that contain data for previous years.

Rating tables for Wappinger Creek, near Wappinger Falls, N. Y.

MAY 19, 1903, TO AUGUST 31, 1903.[a]

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.30	30	1.50	260	2.70	629	3.90	1,098
0.40	40	1.60	286	2.80	665	4.00	1,140
0.50	52	1.70	313	2.90	702	4.20	1,226
0.60	66	1.80	341	3.00	740	4.40	1,315
0.70	82	1.90	370	3.10	778	4.60	1,407
0.80	100	2.00	400	3.20	816	4.80	1,502
0.90	120	2.10	430	3.30	855	5.00	1,600
1.00	142	2.20	461	3.40	894	5.20	1,700
1.10	165	2.30	493	3.50	934	5.40	1,802
1.20	188	2.40	526	3.60	974	5.60	1,906
1.30	211	2.50	560	3.70	1,015	5.70	1,959
1.40	235	2.60	594	3.80	1,056		

[a] This table is based on 6 discharge measurements made during 1903 and is well defined between gage heights 0.6 foot and 5.0 feet.

SEPTEMBER 1, 1903, TO JUNE 30, 1905.[b]

−0.30	10	1.00	181	2.30	537	4.20	1,287
−0.20	16	1.10	202	2.40	571	4.40	1,375
−0.10	23	1.20	224	2.50	606	4.60	1,465
0.00	31	1.30	247	2.60	641	4.80	1,557
0.10	40	1.40	271	2.70	677	5.00	1,650
0.20	51	1.50	296	2.80	714	5.20	1,744
0.30	63	1.60	323	2.90	752	5.40	1,840
0.40	76	1.70	351	3.00	790	5.60	1,937
0.50	90	1.80	380	3.20	868	5.80	2,035
0.60	105	1.90	410	3.40	948	6.00	2,135
0.70	122	2.00	441	3.60	1,030	7.00	2,644
0.80	141	2.10	472	3.80	1,114	8.00	3,174
0.90	161	2.20	504	4.00	1,200	9.00	3,724

[b] This table is applicable only for open-channel conditions. It is based on 5 discharge measurements made during 1903 to 1905 and on the form of the preceding curve. It is well defined between gage heights 0.15 foot and 3.0 feet.

Monthly discharge of Wappinger Creek near Wappinger Falls, N. Y., for 1903–1905.

[Drainage area, 194 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
1903.					
May 19 to 31	200	35	75.9	0.391	0.19
June	1,960	35	653	3.37	3.76
July	836	91	267	1.38	1.59
August	1,450	120	345	1.78	2.05
September	771	122	276	1.42	1.58
October	3,040	114	633	3.26	3.76
November	696	181	282	1.45	1.62
1904.					
March 8 to 31	3,500	284	977	5.04	4.50
April	868	192	424	2.19	2.44
May	771	151	248	1.28	1.48
June	1,530	90	302	1.56	1.74
July	504	70	129	.665	.77
August	161	13	52.7	.272	.31
September	790	23	167	.861	.96
October	771	93	209	1.08	1.24
November	247	105	162	.835	.93
December 1 to 7 and 28 to 31	1,380	181	560	2.89	1.18
1905.					
January	2,440	472	893	4.60	5.30
March 10 to 31	2,780	435	1,420	7.32	5.99
April	908	181	468	2.41	2.69
May	181	57	122	.629	.73
June	87	31	59.1	.305	.34

NOTE.—Ice conditions November 29 to December 31, 1903; January 1 to March 7 and December 8 to 27, 1904; February 1 to March 9, 1905.

Values for 1903 are rated as follows: May and August, good; June, July, and September to November, excellent.

Values for 1904 and 1905 are excellent.

DELAWARE AND HUDSON CANAL AT CREEKLOCKS, N. Y.

In order to determine the run-off from the Rondout Creek drainage basin, gagings of the flow in the Delaware and Hudson Canal at the foot of the Rosendale level were made from June, 1901, to December, 1903, inclusive, and were resumed in December, 1905. The diversion to the canal, added to the measured discharge of Rondout gaging station, represents the total flow from the drainage basin. The observations in 1905 and 1906 were made in cooperation with the New York water-supply commission. The conditions at the station are described in Water-Supply Paper No. 166, page 57, where are given also references to publications that contain data for previous years.

Daily discharge in second-feet of Delaware and Hudson Canal at Creeklocks, N. Y., for 1906.

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

[a] Canal closed for season.

Monthly discharge of Delaware and Hudson Canal at Creeklocks, N. Y., for 1906.

Month.	Discharge in second-feet.		
	Maximum.	Minimum.	Mean.
April (9–30)	20	8	15.0
May	24	19	21.1
June	23	19	22.0
July	24	20	21.8
August	24	19	21.6
September	24	17	20.8
October	28	16	19.5
November	22	15	18.4

NOTE.—Daily discharges interpolated on Sundays and other days when no flow was recorded.

RONDOUT CREEK AT ROSENDALE, N. Y.

This station was established July 6, 1901, at the highway bridge at Rosendale, discontinued November 7, 1903, and reestablished in December, 1905, in cooperation with the New York water-supply commission.

The flow in the Delaware and Hudson Canal at the Rosendale level must be added to that at the gaging station to obtain the total run-off from the drainage area above this point. The conditions at the station are described in Water-Supply Paper No. 166, page 57, where are given also references to publications that contain data for previous years.

The following discharge measurement was made August 23, 1906:

Width, 100 feet; area, 482 square feet; gage height, 6.50 feet; discharge, 261 second-feet.

Daily gage height, in feet, of Rondout Creek at Rosendale, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.08	6.87	7.23	9.05	6.97	6.95	7.20	6.67	6.42	7.00	.....	6.72
2	6.98	6.83	7.15	8.40	6.91	6.87	6.90	6.43	6.32	6.50	6.58	6.70
3	6.92	6.73	7.09	8.17	7.05	6.79	7.45	6.50	6.50	6.28	6.59	6.62
4	7.35	6.67	11.44	8.00	7.03	6.73	7.87	6.90	6.48	6.14	6.54	6.68
5	7.75	6.59	8.87	8.33	6.92	6.70	7.40	6.83	6.50	6.09	6.52	6.82
6	7.35	6.57	7.89	9.15	6.90	7.03	6.93	6.67	6.20	6.05	6.55	6.75
7	7.22	6.50	7.65	8.55	6.95	6.93	6.79	6.47	6.12	6.04	6.49	7.78
8	7.18	6.49	7.53	7.97	6.89	6.73	6.75	8.37	6.10	6.04	6.42	7.12
9	7.12	6.53	7.43	7.80	6.95	6.63	6.60	7.00	6.08	6.30	6.48	7.08
10	6.92	6.63	7.40	11.50	7.27	6.85	6.80	6.70	6.04	6.12	6.42	7.10
11	7.20	6.73	7.17	10.60	7.13	6.80	6.63	6.57	6.05	6.08	6.50	7.02
12	7.40	6.73	7.21	9.57	7.20	6.63	6.65	6.70	6.05	6.08	6.55	6.98
13	7.47	6.74	7.07	8.83	7.00	6.53	6.67	6.55	6.05	6.08	6.80	6.82
14	7.17	6.75	6.97	8.35	6.88	6.53	6.57	6.43	6.04	6.08	6.72	6.85
15	7.08	6.67	6.87	13.67	6.85	6.43	6.40	6.30	6.03	6.05	6.60	6.78
16	7.00	6.63	7.00	11.10	6.77	6.45	6.27	6.27	6.00	6.10	6.62	7.50
17	7.05	6.60	7.10	9.43	6.71	7.17	6.37	6.23	6.00	6.10	6.68	7.20
18	6.93	6.63	6.93	8.55	6.69	7.70	6.40	6.27	5.98	6.05	6.62	7.00
19	6.83	6.67	6.93	8.20	6.69	7.85	6.39	6.19	5.95	6.38	7.92	7.00
20	6.83	6.77	7.05	7.90	6.63	7.50	6.33	6.25	6.02	7.50	7.55	6.85
21	6.73	6.90	6.97	7.67	6.59	7.23	6.23	7.00	6.28	8.00	7.62	7.30
22	7.10	8.90	6.85	7.47	6.53	7.35	6.75	6.67	6.85	7.10	7.30	7.40
23	6.64	8.75	6.79	7.67	6.47	7.43	6.57	6.82	6.65	6.85	7.20	7.20
24	8.61	7.65	6.65	7.75	6.41	7.30	6.45	6.70	6.48	6.72	7.02	6.80
25	7.95	7.75	6.83	7.47	6.45	7.00	6.33	6.38	6.38	6.90	6.92	6.90
26	7.30	7.37	6.73	7.33	6.41	6.87	6.43	6.22	6.28	7.70	6.88	6.80
27	7.17	7.63	6.90	6.93	6.75	6.73	6.33	6.15	6.20	7.28	6.80	6.90
28	7.17	7.43	8.83	7.10	7.55	6.63	6.23	6.42	6.12	7.15	6.78	6.80
29	7.00	.....	8.73	7.03	8.07	6.63	6.23	6.38	6.12	6.95	6.70	6.75
30	6.87	.....	8.60	7.03	7.45	6.55	6.37	6.35	7.15	6.75	6.70	6.80
31	6.73	.....	9.78	.....	6.10	.....	6.73	6.52	.....	6.72	.....	7.20

NOTE.—Ice conditions from February 3 to noon February 22. Ice averaged about 0.5 foot in thickness. No report of ice after this date. December 6 river frozen over; ice went out 3 p. m. December 31. Ice averaged from 0.25 to 0.50 foot thick. During the frozen period the readings were taken to the water surface through a hole cut in the ice for January, February, and March, and to surface of ice for December with extra readings to water surface.

Comparative ice and water readings.

Date.	Water surface.	Top of ice.	Thickness of ice at gage.
	Feet.	*Feet.*	*Feet.*
December 19	6.85	7.0	0.12
December 22	7.4	7.2	.15
December 26	6.8	7.1	.25
December 29	6.75	7.25	.4

Rating table for Rondout Creek at Rosendale, N. Y., for 1901–1903 and 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
5.95	32	7.20	712	8.50	2,000	10.60	4,430
6.00	50	7.30	799	8.60	2,108	10.80	4,675
6.10	86	7.40	885	8.70	2,216	11.00	4,920
6.20	121	7.50	971	8.80	2,323	11.20	5,184
6.30	157	7.60	1,071	8.90	2,431	11.40	5,440
6.40	192	7.70	1,171	9.00	2,539	11.60	5,706
6.50	228	7.80	1,272	9.20	2,764	11.80	5,978
6.60	290	7.90	1,372	9.40	2,984	12.00	6,250
6.70	353	8.00	1,472	9.60	3,222	13.00	7,640
6.80	415	8.10	1,578	9.80	3,461	14.00	9,070
6.90	478	8.20	1,683	10.00	3,700		
7.00	540	8.30	1,789	10.20	3,943		
7.10	626	8.40	1,894	10.40	4,186		

NOTE.—The above table is applicable only for open-channel conditions. It is based on discharge measurements made during 1901–1906, and is well defined between gage heights 6.1 feet and 7.0 feet. Above 7.0 feet the rating is approximate.

Monthly discharge of Rondout Creek at Rosendale, N. Y., for 1906.

Month.	Discharge in second-feet.		
	Maximum.	Minimum.	Mean.
January	2,120	316	700
March	5,490	322	1,100
April	8,600	497	2,150
May	1,550	86	493
June	1,320	203	520
July	1,340	132	355
August	1,860	103	315
September	669	32	150
October	1,470	64	342
November	1,390	199	434

NOTE.—Values for 1906 are fair.

MISCELLANEOUS MEASUREMENTS IN HUDSON RIVER DRAINAGE BASIN.

Miscellaneous discharge measurements in Hudson River drainage basin in 1904 and 1906.

Date.	Stream.	Locality.	Width.	Area of section.	Gage height.	Discharge.
1904.			*Feet.*	*Sq.-ft.*	*Feet.*	*Sec.-ft.*
July 30[a]	Hudson River	Corinth, N. Y.		1,220	126.16	2,600
August 25[a]	do	do		1,500	126.92	4,480
September 10[a]	do	do		1,150	126.03	2,360
September 26[a]	do	do		1,440	126.87	3,910
September 28[a]	do	do		1,500	126.95	4,360
October 2[a]	do	do		1,930	127.92	7,050
October 22[a]	do	do		3,050	130.45	17,970
1906.						
September 11[b]	Hudson River	do	507	994	125.9	1,670
September 12[b]	do	do	507	1,050	125.82	1,730
November 1[c]	do	do	488	1,650	126.12	2,580
August 19	Sacandaga River	Near Northville	52	81.4	.23	134
August 20	do	do	52	81.4	.20	132
August 23	Schoharie Creek	Middleburg, N. Y.			1.93	249
August 23	do	do			1.55	267
August 25	do	do			1.40	[d]108
September 7	do	do	90	140	1.30	78
September 7	do	do	90	141	1.28	74
August 24	do	First bridge below Schoharie Junction.			(e)	195
August 22	Fox Creek	Near junction Schoharie Creek.				57
August 23	do	do				59
August 25	do	do				46
April 3	Oriskany Creek	Walesville Upper Bridge.	60	213	[f]1.72	322
April 3	Small stream just below Walesville.		15.4	10.4		7.9

[a] Measured from boat above highway bridge.
[b] Measured by boat above highway bridge.
[c] Measured from highway bridge.
[d] Meter thought to be out of order.
[e] Water surface 27.6 feet below top of iron bars right-hand end of bridge, downstream side.
[f] Gage at Coleman.

PASSAIC RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Passaic River rises in Somerset and Morris counties, N. J. Above its confluence with Pompton River, its main tributary, it meanders through a flat country of Triassic red sandstone, to which in large measure must be attributed the turbidity of its waters. In contrast with the sluggish, muddy character of the Passaic, the Pompton is a rapid stream, and its waters are clear. It drains parts of Sussex, Passaic, Morris, and other adjoining counties, and traverses for a large part of its course a country of hard crystalline rocks and heavy forests, the general level of which is several hundred feet above that of the Passaic. At their confluence the Pompton enters with a current which carries it well toward the right bank of the Passaic, and at times of flood causes much backwater in the latter.

