DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

WATER-SUPPLY PAPER 401

SURFACE WATER SUPPLY OF THE UNITED STATES

1915

PART I. NORTH ATLANTIC SLOPE DRAINAGE BASINS

NATHAN C. GROVER, Chief Hydraulic Engineer
C. H. PIERCE, C. C. COVERT, and G. C. STEVENS, District Engineers

Prepared in cooperation with the States of
MAINE, VERMONT, MASSACHUSETTS, and NEW YORK

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

Water-Supply Paper 401

SURFACE WATER SUPPLY OF THE UNITED STATES

1915

PART I. NORTH ATLANTIC SLOPE DRAINAGE BASINS

NATHAN C. GROVER, Chief Hydraulic Engineer
C. H. PIERCE, C. C. COVERT, and G. C. STEVENS, District Engineers

Prepared in cooperation with the States of
MAINE, VERMONT, MASSACHUSETTS, and NEW YORK

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
15 CENTS PER COPY

CONTENTS.

ILLUSTRATIONS.

SURFACE WATER SUPPLY OF NORTH ATLANTIC SLOPE DRAINAGE BASINS, 1915.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1915.

The data presented in these reports were collected by the United States Geological Survey under authority implied in the organic law (20 Stat. L., p. 394), which contains the following paragraph:

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

The work was begun in 1888 in connection with special studies of water supply for irrigation. Since the fiscal year ending June 30, 1895, successive sundry bills passed by Congress have carried the following item and appropriations:

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

Annual appropriations for the fiscal years ending June 30, 1895–1915.

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1915, inclusive	150,000

In the execution of the work many private and State organizations have cooperated either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 14.

Measurements of stream flow have been made at about 3,800 points in the United States and also at many points in small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, and the Hawaiian Islands. In July, 1914, 1,480 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscel-

laneous discharge measurements are made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in the regular water-supply papers from time to time.

DEFINITION OF TERMS.

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

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross-section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (p. 9).

"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 depth 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 of inches.

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

"Millions of cubic feet" is used to express quantities of water stored in reservoirs, most frequently in connection with studies of flood control.

The following terms used in these reports are not in common use:

"Discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," "controlling section," and "point of control," terms used to designate the section or sections of the stream below the gage which determine the discharge relation at the gage. It should be

noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a given gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

CONVENIENT EQUIVALENTS.

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

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge (second-feet per square mile.)	Run-off (depth in inches).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	0.03719	1.041	1.079	1.116	1.153
2.....	.07438	2.083	2.157	2.231	2.306
3.....	.11157	3.124	3.236	3.347	3.459
4.....	.14876	4.165	4.314	4.463	4.612
5.....	.18595	5.207	5.393	5.578	5.764
6.....	.22314	6.248	6.471	6.694	6.917
7.....	.26033	7.289	7.550	7.810	8.070
8.....	.29752	8.331	8.628	8.926	9.223
9.....	.33471	9.372	9.707	10.041	10.376

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge (second-feet).	Run-off (acre-feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	1.983	55.54	57.52	59.50	61.49
2.....	3.967	111.1	115.0	119.0	123.0
3.....	5.950	166.6	172.6	178.5	184.5
4.....	7.934	222.1	230.1	238.0	246.0
5.....	9.917	277.7	287.6	297.5	307.4
6.....	11.90	333.2	345.1	357.0	368.9
7.....	13.88	388.8	402.6	416.5	430.4
8.....	15.87	444.3	460.2	476.0	491.9
9.....	17.85	499.8	517.7	535.5	553.4

NOTE.—For part of a month multiply run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge (second-feet).	Run-off (millions of cubic feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1.....	0.0864	2.419	2.506	2.592	2.678
2.....	.1728	4.838	5.012	5.184	5.356
3.....	.2592	7.257	7.518	7.776	8.034
4.....	.3456	9.676	10.02	10.37	10.71
5.....	.4320	12.10	12.53	12.96	13.39
6.....	.5184	14.51	15.04	15.55	16.07
7.....	.6048	16.93	17.54	18.14	18.75
8.....	.6912	19.35	20.05	20.74	21.42
9.....	.7776	21.77	22.55	23.33	24.10

NOTE.—For part of a month multiply run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge (second-feet).	Run-off (millions of gallons.)				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.22	58.17	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.171	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting velocity into feet per second into velocity in miles per hour.

[1 foot per second—0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour=1.4666 feet per second. In computing the table the figures 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

1 second-foot equals 40 California miner's inches (law of Mar. 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year (365 days) covers 1 square mile 1.131 feet of 13.752 inches deep.

1 second-foot for one year (365 days) equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one year (365 days) equals 724 acre-feet.

1 second-foot for one day equals 86,400 cubic feet.

1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.

1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.

1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.

1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.

1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.

100 California miner's inches equals 18.7 United States gallons per second.

100 California miner's inches for one day equals 4.96 acre-feet.

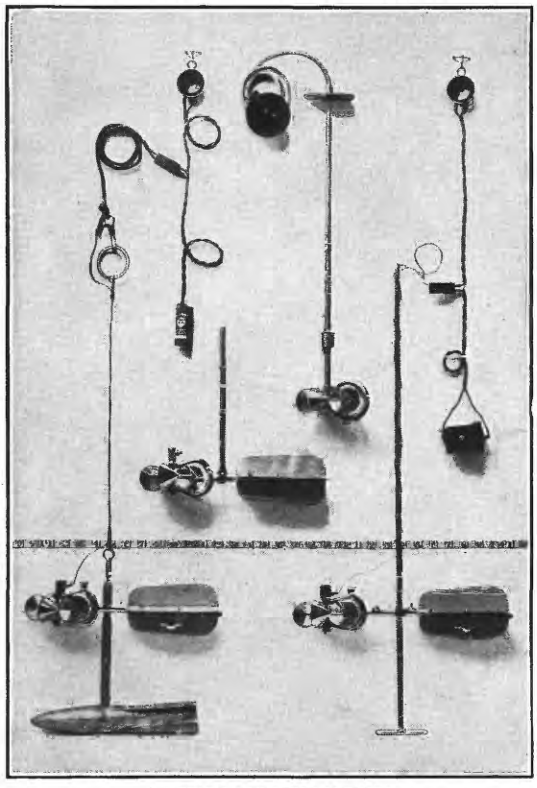
100 Colorado miner's inches equals 2.60 second-feet.

100 Colorado miner's inches equals 19.5 United States gallons per second.

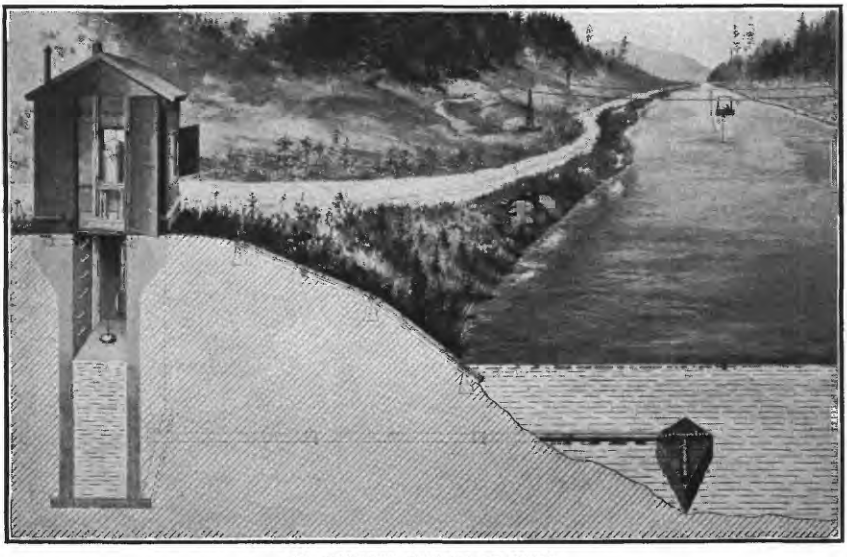
100 Colorado miner's inches for one day equals 5.17 acre-feet.

100 United States gallons per minute equals 0.223 second-foot.

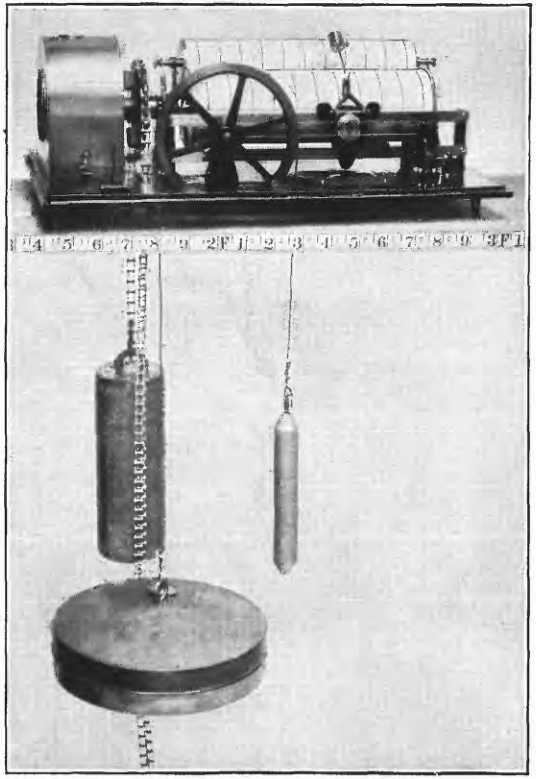
100 United States gallons per minute for one day equals 0.442 acre-foot.



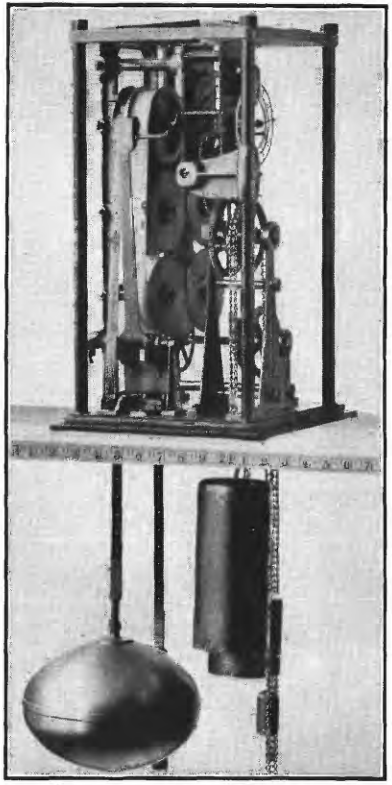
A. PRICE CURRENT METERS.



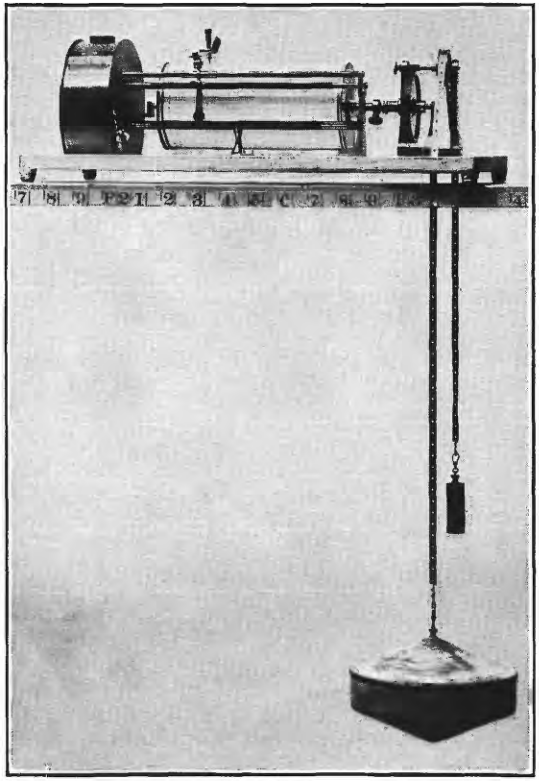
B. TYPICAL GAGING STATION.



A. STEVENS.



B. GURLEY PRINTING.



C. FRIEZ.

WATER-STAGE RECORDERS.

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

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

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1914, and ending September 30, 1915. At the first of January, in most parts of the country a large amount of the precipitation for the preceding three months is stored, either as ground water, in the form of snow, or in lakes. This stored water passes off in the streams during the spring break-up. At the end of September the only stored water available for run-off in the streams is possibly a small amount held in ground storage. Therefore the run-off for a year, beginning with October 1 is practically all derived from precipitation occurring within that year.

The base data collected at gaging stations (Pl. I, *B*) consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder (Pl. II) that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge.

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights, give the daily discharge from which the monthly and yearly mean discharge is determined.

The data presented for each gaging station in the area covered by this report comprises a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the constancy of the discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge gives the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the mean discharge for the day. If such stations are equipped with water-stage recorders the mean daily discharge may be obtained by averaging discharge at regular intervals during the day or by use of the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the mean flow, as determined from the rating table, for the day when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height, and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column of "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this the computations for the remaining columns, which are defined on page 8, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

The accuracy of stream-flow data depends primarily (1) on the permanency of the discharge relation and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

In order to give engineers and others information regarding the probable accuracy of the computed results, footnotes are added to

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

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

Even though the monthly means for any station may represent with a high degree of accuracy the quantity of water flowing past the gage, the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors which result from including in the measured drainage area large noncontributing districts or omitting estimates of water diverted for irrigation or other use. On this account computations of "second-feet per square mile" and "run-off (depth in inches)" have not been made for streams draining areas in which the annual rainfall is less than 20 inches nor for streams draining areas in which the precipitation exceeds 20 inches if such computations might be uncertain or misleading because of the presence of large noncontributing districts in the measured drainage area, because of the omission of estimates of water diverted for irrigation or other use, or because of artificial control or unusual natural control of the flow of the river above the gaging station. All values of "second-feet per square mile" and "run-off (depth in inches)" previously published by the Survey should be used with care because of possible inherent sources of error not known to the Survey.

In general the base data collected each year by the Survey engineers are published not only to comply with the law but also to afford any engineer the means of analyzing in detail the results of the computations. The table of monthly discharge is so arranged as to give only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data already collected and published.

COOPERATION.

The hydrometric work in Maine was carried on in cooperation with the Public Utilities Commission of Maine, Benjamin F. Cleaves, chairman, and Paul L. Bean, chief engineer.

Hydrometric work in Vermont and Massachusetts was carried on under cooperative agreements between Charles W. Gates, governor of Vermont, David I. Walsh, governor of Massachusetts, and the director of the United States Geological Survey.

The station on Pomperaug River at Bennetts Bridge, Conn., was maintained in cooperation with the State of Connecticut.

In New York hydrometric work was carried on in cooperation with Frank M. Williams, State engineer and surveyor, and with the Division of Inland Waters of the State Conservation Commission.

Financial assistance has been rendered by the New England Power Co., the Turners Falls Power & Electric Co., the Connecticut Valley Lumber Co., the Holyoke Water Power Co., the International Paper Co., the Potomac Electric Power Co., the Spottsylvania Power Co., and other power companies in connection with records on streams which they are utilizing.

DIVISION OF WORK.

The data for stations in New England were collected and prepared for publication under the direction of C. H. Pierce, district engineer. The work in Maine was under the immediate supervision of G. C. Danforth, assistant engineer of the Public Utilities Commission, assisted by W. G. Hill. The other assistants in New England were Hardin Thweatt, R. S. Barnes, G. F. Adams, and W. A. Elwood.

For stations in New York the data were collected and prepared for publication under the direction of C. C. Covert, district engineer, who was assisted by O. W. Hartwell, C. S. DeGolyer, E. D. Burchard, H. W. Fear, R. M. Adams, W. A. James, and H. Kimmey.

For stations in New Jersey, Maryland, and Virginia the data were collected and prepared for publication under the direction of G. C. Stevens, district engineer, who was assisted by E. S. Fuller, H. J. Dean, E. D. Burchard, H. W. Fear, M. I. Walters, W. A. Elwood, and W. F. Zens.

The manuscript was assembled and reviewed by H. J. Dean.

GAGING-STATION RECORDS.

ST. JOHN RIVER BASIN.

ST. JOHN RIVER AT FORT KENT, MAINE.

LOCATION.—At suspension footbridge in the town of Fort Kent, Aroostook County, a short distance above mouth of Fish River and about 15 miles below mouth of St. Francis River.

DRAINAGE AREA.—4,880 square miles; not including 270 square miles of Chamberlain Lake drainage area, which is partly tributary to Penobscot basin. (See Water-Supply Paper 281, p. 28.)

RECORDS AVAILABLE.—October 13, 1905, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Inclined staff 22 feet long, in two sections, attached to new concrete pier nearest New Brunswick shore of river. Lower part of gage is placed in a groove in the side of the pier; upper part is fastened to downstream end of same pier. Gage read twice daily by F. L. Hamilton.

DISCHARGE MEASUREMENTS.—Made from footbridge.

CHANNEL AND CONTROL.—Practically permanent; both banks high, rocky, cleared, and not subject to overflow except in extreme freshets.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.5 feet at 4 p. m., May 5, and at 8 a. m., May 6 (discharge, 43,700 second-feet); minimum stage recorded, below 3.0 feet (bottom of gage), August 4–7, and September 12–15 (estimated discharge, 840 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Operation of a few dams on upper headwaters for log driving affects only slightly flow past gage.

ACCURACY.—Results considered good.

The following discharge measurement was made by W. G. Hill:
May 19, 1915: Gage height, 7.70 feet; discharge, 13,600 second-feet.

Daily discharge, in second-feet, of St. John River at Fort Kent, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,890	4,370	4,500	.....	35,400	8,170	2,610	1,160	2,610
2	1,810	4,630	4,760	.....	38,000	7,500	2,420	1,060	2,060
3	1,810	5,040	5,770	.....	38,200	7,170	1,970	1,060	1,810
4	1,810	6,380	6,690	.....	40,200	6,540	1,890	950	1,810
5	1,660	6,380	9,400	.....	42,200	6,690	1,660	950	1,520
6	1,660	6,070	10,100	.....	43,100	7,830	1,890	900	1,330
7	1,520	5,770	9,580	.....	36,000	8,000	2,060	900	1,060
8	1,460	6,380	8,340	.....	39,100	6,690	2,140	1,060	1,060
9	1,270	6,380	7,330	.....	41,700	5,040	2,510	1,110	1,160
10	1,220	6,380	6,380	.....	41,400	4,760	3,860	1,890	1,060
11	2,060	6,070	5,770	.....	35,200	4,370	4,900	2,140	1,060
12	8,520	6,220	4,760	.....	30,700	4,370	5,180	2,140	980
13	11,300	6,070	4,110	.....	27,900	5,040	5,620	2,710	840
14	10,300	6,070	.....	.....	25,900	5,180	7,830	3,860	980
15	7,330	5,320	.....	37,400	22,800	4,900	8,860	6,070	1,060
16	5,620	4,760	.....	26,400	20,700	4,760	7,660	6,070	1,060
17	5,040	4,240	.....	30,900	16,900	4,900	7,830	5,620	1,520
18	4,370	3,610	.....	35,200	15,400	4,900	7,330	4,900	1,660
19	4,370	3,740	.....	41,400	14,300	4,630	6,540	4,240	1,660
20	5,770	2,710	.....	40,200	15,000	3,980	5,180	4,240	1,520
21	7,660	2,710	.....	40,200	13,700	3,490	4,500	3,980	1,390
22	9,040	3,610	.....	39,700	12,300	3,370	3,740	3,140	2,320
23	11,100	4,630	.....	34,700	12,100	3,030	3,260	2,610	4,240
24	12,300	4,370	.....	33,000	12,700	3,140	3,140	2,710	4,370
25	11,100	4,370	.....	33,000	10,700	3,740	2,920	2,820	4,110
26	9,220	4,370	.....	32,500	8,860	3,860	2,920	3,370	3,860
27	8,170	4,370	.....	41,400	11,100	3,860	2,920	4,240	4,110
28	7,010	4,110	.....	38,500	9,580	3,860	2,610	4,110	10,700
29	5,620	4,110	.....	33,000	9,400	3,490	2,060	3,370	15,400
30	5,040	4,110	.....	33,000	9,220	3,030	1,590	3,140	13,700
31	4,500	.....	.....	.....	8,690	.....	1,330	2,920	.....

NOTE.—Discharge determined from a well-defined rating curve. No gage readings obtained Aug. 4-7 and Sept. 12-15; discharge estimated by comparison with records at Van Buren. Discharge relation affected by ice Dec. 14 to Apr. 14; discharge not estimated.

Monthly discharge of St. John River at Fort Kent, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 4,880 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	12,300	1,220	5,530	1.13	1.30	B.
November	6,380	2,710	4,910	1.01	1.13	B.
December 1–13	10,100	4,110	6,730	1.38	.67	B.
April 15–30	41,400	26,400	35,700	7.32	4.36	B.
May	43,100	8,690	23,800	4.88	5.63	B.
June	8,170	3,030	5,010	1.03	1.15	B.
July	8,860	1,330	3,900	.799	.92	B.
August	6,070	900	2,890	.592	.68	B.
September	15,400	840	3,070	.629	.70	B.

ST. JOHN RIVER AT VAN BUREN, MAINE.

LOCATION.—At new International Bridge at Van Buren, Aroostook County, Maine, about 14 miles above Grand Falls, New Brunswick.

DRAINAGE AREA.—8,270 square miles.

RECORDS AVAILABLE.—May 4, 1908, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Gage used since May 6, 1912, painted vertically on second pier from Van Buren end of bridge; zero of gage 407.69 feet above sea level; gage heights 1908 to 1911 read on a vertical rod attached to pier of sawdust carrier of Hammond's mill, about 700 feet below International Bridge, but reduced to datum of bridge gage in published reports. Gage read twice daily by W. H. Scott.

DISCHARGE MEASUREMENTS.—Made from International Bridge.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 22.0 feet at 5.15 p. m., May 9 (discharge, 87,500 second-feet); minimum stage recorded, 1.4 feet at 6.10 a. m. and 6 p. m., September 13 (discharge, 1,740 second-feet).

WINTER FLOW.—Discharge relation affected by ice. Estimate of discharge based on gage heights observed at Grand Falls.

REGULATION.—The little storage above for log driving probably does not affect the discharge.

ACCURACY.—Results considered good.

COOPERATION.—Winter gage heights at Grand Falls furnished by H. S. Ferguson, consulting engineer.

Discharge measurements of St. John River at Van Buren, Maine, during the year ending Sept. 30, 1915.

[Made by W. G. Hill.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 2	[a] 8.00	7,040	May 20	12.10	32,100
May 18	12.65	35,500			

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of St. John River at Van Buren, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3,160	7,720	9,790	3,500	2,410	8,150	5,500	61,100	18,800	7,120	4,050	3,940
2	2,880	7,720	7,250	3,350	2,410	8,150	5,500	60,500	17,900	6,520	3,640	3,640
3	2,700	8,850	7,840	3,350	2,410	8,630	5,500	64,500	17,400	5,940	3,340	3,150
4	2,440	9,240	9,450	3,200	2,300	8,960	5,400	67,200	16,500	5,360	3,060	2,790
5	2,200	9,500	10,100	3,050	2,300	9,120	5,400	70,200	19,200	4,810	2,880	2,700
6	2,200	9,630	10,100	2,910	2,190	9,120	5,500	71,700	18,700	5,360	2,700	2,530
7	2,120	9,370	9,450	3,050	2,190	9,450	5,610	69,300	17,400	5,820	2,530	2,360
8	2,040	9,760	9,120	3,200	2,300	9,960	6,070	70,800	15,600	5,590	2,700	2,040
9	2,040	9,630	8,790	3,200	2,410	10,100	6,700	86,500	13,000	7,480	2,790	2,280
10	2,200	8,980	8,150	3,200	2,520	10,100	7,250	82,600	10,300	11,000	3,340	2,440
11	6,400	8,100	7,540	3,200	2,520	10,100	9,960	73,200	11,800	11,400	3,640	2,200
12	9,500	6,880	6,700	3,050	2,520	9,790	26,200	64,500	11,800	10,800	3,540	2,040
13	14,100	6,280	6,440	3,050	2,300	9,620	35,200	59,200	12,300	10,700	3,640	1,740
14	14,600	6,160	5,720	3,050	2,300	9,450	36,800	55,000	12,200	12,100	3,840	2,040
15	12,200	5,820	5,290	2,910	2,300	9,120	49,200	50,000	11,900	13,600	3,250	2,200
16	9,630	6,050	5,090	2,910	2,300	9,120	68,700	44,800	11,600	13,000	5,820	2,200
17	7,720	7,240	4,890	2,770	2,190	9,120	71,100	39,800	11,500	12,600	7,720	2,200
18	7,480	7,240	4,890	2,770	2,410	8,960	83,000	36,100	11,100	13,200	7,120	2,360
19	7,240	8,600	5,090	2,770	2,640	8,790	68,400	34,100	11,000	12,300	5,940	2,700
20	7,600	11,200	5,500	2,770	2,910	8,790	61,600	33,600	10,400	10,600	5,590	2,880
21	10,000	12,100	5,290	2,770	3,350	8,470	61,400	32,800	10,200	9,240	5,700	3,160
22	11,400	13,000	5,090	2,910	4,330	8,150	60,500	29,600	9,630	8,220	5,140	3,840
23	12,200	13,000	4,890	3,200	4,700	8,000	56,200	27,800	9,110	7,360	4,590	5,940
24	11,400	12,800	4,700	3,820	5,090	7,840	53,000	27,600	8,860	7,000	4,370	7,000
25	10,300	12,800	4,700	3,500	5,720	7,250	51,500	24,700	8,720	6,640	3,840	6,050
26	9,370	13,000	4,510	3,200	6,700	7,110	53,200	22,700	8,470	6,160	4,050	6,160
27	8,220	12,600	4,160	2,910	7,840	6,440	57,500	22,900	8,220	5,940	4,920	13,300
28	7,600	12,200	3,990	2,770	8,150	5,950	68,100	24,400	8,220	5,700	5,700	17,400
29	7,000	12,100	3,990	2,520	.....	5,500	69,600	22,700	7,970	5,250	5,360	20,800
30	6,760	12,100	3,660	2,520	.....	5,500	65,400	21,200	7,720	4,700	4,700	22,400
31	7,360	.....	3,660	2,410	.....	5,400	.....	20,000	.....	4,370	4,480	.....

NOTE.—Discharge for open-water period determined from a well-defined rating curve. Discharge relation affected by ice Dec. 1 to Apr. 11; discharge determined from gage heights at Grand Falls by means of a rating curve based on discharge measurements at Van Buren.

Monthly discharge of St. John River at Van Buren, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 8,270 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	14,600	2,040	7,160	0.866	1.00	A.
November	13,000	5,820	9,660	1.17	1.30	A.
December	10,100	3,660	6,320	.764	.88	C.
January	3,820	2,410	3,030	.366	.42	C.
February	8,150	2,190	3,350	.405	.42	C.
March	10,100	5,400	8,390	1.01	1.16	C.
April	83,000	5,400	38,900	4.70	5.24	B.
May	86,500	20,000	47,500	5.74	6.62	A.
June	19.200	7,720	12,300	1.49	1.66	A.
July	13,600	4,170	8,250	.998	1.15	A.
August	7,720	2,530	4,320	.522	.60	A.
September	22,400	1,740	5,220	.631	.70	A.
The year	86,500	1,740	12,900	1.56	21.15	

MACHIAS RIVER BASIN.

MACHIAS RIVER AT WHITNEYVILLE, MAINE.

LOCATION.—At a wooden highway bridge in the town of Whitneyville, Washington County, 200 feet below a storage dam, 4 miles above Machias.

DRAINAGE AREA.—465 square miles.

RECORDS AVAILABLE.—October 17, 1903, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain installed on the wooden highway bridge October 10, 1911; prior to October 3, 1905, chain gage on the Washington County railroad bridge, three-fourths of a mile downstream; October 3, 1905, to October 9, 1911, staff gage on highway bridge at datum of present chain gage. Gage read once a day by Ira S. Albee.

DISCHARGE MEASUREMENTS.—Made from railroad bridge or by wading at a point 200 feet above railroad bridge.

CHANNEL AND CONTROL.—Practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.0 feet at 1.30 p. m. May 2, and 2.10 p. m. May 3 (discharge, 6,780 second-feet); minimum stage recorded, 2.8 feet, on October 1, 2, 3, 16, 17, 18 (discharge, 30 second-feet).

WINTER FLOW.—Discharge relation not seriously affected by ice.

REGULATION.—Opening and closing of gates in storage dam immediately above station each day during low stages of the river causes considerable fluctuation; some log driving every year and jams of short duration occasionally occur.

ACCURACY.—Results considered fair.

Discharge measurements of Machias River at Whitneyville, Maine, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 6	W. G. Hill	7.45	3,280
Sept. 14	G. C. Danforth	3.77	399

Daily discharge, in second-feet, of Machias River at Whitneyville, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	30	682	412	362	464	1,230	221	3,880	1,710	517	626	412
2	30	571	412	314	412	1,040	221	6,780	1,490	517	626	362
3	30	517	412	267	412	740	221	6,780	1,360	517	1,040	314
4	51	464	517	267	412	571	267	6,120	1,230	464	981	267
5	77	412	626	221	412	517	267	4,480	1,100	464	920	267
6	107	362	517	221	412	464	267	2,980	1,100	517	860	267
7	107	314	464	464	517	412	517	2,980	1,100	517	800	267
8	77	267	412	920	981	412	740	3,080	1,040	517	740	267
9	51	267	362	860	920	412	740	3,180	981	2,620	682	267
10	51	267	314	682	740	412	740	3,380	981	5,130	682	267
11	51	221	267	517	626	412	740	3,280	950	3,580	626	267
12	51	178	267	464	517	362	1,100	2,620	920	2,270	571	267
13	51	141	267	412	517	362	1,710	2,180	860	1,360	517	314
14	51	107	267	362	412	362	1,360	1,940	626	1,230	464	362
15	51	107	800	314	362	314	1,360	1,640	412	1,100	412	412
16	30	517	740	267	682	314	1,360	1,490	517	981	412	412
17	30	1,490	626	267	1,290	314	1,360	1,360	517	860	412	412
18	30	1,170	464	267	981	314	1,290	1,360	517	860	387	412
19	51	800	362	2,440	800	267	1,230	1,360	464	860	362	412
20	178	740	362	3,080	626	267	1,100	1,490	464	800	362	412
21	362	740	362	1,940	517	267	1,040	1,710	1,100	740	362	362
22	571	676	362	1,170	464	267	981	1,860	1,040	682	412	314
23	571	517	362	1,040	412	267	981	2,100	981	740	517	267
24	571	464	362	981	981	221	981	2,360	981	740	571	221
25	517	464	362	920	2,360	221	1,230	2,360	920	682	626	221
26	464	464	362	860	2,980	221	1,430	2,270	920	626	571	267
27	464	464	314	800	4,280	221	1,560	2,180	860	626	517	362
28	517	464	267	800	2,180	221	1,640	2,100	800	626	464	362
29	517	412	267	800	.....	221	1,640	2,100	740	626	464	314
30	626	412	267	800	.....	221	1,940	2,100	626	626	464	267
31	800	.....	314	517	.....	221	.....	1,940	.....	626	412	.....

NOTE.—Discharge determined from a rating curve well defined between 100 and 4,000 second-feet. Discharge relation may have been slightly affected by ice at various times in December, January, and February.

Monthly discharge of Machias River at Whitneyville, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 465 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	800	30	231	0.497	0.57	C.
November	1,490	107	489	1.05	1.17	B.
December	800	267	402	.865	1.00	C.
January	3,080	221	761	1.64	1.89	C.
February	4,280	362	952	2.05	2.14	C.
March	1,230	221	390	.839	.97	B.
April	1,940	221	1,000	2.15	2.40	B.
May	6,780	1,360	2,760	5.94	6.85	B.
June	1,710	412	910	1.96	2.19	B.
July	5,130	464	1,070	2.30	2.65	B.
August	1,040	362	576	1.24	1.43	B.
September	412	221	320	.688	.77	B.
The year	6,780	30	822	1.77	24.03	

UNION RIVER BASIN.

WEST BRANCH OF UNION RIVER AT AMHERST, MAINE.[a]

LOCATION.—At highway bridge, three-fourths of a mile west of Amherst post office, Hancock County, on road to Bangor, about a mile below highway bridge at old tannery dam.

DRAINAGE AREA.—140 square miles.

RECORDS AVAILABLE.—July 25, 1909, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain, installed June 2, 1910, at same datum as old vertical gage nailed to log abutment; read twice a day by Mrs. Emma Sumner.

DISCHARGE MEASUREMENTS.—Made from downstream side of the bridge.

CHANNEL AND CONTROL.—Gravel; unlikely to change except in unusual flood.

WINTER FLOW.—Discharge relation seriously affected by ice.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12 feet at 4 p. m. May 1 (discharge, from extension of rating curve, 1,840 second-feet); minimum open stage recorded, 5.05 feet October 3, 6, and 8 (discharge, 21 second-feet); minimum discharge estimated at 19 second-feet December 22–25 and January 5, when discharge relation was affected by ice.

REGULATION.—A few log-driving dams above the station, but the regimen of stream is only slightly affected thereby.

ACCURACY.—Results considered fair.

Discharge measurements of West Branch of Union River at Amherst, Maine, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Feb. 15	W. G. Hill	[b] 8.35	285
Sept. 17	G. C. Danforth	5.68	61

[a] Published in reports for 1911 to 1913 as "Union River at Amherst."

[b] Discharge relation affected by ice.

Daily discharge, in second-feet, of West Branch of Union River at Amherst, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	23	72	90	.....	140	1,500	274	96	96	173
2	23	78	90	.....	148	1,680	304	90	140	132
3	21	78	96	.....	156	1,520	226	148	173	96
4	23	72	.....	.....	156	1,600	217	110	132	96
5	23	68	.....	.....	164	1,660	190	78	118	90
6	21	68	.....	.....	173	1,600	199	90	110	110
7	21	68	.....	.....	236	1,370	190	90	140	68
8	21	59	.....	.....	284	1,240	164	90	118	68
9	23	59	.....	.....	325	1,130	132	930	78	63
10	28	59	.....	.....	369	1,110	140	1,220	78	63
11	26	55	.....	.....	438	896	140	984	90	59
12	23	55	.....	.....	738	738	140	896	72	59
13	23	55	.....	199	896	682	125	913	110	68
14	23	59	.....	*a* 207	846	568	110	814	110	68
15	23	.....	.....	*a* 216	768	532	110	724	68	68
16	34	.....	.....	*a* 224	783	484	110	618	68	68
17	34	.....	.....	132	656	520	125	520	90	68
18	37	.....	.....	*a* 127	669	415	125	484	103	59
19	40	.....	.....	*a* 122	605	369	103	415	103	59
20	51	.....	.....	118	580	347	125	314	96	55
21	51	.....	.....	*a* 124	556	325	164	294	90	51
22	40	.....	.....	*a* 129	532	304	156	199	90	51
23	40	.....	.....	*a* 134	532	294	156	190	190	51
24	40	.....	.....	140	508	294	156	164	190	44
25	51	.....	.....	*a* 143	520	294	156	148	264	44
26	55	.....	.....	*a* 145	461	284	140	118	236	164
27	72	.....	.....	148	532	347	125	103	199	182
28	96	.....	.....	*a* 144	532	380	125	96	182	182
29	78	.....	.....	*a* 140	508	380	110	90	164	164
30	78	.....	.....	*a* 136	605	336	103	103	118	90
31	83	.....	.....	132	.....	304	.....	103	164	.....

a Discharge interpolated.

NOTE.—Discharge determined from a fairly well defined rating curve. Discharge relation affected by ice Nov. 15–30 and Dec. 4 to March 12, estimates based on gage heights corrected for backwater by means of one discharge measurement and climatic data.

Monthly discharge of West Branch of Union River at Amherst, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 140 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	96	21	39.5	0.282	0.33	A.
November	.....	55	99.1	.708	.79	B.
December	.....	.....	63.2	.452	.52	C.
January	.....	.....	91.9	.657	.76	C.
February	.....	.....	309	2.21	2.30	C.
March	.....	118	235	1.68	1.94	B.
April	896	140	481	3.44	3.84	B.
May	1,680	284	758	5.41	6.24	B.
June	304	103	155	1.11	1.24	B.
July	1,220	78	362	2.59	2.99	B.
August	264	68	128	.914	1.05	B.
September	182	44	87.1	.622	.69	B.
The year	1,680	19	234	1.67	22.69	

BRANCH LAKE NEAR ELLSWORTH, MAINE.

LOCATION.—At Branch Pond Lumber Co.'s mill at lower end of Branch Lake, 5 miles northwest of Ellsworth.

AREA OF LAKE SURFACE.—4.33 square miles.

RECORDS AVAILABLE.—June 29, 1909, to March 31, 1915, when station was discontinued.

GAGE.—Vertical staff nailed to corner of mill near intake to wheels.

ALTITUDE.—Altitude as determined by United States Geological Survey, 236 feet above sea level, which was assumed as height of water surface at time of Union River surveys.[1]

Daily gage height, in feet, of Branch Lake near Ellsworth, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Jan.	Feb.	Mar.
1	.....	0.4	.....	.....	3.0	16	.....	.....	.....	.....	3.2
2	.....	.....	.....	.....	3.15	17	.....	.....	0.7	.....	3.2
3	.....	.....	0.7	.....	3.2	18	0.8	.....	.....	.....	3.2
4	1.2	.....	.....	.....	3.05	19	.....	.....	.....	1.9	3.15
5	.....	.....	.....	.....	3.05	20	.....	.....	.....	2.1	3.1
6	.....	.....	.....	1.9	3.1	21	.....	.....	.....	.....	.....
7	.....	.....	.....	.....	.....	22	.....	.....	.....	2.2	3.1
8	.....	.....	1.05	.....	3.15	23	.....	.....	1.7	2.1	3.1
9	.....	.....	.....	.....	3.15	24	.....	.....	.....	2.05	3.1
10	.....	.....	1.1	.....	3.15	25	.6	.....	.....	2.1	3.1
11	1.0	.....	.....	.....	3.15	26	.....	.....	.....	2.85	3.1
12	.....	.....	.....	.....	3.15	27	.....	.....	.....	2.9	3.15
13	.....	.....	.....	1.8	3.15	28	.....	.....	.....	3.0	.....
14	.....	.....	.....	.....	.....	29	.....	.....	.....	.....	3.2
15	.....	.....	.....	.....	3.2	30	.....	.....	1.85	.....	3.2
						31	.....	.....	.....	.....	3.15

PENOBSCOT RIVER BASIN.

WEST BRANCH OF PENOBSCOT RIVER AT MILLINOCKET, MAINE.

LOCATION.—At Quakish Lake dam and Millinocket mill of Great Northern Paper Co. at Millinocket, Penobscot County.

DRAINAGE AREA.—1,880 square miles.

RECORDS AVAILABLE.—January 11, 1901, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—Water-stage recorder at Quakish Lake dam and gages in the fore bay and tailraces at the mill.

CHANNEL AND CONTROL.—Crest of concrete dam.

DETERMINATION OF DISCHARGE.—Flow computed by considering the flow over the dam, the flow through the wheels, and the water used from time to time through the log sluices and filters. The wheels were rated at Holyoke, Mass., before being placed in position and were tested later by numerous tube-float and current-meter measurements. When the flow of the river is less than 2,500 second-feet, all the water generally flows through the wheels of the mill.

WINTER FLOW.—Discharge relation not seriously affected by ice.

REGULATION.—Dams at outlets of North Twin and Chesuncook lakes store water on a surface of about 65 square miles, with a capacity of about 32 billion cubic feet. Except during the time (usually in August) when excess water has to be supplied for log driving on the river below Millinocket and for a short time during the spring freshet, run-off is regulated by storage. Results corrected for storage.

COOPERATION.—Results obtained and computations made by engineers of Great Northern Paper Co.

[1] U. S. Geol. Survey Water-Supply Paper 281, p. 57, 1912.

Monthly discharge of West Branch of Penobscot River at Millinocket, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 1,880 square miles.]

Month.	Discharge in second-feet.			Corrected run-off (depth in inches on drainage area).
	Observed mean.	Corrected for storage.		
		Mean.	Per square mile.	
October	2,300	1,260	0.670	0.77
November	2,280	1,730	.920	1.03
December	2,230	1,140	.606	.70
January	2,230	656	.349	.40
February	2,060	641	.341	.35
March	1,700	1,500	.798	.92
April	1,740	5,370	2.86	3.19
May	2,240	7,600	4.04	4.66
June	2,260	3,030	1.61	1.80
July	2,470	2,280	1.21	1.40
August	2,680	925	.492	.57
September	2,270	927	.493	.55
The year	2,200	2,260	1.20	16.34

PENOBSCOT RIVER AT WEST ENFIELD, MAINE.

LOCATION.—At the steel highway bridge 1,000 feet below the mouth of Piscataquis River and 3 miles west of Enfield railroad station, Penobscot County.

DRAINAGE AREA.—6,600 square miles.

RECORDS AVAILABLE.—January 1, 1902, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Friez water-stage recorder on left bank, downstream side of left bridge abutment, used since December 11, 1912; standard chain gage on upstream side of bridge; gages set to same datum.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Channel at gage broken by four bridge piers; straight above and below the gage; banks high and rocky and not subject to overflow. The control is at Passadumkeag Rips, about 5 miles below the gage; a wing dam at this point overflows at about gage height 5.5 feet.

WINTER FLOW.—Discharge relation seriously affected by ice; discharge estimated by comparison with records at Sunkhaze Rips.

EXTREMES OF DISCHARGE.—Maximum stage during year (water-stage recorder): 12.9 feet on May 2 (discharge, 53,800 second-feet); minimum discharge occurred at gage height of 3.47 feet at 2 a. m. January 5 (discharge, 2,470 second-feet; discharge relation affected by ice).

DIVERSIONS.—Flow since 1900 largely controlled by storage, principally in the lakes tributary to the West Branch.

REGULATION.—The operation of a dam 1 mile above the gage and also one on the Piscataquis near its mouth and storage on the West Branch of the Penobscot do not cause diurnal fluctuation except for short periods on Sunday. Results not corrected for storage.

ACCURACY.—Results good, the rating curve being well defined and gage-height record reliable.

COOPERATION.—Gage-height records and several discharge measurements furnished by Thomas W. Clark, hydraulic engineer, Oldtown, Maine. Several discharge measurements were made by students of the University of Maine under the direction of Prof. H. S. Boardman.

Discharge measurements of Penobscot River at West Enfield, Maine, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 3	University of Maine students	2.43	4,380	Apr. 6	H. A. Lancaster	3.84	7,640
3	do	2.43	4,530	June 11	T. W. Clark	4.15	8,090
7	do	2.35	3,770	July 23	L. W. Mayhew	4.52	9,390
7	do	2.35	3,950	Sept. 16	G. C. Danforth	2.51	4,300
10	do	2.29	4,020	23	University of Maine students	3.75	7,270
10	do	2.28	4,000	23	do	3.75	7,570
29	do	2.02	3,490	30	do	3.65	6,940
29	do	2.02	3,610				

Daily discharge, in second-feet, of Penobscot River at West Enfield, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4,390	4,610	4,500	3,330	4,960	17,000	6,780	38,400	11,500	7,040	7,170	6,140
2	4,280	4,500	4,730	3,230	5,080	16,600	7,300	52,700	11,000	6,910	6,780	5,770
3	4,170	4,390	4,730	3,130	5,080	15,600	7,570	48,200	10,000	7,040	6,910	5,530
4	3,840	4,500	5,190	2,850	5,080	13,700	7,170	47,800	9,420	6,520	7,440	5,420
5	3,630	4,500	5,530	2,570	4,960	12,300	6,650	51,000	8,680	6,260	7,040	5,300
6	3,630	4,280	5,070	2,850	5,080	11,500	7,980	47,800	8,400	6,390	7,040	4,840
7	3,950	4,170	4,280	3,530	4,840	10,800	8,260	43,700	7,980	7,170	7,040	4,960
8	3,730	4,060	4,610	4,060	4,730	10,000	8,680	41,000	7,440	6,910	6,910	4,840
9	3,840	3,630	4,960	4,060	4,840	9,270	10,000	41,400	7,300	13,500	6,520	5,300
10	3,840	3,430	4,960	3,950	5,080	8,680	12,000	37,400	7,840	29,300	7,040	5,300
11	3,630	3,840	5,070	3,840	4,960	8,260	13,300	32,500	8,260	24,700	8,830	5,300
12	3,330	4,060	4,610	3,730	4,840	7,710	19,700	28,200	8,120	19,700	9,120	5,070
13	3,330	3,840	4,500	3,840	4,960	7,040	35,400	26,000	7,710	18,000	8,260	4,500
14	3,330	3,730	4,060	3,730	4,960	7,040	33,200	23,000	7,040	16,200	7,170	4,390
15	3,230	3,530	3,730	3,630	4,730	5,650	29,000	21,100	7,570	14,600	6,780	4,500
16	3,430	3,630	3,330	3,630	5,080	5,650	26,800	18,800	8,540	13,200	6,390	4,390
17	3,430	5,770	3,730	3,530	6,140	6,010	26,500	18,200	8,830	12,000	6,780	4,390
18	3,430	6,910	3,950	3,330	6,780	5,890	26,800	16,600	8,830	12,100	7,040	4,390
19	3,530	6,140	3,950	4,280	7,040	5,650	26,000	16,000	8,680	11,800	7,040	4,390
20	3,730	5,420	3,730	6,260	6,650	5,420	25,200	15,800	7,840	11,600	6,650	4,060
21	4,280	5,770	3,630	7,570	6,140	5,190	24,200	14,300	7,710	11,100	6,260	4,390
22	4,500	5,770	3,430	7,840	5,890	5,190	22,500	13,900	7,570	10,000	5,890	5,190
23	4,280	5,070	3,230	7,440	5,770	5,540	19,900	12,800	7,440	9,570	6,140	7,040
24	3,950	4,730	3,430	6,650	5,770	5,890	17,600	11,300	7,710	9,120	7,040	6,910
25	3,730	5,300	3,530	6,010	6,390	6,650	16,600	11,300	7,980	8,540	9,720	6,140
26	3,630	5,190	3,630	5,770	12,600	6,910	17,200	11,500	7,840	7,710	9,720	5,770
27	3,430	5,420	3,630	6,010	18,800	7,570	19,300	13,200	7,300	7,980	9,420	5,890
28	3,530	5,070	3,630	5,890	20,100	6,780	21,800	14,800	7,040	7,570	8,400	7,710
29	3,530	4,500	3,630	5,770	.....	6,520	21,100	13,900	7,170	7,300	7,440	7,440
30	3,630	4,390	3,630	6,010	.....	6,650	20,600	12,500	7,040	7,710	6,520	6,910
31	4,060	.....	3,630	5,890	.....	6,650	.....	12,000	.....	7,570	6,390	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by log jam Oct. 1, 1914, and by ice from Nov. 18 to Apr. 1; discharge estimated by comparison with records at Sunk Hazerips, by means of a reduction factor obtained by comparison of records representing normal conditions.

Monthly discharge of Penobscot River at West Enfield, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 6,600 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	4,500	3,230	3,750	0.568	0.65	A.
November	6,910	3,430	4,670	.708	.79	B.
December	5,530	3,230	4,140	.627	.72	B.
January	7,840	2,570	4,650	.705	.81	B.
February	20,100	4,730	6,690	1.01	1.05	B.
March	17,000	5,190	8,370	1.27	1.46	B.
April	35,400	6,650	18,200	2.76	3.08	A.
May	52,700	11,300	26,000	3.94	4.54	A.
June	11,500	7,040	8,190	1.24	1.38	A.
July	29,300	6,260	11,100	1.68	1.94	A.
August	9,720	5,890	7,320	1.11	1.28	A.
September	7,710	4,060	5,410	.820	.91	A.
The year	52,700	2,570	9,060	1.37	18.61	

NOTE.—Monthly discharge in second-feet per square mile and run-off in depth in inches shown by the able do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

EAST BRANCH OF PENOBSCOT RIVER AT GRINDSTONE, MAINE.