The highest recorded flood which has occurred in this drainage basin was that of October, 1903. The flood began at 6.30 p. m. October 8 and lasted until midnight October 18, the maximum height being reached at 9 p. m. October 10. There was a total rainfall of 11.74 inches between October 8 and 11. The estimated maximum discharge at the Dundee dam was 35,800 second-feet. This flood is fully described in Water-Supply Paper No. 92.

PASSAIC RIVER AT MILLINGTON, N. J.

This station was established November 25, 1903, and was discontinued July 15, 1906. It is located at the lower highway bridge at Millington, N. J. The conditions at the bench marks are described in Water-Supply Paper No. 167, page 59, where are given also references to publications that contain data for previous years.

Discharge measurements of Passaic River at Millington, N. J., for 1903 to 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1903.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
December 10	F. H. Tillinghast		71	1.80	78
December 18[a]	do		109	2.50	66
1904.					
April 9	F. H. Tillinghast	65	90	2.12	133
May 13	F. H. Brundage	57	37	1.36	38
June 4	John C. Hoyt	63	63	1.65	75
August 1	do	55	27	1.20	21
November 9	H. D. Comstock	62	44	1.42	38
1905.					
June 21	R. H. Bolster	54	24	1.12	12.8
1906.					
May 3	Robert Follansbee	63	65	1.82	83

[a] Measurement affected by ice jams below the gaging section.

Daily gage height, in feet, of Passaic River at Millington, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	1.95	1.58	2.20	3.00	1.60	2.15	1.30
2	1.65	1.58	1.80	2.65	1.65	1.85	1.28
3	1.58	2.05	2.25	2.45	1.70	1.65	1.22
4	3.15	1.68	5.80	2.05	1.70	1.50	2.20
5	3.20	1.52	5.15	1.95	1.60	1.42	2.25
6	2.80	1.60	4.72	2.00	1.60	1.40	1.95
7	2.38	1.52	3.45	1.90	1.65	1.32	1.72
8	2.25	1.55	2.60	1.80	1.68	1.30	1.45
9	1.85	1.70	2.90	1.85	1.68	1.30	1.40
10	2.10	1.70	2.70	4.90	1.70	1.30	1.35
11	1.98	1.70	2.60	4.95	1.62	1.30	1.48
12	1.62	1.70	2.45	4.00	1.55	1.28	1.40
13	1.88	1.70	2.40	3.10	1.55	1.22	1.35
14	1.82	1.78	2.25	2.45	1.55	1.15	1.22
15	1.95	1.88	2.10	3.85	1.52	1.15	1.20
16	2.30	1.82	2.15	4.20	1.50	1.30	.....
17	2.45	1.68	2.55	3.55	1.50	1.45	.....
18	2.28	1.75	2.50	2.75	1.48	1.50	.....
19	2.10	1.72	2.15	2.40	1.40	1.78	.....
20	1.95	1.70	2.20	2.20	1.38	1.68	.....
21	1.95	1.98	2.35	2.05	1.32	1.55	.....
22	2.00	3.72	2.10	1.95	1.30	1.55	.....
23	2.00	3.10	2.05	2.05	1.30	1.42	.....
24	1.90	2.68	1.75	.....	1.30	1.48	.....
25	1.82	2.35	1.60	.....	1.30	1.38	.....
26	1.72	2.55	1.65	.....	1.30	1.25	.....
27	1.62	2.22	1.95	.....	1.38	1.22	.....
28	1.68	1.92	3.20	.....	2.00	1.20	.....
29	1.72	.....	3.90	1.65	2.90	1.30	.....
30	1.58	.....	3.55	1.65	2.68	1.32	.....
31	1.55	.....	3.45	.....	2.42	.....	.....

NOTE.—River frozen February 2 to 21.

Rating table for Passaic River at Millington, N. J., for 1903 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.90	7	2.10	128	3.30	398	5.00	935
1.00	10	2.20	146	3.40	424	5.20	1,005
1.10	14	2.30	164	3.50	452	5.40	1,075
1.20	20	2.40	184	3.60	480	5.60	1,145
1.30	28	2.50	204	3.70	510	5.80	1,215
1.40	37	2.60	226	3.80	540	6.00	1,285
1.50	47	2.70	248	3.90	570	6.20	1,360
1.60	58	2.80	272	4.00	600	6.40	1,440
1.70	70	2.90	296	4.20	664	6.60	1,520
1.80	82	3.00	320	4.40	728	6.80	1,600
1.90	96	3.10	346	4.60	795	7.00	1,680
2.00	112	3.20	372	4.80	865	7.20	1,760

NOTE.—The above table is applicable only for open-channel conditions. It is based on 8 discharge measurements made during 1903–1906 and is well defined between gage heights 1.0 feet and 2.5 feet. The extension of this rating is only approximate at gage height, 7.3 feet.

Monthly discharge of Passaic River at Millington, N. J., for 1903 to 1906.

[Drainage area, 57 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-feet per sq. mile.	Depth in inches.
1903.[a]					
November 25 to 30	80	56	65.3	1.15	0.26
December [b]	858	26	130	2.28	2.63
1904.[c]					
January [d]			80	1.40	1.61
February [d]			100	1.75	1.89
March [d]	[g] 1,750		277	4.86	5.60
April	600	39	152	2.67	2.98
May	194	17	58.1	1.02	1.18
June	104	12	37.2	.653	.73
July	72	11	23.7	.416	.48
August	260	24	102	1.79	2.06
September	907	14	155	2.72	3.03
October	616	20	106	1.86	2.14
November	194	35	67.1	1.18	1.32
December [d]			50	.877	1.01
The year	1,750	11	101	1.77	24.03
1905.[e]					
January [f]			130	2.28	2.63
February [f]			30	.526	.55
March [f]	[g] 1,180		330	5.79	6.68
April	296	47	107	1.88	2.10
May	60	24	35.2	.618	.71
June	56	14	24.3	.426	.48
July	52	8	15.8	.277	.32
August	180	12	39.1	.686	.79
September	367	17	133	2.33	2.60
October	150	19	40.9	.718	.83
November	341	17	36.0	.632	.71
December	346	35	138	2.42	2.79
The year	1,180	8	88.3	1.55	21.18
1906.[h]					
January	372	52	125	2.19	2.52
February [i]			75	1.32	1.38
March [i]			200	3.51	4.05
April [j]	917	64	251	4.40	4.91
May	296	28	70.0	1.23	1.42
June	137	17	41.6	.730	.81
July 1 to 15	155	20	54.7	.960	.54

[a] Values for 1903 are rated as follows: November, good; December, fair.

[b] Ice conditions. Mean discharge determined partly from the flow of North Branch of Raritan River, at Pluckemin, N. J., during December, 1903.

[c] Values for 1904 are rated as follows: April to November, good; March, fair; January, February, and December, approximate.

[d] Ice conditions January 1 to March 8 and during parts of December. Estimates for the frozen periods are based on the flow at Pluckemin, N. J., and are considered conservative.

[e] Values for 1905 are rated as follows: April to December, good; January to March, approximate. The gage zero was checked against the bench marks on June 21, 1905, and May 3, 1906. On the latter date it was found to be 0.14 in error, but no information is available to show when the error occurred. Consequently no corrections in gage heights were made for the latter part of 1905, and those estimates may be somewhat too high. Gage heights for 1906 were, however, corrected, which should give reasonably close estimates. The estimates of accuracy have been made on the assumption that no error existed in the gage heights.

[f] Ice conditions January 1 to March 17; estimates based on flow at Pluckemin, N. J.

[g] Open channel.

[h] Values for 1906 are rated as follows: April to July, good (see footnote 1905); January, fair; February and March, approximate.

[i] Ice conditions during February and probably backwater during March, owing to ice lodged at and below the gaging section. Estimates based on estimates at Pluckemin and at Chatham, N. J.

[j] Discharge interpolated April 24 to 28.

NOTE.—Flow at the Pluckemin station is probably only affected by a smooth ice cover during frozen periods. North Branch of Raritan is a deep, sluggish stream at the Pluckemin station. The Millington section, on the other hand, is shallow and rocky and collects much ice drift, frequently causing backwater at the gaging section, thus rendering the daily gage heights of little value as an index of the discharge. Knowing the ice thickness at Pluckemin it has been possible to obtain good estimates at that point for ice periods. A coefficient based on the relative flow at Millington and Pluckemin was used to find flow at the former.

The following table gives the horsepower, 80 per cent efficiency, per foot of fall that may be developed at different rates of discharge and shows the number of days on which the flow and the corresponding horsepower were respectively less than the amounts given in the columns for "discharge" and "horsepower."

Discharge and horsepower table for Passaic River at Millington, N. J.

Discharge in second-feet.	H. P. per foot fall; 80 per cent efficiency.	Number of days of deficient flow.			
		1903.[a]	1904.	1905.	1906.[b]
11	1	.....	.....	5	.....
22	2	.....	49	80	4
33	3	1	87	182	43
44	4	4	128	211	57
55	5	9	195	240	71

[a] November 25 to December 31, 1903. [b] January 1 to July 15, 1906.

PASSAIC RIVER NEAR CHATHAM, N. J.

This station was established February 10, 1903, by the United States Weather Bureau, by which it is maintained. It is located at the second bridge, about 1.5 miles upstream from Chatham, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 61, where are given also references to publications that contain data for previous years.

The following discharge measurement was made May 3, 1906:

Width, 65 feet; area, 95 square feet; gage height, 2.74 feet; discharge, 106 second-feet.

Daily gage height, in feet, of Passaic River, near Chatham, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.3	2.6	2.6	4.2	2.7	3.2	3.1	3.7	2.3	2.2	2.8	2.3
2	3.2	2.5	2.6	3.8	2.6	3.0	2.8	3.4	2.2	2.2	2.7	2.2
3	3.2	.....	2.7	3.5	2.7	2.9	2.5	3.6	2.2	2.2	2.6	2.2
4	4.1	.....	4.9	3.4	2.6	2.8	3.0	3.7	2.2	2.1	2.6	.....
5	4.0	.....	4.9	3.2	2.6	2.7	3.8	3.6	2.2	2.2	2.5	.....
6	3.9	.....	4.5	3.2	2.6	2.6	3.6	3.4	2.2	2.3	2.5	.....
7	3.5	.....	4.2	3.1	2.8	2.5	3.3	3.0	2.1	2.3	2.4	2.8
8	3.3	.....	4.0	2.9	2.7	2.5	2.9	3.3	2.1	2.3	2.4	.....
9	3.8	.....	3.6	2.8	2.7	2.4	2.5	3.2	2.1	2.2	2.3	.....
10	3.5	.....	3.3	5.0	2.8	2.4	2.3	3.0	2.1	2.2	2.3	.....
11	3.3	.....	3.2	4.8	2.7	2.4	2.4	2.9	2.1	2.2	2.3	2.9
12	3.0	.....	3.1	4.7	2.7	2.3	2.3	3.3	2.1	2.1	2.5	2.8
13	3.1	.....	3.0	4.5	2.7	2.3	2.2	3.2	2.1	2.1	2.5	2.7
14	3.1	.....	2.8	4.4	2.8	2.3	2.2	3.0	2.1	2.1	2.4	2.6
15	3.2	.....	2.7	5.0	2.7	2.2	2.2	2.9	2.0	2.1	2.3	2.6
16	3.3	.....	2.9	5.3	2.7	2.2	2.1	2.8	2.0	2.1	2.6	2.5
17	3.6	.....	2.8	4.5	2.6	2.4	2.1	2.7	2.0	2.0	2.5	2.6
18	3.4	.....	2.8	4.4	2.6	2.5	2.8	2.7	2.0	2.0	2.5	2.9
19	3.3	.....	2.7	3.9	2.6	2.7	2.7	2.7	2.0	2.0	3.2	.....
20	3.1	.....	2.7	3.5	2.5	3.1	2.5	2.6	2.0	2.0	3.2	.....
21	3.0	.....	2.6	3.2	2.5	2.9	2.3	2.5	2.0	2.3	3.1	4.0
22	3.0	3.6	2.6	3.0	2.5	2.8	2.7	2.5	2.0	2.7	3.0	3.8
33	2.9	4.3	2.6	2.8	2.4	2.7	2.9	2.4	2.1	2.8	2.9	.....
24	3.0	4.0	2.5	3.4	2.4	2.8	2.8	2.4	2.1	3.0	2.8	.....
25	3.0	3.4	2.5	3.3	2.4	2.7	2.7	2.4	2.0	3.0	2.7	.....
26	2.9	3.3	2.8	3.2	2.4	2.6	2.6	2.3	2.0	2.9	2.6	.....
27	2.9	3.0	3.2	3.0	2.3	2.5	2.5	2.4	2.0	2.8	2.5	.....
28	2.8	2.7	4.0	2.9	2.7	2.4	2.4	2.5	2.1	2.7	2.5	.....
29	2.7	.....	4.6	2.8	4.0	3.4	3.9	2.4	2.1	2.7	2.4	.....
30	2.7	.....	4.5	2.8	3.8	3.3	4.2	2.3	2.2	2.6	2.3	.....
31	2.6	.....	4.4	.....	3.5	.....	4.0	2.3	.....	2.6	.....	.....

NOTE.—Ice conditions January 9 to 16, February 3 to 22, February 28 to March 2, March 19 to 23, December 4 to 6, 8 to 10, 19 to 20, and 23 to 31.

Rating table for Passaic River, near Chatham, N. J., for 1903 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.00	2	2.90	124	3.70	391	4.50	758
2.10	4	3.00	149	3.80	433	4.60	809
2.20	9	3.10	176	3.90	476	4.70	861
2.30	17	3.20	206	4.00	520	4.80	914
2.40	29	3.30	239	4.10	565	4.90	968
2.50	44	3.40	274	4.20	611	5.00	1,022
2.60	61	3.50	312	4.30	659	5.20	1,132
2.70	80	3.60	351	4.40	708	5.40	1,245
2.80	101						

NOTE.—The above table is applicable only for open-channel conditions. It is based on 14 discharge measurements made during 1903 to 1905, and is well defined between gage heights 2.28 feet and 3.8 feet. At gage heights 2.0 and 2.1 feet the rating is approximate.

Monthly discharge of Passaic River near Chatham, N. J., for 1906.