LOCATION.—At Bangor & Aroostook Railroad bridge half a mile south of railroad station at Grindstone, Penobscot County, one-eighth mile above Grindstone Falls, and about 8 miles above the mouth (at Medway).

DRAINAGE AREA.—1,100 square miles; includes 270 square miles tributary to Chamberlain Lake.

RECORDS AVAILABLE.—October 23, 1902, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain attached to railroad bridge; read twice a day by R. D. Porter.

DISCHARGE MEASUREMENTS.—Made from railroad bridge.

CHANNEL AND CONTROL.—Practically permanent; stream confined by abutments of bridge and broken by one pier at ordinary stages; velocity of current medium at moderate and high stages, but sluggish at low water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.0 feet at 4.30 p. m., May 5 (discharge, from extension of rating curve, 10,000 second-feet); minimum stage recorded, 3.9 feet at 6.30 a. m. and 5 p. m. October 8 (discharge, from extension of rating curve, 160 second-feet); minimum discharge estimated as 110 second-feet on December 28 and 29.

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Several dams maintained at outlets of a number of lakes and ponds near source of river are regulated in the interests of log driving; during the summer and fall gates are generally left open. The basin of the East Branch since about 1840 includes about 270 square miles of territory draining into Chamberlain Lake that formerly drained into the St. John River basin, the diversion being made through what is known as the Telos canal. Results not corrected for storage and diversions.

ACCURACY.—Discharge relation materially affected by backwater from log jams at station and at Grindstone Falls immediately below, and by ice during winter. Results probably good for moderate and high stages but somewhat uncertain for low stages.

Discharge measurements of East Branch of Penobscot River at Grindstone, Maine, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 2	Danforth and Hill	[a] 5.44	461	July 1	W. G. Hill	6.04	1,780
Mar. 5	W. G. Hill	[a] 6.80	1,970				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of East Branch of Penobscot River at Grindstone, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	185	590	715	120	258	3,510	480	3,230	3,890	1,960	1,190	360
2	185	560	560	130	455	3,140	505	3,990	3,800	2,280	1,450	360
3	185	505	405	130	405	2,700	533	5,120	3,800	1,660	1,520	360
4	185	505	382	140	382	2,280	560	6,890	3,050	1,520	1,380	360
5	185	505	360	140	405	1,960	590	9,880	3,420	1,520	1,250	360
6	185	505	338	150	405	1,740	650	9,380	2,620	1,520	1,130	338
7	185	480	315	160	430	1,520	680	8,770	1,320	1,520	1,020	295
8	160	455	275	185	455	1,380	750	8,530	920	1,250	970	275
9	185	455	240	198	430	1,250	1,660	8,050	1,520	2,620	920	275
10	210	405	210	210	430	1,130	2,790	7,580	1,380	5,990	1,080	275
11	240	315	210	240	405	970	4,290	6,430	1,520	4,490	1,380	275
12	210	360	210	240	405	875	5,770	5,330	1,520	2,360	970	258
13	210	275	210	240	405	790	6,540	4,800	[a] 2,070	2,360	750	240
14	185	315	210	225	405	750	6,780	5,330	2,620	2,120	750	240
15	185	360	198	240	405	715	6,100	5,020	3,510	1,740	750	240
16	185	455	172	258	505	680	5,660	4,390	3,510	1,380	680	240
17	185	1,320	160	275	560	680	5,550	3,600	3,700	2,040	750	240
18	[a] 185	750	160	295	680	650	5,880	3,140	3,420	2,280	750	240
19	[a] 210	533	160	505	620	620	5,550	3,990	3,510	2,040	790	225
20	[a] 315	430	160	750	560	560	4,910	3,230	3,140	2,040	680	210
21	405	360	160	1,130	505	560	4,700	3,140	3,140	1,380	620	240
22	360	295	150	1,020	480	505	4,390	2,620	3,140	1,450	620	505
23	315	240	140	920	430	505	3,510	2,790	3,600	1,590	715	590
24	315	275	130	790	2,120	505	3,140	2,620	3,510	1,520	875	480
25	315	315	120	680	5,660	505	2,790	2,280	2,540	1,520	830	505
26	275	360	120	620	5,120	505	2,790	2,960	2,280	1,520	790	680
27	275	455	120	590	4,490	533	3,320	3,050	2,120	1,520	650	1,450
28	275	560	110	560	4,090	560	3,800	4,290	1,960	1,190	533	1,190
29	275	715	110	455	.....	560	3,510	4,190	1,960	1,130	430	875
30	338	920	120	405	.....	533	2,790	[a] 4,240	1,960	1,130	405	790
31	590	.....	120	315	.....	505	.....	4,290	.....	1,020	405	.....

[a] Discharge interpolated.

NOTE.—Discharge determined from a rating curve well defined between 400 and 8,000 second-feet. Discharge relation affected by ice from Nov. 20 to Apr. 11; estimates based on gage heights corrected for backwater by means of two discharge measurements and climatic data.

Monthly discharge of East Branch of Penobscot River at Grindstone, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 1,100 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	590	160	248	0.225	0.26	A.
November	1,320	240	485	.441	.49	B.
December	715	110	228	.207	.24	D.
January	1,130	120	397	.361	.42	D.
February	5,660	258	1,140	1.04	1.08	C.
March	3,510	505	1,080	.982	1.13	C.
April	6,780	480	3,360	3.05	3.40	B.
May	9,880	2,280	4,940	4.49	5.18	A.
June	3,890	920	2,680	2.44	2.72	A.
July	5,990	1,020	1,920	1.75	2.02	A.
August	1,520	405	872	.793	.91	A.
September	1,450	210	432	.393	.44	A.
The year	9,880	110	1,480	1.35	18.29	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

MATTAWAMKEAG RIVER AT MATTAWAMKEAG, MAINE.

LOCATION.—At Maine Central Railroad bridge at village of Mattawamkeag, Penobscot County, half a mile above mouth of river.

DRAINAGE AREA.—1,500 square miles.

RECORDS AVAILABLE.—August 26, 1902, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain fastened to railroad bridge; read twice a day by W. T. Mincher.

DISCHARGE MEASUREMENTS.—Made from the bridge, which is slightly oblique to the current; low-water measurements made by wading at a point about a mile above station.

CHANNEL AND CONTROL.—Practically permanent; channel at bridge broken by two piers.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.2 feet at 7 a. m. and 5 p. m. May 6 and 7 (discharge, from extension of rating curve, 16,400 second-feet); minimum stage recorded, 2.7 feet October 14 and 15 (discharge, 123 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Dams are maintained at outlets of several large lakes and ponds, but the stored water is used only for log driving.

ACCURACY.—Discharge relation at times affected by backwater from log jams. Results for open-water periods considered good.

Discharge measurements of Mattawamkeag River at Mattawamkeag, Maine, during the year ending Sept. 30, 1915.

[Made by W. G. Hill.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 4	[a] 6.25	754
Mar. 9	[a] 7.96	3,470

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Mattawamkeag River at Mattawamkeag, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	170	450	950	215	860	4,090	1,780	12,200	3,520	1,350	1,240	860
2	170	450	950	185	820	4,280	1,970	13,000	3,340	1,240	1,140	780
3	170	565	1,040	145	780	4,380	2,170	14,500	2,920	1,140	1,090	700
4	170	740	1,040	145	740	4,280	2,380	15,100	2,380	1,140	1,040	630
5	200	995	995	145	780	4,180	2,460	15,600	1,970	1,240	950	630
6	170	1,040	950	145	820	4,090	2,530	16,400	1,970	1,140	860	630
7	170	820	950	200	1,040	3,900	2,600	16,400	2,170	1,140	780	565
8	145	860	905	305	995	3,710	2,680	15,600	2,680	1,840	700	630
9	145	860	780	285	950	3,430	2,760	14,600	2,530	3,620	630	630
10	170	860	740	265	860	3,000	2,840	13,600	2,530	5,600	700	565
11	170	780	700	265	820	3,000	4,580	12,600	2,680	7,350	780	565
12	170	665	565	230	780	3,000	6,480	11,700	2,530	7,350	905	565
13	145	565	535	230	820	2,920	7,600	10,100	2,380	7,480	1,040	505
14	123	565	505	200	860	2,680	9,030	8,640	2,240	6,720	1,040	505
15	134	565	505	200	950	2,380	9,960	7,220	2,240	5,920	950	505
16	145	665	480	185	995	1,970	10,100	6,360	2,380	4,880	995	565
17	145	1,040	450	170	1,040	1,710	10,400	5,920	2,240	4,480	1,040	565
18	145	1,410	425	350	1,090	1,470	9,690	5,490	2,240	4,000	950	505
19	200	1,470	400	565	1,090	1,300	9,690	5,280	2,380	3,430	950	450
20	375	1,470	375	950	1,140	1,140	9,690	4,480	2,380	3,000	950	505
21	598	1,470	350	950	1,140	1,090	9,420	3,710	2,240	3,000	950	505
22	630	1,470	305	1,040	1,140	1,090	8,770	3,340	2,100	2,840	950	630
23	630	1,350	305	1,040	1,190	1,090	7,600	3,340	1,840	2,530	950	740
24	565	1,350	285	1,040	1,190	1,040	6,360	3,000	1,780	2,240	950	860
25	565	1,240	265	995	1,840	1,090	6,140	3,000	1,410	1,900	1,040	950
26	480	1,140	265	950	2,680	1,140	5,920	3,080	1,350	1,710	1,140	1,090
27	505	1,240	265	950	3,900	1,190	6,720	3,620	1,350	1,590	1,240	1,300
28	450	1,240	265	950	4,090	1,240	7,600	4,090	1,350	1,470	1,240	1,410
29	450	1,140	265	905	.....	1,350	9,030	3,900	1,470	1,350	1,140	1,650
30	400	1,040	265	905	.....	1,470	10,400	3,900	1,470	1,240	1,040	1,710
31	450	.....	265	860	.....	1,590	.....	3,710	.....	1,240	950	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 5 to Apr. 9; estimates based on gage heights corrected for backwater by means of two discharge measurements and climatic data.

Monthly discharge of Mattawamkeag River at Mattawamkeag, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 1,500 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	630	123	295	0.197	0.23	A.
November	1,470	450	985	.657	.73	A.
December	1,040	265	560	.373	.43	D.
January	1,040	145	515	.343	.40	D.
February	4,090	740	1,260	.840	.87	C.
March	4,380	1,040	2,400	1.60	1.84	C.
April	10,400	1,780	6,310	4.21	4.70	B.
May	16,400	3,000	8,500	5.67	6.54	A.
June	3,520	1,350	2,200	1.47	1.64	A.
July	7,480	1,140	3,070	2.05	2.36	A.
August	1,240	630	979	.653	.75	A.
September	1,710	450	757	.505	.56	A.
The year	16,400	123	2,320	1.55	21.05	

PISCATAQUIS RIVER NEAR FOXCROFT, MAINE.

LOCATION.—At Low's highway bridge, about halfway between Guilford and Foxcroft, Piscataquis County, three-fourths mile above the mouth of Black Stream and 3 miles below Mill Stream.

DRAINAGE AREA.—286 square miles.

RECORDS AVAILABLE.—August 17, 1902, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Staff attached to left abutment of bridge; read to tenths twice a day by A. F. D. Harlow.

DISCHARGE MEASUREMENTS.—At medium and high stages made from the bridge; at low stages made by wading either above or below the bridge.

CHANNEL AND CONTROL.—Practically permanent; banks are high and are overflowed only during extreme floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.8 feet at 4.30 p. m. February 26 (discharge, from extension of rating curve, 9,500 second-feet); minimum stage recorded, 1.3 feet at 7 a. m. October 6 (discharge, 12 second-feet).

WINTER FLOW.—Discharge relation affected by ice during some winters; open-water rating curve used during winter of 1914–15.

REGULATION.—The stream is used to develop power at several manufacturing plants above the station.

ACCURACY.—Discharge relation at low stages considerably affected by the irregular use of the water at the mills; during some winters it is also affected by ice; at times affected by backwater from log jams, although little log driving is now done on the river.

No discharge measurements were made during the year.

Daily discharge, in second-feet, of Piscataquis River near Foxcroft, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	19	51	90	164	1,210	5,080	470	7,510	267	100	148	406
2	19	51	90	180	674	4,520	502	6,130	90	180	220	374
3	19	58	90	180	674	3,970	536	3,880	90	180	220	374
4	19	58	318	180	674	3,610	374	3,100	64	180	220	346
5	19	36	244	318	604	3,020	502	2,420	51	267	220	318
6	15	24	244	318	604	2,490	536	1,620	64	267	267	267
7	19	24	148	406	604	2,220	502	1,510	58	220	267	267
8	22	51	136	292	536	1,720	858	1,300	58	220	638	267
9	19	40	136	604	536	1,720	1,110	1,210	58	3,520	638	318
10	19	19	136	674	980	1,780	1,720	1,160	58	2,640	746	318
11	24	19	100	938	980	1,780	1,720	938	58	1,460	746	180
12	24	19	58	1,020	980	1,720	4,700	746	58	980	674	180
13	22	19	58	782	709	1,110	7,110	709	51	709	437	180
14	22	19	72	782	604	1,020	3,350	536	58	437	437	148
15	22	19	100	980	898	1,020	2,150	502	58	374	709	148
16	22	100	136	470	1,210	782	2,080	502	72	536	1,510	148
17	28	638	136	346	1,720	858	2,560	470	136	536	1,110	318
18	22	437	72	782	1,670	858	3,020	470	136	569	782	292
19	40	292	58	858	1,510	709	3,020	470	100	569	569	292
20	81	180	64	2,020	1,300	604	3,020	374	58	536	502	318
21	90	64	51	2,280	1,210	437	3,100	374	58	470	374	267
22	123	123	58	2,280	858	569	2,860	374	58	267	374	1,300
23	90	51	164	1,960	746	604	2,220	318	58	164	604	1,110
24	90	51	164	1,210	437	604	1,560	346	374	200	2,220	746
25	58	51	58	1,210	858	502	1,670	346	374	164	1,720	437
26	90	51	180	1,300	7,810	1,020	2,020	346	374	164	1,350	502
27	123	51	220	1,300	7,610	980	2,150	346	318	136	1,110	569
28	72	22	220	1,350	5,940	746	1,620	346	244	136	858	569
29	58	17	148	1,460	.....	709	1,020	346	81	164	709	406
30	51	51	58	1,210	.....	536	2,280	346	81	164	638	292
31	51	.....	58	1,210	.....	536	.....	220	.....	164	536	.....

NOTE.—Discharge determined from a rating curve well defined between 20 and 4,000 second-feet, and verified by several discharge measurements made in October, 1915. Discharge relation possibly affected by ice at various times during January and February and by logs Sept. 22–30; open-water rating applied throughout the year.

Monthly discharge of Piscataquis River near Foxcroft, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 286 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	123	15	45	0.157	0.18	A.
November	638	17	90	.315	.35	A.
December	318	51	125	.437	.50	B.
January	2,280	164	938	3.28	3.78	C.
February	7,810	437	1,580	5.52	5.75	C.
March	5,080	437	1,540	5.38	6.20	B.
April	7,110	374	2,010	7.03	7.84	B.
May	7,510	220	1,270	4.44	5.12	B.
June	374	51	122	.426	.48	A.
July	3,520	100	538	1.88	2.17	A.
August	2,220	148	695	2.43	2.80	A.
September	1,300	148	389	1.36	1.52	A.
The year	7,810	15	774	2.71	36.69	

KENDUSKEAG STREAM NEAR BANGOR, MAINE.

LOCATION.—At highway bridge at Sixmile Falls, about 6 miles northwest of Bangor, Penobscot County, and 7 miles below Black Stream.

DRAINAGE AREA.—191 square miles. During freshets a part of the water of Souadabscook Stream finds its way through an artificial cut into Black Stream.

RECORDS AVAILABLE.—September 15, 1908, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain attached to the bridge; read twice a day by Fred Cort.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Practically permanent.

WINTER FLOW.—Discharge relation affected by ice.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.9 feet at 7.10 a. m. February 27 (discharge from extension of rating curve and correction for backwater from ice, 4,250 second-feet); minimum stage recorded, 1.3 feet October 11–16, inclusive (discharge, from extension of rating curve, 7 second-feet).

DIVERSIONS.—A number of years ago an artificial cut was made for log driving through a low divide between Souadabscook Stream and Black Stream, which enters the Kenduskeag about 7 miles above the gaging station. During high stages of the Sousdabscook part of its waters finds its way through the artificial cut into the Kenduskeag; at low stages of the Souadabscook all the flow continues down its own channel; Black Stream probably sends its waters only to the Kenduskeag.

ACCURACY.—Results considered good for ordinary stages, uncertain above 2,500 second-feet.

Discharge measurements of Kenduskeag Stream near Bangor, Maine, during the year ending Sept. 30, 1915.

[Made by W. G. Hill.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Feb. 3	[a] 3.00	57	May 21	2.70	181
May 2	8.25	3,080			

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Kenduskeag Stream near Bangor, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	45	30	.....	.....	431	2,390	128	119	166	262
2	12	45	25	.....	.....	366	3,680	110	119	146	211
3	12	34	34	.....	.....	398	3,140	119	137	188	211
4	12	34	45	.....	.....	398	2,260	119	119	188	177
5	12	34	51	.....	.....	431	2,020	119	119	166	177
6	12	34	57	.....	.....	465	1,500	102	137	146	166
7	12	34	57	895	.....	520	1,240	86	137	156	156
8	12	34	57	a 795	.....	557	1,210	71	177	156	146
9	12	34	57	a 655	.....	722	1,090	57	2,180	211	128
10	12	34	57	538	.....	795	870	64	3,180	211	119
11	7	25	45	a 501	.....	820	655	102	2,820	166	137
12	7	25	45	a 431	.....	950	596	110	1,370	223	137
13	7	30	45	a 398	.....	1,150	576	78	1,000	211	110
14	7	34	57	a 335	.....	1,470	414	110	655	249	78
15	7	45	71	a 305	.....	745	335	110	520	223	64
16	7	64	71	a 249	.....	655	305	110	448	262	110
17	12	71	.....	223	.....	845	290	86	465	557	102
18	18	71	.....	a 538	.....	795	276	128	414	501	94
19	25	94	.....	a 1,060	.....	845	236	177	335	398	71
20	25	102	.....	1,640	a 199	820	223	177	305	276	71
21	25	119	.....	a 1,370	199	678	199	211	236	276	51
22	34	94	.....	a 1,060	a 210	431	177	211	211	305	119
23	34	86	.....	a 845	a 221	414	156	166	188	414	156
24	34	78	.....	615	431	305	146	146	166	520	177
25	34	94	.....	.....	a 448	398	156	128	166	465	177
26	34	102	.....	.....	a 466	448	156	137	199	615	177
27	30	94	.....	.....	a 484	700	223	128	177	845	223
28	30	71	.....	.....	501	655	320	110	156	795	211
29	40	57	.....	.....	a 513	655	305	119	156	501	223
30	45	45	.....	.....	a 526	895	262	137	166	305	199
31	45	.....	.....	.....	538	.....	166	.....	156	262	.....

a Estimated.

NOTE.—Discharge determined from a rating curve well defined between 10 and 1,000 second-feet but uncertain above 2,500 second-feet. Discharge relation affected by ice Dec. 17 to Jan. 6 and Jan. 25 to Mar. 19; estimates based on gage heights corrected for backwater by means of one discharge measurement and climatic data.

Monthly discharge of Kenduskeag Stream near Bangor, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 191 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	45	7	20.2	0.106	0.12	B.
November	119	25	58.8	.308	.34	B.
December	71	25	47.2	.247	.28	C.
January	1,640	18	458	2.40	2.77	C.
February	4,250	57	608	3.18	3.31	D.
March	2,180	156	456	2.39	2.76	C.
April	1,470	305	659	3.45	3.85	B.
May	3,680	146	825	4.32	4.98	B.
June	211	57	122	.639	.71	B.
July	3,180	119	540	2.83	3.26	B.
August	845	146	326	1.71	1.97	B.
September	262	51	148	.775	.86	B.
The year	4,250	7	355	1.86	25.21	

ST. GEORGE RIVER BASIN.

ST. GEORGE RIVER AT UNION, MAINE.

LOCATION.—200 feet below tailrace of electric plant of Dirigo Power Co., half a mile below outlet of Sennebec Lake and a mile above Union, Knox County.

DRAINAGE AREA.—116 square miles.

RECORDS AVAILABLE.—December 11, 1913, to December 31, 1914.

GAGE.—Vertical staff gage bolted to tree on left bank; read once a day by G. E. Hills.

DISCHARGE MEASUREMENTS.—Made from a cable about 50 feet above gage.

CHANNEL AND CONTROL.—Rock and gravel; shifting.

REGULATION.—Dam of Dirigo Power Co. is about 1,000 feet above station; on the completion of the electric plant, now in course of construction, the regimen of the stream will be more or less affected by night storage.

ACCURACY.—Results considered good for period for which they are published.

Discharge measurements of St. George River near Union, Maine, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	G. C. Danforth	1.60	3.2	Apr. 23	W. G. Hill	3.64	157
Apr. 22	W. G. Hill	3.68	168	May 4	do	4.80	642
22	do	3.68	153	4	do	4.80	637
23	do	3.65	154	24	do	3.60	159

Daily discharge, in second-feet, of St. George River near Union, Maine, for the period Oct. 1 to Dec. 31, 1914.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	15	13	13	16	13	13	37
2	15	13	21	17	13	15	68
3	15	15	13	18	15	13	68
4	15	15	21	19	15	15	68
5	15	15	13	20	15	13	56
6	3	15	13	21	18	15	62
7	15	13	29	22	18	13	62
8	15	10	15	23	18	13	62
9	15	10	29	24	15	13	62
10	15	13	15	25	15	13	62
11	15	15	21	26	13	10	62
12	13	15	33	27	13	10	62
13	13	15	33	28	13	10	62
14	13	13	21	29	10	10	56
15	13	13	21	30	10	10	56
				31	10		56

NOTE.—Discharge determined from a rating well defined for period for which it was used. Discharge relation probably not affected by ice.

Monthly discharge of St. George River near Union, Maine, for the period Oct. 1 to Dec. 31, 1914.

[Drainage area, 116 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	18	3	13.8	0.119	0.14
November	15	10	13.0	.112	.12
December	68	13	41.0	.353	.41

KENNEBEC RIVER BASIN.

MOOSEHEAD LAKE AT EAST OUTLET, MAINE.

LOCATION.—At wharf at east outlet of lake, about 8 miles from Kineo, Somerset County.

DRAINAGE AREA.—1,240 square miles.

RECORDS AVAILABLE.—April 1, 1895, to September 30, 1915.

GAGE.—Staff at end of boat landing; two datums have been used at east outlet; the first (or original datum) is at elevation 1,011.30 feet above mean sea level and approximately 10 feet below sills of outlet gates; gage is read to this datum; the second, to which all gage readings published to and including 1911 have been referred, is 10 feet higher; that is, the zero is at the sill of the gates; as it is believed that low water may go below the sill of the gates (zero of second datum), gage heights since 1912 are published as read—that is, to original datum.

REGULATION.—The lake is regulated to a capacity of 23,735,000,000 cubic feet. The dam at the east outlet is controlled by 35 gates; the sills of 15 old gates are at gage height 10 feet (original datum) and the sills of 20 gates at gage height 8 feet (original datum). At extreme low stages the flow from the lake is controlled not by the gates but by a bar above the dam at an approximate gage height of 9 feet (original datum). The records show only fluctuations in the level of the lake and are used in the studies of regulation of the lake and in computing the natural flow of the Kennebec at The Forks station.

COOPERATION.—Record furnished by Hollingsworth & Whitney Co.

Daily gage height, in feet, of Moosehead Lake at east outlet, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	.....	12.0	.....	10.0	11.2	11.25	.....	.....	.....	.....	.....	14.7
2	12.4	12.0	.....	.....	.....	.....	11.75	.....	15.6	14.9	14.6	.....
3	.....	.....	11.8	.....	.....	11.2	.....	14.45	.....	.....	.....	.....
4	.....	.....	.....	11.5	.....	.....	.....	.....	15.6	.....	14.55	14.7
5	12.2	11.95	11.8	.....	11.2	11.3	11.7	14.9	.....	14.85	.....	.....
6	.....	.....	.....	11.45	.....	.....	.....	.....	.....	.....	14.35	14.55
7	12.15	.....	11.8	.....	.....	.....	11.75	15.05	15.5	.....	.....	.....
8	.....	.....	.....	11.4	11.2	11.45	.....	.....	.....	.....	.....	14.5
9	12.15	11.9	11.8	.....	.....	.....	11.8	.....	15.5	.....	14.3	.....
10	.....	.....	.....	.....	11.2	11.5	.....	15.6	.....	15.0	.....	14.5
11	.....	11.85	11.75	11.35	.....	.....	.....	.....	15.4	.....	14.3	.....
12	12.1	.....	.....	.....	11.2	11.55	12.0	15.55	.....	15.1	.....	.....
13	.....	11.8	.....	11.35	.....	.....	.....	.....	.....	.....	14.3	14.4
14	12.1	.....	11.75	.....	.....	.....	12.3	15.65	15.4	15.15	14.4	.....
15	.....	.....	.....	11.3	11.1	11.6	.....	.....	.....	.....	.....	14.35
16	11.95	11.8	11.7	.....	.....	.....	12.5	.....	15.35	15.2	.....	.....
17	.....	.....	.....	.....	11.1	11.65	.....	15.65	.....	.....	.....	14.3
18	.....	11.8	11.7	11.25	.....	.....	.....	.....	15.35	.....	14.5	.....
19	.....	.....	.....	.....	11.05	11.6	12.8	15.75	.....	15.2	.....	14.2
20	12.1	11.8	.....	11.2	.....	.....	.....	.....	.....	.....	14.5	.....
21	12.1	.....	11.65	.....	.....	.....	12.95	15.6	15.35	15.1	.....	.....
22	.....	.....	.....	11.3	11.0	11.65	.....	.....	.....	.....	.....	14.2
23	12.1	11.9	.....	.....	.....	.....	13.1	.....	.....	15.0	14.45	.....
24	.....	.....	11.6	.....	11.0	11.65	.....	15.7	15.25	.....	.....	14.3
25	.....	.....	.....	11.3	.....	.....	.....	.....	.....	.....	14.6	.....
26	12.1	11.9	11.6	.....	11.05	11.75	13.35	15.75	.....	14.9	.....	.....
27	.....	.....	.....	.....	.....	11.7	.....	.....	.....	.....	14.7	14.4
28	12.0	11.9	11.55	11.3	.....	.....	13.7	15.75	15.1	14.85	.....	.....
29	.....	.....	.....	11.3	.....	11.7	.....	.....	.....	.....	.....	14.15
30	11.95	11.8	.....	.....	.....	.....	14.0	.....	15.0	14.7	.....	.....
31	.....	.....	11.5	.....	.....	.....	.....	15.6	.....	.....	14.7	.....

KENNEBEC RIVER AT THE FORKS, MAINE.

LOCATION.—At wooden highway bridge about 2,000 feet above Dead River, Somerset County.

DRAINAGE AREA.—1,570 square miles.

RECORDS AVAILABLE.—September 28, 1901, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—Chain on bridge, a vertical staff on timber retaining wall on left bank 75 feet above bridge, and a Barrett & Lawrence water-stage recorder, used during summer months only, on left abutment; recorder, set to read the same as chain gage at low water, but gives lower readings than chain gage at high water. Chain gage read once a day by S. C. Durgin.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.7 feet at 7 a. m. May 7 (discharge, 9,520 second-feet); minimum stage recorded, 0.5 foot at 7 a. m. April 5 (discharge, 300 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Flow regulated by storage in Moosehead Lake. During May, June, July, and August the operation of Indian Pond for log driving causes a large diurnal fluctuation. Records of monthly discharge have been reduced to natural flow by adding or subtracting the amount of water stored in or released from Moosehead Lake.

Discharge measurements of Kennebec River at The Forks, Maine, during the year ending Sept. 30, 1915.

[Made by W. G. Hill.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 24	[a] 2.62	916
June 26	1.00	508

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Kennebec River at The Forks, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,360	1,180	1,070	1,240	770	915	770	1,330	2,740	2,680	2,640	2,410
2	1,360	1,180	1,070	1,160	770	915	700	1,200	2,720	2,550	2,700	2,540
3	1,360	1,180	1,160	1,070	770	915	635	2,460	2,710	2,470	2,740	2,460
4	1,360	1,100	1,160	1,070	840	915	370	4,150	2,790	2,630	2,660	2,160
5	1,290	1,090	1,160	1,430	880	915	300	4,690	2,500	2,550	3,160	1,970
6	1,260	1,090	1,240	1,240	840	880	320	4,320	2,450	2,610	3,060	1,910
7	1,260	1,090	1,240	1,200	840	880	320	4,500	2,510	3,160	3,120	1,850
8	1,260	1,090	1,240	1,160	770	915	345	4,690	2,550	4,070	2,440	1,780
9	1,260	1,090	1,110	1,030	770	770	450	3,980	2,550	1,940	2,500	1,740
10	1,220	1,090	1,110	990	770	700	510	3,810	2,560	1,790	3,200	1,530
11	1,220	1,050	1,110	990	840	635	700	3,610	2,580	1,450	4,260	1,740
12	1,180	1,050	1,070	990	840	600	1,430	5,080	2,490	2,690	1,720	1,970
13	1,180	1,050	1,110	990	770	600	3,320	4,870	2,480	3,860	1,160	1,970
14	1,180	1,050	1,160	915	840	570	2,880	4,850	2,600	4,320	980	2,300
15	1,130	1,050	1,160	840	840	570	2,080	4,450	2,770	4,050	910	1,890
16	1,090	1,070	1,160	770	840	635	2,020	4,110	2,530	4,040	1,050	2,000
17	1,150	1,070	1,160	700	915	700	2,200	3,760	2,490	3,650	1,000	2,550
18	1,250	770	1,240	770	915	770	2,270	3,670	2,840	3,890	885	2,540
19	1,280	570	1,240	950	840	950	2,140	3,850	1,820	3,730	790	2,190
20	1,550	450	1,240	915	950	990	2,460	3,920	2,350	3,870	1,440	2,120
21	1,490	840	1,240	915	840	1,070	2,200	3,380	1,830	3,960	1,660	2,150
22	1,260	990	1,240	915	840	1,070	1,910	2,490	2,600	3,750	1,630	2,530
23	1,260	1,110	1,160	915	840	1,070	1,740	2,950	2,780	3,480	1,380	1,310
24	1,260	1,110	1,070	880	840	880	990	3,160	2,010	3,150	1,040	830
25	1,260	1,070	950	840	990	770	1,160	2,600	2,400	3,300	910	680
26	1,260	1,070	1,240	840	1,030	510	1,430	2,940	3,180	3,430	845	600
27	1,210	1,070	1,280	840	950	395	1,740	3,720	2,570	3,490	805	610
28	1,180	1,160	1,330	770	915	570	1,240	3,700	2,510	3,670	700	1,000
29	1,110	1,160	1,380	770	.....	770	2,270	2,790	2,680	3,060	665	1,470
30	1,180	1,160	1,430	770	.....	770	2,200	2,930	2,710	3,230	635	2,070
31	1,180	.....	1,330	770	.....	770	.....	2,670	.....	2,810	1,590	.....

NOTE.—Discharge determined from a well-defined rating curve, a table of relation being used to convert discharge rating for chain gage to a corresponding rating for water-stage recorder. Discharge Nov. 16 to May 10 and Sept. 9–11 based on chain-gage readings; that for rest of year on water-stage recorder. Discharge relation affected by ice from Dec. 23 to Mar. 21; estimates based on gage heights corrected for backwater by means of one discharge measurement and climatic data.

Monthly discharge of Kennebec River at The Forks, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 1,570 square miles.]

Month.	Discharge in second-feet.			Corrected run-off (depth in inches on drainage area).
	Observed mean.	Corrected for storage.		
		Mean.	Per square mile.	
October	1,250	720	0.459	0.53
November	1,040	800	.510	.57
December	1,190	840	.535	.62
January	957	665	.424	.49
February	852	787	.501	.52
March	787	1,370	.873	1.01
April	1,440	4,230	2.69	3.00
May	3,570	5,470	3.48	4.01
June	2,540	1,800	1.15	1.28
July	3,200	2,780	1.77	2.04
August	1,750	1,810	1.15	1.33
September	1,830	1,160	.739	.82
The year	1,710	1,880	1.20	16.22

KENNEBEC RIVER AT WATERVILLE, MAINE.

LOCATION.—At dam and mill of Hollingsworth & Whitney Co. at Waterville, Kennebec County, 2 miles above Sebasticook River and about 3½ miles above Messalonskee Stream.

DRAINAGE AREA.—4,270 square miles.

RECORDS AVAILABLE.—March 22, 1892, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—Rod gages in pond above dam and in tailrace of mill.

DETERMINATION OF DISCHARGE.—Discharge computed from flow over dam, through the logway, and through wheels of the mill. When flow is less than about 3,500 second-feet all the water is used through the wheels.

WINTER FLOW.—Discharge relation not, as a rule, affected by ice; in most years winter flow passes through wheels of mill.

REGULATION.—Numerous power plants and much storage above station; results not corrected for storage.

COOPERATION.—Records obtained and estimates of daily discharge furnished by Hollingsworth & Whitney Co.

Daily discharge, in second-feet, of Kennebec River at Waterville, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,480	[a] 792	3,170	1,790	2,510	16,700	3,770	35,000	13,900	3,950	[a] 4,380	3,700
2	1,550	2,610	3,110	2,010	2,380	13,800	6,710	44,200	9,790	4,000	6,110	3,810
3	1,840	2,720	3,320	[a] 946	2,320	12,700	7,890	35,800	9,090	3,770	6,360	4,740
4	[a b] 1,980	2,170	3,620	1,830	2,220	11,900	[a] 4,740	31,700	4,160	[a] 972	6,620	4,640
5	2,120	2,440	3,670	1,950	1,870	9,840	7,100	30,100	4,260	2,910	6,480	[a] 2,050
6	1,810	2,540	[a] 2,460	1,690	1,950	8,980	7,240	30,200	[a] 1,950	5,250	5,930	3,900
7	2,240	1,560	3,900	1,520	[a] 1,900	[a] 6,910	7,240	26,400	4,940	5,440	5,490	3,000
8	1,990	[a] 1,070	3,230	3,120	3,140	8,500	6,850	23,800	4,200	5,220	[a] 5,320	3,490
9	1,960	2,370	2,980	3,230	2,700	7,290	8,690	26,100	4,230	13,900	5,770	2,970
10	1,600	2,220	2,340	[a] 1,510	2,820	3,130	15,900	24,700	4,060	39,700	5,760	2,880
11	[a] 890	1,920	1,910	3,240	2,940	7,100	[a] 17,500	25,900	4,110	[a] 11,100	16,200	3,170
12	2,050	1,920	1,670	2,590	2,490	4,550	41,700	24,000	4,090	9,300	14,600	[a] 1,230
13	1,910	1,390	[a] 825	2,360	2,480	4,040	28,800	18,600	[a] 2,080	10,800	8,810	3,670
14	1,960	2,030	1,750	2,400	[a] 955	[a] 767	30,600	9,090	5,000	10,500	6,360	3,480
15	1,960	[a] 503	1,880	2,350	2,800	4,800	28,300	18,900	4,090	10,700	[a] 5,370	3,450
16	1,700	2,190	2,020	2,320	3,010	4,370	21,300	17,600	3,990	10,700	5,590	2,580
17	1,660	3,830	3,310	[a] 585	3,500	3,010	19,900	17,700	4,220	10,100	5,610	2,860
18	[a] 840	4,840	1,160	2,680	3,470	3,780	24,500	15,100	4,090	[a] 8,770	5,630	3,180
19	2,410	3,730	2,560	2,600	3,530	3,020	26,000	14,100	4,340	10,600	3,920	[a] 998
20	2,420	2,230	[a] 547	4,430	3,460	3,060	24,800	13,800	[a] 3,290	9,720	3,980	4,190
21	3,610	1,840	2,330	5,260	[a] 834	[a] 1,740	20,900	14,100	5,120	9,590	4,030	3,650
22	4,840	[a] 1,440	2,320	4,980	3,600	6,370	22,300	14,600	5,950	8,370	[a] 641	3,760
23	3,650	2,670	1,790	4,090	2,690	5,660	17,400	18,300	5,120	7,500	4,700	6,240
24	2,710	2,700	1,130	[a] 1,340	2,650	6,190	14,800	16,100	3,710	6,830	4,440	5,400
25	[a] 1,440	1,870	686	3,430	2,580	8,070	13,200	15,900	4,010	[a] 3,900	7,720	4,120
26	2,550	652	1,650	3,650	20,700	9,320	16,800	14,600	3,350	6,840	7,820	[a] 963
27	3,290	2,730	[a] 1,160	2,520	31,600	14,000	22,600	17,500	[a] 692	6,510	6,470	3,910
28	2,810	2,600	1,810	2,620	[a] 17,800	[a] 6,020	23,800	12,800	5,140	5,580	5,370	2,360
29	2,010	[a] 1,340	2,120	2,710	.....	7,290	22,500	14,100	3,980	6,170	[a] 3,330	2,540
30	2,490	2,320	1,760	2,640	.....	6,840	21,400	[a] 9,430	3,940	4,800	3,800	1,900
31	2,170	.....	1,670	[a] 858	.....	5,600	.....	16,700	.....	5,320	3,220	.....

[a] Sunday. [b] Estimated.

Monthly discharge of Kennebec River at Waterville, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 4,270 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	4,840	840	2,190	0.513	0.59
November	4,840	503	2,170	.508	.57
December	3,900	547	2,190	.513	.59
January	5,260	585	2,560	.600	.69
February	31,600	834	4,820	1.13	1.18
March	16,700	767	6,950	1.63	1.88
April	41,700	3,770	17,800	4.17	4.65
May	44,200	9,090	20,900	4.90	5.65
June	13,900	692	4,700	1.10	1.23
July	39,700	972	8,350	1.96	2.26
August	16,200	641	6,010	1.41	1.63
September	6,240	963	3,290	.770	.86
The year	44,200	503	6,840	1.60	21.78

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

DEAD RIVER AT THE FORKS, MAINE.

LOCATION.—One-eighth mile above farmhouse of Jeremiah Durgin, 1½ miles west of The Forks, Somerset County.

DRAINAGE AREA.—878 square miles.

RECORDS AVAILABLE.—September 29, 1901, to August 15, 1907; March 16, 1910, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Staff bolted to large bowlder on left bank; read twice a day by Eva M. Forsythe.

DISCHARGE MEASUREMENTS.—Made from cable 700 feet above gage.

CHANNEL AND CONTROL.—Practically permanent.

WINTER FLOW.—Discharge relation affected by ice.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.35 feet at 2.30 p. m. February 27 (discharge relation affected by ice); maximum discharge during year, 8,920 second-feet at 3.30 p. m. April 26; minimum stage recorded during year, 0.6 foot, October 1, 2, 3, 4, and 5 (discharge, from extension of rating curve, 100 second-feet).

REGULATION.—A number of dams on lakes above; used solely for log driving.

ACCURACY.—Results considered good for open-water periods.

Discharge measurements of Dead River at The Forks, Maine, during the year ending Sept. 30, 1915.

[Made by W. G. Hill.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 25	[a] 3.14	386
June 27	1.00	366

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Dead River at The Forks, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	130	370	780	510	415	5,530	2,030	3,240	325	510	1,390	510
2	100	610	780	370	415	5,240	1,860	7,130	370	560	1,240	510
3	130	462	720	240	415	5,100	1,700	3,040	415	610	1,320	415
4	130	462	665	240	415	4,970	1,540	4,840	415	510	1,540	370
5	130	462	610	240	415	4,840	1,390	4,710	510	510	1,240	325
6	160	510	560	240	510	4,710	1,240	3,340	560	510	965	325
7	160	462	510	240	610	4,220	1,390	3,440	610	415	1,100	370
8	240	370	462	462	720	3,770	1,620	3,660	610	665	965	415
9	240	415	415	720	665	3,340	2,120	5,680	610	2,290	1,320	415
10	325	415	415	510	560	3,240	2,380	3,880	610	1,780	2,750	415
11	415	415	560	325	510	2,840	3,040	2,030	720	5,980	4,100	415
12	370	415	780	160	510	2,560	3,140	1,940	720	6,140	3,040	415
13	325	510	665	160	510	2,380	7,130	1,700	720	4,580	2,120	415
14	282	370	510	160	510	2,120	5,980	1,320	720	5,530	1,620	462
15	282	325	325	160	510	1,940	2,470	1,540	665	4,970	1,390	370
16	282	370	325	160	160	1,700	2,030	1,540	610	4,710	1,620	370
17	325	510	370	160	160	1,860	4,710	1,240	510	3,240	1,540	370
18	370	610	510	160	160	2,030	4,840	902	510	1,780	1,390	370
19	462	720	610	370	160	2,200	2,840	665	415	1,780	1,170	325
20	1,030	370	720	610	160	2,380	2,380	415	415	1,700	1,100	325
21	1,320	370	1,030	965	160	2,560	4,840	415	415	1,460	902	325
22	965	370	720	415	160	2,380	4,100	780	415	1,390	415	560
23	840	415	665	415	160	2,380	3,660	902	415	1,390	610	780
24	720	462	415	415	200	2,290	3,770	780	462	1,100	840	665
25	720	462	415	415	240	2,290	3,880	610	415	965	1,240	610
26	560	415	415	415	2,380	2,200	4,710	560	370	840	1,030	462
27	415	510	415	415	6,140	2,200	4,580	510	325	1,240	965	462
28	560	780	415	415	5,830	2,200	2,470	510	415	1,240	780	325
29	1,030	720	415	415	.....	2,200	2,750	510	415	1,100	610	325
30	370	840	560	415	.....	2,200	2,560	462	415	1,100	510	325
31	780	.....	665	415	.....	2,200	.....	370	.....	1,620	415	.....

NOTE.—Discharge determined from a fairly well-defined rating curve. Discharge relation affected by ice Dec. 5–10 and Dec. 24 to Apr. 9; estimates based on gage heights corrected for backwater by means of one discharge measurement and climatic data.

Monthly discharge of Dead River at The Forks, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 878 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	1,320	100	457	0.521	0.60	B.
November	840	325	483	.550	.61	B.
December	1,030	325	562	.640	.74	C.
January	965	160	365	.416	.48	D.
February	6,140	160	848	.966	1.00	D.
March	5,530	1,700	2,970	3.38	3.90	D.
April	7,130	1,240	3,100	3.53	3.94	C.
May	7,130	370	2,020	2.30	2.65	A.
June	720	325	503	.573	.64	A.
July	6,140	415	2,010	2.29	2.64	A.
August	4,100	415	1,330	1.51	1.74	A.
September	780	325	425	.484	.54	B.
The year	7,130	100	1,260	1.44	19.48	

SANDY RIVER NEAR FARMINGTON, MAINE.

LOCATION.—At Fairbanks highway bridge, 3 miles above Farmington, Franklin County.

DRAINAGE AREA.—270 square miles.

RECORDS AVAILABLE.—July 11, 1910, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain attached to bridge; read once a day by L. A. Daggett.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Sand and gravel; probably shifting.

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—No storage basins above station; the water-power dam at Phillips may affect flow at station slightly.

Discharge estimates withheld because of uncertainties regarding gage heights.

Discharge measurements of Sandy River near Farmington, Maine, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 27	W. G. Hill	[a] 9.66	2,230
Apr. 14	....do	5.52	1,540
May 13	Pierce and Danforth	3.70	380
June 29	W. G. Hill	2.51	95
July 14	....do	3.55	382

[a] Discharge relation affected by ice.

SEBASTICOOK RIVER AT PITTSFIELD, MAINE.

LOCATION.—At steel highway bridge just above Maine Central Railroad bridge in Pittsfield, Somerset County.

DRAINAGE AREA.—320 square miles.

RECORDS AVAILABLE.—July 27, 1908, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain attached to highway bridge; read twice a day by C. D. Morrill.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Practically permanent; banks high and rocky and not subject to overflow; stream confined between the abutments of bridge.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.2 feet at 6 a. m. and 6.15 p. m. May 4 (discharge, 3,400 second-feet); minimum stage recorded, 2.2 feet at 9 a. m. and 3.50 p. m. June 20 (water held back by mills; discharge, from extension of rating curve, 14 second-feet).

WINTER FLOW.—Discharge relation not affected by ice, as the rapid fall and the proximity of the power plant immediately above the station tend to keep the river open.

REGULATION.—About 800 feet upstream from the station is the dam of the American Woolen Co. (Pioneer Mills) and the Smith Textile Co., and about one-half mile farther upstream is the dam of the American Woolen Co's Waverly Mills; the storage of water at these dams causes diurnal fluctuation at the gage.

ACCURACY.—Owing to lack of information in regard to the stage at night, when the mills are shut down, table of daily discharge is not published. The tables show the discharge corresponding to gage heights at times of observation.

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

September 2, 1915: Gage height, 3.85 feet; discharge, 672 second-feet.

Twice-daily gage height, in feet, and discharge, in second-feet, of Sebasticook River at Pittsfield, Maine, for the year ending Sept. 30, 1915.

Day.	October.						November.					
	A. M.			P. M.			A. M.			P. M.		
	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.
1	6.00	2.6	97	5.10	2.6	97	9.00	2.3	30	5.00	2.3	30
2	8.00	2.5	71	5.00	2.5	71	6.30	2.4	50	4.00	2.4	50
3	7.00	2.5	71	6.00	2.5	71	6.20	2.4	50	4.00	2.4	50
4	9.30	2.5	71	4.20	2.5	71	10.00	3.1	270	4.00	2.4	50
5	5.55	2.5	71	4.05	2.7	125	6.00	2.4	50	4.00	2.4	50
6	6.00	2.6	97	5.00	2.7	125	12.30	3.1	270	5.00	2.7	125
7	6.00	2.6	97	5.00	2.7	125	6.00	3.1	270	4.00	2.4	50
8	8.00	2.7	125	5.00	2.7	125	12.00	2.3	30	4.00	2.3	30
9	7.00	2.7	125	5.00	2.7	125	6.00	2.9	193	4.00	2.9	193
10	7.00	2.6	97	5.00	2.4	50	7.00	2.9	193	4.30	2.7	125
11	10.00	2.4	50	5.00	2.4	50	6.10	2.7	125	4.00	2.7	125
12	6.10	2.4	50	5.00	2.4	50	12.00	2.7	125	4.00	2.7	125
13	6.00	2.4	50	4.30	2.4	50	12.00	2.9	193	4.00	2.7	125
14	6.00	2.3	30	4.20	2.3	30	7.00	2.5	71	3.00	2.4	50
15	6.00	2.3	30	4.30	2.3	30	10.00	2.4	50	4.00	2.4	50
16	6.10	2.3	30	5.00	2.3	30	6.40	3.1	270	3.00	3.1	270
17	6.00	2.3	30	5.00	2.3	30	6.20	2.4	50	4.00	3.1	270
18	10.00	2.3	30	5.00	2.3	30	9.00	2.5	71	4.00	2.4	50
19	6.00	2.4	50	4.00	2.4	50	8.00	3.0	230	3.00	3.0	230
20	6.00	2.4	50	5.00	2.4	50	9.00	3.1	270	4.00	3.1	270
21	6.10	2.3	30	5.00	2.3	30	6.40	3.1	270	4.00	3.1	270
22	6.05	2.3	30	4.00	2.3	30	10.00	3.0	230	4.00	3.0	230
23	6.00	2.3	30	4.10	2.4	50	6.30	3.1	270	4.00	3.1	270
24	6.00	2.4	50	4.00	2.4	50	8.00	3.0	230	4.00	3.1	270
25	9.00	2.4	50	4.00	2.4	50	8.30	3.1	270	3.45	3.1	270
26	6.00	2.4	50	4.00	2.5	71	10.00	2.5	71	4.00	2.5	71
27	6.15	2.5	71	4.00	2.5	71	8.00	3.0	230	4.00	3.1	270
28	6.15	2.5	71	4.00	2.5	71	8.00	2.4	50	4.00	2.4	50
29	6.00	2.5	71	4.30	2.4	50	10.00	2.4	50	4.00	2.4	50
30	6.00	2.4	50	4.30	2.4	50	7.00	2.7	125	3.10	2.7	125
31	6.05	2.4	50	4.00	2.3	30						

Day.	December.						January.					
	A. M.			P. M.			A. M.			P. M.		
	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.
1	8.00	2.6	97	4.00	2.9	193				1.00	2.3	30
2	8.00	2.7	125	4.00	2.7	125				1.30	2.4	50
3	8.00	2.8	158	3.30	2.8	158						
4	8.00	2.7	125	4.00	2.7	125						
5	8.00	2.6	97	4.00	2.4	50						
6	10.00	2.3	30	3.00	2.3	30				1.00	2.9	193
7	9.00	2.6	97	3.00	2.7	125				12.30	2.4	50
8	7.30	2.5	71	4.00	2.6	97				1.00	2.3	30
9	8.00	2.5	71	3.30	2.4	50				1.00	2.3	30
10	7.10	2.4	50	3.00	2.4	50				12.00	2.4	50
11	7.00	2.4	50	3.00	2.8	158				12.50	2.4	50
12	8.00	2.8	158	3.45	2.8	158	11.45	2.9	193			
13	9.00	2.3	30	4.00	2.3	30				12.30	2.4	50
14	7.00	2.4	50	3.00	2.6	97				1.50	2.4	30
15	8.00	2.4	50	3.00	2.5	71				1.30	2.7	125
16	8.00	2.4	50	1.00	2.3	30				1.10	2.7	125
17	12.00	2.3	30							12.00	2.3	30
18	9.00	2.3	30	4.00	2.4	50				1.40	2.3	30
19	8.00	2.4	50	4.00	2.4	50				12.45	2.7	125
20	9.00	2.4	50	3.00	2.4	50				1.00	2.3	30
21	9.10	2.4	50	3.20	2.4	50	8.00	2.7	125	12.30	2.3	30
22	7.30	2.3	30	4.00	2.3	30	8.20	2.9	193	12.45	3.0	230
23	12.00	2.4	50	4.00	2.4	50	8.00	3.1	270			
24	7.00	2.3	30	3.00	2.3	30	10.30	2.6	97			
25	7.00	2.3	30	3.30	2.3	30	8.00	3.1	270	12.30	2.9	193
26				1.00	2.5	71	7.45	3.1	270	12.40	2.9	193
27	10.00	2.6	97				7.00	3.1	270	12.15	2.7	125
28				1.00	2.5	71	8.00	2.9	193	1.00	2.7	125
29				12.30	2.5	71	9.00	2.6	97	12.15	2.6	97
30				1.00	2.3	30	8.00	2.8	158	4.00	2.7	125
31				1.00	2.3	30	12.00	2.5	71			

Twice-daily gage height, in feet, and discharge, in second-feet, of Sebasitcook River at Pittsfield, Maine, for the year ending Sept. 30, 1915—Continued.

Day.	February.						March.					
	A. M.			P. M.			A. M.			P. M.		
	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.
1	8.00	2.8	158	12.30	2.6	97	8.45	4.5	1,250	1.00	4.5	1,250
2	9.00	2.8	158	1.00	2.8	158	9.00	4.5	1,250	12.15	4.4	1,140
3	8.00	2.8	158	1.00	2.4	50	8.15	4.5	1,250	12.15	4.4	1,140
4	7.45	2.8	158	12.30	2.4	50	10.00	4.4	1,140	1.00	4.4	1,140
5	9.00	2.8	158	1.00	2.9	193	9.00	4.2	938	12.20	4.2	938
6	8.10	3.0	230	1.40	2.9	193	9.00	4.2	938	4.00	4.2	938
7	.....	.....	.....	1.30	2.7	125	.....	.....	.....	12.00	4.1	838
8	9.00	3.0	230	12.45	3.0	230	9.20	4.2	938	5.00	4.2	938
9	9.10	3.1	270	12.30	2.9	193	6.20	4.0	745	12.30	4.0	745
10	9.15	3.0	230	1.00	2.9	193	9.00	3.8	600	12.40	3.8	600
11	8.00	3.1	270	12.45	2.9	193	6.15	3.8	600	1.00	3.8	600
12	8.20	2.9	193	1.00	2.8	158	9.00	3.8	600	12.10	3.8	600
13	9.00	2.9	193	1.45	2.8	158	6.20	3.6	485	1.00	3.6	485
14	9.00	2.9	193	4.00	2.9	193	9.00	3.6	485	4.00	3.6	485
15	8.00	3.1	270	1.00	2.8	158	6.00	3.5	438	1.00	3.5	438
16	8.40	3.1	270	1.00	3.0	230	6.40	3.5	438	1.00	3.5	438
17	8.15	3.1	270	12.40	3.0	230	12.10	3.3	352	4.00	3.3	352
18	9.00	3.1	270	1.00	3.1	270	7.30	3.2	310	12.15	3.2	310
19	8.00	3.1	270	12.40	2.9	193	9.00	3.4	395	1.00	3.4	395
20	.....	.....	.....	2.10	2.8	158	10.10	3.3	352	5.00	3.2	310
21	.....	.....	.....	12.00	3.0	230	10.15	3.2	310	4.00	3.2	310
22	9.15	3.1	270	12.45	3.0	230	9.00	3.4	395	12.40	3.4	395
23	9.00	3.0	230	12.15	2.9	193	6.30	3.3	352	1.00	3.3	352
24	8.00	2.9	193	12.40	2.3	30	6.10	3.3	352	12.30	3.4	395
25	9.00	3.2	310	12.45	3.9	668	6.00	3.4	395	12.10	3.4	395
26	8.40	4.0	745	12.45	4.4	1,140	6.40	3.2	310	12.00	3.3	352
27	7.40	4.4	1,140	1.35	4.4	1,140	9.00	3.4	395	5.10	3.4	395
28	9.00	4.5	1,250	1.00	4.5	1,250	.....	.....	.....	4.00	3.4	395
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.30	3.4	395
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.40	3.5	438
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.10	3.5	438

Day.	April.						May.					
	A. M.			P. M.			A. M.			P. M.		
	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.
1	6.30	3.5	438	12.15	3.5	438	6.00	4.5	1,250	4.00	5.3	2,200
2	7.00	3.5	438	1.00	3.6	485	8.20	5.5	2,460	4.00	5.7	2,720
3	6.15	3.6	485	4.00	3.6	485	6.15	5.9	2,990	6.10	6.0	3,130
4	.....	.....	.....	4.00	3.5	438	6.00	6.2	3,400	6.15	6.2	3,400
5	6.20	3.5	438	4.00	3.5	438	6.10	6.0	3,130	6.40	5.8	2,860
6	8.00	3.6	485	1.00	3.7	540	6.15	5.8	2,860	6.00	5.7	2,720
7	7.00	3.7	540	1.15	3.7	540	7.10	5.6	2,590	6.40	5.6	2,590
8	6.10	3.7	540	3.00	3.7	540	6.00	5.6	2,590	6.00	5.5	2,460
9	6.30	3.9	668	12.15	3.9	668	9.00	5.5	2,460	.....	.....	.....
10	6.00	4.3	1,040	4.00	4.3	1,040	6.20	4.4	1,140	6.00	5.2	2,080
11	.....	.....	.....	12.00	4.3	1,040	6.00	4.8	1,590	6.10	4.8	1,590
12	6.20	4.5	1,250	6.00	4.7	1,470	5.45	4.7	1,470	6.00	4.4	1,140
13	12.00	4.9	1,710	4.00	4.9	1,710	6.15	4.4	1,140	6.00	4.3	1,040
14	7.00	4.9	1,710	4.10	4.9	1,710	6.10	4.1	838	6.00	4.1	838
15	6.00	4.8	1,590	1.00	4.8	1,590	6.15	4.0	745	1.00	4.0	745
16	6.25	4.8	1,590	1.00	4.8	1,590	.....	.....	.....	12.00	4.0	745
17	6.30	4.5	1,250	4.00	4.5	1,250	6.15	3.9	668	6.00	3.8	600
18	.....	.....	.....	12.00	4.5	1,250	6.00	3.7	540	6.15	3.7	540
19	6.10	4.4	1,140	1.00	4.4	1,140	6.10	3.7	540	5.40	3.6	485
20	a12.40	4.4	1,140	4.00	4.3	1,040	6.10	3.8	600	5.00	3.8	600
21	6.15	4.3	1,040	1.00	4.1	838	6.00	3.7	540	6.20	3.7	540
22	6.00	4.1	838	4.00	4.1	838	6.00	3.6	485	6.10	3.7	540
23	12.00	4.0	745	6.00	4.0	745	.....	.....	.....	12.00	3.5	438
24	.....	.....	.....	12.00	4.0	745	6.00	3.4	395	6.20	3.4	395
25	.....	.....	.....	12.00	3.9	668	6.10	3.4	395	6.10	3.3	352
26	7.00	3.8	600	6.10	3.8	600	6.00	3.3	352	6.15	3.1	270
27	6.20	3.8	600	6.00	3.9	668	5.40	3.1	270	6.30	3.1	270
28	6.20	3.9	668	1.10	3.8	600	6.10	3.3	352	6.00	3.3	352
29	6.00	3.8	600	6.00	3.8	600	6.15	3.1	270	4.00	2.9	193
30	1.00	3.8	600	6.00	4.0	745	.....	.....	.....	12.00	2.9	193
31	.....	.....	.....	.....	.....	.....	6.20	3.1	270	6.10	3.1	270

a P. M.

Twice-daily gage height, in feet, and discharge, in second-feet, of Sebasticook River at Pittsfield, Maine, for the year ending Sept. 30, 1915—Continued.

Day.	June.						July.					
	A. M.			P. M.			A. M.			P. M.		
	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.
1	5.30	3.0	230	6.00	3.0	230	6.10	3.0	230	6.00	2.8	158
2	5.00	3.0	230	5.10	3.1	270	7.15	2.9	193	6.00	3.0	230
3	6.30	3.0	230	6.00	3.0	230	9.00	2.5	71	6.00	2.5	71
4	5.40	3.1	270	6.10	3.0	230	8.00	2.4	50	4.10	2.4	50
5	7.00	2.9	193	6.40	2.9	193	6.00	2.4	50	5.00	2.4	50
6	8.00	2.9	193	7.10	2.9	193	6.40	2.9	193	6.00	2.9	193
7	6.00	3.1	270	3.00	3.0	230	5.30	2.8	158	4.00	2.8	158
8	6.10	3.0	230	6.30	2.9	193	7.00	3.0	230	6.10	3.0	230
9	5.30	2.9	193	6.00	3.0	230	6.00	3.3	352	5.30	3.3	352
10	8.00	2.9	193	6.15	2.9	193	6.40	3.2	310	6.00	3.0	230
11	9.00	2.9	193	5.40	3.0	230	.....	.....	.....	12.00	3.0	230
12	8.30	3.0	230	4.00	3.0	230	6.40	3.5	438	6.10	3.5	438
13	12.00	2.8	158	6.00	2.9	193	6.55	3.5	438	7.00	3.6	485
14	6.10	2.9	193	6.15	3.0	230	8.00	3.6	485	6.10	3.6	485
15	5.40	3.0	230	6.00	3.0	230	7.00	3.6	485	6.10	3.4	395
16	5.45	3.1	270	6.00	3.1	270	8.00	3.5	438	7.00	3.4	395
17	6.00	3.0	230	6.10	3.0	230	8.00	3.4	395	3.00	3.5	438
18	6.00	2.9	193	6.15	3.0	230	9.00	3.4	395	4.00	3.4	395
19	5.40	3.0	230	6.00	2.9	193	12.00	3.5	438	6.10	3.5	438
20	9.00	2.2	14	3.50	2.2	14	7.00	3.6	485	6.00	3.6	485
21	7.00	2.9	193	6.30	2.9	193	7.40	3.6	485	6.15	3.4	395
22	5.30	3.0	230	6.10	3.1	270	8.00	3.5	438	6.00	3.4	395
23	6.10	3.0	230	6.00	3.0	230	8.00	3.5	438	6.10	3.5	438
24	6.00	2.8	158	6.10	2.9	193	6.10	3.4	395	4.00	3.1	270
25	7.30	2.9	193	7.00	2.8	158	8.00	3.3	352	4.00	3.4	395
26	6.00	2.8	158	5.40	2.7	125	8.00	3.5	438	6.20	3.5	438
27	8.00	2.4	50	5.00	2.4	50	9.00	3.5	438	6.15	3.5	438
28	6.10	2.9	193	6.00	2.9	193	9.00	3.5	438	6.30	3.6	485
29	5.40	2.9	193	6.10	2.7	125	7.10	3.4	395	7.00	3.1	270
30	5.55	3.0	230	6.00	2.7	125	6.30	3.0	230	6.00	3.0	230
31	.....	.....	.....	.....	.....	.....	9.00	3.0	230	6.40	2.7	215

Day.	August.						September.					
	A. M.			P. M.			A. M.			P. M.		
	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.	Time.	Gage height.	Discharge.
1	.....	.....	.....	12.00	2.6	97	6.00	4.0	745	6.20	4.0	745
2	8.00	2.9	193	6.10	3.0	230	8.00	3.9	668	6.00	3.9	668
3	6.40	3.1	270	7.00	3.1	270	6.40	3.7	540	6.00	3.7	540
4	8.00	3.1	270	6.00	3.2	310	7.10	3.7	540	4.00	3.6	485
5	7.10	3.2	310	6.15	3.2	310	7.00	3.5	438	4.00	3.4	395
6	9.00	3.1	270	6.40	3.1	270	6.00	3.7	540	6.10	3.7	540
7	6.00	3.2	310	4.00	3.2	310	6.00	3.6	485	6.10	3.6	485
8	9.00	2.8	158	4.00	2.8	158	9.00	3.7	540	6.00	3.7	540
9	6.00	3.1	270	6.05	3.2	310	8.00	3.5	438	6.20	3.5	438
10	6.00	3.2	310	6.10	3.2	310	6.40	3.3	352	6.10	3.1	270
11	6.00	3.1	270	6.30	3.1	270	6.20	3.0	230	6.10	2.8	158
12	6.00	3.1	270	6.00	3.1	270	9.00	2.6	97	4.00	2.6	97
13	6.00	3.1	270	7.00	3.2	310	7.00	3.1	270	6.10	3.4	395
14	9.00	3.2	310	5.00	3.2	310	6.00	3.3	352	6.10	3.1	270
15	9.00	3.5	438	6.00	3.5	438	6.25	3.1	270	5.40	3.1	270
16	6.00	3.8	600	7.00	3.8	600	6.10	3.3	352	6.20	3.3	352
17	6.00	3.8	600	6.00	3.8	600	6.35	3.2	310	5.40	3.1	270
18	6.15	3.8	600	6.10	3.7	540	8.00	3.1	270	4.00	2.9	193
19	6.00	3.7	540	7.00	3.7	540	9.00	2.7	125	4.00	2.7	125
20	6.10	3.8	600	6.00	3.8	600	6.30	3.0	230	6.00	3.1	270
21	6.00	3.8	600	5.40	3.4	395	6.10	3.1	270	6.15	3.1	270
22	9.00	3.6	485	5.30	3.6	485	6.30	3.1	270	6.10	3.1	270
23	6.10	3.8	600	6.40	3.8	600	8.00	3.1	270	6.10	3.1	270
24	6.00	3.8	600	6.15	3.8	600	6.00	3.0	230	5.40	3.0	230
25	6.00	4.0	745	6.10	4.0	745	6.10	3.0	230	4.00	2.8	158
26	7.00	4.2	938	6.15	4.4	1,140	12.00	2.6	97	4.00	2.6	97
27	6.40	4.5	1,250	6.00	4.5	1,250	6.00	2.8	158	4.15	3.1	270
28	6.00	4.5	1,250	5.30	4.5	1,250	6.10	3.1	270	6.20	3.0	230
29	9.00	4.5	1,250	4.00	4.4	1,140	6.30	3.0	230	6.00	3.0	230
30	6.00	4.3	1,040	4.00	4.2	938	7.00	3.0	230	6.10	2.9	193
31	8.00	4.1	838	6.00	4.1	838	.....	.....	.....	.....	.....	.....

NOTE.—Discharge determined from a rating curve well defined between 70 and 4,000 second-feet.

Monthly discharge of Sebasticook River at Pittsfield, Maine, for the years ending Sept. 30, 1914–15.

[Drainage area, 320 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
1913–14.					
October	600	71	256	0.800	0.92
November	668	395	504	1.58	1.76
December	668	230	409	1.28	1.48
January	395	97	272	.850	.98
February	438	125	321	1.00	1.04
March	668	193	470	1.47	1.70
April	6,380	668	2,720	8.50	9.48
May	2,590	193	1,070	3.33	3.84
June	250	50	133	.416	.46
July	193	50	109	.340	.39
August	71	30	52	.162	.19
September	60	30	44	.137	.15
The year	6,380	30	528	1.65	22.39
1914–15.					
October	60	22	35	0.109	0.13
November	111	22	66	.206	.23
December	71	22	38	.119	.14
January	230	14	93	.291	.34
February	1,140	71	303	.947	1.02
March	1,200	310	589	1.84	2.12
April	1,710	438	878	2.74	3.06
May	3,400	193	1,250	3.91	4.51
June	270	14	198	.619	.69
July	485	50	324	1.01	1.16
August	1,250	97	532	1.66	1.91
September	745	97	329	1.03	1.15
The year	3,400	14	388	1.21	16.46

NOTE.—Because of the effect of power regulation, results of mean daily discharge for any individual day may be considerably in error, and therefore no quantities of daily discharge are published for this station. Such errors, however, compensate in large measure, so that quantities of monthly mean discharge given in the above table are believed to be of a fair degree of accuracy.

COBBOSSEECONTEE STREAM AT GARDINER, MAINE.

LOCATION.—At dam of Gardiner Water Power Co. in Gardiner, Kennebec County.

DRAINAGE AREA.—220 square miles.

RECORDS AVAILABLE.—June 16, 1890, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—One in pond above dam and one in tailrace of power house.

DETERMINATION OF FLOW.—Discharge determined by considering (1) flow over dam; usually nothing except for a short time in the spring; (2) flow through two gates; and (3) flow through a 39-inch Victor wheel installed in 1907. The computations of daily discharge are made by the engineers of the S. D. Warren Co., from tables of discharge based on careful experiments.

WINTER FLOW.—Discharge relation not affected by ice.

REGULATION.—The many lakes in the basin are controlled by storage dams and the streams afford a remarkable example of the regularity of flow that can be obtained with proper storage. Except for a short time in the spring no water is wasted. Results not corrected for storage.

COOPERATION.—Station maintained by S. D. Warren Co., which furnished the records of daily discharge for publication.

Daily discharge, in second-feet, of Cobbosseecontee Stream at Gardiner, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	180	a 0	150	150	210	650	250	250	140	180	a 0	250
2	180	180	150	150	210	360	250	a 0	200	180	250	250
3	180	180	150	a 0	210	280	250	250	200	180	250	250
4	a 0	180	150	150	210	280	a 0	250	200	a 100	250	250
5	180	180	150	150	210	280	250	250	200	0	250	a 0
6	180	180	a 0	150	210	280	250	250	a 0	180	250	250
7	180	180	150	150	a 0	a 0	250	250	200	180	250	250
8	180	a 0	150	150	210	280	250	250	200	370	a 0	250
9	180	180	150	150	210	280	250	a 0	200	640	250	250
10	180	180	150	a 0	210	280	250	250	200	700	250	250
11	a 0	180	150	150	210	280	a 0	250	200	a 550	250	250
12	180	180	150	150	210	280	250	250	200	360	250	a 0
13	180	180	a 0	150	210	280	250	250	a 0	250	250	250
14	180	180	150	150	a 0	a 0	250	250	200	250	250	250
15	180	a 0	150	150	210	250	250	250	200	250	a 0	250
16	180	150	150	150	250	250	250	a 0	200	250	250	250
17	180	150	150	a 0	250	250	250	200	200	250	250	250
18	a 0	150	150	150	250	250	a 0	200	200	a 30	250	250
19	180	150	150	150	250	250	250	200	200	250	250	a 0
20	180	150	a 0	220	250	250	250	200	a 0	250	250	250
21	180	150	150	220	a 0	a 0	250	200	200	250	250	250
22	180	a 0	150	220	250	250	250	200	200	250	a 0	250
23	180	150	150	220	250	250	250	a 0	200	250	250	250
24	180	150	150	a 0	250	250	250	200	200	250	250	250
25	a 0	150	150	220	250	250	a 0	200	200	a 0	250	250
26	180	0	150	220	900	250	250	200	200	250	250	a 0
27	180	150	a 0	220	950	250	250	200	a 0	250	250	250
28	180	150	150	220	a 850	a 0	250	200	180	250	250	250
29	180	0	150	220	.....	250	250	200	180	250	a 0	250
30	180	150	150	220	.....	250	250	a 0	180	250	250	250
31	180	.....	150	a 0	.....	250	.....	200	.....	250	250	.....

a Sunday.

Monthly discharge of Cobbosseecontee Stream at Gardiner, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 220 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	180	0	157	0.714	0.82
November	180	0	132	.600	.67
December	150	0	131	.595	.69
January	220	0	148	.673	.78
February	950	0	274	1.25	1.30
March	650	0	244	1.11	1.28
April	250	0	217	.986	1.10
May	250	0	183	.832	.96
June	200	0	169	.768	.86
July	700	0	255	1.16	1.34
August	250	0	210	.955	1.10
September	250	0	217	.986	1.10
The year	950	0	194	.882	12.00

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches, shown by the table, do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

ANDROSCOGGIN RIVER BASIN.

ANDROSCOGGIN RIVER AT ERROL DAM, N. H.

LOCATION.—At Errol dam, 1 mile above Errol, Coos County.

DRAINAGE AREA.—1,095 square miles.

RECORDS AVAILABLE.—January 1, 1905, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Movable rod gage; readings taken daily from sill of deep gate No. 6; elevation of zero of gage or sill of gate, 1,231.3 feet above mean sea level.

DISCHARGE.—Computed from discharge through 14 gates in the dam by means of coefficients determined from a few discharge measurements.[a]

WINTER FLOW.—Discharge relation little affected by ice.

REGULATION.—Errol dam controls the storage of Umbagog Lake, the lower of the Rangeley series of lakes, comprising the principal storage of Androscoggin River and amounting to nearly 20 billion cubic feet, and also a recently developed storage site on Magalloway River created by the Aziscohos Dam, which amounts to about 9.6 billion cubic feet, thus making the total storage about 29.6 billion cubic feet. Errol Dam is about 5 miles below outlet of Umbagog Lake and about 3.5 miles below mouth of Magalloway River, thus making this stream one of the feeders of Umbagog Lake. Results not corrected for storage.

COOPERATION.—Records obtained and computations of daily discharge made under direction of Walter H. Sawyer, agent for Union Water Power Co., Lewiston, Me.

Daily discharge, in second-feet, of Androscoggin River at Errol dam, N. H., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,640	1,550	1,640	1,730	1,540	1,520	977	1,360	1,290	691	995	1,190
2	1,670	1,500	1,420	1,660	1,570	1,420	962	1,380	1,360	1,280	962	1,280
3	1,690	1,370	1,260	1,700	1,620	1,130	944	1,380	1,010	1,160	783	1,370
4	1,690	1,480	1,290	1,720	1,600	1,110	944	1,380	1,000	1,130	702	1,470
5	1,810	1,580	1,300	1,690	1,580	1,300	944	1,370	983	1,130	718	1,420
6	1,840	1,600	1,360	1,640	1,560	1,250	944	967	983	1,080	1,010	1,350
7	1,840	1,600	1,410	1,500	1,550	1,220	911	551	1,350	1,190	1,110	1,450
8	1,780	1,610	1,440	1,520	1,540	1,220	928	1,230	1,330	806	1,100	1,570
9	1,700	1,610	1,490	1,610	1,530	1,230	944	1,320	1,370	123	521	1,550
10	1,700	1,660	1,490	1,620	1,510	1,320	977	1,140	1,400	130	240	1,520
11	1,790	1,750	1,470	1,560	1,500	1,330	640	481	1,250	337	246	1,480
12	1,800	1,760	1,450	1,590	1,480	1,380	245	563	1,280	646	252	1,600
13	1,760	1,770	1,560	1,540	1,510	1,330	[b] 80	1,160	1,310	1,180	258	1,620
14	1,740	1,860	1,620	1,500	1,500	1,380	[b] 80	1,240	1,390	721	467	1,510
15	1,680	1,840	1,620	1,500	1,520	1,360	730	839	1,350	570	840	1,560
16	1,660	1,480	1,600	1,500	1,400	1,330	898	603	1,380	1,100	1,050	1,640
17	1,430	1,340	1,640	1,530	1,390	1,270	935	942	1,390	479	1,010	1,630
18	1,340	1,750	1,650	1,500	1,420	1,240	998	963	1,250	[b] 80	978	1,650
19	1,610	1,880	1,620	1,390	1,500	1,220	1,030	1,140	1,240	862	1,020	1,620
20	1,500	1,760	1,590	1,460	1,480	1,160	934	1,120	1,280	796	1,140	1,670
21	1,590	1,720	1,560	1,480	1,460	1,150	305	1,100	1,410	1,190	1,220	1,220
22	1,560	1,700	1,520	1,490	1,410	1,130	1,080	1,180	1,490	1,090	1,240	951
23	1,650	1,690	1,500	1,490	1,360	1,130	1,170	1,060	1,520	847	843	1,640
24	1,640	1,680	1,520	1,490	1,280	1,130	1,170	1,120	1,530	958	850	1,560
25	1,630	1,690	1,560	1,470	918	1,130	1,180	1,280	1,530	944	968	1,520
26	1,680	1,580	1,540	1,380	791	1,110	1,230	1,270	1,510	1,050	872	1,100
27	1,710	1,470	1,560	1,440	840	1,090	1,300	1,240	1,410	527	869	1,140
28	1,740	1,470	1,590	1,510	1,250	1,080	1,340	1,210	1,410	1,200	860	1,270
29	1,700	1,620	1,560	1,540	.....	1,080	1,340	1,200	996	996	850	1,490
30	1,640	1,590	1,490	1,550	.....	1,060	1,340	1,160	1,470	334	992	1,540
31	1,560	.....	1,480	1,540	.....	1,020	.....	1,130	.....	411	1,060	.....

[a] See U. S. Geol. Survey Water-Supply Paper 321, p. 61.

[b] Estimated; flow due to leakage only.

Monthly discharge of Androscoggin River at Errol dam, N. H., for the year ending Sept. 30, 1915.

[Drainage area, 1,095 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,840	1,340	1,670	1.52	1.75
November	1,880	1,340	1,630	1.49	1.66
December	1,650	1,260	1,510	1.38	1.59
January	1,730	1,380	1,540	1.41	1.63
February	1,620	840	1,410	1.29	1.34
March	1,520	1,020	1,220	1.11	1.28
April	1,340	[a] 80	917	.838	.94
May	1,380	481	1,100	1.00	1.15
June	1,530	983	1,320	1.20	1.34
July	1,280	80	808	.738	.85
August	1,240	240	840	.767	.88
September	1,670	951	1,450	1.32	1.47
The year	1,880	[a] 80	1,280	1.17	15.88

[a] Estimated; flow due to leakage only.

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches, shown by the table, do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

ANDROSCOGGIN RIVER AT BERLIN, N. H.

LOCATION.—At the upper or sawmill dam of the Berlin Mills Co., at Berlin, Coos County.

DRAINAGE AREA.—1,350 square miles.

RECORDS AVAILABLE.—October 1, 1913, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—Fixed gages are maintained in the river above the forebay racks and in the tailrace immediately below the outlet of the wheels; these gages are referred to the same datum, and the differences in the readings give the head acting on the wheels; a gage is also attached to each wheel gate, from which the wheel-gate opening can be ascertained.

DETERMINATION OF DISCHARGE.—Discharge computed from curves prepared from Holyoke tests of the wheel runners, using the head and gate openings as ascertained from the gages. Quantity of water wasted over the dam is computed by the Francis formula for discharge over weirs.

WINTER FLOW.—Discharge relation not affected by ice.

REGULATION.—Under an agreement between the power users on Androscoggin River, the flow at Berlin, N. H., is maintained at a minimum of 1,550 second-feet and at such a higher point above 1,550 second-feet as is consistent with the constant maintenance of that quantity. The actual fine regulation of the river is carried on at Pontocook dam, N. H., above which is a pond containing about a day's supply. The primary regulation of the river is made at Errol, N. H., about 30 miles above Berlin.

COOPERATION.—The readings are kept under the direction of Mr. John H. Wilson of the Berlin Mills Co. and discharge record is furnished for publication by Mr. Walter H. Sawyer, agent for Union Water Power Co.

Daily discharge, in second-feet, of Androscoggin River at Berlin, N. H., for the years ending Sept. 30, 1914–15.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	1,600	1,720	1,720	1,820	1,820	1,640	1,760	4,180	1,900	1,920	1,750	1,720
2	1,650	1,720	1,690	1,800	1,820	2,300	1,960	3,850	1,780	2,090	1,780	1,750
3	2,140	1,700	1,710	1,850	1,800	2,600	1,850	3,500	1,800	1,990	1,770	1,760
4	1,770	1,720	1,820	2,020	1,770	2,150	1,650	4,100	1,840	1,880	1,770	1,750
5	1,730	1,680	1,850	1,970	1,780	2,180	1,680	5,400	1,870	1,900	1,750	1,750
6	1,730	1,690	1,820	1,820	1,770	2,350	1,660	6,000	1,830	1,780	1,700	1,750
7	1,710	1,670	1,880	1,840	1,740	2,300	1,500	6,500	1,830	1,820	1,800	1,750
8	1,650	a1,700	2,100	1,850	1,740	2,190	1,520	6,800	1,780	1,800	1,700	1,750
9	1,620	1,730	2,100	1,810	1,800	2,090	2,180	7,350	1,750	1,790	1,700	1,750
10	1,620	4,770	2,040	1,820	1,740	1,970	2,360	14,300	1,730	1,700	1,680	1,750
11	1,630	1,970	2,110	1,770	1,750	1,950	2,370	14,150	1,760	1,800	1,680	1,750
12	1,660	1,920	2,170	1,700	1,740	2,000	1,860	12,700	1,830	2,120	1,700	1,750
13	1,650	1,860	2,350	1,700	1,770	1,980	2,300	10,300	1,840	2,050	1,650	1,750
14	1,700	1,760	2,150	1,710	1,770	1,940	2,300	8,300	1,840	1,740	1,700	1,750
15	1,690	1,630	2,060	1,770	1,770	1,880	2,000	5,600	1,750	a1,700	1,850	1,710
16	1,750	1,780	1,970	1,850	1,790	1,800	1,970	4,170	1,720	1,670	1,850	1,720
17	1,740	1,780	1,950	1,900	1,610	1,780	1,800	3,170	1,720	1,700	1,720	1,720
18	1,730	1,750	1,940	1,920	1,640	1,730	1,920	2,900	1,760	1,710	1,750	1,740
19	1,740	1,760	1,950	1,860	1,640	1,680	2,700	2,800	1,790	1,620	1,670	1,750
20	1,890	1,790	1,900	1,880	1,600	1,670	9,000	2,600	1,910	1,720	1,800	1,750
21	2,420	1,760	1,950	1,900	1,580	1,680	10,500	2,600	1,990	1,710	1,750	1,740
22	1,940	1,640	1,910	1,810	1,650	1,680	7,600	2,500	1,940	1,710	1,750	1,750
23	1,670	1,700	1,860	1,690	1,750	1,680	4,550	2,500	1,820	1,750	1,730	1,830
24	1,710	1,600	1,880	1,780	1,670	1,700	3,900	2,500	1,800	1,750	1,750	1,790
25	1,600	1,720	1,960	1,850	1,550	1,750	4,200	2,300	1,760	1,750	1,740	1,750
26	1,800	1,750	1,890	1,880	1,550	1,820	3,800	2,100	1,700	1,750	1,740	1,780
27	2,050	1,750	1,780	1,890	1,560	2,030	3,400	1,700	1,820	1,750	1,750	1,880
28	1,870	1,650	1,750	1,880	1,570	2,110	3,200	1,600	1,860	1,760	1,760	1,740
29	1,780	1,750	1,720	1,870	.....	2,040	4,200	1,460	a1,840	1,760	1,750	1,600
30	1,750	1,680	1,780	1,860	.....	1,890	4,900	1,800	1,820	1,740	1,750	1,760
31	1,850	.....	1,850	1,810	.....	1,780	.....	1,800	.....	1,760	1,700	.....
1914–15.												
1	1,750	1,690	1,750	1,550	1,550	1,700	1,100	3,850	1,530	1,670	1,550	1,560
2	1,750	1,660	1,790	1,550	1,520	2,000	1,090	3,000	1,530	1,560	1,570	1,570
3	1,750	1,560	1,790	1,550	1,500	1,750	1,070	2,720	1,540	1,630	1,570	1,550
4	1,750	1,560	1,770	1,560	1,530	1,600	1,050	2,800	1,610	1,600	1,550	1,520
5	1,750	1,580	1,760	1,560	1,540	1,620	1,080	2,700	1,520	1,580	1,530	1,400
6	1,750	1,600	1,750	1,560	1,540	1,590	1,090	2,460	1,550	1,550	1,540	1,620
7	1,750	1,570	1,730	1,650	1,550	1,550	1,070	2,100	1,530	1,530	1,550	1,680
8	1,750	1,680	1,700	1,550	1,550	1,510	1,050	1,900	1,540	1,610	1,570	1,580
9	1,740	1,730	1,710	1,560	1,540	1,510	1,200	2,150	1,530	4,300	1,500	1,610
10	1,750	1,650	1,720	1,560	1,530	1,510	1,400	2,250	1,530	3,800	2,050	1,840
11	1,750	1,650	1,700	1,630	1,530	1,500	2,300	2,030	1,540	1,900	2,110	1,710
12	1,760	1,650	1,660	1,620	1,550	1,490	3,700	1,650	1,580	1,650	1,950	1,740
13	1,730	1,700	1,590	1,600	1,530	1,450	4,000	1,630	1,550	1,660	1,600	1,740
14	1,740	1,650	1,550	1,550	1,500	1,450	2,880	1,670	1,550	1,660	1,570	1,740
15	1,730	1,680	1,740	1,560	1,520	1,450	2,160	1,760	1,550	1,620	1,540	1,740
16	1,740	1,800	1,530	1,550	1,470	1,440	2,300	1,660	1,540	1,580	1,580	1,740
17	1,740	1,800	1,550	1,550	1,530	1,420	2,740	1,650	1,550	1,620	1,600	1,740
18	1,620	1,780	1,570	1,550	1,530	1,400	3,000	1,640	1,700	1,620	1,600	1,730
19	1,740	1,750	1,570	1,550	1,530	1,370	2,800	1,640	1,550	1,650	1,560	1,740
20	1,750	1,730	1,560	1,600	1,530	1,370	2,800	1,630	1,550	1,610	1,530	1,690
21	1,750	1,750	1,560	1,660	1,530	1,300	2,660	1,600	1,550	1,540	1,550	1,700
22	1,750	1,750	1,590	1,660	1,530	1,280	2,230	1,590	1,530	1,470	1,580	1,730
23	1,740	1,740	1,580	1,660	1,470	1,240	2,140	1,580	1,460	1,520	1,850	1,790
24	1,740	1,730	1,560	1,630	1,430	1,240	2,200	1,560	1,540	1,530	1,750	1,800
25	1,740	1,740	1,570	1,600	2,600	1,270	2,520	1,560	1,540	1,520	1,720	1,740
26	1,740	1,740	1,570	1,580	2,300	1,290	4,000	1,600	1,550	1,540	1,720	1,740
27	1,620	1,740	1,570	1,520	1,750	1,280	3,990	1,630	1,550	1,550	1,560	1,710
28	1,600	1,760	1,560	1,560	1,560	1,270	3,430	1,640	1,560	1,550	1,560	1,700
29	1,660	1,730	1,550	1,560	.....	1,220	3,000	1,620	1,480	1,560	1,590	1,720
30	1,700	1,720	1,550	1,540	.....	1,140	3,000	1,620	1,520	1,610	1,660	1,750
31	1,690	.....	1,540	1,580	.....	1,110	.....	1,540	.....	1,570	1,560	.....

a Interpolated.

Monthly discharge of Androscoggin River at Berlin, N. H., for the years ending Sept. 30, 1914–15.

[Drainage area, 1,350 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
1913–14.					
October	2,420	1,600	1,770	1.31	1.51
November	4,770	1,600	1,840	1.36	1.52
December	2,350	1,690	1,920	1.42	1.64
January	2,020	1,690	1,840	1.36	1.57
February	1,820	1,550	1,770	1.26	1.31
March	2,600	1,640	1,950	1.44	1.66
April	10,500	1,500	3,220	2.39	2.67
May	14,300	1,560	4,890	3.62	4.17
June	1,990	1,700	1,810	1.34	1.50
July	2,120	1,620	1,800	1.33	1.53
August	1,850	1,650	1,740	1.29	1.49
September	1,880	1,600	1,750	1.30	1.45
The year	14,300	1,500	2,190	1.62	22.02
1914–15.					
October	1,750	1,600	1,730	1.28	1.48
November	1,800	1,560	1,700	1.26	1.41
December	1,790	1,530	1,640	1.21	1.40
January	1,660	1,520	1,580	1.17	1.35
February	2,600	1,430	1,600	1.18	1.23
March	2,000	1,110	1,430	1.06	1.22
April	4,000	1,000	2,300	1.70	1.90
May	3,850	1,540	1,950	1.44	1.66
June	1,610	1,460	1,540	1.14	1.27
July	4,300	1,470	1,750	1.30	1.50
August	2,110	1,530	1,640	1.21	1.40
September	1,840	1,400	1,690	1.25	1.40
The year	4,300	1,000	1,710	1.27	17.22

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches is shown by the table, do not represent the natural flow from the basin, because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

ANDROSCOGGIN RIVER AT RUMFORD FALLS, MAINE.

LOCATION.—At dam of Rumford Falls Power Co., at Rumford, Oxford County.

DRAINAGE AREA.—2,090 square miles.

RECORDS AVAILABLE.—May 18, 1892, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—One in pond above dam; another in tailrace of power house.

DISCHARGE.—Computed from discharge over the dam by use of the Francis weir formula with modified coefficient, and the quantities passing through the various wheels of the power house, which have been carefully rated.

WINTER FLOW.—Discharge relation little affected by ice.

REGULATION.—Storage in Rangeley system of lakes at headwaters of Androscoggin River, aggregating about 29.6 billion cubic feet, is largely under complete control. The stored water is regulated in the interests of the water-power users below. Results not corrected for storage.

COOPERATION.—Records obtained and computations made by Mr. Charles A. Mixer, engineer, Rumford Falls Power Co.

60411°—WSP 401—17——4

Daily discharge, in second-feet, of Androscoggin River at Rumford Falls, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,860	1,690	2,190	1,560	1,760	3,400	1,850	10,300	2,160	1,890	1,810	2,090
2	1,820	1,760	2,560	1,630	1,820	2,980	1,970	6,810	1,790	3,900	2,800	2,000
3	1,790	1,760	2,930	1,460	1,680	2,880	1,870	5,800	1,850	3,840	3,020	1,960
4	1,610	1,610	3,060	1,570	1,690	2,770	1,570	5,240	1,850	3,020	2,570	1,960
5	1,690	1,580	2,490	1,600	1,760	2,700	1,910	4,420	1,800	2,130	2,510	1,250
6	1,820	1,690	1,870	1,580	1,880	2,600	2,050	3,920	1,750	3,100	2,850	1,280
7	1,760	1,700	1,730	1,870	2,030	1,950	1,890	3,630	1,870	2,720	2,320	1,880
8	1,810	1,540	2,080	3,020	1,860	2,480	2,310	3,310	1,860	4,580	1,970	2,010
9	1,770	1,710	1,890	2,520	1,860	2,450	2,940	2,700	1,840	17,100	2,760	1,900
10	1,820	1,750	1,840	1,980	1,730	2,320	3,510	3,220	1,700	9,000	4,400	2,020
11	1,700	1,600	1,720	2,000	1,680	2,250	6,850	2,880	1,940	4,310	3,740	1,900
12	1,610	1,670	1,650	1,950	1,690	2,150	11,800	3,830	1,740	3,180	3,000	1,270
13	1,790	1,760	1,470	1,970	1,720	2,100	9,070	2,750	1,470	2,930	3,120	1,900
14	1,740	1,800	1,490	1,870	1,900	1,810	5,990	2,730	1,750	2,870	3,020	1,920
15	1,670	1,620	1,570	1,780	1,740	2,050	4,440	2,380	1,790	2,880	1,950	1,910
16	1,770	2,370	1,340	1,750	1,870	2,000	4,040	2,020	1,810	2,710	2,410	1,920
17	1,870	3,030	1,540	1,620	2,100	1,980	4,310	2,510	1,910	2,470	2,320	1,890
18	1,840	2,160	1,590	1,900	2,120	1,940	4,250	2,500	2,460	2,680	2,280	1,850
19	1,720	1,600	1,590	2,270	2,040	1,830	4,650	2,430	2,100	2,400	2,120	1,360
20	1,990	1,640	1,600	3,970	1,870	1,790	4,430	2,340	1,790	2,560	1,990	1,760
21	1,870	1,900	1,620	2,690	1,940	1,470	4,330	2,240	2,150	2,370	1,950	1,810
22	1,850	1,920	1,650	2,350	1,870	1,800	3,480	2,070	1,860	2,210	1,290	2,880
23	1,840	1,830	1,520	2,140	1,890	1,880	2,980	1,740	1,800	2,300	3,940	2,340
24	1,740	1,640	1,500	2,050	1,820	1,790	3,410	2,300	1,520	2,040	3,910	2,250
25	1,670	1,880	1,650	1,960	9,250	2,110	4,390	2,600	1,730	1,520	3,030	2,010
26	1,630	2,210	1,340	1,850	13,900	2,240	7,720	1,960	1,730	2,330	2,930	1,420
27	1,850	2,380	1,440	1,880	6,730	1,960	7,180	2,090	1,690	2,670	2,600	2,140
28	1,640	2,580	1,660	1,810	4,270	1,660	5,710	2,100	1,710	2,450	2,170	2,080
29	1,600	2,100	1,660	1,760	.....	1,860	4,520	2,030	1,780	2,370	1,650	1,990
30	1,800	2,180	1,600	1,680	.....	1,730	5,890	1,710	1,600	2,460	2,170	2,010
31	1,740	.....	1,630	2,130	.....	1,650	.....	1,940	.....	2,140	2,210	.....

Monthly discharge of Androscoggin River at Rumford Falls, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 2,090 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	1,990	1,600	1,760	0.842	0.97
November	3,030	1,540	1,890	.904	1.01
December	3,060	1,340	1,790	.856	.99
January	3,970	1,460	2,000	.957	1.10
February	13,900	1,680	2,800	1.34	1.40
March	3,400	1,470	2,150	1.03	1.19
April	11,800	1,570	4,380	2.10	2.34
May	10,300	1,710	3,140	1.50	1.73
June	2,460	1,420	1,830	.876	.98
July	17,100	1,520	3,390	1.62	1.87
August	4,400	1,290	2,610	1.25	1.44
September	2,880	1,250	1,900	.909	1.01
The year	17,100	1,250	2,470	1.18	16.03

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches, shown by the table, do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

MAGALLOWAY RIVER AT AZISCOHOS DAM, MAINE.

LOCATION.—At the Aziscohos dam, Oxford County, about 15 miles above the mouth.

DRAINAGE AREA.—215 square miles.

RECORDS AVAILABLE.—January 1, 1912, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Vertical staff in two sections, the lower attached to one of the concrete buttresses of the dam and the upper on the concrete gate tower.

DETERMINATION OF DISCHARGE.—Discharge determined from readings of gate openings. Gates have been rated by current-meter measurements.

REGULATION.—The capacity of the storage reservoir above the dam is 9,593,000,000 cubic feet, and the reservoir is regulated for power interests below. The operation of the gates is planned to maintain as nearly as possible a constant flow at Berlin, N. H. Results not corrected for storage.

COOPERATION.—Discharge computed and furnished for publication by Walter H. Sawyer, agent Union Water Power Co., Lewiston, Maine.

Monthly discharge of Magalloway River at Aziscohos dam, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 215 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	956	88	264	1.23	1.42
November	1,190	669	974	4.53	5.05
December	894	385	687	3.20	3.69
January	1,200	1,000	1,100	5.12	5.90
February	1,850	898	1,190	5.54	5.77
March			(a)		
April	1,800	54	573	2.67	2.98
May	1,040	69	127	.591	.68
June	1,320	75	789	3.67	4.10
July	150	74	97	.451	.52
August	147	80	125	.582	.67
September	175	93	113	.526	.59

a Mean discharge Mar. 1–13, 1,450 second-feet; Mar. 23–31, 1,670 second-feet. No record Mar. 14–22 on account of repair to gates.

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches, shown by the table, do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

LITTLE ANDROSCOGGIN RIVER NEAR SOUTH PARIS, MAINE.

LOCATION.—At left end of an old dam at Bisco Falls, 200 feet below a highway bridge and 5 miles above South Paris, Oxford County.

DRAINAGE AREA.—75 square miles.

RECORDS AVAILABLE.—September 14, 1913, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGE.—Chain on left bank installed April 16, 1914; original gage, a vertical staff, was destroyed by ice March 2, 1914; from March 18 to April 9, 1914, a chain gage on a footbridge was used; all gages referred to same datum and at practically same place.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—At low and medium stages flow is through opening at left of old stone dam; opening was enlarged by flood of April 9, 1914; water flows over dam at gage height 5.30 feet.

EXTREMES OF DISCHARGE.—Maximum gage height recorded during year, 9.3 feet at 7 a. m. July 9 (discharge 2,970 second-feet); minimum gage height recorded, 0.8 foot at 4 p. m. October 19, 4 p. m. November 13, and 3 p. m. November 15 (discharge 2 second-feet).

WINTER FLOW.—Discharge relation not seriously affected by ice.

REGULATION.—Some storage in lakes above station.

ACCURACY.—Results good.

The following discharge measurement was made by W. G. Hill:

April 13, 1915: Gage height, 6.62 feet; discharge, 546 second-feet.

Daily discharge, in second-feet, of Little Androscoggin River near South Paris, Maine, from Sept. 14, 1913, to Sept. 30, 1915.