[Drainage area, 101 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January[a]	[b]565	[b]61	203	2.01	2.32
February[a]	[b]659	.....	122	1.21	1.26
March[a]	[b]968	.....	293	2.90	3.34
April	1,190	101	427	4.23	4.72
May	520	17	98.7	.977	1.13
June	274	9	80.9	.801	.89
July	611	4	133	1.32	1.52
August	391	17	140	1.39	1.60
September	17	2	4.7	.047	.05
October	149	2	34.7	.344	.40
November	206	17	67.3	.666	.74
December[a]	[b]520	[b]9	85.3	.845	.97
The year	1,190	2	141	1.40	18.94

[a] Ice conditions during January, February, March, and December. Daily flow during frozen periods determined largely by the flow of North Branch of Raritan River at Pluckemin, N. J. The section at the latter point is deep, and the flow during ice periods is probably only affected by a smooth ice cover. The Chatham section is shallow, and at times the collection of ice below the gage causes backwater.

[b] Open channel.

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

RAMAPO RIVER NEAR MAHWAH, N. J.

This station was established February 10, 1903, by the United States Weather Bureau, by which it is maintained. It is located at a concrete-arch highway bridge about 1 mile west of Mahwah, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 64, where are given also references to publications that contain data for previous years.

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Daily gage height, in feet, of Ramapo River, near Mahwah, N. J., for 1906.

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

NOTE.—River frozen January 10 to 15, February 6 to 19, March 1 and 2, December 8 to 13, 19 to 20, and 24 to 29.

Rating table for Ramapo River near Mahwah, N. J., for 1905 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.60	24	3.60	167	4.60	546	5.60	1,075
2.70	30	3.70	194	4.70	593	5.70	1,133
2.80	37	3.80	224	4.80	641	5.80	1,191
2.90	46	3.90	257	4.90	691	5.90	1,250
3.00	56	4.00	293	5.00	743	6.00	1,310
3.10	68	4.10	331	5.10	796	6.20	1,433
3.20	82	4.20	371	5.20	850	6.40	1,560
3.30	99	4.30	413	5.30	905	6.60	1,690
3.40	119	4.40	456	5.40	961	6.80	1,820
3.50	142	4.50	500	5.50	1,018	7.00	1,950

NOTE.—The above table is applicable only for open-channel conditions. It is based on 6 discharge measurements made during 1904 to 1905, and is well defined between gage heights 2.65 feet and 6.0 feet.

Monthly discharge of Ramapo River near Mahwah, N. J., for 1906.

[Drainage area, 118 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	546	.....	275	2.33	2.69
February	796	.....	209	1.77	1.84
March	1,880	142	454	3.85	4.44
April	1,560	194	588	4.98	5.56
May	1,430	82	292	2.47	2.85
June	546	56	156	1.32	1.47
July	546	37	126	1.07	1.23
August	500	37	124	1.05	1.21
September	167	24	41.8	.354	.40
October	224	24	56.7	.481	.55
November	293	30	79.7	.675	.75
December	331	56	103	.873	1.01
The year	1,880	24	209	1.77	24.00

NOTE.—Values are rated as follows: March to November, excellent; January, good; February and December, fair. Since this station has not been visited since June, 1905, the above estimates of accuracy are dependent on the constancy of conditions of flow at the station since that time. Discharge during ice periods estimated.

RARITAN RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Raritan River, the largest stream in New Jersey except the Delaware, is formed by two chief branches, North and South, which have their sources a few miles apart in the highlands of Morris County, flow southward, and unite near Somerville, from which point the course of the river is southeastward to Raritan Bay. The river is tidal to a point about 2 miles above New Brunswick, and is navigable to that city, about 12 miles from the mouth.

The total area of the drainage basin is 1,105 square miles, about 10 per cent of which is forested. The highlands consist mostly of trap rock and contain a large proportion of the wooded areas of the basin. The area outside of the highlands consists either of trap rock or red sandstone. Of the 800 square miles of drainage area above the gaging station at Boundbrook, about 150 square miles are in the cultivated part of the highlands and on the trap ridges; the remainder is mostly on the low, level, red-sandstone plain.

The valley of the Raritan is populous and highly cultivated, and a large amount of water power is utilized on its various branches. North Branch is considered a valuable source for a gravity supply, the elevation of the upper portion ranging from 750 to 1,100 feet. Millstone River, an important stream which unites with the Raritan a few miles west of Boundbrook, differs from the other branches, having its rise in sand hills and flowing northwestward through a sandy soil. It has large ground storage, and is better suited for power than for water supply, being very muddy at high stages.

SOUTH BRANCH RARITAN RIVER AT STANTON, N. J.

This station was established July 2, 1903, at the highway bridge about 500 feet from the Lehigh Valley Railroad station at Stanton, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 68, where are given also references to publications that contain data for previous years.

The following discharge measurement was made May 4, 1906:

Width, 98 feet; area, 173 square feet; gage height, 2.94 feet; discharge, 219 second-feet.

Daily gage height, in feet, of South Branch Raritan River at Stanton, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.31	3.02	3.01	3.18	2.92	2.91	3.08	3.46	2.39	2.11	2.46	2.68
2	3.39	3.00	3.04	3.15	2.91	2.81	3.09	3.48	2.36	2.16	2.49	2.74
3	3.30	3.02	5.45	3.21	2.96	2.90	2.88	3.24	2.31	2.21	2.54	2.78
4	3.29	3.11	5.56	3.19	2.84	2.82	2.80	2.88	2.30	2.29	2.39	2.86
5	3.22	3.08	4.08	3.22	2.81	2.79	2.80	2.79	2.25	2.29	2.59	2.71
6	3.14	3.02	3.56	3.21	2.81	2.79	2.76	2.64	2.24	2.28	2.58	2.76
7	3.04	3.05	3.40	3.16	2.82	2.80	2.76	2.68	2.26	2.34	2.54	2.89
8	2.96	3.11	3.28	3.14	2.80	2.76	2.66	2.59	2.21	2.34	2.49	2.89
9	2.96	2.99	3.21	3.08	2.79	2.71	2.68	2.51	2.21	2.26	2.52	2.96
10	2.98	3.04	3.22	3.01	2.80	2.76	2.66	2.51	2.16	2.22	2.46	2.88
11	3.18	2.90	3.20	3.00	2.81	2.68	2.61	2.52	2.18	2.24	2.96	2.89
12	3.25	2.96	3.21	3.01	2.84	2.69	2.58	2.50	2.18	2.28	2.99	2.81
13	3.08	2.91	3.19	2.95	2.92	2.56	2.56	2.55	2.16	2.24	2.81	2.82
14	3.12	2.89	3.16	3.01	2.89	2.59	2.52	2.59	2.14	2.26	2.76	2.79
15	3.11	2.82	3.16	4.61	2.82	2.45	2.42	2.61	2.19	2.12	2.68	2.84
16	3.35	2.96	3.19	4.28	2.81	2.49	2.41	2.48	2.19	2.21	2.58	2.91
17	3.09	3.15	3.14	3.74	2.80	2.44	2.40	2.56	2.16	2.32	2.48	2.98
18	3.09	3.16	3.09	3.41	2.79	2.49	2.89	2.55	2.12	2.01	2.51	3.16
19	3.11	3.41	3.12	3.36	2.75	2.49	2.61	2.41	2.16	2.18	2.50	3.19
20	3.08	3.39	3.16	3.32	2.86	2.51	2.59	2.40	2.01	2.26	2.49	3.18
21	3.05	3.45	3.19	3.30	2.86	2.50	2.59	2.41	2.01	2.56	2.44	3.30
22	3.11	4.75	3.16	3.25	2.81	2.49	2.62	2.42	2.16	3.10	2.49	3.12
23	3.08	3.61	3.20	3.16	2.81	2.45	2.59	2.49	2.41	2.82	2.48	3.42
24	3.06	3.39	3.19	3.09	2.85	2.71	2.61	2.51	2.30	2.81	2.48	3.79
25	3.00	3.55	3.09	3.11	2.86	4.00	2.54	2.44	2.22	2.69	2.51	3.34
26	3.02	3.42	3.16	3.01	2.84	3.64	2.51	2.49	2.20	2.64	2.54	3.21
27	3.11	3.18	3.52	2.98	3.31	3.01	2.59	2.59	2.25	2.61	2.52	3.34
28	3.10	3.11	3.82	2.94	4.30	2.81	2.60	2.56	2.25	2.59	2.49	3.72
29	3.18	.....	3.68	2.92	4.05	2.76	5.01	2.41	2.22	2.61	2.46	3.75
30	3.09	.....	3.51	2.98	3.81	2.71	3.76	2.40	2.24	2.49	2.56	3.66
31	2.98	.....	3.31	.....	3.56	.....	3.46	2.42	.....	2.52	.....	5.22

NOTE.—Ice conditions February 8 to 19; also December 21 to 30; ice attaining a thickness of 0.3 foot during both periods.

Rating table for South Branch Raritan River at Stanton, N. J., for 1905 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.00	37	3.00	231	4.00	645	5.00	1,180
2.10	46	3.10	264	4.10	694	5.10	1,238
2.20	57	3.20	299	4.20	744	5.20	1,297
2.30	70	3.30	337	4.30	795	5.30	1,357
2.40	86	3.40	377	4.40	847	5.40	1,417
2.50	105	3.50	419	4.50	900	5.50	1,478
2.60	126	3.60	462	4.60	954	5.60	1,539
2.70	149	3.70	506	4.70	1,009		
2.80	174	3.80	551	4.80	1,065		
2.90	201	3.90	597	4.90	1,122		

NOTE.—The above table is applicable only for open-channel conditions. It is based on 11 discharge measurements made during 1903 to 1906 and is well defined between gage heights 2.1 feet and 4.4 feet.

Monthly discharge of South Branch Raritan River at Stanton, N. J., for 1906.

[Drainage area, 158 square miles.]

Month	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	373	219	274	1.73	1.99
February	1,040	.....	288	1.82	1.90
March	1,510	234	410	2.59	2.99
April	960	207	323	2.04	2.28
May	795	161	245	1.55	1.79
June	645	94	174	1.10	1.23
July	1,190	86	197	1.25	1.44
August	411	86	138	.873	1.01
September	88	38	59.9	.379	.42
October	264	38	91.8	.581	.67
November	228	84	119	.753	.84
December	1,310	.....	238	1.51	1.74
The year	1,510	38	213	1.35	18.30

NOTE.—Values are rated as follows: January and March to July, excellent; February and December, fair; August to November, good. Discharge during ice periods estimated.

NORTH BRANCH OF RARITAN RIVER NEAR PLUCKEMIN, N. J.

This station was established September 9, 1903, and was discontinued July 15, 1906. It is located at the second bridge below Far Hills, N. J., on the road to Somerville, about 2 miles from Far Hills. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 70, where are given also references to publications that contain data for previous years.

Discharge measurements of North Branch of Raritan River near Pluckemin, N. J., for 1903 to 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1903.		*Feet.*	*Sq. ft.*	*Feet.*	*Sec.-ft.*
September 9	E. P. Roundey	.....	165	1.70	74
October 20	Wm. Nunn	.....	204	2.30	163
1904.					
May 12	F. H. Brundage	55	160	1.51	56
November 9	H. D. Comstock	55	172	1.70	63
1905.					
June 21	R. M. Packard	55	146	1.25	24.6
March 16	F. H. Tillinghast	46	69	2.30	108
1906.					
May 3	Robert Follansbee	56	169	1.80	95

Daily gage height, in feet, of North Branch of Raritan River, near Pluckemin, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	2.00	1.75	1.85	2.35	1.80	1.90	1.48
2	1.90	1.80	1.80	2.05	1.80	1.82	1.30
3	3.40	2.00	2.25	1.98	1.85	1.78	1.30
4	3.00	1.90	2.95	1.90	1.72	1.72	2.20
5	2.00	1.85	2.48	1.90	1.60	1.68	1.70
6	2.00	2.00	2.38	1.90	1.70	1.60	1.58
7	2.00	2.00	2.28	1.90	1.78	1.62	1.45
8	2.00	2.00	2.08	1.90	1.70	1.50	1.38
9	2.00	2.15	2.00	2.15	1.70	1.45	1.50
10	2.00	2.05	1.90	3.68	1.62	1.40	1.65
11	2.00	2.10	1.90	2.75	1.58	1.40	1.42
12	2.20	2.20	1.90	2.60	1.52	1.35	1.38
13	2.20	2.10	1.90	2.60	1.50	1.30	1.22
14	2.20	1.82	1.90	2.60	1.50	1.30	1.20
15	2.10	1.75	1.80	3.60	1.50	1.30	1.20
16	2.25	1.78	1.88	2.70	1.50	2.20	.....
17	2.00	1.70	1.80	2.48	1.50	2.00	.....
18	2.00	1.70	1.75	2.38	1.50	2.65	.....
19	2.00	1.65	1.75	2.90	1.50	1.90	.....
20	1.90	1.60	1.68	2.45	1.45	1.90	.....
21	1.92	2.10	1.58	2.05	1.45	1.85	.....
22	2.00	2.50	1.50	1.90	1.40	1.82	.....
23	2.00	2.05	1.50	1.90	1.40	1.80	.....
24	2.00	1.90	1.50	1.90	1.42	1.72	.....
25	2.00	2.50	1.50	1.85	1.30	1.58	.....
26	1.95	2.15	1.55	1.82	1.30	1.50	.....
27	1.90	1.98	2.30	1.80	2.95	1.50	.....
28	1.90	1.90	2.80	1.80	3.00	1.50	.....
29	1.85	.....	2.70	1.80	2.35	1.80	.....
30	1.75	.....	2.50	1.88	2.05	1.70	.....
31	1.75	.....	2.55	.....	1.92	.....	.....

NOTE.—River frozen February 2 to 19.

Rating table for North Branch of Raritan River, near Pluckemin, N. J., for 1903 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.10	13	2.40	177	3.70	420	5.00	705
1.20	20	2.50	194	3.80	440	5.10	730
1.30	29	2.60	211	3.90	460	5.20	755
1.40	39	2.70	228	4.00	480	5.30	780
1.50	50	2.80	246	4.10	500	5.40	805
1.60	62	2.90	264	4.20	520	5.50	830
1.70	74	3.00	282	4.30	540	5.60	855
1.80	87	3.10	301	4.40	560	5.70	880
1.90	101	3.20	320	4.50	580	5.80	905
2.00	115	3.30	340	4.60	605	5.90	930
2.10	130	3.40	360	4.70	630	6.00	960
2.20	145	3.50	380	4.80	655	6.20	1,020
2.30	161	3.60	400	4.90	680	6.40	1,080

NOTE.—The above table is applicable only for open-channel conditions. It is based on 6 discharge measurements made during 1903–1906 and is fairly well defined between gage heights 1.2 feet and 2.5 feet. The above rating is approximate at gage height 6.4 feet.