Day.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.													
1	.....	48	139	115	50	83	500	307	493	47	24	9	40
2	.....	56	111	111	53	90	890	890	366	47	29	4	24
3	.....	307	86	94	56	70	700	419	292	40	34	12	16
4	.....	111	111	90	48	48	500	361	314	54	20	12	12
5	.....	83	83	86	56	53	400	297	325	132	24	12	12
6	.....	58	83	83	53	51	300	277	348	124	29	9	6
7	.....	53	83	94	53	67	200	257	264	108	29	4	6
8	.....	56	73	339	50	58	100	237	209	76	24	3	12
9	.....	53	131	237	58	64	100	648	830	47	24	3	4
10	.....	48	530	166	58	53	100	760	475	54	22	3	9
11	.....	48	407	152	48	53	105	558	336	47	20	3	12
12	.....	56	277	123	48	53	110	458	303	34	20	4	12
13	.....	90	237	115	48	53	115	426	259	34	24	4	3
14	14	76	188	83	53	53	120	411	219	16	29	3	3
15	11	111	184	90	56	53	125	397	159	29	29	3	3
16	23	119	156	83	56	53	130	384	149	29	29	1	4
17	19	119	148	83	58	53	135	411	124	29	12	4	16
18	43	104	127	83	43	53	152	442	149	18	9	4	16
19	40	100	119	83	48	53	152	585	140	24	9	5	16
20	38	135	222	83	48	53	135	1,320	124	24	20	6	16
21	40	521	197	76	48	53	104	2,120	108	16	24	12	24
22	184	267	152	76	48	53	93	675	108	29	20	12	20
23	282	156	135	73	48	53	90	512	124	24	9	4	16
24	139	119	127	70	48	53	97	384	76	20	20	3	24
25	90	143	119	53	104	53	104	336	132	24	12	6	24
26	40	247	111	58	119	53	135	325	124	24	9	6	16
27	53	395	111	56	111	53	188	466	116	20	16	3	9
28	36	272	111	56	115	53	419	475	92	9	6	4	16
29	38	207	111	58	104	.....	395	475	76	14	16	12	16
30	48	307	111	56	83	.....	361	475	54	24	12	26	16
31	.....	170	.....	56	83	.....	339	.....	47	.....	9	54	.....

Daily discharge, in second-feet, of Little Androscoggin River near South Paris, Maine, from Sept. 14, 1913, to Sept. 30, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	16	3	34	9	84	458	140	1,180	54	54	100	92
2	16	9	32	9	68	348	149	535	47	84	132	68
3	16	12	68	61	61	270	132	458	47	108	124	68
4	4	12	54	47	29	239	140	411	54	100	124	61
5	12	9	47	34	47	219	159	360	47	124	189	47
6	12	20	16	24	47	189	159	325	40	149	154	68
7	16	20	34	16	61	149	179	281	40	124	140	61
8	9	4	34	149	61	140	249	219	34	100	140	54
9	12	16	16	84	68	149	325	179	34	2,470	149	47
10	6	16	12	47	47	140	360	199	47	585	169	47
11	4	16	16	47	61	132	466	159	54	325	159	34
12	9	20	16	40	61	140	990	132	54	303	124	24
13	12	2	6	47	61	132	760	140	40	249	140	29
14	6	16	12	40	29	116	426	159	47	209	140	29
15	9	2	29	34	47	124	325	159	47	169	159	29
16	9	16	20	34	92	132	239	140	54	159	108	24
17	6	84	20	20	124	124	239	149	84	159	124	24
18	2	54	16	34	108	124	219	124	84	159	116	29
19	9	47	12	108	84	116	199	116	76	140	92	26
20	12	47	6	169	84	108	179	108	61	124	92	24
21	20	34	9	116	84	108	140	108	68	100	84	47
22	20	16	12	76	68	124	124	68	61	100	40	179
23	20	34	16	84	84	116	124	47	54	92	76	124
24	20	20	9	76	92	124	132	100	47	76	84	84
25	9	20	6	68	830	159	219	84	54	54	124	61
26	20	16	4	68	2,470	179	360	92	47	194	169	54
27	12	20	4	68	760	140	325	108	24	234	116	61
28	9	24	9	61	535	140	219	92	40	132	100	54
29	16	16	9	68	.....	124	219	47	40	159	84	47
30	16	24	12	68	.....	124	325	47	34	159	84	34
31	12	.....	12	61	.....	124	.....	47	.....	132	100	.....

NOTE.—Daily discharge ascertained from two well-defined rating curves, applicable Sept. 14, 1913, to Apr. 9, 1914, and Apr. 10, 1914, to Sept. 30, 1915, respectively. Several discharge measurements obtained subsequent to Sept. 30, 1915, were used to determine the latter curve.

No gage-height record Feb. 6, 14, 17–28, Mar. 1–17, 22, Apr. 10–15, June 8, Aug. 19, Dec. 22, and 25, 1914, Jan. 4–6, and Mar. 2–8, 1915, for which daily discharge was estimated. Gage height of flood of Mar. 2, 1914; estimated 7.5 feet by gage observer.

Monthly discharge of Little Androscoggin River near South Paris, Maine, from Sept. 14, 1913, to Sept. 30, 1915.

[Drainage area, 75 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
1913.					
September 14-30	282	11	67	0.894	1.00
1913-14.					
October	521	48	149	1.99	2.29
November	530	73	159	2.12	2.36
December	339	53	99	1.32	1.52
January	119	43	63	.840	.97
February	90	48	a 57	.760	.79
March	890	90	a 238	3.18	3.67
April	2,120	237	a 536	7.14	7.97
May	830	47	224	2.99	3.45
June	132	9	41	.546	.61
July	34	6	20	.267	.31
August	54	1	8	.106	.12
September	40	3	14	.187	.21
The year	2,120	1	134	1.79	24.27
1914-15.					
October	20	2	12	0.160	0.18
November	84	2	22	.293	.33
December	68	4	19	.253	.29
January	169	9	60	.800	.92
February	2,470	29	216	2.88	3.11
March	458	108	a 162	2.16	2.49
April	990	124	274	3.65	4.07
May	1,180	47	205	2.73	3.15
June	84	24	50	.666	.74
July	2,470	54	236	3.15	3.63
August	189	40	120	1.60	1.84
September	179	24	54	.720	.80
The year	2,470	2	119	1.59	21.55

a Partly estimated; see footnote to table of daily discharge.

PRESUMPSCOT RIVER BASIN.

PRESUMPSCOT RIVER AT OUTLET OF SEBAGO LAKE, MAINE.

LOCATION.—At outlet dam at Sebago Lake and the hydroelectric plant at Eel Weir Falls, Cumberland County, 1 mile below lake outlet.

DRAINAGE AREA.—436 square miles.

RECORDS AVAILABLE.—January 1, 1887, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine. Results of a recomputation of all data from 1887 to 1911 are published in the second annual report of Maine State Water Storage Commission.

GAGES.—On bulkhead of gatehouse at outlet dam and in forebay and tailrace of power plant.

DISCHARGE.—Prior to March, 1904, discharge was determined from records of opening of gates in dam; since March, 1904, flow from lake has been recorded by three Allen meters, one on each of three pairs of 30-inch Hercules wheels; wheels and recording meters checked by current-meter measurements, brake tests of wheels, and electrical readings of the generator output.

WINTER FLOW.—Discharge relation not affected by ice.

REGULATION.—Sebago Lake (area, 46 square miles) is under complete control. Results not corrected for storage.

COOPERATION.—Entire record furnished by S. D. Warren Co.

Daily discharge, in second-feet, of Presumpscot River at outlet of Sebago Lake, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	776	a 242	633	685	582	555	538	280	400	160	a 66.7	522
2	637	676	628	672	583	543	533	a 89	417	55	335	533
3	705	672	632	a 413	587	622	450	532	412	8.3	363	468
4	a 427	665	635	658	590	622	a 182	463	420	a 8.3	418	505
5	745	670	602	650	593	588	575	478	415	8.3	255	a 45
6	765	668	a 292	630	540	533	512	475	a 113	87	358	168
7	758	660	630	542	a 210	a 188	357	485	347	133	268	555
8	796	a 250	642	515	517	550	500	433	330	185	a 85	617
9	770	666	630	597	678	555	473	a 140	330	a 8.3	402	615
10	705	655	633	a 230	662	533	423	425	333	20	360	633
11	a 253	668	647	643	600	515	a 185	422	332	48	357	567
12	728	665	642	633	667	538	482	422	330	148	383	a 215
13	802	662	a 320	645	580	532	488	427	a 103	212	450	693
14	735	658	600	663	a 193	a 182	455	418	320	225	427	635
15	753	a 333	625	673	595	553	485	407	297	238	a 102	575
16	745	660	637	655	428	552	538	a 120	293	218	467	662
17	687	660	640	a 188	503	538	458	422	308	217	485	643
18	a 223	638	633	513	545	552	a 185	422	297	a 88	540	578
19	708	637	635	365	658	545	572	418	295	250	533	a 182
20	688	632	a 342	420	357	542	487	423	a 75	225	537	635
21	730	625	630	457	a 180	a 185	492	413	270	223	443	548
22	743	a 343	628	533	667	552	657	392	280	265	a 107	640
23	735	635	627	567	622	528	523	a 90	280	348	533	667
24	658	635	657	a 182	573	500	468	413	283	222	505	632
25	a 198	638	435	542	263	470	a 180	417	280	a 68	540	528
26	668	383	257	555	353	488	467	420	280	358	520	a 178
27	670	367	a 375	585	432	462	533	420	a 57	302	520	607
28	677	390	623	602	a 195	a 170	518	418	132	292	512	665
29	673	a 335	655	595	.....	527	530	417	140	277	a 103	665
30	683	632	658	538	.....	580	463	a 50	158	318	520	638
31	652	.....	680	205	.....	535	.....	50	.....	253	520	.....

a Sunday.

Monthly discharge of Presumpscot River at outlet of Sebago Lake, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 436 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	802	198	661	1.52	1.75
November	676	242	567	1.30	1.45
December	680	257	578	1.33	1.53
January	685	182	527	1.21	1.40
February	678	180	498	1.14	1.19
March	622	170	495	1.14	1.31
April	657	180	457	1.05	1.17
May	485	50.0	361	.828	.95
June	420	56.7	278	.638	.71
July	358	8.3	176	.404	.47
August	540	66.7	388	.890	1.03
September	693	45.0	527	1.21	1.35
The year	802	8.3	459	1.05	14.31

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

SACO RIVER BASIN.

SACO RIVER AT WEST BUXTON, MAINE.

LOCATION.—At hydroelectric plant of Portland Electric Co., at West Buxton, York County.

DRAINAGE AREA.—1,550 square miles.

RECORDS AVAILABLE.—October 19, 1907, to September 30, 1915. Data also in annual reports of Public Utilities Commission of Maine.

GAGES.—One in pond above dam; another in tailrace of power house.

CHANNEL AND CONTROL.—Crest of concrete dam about 300 feet long.

DISCHARGE.—Flow over dam and through rated wheels of power plant determined by means of hourly gage readings.

WINTER FLOW.—Discharge relation not affected by ice.

REGULATION.—Dams on numerous but comparatively small lakes in basin above station; storage regulation probably affects regimen of stream but not to extent that obtains in other basins in Maine where natural storage facilities are better and more fully developed.

COOPERATION.—Records furnished by Cumberland County Power & Light Co.

Daily discharge, in second-feet, of Saco River at West Buxton, Maine, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	856	808	1,010	769	1,770	9,100	2,590	6,160	1,780	1,060	2,160	2,340
2	997	623	1,100	765	1,790	9,120	2,360	6,530	2,150	1,550	2,670	2,290
3	992	759	1,280	533	1,650	8,730	2,880	6,830	1,670	1,640	2,730	2,260
4	928	675	1,200	681	1,590	7,520	2,800	6,710	1,330	3,040	2,890	2,120
5	701	656	1,270	652	1,650	7,620	2,950	6,520	1,120	3,630	3,240	2,010
6	857	792	1,060	609	1,570	6,970	2,970	6,310	740	4,260	3,600	2,070
7	967	919	1,080	1,040	1,300	6,440	3,410	6,070	1,420	4,150	3,490	2,020
8	682	615	937	1,080	1,960	6,310	3,670	5,860	1,440	4,570	3,210	2,060
9	762	742	1,150	1,600	1,970	5,930	3,740	5,460	1,040	8,420	3,790	1,800
10	742	770	1,000	674	1,830	5,580	3,920	5,310	1,380	8,690	3,820	1,570
11	705	730	1,040	1,200	1,760	5,340	4,030	4,960	1,320	8,150	3,420	1,600
12	723	694	1,290	1,200	1,610	5,030	5,500	4,320	1,080	7,870	3,380	1,310
13	684	737	562	1,170	1,600	4,840	6,580	4,220	897	7,140	3,120	1,620
14	693	829	977	1,160	1,320	4,310	6,890	3,830	1,370	7,200	2,950	1,400
15	519	639	950	1,170	1,870	4,340	7,470	3,700	1,510	6,060	2,550	1,530
16	428	910	1,060	1,280	1,960	3,800	7,960	3,320	1,210	5,480	2,970	1,370
17	472	1,300	1,030	1,220	2,550	3,760	7,740	3,380	1,360	4,890	2,860	1,320
18	474	1,110	945	1,370	2,360	3,400	7,480	3,100	1,090	2,080	2,620	1,380
19	559	987	929	1,850	2,230	3,110	7,470	2,690	1,020	4,410	2,580	1,190
20	730	980	496	1,960	2,260	2,900	6,980	2,420	1,060	4,020	2,480	1,510
21	704	808	847	2,490	1,900	2,800	6,460	2,460	1,690	3,830	2,400	1,630
22	689	692	734	2,100	2,370	2,850	6,170	2,280	1,730	3,600	1,950	1,580
23	757	941	681	1,820	2,270	2,710	5,810	2,000	1,690	3,370	2,440	1,520
24	605	850	684	1,760	2,560	2,920	5,530	2,390	1,620	3,020	2,700	1,540
25	465	876	770	2,380	4,960	2,990	4,750	2,220	1,460	2,470	2,450	1,680
26	808	953	643	1,940	8,980	3,100	5,140	2,320	1,160	2,970	2,780	1,350
27	730	1,050	393	1,790	9,290	3,140	5,180	2,060	960	2,790	2,620	1,930
28	598	1,320	562	1,650	8,990	2,830	5,060	1,930	1,210	2,760	2,510	1,890
29	540	830	738	1,820	.....	3,190	5,080	1,610	1,370	2,730	2,150	1,780
30	541	1,220	833	1,660	.....	2,940	4,990	1,450	1,430	2,800	2,540	1,750
31	558	.....	852	1,380	.....	2,800	.....	1,410	.....	2,590	2,390	.....

Monthly discharge of Saco River at West Buxton, Maine, for the year ending Sept. 30, 1915.

[Drainage area, 1,550 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	997	428	692	0.446	0.51
November	1,320	615	861	.556	.62
December	1,290	393	907	.586	.68
January	2,490	533	1,380	.891	1.03
February	9,290	1,300	2,780	1.79	1.86
March	9,120	2,710	4,720	3.04	3.50
April	7,960	2,360	5,120	3.30	3.68
May	6,830	1,410	3,860	2.50	2.88
June	2,150	740	1,340	.865	.97
July	8,690	1,060	4,240	2.74	3.16
August	3,820	1,950	2,820	1.82	2.10
September	2,340	1,190	1,710	1.10	1.23
The year	9,290	393	2,540	1.64	22.22

MERRIMACK RIVER BASIN.

MERRIMACK RIVER AT FRANKLIN JUNCTION, N. H.

LOCATION.—At covered wooden bridge of the Boston & Maine Railroad near Franklin Junction, Merrimack County, about a mile below the confluence of Pemigewasset and Winnepesaukee rivers.

DRAINAGE AREA.—1,460 square miles.

RECORDS AVAILABLE.—July 8, 1903, to September 30, 1915.

GAGE.—Chain fastened to floor of bridge on upstream side over the west channel; a gage painted on the downstream right-hand side of the center pier is used by the United States Weather Bureau for high-water readings.

DISCHARGE MEASUREMENTS.—Made from upstream side of the bridge.

CHANNEL AND CONTROL.—Coarse gravel and bowlders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the two years ending September 30, 1915, 19.5 feet at 5 p. m. April 21, 1914 (discharge determined from extension of rating curve, 32,300 second-feet); minimum stage for same period, 3.8 feet at 10 a. m. September 7, 1914 (discharge, 850 second-feet).

WINTER FLOW.—Discharge relation affected by ice during the winter months.

REGULATION.—Flow affected by storage in Winnepesaukee, Squam, and New Found lakes, and by the operation of mills above the station.

COOPERATION.—Gage heights furnished by the proprietors of locks and canals on Merrimack River, Lowell, Mass.

Discharge measurements of Merrimack River at Franklin Junction, N. H., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 27	Pierce and Thweatt	5.72	2,960
Sept. 7	Thweatt and Adams	4.44	1,520

NOTE.—Additional measurements, subsequent to Sept. 30, were used in determining the stage-discharge relation.

Daily discharge, in second-feet, of Merrimack River at Franklin Junction, N. H., for the years ending Sept. 30, 1914–15.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	940	1,330	1,790	1,670	.....	5,060	6,770	10,000	2,050	1,440	1,230	2,180
2	1,080	1,620	1,920	1,790	2,180	7,820	9,920	6,980	2,050	1,790	1,360	1,670
3	1,670	1,920	1,790	1,670	2,180	19,300	8,550	6,770	1,920	1,920	1,500	1,550
4	1,550	1,790	1,790	1,670	2,180	12,000	7,180	6,560	2,050	1,670	1,330	1,440
5	1,440	1,670	1,920	1,670	1,920	6,770	5,810	7,190	3,160	1,580	1,330	1,330
6	1,330	1,500	1,790	1,550	1,670	4,280	4,450	7,820	3,310	1,500	1,230	1,090
7	1,080	1,440	2,550	1,440	1,670	3,310	4,280	7,190	3,160	1,670	1,230	850
8	1,030	1,500	3,310	1,330	.....	3,160	4,280	6,980	3,010	1,790	1,130	1,330
9	1,330	5,800	3,620	1,330	.....	3,010	6,140	6,980	2,180	1,670	1,280	1,230
10	1,330	10,100	1,670	.....	.....	3,010	8,450	6,360	1,920	1,550	1,440	1,330
11	1,330	6,350	1,330	.....	.....	2,720	8,240	5,740	1,790	1,550	1,330	1,230
12	1,300	5,740	2,180	.....	.....	2,580	7,820	5,740	1,670	1,670	1,380	1,230
13	1,280	3,310	2,180	.....	.....	2,180	7,400	5,740	1,440	1,790	1,380	1,230
14	1,330	3,010	2,120	.....	.....	2,050	6,140	5,740	1,550	1,790	1,380	1,230
15	1,330	2,720	2,050	.....	.....	2,120	5,740	5,350	1,670	1,670	1,330	1,230
16	1,550	2,650	2,050	.....	.....	2,180	5,740	4,620	1,790	1,550	1,280	1,230
17	1,550	2,580	2,180	.....	.....	2,310	4,980	4,200	1,670	1,440	1,230	1,280
18	1,180	2,310	1,920	.....	.....	2,180	4,800	3,780	1,670	1,440	1,380	1,230
19	1,160	2,180	1,670	.....	.....	2,860	11,400	3,460	1,670	1,550	1,330	1,230
20	1,130	2,050	1,440	.....	.....	2,720	18,000	3,310	1,670	1,670	1,330	1,230
21	8,450	2,180	1,360	.....	.....	2,580	31,200	3,310	1,610	1,670	1,440	1,230
22	4,620	2,050	1,280	.....	.....	2,320	19,100	3,780	1,550	1,330	1,380	1,130
23	2,720	1,980	1,230	.....	.....	2,050	9,710	3,620	1,670	1,440	1,360	1,130
24	2,440	1,920	1,130	.....	.....	1,920	7,820	3,390	1,550	1,280	1,330	1,030
25	2,050	1,920	1,500	.....	.....	1,670	5,940	3,160	1,550	1,230	1,330	1,030
26	3,080	2,050	1,330	.....	.....	2,050	6,780	3,010	1,500	1,200	1,230	1,030
27	4,110	1,920	1,230	.....	.....	3,310	7,610	2,860	1,410	1,180	1,330	1,180
28	3,940	1,790	1,700	.....	.....	3,460	8,660	2,580	1,320	1,130	1,330	1,330
29	3,620	1,790	2,180	.....	.....	4,800	9,290	2,440	1,230	1,130	1,440	1,330
30	3,160	1,790	1,920	.....	.....	6,140	13,100	2,050	1,330	1,500	1,940	1,330
31	2,720	.....	1,670	.....	.....	5,740	.....	2,050	.....	1,380	2,440	.....
1914–15.												
1	1,280	1,080	1,330	.....	.....	4,800	2,050	3,780	1,440	1,670	2,510	2,180
2	1,230	1,030	1,380	.....	.....	3,620	1,920	3,860	1,380	4,280	2,580	1,920
3	1,130	1,030	1,440	.....	.....	3,620	1,790	3,940	1,330	6,350	3,780	1,920
4	1,180	1,030	1,330	.....	.....	3,620	1,860	3,620	1,280	5,940	3,460	1,790
5	1,230	1,030	1,330	.....	.....	3,160	1,920	3,460	1,230	5,540	4,110	1,670
6	1,230	1,130	1,230	.....	.....	2,860	2,050	3,160	1,200	4,450	4,110	1,550
7	1,230	1,130	1,130	.....	.....	2,790	2,050	2,720	1,180	3,780	3,780	1,440
8	1,180	1,060	1,030	.....	.....	2,720	2,720	2,440	1,180	3,940	3,540	1,440
9	1,130	985	1,440	.....	1,790	2,720	2,720	2,650	1,130	19,300	3,310	1,440
10	1,030	940	1,440	.....	1,790	2,580	3,010	2,860	1,080	16,900	3,620	1,380
11	1,030	1,130	1,440	.....	1,500	2,440	9,400	2,720	1,230	10,500	3,460	1,380
12	1,030	1,030	1,030	1,790	1,440	2,310	15,800	2,580	1,180	4,110	3,160	1,410
13	1,030	1,130	.....	1,550	1,500	2,180	13,100	2,310	1,230	3,620	3,010	1,440
14	1,030	1,030	.....	1,440	1,520	2,120	5,740	2,180	1,280	3,310	3,160	1,440
15	1,030	1,030	.....	1,550	1,550	2,050	4,450	2,050	1,280	1,550	2,940	1,440
16	1,130	1,030	.....	1,440	2,050	2,050	3,620	1,980	1,180	2,720	2,720	1,500
17	1,130	3,010	.....	1,470	3,010	2,050	3,460	1,920	1,440	3,010	2,650	1,440
18	1,060	2,180	.....	1,500	2,720	1,920	3,620	1,790	1,440	2,860	2,580	1,330
19	985	2,180	.....	2,180	2,580	1,920	3,780	1,790	1,550	2,720	2,440	1,380
20	1,130	1,920	.....	5,540	2,310	1,920	3,780	1,920	1,610	2,580	2,440	1,440
21	1,330	1,440	.....	4,450	2,180	1,980	3,620	1,920	1,670	2,440	1,920	1,500
22	1,330	1,280	.....	3,160	2,050	2,050	3,160	1,920	1,550	2,440	3,100	1,920
23	1,230	1,130	.....	2,440	1,920	1,920	3,010	1,860	1,330	2,310	4,280	2,180
24	1,230	1,130	.....	2,720	1,920	1,920	3,160	1,790	1,280	2,310	4,110	1,670
25	1,130	1,230	.....	3,010	8,450	2,310	3,640	1,670	1,280	2,380	3,620	1,440
26	1,030	1,030	.....	2,580	28,600	2,310	4,110	1,500	1,200	2,440	3,940	1,380
27	1,180	1,230	.....	2,050	10,600	2,310	3,780	1,670	1,120	2,720	3,010	1,330
28	1,130	1,230	.....	1,920	7,700	2,240	3,940	1,790	1,030	2,440	3,010	1,440
29	1,130	1,280	.....	1,790	.....	2,180	3,620	1,670	1,440	2,860	2,530	1,550
30	1,230	1,330	.....	.....	.....	2,180	3,460	1,580	1,330	2,720	2,050	1,550
31	1,130	.....	.....	.....	.....	2,050	.....	1,500	.....	2,440	2,180	.....

NOTE.—Discharge relation affected by ice Jan. 10 to Feb. 1, 1914, Feb. 8–28, 1914, Dec. 13, 1914, to Jan. 11, 1915, and Jan. 30 to Feb. 8, 1915. Mean discharge, during periods of ice, estimated by comparison with records at Garvins Falls as follows: Jan. 10–25, 1914, 1,170 second-feet; Jan. 26–31, 1914, 2,270 second-feet; Feb. 1, 1914, 2,400 second-feet; Feb. 8–28, 1914, 1,420 second-feet; Dec. 13–31, 1915, 937 second-feet; Jan. 1–5, 1915, 940 second-feet; Jan. 6–11, 1915, 1,800 second-feet; Jan. 30–31, 1915, 1,550 second-feet; Feb. 1–8, 1915, 1,440 second-feet.

Monthly discharge of Merrimack River at Franklin Junction, N. H., for the years ending Sept. 30, 1914–15.

[Drainage area, 1,460 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1913–14.						
October	8,450	940	2,160	1.48	1.71	B.
November	10,100	1,330	2,700	1.85	2.06	B.
December	3,620	1,130	1,860	1.27	1.46	B.
January	.....	.....	1,500	1.03	1.19	D.
February	.....	.....	1,580	1.08	1.12	D.
March	19,300	1,670	4,120	2.82	3.25	C.
April	31,200	4,280	8,840	6.05	6.75	C.
May	10,000	2,050	4,930	3.38	3.90	B.
June	3,310	1,230	1,870	1.28	1.43	B.
July	1,920	1,130	1,520	1.04	1.20	B.
August	2,440	1,130	1,390	.952	1.10	B.
September	2,180	850	1,270	.870	.97	B.
The year	31,200	850	2,810	1.92	26.14	
1914–15.						
October	1,330	985	1,150	0.788	0.91	B.
November	3,010	940	1,280	.877	.98	B.
December	.....	.....	1,080	.740	.85	C.
January	.....	.....	1,970	1.35	1.56	C.
February	.....	.....	3,530	2.42	2.52	C.
March	4,800	1,920	2,480	1.70	1.96	B.
April	15,800	1,790	4,140	2.84	3.17	C.
May	3,940	1,500	2,340	1.60	1.84	B.
June	1,670	1,030	1,300	.890	.99	B.
July	19,300	1,550	4,410	3.02	3.48	B.
August	4,280	1,920	3,130	2.14	2.47	B.
September	2,180	1,330	1,560	1.07	1.19	B.
The year	19,300	.....	2,360	1.62	21.92	

MERRIMACK RIVER AT GARVINS FALLS, N. H.

LOCATION.—At the dam of the Manchester Traction, Light & Power Co., at Garvins Falls, 4 miles below Concord, Merrimack County.

DRAINAGE AREA.—2,340 square miles.

RECORDS AVAILABLE.—1904 to September 30, 1915.

DAM.—During 1903–4 an overfall dam of the ogee type was completed. This dam is 550 feet long between abutments and about 800 feet over all, including the head gates, and is of stone masonry substantially built. The new dam and head gates are situated about 800 feet downstream from the old dam, which was destroyed on the completion of the new structure.

CANALS AND WASTEWAYS.—A canal about 500 feet long and 74 feet wide at the water line has been completed; in the sides of this canal wasteways are provided, one 90 feet long at elevation 102 feet (the main crest of the dam being taken as elevation 100) and another 45 feet long at elevation 103 feet. A waste gate, 10 feet wide and capable of being lowered to elevation 93 feet, is also provided for use in floating out any obstacles which lodge against the rocks.

TURBINES.—Six triplex turbines of somewhat more than 1,000 horsepower each and one small duplex turbine of 75 horsepower used in running exciters. Each large unit has three 39-inch runners mounted on a horizontal shaft which revolves at 180 revolutions a minute. Two of the wheels in each set discharge through a common T center and draft tube near the forebay wall. The third wheel is set opposite a quarter turn at the downstream end of the casing and discharges through this quarter turn into a smaller draft tube. The top of the penstock opening is at

elevation 95.5. The lower ends of the draft tubes are horizontal and are about 2 feet below the elevation of usual tail water. The gates for the runners are of the plain, cylindrical pattern, without fingers, and are controlled by governors. The average head on the wheels is about 29 feet, and there are six 650-kilowatt 3-phase generators directly connected with the turbines.

UTILIZATION OF POWER.—The power developed is transmitted at 12,000 volts tension to a substation at Manchester, about 14 miles away, where it is transformed to a lower voltage and utilized for light and power.

COMPUTATIONS OF DISCHARGE.—Careful records of the pond and tailrace levels and wheel openings have been kept by the company since the dam was completed in 1904 and have been furnished for computations of discharge.

WINTER FLOW.—Flow over dam is somewhat affected by ice during winter.

ACCURACY.—Wheel ratings somewhat uncertain and records considered only fair.

COOPERATION.—Computations of discharge for 1914 and 1915 were made by Metcalf & Eddy, consulting engineers, Boston.

Daily discharge, in second-feet, of Merrimack River at Garvins Falls, N. H., for the years ending Sept. 30, 1914–15.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	1,832	3,425	2,602	2,000	2,820	3,820	12,240	18,820	2,590	1,900	1,640	2,760
2	2,233	2,885	2,751	2,280	3,120	5,840	14,380	16,490	2,680	1,920	1,110	2,330
3	1,625	2,910	2,651	1,970	3,070	13,240	19,820	12,860	2,700	1,820	1,880	2,060
4	3,956	2,730	2,818	1,740	3,040	16,880	16,310	11,710	2,500	2,280	1,890	1,950
5	3,140	2,622	3,050	2,260	2,910	15,110	12,960	11,820	3,670	2,120	1,820	1,550
6	2,364	2,721	3,122	2,250	2,820	12,570	10,790	12,680	5,570	2,270	1,750	1,640
7	2,293	2,611	2,527	2,290	2,710	10,230	9,320	13,100	3,960	2,620	1,700	1,650
8	2,246	2,554	3,488	2,310	2,330	8,490	8,860	12,330	3,390	2,510	1,590	1,610
9	2,109	1,884	5,566	2,270	2,460	7,450	10,750	10,610	3,100	2,650	1,130	1,690
10	2,076	3,068	4,689	2,240	2,540	6,220	17,130	11,910	2,880	2,550	1,550	1,800
11	1,630	10,020	4,257	1,630	2,350	5,540	14,960	10,700	2,840	2,340	1,750	1,820
12	918	6,441	3,144	2,180	2,870	5,010	12,860	9,710	2,200	2,320	1,560	1,580
13	1,148	4,841	3,349	1,880	2,090	4,610	13,360	8,980	2,110	3,230	1,590	1,440
14	2,724	3,934	2,934	1,190	2,050	4,320	12,650	9,440	1,920	2,680	1,620	1,680
15	2,524	3,562	3,086	1,530	1,820	3,970	10,850	9,360	1,820	2,500	1,680	1,270
16	2,370	3,123	3,284	1,610	2,210	3,960	10,110	8,170	2,030	2,180	1,130	1,710
17	2,197	3,071	3,123	1,930	1,960	4,140	10,530	6,810	2,210	1,980	1,700	1,660
18	2,090	3,204	3,041	1,400	2,240	4,360	10,020	6,520	2,180	1,780	1,790	1,560
19	1,518	2,976	1,829	1,600	2,150	4,690	10,560	6,420	2,300	1,230	1,730	1,280
20	2,133	2,949	2,451	2,080	2,030	4,770	15,840	6,100	2,230	2,000	1,790	940
21	2,812	3,876	2,018	2,000	2,000	4,210	30,140	5,920	1,700	1,920	1,890	1,470
22	5,710	3,977	2,633	2,000	1,720	3,970	32,490	5,620	2,080	1,920	1,960	1,710
23	3,609	3,141	2,776	2,010	1,840	3,780	20,360	5,190	2,040	1,880	1,600	1,580
24	3,310	3,126	2,202	1,960	1,950	3,700	15,080	4,790	2,020	1,860	1,890	1,390
25	2,288	3,067	2,345	1,540	1,940	3,580	12,490	4,460	2,110	1,560	1,630	1,660
26	2,664	2,983	2,274	2,230	1,900	4,010	10,880	3,860	1,900	1,100	1,670	1,420
27	3,926	2,501	2,368	2,650	1,980	5,550	13,030	3,710	1,700	1,680	1,530	840
28	4,927	2,608	2,065	3,070	2,780	10,180	16,220	3,720	1,500	1,720	1,630	1,640
29	3,886	2,687	2,410	3,180	.....	16,680	17,750	3,450	2,390	1,570	1,520	1,850
30	3,294	2,079	2,534	3,310	.....	16,190	18,850	3,020	1,810	1,640	2,450	1,630
31	3,373	.....	2,410	3,120	.....	13,920	.....	2,670	.....	1,880	3,250	.....

Daily discharge, in second-feet, of Merrimack River at Garvins Falls, N. H., for the years ending Sept. 30, 1914–15—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	1,200	1,120	2,240	1,240	2,300	13,880	3,310	7,370	2,340	1,850	4,700	3,690
2	1,770	1,490	2,210	1,580	2,460	10,670	3,480	9,730	2,140	2,280	4,860	3,460
3	1,360	1,380	2,140	1,130	2,330	6,770	3,590	7,310	1,910	5,140	6,980	3,290
4	800	1,600	2,530	1,600	2,160	6,090	3,310	6,420	1,710	7,590	6,260	3,070
5	1,380	1,530	2,650	1,570	2,250	6,970	3,330	5,700	1,600	10,040	7,550	3,000
6	1,430	1,480	2,010	1,960	2,340	5,140	3,500	5,160	1,210	7,980	7,480	2,940
7	1,460	1,570	1,780	1,720	2,370	5,080	3,970	4,460	1,820	7,050	6,830	2,750
8	1,550	1,110	2,190	2,010	2,720	4,910	4,240	4,200	1,600	7,270	6,440	2,750
9	1,350	1,450	2,110	2,860	3,100	4,870	4,990	3,970	1,880	31,320	6,060	2,260
10	1,310	1,570	2,100	2,590	3,240	4,680	6,430	4,370	1,760	27,600	6,680	2,320
11	990	1,540	1,920	2,570	3,150	4,460	7,520	4,010	1,900	17,500	6,330	2,040
12	970	1,740	1,830	2,490	2,790	4,170	15,290	3,860	1,630	7,410	5,860	1,140
13	1,070	1,570	910	2,390	2,600	3,710	19,620	3,510	1,200	6,760	5,580	2,420
14	1,370	1,380	1,790	2,220	2,480	3,480	13,640	3,320	1,830	5,990	5,720	2,050
15	1,380	1,090	1,660	2,230	2,410	3,670	10,090	3,270	1,890	2,850	5,390	1,930
16	1,600	1,510	1,550	2,120	2,950	4,360	8,260	2,810	1,790	4,930	5,060	1,710
17	1,200	1,940	1,920	1,430	4,050	3,160	7,100	2,660	1,920	5,510	4,900	2,280
18	1,090	3,030	1,670	2,370	5,400	3,080	6,750	2,740	1,920	5,230	4,740	1,890
19	1,620	2,470	1,610	3,430	5,120	3,130	6,080	2,860	2,310	4,950	4,480	1,020
20	1,270	2,100	1,210	6,410	4,400	2,950	5,800	2,530	1,690	4,670	4,420	2,160
21	1,520	1,900	1,620	8,470	4,000	2,630	5,630	2,590	2,190	4,610	3,630	1,950
22	2,150	1,260	1,370	6,620	3,630	3,310	5,170	2,650	2,410	4,610	5,730	2,550
23	1,510	1,590	1,550	5,340	3,570	3,170	4,420	2,260	2,680	4,350	7,840	3,140
24	1,630	1,730	1,380	4,040	3,730	3,370	4,060	2,540	2,140	4,290	7,550	3,240
25	970	2,010	970	3,600	4,970	3,730	3,860	2,390	2,250	4,380	6,690	2,430
26	1,600	1,290	1,330	3,690	27,610	4,640	5,670	2,480	1,890	4,480	7,260	1,970
27	1,880	2,030	980	3,350	26,830	4,820	6,560	2,450	840	5,120	5,450	2,580
28	1,620	1,770	1,340	3,300	18,700	4,030	6,000	2,420	2,140	4,540	5,380	2,090
29	1,450	1,300	1,640	3,070	.....	3,980	4,810	2,440	1,620	5,250	4,500	2,590
30	1,490	2,130	1,490	2,780	.....	3,660	4,520	1,870	1,750	4,990	3,630	2,400
31	1,350	.....	1,670	2,320	.....	3,420	.....	1,950	.....	4,540	3,690	.....

Monthly discharge of Merrimack River at Garvins Falls, N. H., for the years ending Sept. 30, 1914–15.

[Drainage area, 2,340 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
1913–14.					
October	5,710	918	2,675	1.14	1.31
November	10,020	1,884	3,385	1.45	1.62
December	5,566	1,829	2,896	1.24	1.43
January	3,310	1,190	2,120	.906	1.04
February	3,120	1,720	2,350	1.00	1.04
March	16,880	3,580	7,450	3.18	3.67
April	32,490	8,860	14,700	6.28	7.01
May	18,820	2,670	8,420	3.60	4.15
June	5,570	1,500	2,470	1.06	1.18
July	3,230	1,100	2,050	.876	1.01
August	3,250	1,110	1,720	.735	.85
September	2,760	840	1,640	.701	.78
The year	32,490	840	4,330	1.85	25.09
1914–15.					
October	2,150	800	1,400	0.598	0.69
November	3,030	1,090	1,660	.709	0.79
December	2,650	910	1,720	.735	.85
January	8,470	1,130	2,980	1.27	1.46
February	27,610	2,160	5,490	2.35	2.45
March	13,880	2,630	4,710	2.01	2.32
April	19,620	3,310	6,370	2.72	3.04
May	9,730	1,870	3,750	1.60	1.84
June	2,680	840	1,870	.799	.89
July	31,320	1,850	7,260	3.10	3.57
August	7,840	3,580	5,670	2.42	2.79
September	3,690	1,020	2,440	1.04	1.16
The year	31,320	800	3,770	1.61	21.85

MERRIMACK RIVER AT LAWRENCE, MASS.

LOCATION.—At the dam of the Essex Co. in Lawrence, Essex County.

DRAINAGE AREA.[1]—Total of Merrimack River basin above Lawrence, 4,663 square miles; net drainage area, exclusive of diverted parts of Nashua and Sudbury River and Lake Cochituate basins, 4,452 square miles.

RECORDS AVAILABLE.—January 1, 1880, to September 30, 1915.

COMPUTATIONS OF DISCHARGE.—Accurate record is kept of the flow over the dam and through the various wheels and gates. This flow includes the water wasted into the Merrimack from the Nashua, Sudbury, and Cochituate drainage basins. Estimates of the quantity wasted from these basins is furnished by the Metropolitan Water and Sewerage Board of Boston and subtracted from the quantity measured at Lawrence to obtain the net flow from the net drainage area of 4,452 square miles.

DIVERSIONS.—Practically the entire flow of the South Branch of Nashua River, Sudbury River, and Lake Cochituate is diverted for use by the Metropolitan water district of Boston.

REGULATION.—Flow regulated to some extent by storage in Lake Winnepesaukee. The low water flow of the stream is affected by operation of various power plants above Lawrence.

STORAGE.—There are several reservoirs in the basin. It is estimated that the water surface is about 3.5 per cent of the entire drainage area.

ACCURACY.—These records are obtained with great care and are considered good; those for the later years are probably more accurate than those for the earlier years.

COOPERATION.—The entire record has been furnished by R. A. Hale, principal assistant engineer of the Essex Co.

Daily discharge, in second-feet, of Merrimack River at Lawrence, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	1,674	143	2,339	1,655	5,069	20,559	4,660	6,784	4,089	2,681	5,333	4,470
2	1,726	1,718	2,317	1,167	4,098	14,444	4,449	11,227	3,298	3,172	6,352	4,221
3	938	1,736	2,488	250	3,648	11,321	3,679	11,020	3,077	4,797	6,025	3,977
4	119	1,768	2,726	1,855	3,291	9,971	4,090	9,462	2,676	10,559	7,765	3,083
5	1,706	1,770	1,887	1,867	3,299	8,539	5,608	8,362	1,799	10,635	15,635	2,586
6	1,694	1,729	710	1,794	2,431	7,427	5,104	7,476	428	9,266	21,786	2,343
7	1,690	1,006	3,656	2,531	1,701	6,967	5,461	6,666	2,302	7,845	18,978	4,498
8	1,708	119	2,919	3,533	5,285	7,918	6,298	5,869	2,411	6,774	15,753	3,884
9	1,736	1,698	2,673	4,226	4,600	6,106	6,843	5,358	2,540	15,303	15,118	2,633
10	980	1,724	2,424	4,300	4,897	6,593	7,736	6,802	2,536	29,926	14,443	2,878
11	113	1,655	2,199	5,178	4,664	6,325	8,790	5,912	2,226	22,714	13,451	1,949
12	69	1,647	1,550	4,211	4,383	6,088	14,045	5,446	1,335	16,713	11,503	896
13	1,660	1,744	458	4,270	3,022	4,685	20,562	5,035	152	12,342	10,060	3,884
14	1,730	1,008	2,638	4,462	2,901	4,548	18,707	4,902	2,238	9,327	8,902	3,206
15	1,719	125	2,980	4,371	5,179	6,321	14,274	3,651	2,389	7,865	8,449	2,809
16	1,682	1,770	2,627	2,823	5,083	5,295	11,538	3,610	2,453	7,114	9,027	2,700
17	1,028	1,796	2,377	1,961	6,750	4,466	9,608	5,418	2,065	5,835	9,209	2,792
18	126	1,885	2,371	5,351	8,218	4,666	8,536	4,352	1,919	5,143	7,929	1,989
19	1,732	2,553	1,451	10,376	8,202	4,761	8,227	3,868	1,221	5,907	6,982	487
20	1,912	2,801	192	13,364	8,090	3,581	8,140	3,745	947	5,218	6,180	2,684
21	1,883	1,924	2,028	13,589	6,080	3,650	7,269	3,617	3,224	4,791	4,595	2,929
22	1,830	696	2,178	10,991	6,030	5,520	6,730	2,693	2,875	4,553	3,819	2,669
23	1,817	3,035	2,195	7,688	7,560	4,794	6,554	1,876	2,740	4,517	5,783	2,816
24	997	2,870	2,119	6,546	7,150	4,617	4,943	4,470	2,829	3,664	9,142	3,771
25	115	2,873	541	7,349	9,100	4,828	4,648	3,365	2,508	3,096	10,347	2,808
26	1,783	947	953	6,287	26,300	5,428	6,260	3,158	1,542	4,603	8,260	1,960
27	1,837	1,611	149	5,649	39,200	5,691	6,643	3,209	408	4,420	7,440	4,289
28	1,720	978	2,069	5,250	27,054	5,313	7,441	3,087	2,570	5,168	5,793	3,121
29	1,692	132	2,031	2,991	.....	6,100	6,687	2,007	2,539	6,085	4,592	2,870
30	1,707	2,956	1,967	3,432	.....	5,451	6,068	1,587	2,341	6,650	5,286	2,889
31	974	.....	2,053	2,813	.....	5,059	.....	2,174	.....	6,200	4,470	.....

NOTE.—The above table shows the actual flow at Lawrence; not corrected for water wasted by the Metropolitan Water and Sewerage Board.

[1] See footnote to tables of weekly discharge.

Weekly discharge, in second-feet, of Merrimack River at Lawrence, Mass., for the year ending Sept. 30, 1915.

[Weeks arranged in order of dryness.]

Week ending Sunday—	Measured at Lawrence (total drainage area, 4,663 square miles).	Wasting into Merrimack from diverted drainage basins (211 square miles).	From net drainage area of 4,452 square miles.	Per square mile of net drainage area.	Week ending Sunday—	Measured at Lawrence (total drainage area, 4,663 square miles).	Wasting into Merrimack from diverted drainage basins (211 square miles).	From net drainage area of 4,452 square miles.	Per square mile of net drainage area.
Oct. 18	1,145	7	1,138	0.256	July 4	4,094	105	3,989	0.896
4	1,348	8	1,340	.301	Feb. 14	4,250	196	4,054	.911
Nov. 15	1,372	29	1,343	.302	July 25	4,535	51	4,484	1.007
Oct. 11	1,375	8	1,367	.307	Mar. 21	4,677	33	4,644	1.043
Nov. 8	1,407	26	1,381	.310	Apr. 4	4,784	27	4,757	1.069
1	1,408	10	1,398	.314	May 16	5,051	20	5,031	1.130
Dec. 27	1,452	30	1,422	.319	Jan. 31	5,109	153	4,956	1.113
Oct. 25	1,469	8	1,461	.328	Mar. 28	5,170	30	5,140	1.155
Jan. 3	1,599	28	1,571	.353	Aug. 1	5,494	45	5,449	1.224
Nov. 29	1,778	27	1,751	.393	Mar. 14	6,038	70	5,968	1.341
June 20	1,890	10	1,880	.422	Apr. 11	6,549	43	6,506	1.461
Nov. 22	1,918	31	1,887	.424	25	6,644	22	6,622	1.487
June 13	1,929	10	1,919	.431	Feb. 21	6,800	264	6,536	1.468
Dec. 20	2,091	39	2,052	.461	Aug. 22	6,820	59	6,761	1.519
6	2,203	29	2,174	.488	May 2	7,301	33	7,268	1.633
13	2,268	31	2,237	.502	Aug. 29	7,337	48	7,289	1.637
June 27	2,304	9	2,295	.515	May 9	7,745	35	7,710	1.732
6	2,506	11	2,495	.560	July 18	9,191	76	9,115	2.047
Sept. 19	2,552	12	2,540	.571	Jan. 24	9,701	341	9,360	2.102
12	2,726	19	2,707	.608	Mar. 7	11,318	147	11,171	2.509
26	2,805	19	2,786	.626	Aug. 15	11,704	131	11,573	2.600
Jan. 10	2,872	66	2,806	.630	8	13,185	245	12,940	2.907
May 30	2,983	16	2,967	.666	Apr. 18	13,896	14	13,882	3.118
Feb. 7	3,362	150	3,212	.721	July 11	14,638	167	14,471	3.250
May 23	3,653	21	3,632	.816	Feb. 28	17,485	258	17,227	3.869
Jan. 17	3,897	145	3,752	.843					
Sept. 5	4,013	24	3,989	.896	Year.	4,997	66	4,931	1.108

NOTE.—Estimates of discharge wasted from diverted drainage area based on data furnished by the Metropolitan Water and Sewage Board of Boston.

Monthly discharge of Merrimack River at Lawrence, Mass., for the year ending Sept. 30, 1915.

Month.	Mean discharge in second-feet.				Run-off.		Rainfall in inches.
	Measured at Lawrence (total drainage area, 4,663 square miles).	Wasting into Merrimack from diverted drainage basins (211 square miles).	From net drainage area of 4,452 square miles.	Per square mile of net drainage area.	Depth in inches on drainage area.	Per cent of rainfall.	
October	1,358	8	1,350	0.303	0.349	23.7	1.47
November	1,614	28	1,586	.356	.397	15.3	2.60
December	1,976	31	1,945	.437	.504	16.9	2.99
January	4,972	162	4,810	1.080	1.245	25.1	4.96
February	7,974	218	7,756	1.742	1.814	51.0	3.56
March	6,678	65	6,613	1.485	1.712	2,140.0	.08
April	7,987	26	7,961	1.788	1.995	89.5	2.23
May	5,039	25	5,014	1.126	1.298	81.6	1.59
June	2,189	10	2,179	.489	.546	22.7	2.41
July	8,158	98	8,060	1.810	2.087	21.6	9.62
August	9,303	113	9,190	2.064	2.379	38.9	6.12
September	2,936	18	2,918	.655	.731	55.4	1.32
The year	5,015	67	4,948	1.110	15.057	38.7	38.95

NOTE.—The monthly discharge in second-feet per square mile and the run-off in depth in inches, shown by the table, do not represent the natural flow from the basin because of artificial storage. The yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

SOUTH BRANCH OF NASHUA RIVER BASIN (WACHUSETT DRAINAGE BASIN) NEAR CLINTON, WORCESTER COUNTY, MASS.

DRAINAGE AREA.—The area of the basin has been artificially changed at times in connection with the water-supply systems of the Metropolitan district. From 1896 to 1907, 119 square miles; 1908 to 1913, 118.19 square miles; 1914 to 1915, 108.84 square miles.

RECORDS AVAILABLE.—July, 1896, to September, 1915.

DETERMINATION OF DISCHARGE.—South Branch of Nashua River has been utilized in the water-supply development for the Metropolitan district of Boston.

The flow is affected by storage in Wachusett reservoir and several ponds. Investigations of the water supply have been made by the Metropolitan Water and Sewerage Board since July, 1896. Since 1897 the estimates of discharge have been corrected for gain or loss in the reservoir and ponds, so that the record shows approximately the natural flow of the stream.

The yield per square mile is the yield of the drainage area including the water surfaces. For the years 1897 to 1902, inclusive, the water surface amounted to 2.2 per cent of the total area; 1903, 2.4 per cent; 1904, 3.6 per cent; 1905, 4.1 per cent; 1906, 5.1 per cent; 1907, 6 per cent; 1908–1915, 7 per cent.

COOPERATION.—Complete record for the calendar years furnished by the Metropolitan Water and Sewerage Board of Boston and changed to the climatic year by engineers of the Geological Survey.

Yield and rainfall in South Branch of Nashua River basin (Wachusett drainage area) near Clinton, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 108.84 square miles.]

Month.	Total yield (million gallons).	Yield per square mile.		Run-off.		Rainfall (inches).
		Million gallons per day.	Second-feet.	Depth on drainage area (inches).	Per cent of rainfall.	
October	459.3	0.136	0.211	0.243	12.9	1.88
November	687.9	.211	.326	.364	12.3	2.97
December	1,256.6	.372	.576	.664	17.1	3.89
January	6,956.9	2.062	3.190	3.678	58.3	6.313
February	5,975.4	1.961	3.034	3.159	95.3	3.315
March	1,930.2	.572	.885	1.020	1,700.6	.060
April	3,024.5	.926	1.443	1.599	88.9	1.798
May	1,534.2	.455	.704	.811	48.5	1.673
June	743.8	.228	.353	.393	12.4	3.175
July	3,654.5	1.083	1.676	1.932	22.4	8.605
August	5,590.4	1.657	2.564	2.956	42.8	6.900
September	515.5	.158	.244	.272	17.8	1.533
The year	32,329.2	.814	1.260	17.091	40.6	42.112

Summary of yield and rainfall in South Branch of Nashua River basin (Wachusett drainage area) near Clinton, Mass., for the years ending Sept. 30, 1897–1915.

[Drainage area, 108.84 square miles.[a]]

Month.	Total yield (million gallons).	Yield per square mile.		Run-off.		Rainfall (inches).
		Million gallons per day.	Second-feet.	Depth on drainage area (inches).	Per cent of rainfall.	
1897–1915.						
October	33,668.5	0.525	0.812	0.936	26.9	3.483
November	48,056.5	.775	1.199	1.338	39.5	3.388
December	74,064.9	1.155	1.787	2.060	50.4	4.086
January	79,014.2	1.233	1.907	2.198	58.2	3.779
February	80,831.7	1.388	2.148	2.249	60.8	3.702
March	165,840.7	2.587	4.002	4.614	111.1	4.153
April	131,084.7	2.113	3.268	3.648	95.5	3.821
May	75,080.0	1.171	1.812	2.089	62.2	3.360
June	43,426.4	.700	1.083	1.208	34.2	3.533
July	26,323.5	.411	.635	.732	17.6	4.165
August	28,114.8	.439	.678	.782	18.1	4.316
September	20,367.1	.328	.508	.567	16.2	3.494
The year	805,872.8	1.068	1.652	22.421	49.5	45.280

[a] Although the drainage area has been changed at different times, quantities in this table have been reduced to correspond with the present drainage area.

SUDBURY RIVER AND LAKE COCHITUATE BASINS NEAR FRAMINGHAM AND COCHITUATE, MIDDLESEX COUNTY, MASS.

DRAINAGE AREA.—The areas of Sudbury River and Lake Cochituate basins have been artificially changed at times in connection with the water-supply systems of the Metropolitan district. Area of Sudbury basin from 1875 to 1878, inclusive, 77.8 square miles; 1879–80, 78.2 square miles; 1881–1915, 75.2 square miles; area of Cochituate basin from 1863 to 1909, inclusive, 18.87 square miles; 1910, 17.8 square miles; 1911 to 1915, 17.58 square miles.

RECORDS AVAILABLE.—Sudbury River basin, January, 1875, to September, 1915; Lake Cochituate basin, January, 1863, to September, 1915. Sudbury River and Lake Cochituate have been studied by the engineers of the city of Boston, the State board of health of Massachusetts, and the Metropolitan Water and Sewerage Board; records of rainfall have been kept in the Sudbury basin since 1875 and in the Cochituate basin since 1852, but Cochituate records prior to 1872 are of doubtful accuracy.

REGULATION.—The greater part of the flow from these basins is controlled by storage reservoirs constructed by the city of Boston and the Metropolitan Water and Sewerage Board. Lake Cochituate, which drains into Sudbury River a short distance below Framingham, is controlled as a storage reservoir by the Metropolitan Water Works. In the Sudbury River basin the water surfaces exposed to evaporation have been increased from time to time by the construction of additional storage reservoirs. From 1875 to 1878, inclusive, the water surface amounted to 1.9 per cent of the total area; from 1879 to 1884, to 3 per cent; 1885 to 1893, to 3.4 per cent; 1894 to 1897, to 3.9 per cent; 1898 and subsequent years, 6.5 per cent.

DETERMINATION OF DISCHARGE.—In determining the run-off of the Sudbury and Cochituate drainage basins the water diverted for the municipal supply of Framingham, Natick, and Westboro, which discharge their sewage outside the basins, is taken into consideration; the results, however, are probably less accurate since the sewerage diversion works were constructed. The public water and sewerage works were installed in these towns as follows:

Dates of installation of water and sewerage works in Framingham, Natick, and Westboro.

Town.	Water supply.	Sewerage works.
Framingham	1885	1889
Natick	1874	1896
Westboro	1879	1892

Water from the Wachusett drainage basin passes into the reservoirs in the Sudbury basin and must be measured to determine the yield of the Sudbury basin; the accuracy of the estimates of the Sudbury water supply during months of low yield in years subsequent to 1897 is impaired by the errors unavoidable in the measurement of large quantities of water.

COOPERATION.—Complete records for calendar years furnished by the Metropolitan Water and Sewerage Board of Boston; changed to the climatic year by engineers of the Geological Survey.

Yield and rainfall in Sudbury River basin near Framingham, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 75.2 square miles.]

Month.	Total yield (million gallons).	Yield per square mile.		Run-off.		Rainfall (inches).
		Million gallons per day.	Second-feet.	Depth on drainage area (inches).	Per cent of rainfall.	
October	−137.5	−0.059	−0.091	−0.105	−6.6	1.60
November	219.8	.097	.151	.168	6.7	2.53
December	582.6	.250	.387	.446	12.9	3.46
January	3,797.4	1.629	2.520	2.906	44.7	6.508
February	3,937.1	1.870	2.893	3.013	84.1	3.583
March	1,383.4	.593	.918	1.059	2,116.9	.050
April	1,330.1	.590	.912	1.018	41.0	2.483
May	594.5	.255	.395	.455	26.1	1.743
June	227.9	.101	.156	.174	4.8	3.653
July	2,437.0	1,045	1.617	1.865	23.0	8.125
August	2,723.5	1.168	1.808	2.084	35.5	5.870
September	86.7	.038	.059	.066	6.1	1.095
The year	17,182.5	.626	.909	13.149	32.3	40.700

Summary of yield and rainfall in Sudbury River basin near Framingham, Mass., for the years ending Sept. 30, 1876–1915.

[Drainage area, 75.2 [a] square miles.]

Month.	Total yield (million gallons).	Yield per square mile.		Run-off.		Rainfall (inches).
		Million gallons per day.	Second-feet.	Depth on drainage area (inches).	Per cent of rainfall.	
October	39,711.9	0.426	0.659	0.760	19.7	3.86
November	68,760.6	.762	1.179	1.315	34.7	3.79
December	91,040.0	.976	1.510	1.741	45.7	3.81
January	114,048.8	1.223	1.892	2.181	52.4	4.16
February	143,355.2	1.687	2.610	2.740	66.4	4.13
March	257,468.6	2.761	4.272	4.925	113.8	4.32
April	175,882.2	1.949	3.016	3.365	95.4	3.53
May	98,052.9	1.052	1.628	1.877	57.4	3.27
June	41,261.7	.457	.707	.786	27.2	2.90
July	15,900.1	.172	.266	.307	8.4	3.65
August	22,763.7	.244	.378	.436	11.1	3.91
September	19,973.1	.221	.342	.382	11.5	3.33
The year	1,088,218.8	.991	1.533	20.818	46.6	44.66

[a] The drainage area has been changed at different times, but quantities in this table have been reduced to correspond with the present drainage area.

Yield and rainfall in Lake Cochituate basin near Cochituate, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 17.58 square miles.]

Month.	Total yield (million gallons).	Yield per square mile.		Run-off.		Rainfall (inches).
		Million gallons per day.	Second-feet.	Depth on drainage area (inches).	Per cent of rainfall.	
October	10.5	0.019	0.030	0.03	2.0	1.69
November	108.7	.195	.301	.35	14.5	2.45
December	191.1	.351	.543	.63	18.5	3.38
January	1,012.3	1.857	2.874	3.314	50.4	6.57
February	1,084.3	2.203	3.408	3.549	91.5	3.88
March	349.5	.641	.992	1.144	1,439.0	.01
April	306.3	.581	.899	1.003	35.6	2.82
May	123.8	.227	.351	.405	25.5	1.59
June	47.9	.091	.141	.157	.4	3.51
July	571.5	1.049	1.623	1.871	2.2	8.38
August	565.4	1.037	1.605	1.851	3.2	5.72
September	51.1	.097	.150	.167	1.9	.88
The year	4,422.4	.689	1.066	14.471	35.4	40.88

Summary of yield and rainfall in Lake Cochituate basin near Cochituate, Mass., for the years ending Sept. 30, 1864–1915.

[Drainage area, 17.58 [a] square miles.]

Month.	Total yield (million gallons).	Yield per square mile.		Run-off.		Rainfall (inches).
		Million gallons per day.	Second-feet.	Depth on drainage area (inches).	Per cent of rainfall.	
October	15,009.3	0.530	0.819	0.95	23.1	4.09
November	20,707.9	.755	1.171	1.30	32.8	3.97
December	25,707.7	.907	1.407	1.62	45.3	3.57
January	31,422.3	1.109	1.716	1.98	50.4	3.93
February	39,008.1	1.511	2.338	2.45	62.8	3.91
March	60,787.5	2.145	3.319	3.83	89.3	4.29
April	45,181.7	1.647	2.548	2.84	81.9	3.47
May	26,889.0	.949	1.468	1.69	47.2	3.58
June	12,042.9	.439	.679	.76	25.7	2.96
July	7,199.2	.254	393	.45	11.9	3.77
August	10,920.2	.385	.596	.69	16.7	4.14
September	10,799.7	.394	.610	.68	19.1	3.55
The year	305,670.5	.915	1.416	19.24	42.6	45.23

[a] The drainage area has been changed at different times, but quantities in this table have been reduced to correspond with the present drainage area.

BLACKSTONE RIVER BASIN.

BLACKSTONE RIVER AT ALBION, R. I.

LOCATION.—At the dam of the Valley Falls Co. in Albion, Providence County.

DRAINAGE AREA.—433 square miles.

RECORDS AVAILABLE.—October 1, 1914, to September 30, 1915.

GAGE.—Staff gage on the pond 25 feet above the dam, staff gage in the canal near entrance to the wheels, and staff gage in the lower tailrace; read five times a day at 6.15, 9 and 11.30 a. m., 3 and 5.30 p. m. Water-stage recorder installed on the pond 40 feet above the dam August 3, 1915.

DISCHARGE MEASUREMENTS.—Made from highway bridge, from temporary footbridges across canals, or by wading.

COMPUTATION OF DISCHARGE.—Flow over dam determined from rating curve based on current meter measurements; discharge through wheels determined from measurements of flow in canals. Records are kept of wheel operations which are nearly always at full-gate openings during working hours. Variations in load are carried by an auxiliary steam plant.

WINTER FLOW.—Discharge relation not seriously affected by ice.

REGULATION.—At ordinary stages the flow is practically all controlled by the power plants along the river and is held in storage by dams during the hours when the mills are not in operation.

ACCURACY.—A study is being made by means of continuous records of gage height to determine how closely the readings made five times a day during working hours represent the conditions during those periods, and to determine also the ratio between 10-hour and 24-hour flow. Monthly mean discharge only is published.

COOPERATION.—Gage-height observations on staff gages are furnished by Mr. Arnold B. Chace, of the Valley Falls Co.

Discharge measurements of Blackstone River and canals at Albion, R. I., during the year ending Sept. 30, 1915.

[Made by Hardin Thweatt.]

Date.	Gage height.[a]	Discharge.	Date.	Gage height.[a]	Discharge.	Date.	Gage height.[a]	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Aug. 2	.....	[b] 216	Aug. 5	1.44	1,760	Aug. 9	.....	[f] 342
Do	.....	[c] 340	Do	.....	[e] 312	Do	0.85	725
Aug. 3	.....	[d] 321	Do	.....	[e] 313	Aug. 10	.....	[g] 214
Do	0.65	495	Aug. 6	1.57	1,950	Aug. 11	.....	[g] 206

[a] Pond gage above dam.
[b] In tailrace No. 1; head on wheels 12.7 feet.
[c] In tailrace No. 2; head on wheels 12.8 feet.
[d] In tailrace No. 2; head on wheels 13.0 feet.
[e] In tailrace No. 2; head on wheels 12.9 feet.
[f] In tailrace No. 2; head on wheels 13.1 feet.
[g] In tailrace No. 1; head on wheels 13.0 feet.

NOTE.—Measurements indicate flow of river except as noted.

Monthly discharge of Blackstone River at Albion, R. I., for the year ending Sept. 30, 1915.

[Drainage area, 433 square miles.]

Month.	Discharge in second-feet.		Run-off (depth in inches on drainage area).	Month.	Discharge in second-feet.		Run-off (depth in inches on drainage area).
	Mean.	Per square mile.			Mean.	Per square mile.	
October	365	0.843	0.97	May	340	0.785	0.90
November	296	.684	.76	June	296	.684	.76
December	253	.584	.67	July	465	1.07	1.23
January	1,090	2.52	2.90	August	637	1.47	1.70
February	1,570	3.63	3.78	September	168	.388	.43
March	771	1.78	2.05				
April	568	1.31	1.46	The year	562	1.30	17.61

CONNECTICUT RIVER BASIN.

CONNECTICUT RIVER AT ORFORD, N. H.

LOCATION.—At covered highway bridge between Orford, Grafton County, N. H., and Fairlee, Vt., approximately 10 miles downstream (by river) from the mouth of Waits River.

DRAINAGE AREA.—3,100 square miles.

RECORDS AVAILABLE.—August 6, 1900, to September 30, 1915.

GAGE.—Chain attached to upstream side of bridge; an inclined staff gage is also used at certain stages.

DISCHARGE MEASUREMENTS.—Open-water measurements made from cable.

CHANNEL AND CONTROL.—Channel wide and deep, with gravelly bottom; control for low stages slightly shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 23.9 feet, at 6 p. m. February 26 (discharge, 35,200 second-feet); minimum discharge occurred on January 6 and February 2–6, stage discharge relation affected by ice (discharge, 730 second-feet).

1900–1915: Maximum stage recorded, 33.4 feet, at 12 noon March 28, 1913 (discharge, computed from extension of rating curve, 57,300 second-feet); minimum 24-hour discharge, 288 second-feet, September 28, 1908.

WINTER FLOW.—Discharge relation seriously affected by ice, usually from December to March, but the relation is unusually constant during each period.

REGULATION.—Flow not seriously affected by regulation. (*See* Accuracy.)

ACCURACY.—Rating curve well defined; records considered good. A special study by means of a temporarily installed water-stage recorder from September 15 to October 19, 1914, showed that although determinations for individual days might be slightly in error the mean discharge for this period as computed from two gage readings a day differed by less than 1 per cent from the discharges obtained from continuous record of gage height.

Discharge measurements of Connecticut River at Orford, N. H., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 4	R. S. Barnes	4.85	2,120	Feb. 26	R. S. Barnes	23.52	34,500
Dec. 23	C. S. De Golyer	[a] 4.92	1,040	Apr. 28	do	13.70	14,100
24	R. S. Barnes	[a] 4.80	1,040	Sept. 17	Thweatt and Adams	4.16	1,390
Jan. 15	do	[a] 5.73	1,410	17	G. F. Adams	4.05	1,440
Feb. 9	do	[a] 6.80	1,600	18	do	3.82	1,330
25	do	[a] 13.00	9,190				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Connecticut River at Orford, N. H., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,030	1,500	4,610	880	1,040	18,200	2,030	12,000	2,850	2,470	6,360	2,470
2	2,110	1,790	4,380	880	730	13,000	2,200	11,800	2,290	3,470	5,460	2,290
3	1,790	1,950	4,840	880	730	10,700	2,290	10,200	2,030	3,930	6,100	2,110
4	1,640	2,290	6,100	880	730	8,880	2,290	8,740	2,030	4,050	5,330	1,950
5	1,640	2,560	6,630	880	730	8,020	2,380	7,460	1,950	4,040	4,840	1,790
6	1,500	3,050	5,840	730	730	7,320	2,560	6,760	1,950	4,160	3,930	1,790
7	1,290	3,490	4,840	1,100	880	6,900	2,750	5,840	1,640	4,380	3,490	1,640
8	1,040	3,710	4,050	3,050	1,430	6,760	2,950	5,700	1,360	4,380	3,050	1,430
9	1,100	3,710	3,490	3,930	1,430	6,360	4,040	6,630	1,500	11,800	3,600	1,430
10	1,360	3,270	3,160	3,050	1,290	5,960	5,840	6,630	1,430	21,900	5,080	1,500
11	1,220	3,270	2,850	2,850	1,100	5,200	10,800	6,220	1,430	20,100	8,600	1,870
12	1,100	3,270	2,380	2,560	880	4,610	19,300	5,330	1,790	14,000	9,770	2,380
13	1,220	3,050	1,950	2,110	780	4,610	23,800	4,960	2,470	8,740	8,160	2,560
14	1,500	2,850	2,110	1,790	730	4,720	21,700	4,380	2,470	5,840	6,100	2,380
15	1,710	2,850	1,950	1,430	980	4,610	18,400	3,930	2,110	4,610	5,080	2,110
16	1,640	3,270	1,870	1,290	1,500	4,380	13,300	3,710	2,030	3,930	4,160	1,790
17	1,360	3,820	1,640	1,100	2,560	4,040	10,800	3,380	1,950	3,710	4,380	1,570
18	1,430	4,960	1,500	1,290	2,950	3,270	10,400	3,270	3,050	4,050	4,380	1,360
19	2,030	4,610	1,160	2,560	2,950	2,950	9,620	3,160	4,380	8,020	4,050	1,360
20	3,270	3,490	1,040	5,580	2,950	2,950	9,320	3,050	5,200	8,600	3,820	1,570
21	3,600	3,380	1,100	5,450	2,750	3,270	9,030	2,950	4,380	6,900	3,160	1,790
22	3,490	2,850	1,100	4,050	2,560	3,490	8,160	2,950	3,710	6,360	2,850	2,750
23	3,270	3,270	1,100	3,600	2,380	3,270	7,180	3,050	3,050	7,180	3,930	5,080
24	3,050	3,050	1,040	2,950	2,380	3,600	6,100	2,850	2,650	6,900	5,960	5,840
25	2,650	2,850	930	2,470	11,300	3,930	6,630	2,470	2,470	5,580	6,100	4,840
26	2,750	2,850	880	2,200	33,700	4,840	10,800	2,650	2,110	4,610	6,100	3,820
27	1,950	3,270	930	1,950	31,000	5,080	14,400	3,050	1,950	4,720	5,580	3,270
28	1,640	3,710	1,040	1,640	24,200	4,050	15,000	3,820	1,950	6,630	4,610	3,600
29	1,640	4,380	930	1,570	.....	3,050	12,600	4,380	1,950	6,630	3,600	4,050
30	1,640	4,610	1,040	1,290	.....	2,290	10,700	3,710	1,790	7,180	3,050	3,930
31	1,500	.....	1,040	1,040	.....	2,110	.....	3,270	.....	8,020	2,650	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 14, 1914, to Feb. 25, 1915; estimates for this period based on gage heights corrected for backwater by means of five discharge measurements and climatic data.

Monthly discharge of Connecticut River at Orford, N. H., for the year ending Sept. 30, 1915.

[Drainage area, 3,100 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	3,600	1,040	1,910	0.616	0.71	C.
November	4,960	1,500	3,230	1.04	1.16	B.
December	6,630	880	2,500	.806	.93	B.
January	5,580	730	2,160	.697	.80	B.
February	33,700	730	4,910	1.58	1.64	B.
March	18,200	2,110	5,560	1.79	2.06	A.
April	23,800	2,030	9,250	2.98	3.32	A.
May	12,000	2,470	5,110	1.65	1.90	A.
June	5,200	1,360	2,400	.774	.86	A.
July	21,900	2,470	7,000	2.26	2.61	A.
August	9,770	2,650	4,950	1.60	1.84	A.
September	5,840	1,360	2,540	.819	.91	A.
The year	33,700	730	4,290	1.38	18.74	

CONNECTICUT RIVER AT SUNDERLAND, MASS.

LOCATION.—At the five-span steel highway bridge at Sunderland, Franklin County, about 18 miles in a direct line and 24 miles by river above the dam at Holyoke. Deerfield River enters the Connecticut from the west about 8 miles above the station.

DRAINAGE AREA.—8,000 square miles.

RECORDS AVAILABLE.—March 31, 1904, to September 30, 1915. From 1880 to 1899 records were obtained at Holyoke, Mass.

GAGE.—Chain on highway bridge; read twice each day by V. Lawer.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Channel deep, with bottom of coarse gravel and alluvium. Control at low stages not well defined but practically permanent; at high stages it is evidently the crest of the dam at Holyoke.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 23.3 feet at 5 p. m. February 26 (discharge, 75,000 second-feet); minimum stage recorded, 0.6 foot at 5 p. m. November 8, 1914 (discharge, determined from extension of rating curve, 700 second-feet).

1904–1915, maximum stage: 30.7 feet during the night of March 28, 1913, determined by leveling from flood marks (discharge determined from extension of rating curve, 101,000 second-feet); minimum stage recorded, 0.6 foot September 28 and November 8, 1914 (discharge, determined from extension of rating curve, 700 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice for several months each winter.

REGULATION.—Flow affected by the operation of various power plants above the station on the Connecticut itself and also the tributaries.

ACCURACY.—Record considered good.

Discharge measurements of Connecticut River at Sunderland, Mass., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 2	R. S. Barnes	1.10	1,180	Feb. 24	R. S. Barnes	[a] 7.15	9,040
Dec. 22	do	[a] 3.60	2,760	27	do	21.27	68,600
Jan. 9	do	[a] 5.88	5,780	28	do	17.50	55,100
Feb. 7	do	[a] 6.45	7,800	Sept. 25	Hardin Thweatt	4.48	7,050

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Connecticut River at Sunderland, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,200	1,730	5,620	3,330	6,050	42,600	7,660	22,100	6,490	3,670	13,300	8,960
2	2,450	1,450	5,620	3,170	6,050	33,200	7,660	24,800	5,620	8,690	19,200	9,240
3	2,580	2,080	4,790	2,870	5,830	28,800	6,950	24,000	4,590	16,000	14,300	9,520
4	3,020	2,720	6,050	2,580	5,830	23,600	7,910	23,300	4,990	18,400	22,500	6,950
5	2,200	2,870	7,180	2,320	5,830	18,100	8,160	18,400	5,200	17,800	55,800	3,020
6	3,500	2,720	6,270	1,960	6,950	13,300	9,810	16,700	3,330	12,000	36,900	2,450
7	3,500	2,720	6,270	3,020	7,660	23,300	9,810	16,700	3,330	12,000	36,900	2,450
8	2,720	1,290	7,660	7,910	7,910	15,000	10,100	4,210	11,700	25,200	25,200	5,830
9	2,450	1,510	6,050	7,420	7,420	12,600	15,000	12,000	3,330	64,900	18,100	5,410
10	2,870	2,720	4,990	6,950	6,720	12,600	18,800	13,000	3,670	55,100	19,200	5,620
11	1,620	3,330	4,400	6,050	5,830	12,300	34,400	12,600	3,500	45,800	18,800	4,790
12	1,400	3,330	4,400	5,830	5,200	12,000	54,400	12,000	3,330	33,200	17,040	3,670
13	2,320	3,670	3,020	6,050	4,590	11,300	57,900	11,000	1,740	35,300	18,800	4,030
14	2,200	3,670	3,670	4,030	4,400	8,690	53,000	9,240	2,200	16,400	17,800	5,200
15	2,200	1,730	5,410	3,850	4,210	8,160	43,800	8,420	3,170	13,300	16,000	5,200
16	2,080	2,320	7,420	3,850	12,000	8,960	37,700	7,420	3,670	15,300	12,000	4,400
17	2,200	6,270	6,270	3,170	18,100	8,160	32,400	8,420	4,400	14,700	13,300	4,400
18	1,730	6,720	5,200	2,580	18,800	8,690	26,400	8,420	5,200	16,000	12,300	4,400
19	1,400	6,950	4,400	7,180	15,700	8,960	24,000	6,490	6,270	9,240	10,400	3,170
20	2,450	4,990	3,330	13,000	12,600	7,660	22,500	8,420	4,400	13,300	7,910	2,870
21	2,720	4,700	2,080	12,300	10,700	5,620	21,000	10,100	5,410	20,300	7,180	4,400
22	3,020	4,030	2,870	11,700	8,960	6,720	19,500	8,960	6,950	16,400	7,910	7,180
23	3,170	4,030	3,020	8,160	9,240	6,950	17,000	3,330	8,420	14,000	24,000	7,180
24	3,020	4,990	2,580	7,910	9,520	6,950	19,500	4,400	5,830	14,700	14,700	6,490
25	1,960	4,590	1,960	7,420	44,300	8,420	11,300	7,180	4,590	14,000	16,700	7,186
26	2,200	3,170	1,330	7,180	62,800	62,800	11,300	8,960	7,910	5,200	18,100	7,180
27	3,500	2,729	1,740	6,950	69,000	69,000	13,600	14,700	6,720	2,720	16,700	6,490
28	3,330	3,330	2,080	6,720	56,500	56,500	20,300	6,050	2,450	18,800	15,300	6,270
29	3,330	2,320	2,450	6,490	.....	10,700	21,000	6,720	4,030	10,500	8,160	6,490
30	2,720	3,020	2,870	6,490	.....	10,700	22,500	4,400	3,670	13,300	10,100	8,420
31	2,200	.....	3,330	6,270	.....	9,520	.....	3,170	.....	13,30	11,300	.....

NOTE.—Discharge determined from rating curve well defined between 1,500 and 70,000 second-feet. Discharge relation affected by ice Dec. 22 to Feb. 26; estimates for this period based on gage heights, discharge measurements, and weather records.

Monthly discharge of Connecticut River at Sunderland, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 8,000 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	3,500	1,400	2,510	0.314	0.36	B
November	6,950	1,290	3,390	.424	.47	B
December	7,660	1,290	4,330	.541	.62	B
January	13,000	1,960	5,960	.745	.86	C
February	69,000	4,210	15,700	1.96	2.04	C
March	42,600	5,620	13,200	1.65	1.90	B
April	57,900	6,950	22,100	2.76	3.08	B
May	24,800	3,170	11,000	1.38	1.59	A
June	8,420	1,740	4,400	.550	.61	A
July	64,900	3,670	18,900	2.36	2.72	A
August	55,800	7,180	17,600	2.20	2.54	A
September	9,520	2,450	5,690	.711	.79	A
The year	69,000	1,290	10,400	1.30	17.58	

PASSUMPSIC RIVER AT PIERCE'S MILLS, NEAR ST. JOHNSBURY, VT.

LOCATION.—At suspension foot bridge just below dam of Pierce's mills, about 5 miles north of St. Johnsbury, Caledonia County. Sheldon Branch enters the Passumpsic about 2 miles above and Moose River 4 miles below the station.

DRAINAGE AREA.—237 square miles.

RECORDS AVAILABLE.—May 26, 1909, to September 30, 1915. A station was maintained from June 29 to November 30, 1903, at St. Johnsbury Center.

GAGE.—Low-water section a vertical staff bolted to ledge just above bridge; high-water section an inclined staff bolted to ledge just below bridge.

DISCHARGE MEASUREMENTS.—Made from downstream side of footbridge or by wading.

CHANNEL AND CONTROL.—Stream bed composed chiefly of gravel with ledge rock near right bank; control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.7 feet at 6 a. m. April 12 (discharge, determined from extension of rating curve, 4,560 second-feet; zero flow recorded on afternoon of June 28; water held back by mills. 1909–1915: Maximum stage, 14.8 feet on night of March 27, 1913, determined by leveling from flood marks (discharge not determined); minimum stage, zero flow at various times, when water was held back by mills.

WINTER FLOW.—Discharge relation affected by ice. Station temporarily discontinued during the winter.

REGULATION.—A small diurnal fluctuation is caused by the operation of Pierce's mills, just above station, and by other mills farther upstream. (See Accuracy.)

ACCURACY.—Rating curve fairly well defined, but many discharge measurements show a large percentage of error due to fluctuation in stage during the measurement. The effect of the diurnal fluctuation was studied by means of a portable water-stage recorder during August and September, 1914. Although the results obtained by reading the gage twice a day were found to be occasionally in error for individual days, the mean discharge for the period August 16 to September 11, as determined from these readings and from continuous record of gage height was found to be identical.

The following discharge measurement was made by R. S. Barnes:
April 26, 1915: Gage height, 4.34 feet; discharge, 1,140 second-feet.

Daily discharge, in second-feet, of Passumpsic River at Pierce's mills, near St. Johnsbury, Vt., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	141	69	164	.....	750	189	600	164	107	375	230
2	130	111	260	.....	600	230	600	152	164	640	202
3	111	128	405	.....	530	230	500	152	141	420	176
4	97	120	305	.....	420	202	420	130	141	290	176
5	91	126	164	.....	405	290	390	122	189	275	152
6	97	126	189	.....	390	340	340	101	202	230	152
7	97	122	176	.....	340	245	305	113	130	202	152
8	93	97	141	.....	340	460	530	113	320	530	710
9	91	122	130	.....	305	710	500	120	2,540	750	600
10	71	128	111	.....	290	870	405	117	750	1,310	305
11	68	109	113	.....	260	1,820	340	120	405	600	202
12	97	73	130	.....	245	4,000	290	320	260	360	176
13	82	105	89	.....	245	1,360	275	176	216	320	176
14	80	117	105	.....	230	910	260	152	176	460	189
15	82	97	.....	.....	230	750	230	128	176	320	176
16	78	260	.....	.....	189	670	216	152	152	320	152
17	78	340	.....	.....	176	670	216	405	670	390	164
18	202	152	.....	.....	176	600	260	530	910	360	152
19	152	202	.....	.....	202	560	230	260	405	260	130
20	141	141	.....	.....	202	530	260	375	360	202	152
21	141	130	.....	.....	176	460	216	260	260	176	420
22	130	141	.....	.....	164	390	230	176	230	202	640
23	113	189	.....	.....	189	375	216	152	560	1,170	290
24	97	164	.....	.....	290	360	189	130	275	710	216
25	105	141	.....	.....	340	1,000	176	141	202	670	189
26	101	141	.....	.....	530	1,000	202	152	245	530	202
27	111	202	.....	.....	260	750	460	113	1,310	375	600
28	97	202	.....	950	260	530	275	108	460	290	360
29	99	176	.....	.....	152	500	216	105	1,660	260	260
30	101	152	.....	.....	189	530	189	93	830	230	216
31	82	.....	.....	.....	176	.....	176	.....	500	275	.....

NOTE.—Discharge determined from a rating curve well defined between 40 and 2,000 second-feet.

Monthly discharge of Passumpsic River at Pierce's mills, near St. Johnsbury, Vt., for the year ending Sept. 30, 1915.

[Drainage area, 237 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	202	68	105	0.443	0.51	B.
November	340	69	146	.616	.69	B.
December	.....	.....	[a] 145	.612	.71	C.
January	.....	.....	[a] 170	.717	.83	D.
February	950	.....	[a] 270	1.14	1.19	D.
March	750	164	298	1.26	1.45	A.
April	4,000	189	718	3.03	3.38	A.
May	600	176	313	1.32	1.52	A.
June	530	93	178	.751	.84	A.
July	2,540	107	482	2.03	2.34	A.
August	1,310	176	436	1.84	2.12	A.
September	710	130	264	1.11	1.24	A.
The year	4,000	.....	294	1.24	16.82	

[a] Estimated by comparison with records in near-by drainage basins.

WHITE RIVER AT WEST HARTFORD, VT.

LOCATION.—About 500 feet above the highway bridge in the village of West Hartford, Windsor County, and 7 miles above the mouth of the river.

DRAINAGE AREA.—687 square miles.

RECORDS AVAILABLE.—June 9 to September 30, 1915.

GAGE.—Inclined staff on left bank; read twice a day by F. P. Morse.

DISCHARGE MEASUREMENTS.—Made from cable 1,500 feet below the gage, or by wading.

CHANNEL AND CONTROL.—Channel wide and of fairly uniform cross-section at measuring section; covered with gravel, sand, and clay. Control formed by rock ledge 100 feet below the gage, and well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 8.1 feet at 6 a. m. July 9 (discharge, determined from extension of rating curve, 5,570 second-feet); minimum stage recorded, 2.82 feet at 6 p. m. September 20 (discharge 130 second-feet). The high water of March 27, 1913, reached a stage of 18.9 feet, as determined from reference mark on scale platform opposite gage (discharge not determined).

REGULATION.—Of several power plants on main stream and tributaries above the station, the nearest is that of the Vermont Copper Co. at Sharon. This plant was not in operation in 1915 and the pondage above the dam equalized the flow, so that there was very little diurnal fluctuation at gaging station.

ACCURACY.—Results good.

Discharge measurements of White River at West Hartford Vt., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 9	C. H. Pierce	3.11	230	Sept. 13	Hardin Thweatt	3.08	233
Sept. 8	Thweatt and Adams	3.30	260				

Daily discharge, in second-feet, of White River at West Hartford, Vt., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	.....	410	515	435	16	295	655	542	210
2	.....	1,450	715	385	17	385	810	542	210
3	.....	1,270	1,020	315	18	625	777	570	195
4	.....	1,270	745	295	19	460	685	460	177
5	.....	950	1,270	295	20	435	1,180	385	180
6	.....	1,100	1,020	240	21	435	845	337	275
7	.....	745	915	275	22	337	810	385	487
8	.....	950	715	337	23	275	1,360	1,180	337
9	225	4,280	715	410	24	240	915	985	257
10	210	1,960	777	337	25	240	715	950	240
11	240	1,180	655	257	26	225	715	777	180
12	410	915	542	225	27	180	880	597	295
13	410	777	570	225	28	240	685	487	295
14	295	845	597	240	29	225	915	435	257
15	275	845	487	225	30	195	810	460	210
					31	.....	625	460	.....

NOTE.—Discharge determined from a fairly well defined rating curve. Several discharge measurements made subsequent to September 30 were used in determining the rating curve.

Monthly discharge of White River at West Hartford, Vt., for the year ending Sept. 30, 1915.

[Drainage area, 687 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
June 9-30	625	180	312	0.454	0.37	B.
July	4,280	410	1,040	1.51	1.74	B.
August	1,270	337	671	.977	1.13	B.
September	487	177	277	.403	.45	B.

MILLERS RIVER AT ERVING, MASS.

LOCATION.—At downstream end of chair factory at Erving, Franklin County, about 7 miles above the confluence of Millers River with Connecticut River and below all important tributaries.

DRAINAGE AREA.—372 square miles.

RECORDS AVAILABLE.—August 1, 1914, to September 30, 1915.

GAGE.—Staff gage attached to factory August 1, 1914, to June 30, 1915; water stage recorder July 1 to September 30, 1915.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed is coarse gravel and boulders; control permanent.

EXTREMES OF STAGE.—Maximum stage recorded, 5.6 feet at 4 p. m. February 25, 1915 (discharge, 5,160 second-feet);[1] minimum stage recorded, 0.90 foot at 8a. m. November 8, no flow, as water was being stored farther upstream.

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—The operation of power plants at Athol, Orange, Wendell, and Erving affect the flow to such an extent that mean daily discharge can not be determined from two gage readings a day.

ACCURACY.—Well-defined curve has been determined by means of measurements made subsequent to September 30, 1915. Records after July 1, 1915, are excellent; prior to that date fair.

[1] Supersedes value published in U. S. Geol. Survey Water Supply Paper 415, p. 84.

Discharge measurements of Millers River at Erving, Mass., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 24	R. S. Barnes	1.95	192	Sept. 22	Hardin Thweatt	2.33	404
Aug. 18	Hardin Thweatt	2.80	643				

Twice-daily discharge, in second-feet, of Millers River at Erving, Mass., for the year ending Sept. 30, 1915.

Day.	October.		November.		December.		January.		February.		March.	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
1	166	124	a 35	(b)							1,060	1,230
2	205	124	83	35							1,290	1,160
3	202	69	74	209							1,310	788
4	a 4	(b)	213	46							1,510	804
5	153	127	101	85							836	644
6	147	94	220	54							788	630
7	144	98	205	72							a 588	(b)
8	157	150	a 0	(b)							932	630
9	157	85	89	150							600	618
10	136	141	228	69							612	612
11	a 7	(b)	236	76							612	624
12	98	30	52	76							624	570
13	232	74	224	58							576	445
14	150	78	157	124							a 385	(b)
15	160	76	a 4	(b)							558	355
16	213	72	144	160					1,540	1,330	415	492
17	220	83	220	44					1,360	1,300	360	486
18	a 22	(b)	141	60					1,370	1,090	335	612
19	228	153	213	72					1,260	923	468	528
20	228	150	150	83					960	812	504	305
21	213	157	147	35					a 748	(b)	a 365	(b)
22	252	124	a 7	(b)					788	637	540	385
23	224	157	150	220					812	780	350	450
24	224	133	213	39					869	887	430	445
25	a 11	(b)	220	41					3,010	4,850	320	504
26	160	89	33	(b)					4,480	4,100	534	564
27	272	127	150	138					3,320	2,820	456	430
28	236	41	256	58					a2,060	(b)	a 435	(b)
29	224	31	a 41	(b)							504	400
30	209	63	220	202							315	335
31	94	46									425	272

a Sunday.
b Gage read in morning only; afternoon discharge taken as mean of discharge for preceding and following mornings in computing monthly discharge.

Twice-daily discharge, in second-feet, of Millers River at Erving, Mass., for the year ending Sept. 30, 1915—Continued.

Day.	April.		May.		June.		July.		August.		September.	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
1	708	582	1,510	1,170	474	340	240	284	a 450	(b)	400	522
2	305	355	a1,310	(b)	280	121	300	456	651	534	252	420
3	435	456	1,150	1,110	213	370	672	788	665	708	320	405
4	a 198	(b)	1,150	1,050	224	138	a 820	(b)	564	2,730	280	355
5	492	435	950	896	124	130	732	716	3,210	2,910	a 153	(b)
6	370	658	860	828	a 48	(b)	570	606	2,640	2,560	256	3
7	335	588	740	748	232	360	546	606	2,390	2,390	106	180
8	630	686	588	686	220	53	390	540	a2,000	(b)	183	462
9	804	732	a 618	(b)	224	114	2,730	2,820	1,720	1,360	157	415
10	878	679	672	658	202	96	2,560	2,560	1,370	1,240	420	320
11	a 923	(b)	686	606	228	180	a2,080	(b)	1,140	1,130	173	252
12	1,820	2,230	665	686	121	111	1,630	1,410	1,620	828	a 173	(b)
13	2,230	2,080	651	658	a 52	(b)	1,220	950	923	950	276	268
14	1,860	1,510	492	462	236	350	606	780	980	960	213	345
15	1,420	923	400	410	260	220	748	764	a 844	(b)	248	365
16	1,190	1,100	a 330	(b)	240	153	658	748	724	740	205	445
17	1,020	780	564	450	228	205	430	658	624	732	252	345
18	a 716	(b)	350	430	240	202	a 205	(b)	564	724	260	252
19	679	665	462	480	127	183	335	510	355	724	a 41	(b)
20	570	708	325	480	a 60	(b)	330	492	350	679	232	370
21	612	672	236	370	410	360	256	300	320	325	205	365
22	612	637	187	445	228	325	516	546	a 213	(b)	244	330
23	588	594	a 209	(b)	224	425	612	672	700	679	288	456
24	570	700	486	430	252	160	582	546	370	644	248	450
25	a 300	(b)	276	510	240	213	a 335	(b)	390	665	345	176
26	492	510	280	300	144	194	345	340	380	630	a 173	(b)
27	606	630	280	335	a 53	(b)	498	600	400	576	380	292
28	612	450	268	445	220	325	335	552	380	582	240	202
29	400	450	202	440	236	170	395	606	a 240	(b)	248	40
30	570	732	a 180	(b)	244	248	564	630	474	296	244	224
31			180	480			564	606	310	498		

a Sunday. b Discharge estimated by comparison of twice-a-day readings.

Daily discharge, in second-feet, of Millers River at Erving, Mass., for the year ending Sept. 30, 1915.

[By water-stage recorder.]

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1	284	a 468	385	16	780	644	252
2	390	445	335	17	644	665	220
3	665	588	345	18	a 468	582	a 190
4	a 724	1,120	395	19	486	522	a b 135
5	693	2,730	a 236	20	492	504	b 200
6	510	2,310	141	21	b 285	430	190
7	534	2,150	144	22	450	a 340	220
8	724	a 1,670	248	23	534	558	232
9	2,560	1,430	224	24	440	498	260
10	2,310	1,180	355	25	a 350	510	127
11	a 1,760	1,000	260	26	325	492	a 166
12	1,510	878	a 153	27	462	516	244
13	1,130	914	264	28	440	528	213
14	748	869	232	29	462	a 209	98
15	788	a 748	236	30	522	305	187
				31	528	330	

a Sunday. b Discharge estimated by comparison of twice-a-day readings.

NOTE.—Discharge computed from a rating curve fairly well defined below 1,800 second-feet, several discharge measurements made subsequent to Sept. 30, 1915, being used to determine the curve. Determinations twice a day from observer's readings on staff gage and are given for July, August, and September, 1915, subsequent to the installation of water-stage recorder for the purpose of comparing the results obtained from two readings a day with those obtained from continuous record of gage height; the readings were made at about 8 a. m. and 4 p. m. Monthly discharge for period prior to July 1, 1915, determined by applying a reduction factor of 0.90 to means from the two readings a day, this factor being derived by a comparative study of results subsequent to installation of recorder. Discharge relation affected by ice at various times during December, 1914, and January and February, 1915.

Monthly discharge of Millers River at Erving, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 372 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October			119	0.320	0.37	B.
November			103	.277	.31	B.
December			82.5	.222	.26	D
January			652	1.75	2.02	C.
February			1,010	2.72	2.83	C.
March			530	1.42	1.64	B.
April			695	1.87	2.09	B.
May			518	1.39	1.60	B.
June			190	.511	.57	B.
July	2,560	284	742	1.99	2.29	A.
August	2,730	209	843	2.27	2.62	A.
September	395	98	230	.618	.69	A.
The year			471	1.27	17.29	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

DEERFIELD RIVER AT CHARLEMONT, MASS.

LOCATION.—One mile below the village of Charlemont, Franklin County.

DRAINAGE AREA.—362 square miles.

RECORDS AVAILABLE.—June 19, 1913, to September 30, 1915.

GAGE.—Friez water-stage recorder on left bank, referred to datum by a hook gage inside the well; inclined staff gage for auxiliary readings.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Channel of coarse gravel and boulders; fairly uniform section; control practically permanent.

EXTREMES OF DISCHARGE.—1913–1915: Maximum stage (water-stage recorder), 15.7 feet at 11 p. m. July 8 (discharge, computed from extension of rating curve, 45,000 second-feet); minimum stage (water-stage recorder), 1.35 feet at 6 p. m. November 3, 1914 (discharge, 23 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Summer flow largely regulated by a storage reservoir at Somerset, Vt. Several power plants above the station also cause diurnal fluctuation.

ACCURACY.—Rating curve well defined; results for open water period considered good.

Discharge measurements of Deerfield River at Charlemont, Mass., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 3[a]	C. H. Pierce	1.36	24.8	May 28	C. H. Pierce	2.00	240
25	R. S. Barnes	[b] 2.08	129	June 19	do	1.97	217
Dec. 23	do	[b] 2.28	92	July 17	Hardin Thweatt	2.14	285
Jan. 14	C. H. Pierce	[b] 2.38	380	Aug. 17	do	2.12	258
18	R. S. Barnes	[b] 2.19	288	24	do	3.38	1,230
Feb. 14	do	[b] 4.44	627	24	do	3.23	1,120
23	do	[b] 2.64	549	24	do	3.11	1,010

[a] Measurement made by wading 200 feet above gage.
[b] Discharge relation affected by ice.

Daily discharge, in second-feet, of Deerfield River at Charlemont, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	128	95	166	70	400	1,060	392	985	123	1,770	389	571
2	168	75	304	76	715	873	413	850	209	1,860	738	326
3	77	51	304	87	570	688	412	802	125	1,930	876	465
4	51	84	277	76	535	601	383	753	245	1,440	7,020	453
5	29	66	245	88	400	626	416	651	243	1,160	6,320	230
6	36	45	179	76	465	632	465	579	213	1,230	2,330	233
7	42	79	79	1,250	790	592	649	474	232	758	1,910	360
8	81	70	175	1,300	870	560	885	479	256	11,400	1,280	578
9	61	38	106	715	605	505	1,630	444	271	12,200	962	498
10	52	81	79	535	400	500	2,440	472	340	2,710	825	493
11	32	112	135	396	340	497	9,350	366	348	1,340	587	303
12	31	70	147	364	570	428	8,270	305	278	929	503	140
13	49	56	171	389	640	402	3,600	266	194	678	480	337
14	37	41	230	358	960	389	2,090	325	281	515	425	1,410
15	45	157	158	250	435	426	1,780	290	320	460	370	802
16	60	649	109	245	2,870	360	1,700	239	359	237	423	463
17	137	889	94	245	1,420	424	1,670	203	237	293	400	511
18	257	415	72	542	870	362	1,520	465	250	380	392	371
19	136	225	74	5,210	750	324	1,390	370	185	294	283	252
20	328	166	81	3,140	605	335	1,360	272	124	565	369	302
21	202	57	109	1,420	570	361	1,110	267	99	551	283	1,220
22	150	70	109	878	535	331	844	322	240	698	733	1,580
23	102	103	97	629	640	364	717	318	108	580	2,620	662
24	66	87	97	1,250	1,050	457	596	186	104	500	1,140	626
25	42	106	94	1,070	12,100	619	486	328	152	327	1,250	383
26	60	109	76	847	5,440	871	537	138	136	422	950	330
27	99	230	43	598	2,250	612	459	263	145	1,770	641	727
28	82	500	53	581	1,360	500	426	282	262	1,170	522	638
29	55	376	62	340	.....	509	538	243	362	776	349	503
30	54	201	76	196	.....	380	695	199	265	593	618	461
31	66	.....	109	389	.....	365	.....	152	.....	393	758	.....