Monthly discharge of North Branch of Raritan River, near Pluckemin, N. J., for 1903 to 1906.

[Drainage area, 52 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
1903.[a]					
September 9 to 30	320	50	102	1.96	1.60
October	1,110	48	180	3.46	3.99
November[b]	115	[c]70	82.6	1.59	1.77
December[b]	[d]540	[c]50	129	2.48	2.86
1904.[e]					
January[f]	[d]1,030	[c]50	137	2.63	3.03
February[f]	[d]1,000	[c]70	178	3.42	3.69
March	767	87	157	3.02	3.48
April	255	74	116	2.23	2.49
May	174	29	68.7	1.32	1.52
June	168	20	65.5	1.26	1.41
July	246	29	65.6	1.26	1.45
August	560	39	109	2.10	2.42
September[g]		39	175	3.37	3.76
October	592	50	112	2.15	2.48
November	273	74	151	2.90	3.24
December[f]	[c]120	[c]30	56.1	1.08	1.24
The year	1,030	20	116	2.23	30.21
1905.[h]					
January[i]	[d]680	[c]60	151	2.90	3.34
February[i]	[c]70	[c]20	36.4	.700	.73
March[i]	[d]460	[c]20	190	3.65	4.21
April	211	56	112	2.15	2.40
May	74	24	44.8	.862	.99
June	74	16	33.1	.637	.71
July	237	13	46.6	.896	1.03
August	310	20	62.5	1.20	1.38
September	400	62	164	3.15	3.51
October	145	44	68.1	1.31	1.51
November	500	39	74.5	1.43	1.60
December	400	50	139	2.67	3.08
The year	680	13	93.5	1.80	24.49
1906.[j]					
January	360	80	128	2.46	2.84
February[k]	[d]194	[c]40	79.4	1.53	1.59
March	273	50	120	2.31	2.66
April	416	87	158	3.04	3.39
May	282	29	79.2	1.52	1.75
June	219	29	74.8	1.44	1.61
July 1 to 15	145	20	48.3	.929	.52

[a] Values for 1903 are rated as follows: September, excellent; October and November, good; December, fair.

[b] Ice conditions November 30 to December 12, December 17 to 19 and 27 to 31. Daily discharge estimated from observer's notes on ice thickness.

[c] Ice conditions; values approximate.

[d] Open channel.

[e] Values for 1904 are rated as follows: March to November, good: January, February, and December, approximate.

[f] Ice conditions January 1 to March 1 and December 7-31. Daily flow during ice period determined from observer's notes on ice thickness.

[g] Gage washed away September 14. Discharge September 15 to 17 estimated 700 second-feet on basis of flow at other stations in Raritan River drainage basin, and Passaic River drainage basin.

[h] Values for 1905 are rated as follows: April to December, good; March, fair; January and February, approximate.

[i] Ice conditions January 1 to 6, 15 to 18, and January 22 to March 10. Daily flow during ice period based upon observer's notes on ice thickness.

[j] Values for 1906 are rated as follows: January and March to July, good; February, approximate.

[k] River frozen February 2 to 19. Daily discharge estimated from observer's notes on ice thickness.

The following table gives the horsepower, 80 per cent efficiency, per foot of fall that may be developed at different rates of discharge and shows the number of days on which the flow and the corresponding horsepower were, respectively, less than the amounts given in the columns for "discharge" and "horsepower."

Discharge and horsepower table for North Branch Raritan River near Pluckemin, N. J.

Discharge in second-feet.	H. P. per foot fall; 80 per cent efficiency.	Number of days of deficient flow.			
		1903.[a]	1904.	1905.	1906.[b]
22	2	.....	1	36	2
33	3	.....	20	79	10
44	4	.....	58	110	21
55	5	14	108	173	50

[a] September 9 to December 31, 1903.
[b] January 1 to July 15, 1906.

RARITAN RIVER AT FINDERNE, N. J.

This station was established June 27, 1903. It is located at the highway bridge one-fourth mile from the Central Railroad of New Jersey station at Finderne, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 71, where are given also references to publications that contain data for previous years.

The following discharge measurement was made May 2, 1906:

Width, 166 feet; area, 231 square feet; gage height, 4.27 feet; discharge, 563 second-feet.

Daily gage height, in feet, of Raritan River at Finderne, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.45	4.22	4.32	5.25	4.18	4.35	4.22	4.12	3.78	3.68	4.22	3.72
2	4.22	4.02	4.60	4.82	4.30	4.28	3.88	4.35	3.72	3.62	4.05	3.62
3	4.25	4.38	6.52	4.72	4.28	4.18	3.85	4.68	3.98	3.58	3.92	3.55
4	4.18	4.42	11.65	4.62	4.18	4.08	8.00	5.20	3.68	3.58	3.92	3.42
5	8.80	4.40	6.02	4.50	4.15	4.00	5.72	4.45	3.68	7.50	3.95	4.08
6	5.72	4.15	5.15	4.52	4.08	3.90	4.38	4.30	3.62	4.60	3.82	3.80
7	5.25	4.30	5.02	4.52	4.15	3.85	4.25	4.18	3.62	4.50	3.78	4.22
8	4.42	3.90	4.88	4.32	4.18	3.90	3.63	4.30	3.60	3.72	3.72	4.25
9	4.55	4.20	4.75	4.30	4.02	3.88	4.25	4 50	3.58	3.68	3.72	4.35
10	5.52	4.12	4.72	10.48	4.28	3.80	3.92	3.92	4.48	3.72	3.78	4.25
11	5 70	4.42	4.45	7.30	4.02	3.82	4 35	3.88	3.52	3.72	4.40	4.88
12	5.85	4.15	4.40	5.78	4.02	3.78	4.18	3.85	3.48	3.62	3.92	4.10
13	4.65	4.02	4.45	5.15	3.98	3.80	3.88	3.80	3.52	3.58	3.88	4.25
14	4.92	4.10	4.28	4.82	3.88	3.68	3 78	3.72	3.50	3.62	3.82	3.98
15	4.48	4.58	4.20	7.88	4.02	3.62	3.82	3.70	3.52	3.58	3.78	3.98
16	5.12	4.58	4.38	6.18	3.88	3.78	3.98	3.62	3.50	3.58	3.88	3.98
17	5.15	4.20	4.40	5.28	3.88	4.25	4.12	3.62	3.48	3.55	4.35	4.42
18	4.70	4.08	4.35	5.00	4.08	4.52	4.25	3.60	3.50	3.60	4.28	4.50
19	4.48	4.08	4.38	4.90	4.00	4.95	3.82	3.62	3.50	3.68	5.25	4.15
20	4.55	4.48	4.22	4.60	3.85	4.48	4.10	3.65	3.48	4.28	4.48	4.20
21	4.42	4.62	4.25	4.58	3.88	4.15	4.05	3.62	3.50	4.42	4.25	6.02
22	4.62	7.85	4.35	4.58	3.78	4.35	4.05	3.68	3.50	4.72	4.22	5.55
23	4.48	4.90	4.10	4.58	3.75	4.22	3.98	4.35	4.18	4.50	4.12	4.70
24	4.62	4.58	3.98	4.75	3.75	4.12	3.90	3.85	3.72	4.58	4.30	4.18
25	4.40	4.70	4.08	4.58	3.72	3.98	3.72	3.70	3.62	4.22	3.98	4.70
26	4.60	5.18	4.15	4.38	3.72	3.98	3.68	3.78	3.60	4.00	3.98	4.52
27	4.40	5.05	5.05	4.30	4.80	3.88	3.62	3.72	3.52	3.98	4.25	4.45
28	4.52	4.58	8.10	4.32	6.98	3.92	3.62	3.75	3.52	3.92	3.98	4.28
29	4.30	.....	6.40	4.12	5.80	3.92	4.95	3.82	3.50	3.98	4.25	4.20
30	4.18	.....	5.68	4.20	4.82	4.18	5.62	3.78	3.52	3.88	3.80	4.05
31	4.15	.....	5.95	.....	4.55	.....	4.42	3.80	.....	4.58	.....	5.22

NOTE.—No ice notes by observer; flow assumed to be unaffected by ice during the winter period.

Rating table for Raritan River at Finderne, N. J., for 1905 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
3.40	105	4.80	1,064	6 20	2,585	8.20	5,110
3.50	140	4.90	1,159	6.30	2,705	8.40	5,380
3.60	180	5.00	1,255	6.40	2,825	8.60	5,650
3.70	225	5.10	1,355	6.50	2,945	8.80	5,930
3.80	275	5.20	1,460	6.60	3,065	9.00	6,210
3.90	330	5.30	1,565	6.70	3,190	9.20	6,500
4.00	393	5.40	1,675	6.80	3,315	9.40	6,800
4.10	461	5.50	1,785	6.90	3,440	9.60	7,100
4.20	534	5.60	1,895	7.00	3,565	9.80	7,410
4.30	612	5.70	2,005	7.20	3,815	10.00	7,730
4.40	695	5.80	2,120	7.40	4,065	11.00	9,430
4.50	783	5.90	2,235	7.60	4,325	12.00	11,130
4.60	875	6.00	2,350	7.80	4,585		
4.70	969	6.10	2,465	8.00	4,845		

NOTE.—The above table is applicable only for open-channel conditions. It is based on 14 discharge measurements made during 1903 to 1906, and is well defined between gage heights 3.9 feet and 10.0 feet. Above gage height 10.0 feet the rating curve is a tangent, the difference being 170 per tenth.

Monthly discharge of Raritan River at Finderne, N. J., for 1906.

[Drainage area, 490 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	5,930	497	1,150	2.35	2.71
February	4,650	330	843	1.72	1.79
March	10,500	380	1,490	3.04	3.50
April	8,550	476	1,490	3.04	3.39
May	3,540	235	616	1.26	1.45
June	1,210	189	449	.916	1.02
July	4,840	189	673	1.37	1.58
August	1,460	180	407	.831	.96
September	765	133	207	.422	.47
October	4,200	160	521	1.06	1.22
November	1,510	235	461	.941	1.05
December	2,370	112	673	1.37	1.58
The year	10,500	112	748	1.53	20.72

NOTE.—Values are rated as follows: January to December, excellent, except September, which is good. Flow probably not materially affected by ice during the winter months.

RARITAN RIVER AT BOUNDBROOK, N. J.

This station was established September 12, 1903. It is located at the highway bridge just back of the Lehigh Valley Railroad station at Boundbrook, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 73, where are given also references to publications that contain data for previous years.

The following discharge measurement was made May 2, 1906:

Width, 357 feet; area, 983 square feet; gage height, 1.50 feet; discharge, 701 second-feet.

Daily gage height, in feet, of Raritan River at Boundbrook, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.75	1.6	1.85	2.7	1.5	1.75	1.45	1.45	1.2	1.5	2.35	1.4
2	1.7	1.45	1.85	2.25	1.45	1.6	1.35	1.55	1.2	1.5	1.8	1.3
3	1.6	1.3	2.95	2.05	1.6	1.55	1.25	2.3	1.2	1.45	1.7	1.3
4	5.4	1.45	8.8	1.9	1.55	1.45	4.05	3.05	1.2	1.5	1.55	1.15
5	3.9	1.3	5.3	2.0	1.5	1.4	2.45	2.4	1.2	3.1	1.5	1.35
6	2.85	1.3	2.95	1.85	1.5	1.4	2.15	1.9	1.2	2.05	1.5	1.4
7	2.15	1.2	2.45	1.8	1.55	1.35	1.8	1.6	1.15	1.8	1.5	1.75
8	2.0	1.2	2.45	1.7	1.55	1.3	1.55	1.5	1.15	1.65	1.4	1.6
9	1.9	1.5	2.23	1.8	1.5	1.3	1.45	1.6	1.15	1.5	1.45	1.6
10	2.0	1.5	2.05	7.62	1.6	1.3	1.5	1.6	1.1	1.45	1.45	1.5

Daily gage height, in feet, of Raritan River at Boundbrook, N. J., for 1906—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11	2.0	1.4	2.0	4.3	1.55	1.3	1.75	1.6	1.1	1.5	1.5	2.6
12	1.9	1.3	1.95	3.05	1.5	1.25	1.45	1.65	1.1	1.4	1.6	2.8
13	1.85	1.35	1.7	2.4	1.5	1.2	1.35	1.45	1.3	1.4	1.55	2.15
14	1.55	1.85	1.8	2.25	1.45	1.2	1.3	1.35	1.5	1.35	1.5	1.75
15	2.05	2.65	1.8	4.05	1.4	1.2	1.25	1.25	1.5	1.25	1.5	1.65
16	2.5	2.2	1.7	3.85	1.4	1.3	1.2	1.2	1.5	1.2	1.65	1.75
17	2.85	2.05	1.8	2.85	1.4	1.5	1.35	1.2	1.5	1.3	1.75	2.1
18	2.15	1.85	1.7	2.3	1.45	1.6	1.65	1.2	1.5	1.35	1.9	2.45
19	2.4	1.55	1.6	2.25	1.45	2.4	1.55	1.2	1.5	1.45	2.5	1.8
20	2.25	1.65	1.9	2.05	1.35	1.95	1.35	1.15	1.45	1.6	2.2	1.9
21	1.95	1.85	1.95	2.05	1.3	1.65	1.45	1.55	1.45	2.1	2.0	3.65
22	2.0	4.35	1.9	1.8	1.3	1.6	2.15	2.4	1.6	2.3	1.85	3.0
23	2.0	2.35	1.85	1.95	1.3	1.55	1.6	1.6	2.05	1.95	1.75	2.45
24	2.0	2.05	1.75	2.1	1.25	2.15	1.5	1.35	1.55	1.85	1.7	1.4
25	1.95	2.05	1.7	1.95	1.2	1.45	1.4	1.35	1.5	1.95	1.65	1.4
26	1.8	2.65	1.85	1.75	1.2	1.45	1.3	1.35	1.5	1.85	1.55	1.7
27	1.6	2.1	3.05	1.75	1.25	1.0	1.3	1.3	1.45	1.75	1.6	1.7
28	1.7	1.8	5.4	1.6	2.0	1.1	1.3	1.35	1.45	1.65	1.5	1.7
29	1.8	.....	4.1	1.65	4.15	1.25	1.9	1.35	1.5	1.5	1.4	1.8
30	1.55	.....	3.1	1.5	2.4	1.5	2.4	1.35	1.5	1.5	1.4	1.8
31	1.6	.....	3.2	.....	1.85	.....	1.85	1.25	.....	1.5	.....	2.5

NOTE.—River frozen February 4 to 12, December 4, 7 to 10, and 24 to 29.