NOTE.—Discharge determined from a well-defined rating curve by averaging the discharge for 12 two-hour periods each day, except for short period when water-stage recorder was not working properly. Discharge relation affected by ice Nov. 19, 1914, to Jan. 18, 1915, and Jan. 29 to Feb. 23, 1915; estimates based on gage heights corrected for backwater by means of six discharge measurements and climatic data.

Monthly discharge of Deerfield River at Charlemont, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 362 square miles.]

Month.	Observed discharge (second-feet).			Gain or loss in storage at Somerset, Vt. (millions of cubic feet).	Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.		Mean.	Per square mile.		
October	257	29	90.8	+31.1	102	0.282	0.32	A.
November	889	41	177	+84.8	210	.580	.65	B.
December	304	43	133	+70.5	159	.439	.51	B.
January	5,210	70	761	+254	856	2.36	2.72	B.
February	12,100	340	1,400	+285	1,520	4.20	4.37	D.
March	1,060	324	515	+72.7	542	1.50	1.73	A.
April	9,350	383	1,570	+439	1,740	4.81	5.37	A.
May	985	138	396	+147	451	1.25	1.44	A.
June	362	99	224	−253	126	.348	.39	A.
July	12,200	237	1,610	+239	1,700	4.70	5.42	A.
August	7,020	283	1,190	+225	1,270	3.51	4.05	A.
September	1,580	140	541	−206	462	1.28	1.43	A.
The year	12,200	29	712	+1,390	756	2.09	28.40	

NOTE.—The increase (+) or decrease (−) of water held in storage at Somerset, Vt., during the month has been computed by engineers of the Geological Survey from data of storage increase or decrease furnished by the company operating the reservoir.

WARE RIVER AT GIBBS CROSSING, MASS.

LOCATION.—Between the highway bridge and the electric-railway bridge at the point known as Gibbs Crossing, about 3 miles below Ware, Hampshire County. Muddy Brook enters from right at Ware and Beaver Brook from right about 2½ miles below the station.

DRAINAGE AREA.—201 square miles.

RECORDS AVAILABLE.—August 20, 1912, to September 30, 1915.

GAGE.—Barrett & Lawrence water stage recorder on the right bank, referred to gage datum by a hook gage inside the well; an inclined staff gage is used for auxiliary readings.

DISCHARGE MEASUREMENTS.—Made from the electric railway bridge or by wading.

CHANNEL AND CONTROL.—Channel rough and subject to a growth of aquatic vegetation during the summer months. Control free from weeds and practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year (water-stage recorder): 5.48 feet at 1.45 a. m. February 26 (discharge, 2,560 second-feet); minimum stage (water-stage recorder): 1.20 feet at 1–11 a. m. October 26, 1914 (discharge, 5.0 second-feet).

1912–1915: Maximum open-water stage recorded, 5.9 feet March 2, 1914 (discharge, 2,770 second-feet); minimum stage recorded, 1.20 feet October 26, 1914 (discharge, 5.0 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Flow regulated by the operation of mills above the station, which causes diurnal fluctuation at low stages and low discharge on Sundays and holidays.

ACCURACY.—Rating curve well defined; results for open-water periods considered good.

Discharge measurements of Ware River at Gibbs Crossing, Mass., during the year ending Sept. 30, 1915.

[Made by R. S. Barnes.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 4	1.62	37.3	Jan. 5	a 1.80	42.5	Feb. 5	2.54	233
Dec. 20	a 1.80	40	Jan. 6	a 3.50	147	Mar. 1	3.38	774
Jan. 4	a 3.85	174	Jan. 21	3.68	1,120			

a Discharge relation affected by ice.

Daily discharge, in second-feet, of Ware River at Gibbs Crossing, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	13	7.8	69	60	236	669	138	195	141	108	187	159
2	17	30	70	46	218	511	131	198	148	137	264	150
3	8.7	35	72	25	159	424	72	239	118	304	359	150
4	6	38	26	46	168	343	108	236	88	338	523	60
5	26	51	29	60	123	308	149	200	24	229	1,350	50
6	27	20	26	76	200	282	188	217	17	238	1,370	140
7	50	17	72	244	420	241	232	176	56	222	1,340	136
8	12	17	68	284	438	281	235	191	59	179	975	130
9	20	61	66	99	329	284	252	219	76	555	750	119
10	18	46	73	57	248	236	273	226	90	714	571	105
11	8.8	31	47	46	168	237	263	222	89	443	480	25
12	9.6	28	24	60	140	230	537	192	21	398	378	21
13	35	14	24	248	174	157	598	165	11	358	377	78
14	34	9.8	57	276	142	134	466	155	58	273	386	78
15	32	6.6	95	174	393	209	379	110	63	260	305	79
16	36	45	89	125	1,240	238	324	109	72	209	342	80
17	22	56	68	120	956	169	290	207	68	118	314	81
18	57	47	60	1,280	660	169	212	121	62	112	267	24
19	82	43	47	2,370	529	163	232	120	21	149	217	19
20	66	24	53	1,640	420	99	269	115	16	240	210	81
21	36	20	76	870	343	96	253	102	67	201	148	114
22	32	15	101	515	368	176	189	82	70	228	129	190
23	14	42	79	378	343	192	204	133	68	242	212	182
24	11	62	60	1,000	420	153	153	191	70	175	208	132
25	7.3	69	35	790	1,660	145	132	192	73	116	248	75
26	34	13	20	585	2,230	138	195	131	61	140	182	29
27	42	15	25	393	1,180	89	204	127	20	163	177	105
28	75	30	51	320	788	118	182	121	66	144	114	98
29	71	52	85	268	.....	194	173	29	80	171	139	100
30	17	85	40	200	.....	195	159	50	77	243	207	92
31	11	.....	174	153	.....	136	.....	53	.....	148	182	.....

NOTE.—Discharge determined from a well-defined rating curve by averaging the discharge of short periods throughout the day, the length of period varying from 1 to 6 hours. Discharge relation affected by ice Dec. 16, 1914, to Jan. 18, 1915, and Feb. 1–5, 1915; estimates based on gage heights corrected for backwater by means of four discharge measurements and climatic data.

Monthly discharge of Ware River at Gibbs Crossing, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 201 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	82	6.0	30.0	0.149	0.17	A.
November	85	6.6	34.3	.171	.19	A.
December	174	20	60.7	.302	.35	C.
January	2,370	25	413	2.05	2.36	C.
February	2,230	123	525	2.61	2.72	B.
March	669	89	226	1.12	1.29	A.
April	598	72	240	1.19	1.33	A.
May	239	29	156	.776	.89	A.
June	148	11	65.0	.323	.36	A.
July	714	108	244	1.21	1.40	A.
August	1,370	114	416	2.07	2.39	A.
September	190	19	96.1	.478	.53	A.
The year	2,370	6.0	207	1.03	13.98	

SWIFT RIVER AT WEST WARE, MASS.

LOCATION.—Just below the timber dam opposite the West Ware station of the Boston & Albany Railroad, about 6 miles downstream from Enfield, Hampshire County.

DRAINAGE AREA.—186 square miles (revised).

RECORDS AVAILABLE.—July 15, 1910, to September 30, 1915.

GAGE.—Barrett & Lawrence water-stage recorder on left bank about 1,000 feet below the dam, referred to datum by a hook gage inside the well, since August 25, 1912; inclined staff for auxiliary readings; July 15, 1910, to August 25, 1912, chain gage attached to downstream side of footbridge about 400 feet below the dam.

DISCHARGE MEASUREMENTS.—Made from cable about 50 feet above the present gage by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and alluvial deposits; some aquatic vegetation during summer months. Control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during the year, from water-stage recorder, 9.1 feet at 3 a. m. February 26 (discharge, determined from extension of rating curve, 2,240 second-feet); minimum stage, from water-stage recorder, 1.40 feet at 6.10 a. m. October 25, 1914 (discharge, 22 second-feet).

1910–1915: Maximum stage recorded February 26, 1915 (see preceding paragraph); minimum stage recorded, 1.36 feet September 22, 1914 (discharge, 22 second-feet).

WINTER FLOW.—Discharge relation not seriously affected by ice.

REGULATION.—The operation of mills at Enfield, 6 miles above the station, affects the distribution of flow at low and medium stages. This diurnal fluctuation is somewhat equalized by the pondage above the dam at West Ware, which has not been used for power development for several years and has only a slight effect when the mean daily discharge is over 200 second-feet. (See Water-Supply Paper 375, p. 132.)

ACCURACY.—Records considered good.

Discharge measurements of Swift River at West Ware, Mass., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 4	R. S. Barnes	1.80	66	Apr. 14	R. S. Barnes	4.69	791
20	do	[a]1.83	59.6	14	do	4.68	788
Jan. 5	do	[a]1.90	59	Sept. 30	Hardin Thweatt	2.05	106
Feb. 5	do	[a]2.53	145				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Swift River at West Ware, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	34	38	59	47	143	895	156	389	101	136	376	180
2	37	40	66	44	152	655	145	461	109	172	475	166
3	35	41	67	36	150	520	132	420	109	280	640	154
4	30	46	67	47	139	368	134	389	102	355	728	145
5	38	52	67	54	136	342	150	342	95	360	1,610	141
6	30	48	65	40	158	304	200	312	88	322	1,800	130
7	34	46	64	359	241	292	239	282	74	335	1,760	121
8	35	46	66	297	277	267	245	275	72	270	1,360	121
9	34	53	67	325	270	267	255	275	78	565	1,020	121
10	34	48	64	262	239	255	262	270	76	925	795	113
11	31	45	64	176	217	243	317	257	68	848	610	106
12	35	45	58	182	176	239	565	228	66	672	490	102
13	32	44	58	272	145	217	865	208	62	535	444	98
14	32	46	76	255	134	204	795	188	59	397	447	95
15	33	44	62	225	210	184	655	172	56	320	417	100
16	38	74	60	194	550	196	505	152	64	277	391	98
17	55	81	60	180	655	187	404	149	71	215	347	113
18	56	72	55	565	595	177	368	164	74	194	307	94
19	59	70	53	985	505	168	335	164	72	188	267	88
20	51	79	58	1,180	404	160	320	156	78	221	241	84
21	47	72	53	895	356	143	297	145	78	267	215	121
22	45	65	53	565	330	147	277	166	81	280	213	150
23	43	60	61	434	325	166	260	174	86	272	241	139
24	43	56	61	434	399	164	245	176	86	267	243	139
25	42	64	45	407	1,490	162	234	184	77	272	260	136
26	55	65	46	407	2,200	174	221	172	81	248	234	130
27	48	67	46	342	1,800	162	230	162	79	248	213	125
28	43	73	43	287	1,270	150	230	147	72	282	198	117
29	44	67	42	232	.....	143	225	128	71	368	188	109
30	45	62	46	215	.....	162	239	118	71	391	186	95
31	46	.....	48	170	.....	160	.....	106	.....	391	188	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 16, 1914, to Jan. 20, 1915, and Jan. 30 to Feb. 24, 1915; estimates based on gage heights corrected for backwater by means of three discharge measurements and climatic data. Discharge interpolated Mar. 17–18.

Monthly discharge of Swift River at West Ware, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 186 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	59	30	40.8	0.219	0.25	B.
November	81	38	57.0	.306	.34	B.
December	76	42	58.1	.312	.36	C.
January	1,180	36	326	1.75	2.02	C.
February	2,200	134	488	2.62	2.73	C.
March	895	143	254	1.37	1.58	B.
April	865	132	317	1.70	1.90	B.
May	461	106	224	1.20	1.38	B.
June	109	56	78.5	.422	.47	B.
July	925	136	351	1.89	2.18	B.
August	1,800	186	545	2.93	3.38	B.
September	180	84	121	.651	.73	B.
The year	2,200	30	237	1.27	17.32	

QUABOAG RIVER AT WEST BRIMFIELD, MASS.

LOCATION.—At the two-span highway bridge, in Hampden County, just west of the West Brimfield station of the Boston & Albany Railroad, about 3 miles below West Warren.

DRAINAGE AREA.—150 square miles.

RECORDS AVAILABLE.—August 23, 1909, to September 30, 1915.

GAGE.—Stevens water-stage recorder installed September 28, 1914, at the downstream end of center pier and referred to datum by a hook gage inside the well; August 19, 1912, to September 27, 1914, Barrett & Lawrence water-stage recorder; prior to August 19, 1912, a vertical staff on the upstream side of the right abutment of the bridge. All gages at the same datum.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of bowlders, gravel, and alluvial deposits; control practically permanent.

WINTER FLOW.—Discharge relation seriously affected by ice.

EXTREMES OF DISCHARGE.—Maximum stage during the year, from water-stage recorder, 5.2 feet at 9.30 a. m. January 7 (discharge, determined by applying correction for effect of ice, which probably obstructed the channel to a small extent, 1,660 second-feet); minimum stage, from water-stage recorder, 1.61 feet at 6 a. m. October 9 and 1 a. m. October 11, 1914 (discharge, 10 second-feet).

1909–1915: Maximum open-water stage recorded, 4.9 feet March 1, 1910 (discharge, 1,660 second-feet); minimum stage recorded, 1.4 feet September 17–18, 1910 (discharge, 2.5 second-feet).

REGULATION.—The operation of mills at West Warren causes a decided diurnal fluctuation discharge at the station. (See Water-Supply Paper 375, p. 132.)

ACCURACY.—Rating curve well defined; results for open-water period, obtained by continuous record of gage height, considered good.

Discharge measurements of Quaboag River at West Brimfield, Mass., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 3	R. S. Barnes	1.80	27.3	Feb. 6	R. S. Barnes	[a] 3.00	341
21	do	[a] 2.27	62	Mar. 5	do	3.12	464
Jan. 4	do	[a] 2.63	39.4	Aug. 14	Hardin Thweatt	2.55	194
6	do	[a] 2.06	31.9				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Quaboag River at West Brimfield, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	65	13	52	33	284	620	128	136	113	75	94	87
2	21	41	55	28	193	568	130	148	77	136	115	81
3	44	37	49	18	262	477	125	148	85	133	142	79
4	25	40	58	50	401	335	120	136	79	136	250	58
5	49	21	55	63	562	455	151	133	58	118	423	79
6	44	28	34	101	401	417	163	130	73	120	330	77
7	37	25	71	1,000	396	380	176	123	98	94	302	83
8	31	18	40	935	375	345	176	136	59	118	284	69
9	27	43	46	763	375	306	190	145	63	254	288	61
10	24	40	46	729	311	284	193	136	63	211	279	75
11	16	38	37	661	320	258	207	120	52	190	254	37
12	40	16	38	797	266	246	246	120	49	183	234	53
13	50	14	50	970	284	218	242	113	32	166	250	77
14	37	28	59	722	270	211	238	108	79	157	207	77
15	34	25	73	581	391	204	226	85	58	151	193	79
16	28	59	125	562	633	186	211	96	56	139	176	89
17	29	56	142	525	562	186	207	120	56	110	157	77
18	21	49	113	1,020	507	169	190	98	65	103	139	50
19	67	41	79	709	483	163	183	87	55	113	123	49
20	41	52	40	647	439	160	169	81	56	110	128	65
21	38	47	197	581	412	151	166	89	85	105	101	101
22	31	33	94	501	391	166	163	113	55	105	123	96
23	32	67	58	562	370	145	160	123	59	115	125	85
24	34	68	44	661	401	136	151	125	52	91	113	77
25	19	68	40	614	790	133	157	113	53	91	110	63
26	30	68	35	555	756	128	160	110	44	103	110	69
27	41	69	33	507	640	77	142	105	49	75	94	81
28	40	61	31	461	661	120	148	89	77	71	81	65
29	26	47	33	407	.....	123	139	87	52	96	96	61
30	26	67	30	302	.....	115	142	103	49	98	103	69
31	21	.....	33	293	.....	110	.....	94	.....	77	85	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 11, 1914, to Jan. 20, 1915, and Jan. 31 to Feb. 17, 1915; estimates based on gage heights corrected for backwater by means of four discharge measurements and climatic data. Discharge interpolated Nov. 24–26.

Monthly discharge of Quaboag River at West Brimfield, Mass., for the year ending Sept. 30, 1915.

[Drainage area 150 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	67	16	34.5	0.230	0.27	A.
November	69	13	42.6	.284	.32	A.
December	197	30	61.0	.407	.47	C.
January	1,020	18	528	3.52	4.06	C.
February	790	193	433	2.89	3.01	C.
March	620	77	245	1.63	1.88	A.
April	246	120	173	1.15	1.28	A.
May	148	81	115	.767	.88	A.
June	113	32	634	.423	.47	A.
July	254	71	124	.827	.95	A.
August	423	81	178	1.19	1.37	A.
September	101	37	72.3	.482	.54	A.
The year	1,020	13	171	1.14	15.50	

WESTFIELD RIVER AT KNIGHTSVILLE, MASS.

LOCATION.—At the single-span steel highway bridge known locally as the Pitcher Bridge, at Knightville, Hampshire County, 1 mile north of the outlet of Norwich Lake and about 3 miles above confluence with middle branch of Westfield River.

DRAINAGE AREA.—162 square miles.

RECORDS AVAILABLE.—August 26, 1909, to September 30, 1915.

GAGE.—Chain attached to downstream side of bridge.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed rough, covered with bowlders and ledge rock; control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.34 feet at 8 a. m. February 25 (discharge computed from extension of rating curve, ,630 second-feet); minimum stage recorded, 0.77 foot at 5 p. m. October 1, 5 p. m. October 8, and 7.30 a. m. October 12, 1914 (discharge, 11 second-feet).

1909–1915: Maximum open-water stage recorded, 8.9 feet March 27, 1913 (discharge, 5,100 second-feet); a gage height of 9.4 feet was recorded at 9.15 a. m. January 22, 1910, but the channel was probably obstructed by ice at that time; minimum stage recorded, 0.60 foot August 10, 1913 (discharge, 4.0 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Flow not seriously affected by regulation.

ACCURACY.—Rating curve is well defined below 2,000 second-feet, open-water records considered good.

Discharge measurements of Westfield River at Knightville, Mass., during the year ending Sept. 30, 1915.

[Made by R. S. Barnes.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar 2	2.62	447	Apr. 12	4.70	1,790

Daily discharge, in second-feet, of Westfield River at Knightville, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	18	120	110	130	373	166	395	68	97	116	222
2	12	20	80	80	250	373	198	330	73	291	121	183
3	13	20	125	70	200	330	222	272	63	395	255	161
4	14	20	112	60	180	310	350	207	56	255	3,040	141
5	13	17	90	55	160	291	183	207	52	169	1,920	129
6	14	18	63	50	250	291	172	222	55	207	985	118
7	14	20	48	600	640	272	523	207	61	139	920	118
8	12	20	192	580	495	395	523	207	61	1,640	495	116
9	14	19	92	373	350	291	610	222	61	1,920	395	108
10	14	23	71	272	272	291	640	183	46	730	610	101
11	15	20	48	330	255	255	1,780	158	44	350	373	92
12	12	23	32	395	222	238	1,920	146	37	445	291	80
13	13	22	24	640	255	195	1,050	134	35	395	395	82
14	14	19	105	470	255	222	640	134	34	272	291	172
15	13	30	90	255	222	222	550	121	40	181	207	151
16	18	169	80	255	1,500	195	445	104	63	148	222	99
17	49	153	60	195	790	192	395	116	84	136	207	90
18	74	97	60	523	420	183	350	129	87	129	166	85
19	63	99	55	1,990	330	164	330	121	73	129	146	74
20	58	90	35	985	272	198	310	110	92	1,240	139	68
21	44	45	50	373	272	222	272	103	104	373	116	179
22	38	60	65	291	272	195	255	255	73	550	445	445
23	28	70	35	291	291	238	238	201	66	350	1,180	183
24	23	70	30	495	670	272	238	156	61	238	470	127
25	20	55	20	373	3,920	310	222	125	46	179	445	108
26	19	70	15	291	1,850	470	201	121	68	158	330	108
27	20	65	15	255	985	272	201	129	53	174	222	238
28	23	75	15	222	580	272	183	112	67	174	192	146
29	17	95	50	174	.....	222	201	94	55	192	207	112
30	16	110	125	150	.....	156	272	88	48	179	238	101
31	13	.....	120	120	.....	164	.....	74	.....	139	291	.....

NOTE.—Discharge determined from a rating curve well defined below 2,000 second-feet. Discharge relation affected by ice Nov. 21 to Dec. 2, 1914, Dec. 14 to Jan. 7, and Jan. 30 to Feb. 6, 1915; discharge estimated by comparison with other records.

Monthly discharge of Westfield River at Knightville, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 162 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	74	12	23.3	0.144	0.17	C.
November	169	17	54.4	.336	.37	B.
December	192	15	68.5	.423	.49	B.
January	1,990	50	365	2.25	2.59	B.
February	3,920	130	582	3.59	3.74	B.
March	470	156	260	1.60	1.84	A.
April	1,920	166	455	2.81	3.14	A.
May	395	74	167	1.03	1.19	A.
June	104	34	60.9	.376	.42	B.
July	1,920	97	386	2.38	2.74	A.
August	3,040	116	498	3.07	3.54	A.
September	445	68	138	.852	.95	A.
The year	3,920	12	253	1.56	21.18	

WESTFIELD RIVER NEAR WESTFIELD, MASS.

LOCATION.—At a point locally known as Trap Rock Crossing, about 3 miles east of Westfield, Hampden County, and 2 miles below the mouth of Westfield Little River. Great Brook enters about a mile above the station.

DRAINAGE AREA.—496 square miles.

RECORDS AVAILABLE.—June 27, 1914, to September 30, 1915.

GAGE.—Stevens water-stage recorder on right bank referred to datum by a hook gage inside the well; inclined staff used for auxiliary readings.

DISCHARGE MEASUREMENTS.—Made from cable about one-half mile below gage or by wading.

CHANNEL AND CONTROL.—Bed of gravel. Control at low and medium stages is about 200 feet below the gage; practically permanent; at high stages control is probably formed by the crest of the dam at Mittineague, 3 miles below the station.

EXTREMES OF DISCHARGE.—Maximum stage during year (water-stage recorder), 17.4 feet at 11.30 p. m. August 4, 1915 (discharge, determined from an extension of the rating curve, 17,400 second-feet); minimum stage (water-stage recorder), 3.03 feet several times each day October 1, 2, 3, 6, 7, 9, and 10, 1914 (discharge, 49 second-feet).

1914–15: Maximum stage recorded, 17.4 feet at 11.30 p. m. August 4, 1915 (discharge, 17,400 second-feet); minimum stage recorded, 3.02 feet September 24, 1914 (discharge, 46 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

DIVERSIONS.—Water is diverted from Westfield Little River for municipal supply of Springfield. The amount diverted is added in the table of monthly discharge to give the total flow of Westfield River.

REGULATION.—Several power plants above the station cause diurnal fluctuation of flow. The nearest dam is at Westfield.

ACCURACY.—Records considered good.

Discharge measurements of Westfield River near Westfield, Mass., during the years ending Sept. 30, 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Dec. 16	R. S. Barnes	3.55	182	Jan. 21	R. S. Barnes	5.59	1,360
Jan. 7	do	[a] 5.22	393	22	do	4.99	1,040
19	C. H. Pierce	10.4	6,810	Feb. 4	do	[a] 4.46	566
20	R. S. Barnes	7.34	2,950	Apr. 11	do	7.94	3,620
20	do	7.12	2,670	13	do	6.94	2,540
				15	do	5.54	1,270
				Aug. 16	Hardin Thweatt	4.28	573

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Westfield River near Westfield, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	61	188	352	340	372	1,260	505	1,300	352	328	268	660
2	61	94	216	260	690	1,080	510	1,020	376	280	296	525
3	64	84	336	220	605	960	535	900	252	780	475	475
4	80	108	296	180	530	750	530	780	228	660	4,500	425
5	84	101	320	160	475	810	620	690	200	515	7,550	324
6	67	160	228	140	630	840	840	690	105	610	2,500	324
7	67	140	244	1,790	1,550	780	1,220	600	168	490	1,910	385
8	84	152	304	990	1,220	840	1,190	630	248	870	1,400	320
9	70	84	192	430	840	810	1,300	750	208	8,200	1,020	324
10	70	70	212	212	660	750	1,470	636	184	2,030	1,120	316
11	80	70	200	188	510	720	3,660	550	176	1,120	900	300
12	70	70	208	336	520	690	5,440	510	168	1,080	720	280
13	87	80	204	2,030	545	605	2,500	420	144	1,160	810	272
14	98	136	304	1,080	505	636	1,670	410	136	810	840	316
15	87	77	276	690	720	648	1,330	390	204	625	666	296
16	101	340	240	480	4,140	600	1,190	348	204	520	605	328
17	148	550	180	455	2,160	607	1,080	415	200	440	595	319
18	140	385	180	2,300	1,360	614	990	415	348	364	525	310
19	212	348	184	6,000	1,020	621	930	425	368	405	465	301
20	260	224	108	3,100	930	628	900	415	308	900	420	292
21	248	129	144	1,510	900	634	810	332	364	750	368	282
22	248	184	200	960	930	640	750	540	405	750	520	272
23	133	208	108	720	1,020	647	720	750	272	810	1,870	263
24	119	208	88	1,550	1,710	654	684	620	248	540	1,050	254
25	112	160	49	1,220	14,500	750	654	520	129	420	900	245
26	129	220	46	960	5,040	930	642	485	140	435	900	236
27	94	200	43	780	2,210	648	600	445	196	372	654	332
28	91	224	40	720	1,590	580	570	445	208	376	545	376
29	108	284	40	590	.....	615	565	405	228	440	485	320
30	115	336	430	455	.....	500	810	292	192	385	636	288
31	126	.....	405	360	.....	475	.....	188	.....	356	900	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 16, 1914, to Jan. 18, 1915, and Feb. 1–14, 1915; estimates based on gage heights corrected for backwater by means of three discharge measurements and climatic data. Discharge interpolated Mar. 17–23 and Sept. 17–25, as recorder was not working properly.

Monthly discharge of Westfield River at Westfield, Mass., for the year ending Sept. 30, 1915.

[Drainage area 496 square miles.]

Month.	Observed discharge in second-feet.			Diversion from Westfield Little River in millions of gallons	Total discharge in second-feet.		Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.		Mean.	Per square mile.		
October	260	61	113	341.0	130	0.262	0.30	B.
November	550	70	187	311.8	203	.409	.46	B.
December	352	40	206	341.7	223	.449	.52	C.
January	6,000	140	1,010	327.4	1,030	2.08	2.40	C.
February	14,500	372	1,710	282.9	1,730	3.49	3.63	C.
March	1,260	475	720	325.2	736	1.48	1.71	A.
April	5,440	505	1,170	319.6	1,190	2.40	2.68	A.
May	1,300	188	559	324.6	576	1.16	1.34	A.
June	405	105	232	337.1	250	.504	.56	B.
July	8,200	280	897	344.9	914	1.84	2.12	A.
August	7,550	268	1,170	324.6	1,190	2.40	2.77	A.
September	660	236	332	328.7	349	.704	.79	A.
The year	14,500	40	687	3,910	704	1.42	19.28	

MIDDLE BRANCH OF WESTFIELD RIVER AT GOSS HEIGHTS, MASS.

LOCATION.—At the single-span highway bridge in Goss Heights, Hampshire County, about 1½ miles north of the village of Huntington and half a mile above the mouth of the Middle Branch.

DRAINAGE AREA.—53 square miles.

RECORDS AVAILABLE.—July 14, 1910, to September 30, 1915.

GAGE.—Barrett & Lawrence water-stage recorder on upstream side of abutment on right bank, referred to datum by hook gage inside the well; inclined staff for auxiliary readings; prior to September 7, 1912, chain gage attached to upstream side of bridge.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of coarse gravel and bowlders; control somewhat shifting.

EXTREMES OF DISCHARGE.—1910–1915: Maximum stage, from water-stage recorder, 7.33 feet at 9 p. m. July 8, 1915 (approximate discharge, determined from extension of rating curve, 4,500 second-feet); minimum stage, from water-stage recorder, 0.70 foot at 6 p. m. October 26 to 10 a. m. October 27, 1914 (discharge, zero).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Some diurnal fluctuation caused by operation of a small power plant about 2 miles above the station.

ACCURACY.—Open-water records considered good.

Discharge measurements of Middle Branch of Westfield River at Goss Heights, Mass., during the year ending Sept. 30, 1915.

[Made by R. S. Barnes.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 16	[a] 1.40	51	Mar. 2	[a] 1.94	116
Jan. 8	[a] 2.86	116	Apr. 12	2.92	657
Feb. 1	[a] 1.79	62			

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Middle Branch of Westfield River at Goss Heights, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.3	2.0	14	12	45	138	35	102	7.4	23	18	43
2	2.3	4.0	16	12	61	124	30	87	5.6	51	13	30
3	2.0	2.6	18	12	53	99	35	82	5.2	65	26	27
4	2.0	2.3	15	12	67	84	38	75	4.8	38	1,180	24
5	2.0	2.6	11	12	77	97	38	65	4.0	30	646	23
6	2.0	2.9	8.9	17	143	82	61	61	2.6	38	256	15
7	2.0	3.6	9.4	65	260	72	127	53	3.6	19	208	12
8	2.0	2.0	11	114	173	84	130	61	3.6	919	149	13
9	2.0	4.4	10	38	117	75	158	70	3.2	886	87	13
10	2.3	3.6	8.4	23	77	61	179	51	2.6	176	84	13
11	2.6	2.0	5.6	12	57	59	570	38	2.3	80	57	12
12	2.6	3.6	7.4	41	63	53	710	33	2.0	135	39	9.4
13	2.6	2.6	7.9	388	67	50	256	32	1.2	117	61	11
14	2.6	2.9	51	238	57	45	173	30	1.2	61	47	6.4
15	2.6	2.6	55	221	221	47	135	24	1.4	41	38	3.6
16	3.6	41	29	238	576	41	117	23	2.9	35	35	3.6
17	12	35	23	335	294	38	107	24	4.8	32	32	4.4
18	17	19	15	879	204	33	102	27	6.0	30	24	4.4
19	17	14	12	840	161	30	92	23	4.0	26	23	4.0
20	17	11	12	416	143	33	82	19	5.6	112	19	6.0
21	11	7.9	23	256	135	36	75	14	6.4	35	19	33
22	7.4	7.4	33	218	130	32	59	53	3.2	67	127	38
23	6.9	6.9	35	221	143	35	47	49	2.9	38	173	12
24	6.9	7.4	20	286	388	45	43	36	2.6	30	80	7.4
25	5.2	10	12	218	1,810	65	39	26	2.3	33	72	5.2
26	1.4	17	12	182	530	102	38	24	2.0	24	53	6.0
27	.4	26	11	158	238	61	36	35	2.0	23	38	7.4
28	.6	51	12	135	158	47	35	23	9.4	23	35	7.9
29	1.4	41	23	107	.....	38	35	12	6.9	26	35	6.0
30	2.0	29	23	80	.....	30	75	9.4	6.0	26	80	6.4
31	2.6	.....	14	57	.....	38	.....	8.9	.....	18	77	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Nov. 19–27; Dec. 16 to Jan. 17; Jan. 30 to Feb. 15, and Feb. 27 to Mar 12; estimates based on gage heights corrected for backwater by means of four discharge measurements and climatic data, but owing to unstable conditions of ice can be considered only approximately correct.

Monthly discharge of Middle Branch of Westfield River at Goss Heights, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 53 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	17	0.4	4.72	0.089	0.10	B.
November	51	2.0	12.2	.230	.26	C.
December	55	5.6	18.0	.340	.39	C.
January	879	12	188	3.55	4.09	C.
February	1,810	45	230	4.34	4.52	C
March	138	30	60.5	1.14	1.31	C.
April	710	30	122	2.30	2.57	A.
May	102	8.9	41.0	.774	.89	A.
June	9.4	1.2	3.92	.074	.08	B.
July	919	18	105	1.98	2.28	A.
August	1,180	13	124	2.34	2.70	A
September	43	3.6	13.6	.257	.29	A.
The year	1,810	.4	76.1	1.44	19.48	

WESTFIELD LITTLE RIVER NEAR WESTFIELD, MASS.

LOCATION.—At diversion dam of Springfield waterworks, in town of Russell, Hampden County, 3 miles below confluence of Pebble and Borden brooks, and about 3 miles west of Westfield; originally (July, 1905, to December, 1909) a short distance below Borden Brook, near Cobble Mountain.

DRAINAGE AREA.—48 square miles at present site; 43 square miles at original site.

RECORDS AVAILABLE.—July 13, 1905, to September 30, 1915.

DETERMINATION OF DISCHARGE.—High-water flow determined from continuous record of head on concrete diversion dam (crest length, 155.4 feet), for which coefficients have been deduced from experiments at Cornell University; low-water flow—less than 163 second-feet—determined from continuous record of head on a 12-foot sharp-crested weir without end contractions, the crest being 2.55 feet below that of dam. Water diverted to city of Springfield is measured by a 54-inch Venturi meter, using continuous-record chart. Daily record corrected for storage in a reservoir on Borden Brook about 5 miles above station. Owing to the time required for water to reach the dam and the natural storage along the stream, and the fact that no allowance is made for evaporation and seepage from the reservoir, the record as corrected does not represent exactly the natural flow of the stream at all times.

At original site below Borden Brook (used 1905 to 1909) discharge was determined by methods commonly employed at current-meter gaging stations. From August, 1906, to September, 1907, a 30-foot weir was maintained a short distance below gage.[1]

EXTREMES OF DISCHARGE.—Maximum 24-hour discharge recorded, 1,850 second-feet February 25, 1915; apparent minimum discharge zero at various times. See footnote to tables of daily and monthly discharge.

DIVERSIONS.—Record of water diverted at station for municipal supply of Springfield included in records as published.

COOPERATION.—Data collected and compiled under direction of E. E. Lochridge, chief engineer, Board of Water Commissioners, Springfield, Mass.

---

[1] Results obtained by weir and current-meter methods are compared in U. S. Geol. Survey Water-Supply Paper 201, pp. 105–110, and 241, pp. 164–168.

Daily discharge, in second-feet, of Westfield Little River near Westfield, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	.....	.....	19	0.5	146	114	38	228	24	88	19	43
2	.....	.....	28	15	126	80	28	145	19	135	20	35
3	.....	.....	23	20	96	70	37	115	16	114	26	33
4	.....	.....	33	3.2	74	55	31	126	15	96	697	25
5	.....	1.0	16	4.3	62	68	50	119	13	77	522	21
6	.....	1.6	14	14	283	55	70	103	13	52	218	19
7	3.9	.7	14	326	303	53	123	101	15	47	160	20
8	13	11	22	158	153	55	140	131	17	382	103	17
9	.....	1.0	14	101	120	55	136	123	15	962	77	14
10	.....	.....	14	49	89	52	162	101	15	514	54	14
11	.....	.....	23	37	73	52	608	85	15	116	49	13
12	.....	.....	14	185	81	50	767	70	4.5	104	43	15
13	.....	.....	11	533	76	49	339	63	3.6	111	78	11
14	.....	12	29	232	49	52	177	57	11	73	56	.....
15	.....	14	27	149	300	42	133	50	16	57	42	3.9
16	12	78	9.9	105	652	41	118	42	73	48	36	7.0
17	17	95	3.3	130	258	39	110	49	125	41	41	22
18	13	40	3.6	807	138	41	101	51	112	33	33	23
19	16	151	15	925	111	36	94	41	62	25	24	12
20	17	142	20	413	98	21	93	36	120	25	22	12
21	14	49	24	157	95	31	64	48	117	28	28	38
22	15	95	15	99	83	32	77	126	42	51	134	78
23	.....	142	15	193	108	58	77	102	38	53	236	23
24	.....	142	14	266	658	49	78	80	31	41	129	26
25	.8	70	24	152	1,850	70	70	61	25	26	96	12
26	1.5	79	6.9	110	546	66	70	59	21	20	59	19
27	2.4	49	1.6	93	247	52	62	57	22	20	49	19
28	1.2	29	2.2	88	148	38	59	50	19	25	38	15
29	2.5	22	40	48	.....	35	58	42	14	40	38	13
30	18	28	17	44	.....	39	222	35	16	33	58	10
31	13	.....	25	49	.....	41	.....	26	.....	23	56	.....

NOTE.—For days for which discharge is not given, the quantity of water released from storage was apparently equal to or greater than the total flow at the diversion dam.

Monthly discharge of Westfield Little River near Westfield, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 48 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	18	(a)	5.2	0.108	0.12
November	151	(a)	41.7	.860	.96
December	40	1.6	17.3	.360	.42
January	925	0.5	178	3.71	4.28
February	1,850	49	251	5.23	5.45
March	114	21	51.3	1.07	1.23
April	767	28	140	2.92	3.26
May	228	26	81.3	1.69	1.95
June	125	3.6	35.0	.729	.81
July	962	20	112	2.42	2.79
August	697	19	104	2.17	2.50
September	78	(a)	20.4	.425	.47
The year	1,850	(a)	85.3	1.78	24.24

[a] See footnote to daily discharge table.

BORDEN BROOK NEAR WESTFIELD, MASS.

LOCATION.—At the outlet of Borden Brook reservoir in the town of Granville, Hampden County, 2 miles above the confluence of Borden and Pebble brooks and about 8 miles west of Westfield.

DRAINAGE AREA.—8 square miles.

RECORDS AVAILABLE.—January 1, 1910, to September 30, 1915.

DETERMINATION OF DISCHARGE.—Flow determined from a continuous record of the head on a 5-foot sharp-crested weir without end contractions; results are then corrected for apparent gain or loss in water stored in reservoir, but, as no allowance is made for evaporation or seepage, they show only approximately the natural flow.

EXTREMES OF DISCHARGE.—Maximum 24-hour flow recorded during year, 245 second-feet on February 25, 1915; minimum apparent flow: Zero at various times when the quantity of stored water released was apparently equal to or greater than the measured flow at the weir.

1910–1915: Maximum 24-hour flow recorded, 294 second-feet on October 21, 1911; minimum apparent flow, zero.

COOPERATION.—Records furnished by the board of water commissioners of Springfield, through E. E. Lockridge, chief engineer.

Daily discharge, in second-feet, of Borden Brook near Westfield, Mass., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Ju ne.	July.	Aug.	Sept.
1	.....	.....	0.5	27.9	21.7	9.3	29.0	.....	6.8	.....	3.8
2	.....	7.7	9.8	18.6	.....	.....	25.8	.....	6.7	.....	3.2
3	.....	.....	.7	18.6	10.8	10.8	9.4	.....	8.1	.....	2.2
4	.....	9.3	3.2	9.3	.....	.....	15.6	.....	6.8	146	.....
5	.....	.....	2.0	9.3	10.8	10.8	12.2	.....	5.4	76.3	.....
6	.....	.....	.....	48.0	18.6	10.8	.....	.....	4.0	37.2	.....
7	.....	.....	71.6	38.7	11.2	21.7	4.7	.....	2.9	24.5	.....
8	.....	7.7	15.5	20.0	11.2	32.5	5.8	.....	127	13.2	.....
9	.....	.....	17.0	20.1	11.2	21.7	5.8	.....	78.2	14.5	.....
10	.....	.....	7.7	18.6	11.2	32.5	5.8	.....	37.5	.....	.....
11	.....	9.3	.....	10.8	11,2	163	5.8	.....	21.2	4.4	.....
12	.....	.....	83.6	9.3	11.2	88.2	4.7	4.0	10.0	1.9	.....
13	.....	.....	20.1	20.1	11.2	37.2	3.5	.....	13.4	1.1	.....
14	.....	7.7	65.0	.....	22.1	24.9	2.3	7.1	.....	.....	.....
15	1.3	7.7	26.3	77.4	11.2	13.9	.....	8.2	2.1	.....	.....
16	17.0	6.1	17.0	60.4	11.2	15.0	.....	17.5	.....	.....	.....
17	15.9	.5	34.1	40.2	11.2	15.0	.....	12.9	.....	.....	12.9
18	6.6	.5	152	20.1	22.1	15.0	.....	9.3	.....	.....	12.4
19	25.2	9.8	127	20.1	12.8	15.0	.....	18.6	.....	.....	.....
20	23.6	.7	54.2	9.3	.4	14.5	.....	9.9	.....	.....	.....
21	8.1	7.7	27.9	10.8	11.2	.6	8.4	11.0	.....	9.5	.....
22	15.9	.....	9.3	9.3	12.8	5.8	9.1	2.2	.....	22.7	37.2
23	23.6	.....	37.2	20.1	11.5	6.2	10.0	2.2	.....	20.4	.....
24	23.6	.....	26.3	243	9.3	5.9	7.3	.....	.....	20.4	9.3
25	.....	9.3	27.9	245	21.7	4.6	4.2	.....	.....	16.9	.....
26	24.7	6.9	9.3	54.2	.....	3.5	3.1	.....	.....	.....	.....
27	.....	1.6	9.3	21.7	10.8	2.8	.....	.....	.....	4.6	.....
28	.....	2.0	18.6	21.7	.....	2.8	.....	.....	6.6	2.8	.....
29	4.6	9.3	9.3	.....	.....	2.8	.....	.....	5.0	3.2	.....
30	7.7	.....	9.3	.....	10.8	42.1	.....	.....	5.0	5.5	.....
31	.....	7.7	9.3	.....	10.8	.....	.....	.....	.....	5.8	.....

NOTE.—For days for which discharge is not given, the quantity of water released from storage was apparently equal to or greater than that passing over the weir.

Monthly discharge of Borden Brook near Westfield, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 8.0 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October			0.00	0.000	0.00
November	25.2		6.59	.824	.92
December	9.8		3.60	.450	.52
January	152		29.1	3.64	4.20
February	245		40.1	5.01	5.22
March	22.1		10.7	1.34	1.54
April	163		21.0	2.62	2.92
May	29.0		5.56	.695	.80
June	18.6		3.43	.429	.48
July	127		11.2	1.40	1.61
August	146		13.9	1.74	2.01
September	37.2		2.70	.338	.38
The year	245		12.1	1.51	20.60

NOTE.—For months for which no maximum or minimum is given see footnote to daily discharge table.

FARMINGTON RIVER[a] NEAR NEW BOSTON, MASS.

LOCATION.—At a highway bridge a quarter of a mile below Clam River and about a mile south of New Boston, Berkshire County.

DRAINAGE AREA.—92.7 square miles.

RECORDS AVAILABLE.—May 27, 1913, to September 30, 1915.

GAGE.—Barrett & Lawrence water-stage recorder, installed June 11, 1913, on left bank on downstream side of bridge referred to datum by a hook gage inside the well; vertical staff installed on bridge abutment May 27, 1913, is used for auxiliary readings.

DISCHARGE MEASUREMENTS.—Made from a cable 120 feet below gage or by wading.

CHANNEL AND CONTROL.—Channel rocky and filled with boulders; control practically permanent except as affected by removal of rocks in measuring section.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 7.15 feet at 4 a. m. February 25 (discharge, computed from extension of rating curve, 2,600 second-feet); minimum stage, 2.24 feet at 6 p. m. November 3, 1914 (discharge, 4.8 second-feet).

1913–1915: Maximum stage recorded, 7.64 feet October 26, 1913 (discharge, 3,200 second-feet); minimum stage recorded, 2.22 feet August 27, 1913 (discharge, 4.4 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Flow affected by storage in Otis reservoir, about 5 miles above New Boston, and by operation of a woodworking shop just above the station.

ACCURACY.—Results for open-water periods considered good.

Discharge measurements of Farmington River near New Boston, Mass., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 18	R. S. Barnes	[b] 3.08	40.8	Mar. 4	R. S. Barnes	3.65	151
Feb. 3	do	[b] 3.82	151	June 21	C. H. Pierce	3.48	122

[a] Formerly published as "West Branch of Farmington River."

[b] Discharge relation affected by ice.

Daily discharge, in second-feet, of Farmington River near New Boston, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	65	12	32	50	269	269	77	197	67	116	56	96
2	49	13	42	38	173	210	84	173	61	162	54	80
3	38	13	44	33	151	162	87	162	54	151	105	65
4	36	16	41	29	141	151	82	141	52	151	574	62
5	29	15	36	29	131	131	93	131	47	141	1,060	58
6	27	15	36	39	210	116	141	131	47	141	500	55
7	23	15	35	650	286	108	151	116	47	518	375	52
8	22	14	37	455	197	104	185	151	50	1,700	238	50
9	21	15	37	435	151	105	210	162	47	1,310	185	48
10	16	16	36	375	151	104	224	131	43	550	141	46
11	13	16	40	210	197	87	375	112	41	337	114	44
12	10	16	40	337	173	87	980	105	40	269	98	42
13	10	15	44	680	122	86	525	98	37	224	112	39
14	15	15	47	286	112	77	337	87	32	151	99	37
15	29	16	71	185	141	77	254	81	34	110	84	37
16	27	32	65	141	710	90	197	78	107	90	75	46
17	22	40	54	118	415	65	173	81	162	93	107	49
18	22	40	43	550	302	75	162	90	151	96	87	56
19	15	36	30	980	238	60	162	82	98	99	65	58
20	15	40	40	600	185	71	151	73	151	102	60	58
21	10	36	49	337	162	73	141	71	122	104	55	105
22	7.0	40	49	210	151	75	122	141	86	105	212	122
23	11	36	41	224	162	77	118	162	86	107	415	90
24	13	36	32	375	337	84	118	141	90	96	185	65
25	11	38	34	269	2,000	91	108	114	74	84	151	49
26	8.8	37	34	210	875	87	110	104	60	68	122	43
27	8.8	45	25	162	455	83	112	112	56	65	98	52
28	10	42	23	141	337	79	105	98	71	62	110	49
29	10	49	23	108	.....	75	106	87	62	98	87	44
30	13	40	54	116	.....	71	162	77	62	80	100	41
31	10	.....	67	122	.....	74	.....	74	.....	62	112	.....

NOTE.—Discharge determined from a rating curve well defined below 1,500 second-feet. Discharge relation affected by ice Dec. 16, 1914, to Jan. 5, 1915, and Jan. 31 to Feb. 12, 1915; estimates based on two discharge measurements and climatic data. Discharge estimated Feb. 27 to Mar. 1, and interpolated Nov. 5–7, Sept. 1, 2, 4–6, 8, 9, and 11–13, as the recorder was not working properly.

Monthly discharge of Farmington River near New Boston, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 92.7 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	65	7.0	19.9	0.215	0.25	B.
November	49	12	27.0	.291	.32	B.
December	71	23	41.3	.446	.51	C.
January	980	29	274	2.96	3.41	B.
February	2,000	112	319	3.44	3.58	B.
March	269	60	100	1.08	1.24	A.
April	980	77	195	2.10	2.34	A.
May	197	71	115	1.24	1.43	A.
June	162	32	71.2	.768	.86	A.
July	1,700	62	240	2.59	2.99	A.
August	1,060	54	188	2.03	2.34	A.
September	122	37	57.9	.625	.70	A.
The year	2,000	7.0	136	1.47	19.97	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

HOUSATONIC RIVER BASIN.