Rating table for Raritan River at Boundbrook, N. J., for 1903 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
1.00	275	2.20	1,580	3.40	3,610	5.20	7,500
1.10	350	2.30	1,730	3.50	3,800	5.40	7,980
1.20	430	2.40	1,890	3.60	4,000	5.60	8,480
1.30	520	2.50	2,050	3.70	4,200	5.80	8,980
1.40	615	2.60	2,210	3.80	4,400	6.00	9,500
1.50	715	2.70	2,370	3.90	4,600	6.20	10,030
1.60	820	2.80	2,540	4.00	4,800	6.40	10,570
1.70	930	2.90	2,710	4.20	5,220	6.60	11,120
1.80	1,050	3.00	2,880	4.40	5,660	6.80	11,680
1.90	1,170	3.10	3,060	4.60	6,100	7.00	12,250
2.00	1,300	3.20	3,240	4.80	6,560	8.00	15,200
2.10	1,440	3.30	3,420	5.00	7,020	9.00	18,340

NOTE.—The above table is applicable only for open-channel conditions. It is based on 12 discharge measurements made during 1903 to 1906 and is well defined between gage heights 1.0 foot and 3.0 feet. The extension is based on one high-water measurement at gage height 7.35 feet.

Monthly discharge of Raritan River at Boundbrook, N. J., for 1906.

[Drainage area, 800 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	7,980	767	1,630	2.04	2.35
February[a]	5,550	430	1,170	1.46	1.52
March	17,700	820	2,560	3.20	3.69
April	14,100	715	2,190	2.74	3.06
May	5,110	430	866	1.08	1.24
June	1,890	275	706	.882	.98
July	4,900	430	960	1.20	1.38
August	2,970	390	831	1.04	1.20
September	1,370	350	603	.754	.84
October	3,060	430	917	1.15	1.33
November	2,050	615	926	1.16	1.29
December	4,100	390	1,240	1.55	1.79
The year	17,700	275	1,220	1.52	20.67

[a] Discharge applied during frozen period as if open channel conditions existed.

NOTE.—Values are rated as follows: January, and March to November, good; February and December, fair.

DELAWARE RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Delaware River rises in Delaware, Greene, and Schoharie counties, N. Y., the source of the main stream, which is commonly known as West Branch, to distinguish it from the smaller East or Pepacton Branch, being a small lake almost on the line of Schoharie and Delaware counties, at an elevation of 1,886 feet above tide. From this lake it flows southwestward across central Delaware County to Deposit, where it receives Oquaga Creek, a large tributary draining eastern Broome County, and turns abruptly to the southeast, forming the boundary line between New York and Pennsylvania until Port Jervis is reached. Here it turns again to the southwest and flows for a distance of about 40 miles along the base of the Shawangunk Range until it passes through the water gap, from which point it flows irregularly southward to Trenton. Below Trenton the course is in general southwestward to Delaware Bay. South of Port Jervis it forms the dividing line between Pennsylvania and New Jersey, and for a few miles between Delaware and New Jersey.

East Branch rises at Grand Gorge, in northeastern Delaware County, and flows parallel to West Branch across southern Delaware County, uniting with the latter stream at Hancock.

The total length of the river from the mouth to the head of West Branch is about 410 miles; its drainage area, measured at Philadelphia and including Schuylkill River, is 10,100 square miles, of which about 2,580 square miles lie in New York, 5,720 in Pennsylvania, and 1,800 in New Jersey. The river is tidal to Trenton, which lies also at the head of navigation.

The Delaware receives a number of important tributaries, among which may be mentioned Mongaup and Neversink rivers and Callicoon Creek from New York; Lackawaxen, Lehigh, and Schuylkill rivers and numerous creeks from Pennsylvania, and Rancocas Creek, Musconetcong River, and Maurice River from New Jersey.

Measurements of the flow of Delaware River were made during the last half of June, 1891, by Prof. Dwight Porter and students at Delaware Watergap, Pa. The results show a flow from 2,000 to 2,200 second-feet. This was said to be the lowest June stage for five years. Measurements were made during the drought of 1895 by Prof. L. M. Haupt at Point Pleasant, Pa., near the intake of the Delaware and Raritan Canal feeder. The discharge above the bridge was 1,657 second-feet and below the bridge 1,328 second-feet. The discharge was measured by E. G. Paul June 4, 1899, at Martins Creek, Pa., 7 miles above the mouth of Lehigh River, and found to be 2,724 second-feet.

WEST BRANCH DELAWARE RIVER AT HANCOCK, N. Y.

This station was established October 15, 1902. It is located one-half mile west of the Erie Railroad station at Hancock, N. Y., and about 1 mile above the mouth of East Branch. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 78, where are given also references to publications that contain data for previous years.

Information in regard to this station is contained in the annual reports of the State engineer and surveyor of New York.

Discharge measurements of West Branch Delaware River at Hancock, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft*
March 29	Horton and Mott	243	949	5.50	3,620
March 31	do	250	1,080	6.10	5,080
April 12	Covert and Weeks	248	1,080	6.15	4,900
April 13	do	243	1,040	5.90	4,280
July 25	C. C. Covert	196	349	3.22	315
October 6	do	200	335	3.02	235

Daily gage height, in feet, of West Branch Delaware River at Hancock, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.70	4.00	3.80	5.40	3.60	4.00	4.25	3.28	3.40	3.20	4.00	3.80
2	3.65	3.70	3.88	5.15	3.45	3.90	3.78	3.12	3.20	3.20	3.85	3.40
3	3.40	4.55	4.00	4.90	3.75	3.80	3.60	3.22	3.30	3.10	3.80	3.75
4	5.40	4.55	8.30	4.30	3.88	3.60	3.75	3.25	3.18	3.02	3.70	4.95
5	5.45	5.00	5.75	5.80	3.70	3.58	3.75	3.20	3.20	3.00	3.62	4.85
6	4.35	4.90	5.00	6.30	3.60	4.80	3.50	3.12	3.08	2.98	3.52	5.60
7	3.75	4.80	4.75	5.80	3.52	4.55	3.45	3.32	3.05	3.02	3.40	5.50
8	3.55	4.95	4.48	5.45	3.60	4.30	3.30	4.38	3.02	3.05	3.32	4.00
9	3.30	5.00	4.40	5.20	3.55	4.05	3.28	3.60	3.05	3.05	3.35	3.95
10	4.35	4.85	4.30	6.25	3.68	4.40	3.30	3.42	3.00	3.05	3.20	4.70
11	4.25	4.75	4.05	6.90	3.62	4.50	3.35	3.30	2.98	3.00	3.20	4.55
12	4.72	4.85	3.85	6.20	3.55	4.15	3.30	3.10	2.88	3.08	3.50	4.10
13	5.05	4.80	3.82	5.80	3.55	3.95	3.15	3.20	2.85	3.08	3.45	4.10
14	4.85	4.75	3.70	5.65	3.62	3.80	3.15	3.10	2.82	2.95	3.42	4.10
15	4.50	4.65	3.75	7.25	3.62	3.70	3.02	3.05	2.82	3.05	3.25	4.02
16	4.35	4.45	3.55	7.60	3.55	4.62	3.10	3.00	2.78	3.00	3.20	4.60
17	4.20	4.40	3.65	6.45	3.42	6.92	3.08	2.95	2.68	2.95	3.25	4.45
18	4.10	4.40	3.30	5.85	3.65	6.35	3.35	2.90	2.70	2.90	3.58	4.10
19	3.90	4.50	3.85	5.35	3.72	5.70	3.35	2.95	2.62	2.95	6.30	3.60
20	3.70	4.35	3.40	5.15	3.60	5.28	3.15	2.80	2.85	3.80	5.50	3.55
21	3.80	4.45	3.55	4.85	3.50	4.85	3.12	3.65	3.38	4.70	5.35	4.35
22	5.35	6.55	3.50	4.70	3.45	4.55	3.05	3.40	3.08	4.20	5.20	4.20
23	5.38	5.00	3.35	4.55	3.38	4.42	3.20	3.35	3.65	4.05	4.82	3.85
24	6.70	4.75	4.00	4.30	3.40	4.30	3.30	3.18	3.25	3.90	4.55	3.05
25	5.60	5.10	3.78	4.25	3.35	4.02	3.20	3.15	3.20	3.95	4.35	3.20
26	5.00	5.60	3.60	4.05	3.25	3.82	3.12	3.08	3.05	4.20	4.30	3.75
27	4.80	4.50	4.10	3.98	3.35	3.75	3.18	3.30	3.08	3.95	4.20	4.40
28	4.50	3.90	7.85	3.85	4.00	3.65	2.90	4.58	3.15	3.92	4.05	4.45
29	4.20	.....	5.60	3.78	4.70	3.70	3.02	4.22	2.98	4.02	3.95	4.20
30	4.10	.....	5.45	3.70	4.35	3.60	3.20	3.80	3.00	3.82	3.85	4.20
31	4.10	.....	6.20	.....	4.10	.....	3.35	3.55	.....	3.98	.....	5.30

NOTE.—River obstructed by ice January 3 to March 2; clear channel from March 3 to 19, approximately; more or less obstructed by ice and needle ice from the latter date to March 28.

The river seldom freezes solid at the gage and all readings are to water surface, a channel about 10 feet wide near the left bank being kept open by oil and hot water from a pumping station one-half mile above the gage.

There is considerable needle ice in the stream the greater part of the frozen period, making the discharge very uncertain. Attempts to make meter measurements here in 1904-5 were unsuccessful on this account. Needle ice forming on the rifts a few hundred feet below the gage during the frozen period often causes backwater.

Rating table for West Branch Delaware River at Hancock, N. Y., for 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.60	100	3.70	695	4.80	2,130	5.90	4,440
2.70	130	3.80	790	4.90	2,300	6.00	4,700
2.80	165	3.90	890	5.00	2,470	6.20	5,230
2.90	205	4.00	1,000	5.10	2,650	6.40	5,780
3.00	245	4.10	1,120	5.20	2,840	6.60	6,340
3.10	290	4.20	1,250	5.30	3,040	6.80	6,920
3.20	340	4.30	1,380	5.40	3,250	7.00	7,510
3.30	400	4.40	1,520	5.50	3,470	7.20	8,120
3.40	465	4.50	1,660	5.60	3,700	7.40	8,740
3.50	535	4.60	1,810	5.70	3,940	7.60	9,380
3.60	610	4.70	1,970	5.80	4,190		

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

Monthly discharge of West Branch Delaware River at Hancock, N. Y., for 1906.

[Drainage area, 680 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
April	9,380	695	3,440	5.06	5.64
May	1,970	370	684	1.01	1.16
June	7,270	595	1,670	2.46	2.74
July	1,320	205	432	.635	.73
August	1,780	165	484	.712	.82
September	652	106	277	.407	.45
October	1,970	205	574	.844	.97
November	5,500	340	1,180	1.74	1.94
December	3,700	267	1,390	2.04	2.35

NOTE.—Values are rated as follows: April to November, good; ice conditions for December not known, rated as fair.

EAST BRANCH DELAWARE RIVER AT HANCOCK, N. Y.

This station was established October 14, 1902. It is located at the highway bridge one-half mile southeast of the Erie Railroad station at Hancock, N. Y., and 1 mile above the junction with West Branch of the Delaware. The Erie Railroad bridge is just below the station. The conditions at the station and the bench marks are described in Water-Supply Paper No. 167, page 81, where are given also references to publications that contain data for previous years.

Information in regard to this station is contained in the annual reports of the State engineer and surveyor of New York.

Discharge measurements of East Branch Delaware River at Hancock, N. Y., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
March 29	Horton and Mott	335	1,150	4.88	4,010
March 31	do	337	1,400	5.68	5,650
April 12	Covert and Weeks	337	1,560	6.10	7,400
April 13	do	339	1,410	5.78	6,140
July 26	C. C. Covert	274	669	3.40	855
October 6	do	260	490	2.90	343

Daily gage height, in feet, of East Branch Delaware River at Hancock, N. Y., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.58	3.92	7.95	5.05	3.68	4.35	3.60	3.30	3.35	3.12	3.92	3.75
2	3.52	3.70	10.70	4.85	3.60	4.22	3.45	3.18	3.25	3.02	3.80	3.68
3	3.42	3.05	10.65	4.62	3.75	4.05	3.40	3.22	3.25	2.92	3.70	3.52
4	4.28	3.85	10.00	4.75	3.75	3.85	3.55	3.45	3.35	2.88	3.60	4.25
5	4.42	3.95	6.05	5.55	3.62	3.78	3.60	3.35	3.18	2.90	3.52	4.70
6	3.90	4.10	5.05	6.28	3.60	4.50	3.42	3.25	3.10	2.90	3.50	5.00
7	3.65	4.35	4.80	5.60	3.60	4.40	3.28	3.25	3.02	2.95	3.42	5.10
8	3.45	4.35	4.45	5.30	3.62	4.15	3.20	3.40	3.00	3.08	3.40	3.90
9	3.40	4.75	4.35	5.15	3.65	3.98	3.12	3.38	2.95	2.95	3.32	3.90
10	3.25	4.60	4.25	5.80	4.05	5.85	3.12	3.22	2.90	2.95	3.30	4.20
11	3.68	4.80	3.95	7.05	3.85	5.58	3.20	3.18	2.90	3.00	3.35	4.45
12	4.22	4.70	3.95	6.15	3.75	4.88	3.15	2.10	2.85	3.05	3.48	4.10
13	4.85	4.75	3.75	5.75	3.70	4.48	3.08	3.02	2.80	3.02	3.50	4.10
14	4.05	4.65	3.72	5.70	3.70	4.25	3.00	3.00	2.80	2.98	3.40	4.05
15	3.75	4.50	3.70	8.37	3.65	4.05	2.98	2.92	2.78	2.92	3.32	3.90
16	3.65	4.40	3.45	8.40	3.58	4.32	2.92	2.90	2.75	2.90	3.30	4.45
17	3.68	4.25	3.65	6.65	3.50	4.65	2.95	2.85	2.70	2.90	3.48	4.15
18	3.58	4.22	3.50	5.95	3.82	5.00	3.08	2.80	2.70	2.85	3.38	3.95
19	3.50	4.28	3.50	5.48	3.90	4.75	3.05	2.80	2.70	2.85	6.10	3.55
20	3.55	4.28	3.65	5.22	3.75	4.60	3.00	2.85	2.75	4.85	5.70	3.70
21	3.48	4.30	3.58	4.95	3.62	4.35	4.40	3.45	3.05	4.80	5.40	4.15
22	4.55	5.05	3.60	4.75	3.55	4.20	3.80	3.78	3.15	4.25	5.25	3.95
23	5.10	4.60	3.40	4.58	3.50	4.08	3.70	3.45	3.20	3.95	4.85	3.70
24	7.10	4.30	3.45	4.45	3.42	3.98	3.80	3.25	3.15	3.78	4.55	3.55
25	5.60	4.50	3.50	4.28	3.38	3.78	3.60	3.25	2.95	4.12	4.42	4.30
26	5.00	5.15	3.50	4.15	3.32	3.65	3.40	3.10	2.88	4.60	4.25	4.70
27	4.72	4.30	3.62	4.05	3.30	3.55	3.30	3.32	2.90	4.25	4.10	5.00
28	4.55	4.75	6.60	3.88	4.80	3.45	3.22	4.58	2.90	4.30	4.02	5.10
29	4.30	.....	5.05	3.80	5.35	3.48	3.30	4.00	2.88	4.15	3.92	4.90
30	4.10	.....	5.00	3.72	4.85	3.38	3.30	3.65	2.88	4.00	3.75	4.35
31	4.05	.....	5.60	.....	4.55	.....	3.55	3.52	.....	4.00	.....	4.50

NOTE.—Channel full of needle ice during greater part of January; river frozen February 1 to 22, ice 0.3 to 0.75 foot thick; open February 22 and 23, also after March 4, although there was considerable anchor and needle ice until about March 27. Some anchor ice during December.

Rating table for East Branch Delaware River at Hancock, N. Y., for 1906.

Gage height.	Discharge.	Gage height.	Discharge	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
2.70	225	3.90	1,610	5.10	4,215	6.60	8,730
2.80	285	4.00	1,780	5.20	4,475	6.80	9,460
2.90	355	4.10	1,960	5.30	4,740	7.00	10,210
3.00	440	4.20	2,150	5.40	5,010	7.20	10,980
3.10	540	4.30	2,350	5.50	5,285	7.40	11,760
3.20	650	4.40	2,560	5.60	5,565	7.60	12,560
3.30	770	4.50	2,780	5.70	5,850	7.80	13 360
3.40	890	4.60	3,000	5.80	6,140	8.00	14,200
3.50	1,020	4.70	3,230	5 90	6,435	8.20	15,040
3.60	1,160	4.80	3,470	6.00	6 735	8.40	15,920
3.70	1,300	4.90	3,710	6.20	7.365		
3.80	1,450	5.00	3,960	6.40	8,025		

NOTE.—The above table is applicable only for open-channel conditions. It is based on 15 discharge measurements made during 1904-1906, and is fairly well defined between gage heights 2.9 feet and 7.5 feet.

Monthly discharge of East Branch Delaware River at Hancock, N. Y., for 1906.

[Drainage area, 920 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
April	15,900	1,330	5,260	5.72	6.38
May	4,880	770	1,540	1.67	1.92
June	6,290	866	2,390	2.60	2.90
July	2,560	372	852	.926	1.07
August	2,960	285	801	.871	1.00
September	830	225	436	.474	.53
October	3,530	320	1,140	1.24	1.43
November	7,040	770	1,960	2.13	2.38
December	4,220	1,050	2,270	2.47	2.85

NOTE.—Values are rated as follows: April to November, good; December, fair.

DELAWARE RIVER AT RIEGELSVILLE, N. J.

This station was established July 3, 1906. It is located at the toll bridge connecting Riegelsville, N. J., and Riegelsville, Pa. The Musconetcong enters the Delaware 600 or 700 feet below the station.

The channel is straight for one-half mile above and one-fourth mile below the station. Both banks are steep and wooded and will not overflow except in extreme flood. The bed of the stream is composed of gravel and bowlders. It may shift somewhat near the piers. The depth of water is 12 to 15 feet at ordinary stages.

Discharge measurements are made from the suspension bridge to which the gage is attached. The initial point for soundings is the face of the left abutment.

The chain gage, which was read during 1906 by John H. Deemer, is attached to the hand rail in the middle span, 20 feet from the east pier; length of chain, 43.67 feet. The bench mark is on the top of the steel part of the downstream cable anchorage at the left bank; elevation, 39.76 feet above the gage datum.

The following measurement was made July 3, 1906:

Width, 492 feet; area, 4,440 square feet; gage height, 4.52 feet; discharge, 8,550 second-feet.

Daily gage height, in feet, of Delaware River at Riegelsville, N. J., for 1906.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	4.12	3.42	2.45	4.78	4.18	17	3.10	2.89	2.16	2.54	3.56	4.86
2	.....	3.89	3.20	2.44	4.56	3.96	18	3.10	2.71	2.21	2.46	3.48	5.36
3	4.45	3.88	3.12	2.50	4.44	4.08	19	3.05	2.70	2.29	2.42	4.55	4.51
4	5.44	4.81	3.32	2.59	4.20	3.59	20	3.05	2.60	2.19	2.49	7.44	4.19
5	5.50	4.60	3.18	3.20	4.08	3.31	21	3.01	2.78	2.32	4.90	7.72	4.86
6	5.14	4.18	3.12	3.28	3.94	3.66	22	3.42	2.92	2.30	6.42	7.10	5.15
7	4.68	3.99	2.96	2.90	3.84	4.08	23	4.08	3.05	3.54	5.35	6.74	5.25
8	4.26	3.72	2.80	2.85	3.70	5.16	24	4.18	3.48	3.71	4.75	6.06	4.28
9	3.99	3.69	2.68	2.85	3.58	4.66	25	4.06	3.42	2.64	4.76	5.46	3.51
10	3.96	4.02	2.65	2.78	3.55	4.38	26	3.80	3.18	2.65	5.62	5.19	3.62
11	3.90	3.82	2.51	2.72	3.41	4.58	27	3.52	3.28	2.64	5.76	4.95	3.68
12	3.78	3.65	2.45	2.72	3.55	4.54	28	3.40	3.66	2.52	5.29	4.69	3.92
13	3.60	3.46	2.52	2.68	3.61	4.59	29	3.58	3.60	2.45	5.10	4.42	4.22
14	3.45	3.24	2.42	2.58	3.75	4.58	30	3.70	4.25	2.48	4.86	4.34	4.38
15	3.22	3.12	2.30	2.55	3.66	4.50	31	3.98	3.82	.....	5.01	.....	5.38
16	3.15	2.98	2.20	2.64	3.76	4.58							

DELAWARE RIVER AT LAMBERTVILLE, N. J.

This station was established July 22, 1897. It is located at the toll bridge at Lambertville, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 167, page 85, where are given also references to publications that contain data for previous years.

Discharge measurements of Delaware River at Lambertville, N. J., in 1906.

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Sq. ft.*	*Feet.*	*Sec.-ft.*
May 1[a]	Robert Follansbee	982	5,760	5.16	11,600
July 4[a]	do		5,800	5.36	12,000
December 5[abc]	N. C. Grover	945	4,990	4.75	4,910

[a] Discharge of canal not included. [b] Discharge of canal 443 second-feet.
[c] Discharge affected by ice conditions.

Daily gage height, in feet, of Delaware River at Lambertville, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.0	5.05	5.45	8.1	4.95	5.35	4.45	4.55	4.2	2.65	5.05	4.7
2	4.9	4.8	5.0	7.55	4.9	5.15	4.3	4.45	3.95	2.7	5.0	4.6
3	4.6	4.85	5.45	6.95	4.8	4.95	4.35	4.6	3.85	2.6	4.9	4.6
4	5.55	4.7	11.1	6.55	4.8	4.75	5.35	5.1	3.7	2.8	4.8	4.5
5	5.65	.....	11.8	6.4	4.75	4.55	5.25	5.0	3.9	4.65	4.8	4.1
6	5.35	.....	8.8	7.05	4.75	4.4	4.95	4.75	3.75	4.15	4.55	4.15
7	5.55	.....	7.2	7.85	4.7	4.75	4.75	4.55	3.55	3.8	4.4	4.4
8	5.2	.....	6.65	7.2	4.6	4.95	4.45	4.3	3.35	3.55	4.35	5.3
9	4.8	.....	6.2	6.85	4.65	4.9	4.2	4.25	3.2	3.4	4.3	5.1
10	4.65	.....	6.05	8.35	4.75	4.85	4.1	4.3	3.0	3.25	4.25	4.75
11	4.6	.....	5.95	9.4	4.75	4.8	4.05	4.45	2.85	3.2	4.2	4.75
12	4.5	.....	5.5	9.55	4.6	5.1	3.95	4.3	2.75	3.15	4.3	5.1
13	4.9	4.1	5.4	8.25	4.55	4.95	3.75	4.1	2.7	3.1	4.35	4.85
14	4.9	4.25	5.25	7.65	4.5	4.6	3.65	3.8	2.7	3.1	4.4	4.85
15	4.9	4.35	4.95	8.5	4.4	4.35	3.5	3.7	2.5	3.0	4.35	4.8
16	5.05	4.15	4.85	13.2	4.4	4.15	3.4	3.45	2.5	3.0	4.45	4.8
17	5.05	4.1	4.75	11.4	4.35	4.15	3.4	3.3	2.45	2.9	4.35	5.05
18	4.8	4.05	4.65	9.1	4.3	4.95	3.45	3.15	2.4	2.8	4.35	5.2
19	4.85	3.9	4.85	8.1	4.25	6.9	3.4	3.1	2.4	2.7	4.85	5.0
20	4.75	4.1	4.55	7.25	4.55	7.15	3.4	3.1	2.3	2.85	5.9	4.9
21	4.6	4.3	4.4	6.95	4.35	6.15	3.65	3.05	2.35	4.85	6.7	5.1
22	4.7	6.65	4.45	6.6	4.15	6.05	3.85	3.45	2.55	5.9	6.3	5.35
23	4.85	6.15	4.45	6.05	4.1	5.95	4.45	3.5	2.75	5.45	6.1	5.35
24	6.2	6.3	4.35	6.1	4.05	5.65	4.65	3.9	3.1	5.2	5.8	5.0
25	7.5	6.15	4.3	6.05	3.95	5.25	4.55	4.1	3.05	5.0	5.45	4.6
26	6.85	6.6	4.3	5.85	3.8	4.95	4.45	3.95	2.9	5.0	5.25	4.5
27	6.0	6.85	4.5	5.65	3.9	4.7	4.25	3.85	3.05	5.6	5.05	4.5
28	5.8	6.0	5.9	5.35	4.3	4.45	4.05	4.05	2.95	5.45	4.95	4.4
29	5.65	.....	8.25	5.4	6.25	4.3	4.15	4.3	2.7	5.25	4.85	4.45
30	5.25	.....	7.75	5.05	6.45	4.3	4.25	4.4	2.7	5.1	4.7	4.6
31	5.2	.....	7.6	.....	6.1	.....	4.35	4.5	.....	4.95	.....	5.35

NOTE.—River frozen, February 5 to 12; also probably more or less ice conditions during December.

MUSCONETCONG RIVER NEAR BLOOMSBURY, N. J.

This station was established July 4, 1903. It is located at the first highway bridge over Musconetcong River above the village of Bloomsbury, N. J. The conditions and the bench marks are described in Water-Supply Paper No. 166, page 86, where are given also references to publications that contain data for previous years.

The following discharge measurement was made May 4, 1906:

Area, 116 square feet; gage height, 1.67 feet; discharge, 253 second-feet.

Daily gage height, in feet, of Musconetcong River near Bloomsbury, N. J., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.42	1.35	1.67	2.25	1.82	1.98	1.48	1.82	1.18	1.15	1.28	1.15
2	1.33	1.35	1.48	2.10	1.75	1.98	1.30	1.82	1.15	1.20	1.20	1.12
3	1.30	1.15	2.80	1.98	1.92	1.98	1.25	2.00	1.25	1.10	1.22	1.25
4	1.87	1.32	3.75	1.92	1.62	1.90	1.45	1.92	1.22	1.12	1.10	1.18
5	1.68	1.30	2.65	1.90	1.40	1.72	1.38	1.88	1.18	1.58	1.15	1.28
6	1.57	1.13	2.15	1.95	1.38	1.68	1.28	1.85	1.18	1.30	1.10	1.35
7	1.48	1.20	1.95	1.90	1.42	1.60	1.22	1.70	1.02	1.18	1.02	1.38
8	1.48	1.30	1.90	1.85	1.45	1.52	1.20	1.65	1.08	1.18	1.15	1.48
9	1.35	1.25	1.82	1.92	1.55	1.50	1.22	1.60	.92	1.15	.90	1.18
10	1.40	1.27	1.70	2.90	1.55	1.42	1.30	1.55	1.12	1.12	1.08	1.28
11	1.37	1.23	1.70	2.75	1.40	1.35	1.35	1.52	1.10	1.15	1.08	1.65
12	1.47	1.25	1.65	2.55	1.38	1.28	1.28	1.52	1.12	1.15	1.22	1.22
13	1.50	1.22	1.58	2.35	1.38	1.22	1.22	1.50	1.08	1.12	1.12	1.32
14	1.50	1.28	1.52	2.28	1.38	1.20	1.15	1.48	.95	1.05	1.18	1.28
15	1.43	1.25	1.50	2.75	1.40	1.20	1.12	1.45	.90	1.10	1.15	1.35
16	1.57	1.33	1.50	2.80	1.35	1.28	1.18	1.40	1.02	1.12	1.15	1.42
17	1.58	1.27	1.50	2.72	1.35	1.70	1.15	1.40	1.12	1.12	1.12	1.48
18	1.52	1.20	1.48	2.50	1.40	1.48	1.32	1.35	1.12	1.12	1.25	1.42
19	1.48	1.25	1.50	2.32	1.45	1.70	1.25	1.32	1.10	1.00	1.62	1.28
20	1.42	1.30	1.50	2.25	1.38	1.52	1.18	1.28	1.12	1.32	1.55	1.35
21	1.42	1.82	1.55	2.12	1.32	1.42	1.18	1.35	1.15	1.42	1.42	1.65
22	1.47	3.12	1.62	2.05	1.28	1.52	1.30	1.30	1.15	1.38	1.35	1.48
23	1.47	2.08	1.55	2.05	1.28	1.58	1.28	1.28	1.10	1.25	1.25	1.45
24	1.75	1.87	1.55	2.18	1.25	1.65	1.22	1.32	1.10	1.20	1.22	1.32
25	1.62	1.80	1.53	2.10	1.20	1.48	1.18	1.20	1.10	1.22	1.20	1.45
26	1.48	1.82	1.57	2.08	1.22	1.48	1.15	1.22	1.05	1.20	1.20	1.45
27	1.40	1.68	2.02	1.92	1.20	1.42	1.15	1.22	1.10	1.20	1.20	1.32
28	1.43	1.32	2.53	1.85	1.78	1.35	1.20	1.32	1.15	1.12	1.22	1.32
29	1.40	.....	2.35	1.90	2.98	1.32	1.75	1.35	1.08	1.18	1.22	1.30
30	1.37	.....	2.23	1.92	2.98	1.32	2.20	1.30	1.15	1.15	1.22	1.32
31	1.38	.....	2.25	.....	2.20	.....	1.88	1.28	.....	1.18	.....	2.18

NOTE.—River two-thirds frozen over February 6 to 7 and 16 and December 24 to 28.