HOUSATONIC RIVER NEAR GREAT BARRINGTON, MASS.

LOCATION.—At a highway bridge about a quarter of a mile northeast of the Van Dusenville railroad station and 2 miles north of Great Barrington, Berkshire county.

DRAINAGE AREA.—280 square miles.

RECORDS AVAILABLE.—May 17, 1913, to September 30, 1915.

GAGE.—Inclined staff attached to concrete anchorages on downstream side of left abutment of bridge; vertical high-water section attached to bridge abutment.

DISCHARGE MEASUREMENTS.—Made from upstream side of bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand, gravel, and alluvial deposits; control practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.8 feet at 6 a. m. and 6 p. m. July 9 (discharge, determined from extension of rating curve, 4,100 second-feet); zero flow recorded on afternoon of October 25, 1914 (water held back by mills).

1913–1915: Maximum stage recorded, 7.9 feet March 29, 1914 (discharge, determined from extension of rating curve 5,200 second-feet); zero flow at various times due to holding back of water by mills.

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Flow affected by the operation of a paper mill about a mile above the station, which causes low water on Sundays and holidays.

ACCURACY.—Records are based on two observations a day, but as the operation of the paper mill does not cause serious diurnal fluctuation, they are considered fairly good.

Discharge measurements of Housatonic River near Great Barrington, Mass., during the year ending Sept. 30, 1915.

[Made by R. S. Barnes.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec-ft.*		*Feet.*	*Sec-ft.*
Dec. 17	1.46	.151	Apr. 9	2.38	512
Feb. 2	a 2.42	278			

a Discharge relation affected by ice.

Daily discharge, in second-feet, of Housatonic River near Great Barrington, Mass., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	115	a 10	110	159	420	520	375	420	195	180	a 159	445
2	112	122	125	255	470	980	275	a 355	195	255	165	470
3	87	165	150	a 67	295	735	130	295	240	315	295	335
4	a 13	150	115	90	315	580	a 275	397	122	320	315	255
5	56	97	115	81	335	580	255	420	110	255	1,340	a 153
6	135	130	a 77	87	700	495	375	355	a 13	420	1,190	110
7	122	22	90	445	a 520	a 420	520	315	141	375	1,120	355
8	125	a 159	162	520	580	420	520	420	122	1,050	a 770	240
9	97	75	85	550	580	580	470	a 335	105	4,110	69	315
10	24	150	100	a 295	445	470	397	315	97	3,370	520	275
11	a 3.0	107	110	210	375	335	a 1,050	397	81	a 2,060	520	240
12	51	90	61	195	375	420	2,140	355	69	1,420	420	a 180
13	32	57	a 54	610	315	445	2,060	315	a 85	1,190	315	225
14	100	132	150	520	a 335	a 375	1,740	225	97	980	315	225
15	107	a 165	135	375	580	315	980	295	130	700	a 375	195
16	97	97	162	335	2,470	420	770	a 195	122	495	240	240
17	49	125	165	a 295	1,740	397	640	195	75	470	375	225
18	a 1.0	195	159	420	1,050	355	a 445	255	115	a 295	470	255
19	48	130	65	1,500	770	355	470	275	97	275	375	a 180
20	125	107	a 63	1,260	700	315	610	295	a 73	520	275	240
21	122	48	97	1,050	a 397	a 255	520	255	225	580	210	275
22	165	a 67	165	295	520	375	420	275	130	470	a 355	520
23	159	105	195	240	520	335	375	a 375	225	445	315	445
24	110	130	150	a 495	520	397	335	295	195	470	580	397
25	a 2.0	135	17	445	3,370	355	a 355	255	195	a 470	550	255
26	85	37	122	420	3,640	420	240	335	165	255	610	a 210
27	90	122	a 56	445	3,190	375	420	295	a 165	495	520	255
28	75	90	85	335	a 1,190	a 315	335	335	180	295	445	255
29	81	a 11	100	225	.....	225	295	375	210	355	a 355	75
30	83	165	105	95	.....	375	295	a 165	165	255	195	225
31	47	.....	135	150	.....	375	.....	195	.....	150	550	.....

Sunday.

NOTE.—Discharge determined from a rating curve well defined below 1,700 second-feet. Discharge relation may have been affected by ice at various times from Dec. 16 to Jan. 18, and Jan. 31 to Feb. 15; discharge estimated from open water rating curve.

Monthly discharge of Housatonic River near Great Barrington, Mass., for the year ending Sept. 30, 1915.

[Drainage area, 280 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	165	1.0	80.9	0.289	0.33	B.
November	195	10	106	.379	.42	B.
December	195	17	112	.400	.46	C.
January	1,500	67	402	1.44	1.66	C.
February	3,640	295	954	3.41	3.55	C.
March	980	225	429	1.53	1.76	B.
April	2,140	130	603	2.15	2.40	B.
May	420	165	309	1.10	1.27	B.
June	240	13	138	.493	.55	B.
July	4,110	150	755	2.70	3.11	B.
August	1,340	69	462	1.65	1.90	B.
September	520	75	269	.961	1.07	B.
The year	3,640	1.0	382	1.36	18.48	

HOUSATONIC RIVER AT FALLS VILLAGE, CONN.

LOCATION.—At Falls Village, Litchfield county, about half a mile below the power plant of the Connecticut Power Co. and 23 miles north of Gaylordsville.

DRAINAGE AREA.—644 square miles (measurement furnished by Connecticut Power Co.)

RECORDS AVAILABLE.—July 11, 1912, to September 30, 1915.

GAGE.—Temporary staff gages July 11 to October 26, 1912; chain gage 1,500 feet below the railroad station October 27, 1912, to May 22, 1914; Stevens automatic water stage recorder, 300 feet below the chain gage, December 15, 1913, to September 30, 1915. All gage heights referred to datum of chain gage.

DISCHARGE MEASUREMENTS.—Made by wading at low stages from a boat at medium stages and by means of floats at flood stages.

CHANNEL AND CONTROL.—Channel deep and of fairly uniform cross section; one channel at all times. Control not clearly defined except at low stages; probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 13.3 feet at 4.30 p. m. March 29, 1914 (discharge, 8,830 second-feet); zero flow was recorded at various times during the months of October, 1914, to January, 1915, when power plant was shut down and water was being stored.

WINTER FLOW.—Discharge relation occasionally affected by ice.

REGULATION.—Prior to June, 1914; the flow at low water was regulated by power plants farther upstream; thereafter the plant of the Connecticut Power Co. completely regulated the low-water flow. The plant has a present capacity of 9,000 kilowatts with a normal head on the wheels of 90 feet.

ACCURACY.—Record has been obtained by standard methods of stream-gaging and is considered good.

COOPERATION.—Entire record has been furnished by the Connecticut Power Co.

Discharge measurements of Housatonic River at Falls Village, Conn., during the years 1912–1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
Aug. 7	D. M. Wood	[a] 0.63	258	Mar. 17	Hodsdon and Jony	6.06	2,620
8	do	[a] 0.33	155	May 16	Jony and Downs	2.45	667
Oct. 26	Wood and Hodsdon	[b] 6.05	2,630	July 8	D. M. Wood	1.60	254
27	do	[c] 5.51	2,270	9	do	1.44	205
Nov. 11	G. E. Hodsdon	[d] 4.58	1,830	9	do	1.55	235
12	do	[e] 4.02	1,380	Sept. 20	Jony and Magee	1.46	199
13	do	[f] 3.54	1,130	30	do	.94	82
				1914.			
				May 21	Wood and Jony	4.00	1,360

[a] Staff gage.
[b] Gage height by staff gage 4.20 feet.
[c] Gage height by staff gage 3.70 feet.
[d] Gage height by staff gage 3.50 feet.
[e] Gage height by staff gage 2.59 feet.
[f] Gage height by staff gage 2.19 feet.

NOTE.—Gage heights referred to chain gage except as noted.

Daily discharge, in second-feet, of Housatonic River at Falls Village, Conn., for 1912–1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1912.												
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	192	189
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	224	445
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	266	450
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	224	401
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	175	576
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	248	571
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	252	495
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	169	425
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	172	308
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	172	276
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	383	803	430
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	334	637	304
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	338	545	329
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	440	392	182
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	266	324	214
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	324	347	228
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	262	262	329
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	262	316	374
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	388	276	256
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	284	430	242
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	329	450	304
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	231	374	250
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	288	338	200
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	255	555	234
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	228	370	378
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	214	206	273
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	196	307	182
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	145	206	189
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	160	276	214
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	175	245	234
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	270	206	.....
1912-13.												
1	280	646	845	2,110	1,770	1,660	4,410	1,420	632	208	118	190
2	252	790	1,050	2,800	1,660	1,330	3,660	1,270	700	196	133	190
3	256	1,120	1,720	2,430	1,600	1,290	3,180	1,010	800	328	178	187
4	300	790	1,960	2,740	1,320	1,320	2,880	860	800	294	187	205
5	234	775	1,900	2,800	1,290	1,260	2,720	480	1,250	211	202	178
6	154	710	1,990	1,960	1,600	1,020	2,660	845	1,120	208	118	211
7	130	632	1,960	2,170	1,550	825	2,500	840	1,060	175	190	175
8	130	2,130	1,880	2,280	1,540	865	2,300	700	1,080	224	184	163
9	130	2,800	1,540	2,450	1,480	910	2,100	650	740	214	190	187
10	130	2,410	1,340	2,980	1,420	1,290	1,810	508	624	208	214	163
11	130	1,820	1,230	3,020	1,480	1,790	1,670	480	592	217	136	196
12	130	1,380	1,120	2,840	1,320	1,930	3,670	440	529	224	112	166
13	130	1,190	1,100	2,600	1,120	1,720	4,200	610	472	208	142	166
14	130	1,190	1,120	2,340	1,000	1,890	4,240	628	428	199	133	181
15	217	1,550	1,080	2,070	915	3,210	4,060	556	360	211	136	85
16	238	1,470	850	2,080	940	3,900	3,420	542	208	199	115	92
17	109	1,300	925	2,140	588	3,800	2,980	619	199	175	142	80
18	109	1,170	1,100	2,300	900	3,500	2,500	574	178	196	118	166
19	157	1,000	1,230	2,670	655	2,730	2,180	512	184	214	118	166
20	136	975	1,530	2,720	725	2,390	1,740	655	360	202	118	184
21	109	950	1,590	2,650	750	2,410	1,540	664	725	154	196	166
22	91	875	1,590	2,080	1,140	2,430	1,520	810	400	80	190	178
23	166	860	1,530	2,080	1,640	2,330	1,450	880	388	205	172	283
24	2,160	865	1,510	2,130	1,510	1,980	1,320	1,460	400	214	163	297
25	2,960	870	1,320	2,150	1,230	1,960	1,290	1,970	400	214	166	283
26	2,690	725	1,200	2,150	1,290	2,430	1,250	1,600	332	109	166	208
27	2,360	1,170	1,370	2,110	825	3,930	1,050	1,150	336	139	80	190
28	1,420	1,040	1,450	2,080	1,690	6,960	1,070	1,030	272	139	175	214
29	1,160	1,060	1,440	1,400	.....	8,110	1,610	1,710	283	115	196	208
30	1,000	1,100	1,470	1,290	.....	7,160	1,510	1,650	220	148	202	72
31	725	.....	1,810	1,690	.....	5,520	.....	1,240	.....	154	166	.....

Daily discharge, in second-feet, of Housatonic River at Falls Village, Conn., for 1912–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	308	885	890	600	1,800	400	4,640	2,710	606	392	217	252
2	420	592	880	550	1,600	1,000	4,580	2,470	583	396	196	244
3	448	596	1,000	450	1,300	2,500	5,100	1,960	332	364	220	252
4	297	700	870	400	1,100	2,300	4,830	1,710	512	244	217	248
5	205	740	740	350	1,000	2,100	4,320	1,860	632	208	224	217
6	211	601	745	350	800	1,900	3,120	3,330	696	208	252	193
7	178	583	805	350	800	1,600	2,750	3,430	565	353	234	196
8	154	538	1,550	350	800	1,400	2,860	3,050	583	570	214	248
9	196	710	1,490	350	800	1,280	4,740	2,630	480	420	196	241
10	178	1,220	1,300	300	700	1,330	5,680	2,260	448	368	258	244
11	181	2,020	1,240	300	700	1,240	5,640	1,700	400	416	280	238
12	214	2,010	900	250	600	1,420	5,040	1,900	408	396	262	211
13	376	1,350	1,170	200	600	1,020	4,260	2,770	440	372	248	163
14	280	1,220	1,010	200	600	975	3,660	3,160	332	318	234	220
15	311	1,010	740	200	600	855	3,300	2,840	220	318	202	234
16	258	1,040	875	300	600	850	3,280	2,600	380	314	190	227
17	227	900	900	300	600	2,020	3,190	2,120	300	297	258	184
18	205	880	915	300	600	2,800	3,220	1,640	416	350	252	169
19	199	1,100	700	300	600	2,530	3,050	1,530	404	308	248	160
20	196	1,200	725	300	600	2,120	3,050	1,460	388	266	227	142
21	262	1,170	619	300	500	1,950	3,820	1,440	234	272	208	163
22	314	1,180	715	300	450	1,920	4,280	1,320	404	283	300	172
23	346	1,060	735	300	450	860	4,140	1,100	619	255	392	163
24	290	885	870	600	450	1,000	3,600	835	230	248	332	157
25	592	950	930	1,200	400	2,350	2,980	691	262	238	346	160
26	2,060	955	835	800	350	1,590	2,900	750	227	208	300	151
27	4,510	850	810	800	400	4,040	3,350	780	248	238	269	136
28	3,500	795	855	900	400	7,190	3,220	780	318	220	276	166
29	2,630	900	900	1,000	.....	8,520	3,090	790	262	224	336	163
30	1,700	880	870	1,400	.....	7,390	3,100	637	290	220	244	157
31	1,270	.....	673	1,600	.....	5,640	.....	480	.....	214	266	.....
1914–15.												
1	160	90	139	45	1,050	2,760	542	855	336	339	529	1,090
2	169	109	154	70	1,500	2,020	484	820	346	504	583	765
3	151	109	151	35	1,360	1,640	488	682	325	715	664	780
4	139	118	142	135	1,150	1,320	432	673	356	865	1,210	686
5	163	136	112	140	1,060	1,340	556	740	318	845	3,220	614
6	166	133	95	145	1,340	1,140	632	765	241	830	3,320	516
7	166	100	115	950	2,320	1,040	915	650	311	910	2,720	500
8	169	98	136	2,240	1,950	920	1,090	740	308	1,080	2,170	504
9	157	112	157	1,680	1,490	935	1,030	920	314	3,390	1,610	583
10	160	118	118	1,270	1,240	955	1,020	715	280	4,480	1,460	588
11	133	98	130	760	960	920	1,340	705	224	4,390	1,330	460
12	154	88	139	950	840	725	2,740	664	187	3,540	1,230	368
13	148	87	106	2,090	870	735	3,120	610	154	2,630	1,170	448
14	59	73	148	2,000	860	730	2,810	534	234	1,990	895	444
15	24	29	145	1,240	1,460	664	2,240	460	266	1,580	830	420
16	37	154	151	765	3,830	601	1,620	464	255	1,280	850	460
17	60	139	151	668	3,960	691	1,390	436	241	980	1,020	476
18	92	136	151	1,700	3,140	646	1,230	476	297	960	1,060	538
19	121	136	124	2,690	2,200	592	990	504	356	835	910	400
20	121	127	100	2,660	1,490	588	1,070	500	529	1,360	845	516
21	136	139	151	2,040	1,170	538	1,000	456	512	1,220	632	642
22	121	124	148	1,290	965	538	830	700	452	1,400	1,010	1,020
23	121	157	130	965	1,040	547	875	678	420	1,230	1,730	1,080
24	98	148	125	1,650	1,330	512	795	668	560	1,080	1,740	975
25	88	145	109	1,420	3,760	592	740	596	420	935	1,450	686
26	112	112	86	1,190	5,850	642	637	547	416	730	1,440	350
27	112	115	98	1,000	4,800	655	686	614	276	745	1,260	730
28	115	115	138	810	3,740	601	720	601	350	850	1,040	583
29	112	100	136	655	.....	606	673	476	336	850	960	460
30	112	160	141	696	.....	606	730	432	339	850	1,060	456
31	112	.....	130	583	.....	601	.....	356	.....	840	975	.....

NOTE.—No gage height record Sept. 22, Oct. 7–14, 1912, and July 28–30, 1915; discharge estimated. Ice reported in river Feb. 7–23, 1913; Jan. 1 to Mar. 8, 1914, and Jan. 1–7, 1915.

Monthly discharge of Housatonic River at Falls Village, Conn., for 1912–15.

[Drainage area, 644 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
1912.					
July 11–31	440	145	275	0.427	0.33
August	803	169	321	.498	.57
September	576	182	316	.491	.55
1912–13.					
October	2,960	91	591	0.918	1.06
November	2,800	632	1,180	1.83	2.04
December	1,990	845	1,410	2.19	2.52
January	3,020	1,290	2,300	3.57	4.12
February	1,770	588	1,250	1.94	2.02
March	8,110	825	2,700	4.19	4.83
April	4,410	1,050	2,420	3.76	4.20
May	1,970	440	915	1.42	1.64
June	1,250	178	536	.832	.93
July	328	80	193	.297	.34
August	214	80	157	.244	.28
September	297	72	181	.281	.31
The year	8,110	72	1,150	1.79	24.29
1913–14.					
October	4,510	154	726	1.13	1.30
November	2,020	538	984	1.53	1.71
December	1,550	619	912	1.42	1.64
January	1,600	200	513	.797	.92
February	1,800	350	721	1.12	1.17
March	8,520	400	2,390	3.71	4.28
April	5,680	2,750	3,820	5.93	6.62
May	3,430	480	1,830	2.84	3.27
June	696	220	407	.632	.71
July	570	208	306	.475	.55
August	392	190	255	.396	.46
September	252	136	196	.304	.34
The year	8,520	136	1,090	1.69	22.97
1914–15.					
October	169	24	122	.189	.22
November	160	29	117	.182	.20
December	157	86	131	.203	.23
January	2,690	35	1,110	1.72	1.98
February	5,850	840	2,030	3.15	3.28
March	2,760	512	884	1.37	1.58
April	3,120	432	1,110	1.72	1.92
May	920	356	614	.953	1.10
June	560	154	332	.516	.58
July	4,480	339	1,430	2.22	2.56
August	3,320	529	1,320	2.05	2.36
September	1,090	350	605	.939	1.05
The year	5,850	24	810	1.26	17.06

HOUSATONIC RIVER AT GAYLORDSVILLE, CONN.

LOCATION.—At the covered wooden highway bridge at Gaylordsville, Litchfield County, about 2 miles below mouth of Tenmile River.

DRAINAGE AREA.—1,020 square miles.

RECORDS AVAILABLE.—October 24, 1900, to November 14, 1914, when station was discontinued.

GAGE.—Chain attached to the bridge; read once each day.

DISCHARGE MEASUREMENTS.—Made from a cable 1¼ miles below the gage, or by wading.

CHANNEL AND CONTROL.—Channel rough and irregular. Large bowlders and rocks a short distance below the bridge from the control.

WINTER FLOW.—Discharge relation affected by ice for short periods.

REGULATION.—The nearest dam downstream is at New Milford, Conn., about 7 miles below the station; at high stages backwater from this dam may slightly affect the discharge relation. The operation of the power plant about 1 mile above the station greatly affects the flow at low stages.

A special study by means of a temporarily installed water-stage recorder in November, 1914, showed that the diurnal fluctuation at the station was so large that reliable estimates of daily discharge could not be made from one gage reading a day. For this reason neither gage heights nor discharge estimates are published for the year ending September 30, 1915.

Discharge measurements of Housatonic River at Gaylordsville, Conn., during the period Oct. 1 to Nov. 14, 1914.

[Made by R. M. Adams.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 27	3.04	258	Nov. 7	3.12	209
28	3.16	215	8	2.47	53
29	2.56	82	11	2.99	183
31	3.14	217	12	2.65	88
Nov. 2	2.90	109	14	2.96	160
6	3.02	198			

NOTE.—Measurements made by wading at various sections.

POMPERAUG RIVER AT BENNETTS BRIDGE, CONN.

LOCATION.—About one-fifth mile above the confluence of the Pomperaug with Housatonic River, one-fourth mile north of Bennetts Bridge, New Haven County, and 1 mile east of the Sandy Hook Railroad station.

DRAINAGE AREA.—89.3 square miles.

RECORDS AVAILABLE.—July 30, 1913, to September 30, 1915.

GAGE.—Inclined staff in three parts, attached to rock ledge and to tree on right bank.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Channel irregular and covered with gravel and bowlders. Control is formed by large rocks about 100 feet below the gage and is sharply defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year (no record January 1 to February 28), 4.1 feet at 4.30 p. m. August 4 (discharge, 660 second-feet); minimum stage probably occurred during the early part of October, 1914, at which time the discharge relation was uncertain by reason of temporary backwater; minimum discharge subsequent to October 17, 19 second-feet November 7–8.

1913–1915: Maximum stage recorded, 7.4 feet March 2, 1914 (discharge, 2,520 second-feet); minimum stage recorded, 0.68 second-foot September 20, 1914 (discharge, 7.7 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Power plants at South Britain, 2½ miles above the station, cause a small diurnal fluctuation at low stages.

ACCURACY.—Several discharge rating curves have been used owing to changes in the control; these curves are fairly well defined except for the period September 27, 1914, to March 1, 1915, for which estimates are uncertain.

Discharge measurements of Pomperaug River at Bennetts Bridge, Conn., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft*
Nov. 3	R. M. Adams	[a] 2.68	24.2	Mar. 3	R. S. Barnes	2.42	202
18	do	[a] 3.05	60.6	Apr. 10	do	2.06	126
Dec. 19	R. S. Barnes	[a] 3.48	[b] 93.9	10	do	2.07	129
				June 22	C. H. Pierce	1.23	33.2

[a] Discharge relation affected by temporary dam below the gage. [b] Affected by ice.

Daily discharge, in second-feet, of Pomperaug River at Bennetts Bridge, Conn., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	.....	22	45	272	70	148	54	195	21	71
2	.....	22	40	231	71	110	49	104	27	64
3	.....	26	40	209	76	97	46	76	32	55
4	.....	26	35	155	66	85	43	55	246	52
5	.....	22	35	151	107	114	40	50	392	50
6	.....	22	35	166	144	112	39	93	184	50
7	.....	19	45	163	189	91	37	53	203	49
8	.....	19	40	159	159	104	43	71	141	50
9	.....	26	45	134	144	104	40	257	193	49
10	.....	22	45	134	128	82	37	101	355	42
11	.....	22	45	127	182	70	32	70	189	36
12	.....	22	.....	122	420	64	33	60	137	35
13	.....	22	.....	120	224	98	30	52	235	40
14	.....	26	.....	114	176	91	29	55	159	44
15	.....	26	.....	114	153	71	28	50	118	39
16	.....	112	.....	114	135	61	46	32	103	35
17	105	91	.....	106	127	66	42	36	84	32
18	66	55	.....	97	118	77	38	31	76	36
19	55	50	.....	93	110	63	34	34	65	36
20	50	66	.....	97	104	56	32	30	61	37
21	35	66	.....	93	93	56	37	36	54	355
22	30	55	.....	96	89	213	32	46	120	280
23	30	45	.....	107	107	159	31	37	211	155
24	26	45	.....	106	120	112	40	32	112	97
25	26	45	.....	96	101	127	30	27	182	84
26	26	45	.....	91	93	101	29	28	141	75
27	26	55	.....	85	89	118	28	30	85	80
28	22	55	.....	78	80	85	29	24	72	65
29	22	45	.....	87	85	72	27	44	78	58
30	22	45	.....	77	89	58	26	40	117	55
31	26	.....	.....	72	.....	56	.....	31	96	.....

NOTE.—Discharge determined as follows: Oct. 17 to Dec. 11 from a rating curve not well defined; Mar. 1 to Sept. 30 from a well-defined rating curve. No estimates of discharge determined for the winter. For the period Oct. 1–16, on account of uncertainty as to backwater, no estimates have been made.

Monthly discharge of Pomperaug River at Bennetts Bridge, Conn., for the year ending Sept. 30, 1915.

[Drainage area, 89.3 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October 17-31	105	22	37.8	0.423	0.24	C.
November	112	19	40.6	.455	.51	C.
December 1-11	45	35	40.9	.458	.19	C.
March	272	72	125	1.40	1.61	A.
April	420	66	128	1.43	1.60	A.
May	213	56	94.2	1.05	1.21	A.
June	54	26	36.0	.403	.45	B.
July	257	24	60.6	.678	.78	A.
August	392	21	138	1.55	1.79	A.
September	355	32	73.5	.823	.92	A.

HUDSON RIVER BASIN.

HUDSON RIVER AT NORTH CREEK, N. Y.

LOCATION.—At two-span steel highway bridge in village of North Creek, Warren County, immediately above mouth of North Creek, which enters from the right.

DRAINAGE AREA.—804 square miles.

RECORDS AVAILABLE.—September 21, 1907, to September 30, 1915. Data also in annual reports of State engineer and surveyor, and State of New York Conservation Commission.

GAGE.—Chain on highway bridge, read twice daily by William Alexander.

DISCHARGE MEASUREMENTS.—Made from highway bridge..

CHANNEL AND CONTROL.—Heavy gravel; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.7 feet at 7 a. m. April 13 (discharge, 8,240 second-feet); minimum stage recorded, 2.07 feet at 8 a. m. and 5 p. m. November 8 (discharge, 174 second-feet).

1907–1915: Maximum stage recorded, 12.0 feet; evening of March 27, 1913 (discharge, 30,000 second-feet); minimum stage recorded, 2.05 feet at 7.05 a. m. September 30, 1913 (discharge, 168 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Natural flow affected by storage in Indian Lake and other reservoirs in upper Hudson River basin in connection with log driving. Results not corrected for storage.

ACCURACY.—Discharge rating curves well defined; estimates for open water periods considered good.

Discharge measurements of Hudson River at North Creek, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	C. S. De Golyer	2.92	693	Mar. 9	R. M. Adams	[a] 3.03	870
Dec. 28	do	[a] 3.45	301	24	do	2.52	438
Jan. 11	do	[a] 4.44	1,340	Apr. 15	E. D. Burchard	5.42	4,920
29	do	[a] 3.67	670	15	H. W. Fear	5.40	4,890
Feb. 12	R. M. Adams	[a] 3.58	506	June 4	O. W. Hartwell	2.21	279
19	C. S. De Golyer	[a] 4.00	759				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Hudson River at North Creek, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	780	520	780	600	685	3,230	460	3,050	745	700	890	1,100
2	780	520	2,010	560	942	3,050	460	3,050	330	990	790	940
3	780	520	2,180	1,120	1,000	2,530	460	4,440	302	840	745	790
4	780	520	2,180	2,100	1,060	1,840	460	2,210	286	790	790	700
5	732	520	2,180	1,840	942	1,480	460	2,370	266	840	940	655
6	685	520	2,010	1,760	942	1,350	495	3,420	252	1,100	890	655
7	685	520	1,600	1,460	885	1,220	460	1,550	1,350	1,100	790	655
8	685	174	1,060	2,540	832	1,100	700	1,840	570	1,840	890	700
9	685	314	1,060	2,010	685	990	1,160	3,230	446	4,010	890	745
10	685	385	1,000	1,680	685	890	2,060	2,530	360	2,700	890	700
11	780	485	780	1,340	600	890	5,120	2,210	342	7,130	790	610
12	732	485	642	1,180	506	840	6,600	1,220	460	2,870	700	610
13	685	485	560	1,060	418	790	7,960	1,280	610	2,210	610	570
14	685	485	520	942	367	745	6,090	2,530	745	1,620	570	840
15	685	560	.....	642	361	700	4,890	3,420	700	1,480	530	790
16	642	1,390	.....	560	418	655	4,890	530	530	1,280	530	790
17	642	2,180	.....	560	685	610	6,340	495	940	1,100	495	940
18	642	1,600	.....	520	832	570	3,420	1,160	1,040	1,100	460	655
19	642	1,390	.....	685	759	530	4,010	610	1,040	990	495	610
20	600	1,250	.....	1,760	685	460	2,870	1,220	1,040	1,100	460	530
21	642	1,180	.....	1,920	560	460	3,610	460	990	1,100	425	570
22	732	1,000	.....	1,600	485	495	3,230	460	1,910	990	990	700
23	685	780	.....	1,320	450	495	1,840	530	840	890	4,220	700
24	642	685	.....	1,180	600	495	1,760	446	745	840	4,010	700
25	642	600	.....	1,180	2,180	530	3,230	446	700	790	3,610	655
26	642	600	.....	1,000	3,810	610	2,700	1,910	655	790	3,050	655
27	600	780	.....	780	3,420	790	2,870	460	610	790	2,530	700
28	600	1,120	301	732	3,230	655	2,370	940	495	790	1,910	655
29	600	780	520	670	.....	610	2,210	425	425	990	1,480	655
30	600	780	642	600	.....	610	2,210	390	404	1,100	1,350	655
31	560	.....	600	600	.....	570	.....	378	.....	990	1,220	.....

NOTE.—Discharge determined from two well-defined rating curves, applicable Oct. 1 to Feb. 25, and Feb. 26 to Sept. 30. Discharge relation affected by ice Dec. 15 to Feb. 25; estimates based on gage height corrected for effect of ice by means of six discharge measurements and climatic data; mean discharge Dec. 15–27 estimated at 323 second-feet.

Monthly discharge of Hudson River at North Creek, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 804 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	780	560	676	0.841	0.97	A.
November	2,180	174	771	.959	1.07	A.
December	2,180	.....	801	.996	1.15	B.
January	2,540	520	1,180	1.47	1.70	B.
February	3,810	361	1,040	1.29	1.34	B.
March	3,230	460	993	1.24	1.43	A.
April	7,960	460	2,850	3.54	3.95	A.
May	4,440	378	1,590	1.98	2.28	A.
June	1,910	252	671	.835	.93	A.
July	4,010	700	1,480	1.84	2.12	A.
August	4,220	425	1,260	1.57	1.81	A.
September	1,100	530	708	.881	.98	A.
The year	7,960	174	1,170	1.46	19.73	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow.

HUDSON RIVER AT THURMAN, N. Y.

LOCATION.—At Delaware & Hudson Railroad bridge at Thurman, Warren County, about 950 feet below highway bridge on road to Warrensburg, about 2,000 feet below Schroon River, and about 13 miles above Sacandaga River, which enters from the right.

DRAINAGE AREA.—1,550 square miles.

RECORDS AVAILABLE.—September 1, 1907, to September 30, 1915. Data also in annual reports of State engineer and surveyor, and State of New York Conservation Commission.

GAGE.—Chain gage on bridge; read twice daily by S. H. Spencer.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Sand and gravel; likely to shift. Logs occasionally accumulate at control and around bridge piers.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.40 feet at 8 a. m. April 12 (discharge, 11,400 second-feet); minimum stage recorded, 2.30 feet at 4 p. m., December 14; and 8 a. m. December 15 (discharge, 440 second-feet).

1907–1915: Maximum stage recorded 12.5 feet during late evening of March 27, 1913 (determined by leveling from flood marks; approximate discharge, 46,000 second-feet); minimum stage recorded, 2.12 feet at 8.55 a. m. and 6.20 p. m. September 30, 1913 (discharge, 290 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

REGULATION.—Flow affected by storage at Indian Lake and by operation of mills on Schroon River. Results not corrected for storage.

ACCURACY.—Results fair.

COOPERATION.—Gage-height record furnished by the International Paper Co.

Discharge measurements of Hudson River at Thurman, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 29	C. S. De Golyer	[a] 3.89	644	Apr. 15	E. D. Burchard	5.28	7,380
Mar. 23	R. M. Adams	[a] 3.24	1,610	June 2	O. W. Hartwell	2.56	810
26	do	3.24	1,860				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Hudson River at Thurman, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,040	770	.....	.....	1,380	3,860	1,740	1,380	1,550	2,370
2	900	822	.....	.....	1,550	3,460	905	1,340	1,940	1,640
3	956	914	2,960	.....	1,460	3,590	680	1,740	1,740	1,550
4	796	848	3,080	.....	1,460	2,840	680	1,550	1,940	1,220
5	1,030	698	2,720	.....	1,460	4,710	645	1,550	2,370	760
6	874	770	2,260	.....	1,550	4,140	610	2,040	2,040	1,020
7	861	809	1,940	.....	1,550	3,590	645	2,370	1,940	1,080
8	874	606	1,740	.....	1,840	1,840	1,460	2,840	2,040	1,380
9	900	887	1,460	.....	2,720	3,860	720	6,170	2,150	1,080
10	984	848	1,230	.....	3,590	1,740	905	5,000	2,600	1,080
11	835	674	1,040	.....	8,100	1,640	680	5,290	2,260	1,020
12	928	650	796	.....	11,400	1,550	680	5,580	1,840	1,150
13	848	928	900	.....	10,600	1,550	850	4,140	1,740	1,080
14	822	900	639	.....	8,790	1,740	960	4,420	1,460	1,460
15	835	606	.....	.....	7,760	6,170	1,020	3,860	1,380	1,460
16	835	1,740	.....	.....	6,170	1,220	1,020	3,330	1,300	1,150
17	984	2,840	.....	.....	6,470	1,150	1,220	3,080	1,300	1,150
18	900	2,480	.....	.....	5,870	1,380	1,380	2,600	1,080	1,080
19	1,170	2,040	.....	.....	4,710	1,220	1,300	2,370	850	1,020
20	1,140	2,040	.....	.....	4,710	2,480	1,300	2,370	760	960
21	956	1,740	.....	.....	4,420	1,300	1,300	2,370	805	960
22	1,060	.....	.....	.....	6,170	1,150	1,080	2,150	1,220	1,150
23	1,030	.....	.....	.....	3,200	1,020	1,460	2,260	5,870	1,300
24	956	.....	.....	.....	3,460	2,840	1,020	2,040	5,580	1,080
25	861	.....	.....	.....	5,000	1,220	1,020	1,940	5,290	1,300
26	1,040	.....	.....	1,740	3,860	1,150	905	2,370	4,420	1,080
27	887	.....	.....	1,840	2,480	1,220	805	2,260	3,590	960
28	1,010	.....	.....	1,740	4,140	1,150	760	1,740	3,330	1,150
29	770	.....	.....	1,640	3,860	1,080	760	1,380	2,600	1,020
30	710	.....	.....	1,460	4,710	850	850	2,260	2,480	1,020
31	835	.....	.....	1,460	.....	850	.....	1,940	2,150	.....

NOTE.—Discharge determined from two well-defined rating curves applicable as follows: Oct. 1 to Dec. 14, and Mar. 26 to Sept. 30. Discharge relation affected by ice from about Nov. 22 to Dec. 2 and Dec. 15 to Mar. 25, 1915; mean discharge estimated as follows: Nov. 22 to Dec. 2, 1,450 second-feet; Dec. 15-31, 675 second-feet; Jan. 1-31, 1,790 second-feet; Feb. 1-28, 1,870 second-feet; Mar. 1-25, 2,570 second-feet.

Monthly discharge of Hudson River at Thurman, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 1,550 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	1,170	710	923	0.595	0.69	B.
November	2,840	606	1,210	.781	.87	B.
December	3,080	.....	1,160	.748	.86	C.
January	.....	.....	1,790	1.15	1.33	C.
February	.....	.....	1,870	1.21	1.26	C.
March	.....	.....	2,390	1.54	1.78	C.
April	11,400	1,380	4,480	2.89	3.22	A.
May	6,170	850	2,180	1.41	1.63	A.
June	1,740	610	979	.632	.70	A.
July	6,170	1,380	2,780	1.79	2.06	A.
August	5,870	760	2,310	1.49	1.72	A.
September	2,370	760	1,190	.768	.86	A.
The year	11,400	606	1,940	1.25	16.98	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow.

HUDSON RIVER AT SPIER FALLS, N.Y.

LOCATION.—Half a mile below Spier Falls dam, Saratoga County, about 11½ miles below Sacandaga River, and about 11 miles by road southwest of Glens Falls.

DRAINAGE AREA.—2,800 square miles. (Measured on topographic maps.)

RECORDS AVAILABLE.—October 7, 1912, to September 30, 1915. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Gurley Simplex water-stage recorder referred to a hook gage inside of well; inclined staff for auxiliary readings. Recorder inspected by H. T. Wakely, chief operator of the power plant.

DISCHARGE MEASUREMENTS.—Made from a cable about 1,000 feet below gage.

CHANNEL AND CONTROL.—Coarse gravel and bowlders, practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, water-stage recorder, 10.50 feet at 8 a. m. April 13 (discharge, 26,600 second-feet); minimum stage water-stage recorder, 0.76 foot at 5 a. m. June 16 (discharge, 96 second-feet).

1912–1915: Maximum stage, water-stage recorder, 18.59 feet at 12.25 a. m. March 28, 1913 (discharge, 89,100 second-feet); minimum stage, 0.06 foot September 15, 1912 (discharge, 5.7 second-feet; power plant shut down and flow of river stored above dam).

WINTER FLOW.—Discharge relation occasionally affected by ice.

REGULATION.—Flow affected by operation of the Spier Falls power plant (resulting in low discharge on Sunday) and by storage in Indian Lake. Results not corrected for storage.

ACCURACY.—Results considered excellent except when discharge relation is affected by ice. Rating curve well defined; daily discharge determined by averaging hourly discharge to compensate for effect of operation of Spier Falls power plant.

Discharge measurements of Hudson River at Spier Falls, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 22	C. S. De Golyer	4.63	4,930
26	O. W. Hartwell	8.24	16,500

Daily discharge, in second-feet, of Hudson River at Spier Falls, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,580	1,100	3,210	1,640	2,830	13,400	3,130	5,580	2,210	2,440	2,850	4,040
2	1,530	1,210	3,220	1,540	2,890	12,000	3,240	7,070	2,090	6,540	3,250	3,560
3	1,320	998	5,070	1,680	2,880	10,400	3,310	6,360	2,190	6,410	3,190	3,350
4	918	1,430	6,150	1,530	2,280	8,890	3,010	6,480	1,810	6,000	2,950	2,410
5	1,490	1,320	5,290	1,720	2,500	7,820	3,410	6,350	1,300	5,500	5,900	1,930
6	1,430	1,270	4,290	2,450	2,510	7,030	3,300	5,560	467	5,800	6,180	1,560
7	1,400	1,160	3,340	2,480	2,780	6,220	3,740	5,750	1,080	5,480	5,780	2,270
8	1,360	490	2,970	3,110	3,050	5,670	4,190	4,210	1,910	6,520	5,780	2,330
9	1,390	1,540	2,980	6,270	2,780	5,110	6,250	3,430	1,460	12,000	6,470	1,690
10	1,230	1,130	2,930	5,340	2,670	4,790	8,810	4,490	1,130	12,000	6,280	2,690
11	1,080	1,140	2,620	4,930	2,530	4,160	15,400	3,340	1,310	12,700	5,480	2,260
12	1,380	1,040	2,340	4,300	2,310	4,080	23,300	3,050	1,030	13,200	4,700	946
13	1,410	1,110	1,490	3,880	2,460	3,910	25,800	2,770	593	8,790	4,100	2,110
14	1,450	1,040	1,710	3,600	2,170	3,830	23,200	2,990	1,410	8,510	3,420	2,020
15	1,450	972	1,710	3,330	2,460	3,880	19,500	4,130	1,570	7,130	2,720	2,050
16	1,390	2,570	1,350	3,070	3,960	3,730	16,300	3,460	1,530	5,750	3,100	2,380
17	1,250	3,800	1,360	2,740	5,180	3,700	13,900	2,930	2,300	4,910	2,840	2,880
18	955	4,600	1,240	3,650	5,060	3,600	12,200	2,380	2,200	4,050	2,530	3,020
19	1,430	3,560	963	6,100	5,160	3,450	10,800	4,150	2,100	4,030	2,280	1,880
20	1,560	2,630	993	8,140	4,990	3,370	9,800	3,010	1,160	3,260	2,370	2,450
21	1,780	2,590	2,000	8,620	4,460	3,190	9,500	3,590	2,200	3,150	2,120	1,890
22	1,750	2,480	1,900	7,990	4,190	3,490	10,000	3,030	1,940	3,140	2,500	2,130
23	1,830	2,850	1,770	7,070	3,820	3,230	8,010	2,620	2,030	3,030	12,100	1,980
24	1,900	2,340	1,770	6,110	4,320	3,560	6,300	3,890	2,370	2,770	12,800	2,470
25	1,080	2,110	1,720	5,540	14,000	4,190	5,930	2,820	1,730	2,390	12,400	2,390
26	1,530	1,300	1,490	4,850	17,200	4,550	6,980	2,930	1,290	3,380	11,200	1,520
27	1,210	2,460	1,000	4,410	15,600	4,260	4,670	3,440	551	3,340	9,650	2,440
28	1,270	2,960	2,060	3,990	14,700	3,930	5,560	2,720	1,280	4,000	8,020	2,150
29	1,120	3,480	1,440	3,700	.....	4,140	6,900	3,140	1 390	3,400	6,190	2,390
30	1,130	3,520	1,430	3,190	.....	3,500	5,850	1,780	1,490	3,490	5,450	1,790
31	1,030	.....	1,510	2,540	.....	3,120	.....	2,020	.....	3,640	4,670	.....

NOTE.—Discharge Dec. 27, Apr. 18 and 19, estimated. Discharge for other days is mean of 24 hourly determinations for each day.
Discharge determined from a well-defined rating curve.

Monthly discharge of Hudson River at Spier Falls, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 2,800 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	1,900	918	1,380	0.493	0.57	A.
November	4,600	490	2,070	.739	.82	A.
December	6,150	963	2,370	.846	.98	A.
January	8,620	1,530	4,180	1.49	1.72	A.
February	17,200	2,170	5,060	1.81	1.88	A.
March	13,400	3,120	5,170	1.85	2.13	A.
April	25,800	3,010	9,410	3.36	3.75	A.
May	7,070	1,780	3,850	1.38	1.59	A.
June	2,370	467	1,570	.561	.63	A.
July	13,200	2,440	5,700	2.04	2.35	A.
August	12,800	2,120	5,460	1.95	2.25	A.
September	4,040	946	2,300	.821	0.92	A.
The year	25,800	467	4,030	1.44	19.59	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow.

HUDSON RIVER AT MECHANICVILLE, N. Y.

LOCATION.—At the Duncan dam of the West Virginia Pulp & Paper Co., in the village, of Mechanicville, Saratoga County, about 3,700 feet above Anthony Kill, 1¼ miles below Hoosic River and about 19 miles above Mohawk River.

DRAINAGE AREA.—4,500 square miles.

RECORDS AVAILABLE.—1888 to September 30, 1915. Data also in annual reports of State engineer and surveyor, and State of New York Conservation Commission.

GAGE.—Recording gage referred to a vertical staff showing depth of water over crest of dam; prior to summer of 1910, vertical staff, read twice a day.

DETERMINATION OF DISCHARGE.—Discharge determined from a rating curve based on coefficients used by United States Geological Survey for dams of ogee section, and continuous record of the run of wheels in adjoining paper mill.

EXTREMES OF DISCHARGE.—1888–1915: Maximum discharge recorded, 120,000 second-feet at 6 a. m. March 28, 1913.[1] The plant is occasionally shut down and the flow of the river stored in the pond, so that the discharge below the plant becomes practically zero.

DIVERSIONS.—Water diverted above station for Champlain Canal; no correction made for diversion.

REGULATION.—Flow affected by operation of dams above station, which often results in low discharge on Sunday.

COOPERATION.—Records computed and furnished by R. P. Bloss, engineer, West Virginia Pulp & Paper Co.

Daily discharge, in second-feet, of Hudson River at Mechanicville, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,020	925	4,154	1,990	4,104	19,619	5,750	8,221	3,222	1,665	5,026	5,145
2	990	947	4,374	2,097	3,646	18,944	6,344	9,287	2,328	5,794	5,679	5,336
3	1,068	1,070	4,162	2,521	4,078	16,055	5,323	8,744	2,696	10,508	5,845	5,375
4	1,020	769	5,450	1,858	3,955	14,516	5,519	9,141	2,204	7,486	6,219	5,093
5	1,091	910	6,542	1,453	3,772	12,066	5,986	7,682	1,697	6,479	8,585	2,671
6	1,454	906	3,935	1,727	5,141	11,276	6,193	7,671	815	7,628	10,659	2,118
7	1,863	913	4,938	9,393	6,220	10,314	5,707	7,680	2,377	7,826	10,902	4,801
8	1,472	900	2,999	6,900	6,748	11,273	6,525	5,974	1,734	20,966	10,796	3,366
9	1,405	910	1,884	5,365	5,639	9,191	7,089	5,201	1,433	25,429	10,792	3,956
10	1,115	917	3,515	6,887	4,711	8,168	8,908	6,715	2,040	18,061	10,309	3,207
11	850	1,200	3,817	6,604	5,075	8,217	27,728	5,793	2,082	15,359	9,144	4,447
12	904	963	2,846	5,754	4,367	7,555	29,727	5,368	1,719	15,602	7,797	1,806
13	1,401	898	1,827	5,752	4,348	7,841	31,436	3,867	763	9,168	7,040	3,130
14	1,242	1,039	2,314	5,467	4,451	7,806	28,571	4,141	1,958	8,649	5,605	4,777
15	1,191	1,097	1,273	5,788	20,676	7,608	23,429	3,893	1,269	8,526	4,663	3,914
16	887	1,525	1,705	4,144	17,431	7,614	19,361	4,268	1,584	7,321	5,558	4,313
17	1,180	4,116	1,404	5,602	13,028	7,219	19,907	4,977	2,032	6,431	5,379	3,128
18	750	4,727	1,404	12,806	10,768	7,259	17,354	3,901	2,955	4,151	5,127	3,892
19	969	4,838	1,404	14,710	10,397	6,658	15,329	2,527	1,409	7,233	4,120	3,322
20	1,114	4,464	954	13,093	7,919	5,732	13,607	5,075	2,204	5,342	2,960	3,289
21	1,415	3,420	1,627	11,317	8,668	5,576	12,647	4,863	2,215	5,357	3,139	3,629
22	1,763	2,069	2,241	10,539	8,459	6,960	12,666	4,755	3,141	5,608	1,982	4,072
23	1,113	4,245	1,835	9,041	7,735	6,948	11,723	2,900	3,121	5,074	6,842	4,226
24	2,232	4,003	2,125	9,206	11,682	6,803	9,152	4,856	1,752	4,885	14,944	4,541
25	1,500	1,964	1,746	8,396	33,185	7,614	8,315	4,760	2,316	3,169	14,776	3,968
26	1,415	2,347	2,634	7,435	30,973	8,865	9,928	3,188	1,797	5,592	14,673	2,200
27	1,817	1,847	950	6,259	25,338	7,791	9,126	3,742	963	7,631	12,843	4,212
28	1,415	2,786	1,115	5,520	20,631	6,475	7,051	4,765	1,870	7,781	10,393	4,143
29	913	2,878	1,665	5,378	.....	7,591	8,705	3,938	1,294	6,916	8,466	3,459
30	924	4,240	1,998	5,146	.....	7,003	7,784	2,800	1,198	6,179	8,417	4,073
31	920	.....	1,452	3,000	.....	5,828	.....	4,917	.....	5,589	5,725	.....

NOTE.—Discharge estimated Oct. 11, 18, 25, and Nov. 1.

[1] The highest known flood prior to this time occurred in April, 1869; calculated discharge, 70,000 second-feet. See Water-Supply Paper 65, p. 51, and report of United States Board of Engineers on Deep Waterways, pt. 1, pp. 377–380.