Rating table for Musconetcong River near Bloomsbury, N. J., for 1903 to 1906.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge	Gage height.	Discharge.
Feet.	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
0.90	56	1.70	251	2.50	538	3.20	821
1.00	69	1.80	283	2.60	578	3.30	862
1.10	86	1.90	317	2.70	618	3.40	903
1.20	107	2.00	352	2.80	658	3.50	945
1.30	132	2.10	388	2.90	698	3.60	987
1.40	160	2.20	424	3.00	739	3.70	1,030
1.50	190	2.30	461	3.10	780	3.80	1,073
1.60	220	2.40	499				

NOTE.—The above table is applicable only for open-channel conditions. It is based on 9 discharge measurements made during 1903 to 1906, and is well defined between gage heights 1.0 foot and 2.9 feet.

Monthly discharge of Musconetcong River near Bloomsbury, N. J., for 1906.

[Drainage area 146 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	307	132	184	1.26	1.45
February	788	92	185	1.27	1.32
March	1,050	184	319	2.18	2.51
April	698	300	429	2.94	3.28
May	731	107	217	1.49	1.72
June	345	107	200	1.37	1.53
July	424	90	141	.966	1.11
August	352	107	189	1.29	1.49
September	119	56	87.8	.601	.67
October	214	69	107	.733	.85
November	226	56	111	.760	.85
December	417	90	156	1.07	1.23
The year	1,050	56	194	1.33	18.01

NOTE.—Values are rated as follows: January to March and December, good; April to November, excellent. No corrections made in estimates of flow under ice conditions; flow not considered to be materially affected by ice.

TOHICKON CREEK AT POINT PLEASANT, PA.

Measurements of the discharge of Tohickon Creek are made near its mouth at Point Pleasant. Gage heights are furnished by John E. Codman, hydrographer of the water department of Philadelphia. The conditions at the station and the bench marks are described in Water-Supply Paper No. 166, page 89, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Tohickon Creek at Point Pleasant, Pa., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	76.4	79.0	109.0	368.5	38.8	50.0	15.8	25.7	*14.6*	*3.5*	324.5	30.6
2	*57.9*	*57.5*	75.6	157.0	27.2	38.8	18.1	22.2	10.2	4.7	136.0	*21.4*
3	80.5	61.2	1,557.7	105.5	26.8	23.7	26.8	25.2	7.0	6.6	59.8	25.7
4	*1,359.3*	74.7	*2,933.8*	80.5	26.4	20.0	*611.0*	*723.1*	8.6	5.2	43.8	23.1
5	701.8	71.0	657.7	72.5	22.3	21.4	157.2	267.7	5.2	*138.1*	34.8	26.0
6	232.0	71.0	210.0	68.9	20.1	17.5	63.6	57.2	10.3	46.5	31.4	31.8
7	111.0	71.0	147.5	65.5	24.6	19.2	41.6	31.9	11.1	31.5	26.3	101.0
8	75.8	71.0	153.5	58.7	26.8	20.9	32.3	22.3	7.2	23.1	21.7	60.5
9	75.8	71.0	167.5	664.4	28.8	14.5	32.3	25.3	6.3	17.6	23.1	61.2
10	111.0	79.0	142.0	*3,196.4*	32.6	9.7	26.1	29.0	3.1	13.3	18.8	51.6
11	170.5	79.0	104.0	719.0	30.6	14.4	13.2	27.9	4.3	12.5	*14.5*	201.0
12	205.5	71.0	83.5	291.0	27.6	17.1	12.9	21.5	3.0	9.7	48.5	108.9
13	201.0	64.5	75.5	155.0	18.4	12.9	13.4	19.7	6.5	9.7	38.0	51.9
14	249.5	124.0	67.6	80.3	12.6	11.0	12.2	21.1	2.8	8.2	36.5	67.8
15	272.0	182.5	58.7	1,719.9	22.0	10.1	10.9	15.7	4.6	8.8	29.5	48.7
16	510.5	141.0	65.0	1,210.5	18.9	8.4	9.8	10.3	4.9	8.6	35.9	73.4
17	505.5	97.0	71.2	338.5	15.2	*7.0*	14.5	9.8	*2.8*	5.5	41.6	448.2
18	210.0	75.6	65.5	130.0	15.2	267.9	21.8	9.8	3.1	7.7	473.3	427.0
19	168.0	70.6	57.1	102.5	16.9	*1,002.5*	20.1	*5.9*	4.3	8.2	*823.5*	122.2
20	133.5	448.2	59.8	79.0	13.1	459.8	12.4	6.2	5.9	25.0	359.5	337.2
21	137.5	978.3	71.0	64.5	10.7	54.3	8.6	7.5	5.1	76.5	145.5	821.5
22	172.0	*1,763.1*	60.7	55.1	9.9	87.0	*5.2*	13.8	4.5	103.0	89.0	527.0
23	166.0	446.8	55.4	52.2	10.5	83.5	7.9	35.6	3.9	77.5	64.5	226.3
24	475.5	253.5	51.2	51.3	9.2	64.3	7.9	21.0	4.2	58.4	53.4	48.7
25	229.5	390.5	*43.5*	49.5	*4.4*	48.7	8.6	11.9	7.2	77.9	43.8	48.7
26	102.0	426.0	54.6	44.3	7.1	43.3	8.6	9.4	3.8	112.5	39.0	48.7
27	77.0	163.0	1,302.9	39.5	20.5	30.0	6.3	13.4	4.6	83.0	39.0	48.7
28	204.5	101.0	2,689.0	39.0	222.8	22.0	8.1	22.3	5.3	42.5	34.8	48.7
29	237.5	.....	956.2	*29.7*	*943.9*	17.6	7.7	24.9	3.9	33.4	31.0	59.8
30	110.0	.....	394.0	33.7	301.0	19.1	44.8	21.8	4.2	31.0	31.0	67.6
31	85.0	.....	599.1	.....	75.0	.....	33.9	14.6	.....	39.2	.....	*1,863.4*

NOTE.—Italic figures indicate maximum and minimum.

Monthly discharge of Tohickon Creek at Point Pleasant, Pa., for 1906.

[Drainage area, 102 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	1,360	57.9	242	2.37	2.73
February	1,760	57.5	235	2.30	2.40
March	2,930	43.5	424	4.16	4.80
April	3,200	29.7	337	3.30	3.68
May	944	4.4	67.1	.658	.76
June	1,000	7.0	83.9	.823	.92
July	611	5.2	42.4	.416	.48
August	723	5.9	50.7	.497	.57
September	14.6	2.8	5.8	.056	.06
October	138	3.5	36.3	.356	.41
November	824	14.5	106	1.04	1.16
December	1,860	21.4	198	1.94	2.24
The year	3,200	2.8	152	1.49	20.21

NESHAMINY CREEK AT FORKS, PA.

This station is located at the forks of Big and Little Neshaminy creeks. The table of daily discharge for 1906 was furnished by John E. Codman, hydrographer of the Philadelphia water department. The conditions at the station and the bench marks are described in Water-Supply Paper No. 166, page 90, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Neshaminy Creek at forks, Pa., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	125.5	134.0	233.5	362.0	84.5	81.0	217.0	66.5	59.0	*18.5*	414.0	71.0
2	107.0	111.5	147.5	242.0	81.5	68.0	210.5	268.3	46.5	18.5	376.0	*62.0*
3	126.5	135.0	2,048.5	198.0	81.5	59.0	1,048.2	*1,502.1*	44.5	21.5	134.0	62.0
4	*1,539.4*	150.0	*3,050.2*	175.5	80.0	54.0	*2,786.2*	318.5	43.5	23.5	114.0	86.0
5	496.7	106.5	540.5	166.0	209.5	47.5	357.0	128.5	35.0	28.5	99.0	87.0
6	267.5	88.0	327.5	162.0	236.5	41.0	250.0	134.5	38.5	*2,412.5*	94.0	108.0
7	200.5	88.0	272.5	152.0	133.0	44.5	148.5	113.5	42.0	259.5	82.5	116.0
8	171.0	*80.0*	279.0	135.5	114.5	44.5	127.0	103.5	36.5	128.5	75.0	91.0
9	154.0	157.0	267.5	828.0	96.0	38.5	124.5	105.0	31.0	98.0	73.5	88.5
10	153.0	227.5	217.5	*2,079.4*	96.0	36.5	124.5	96.5	28.0	73.5	72.0	97.0
11	151.0	188.5	177.5	467.5	88.5	39.0	100.0	96.5	25.7	68.0	86.0	369.3
12	362.0	154.0	163.0	316.0	76.5	34.0	80.0	100.5	22.5	66.0	138.8	303.5
13	448.0	396.3	154.0	245.0	68.0	26.0	76.5	84.0	*596.4*	54.5	106.5	187.5
14	318.7	678.4	123.0	209.5	61.0	25.5	69.0	72.0	101.0	41.5	*71.0*	72.0
15	362.0	*1,092.5*	123.0	2,064.7	52.0	*24.3*	63.0	63.0	57.5	38.0	71.0	72.0
16	648.0	188.0	305.5	777.5	47.5	760.6	59.0	57.0	31.0	38.0	108.0	88.5
17	424.2	115.0	116.0	319.5	51.5	1,111.5	390 5	50.5	22.5	34.5	146.0	679.6
18	256.5	125.0	144.0	250.5	44.0	2,256.6	166.0	47.0	109.5	31.0	400.5	483.0
19	242.0	115.0	142.0	218.5	33.5	*2,736.5*	73.0	*43.0*	104.5	31.0	*619.7*	200.5
20	200.5	124.5	164.0	195.0	32.0	524.5	56.0	43.0	34.5	42.5	253.5	538.0
21	138.0	369.7	197.5	171.5	*28.5*	235.5	155.5	47.0	121.0	139.7	190.5	792.0
22	*88.0*	983.4	175.5	152.0	28.5	303.2	153.5	210.0	45.5	955.3	173.5	549.8
23	138.0	264.5	134.5	143.0	31.0	605.2	61.0	79.5	60.0	550.5	147.5	288.5
24	241.8	180.0	*115.0*	133.5	31.0	895.0	66.0	125.0	60.5	219.0	122.0	144.0
25	183.5	342.5	115.0	125.0	31.0	247.5	54.0	444.7	34.0	163.0	149.0	144.0
26	143.5	635.3	214.0	115.0	31.0	172.0	45.5	168.0	29.0	209.5	141.5	144.0
27	129.0	198.0	2,160.7	100.5	42.5	144.5	43.0	131.5	28.0	196.0	94.0	178.5
28	305.5	144.5	1,226.5	92.0	574.5	123.0	*41.0*	125.5	25.0	126.0	84.5	213.0
29	290.5	.....	739.8	83.5	*1,064.0*	106.5	148.0	96.5	22.0	111.0	78.0	213.0
30	159.5	.....	362.5	*83.5*	209.0	97.0	408.0	85.0	*18.5*	96.5	73.5	178.5
31	142.0	.....	552.0	.....	102.5	.....	116.5	74.0	.....	87.5	.....	*1,755.2*

NOTE.—Italic figures indicate maximum and minimum.

Monthly discharge of Neshaminy Creek, at forks, Pennsylvania, for 1906.

[Drainage area, 139 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	1,540	88.0	281	2.02	2.33
February	1,090	80.0	270	1.94	2.02
March	3,050	115.0	484	3.48	4.01
April	2,080	83.5	359	2.58	2.88
May	1,060	28.5	127	.914	1.05
June	2,740	24.3	366	2.63	2.93
July	2,790	41.0	252	1.81	2.09
August	1,500	43.0	164	1.18	1.36
September	596	18.5	651	4.68	5.22
October	2,410	18.5	206	1.48	1.71
November	620	71.0	160	1.15	1.28
December	1,760	62.0	273	1.96	2.26
The year	3,050	18.5	299	2.15	29.14

SCHUYLKILL RIVER NEAR PHILADELPHIA, PA.

Records of the height of the Schuylkill at Fairmount pool have been kept for many years, but not in such form as to be useful in computing daily discharges. In 1898, however, careful estimates were prepared by John E. Codman, in charge of hydrographic work, bureau of water, city of Philadelphia.

The figures for daily discharge in the following table represent the total flow of the stream, computed from the amount wasted over the flashboards at the Fairmount dam, the pumpage from the river, the leakage, and also the quantity used for power at Fairmount. They were furnished by John E. Codman. The conditions at the station are described in Water-Supply Paper No. 166, page 92, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Schuylkill River at Fairmount dam, near Philadelphia, Pa., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,143	2,106	2,549	5,445	1,548	1,394	1,216	1,204	727	1,257	1,347	1,422
2	1,887	1,955	2,440	4,328	1,580	1,352	1,166	1,204	727	1,257	1,347	1,422
3	*1,693*	1,715	5,991	3,758	1,580	1,352	1,256	2,281	727	1,257	1,347	1,422
4	*7,811*	1,627	*27,025*	3,229	1,580	1,260	*5,489*	*10,084*	727	1,257	1,347	1,422
5	6,601	1,719	16,857	2,957	1,580	1,260	2,152	4,172	727	*4,259*	1,347	1,422
6	4,096	1,627	8,952	2,828	1,580	1,260	1,337	1,507	727	2,382	1,347	1,422
7	3,515	1,627	5,621	2,739	1,420	1,260	1,166	*1,204*	727	*1,257*	1,347	1,422
8	3,043	1,627	4,753	2,566	1,420	1,260	1,166	1,204	727	1,257	1,347	1,422
9	2,642	1,627	4,186	2,853	1,420	1,260	1,105	1,204	727	1,257	1,347	1,422
10	2,180	1,803	3,590	*16,203*	1,324	1,260	*1,072*	1,204	727	1,257	1,347	1,422
11	1,942	1,803	3,220	7,836	1,324	1,260	1,072	1,204	727	1,257	1,347	1,422
12	2,325	*1,627*	2,835	6,271	1,324	1,260	1,072	1,204	727	1,257	1,347	1,422
13	2,868	1,811	2,704	4,590	1,324	1,260	1,072	1,204	*1,206*	1,257	1,347	1,422
14	2,787	2,710	2,544	3,729	1,324	1,260	1,072	1,204	987	1,257	1,347	1,422
15	2,627	3,604	2,544	10,170	1,324	*1,260*	1,072	1,204	755	1,257	1,347	1,422
16	3,569	2,501	2,544	15,734	1,324	1,778	1,096	1,204	727	1,257	1,347	1,422
17	4,000	1,813	2,477	15,224	1,324	2,427	1,181	1,204	727	1,257	*1,347*	2,150
18	3,139	1,719	2,177	6,055	1,324	3,034	1,181	1,204	727	1,257	1,439	3,117
19	2,563	1,627	2,177	4,294	1,324	*19,978*	1,072	1,204	727	1,257	*2,505*	1,662
20	2,272	1,761	2,137	3,423	1,324	7,525	1,072	1,204	727	1,257	1,607	1,422

Daily discharge, in second-feet, of Schuylkill River at Fairmount dam, near Philadelphia, Pa., for 1906—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21	2,207	3,167	2,097	2,925	1,324	4,279	1,072	1,296	727	3,165	1,354	2,864
22	2,207	*16,053*	2,097	2,740	1,324	4,279	1,095	1,296	727	2,531	1,347	2,944
23	2,207	10,279	1,957	2,536	1,324	4,885	1,072	1,296	727	1,349	1,347	2,711
24	4,121	5,470	*1,873*	2,399	1,324	4,679	1,072	1,204	727	1,282	1,347	2,631
25	3,044	4,558	1,873	2,286	1,324	3,069	1,072	1,204	727	1,349	1,347	3,333
26	2,707	6,325	2,097	1,994	1,324	2,011	1,072	1,204	727	1,713	1,347	*1,422*
27	2,482	4,369	4,349	1,906	*1,324*	1,754	1,072	1,209	727	1,257	1,347	1,422
28	2,818	3,225	9,793	1,838	6,394	1,617	1,072	1,296	727	1,257	1,347	1,422
29	3,085	.....	7,031	1,766	*13,566*	1,462	1,551	1,204	727	1,257	1,347	1,422
30	2,614	.....	6,081	*1,722*	2,931	1,445	1,382	1,204	727	1,257	1,347	1,422
31	2,209	.....	5,946	.....	1,805	.....	1,072	1,204	.....	1,257	.....	*5,786*

NOTE.—Italic figures indicate maximum and minimum.

Monthly discharge of Schuylkill River at Fairmount dam, near Philadelphia, Pa., for 1906.

[Drainage area, 1,920 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	7,810	1,690	3,010	1.57	1.81
February	16,100	1,630	3,280	1.71	1.78
March	27,000	1,870	4,920	2.56	2.95
April	16,200	1,720	4,880	2.54	2.83
May	13,600	1,320	2,010	1.05	1.21
June	20,000	1,260	2,780	1.45	1.62
July	5,490	1,070	1,310	.682	.79
August	10,100	1,200	1,640	.854	.98
September	1,210	727	753	.392	.44
October	4,260	1,260	1,510	.786	.91
November	2,500	1,350	1,400	.729	.81
December	5,790	1,420	1,890	.984	1.13
The year	27,000	727	2,450	1.28	17.26

PERKIOMEN CREEK AT FREDERICK, PA.

Measurements of this creek were begun on August 20, 1884. The station is located at Frederick, about 12 miles above the mouth, and also above two large tributaries known as West Swamp Creek and Northeast Branch of Perkiomen. Both of these tributaries have been measured, the first at Zieglerville and the second at Schwenkville. The records of daily discharge for 1906 have been furnished by John E. Codman. The conditions at the station are described in Water-Supply Paper No. 166, page 93, where are given also references to publications that contain data for previous years.

Daily discharge, in second-feet, of Perkiomen Creek at Frederick, Pa., for 1906.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec
1	151.5	168.0	198.0	394.0	119.5	146.0	91.5	62.5	57.2	*33.5*	281.6	*44.7*
2	*137.5*	139.5	178.0	297.0	113.0	124.0	78.5	55.0	41.4	42.4	163.0	47.0
3	161.0	117.5	2,115.0	238.0	115.0	105.0	91.5	1,339.3	38.3	47.8	113.5	61.1
4	*1,512.0*	108.0	*4,054.4*	207.0	111.5	83.5	*421.5*	*1,690.5*	45.8	51.9	76.5	62.3
5	648.8	92.0	557.5	200.0	102.0	75.0	193.5	241.5	44.3	218.5	61.0	43.2
6	356.0	92.0	382.5	212.0	104.0	75.0	112.2	93.0	42.7	197.5	58.0	106.9
7	180.8	*86.0*	318.5	202.0	116.5	82.5	83.5	101.5	42.7	77.0	58.0	213.0
8	193.0	86.0	311.0	176.0	114.5	89.5	71.0	88.5	42.7	58.0	58.0	111.0
9	173.0	106.0	301.5	1,190.4	113.5	82.0	67.5	106.5	34.5	58.0	58.0	58.0
10	192.0	121.0	262.5	*3,026.6*	117.5	79.5	71.5	106.0	26.3	58.0	46.7	95.0
11	171.0	110.0	223.5	687.3	105.5	76.0	67.5	84.0	*26.3*	50.9	*28.7*	243.6
12	218.5	104.5	203.0	422.0	96.0	63.0	59.0	71.0	90.2	43.7	75.0	163.0
13	314.2	117.5	178.0	326.5	83.5	51.9	54.9	58.0	*292.0*	42.2	83.5	121.5
14	244.5	170.2	163.0	276.0	75.0	*48.3*	59.5	55.0	91.8	35.8	63.5	88.0
15	257.0	217.5	168.0	2,533.3	75.0	50.7	98.0	48.9	43.7	38.3	63.5	83.5
16	581.0	172.0	188.0	1,109.5	76.5	54.3	55.3	44.7	40.6	45.8	75.0	112.0
17	452.0	144.0	196.0	431.0	71.5	69.0	46.8	40.6	30.9	38.4	79.5	455.0
18	290.0	104.5	140.0	332.5	68.0	775.2	62.5	39.1	30.9	36.3	294.7	472.5
19	252.5	128.5	166.0	286.5	64.0	*2,195.2*	61.4	35.8	45.6	47.3	*778.5*	177.0
20	216.0	224.7	183.0	202.0	58.0	441.5	51.3	*28.6*	40.9	153.4	263.0	312.0
21	154.5	1,498.1	178.0	227.5	54.9	232.0	51.9	63.6	26.3	240.5	200.5	743.2
22	168.5	*2,165.3*	157.5	203.5	54.3	301.5	51.9	88.0	30.9	202.0	221.2	537.0
23	249.0	480.7	129.0	195.0	51.3	247.0	43.3	60.4	33.0	148.0	184.2	315.5
24	688.8	328.0	133.5	190.0	45.8	248.0	83.2	83.2	28.6	121.5	128.2	185.0
25	312.0	592.3	*118.5*	170.0	50.0	177.5	83.2	49.3	42.1	*509.0*	88.0	152.5
26	214.0	599.8	153.5	157.0	*44.9*	124.0	46.3	46.7	70.9	352.5	75.0	108.5
27	188.0	258.0	1,379.2	143.0	51.2	106.0	46.8	77.7	34.0	191.5	75.0	99.0
28	492.7	182.0	1,999.8	129.0	*1,864.6*	99.0	*38.6*	170.7	26.3	132.5	75.0	88.0
29	286.0	.....	1,206.0	*117.5*	1,543.3	85.5	63.8	111.0	26.3	119.5	60.4	92.0
30	190.0	.....	530.5	119.5	299.3	92.5	101.5	71.0	26.3	106.0	44.7	130.0
31	168.0	.....	745.5	.....	183.0	.....	93.0	62.5	.....	109.5	.....	*3,362.6*

NOTE.—Italic figures indicate maximum and minimum.

Monthly discharge of Perkiomen Creek at Frederick, Pa., for 1906.

[Drainage area 152 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	1,510	138	317	2.09	2.41
February	2,170	86.0	311	2.05	2.14
March	4,050	118	555	3.65	4.21
April	3,030	118	480	3.16	3.53
May	1,860	44.9	198	1.30	1.50
June	2,200	48.3	216	1.42	1.58
July	422	38.6	83.8	.551	.64
August	1,690	28.6	170	1.12	1.29
September	292	26.3	49.8	.328	.37
October	509	33.5	116	.763	.88
November	778	28.7	131	.862	.96
December	3,360	44.7	287	1.89	2.18
The year	4,050	26.3	243	1.60	21.69

WISSAHICKON CREEK NEAR PHILADELPHIA, PA.

Wissahickon Creek is the principal stream draining into Schuylkill River from the north below Perkiomen Creek. The records of daily discharge for 1906, as furnished by John E. Codman, are given in the following table:

Daily discharge, in second-feet, of Wissahickon Creek near Philadelphia, Pa., for 1906.

[Drainage area, 64.6 square miles.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	63.8	41.8	41.8	157.5	68.3	54.7	46.8
2	54.2	33.7	*32.3*	173.0	61.5	16.8	18.7
3	92.3	26.1	1,010.5	102.0	56.9	9.3	19.3
4	*437.5*	22.3	*1,121.9*	95.9	52.3	7.3	*887.9*
5	215.3	22.3	205.7	102.0	48.6	7.0	219.4
6	131.7	21.7	91.7	98.7	48.6	10.0	72.9
7	111.2	*21.7*	142.0	91.2	47.3	13.2	72.9
8	105.4	34.8	141.5	91.3	44.6	13.5	63.8
9	82.1	69.3	131.5	*628.7*	44.6	16.9	47.4
10	68.4	93.6	121.3	598.0	44.6	17.4	47.4
11	63.8	95.9	114.6	197.5	41.9	10.2	47.4
12	101.9	95.9	104.4	166.2	37.8	7.0	23.8
13	128.2	187.8	95.3	140.3	35.0	7.7	16.0
14	152.4	386.8	93.6	114.6	32.3	6.3	15.4
15	161.3	*417.7*	93.6	475.6	29.6	*3.1*	15.8
16	137.0	128.3	91.3	205.0	28.2	229.2	19.2
17	128.1	89.5	79.8	140.0	28.2	236.5	205.5
18	111.2	72.9	77.5	131.5	22.2	848.1	191.9
19	102.7	57.4	86.7	123.1	*21.6*	*1,096.5*	42.5
20	97.6	52.8	104.9	118.0	22.2	213.7	18.9
21	101.0	101.9	114.5	112.9	22.8	148.7	69.9
22	106.1	289.0	102.6	109.5	22.8	158.0	115.4
23	89.5	89.5	95.3	111.0	22.8	219.0	58.8
24	68.4	89.5	89.0	95.9	22.8	323.7	23.2
25	63.8	140.5	99.8	91.3	22.8	140.3	12.7
26	52.8	221.9	136.3	84.4	22.8	104.8	*11.7*
27	*39.1*	88.4	499.6	79.8	64.4	70.2	50.1
28	105.7	56.9	334.7	77.5	*148.9*	59.2	47.6
29	143.9	.....	156.5	75.2	148.9	54.6	57.3
30	81.1	.....	129.7	*72.9*	22.8	63.7	106.1
31	47.3	.....	185.1	.....	54.7	.....	85.0

NOTE.—Dam drained out and observations discontinued after July. Italic figures indicate maximum and minimum.

Monthly discharge of Wissahickon Creek near Philadelphia, Pa., for 1906.

[Drainage area, 64.6 square miles.]

Month.	Discharge in second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Sec.-ft. per sq. mile.	Depth in inches.
January	438	39.1	111	1.72	1.98
February	418	21.7	109	1.69	1.76
March	1,120	32.3	94.4	1.46	1.68
April	629	72.9	162	2.51	2.80
May	149	21.6	44.9	.695	.80
June	1,100	3.1	139	2.15	2.40
July	888	11.7	88.1	1.36	1.57

INDEX.

CLASSIFICATION OF THE PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY.

[Water-Supply Paper No. 202.]

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*.

1902. East of Mississippi River, Water-Supply Papers Nos. 82 and 83.
West of Mississippi River, Water-Supply Papers Nos. 84 and 85.
1903. East of Mississippi River, Water-Supply Papers Nos. 97 and 98.
West of Mississippi River, Water-Supply Papers Nos. 99 and 100.
1904. East of Mississippi River, Water-Supply Papers Nos. 124, 125, 126, 127, 128, and 129.
West of Mississippi River, Water-Supply Papers Nos. 130, 131, 132, 133, 134, and 135.
1905. East of Mississippi River, Water-Supply Papers Nos. 165*, 166* 167, 168*, 169, 170, and 171.
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