Monthly discharge of Hudson River at Mechanicville, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 4,500 square miles]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
October	2,232	750	1,240	0.276	0.32
November	4,838	769	2,130	.473	.53
December	6,542	950	2,590	.576	.66
January	14,710	1,453	6,480	1.44	1.66
February	33,185	3,646	10,500	2.33	2.43
March	19,619	5,576	9,110	2.02	2.33
April	31,436	5,323	12,900	2.87	3.20
May	9,287	2,527	5,340	1.19	1.37
June	3,222	763	1,940	.431	.48
July	25,429	1,665	8,500	1.89	2.18
August	14,944	1,982	7,880	1.75	2.02
September	5,375	1,806	3,850	.856	.96
The year	33,185	750	6,010	1.34	18.14

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches, shown by the table, do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

CEDAR RIVER NEAR INDIAN LAKE, N. Y.

LOCATION.—At steel highway bridge, about 2 miles west of Indian Lake village, Hamilton County, 8 miles by river above Rock River, 10 miles by river below Cedar River Flow (Wakely dam), and about 12 miles above mouth of river.

DRAINAGE AREA.—85 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 15, 1911, to September 30, 1915. Data published also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Chain on highway bridge; read once daily, October 1 to June 4, and twice daily, June 5 to September 30, by Chauncey Hill.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Coarse gravel and small bowlders; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year: 12.2 feet at 9 a. m. April 12, probably affected by backwater from ice; maximum discharge probably represented by gage height 10.1 feet at 9 a. m. May 1 and 1 p. m. May 6 (approximate discharge, 2,650 second-feet); minimum stage recorded, 2.10 feet at 4 p. m. September 27 (approximate discharge, 5 second-feet).

1911–1915: Maximum discharge recorded (approximately 3,600 second-feet) at a stage of 12.0 feet at 1 p. m April 20. 1914; minimum stage recorded, 2.10 feet 4 p. m. September 27, 1915 (approximate discharge, 5 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice; observations suspended.

REGULATION.—Flow affected by storage in Cedar Lake and Cedar River Flow; storage in Cedar River Flow used principally during the logging season.

ACCURACY.—Results for open-water season fair except for months during which extreme fluctuations are caused by logging operations.

Discharge measurements of Cedar River near Indian Lake, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 21	C. H. Pierce	3.12	74
June 5	O. W. Hartwell	2.65	31

Daily discharge in second-feet of Cedar River near Indian Lake, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	34	52	810					2,650	34	194	42	74
2	30	42	634					130	34	93	86	34
3	30	42	702					226	34	68	39	24
4	27	62	370					164	34	122	130	20
5	27	74	226					130	30	237	184	24
6	27	62	146					2,650	9	204	226	27
7	62	52	138					100	848	146	226	27
8	100	42	130					130	35	422	155	74
9	164	42	130					146	33	478	68	27
10	146	27	138					114	28	422	54	34
11	146	42	107					86	50	450	74	27
12	114	42	130					86	74	62	54	27
13	107	42	130				1,080	74	40	44	48	27
14	100	74	204				668	62	62	58	54	52
15	52	80	194				538	62	74	36	37	47
16	57	1,250	184				570	52	174	74	57	33
17	62	1,250	184				668	74	194	226	42	28
18	62	738	174				634	52	138	155	40	28
19	74	702	164				602	52	146	86	36	36
20	100	702					602	62	122	107	40	27
21	74	370					570	42	62	62	44	27
22	42	370					570	52	47	49	668	27
23	42	248					508	42	40	50	848	27
24	47	204					248	42	50	48	634	27
25	42	194					184	42	50	74	508	27
26	52	204					130	52	44	62	320	34
27	38	296					2,210	42	50	86	155	13
28	34	810					114	42	50	68	130	27
29	62	1,040					2,300	42	30	284	130	27
30	52	1,040					146	52	39	114	114	27
31	57							34		43	80	

NOTE.—Discharge determined from a fairly well-defined rating curve. Discharge relation affected by ice Dec. 20 to Apr. 12; discharge not computed. Discharge during April, May, and June may be somewhat in error owing to violent fluctuations caused by logging operations. These data supersede those published in the 1915 Annual Report of the New York State engineer and surveyor.

Monthly discharge of Cedar River near Indian Lake, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 85 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	164	27	66	0.776	0.89	B.
November	1,250	27	340	4.00	4.46	B.
December 1-19	810	107	258	3.04	2.15	C.
April 13-30	2,300	114	685	8.06	5.40	D.
May	2,650	34	245	2.88	3.32	C.
June	848	9	88	1.04	1.16	B.
July	478	36	149	1.75	2.02	A.
August	848	36	172	2.02	2.33	A.
September	74	13	32	.376	.42	B.

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage.

INDIAN LAKE RESERVOIR NEAR INDIAN LAKE, N. Y.

LOCATION.—At the dam at the outlet of Indian Lake, about 2 miles south of Indian Lake village, Hamilton County, and about 7½ miles above the mouth of Indian River.

DRAINAGE AREA.—131 square miles, including about 9.3 square miles of water surface of Indian Lake at the elevation of the spillway of the dam (measured on topographic map).

RECORDS AVAILABLE.—Records of stage and gate openings July 22, 1900, to September 30, 1915. Data also in annual reports of the State engineer and surveyor, State Water Supply Commission, and State of New York Conservation Commission.

GAGE.—Elevation of water surface in reservoir determined by a chain gage at the dam; prior to November 17, 1911, a staff gage was used or readings were obtained by measuring down from a bench mark; read once daily by Lester Sevarie.

STORAGE DAM.—The masonry storage dam was completed in 1899 and replaced a lumbering dam at the same site. The spillway is in 5 sections, having a total effective length of 88.7 feet, a mean crest elevation of 33.38 feet above reservoir gage datum, and 1,650 feet above mean sea level. There are two logways, one 15 feet wide with bottom at elevation 24.12 feet reservoir gage datum, the other 14 feet wide with bottom at elevation 32.48 feet reservoir gage datum. The discharge at ordinary stages is through one or both of two 5-foot circular sluice gates, controlled independently, and taking water from separate wells in the gate house.

DETERMINATION OF DISCHARGE.—Discharge over the spillway is determined by means of a rating curve based on experiments made in the hydraulic laboratory of Cornell University.[1] Rating curves for the sluice gates have been determined from current-meter measurements at the gaging station on Indian River three-fourths mile below the dam. The results are withheld for further study.

EXTREMES OF STAGE:

Maximum stage recorded during year, 35.9 feet August 25; minimum stage recorded, 5.75 feet November 15.

1900–1915: Maximum stage recorded, 38.8 feet March 28, 1913; minimum stage recorded, 2.0 feet March 9–18, 1907, and January 3–17, 1910.

[1] See U. S. Geol. Survey Water-Supply Paper 200.

Daily gage height, in feet, of Indian Lake Reservoir near Indian Lake, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	16.5	8.3	9.3	11.4	15.15	20.0	22.45	32.3	34.1	34.3	34.35	34.85
2	16.2	8.05	9.6	11.3	15.2	20.2	22.5	32.55	34.1	34.4	34.35	34.8
3	15.85	7.8	10.0	11.15	15.3	20.4	22.55	32.75	34.05	34.45	34.3	34.7
4	15.5	7.6	10.3	10.95	15.4	20.6	22.6	32.95	34.05	34.45	34.35	34.7
5	15.15	7.4	10.55	10.85	15.5	20.75	22.7	33.1	34.0	34.5	34.35	34.65
6	14.75	7.2	10.7	10.65	15.6	20.85	22.75	33.2	34.0	34.6	34.4	34.65
7	14.5	7.0	10.85	10.7	15.7	21.0	22.8	33.3	34.0	34.6	34.45	34.6
8	14.25	6.8	10.95	11.1	15.8	21.15	22.9	33.5	33.95	34.85	34.5	34.55
9	13.95	6.6	11.1	11.45	15.85	21.25	23.05	33.65	33.95	35.3	34.5	34.55
10	13.65	6.45	11.2	11.65	15.9	21.35	23.35	33.75	33.9	35.4	34.5	34.5
11	13.35	6.3	11.3	11.8	15.95	21.40	24.15	33.8	33.9	35.35	34.5	34.45
12	12.95	6.15	11.35	11.95	16.0	21.4	25.45	33.85	33.95	35.3	34.45	34.45
13	12.65	6.0	11.4	12.05	16.05	21.45	26.35	33.9	33.95	35.2	34.45	34.4
14	12.4	5.9	11.45	12.25	16.1	21.5	26.95	33.75	33.95	35.25	34.4	34.4
15	12.15	5.75	11.45	12.35	16.25	21.5	27.45	33.8	34.0	35.2	34.35	34.35
16	11.9	6.1	11.5	12.45	16.45	21.55	27.8	33.85	34.1	35.15	34.35	34.3
17	11.65	6.55	11.55	12.55	16.65	21.6	28.25	33.9	34.15	35.05	34.3	34.25
18	11.4	7.1	11.6	12.7	16.85	21.65	28.75	33.95	34.2	35.0	34.25	34.25
19	11.3	7.45	11.45	12.95	17.0	21.7	29.3	33.95	34.2	34.9	34.25	34.2
20	11.15	7.7	11.25	13.45	17.1	21.75	29.7	33.95	34.2	34.8	34.2	34.2
21	10.95	7.95	11.0	13.7	17.2	21.8	30.1	34.0	34.15	34.7	34.2	34.1
22	10.7	8.1	10.85	14.0	17.3	21.9	30.5	34.0	34.15	34.65	34.5	34.0
23	10.45	8.2	10.7	14.35	17.45	22.0	30.7	34.05	34.1	34.6	35.55	33.9
24	10.2	8.35	10.75	14.75	17.6	22.05	30.95	34.1	34.1	34.55	35.85	33.75
25	9.95	8.5	10.9	14.8	18.3	22.1	31.15	34.15	34.1	34.5	35.9	33.55
26	9.65	8.6	11.0	14.9	18.95	22.2	31.35	34.15	34.05	34.45	35.75	33.45
27	9.4	8.7	11.1	14.95	19.45	22.25	31.55	34.15	34.05	34.4	35.55	33.35
28	9.2	8.8	11.15	14.95	19.8	22.3	31.7	34.15	34.05	34.4	35.4	33.25
29	9.0	8.9	11.3	15.0	.....	22.35	31.9	34.15	34.05	34.5	35.25	33.15
30	8.8	9.15	11.35	15.05	.....	22.35	32.05	34.1	34.1	34.45	35.15	33.05
31	8.55	.....	11.4	15.1	.....	22.4	.....	34.1	.....	34.4	34.95	.....

Gate openings, in feet, of Indian Lake Reservoir near Indian Lake, N. Y., for year ending Sept. 30, 1915.

Date.	Sluice gate A open.	Sluice gate B open.	Date.	Sluice gate A open.	Sluice gate B open.
	Feet.	*Feet.*		*Feet.*	*Feet.*
Oct. 1–Nov. 15, inclusive	5.0	5.0	May 13–14, inclusive	5.0	5.0
Dec. 18–22, inclusive	2.0	5.0	Sept. 20–30, inclusive	2.5	.....
Jan. 2–7, inclusive	.....	5.0			

INDIAN RIVER NEAR INDIAN LAKE, N. Y.

LOCATION.—About three-quarters of a mile below the dam at the outlet of Indian Lake, 1 mile above Big Brook, 2 miles south of Indian Lake village, Hamilton County, and 6½ miles above the mouth.

DRAINAGE AREA.—132 square miles.

RECORDS AVAILABLE.—July 1, 1912, to June 30, 1914; June 5 to September 30, 1915; also miscellaneous measurements in 1911. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Vertical staff on right bank in a pool about 150 feet above the rapids which form the control; read twice weekly by Lester Sevarie.

DISCHARGE MEASUREMENTS.—Made from a cable about 75 feet below the gage, or by wading.

CHANNEL AND CONTROL.—Rough and rocky; practically permanent.

EXTREMES OF DISCHARGE.—1912–1915: Maximum stage recorded, 7.8 feet at 4 p. m. March 28, 1913 (discharge approximately 3,460 second-feet); practically no flow when gates at Indian Lake are closed.

WINTER FLOW.—Because of the proximity of the reservoir discharge relation is not seriously affected by ice.

REGULATION.—Flow controlled by storage in Indian Lake. Results not corrected for storage.

ACCURACY.—Rating curve well defined; results excellent except at extreme low stages and on days when changes are made in the outlet gates of the reservoir.

Discharge measurements of Indian River near Indian Lake, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 29	C. H. Pierce	1.72	198	June 5	O. W. Hartwell	1.08	76

Daily discharge, in second-feet, of Indian River near Indian Lake, N. Y., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1			212	237	16	86			
2					17				
3					18		418	113	
4		168	212		19				158
5	77			224	20	101			
6					21		237		
7		237			22			224	402
8			224	200	23	97			
9	74				24				
10					25		224	250	
11		453	224		26				385
12				189	27	97			
13	77				28		212		
14		418			29			250	385
15			122	168	30	158			
					31				

NOTE.—Discharge determined from a well-defined rating curve.

SCHROON RIVER AT RIVERBANK, N. Y.

LOCATION.—At highway bridge at Riverbank post office, Warren County, a mile below Tumblehead Falls, 3½ miles below outlet of Brant Lake, 9 miles below Schroon Lake, and about 9 miles north of Warrensburg.

DRAINAGE AREA.—534 square miles.

RECORDS AVAILABLE.—September 2, 1907, to September 30, 1915. Data published also in annual reports of State engineer and surveyor, and State of New York Conservation Commission.

GAGE.—Chain on bridge, read twice daily by J. H. Roberts.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Gravel; smooth and somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.7 feet at 5 p. m. April 15 (discharge, 2,260 second-feet) minimum stage recorded, 1.30 feet November 1, 7, 10, and 12 (discharge, 99 second-feet).

Maximum stage recorded 1907–1915: 10.7 feet at 5 p. m. March 28, 1913 (discharge, approximately 13,500 second-feet); minimum stage recorded, 0.85 foot at 5 p. m. October 17, 1909 (discharge, 28 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Flow affected by storage in Schroon and Brant lakes.

ACCURACY.—Results good except for winter and periods in which log jams occur.

Discharge measurements of Schroon River at Riverbank, N. Y., during the year ending Sept. 30, 1015.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	C. S. De Golyer	1.63	184	Mar. 25	R. M. Adams	2.98	796
Jan. 12	do	a 2.76	389	25	do	3.00	790
28	do	a 2.88	615	Apr. 16	E. D. Burchard	4.60	2,030
Feb. 11	R. M. Adams	2.50	540	16	do	4.60	2,010
20	C. S. De Golyer	2.79	568	June 3	O. W. Hartwell	1.86	286
20	do	2.62	567				

a Discharge relation affected by ice.

Daily discharge, in second-feet, of Schroon River at Riverbank, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	230	99	262	.....	518	2,040	690	990	298	1,060	610	560
2	200	126	279	.....	495	2,150	662	920	264	690	635	490
3	200	119	351	.....	472	2,040	690	920	298	800	635	333
4	172	121	351	.....	472	1,940	635	920	298	535	635	298
5	186	117	370	.....	585	1,840	635	920	298	990	662	298
6	186	131	314	.....	610	1,640	662	920	316	1,130	635	298
7	172	110	332	.....	610	1,550	662	800	298	1,210	635	298
8	186	119	351	.....	585	1,370	718	662	316	1,460	690	298
9	186	117	351	.....	560	1,290	800	447	298	1,460	745	316
10	186	110	332	.....	535	1,210	890	468	298	1,640	745	298
11	159	112	314	332	535	1,130	1,130	560	298	1,550	745	316
12	172	110	314	389	512	1,130	1,550	535	316	1,550	745	298
13	159	126	314	390	490	1,130	1,940	560	281	1,460	718	298
14	159	126	296	410	468	1,060	2,040	512	298	1,460	635	316
15	146	186	.....	472	490	1,060	2,150	512	298	1,460	585	298
16	159	200	.....	518	535	1,060	2,150	468	316	1,370	535	298
17	146	200	.....	590	560	1,060	1,940	490	264	1,210	490	298
18	146	200	.....	590	580	990	1,640	468	264	860	298	298
19	159	200	.....	640	585	920	1,640	468	316	920	264	298
20	172	215	.....	695	545	920	1,550	490	248	860	264	264
21	159	215	.....	668	560	800	1,550	512	316	860	264	447
22	146	200	.....	640	535	800	1,370	490	535	920	264	560
23	159	230	.....	640	535	800	1,370	468	264	920	351	535
24	159	215	.....	695	560	800	1,290	490	388	920	407	512
25	136	200	.....	668	1,130	800	1,130	468	298	860	690	490
26	159	200	.....	640	1,210	800	1,210	490	298	920	800	447
27	138	230	.....	668	1,370	718	1,060	490	264	860	800	447
28	144	230	.....	615	1,840	745	1,060	468	298	369	745	427
29	134	262	.....	518	.....	745	990	468	635	490	718	407
30	136	246	.....	495	.....	690	990	407	369	662	718	407
31	136	.....	.....	518	.....	690	.....	316	.....	635	662	.....

NOTE.—Discharge determined from two fairly well-defined rating curves, applicable Oct. 1 to Dec. 14 and Feb. 5 to Sept. 30. Discharge relation affected by ice Nov. 21 to 24 and Dec. 15 to Feb. 4, inclusive; discharge as given only approximate; mean discharge Dec. 15–31 estimated at 236 second-feet, and Jan. 1–10 at 219 second-feet.

Monthly discharge of Schroon River at Riverbank, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 534 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	230	136	164	0.307	0.35	B.
November	262	99	169	.317	.35	B.
December	370	.....	276	.517	.60	C.
January	695	.....	451	.844	.97	C.
February	1,840	468	660	1.24	1.29	B.
March	2,150	690	1,160	2.17	2.50	B.
April	2,150	635	1,230	2.30	2.57	A.
May	990	316	584	1.10	1.27	A.
June	635	248	318	.596	.66	A.
July	1,640	369	1,040	1.95	2.25	A.
August	800	264	591	1.11	1.28	A.
September	560	264	372	.697	.78	A.
The year	2,150	99	584	1.09	14.87	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

SACANDAGA RIVER NEAR HOPE, N. Y.

LOCATION.—About 1½ miles below junction of East and West branches, 3½ miles above post office at Hope, Hamilton County, 4 miles below Wells, and 12 miles above Northville.

DRAINAGE AREA.—494 square miles (measured on topographic maps).

RECORDS AVAILABLE.—September 15, 1911, to September 30, 1915. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Staff in two sections, the lower inclined, the upper vertical; read twice daily by Melvin Willis.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Rocky; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.1 feet at 9 a.m. April 12 (discharge, 9,900 second-feet); minimum stage recorded, 1.55 feet from 6 p. m. October 14 to 8 a. m. October 17 (discharge, 74 second-feet).

1911–1915: Maximum stage recorded, 10.0 feet at 5.30 p. m. March 27, 1913 (discharge, 24,800 second-feet); minimum stage recorded, 1.17 feet at 7.55 a. m. September 20, 1915 (discharge, 20 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

ACCURACY.—Results good for open-water season.

Discharge measurements of Sacandaga River near Hope, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 20	C. S. De Golyer	4.62	2,910	June 4	E. D. Burchard	2.57	505
20	.....do	4.56	2,820				

Daily discharge, in second-feet, of Sacandaga River near Hope, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	116	116	865	.....	.....	1,940	495	1,680	865	2,930	454	780
2	116	116	1,440	.....	.....	1,680	525	1,680	910	1,680	421	660
3	111	116	1,680	.....	.....	1,560	495	1,940	740	1,440	421	590
4	104	116	1,330	.....	.....	1,440	525	1,680	438	1,280	1,060	495
5	104	147	1,010	.....	.....	1,330	525	1,940	255	1,560	1,160	454
6	96	154	1,010	.....	.....	1,220	525	1,680	242	1,560	960	400
7	91	147	780	.....	.....	1,010	660	1,330	221	1,220	960	380
8	91	147	740	.....	.....	910	1,160	1,220	221	2,560	1,110	365
9	91	147	590	.....	.....	910	1,680	1,060	202	4,230	1,010	360
10	91	147	590	.....	.....	820	3,760	1,010	190	2,560	910	360
11	91	147	525	.....	.....	780	7,530	910	190	1,940	820	350
12	91	182	400	.....	.....	740	8,830	740	230	1,560	740	330
13	91	190	438	.....	.....	660	5,990	820	221	1,560	660	335
14	87	287	454	.....	.....	590	4,990	740	221	1,440	558	400
15	81	465	410	.....	.....	590	4,230	820	410	1,110	495	385
16	81	2,390	.....	.....	.....	660	4,230	865	400	910	525	454
17	116	1,680	.....	.....	.....	660	3,990	910	350	780	525	421
18	175	960	.....	.....	.....	590	3,330	3,540	301	740	410	350
19	287	1,010	.....	3,540	.....	558	2,230	1,810	242	700	370	320
20	310	910	.....	2,930	.....	525	2,230	1,010	350	660	320	310
21	287	780	.....	2,080	.....	495	1,940	1,110	301	590	301	400
22	230	660	.....	1,680	.....	495	2,080	1,220	255	495	2,560	421
23	190	558	.....	1,560	.....	525	2,230	1,010	242	438	5,790	400
24	164	465	.....	1,440	.....	590	1,560	1,440	242	410	3,760	350
25	154	525	.....	1,330	5,790	740	1,160	1,440	221	400	3,130	301
26	147	525	.....	1,110	4,480	660	1,010	1,330	186	465	2,230	310
27	147	1,010	.....	1,010	3,540	660	865	1,110	182	1,110	1,810	454
28	147	1,220	.....	910	2,390	590	820	820	182	700	1,440	400
29	144	910	.....	700	.....	590	1,220	590	182	740	1,160	350
30	135	780	.....	660	.....	590	1,280	410	221	660	1,010	320
31	122	.....	.....	600	.....	454	.....	360	.....	590	910	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 16 to Jan. 18 and Jan. 31 to Feb. 24, discharge estimated from records at other stations as follows: Dec. 16–31, 290 second-feet, Jan. 1–18, 630 second-feet, Feb. 1–24, 950 second-feet. These data supersede those published in the 1915 Annual Report of the State engineer and surveyor.

Monthly discharge of Sacandaga River near Hope, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 494 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	310	81	138	0.279	0.32	A.
November	2,390	116	567	1.15	1.28	B.
December	1,680	.....	545	1.10	1.27	C.
January	3,540	.....	996	2.02	2.33	D.
February	5,790	.....	1,340	2.71	2.82	D.
March	1,940	454	825	1.67	1.92	A.
April	8,830	495	2,370	4.80	5.36	A.
May	3,540	360	1,230	2.49	2.87	A.
June	865	182	314	.636	.71	B.
July	4,230	400	1,260	2.55	2.94	A.
August	5,790	301	1,230	2.49	2.87	A.
September	780	301	407	.824	.92	B.
The year	8,830	81	936	1.89	25.61	

SACANDAGA RIVER AT HADLEY, N. Y.

LOCATION.—About half a mile west of railroad station at Hadley, Saratoga County, a mile above mouth of river, and 4½ miles below site of proposed storage dam at Conklingsville.

DRAINAGE AREA.—1,060 square miles (measured on topographic maps).

RECORDS AVAILABLE.—January 1, 1911, to September 30, 1915; September 13, 1907, to December 31, 1910, at upper bridge station; September 24, 1909, to midsummer of 1911, at lower bridge station. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Barrett & Lawrence water-stage recorder referred to datum by a hook gage inside the well; vertical staff gage for auxiliary readings. Recorder inspected by J. F. Kelley.

DISCHARGE MEASUREMENTS.—Made from a cable about 30 feet above gage or by wading about three-fourths mile above gage.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 8.2 feet from 4 to 8 p. m. April 13 (discharge, 11,300 second-feet); minimum stage, from water-stage recorder, 2.57 feet at 10 a. m. October 11 (discharge, 165 second-feet).

1911–1915: Maximum stage, from water-stage recorder, 12.36 feet from 11 a. m. to 12 m. March 28, 1913 (discharge, approximately 35,500 second-feet); minimum stage, from water-stage recorder, 2.25 feet all day September 16, 1913 (discharge 61 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

ACCURACY.—Results good.

Discharge measurements of Sacandaga River at Hadley, N. Y., during the year ending Sept. 30, 1915.

[Made by C. S. De Golyer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 8	2.64	200	Jan. 8	[a] 5.32	1,480
Dec. 26	[a] 5.18	484	13	4.47	1,720

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Sacandaga River at Hadley, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	227	350	1,250	.....	1,190	6,120	1,400	1,980	660	1,670	1,250	1,630
2	218	350	1,290	.....	1,180	5,330	1,400	2,370	830	3,900	1,040	1,360
3	214	350	1,980	.....	1,230	4,600	1,410	2,460	830	3,900	1,010	1,180
4	210	344	2,370	.....	1,630	3,790	1,410	2,370	754	3,790	1,730	1,020
5	205	344	1,980	.....	1,710	3,270	1,460	2,130	622	3,470	3,680	882
6	184	344	1,600	.....	1,360	2,800	1,580	2,050	493	3,580	4,020	795
7	197	350	1,080	.....	1,380	2,540	1,760	1,720	424	3,370	3,790	738
8	184	361	1,060	1,480	1,380	2,210	2,130	1,710	407	3,470	4,020	698
9	172	378	1,010	2,710	1,370	1,900	3,080	1,700	389	5,720	4,240	698
10	168	383	996	2,370	1,330	1,760	4,360	1,500	355	7,130	3,680	738
11	168	383	873	2,130	1,270	1,640	6,690	1,490	334	6,840	2,890	698
12	172	383	698	1,900	1,130	1,560	9,160	1,320	334	5,850	2,290	630
13	176	378	601	1,760	1,200	1,480	10,900	1,130	361	4,840	1,900	594
14	176	383	526	1,630	1,190	1,460	10,600	1,110	366	4,130	1,580	645
15	176	418	.....	1,500	1,290	1,470	8,820	1,090	378	3,580	1,460	976
16	180	986	.....	1,340	2,290	1,470	7,280	1,190	608	2,710	1,320	1,300
17	197	2,800	.....	1,220	3,270	1,440	6,400	1,080	630	2,050	1,220	1,360
18	227	2,370	.....	1,630	3,370	1,400	5,720	1,270	580	1,670	1,130	1,220
19	317	1,360	.....	3,180	3,270	1,340	5,080	1,730	545	1,410	1,010	1,010
20	486	938	.....	4,020	3,080	1,320	4,600	1,430	532	1,200	847	847
21	637	1,010	.....	4,480	2,710	1,350	4,130	1,460	545	1,060	722	804
22	594	1,080	.....	4,480	2,370	1,370	3,680	1,540	545	910	1,290	976
23	526	1,020	.....	4,130	2,050	1,410	3,180	1,560	486	821	5,590	956
24	493	892	.....	3,580	2,210	1,620	2,800	1,430	467	787	6,980	847
25	461	830	.....	2,980	4,720	2,050	2,370	1,430	443	762	6,980	778
26	430	821	.....	2,540	6,120	2,290	1,900	1,340	412	778	6,540	730
27	378	910	.....	2,210	6,980	2,050	1,830	1,280	395	1,410	5,690	778
28	366	1,270	.....	1,900	6,980	2,050	1,540	1,160	395	1,900	4,480	892
29	361	1,580	.....	1,600	.....	1,900	1,560	1,120	401	1,700	3,370	864
30	355	1,420	.....	1,470	.....	1,620	1,830	996	519	1,600	2,540	795
31	355	.....	.....	1,830	.....	1,380	.....	746	.....	1,500	2,050	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 15 to Jan. 8; mean discharge Dec. 15–31, estimated at 428 second-feet; Jan. 1–7, 347 second-feet.

Monthly discharge of Sacandaga River at Hadley, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 1,060 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	637	168	297	0.280	0.32	A.
November	2,800	344	826	.779	.87	A.
December	2,370	.....	794	.749	.86	C.
January	4,480	.....	1,940	1.83	2.11	C.
February	6,980	1,130	2,470	2.33	2.43	B.
March	6,120	1,320	2,190	2.07	2.39	A.
April	10,900	1,400	4,000	3.77	4.21	A.
May	2,460	746	1,510	1.42	1.64	A.
June	830	334	501	.473	.53	A.
July	7,130	762	2,820	2.66	3.07	A.
August	6,980	722	2,910	2.75	3.17	A.
September	1,630	594	915	.863	.96	A.
The year	10,900	168	1,760	1.66	22.56	

WEST BRANCH OF SACANDAGA RIVER AT BLACKBRIDGE, NEAR WELLS, N. Y.

LOCATION.—At highway bridge known as Blackbridge, 2 miles above junction of east and west branches of Sacandaga River and about 3 miles west of Wells, Hamilton County.

DRAINAGE AREA.—211 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 14, 1911, to September 30, 1915. Date also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Chain on upstream side of bridge, read twice daily by Cornelius De Groff.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Rocky; slightly shifting during floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.5 feet at 8 a. m. and 4 p. m. April 12 (discharge 3,080 second-feet); minimum stage recorded, 2.45 feet at 8 a. m. and 4 p. m. October 13–15 (discharge, 40 second-feet).

1911–1915: Maximum stage recorded 11.5 feet at 4 p. m. March 27, 1913 (discharge, about 29,000 second-feet); minimum stage recorded, 2.30 feet September 17 and 21, 1913 (discharge, 3 second-feet).

WINTER-FLOW.—Discharge relation affected by ice for short periods.

REGULATION.—Flow slightly affected by storage dams used for logging in spring.

ACCURACY.—Results good.

Discharge measurements of West Branch of Sacandaga River at Blackbridge, near Wells, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	R. S. Barnes	2.52	43	Jan. 21	C. S. De Golyer	5.34	1,060
Dec. 4	C. S. De Golyer	4.75	689	June 3	E. D. Burchard	4.02	318
Jan. 19	do	6.03	1,610	3	do	3.90	293
19	do	5.99	1,560	Sept. 4	C. C. Covert	3.75	240

Daily discharge, in second-feet, of West Branch of Sacandaga River at Blackbridge, near Wells, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50	56	405	.....	308	965	147	660	550	1,260	184	365
2	48	56	660	.....	290	715	152	775	290	1,180	171	308
3	47	53	775	.....	255	660	126	660	345	775	143	272
4	48	56	715	.....	240	550	197	660	325	775	450	225
5	47	64	605	.....	255	550	171	578	111	775	525	197
6	46	79	500	.....	290	500	211	550	77	1,040	450	197
7	42	70	405	.....	225	450	197	450	66	715	450	171
8	43	74	365	.....	255	365	290	500	44	1,420	525	184
9	42	74	325	.....	225	428	605	450	42	1,660	500	197
10	42	60	225	.....	197	325	1,100	385	43	1,500	450	171
11	44	68	225	.....	197	290	1,580	365	56	775	475	152
12	43	68	197	.....	171	255	3,080	325	95	745	405	130
13	40	68	197	.....	171	225	2,430	290	68	715	365	143
14	40	159	171	.....	152	197	1,580	255	62	632	345	147
15	40	136	130	.....	450	197	1,580	240	77	605	775	111
16	42	805	166	.....	900	171	1,760	197	82	955	255	225
17	60	900	147	.....	715	171	1,580	290	111	405	225	197
18	126	550	126	.....	605	166	1,420	835	95	325	197	184
19	159	500	.....	1,580	550	147	1,180	345	79	290	166	152
20	159	550	.....	1,340	500	136	1,180	605	100	255	147	171
21	136	325	.....	1,100	450	171	1,100	835	95	225	130	197
22	126	385	.....	805	405	171	835	835	86	225	1,940	225
23	95	325	.....	775	405	171	775	775	82	197	1,940	171
24	79	290	.....	688	450	147	660	688	68	197	1,760	159
25	74	255	.....	605	1,580	225	525	660	70	171	1,420	130
26	68	255	.....	525	1,660	240	450	550	62	225	1,340	147
27	64	385	.....	525	1,420	225	405	550	60	450	1,180	197
28	60	450	.....	500	1,260	225	405	405	107	325	775	171
29	56	365	.....	365	.....	197	578	405	104	290	500	197
30	60	365	.....	325	.....	171	605	152	70	290	500	143
31	64	.....	.....	325	.....	171	.....	126	.....	130	405	.....

NOTE.—Discharge determined from two fairly well defined rating curves applicable Oct. 1 to Mar. 31 and Apr. 1 to Sept. 30. Discharge relation estimated from records at Hadley as follows: Dec. 19-31, 142 second-feet; Jan. 1-18, 307 second-feet.

Monthly discharge of West Branch of Sacandaga River at Blackbridge, near Wells, N. Y., for the year ending September 30, 1915.

[Drainage area, 211 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	159	40	67.4	0.319	0.37	B.
November	900	53	262	1.24	1.38	B.
December	775	.....	264	1.25	1.44	C.
January	.....	.....	483	2.29	2.64	D.
February	1,660	152	521	2.47	2.57	C.
March	965	136	309	1.46	1.68	B.
April	3,080	126	897	4.25	4.74	C.
May	835	126	497	2.36	2.72	B.
June	550	42	118	.559	.62	C.
July	1,660	130	630	2.99	3.45	B.
August	1,940	130	616	2.92	3.37	B.
September	365	111	188	.891	.99	C.
The year	3,080	40	404	1.91	25.97	

HOOSIC RIVER NEAR EAGLE BRIDGE, N. Y.

LOCATION.—Half a mile below Walloomsac River and 1½ miles above Owl Kill and Eagle Bridge, Rensselaer County.

DRAINAGE AREA.—512 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 13, 1910, to September 30, 1915; September 25, 1903, to December 31, 1908, at Buskirk, 4 miles below present station. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Inclined staff on left bank; prior to August 17, 1914, chain gage 400 feet above present site; temporary chain gage, May 22 to August 16, 1914. Read twice daily by Mrs. Vashti Russell.

DISCHARGE MEASUREMENTS.—Made from cable half a mile below gage or by wading.

CHANNEL AND CONTROL.—Gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 13.5 feet at 7.30 a. m. July 9 (approximate discharge, 16,700 second-feet); minimum stage recorded, 2.48 feet at 7.30 a. m. December 12 (approximate discharge, 35 second-feet).

1910–1915: Maximum stage not recorded, as gage used prior to August 17, 1914, could not be reached at high stages; minimum stage recorded, 6.1 feet at 5 p. m. September 14, 1913 (discharge, practically zero).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Flow affected by storage on Walloomsac River and at Hoosic Falls, about 2 miles above gage.

ACCURACY.—Results fair. Estimates of low discharge may be somewhat in error because of regulation.

Discharge measurements of Hoosic River near Eagle Bridge, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 4	R. S. Barnes	2.90	79	Jan. 27	R. M. Adams	4.41	686
Jan. 16	R. M. Adams	3.60	319	Mar. 22	R. S. Barnes	4.01	433
19	do	7.23	3,800	Apr. 20	H. W. Fear	5.04	1,210
27	do	[a] 4.40	475				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Hoosic River near Eagle Bridge, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	162	59	173	.....	810	1,590	515	880	375	430	458	458
2	150	94	186	.....	1,390	1,390	515	960	285	845	575	430
3	130	102	212	.....	1,210	1,260	515	1,000	305	1,080	485	458
4	69	120	150	.....	1,120	1,060	515	775	230	880	1,040	375
5	120	140	198	.....	1,000	960	545	810	265	670	3,200	325
6	140	140	86	.....	1,900	845	705	740	285	810	1,490	305
7	120	94	162	6,050	1,900	845	880	775	215	545	1,210	402
8	94	56	173	3,200	960	920	845	775	172	2,580	375	325
9	111	150	173	705	670	705	920	775	172	12,500	960	350
10	94	140	198	458	515	705	1,490	775	265	3,200	740	265
11	43	130	130	485	430	670	5,410	638	172	1,790	638	285
12	74	150	94	375	515	670	4,470	515	172	1,790	605	160
13	140	162	79	1,490	880	605	3,200	545	130	1,120	575	230
14	140	72	198	880	880	605	2,120	575	160	880	605	1,040
15	120	82	.....	485	5,090	670	1,790	545	285	705	485	575
16	120	244	.....	430	4,320	638	1,680	402	200	638	605	325
17	120	455	.....	458	1,790	575	1,590	485	230	575	638	375
18	130	198	.....	2,340	1,160	545	1,300	545	200	605	575	373
19	140	198	.....	3,880	1,000	545	1,590	458	265	545	375	265
20	162	173	.....	2,230	880	515	1,160	485	123	880	430	305
21	150	173	.....	1,080	845	485	1,000	350	245	705	430	305
22	130	91	.....	740	845	575	880	430	215	638	325	705
23	130	150	.....	458	810	575	810	430	185	638	1,490	545
24	120	212	.....	1,390	1,300	670	705	265	200	515	845	430
25	82	162	.....	810	8,640	705	705	430	172	375	1,160	430
26	94	150	.....	575	4,470	960	670	325	215	810	960	305
27	130	162	.....	545	2,340	670	638	458	95	2,010	740	880
28	130	212	.....	430	1,900	605	638	430	185	1,080	575	575
29	130	130	.....	402	.....	670	810	402	215	740	458	430
30	130	173	.....	325	.....	605	1,000	265	245	740	605	402
31	94	.....	.....	245	.....	515	.....	265	.....	485	575	.....

NOTE.—Discharged determined from two fairly well defined rating curves, applicable Oct. 1 to Dec. 14 and Jan. 7 to Sept. 30. Discharge relation affected by ice Dec. 15 to Jan. 6 and Jan. 21 to Feb. 12, and probably during a period in March; estimates Jan. 21 to Feb. 12 approximate; mean discharge Dec. 15 to Jan. 6 derived from power-plant records at Johnsonville and Schaghticoke as follows: Dec. 15–31, 141 second-feet; Jan. 1–6, 215 second-feet.

Monthly discharge of Hoosic River near Eagle Bridge, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 512 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	162	43	119	0.232	0.27	B.
November	455	56	152	.297	.33	C.
December	.....	.....	149	.291	.34	C.
January	6,050	.....	1,020	1.99	2.29	C.
February	8,640	430	1,770	3.46	3.56	C.
March	1,590	485	751	1.47	1.70	C.
April	5,410	515	1,320	2.58	2.88	C.
May	1,000	265	565	1.10	1.27	B.
June	375	95	216	.422	.47	B.
July	12,500	375	1,350	2.64	3.04	C.
August	3,200	325	782	1.53	1.76	B.
September	1,040	160	421	.822	.92	B.
The year	12,500	43	711	1.39	18.83	

MOHAWK RIVER AT VISCHER FERRY DAM,[a] NEW YORK.

LOCATION.—At the Vischer Ferry dam of the Barge canal, a mile above Stony Creek and Vischer Ferry, about 7 miles below Schenectady and about 11 miles above the mouth.

DRAINAGE AREA.—3,400 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 24, 1913, to September 30, 1915. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Gurley water-stage recorder (showing head on crest of spillway) in a corner of the basin near upper end of Barge canal lock; inclined staff at foot of an old bridge abutment, about 100 feet above Vischer Ferry, read June 24 to December 16, 1913, and May 24 to June 2, 1914; staff gage in masonry of outer lock wall just above upper gates, read March 30 to May 23, 1914; datum of staff gage 12.15 feet lower than that of recorder. Recorder inspected by engineers from Albany office of U. S. Geol. Survey.

DISCHARGE MEASUREMENTS.—Made by wading below dam at low water. No provision for measurements at medium and high stages.

CHANNEL AND CONTROL.—At the ferry, coarse gravel; practically permanent; at the dam the control is the crest of the spillway.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.7 feet at 8 a. m. July 9 (discharge, 44,600 second-feet); minimum stage recorded, 0.18 foot from 4 a. m. to 5 a. m. and 4 p. m. to 6 p. m., October 31 (discharge, 290 second-feet).

1913–1915: Maximum stage recorded, 7.6 feet just before noon March 28, 1914, determined by leveling from flood marks (discharge estimated by New York State engineer, 140,000 second-feet); this stage lasted but a few moments and was caused by the breaking of an ice jam near Schenectady.

DIVERSIONS.—Water was diverted into Erie Canal at temporary lock in north end of dam prior to December, 1914. Measurements of this diversion have been made at Bridge 48 about a mile downstream and are given in a table, but no allowance for this diversion has been made in computing the flow.

Barge canal lock No. 7 at south end of dam was put into operation May 15, 1915. The following tables of discharge include the flow over the spillway and through the lock and water wheels.

REGULATION.—Flow affected by operation of dams upstream.

ACCURACY.—Results good for low stages.

Discharge measurements of Mohawk River at Vischer Ferry dam, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 7	Hartwell, Adams, and Barnes	0.21	466
26	De Golyer and Barnes	.34	904

Discharge measurements of Erie Canal at Vischers Ferry (Bridge 48), N. Y., during the period Oct. 1 to Nov. 30, 1914.

Date.	Made by—	Gage height.[b]	Discharge.	Date.	Made by—	Gage height.[b]	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 7	R. M. Adams	1.67	421	Oct. 26	R. M. Adams	1.99	418
19	.....do	1.61	327	Nov. 25	H. W. Fear	1.20	289

[a] Published as Mohawk River at Barge Canal Lock 7 in Water-Supply Paper 381.
[b] Distance to water surface from reference point on bridge.

Daily discharge, in second-feet, of Mohawk River at Vischer Ferry dam, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	440	440	.....	1,850	4,920	.....	3,840	7,500	1,770	8,130	3,380	[illegible]
2	410	410	.....	1,780	5,190	.....	3,680	8,000	1,580	14,900	3,310	[illegible]
3	440	440	.....	1,850	6,700	.....	3,840	8,000	1,700	7,070	6,540	[illegible]
4	470	440	.....	1,850	5,910	.....	3,680	5,820	3,420	5,220	13,500	[illegible]
5	440	550	.....	1,850	5,730	.....	3,360	4,650	3,420	6,080	16,300	[illegible]
6	440	750	.....	1,850	5,910	.....	4,470	4,560	2,670	5,620	9,000	1,770
7	440	950	.....	1,850	5,910	.....	6,000	4,020	2,260	3,810	7,530	1,800
8	510	710	.....	7,000	7,100	.....	7,800	4,830	1,110	7,020	6,390	1,640
9	510	410	.....	8,800	6,700	.....	8,800	5,010	1,060	43,700	6,730	1,590
10	510	470	.....	7,700	5,190	.....	10,800	4,200	1,010	22,500	6,210	2,510
11	470	1,000	1,990	6,800	5,010	.....	16,700	3,520	1,060	10,200	5,560	2,800
12	410	800	.....	5,820	5,100	.....	22,400	2,130	1,110	8,060	4,640	2,380
13	410	710	.....	5,550	5,280	.....	18,200	1,520	1,270	10,200	3,910	2,380
14	440	850	1,280	5,820	6,400	5,100	13,200	3,680	1,910	11,300	3,480	7,910
15	440	800	950	6,500	6,500	5,370	11,000	2,020	1,910	11,200	2,550	6,710
16	590	1,100	3,520	5,820	19,600	5,370	9,000	2,780	1,910	5,760	3,150	4,390
17	590	2,410	.....	4,830	18,900	5,100	7,900	2,300	1,910	3,010	2,930	5,450
18	590	2,410	2,340	6,000	13,500	4,470	7,700	1,740	1,460	3,310	2,500	4,810
19	1,100	.....	2,200	18,900	9,800	4,020	7,300	2,590	1,280	3,310	2,570	3,390
20	1,710	.....	.....	24,600	8,300	3,840	7,000	3,550	1,160	3,900	2,290	1,850
21	1,050	.....	.....	18,900	7,700	4,200	6,400	2,020	1,980	3,320	2,200	1,440
22	950	.....	1,460	12,300	7,500	4,290	6,400	2,440	1,280	3,300	9,610	2,980
23	800	.....	.....	8,000	7,500	4,380	6,000	2,780	1,910	3,330	27,400	4,260
24	900	.....	1,280	7,300	10,800	6,100	4,470	3,150	1,910	2,740	10,800	3,310
25	900	.....	1,400	7,700	32,400	7,600	4,020	2,670	1,990	2,800	9,580	2,210
26	850	.....	1,220	7,300	34,100	8,700	4,200	2,830	1,980	2,740	8,760	3,040
27	670	.....	1,280	6,600	21,700	7,700	4,740	2,230	1,510	8,780	6,460	2,850
28	800	.....	1,400	6,200	12,000	5,820	4,470	1,880	1,520	4,220	5,590	3,080
29	800	.....	1,460	5,820	.....	5,100	4,380	1,740	2,040	3,320	4,570	2,690
30	550	.....	1,460	5,100	.....	4,830	5,910	2,260	2,190	3,350	3,900	2,700
31	350	.....	1,850	4,380	.....	4,380	.....	2,160	.....	2,780	3,870	.....

NOTE.—Discharge October to April is flow over the spillway only; from May to September, discharge includes estimated discharge through the lock and water wheels at the lock. Discharge over spillway determined from a fairly well-defined rating curve; mean discharge for November, December, and March estimated.

Monthly discharge of Mohawk River at Vischer Ferry dam, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 3,400 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	1,710	350	644	0.189	0.22	B.
November	.....	410	1,150	.338	.38	D.
December	.....	.....	2,400	.706	.81	D.
January	24,600	1,780	6,990	2.06	2.38	C.
February	34,100	4,920	10,400	3.06	3.19	B.
March	.....	3,840	5,650	1.66	1.91	C.
April	22,400	3,360	7,590	2.23	2.49	B.
May	8,000	1,520	3,500	1.03	1.19	B.
June	3,420	1,010	1,780	.524	.58	B.
July	43,700	2,740	7,580	2.23	2.57	B.
August	27,400	2,200	6,620	1.95	2.25	B.
September	7,910	1,490	3,080	.959	1.07	B.
The year	43,700	350	4,750	1.40	19.04	

NOTE.—The monthly discharge in second-feet per square mile and the run-off depth in inches shown by the table do not represent the natural flow from the basin because of artificial regulation and storage; the yearly discharge and run-off doubtless represent more nearly the natural flow, for probably little stored water is held over from year to year.

ALPLAUS KILL NEAR CHARLTON, N. Y.

LOCATION.—At highway bridge about half a mile southwest of Charlton, Saratoga County.

DRAINAGE AREA.—24.9 square miles. (Determined by engineers of State of New York Conservation Commission.)

RECORDS AVAILABLE.—August 12, 1913, to September 30, 1915. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Gurley printing water-stage recorder on left bank just above bridge, referred to gage datum by a hook gage inside of well; vertical staff on upstream corner of left abutment of the bridge for auxiliary readings. Recorder inspected by E. B. Litts.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading; original V notch was rated by a number of volumetric measurements.

CHANNEL AND CONTROL.—In 1913 a low weir 43.0 feet long was constructed between abutments of bridge. Average height of its crest, 2.6 feet above bed of stream. Crest of weir was formed by a steel plate with a rectangular notch 36 inches long and 9 inches deep and a V notch in the center of the rectangular notch. Weir carried out by ice March 28, 1914, and replaced in August by a lower concrete weir of the same form except that the rectangular notch was made only 0.2 foot deep. Weir was damaged by flood July 27, 1915, and completely removed by the flood of August 22, 1915, which formed a natural control of boulders about 200 feet downstream.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water stage recorder, 15.3 feet at 3.30 a. m. July 27 (discharge not determined); minimum stage, from water-stage recorder, 9.19 feet from 4 p. m. until midnight October 6 (discharge 0.03 second-foot.

1913–1915: Maximum stage July 27, 1915 (see preceding paragraph); practically no flow August 16–29 and September 5–21, 1913.

WINTER FLOW.—Discharge relation affected by ice; discharge estimated from frequent measurements and climatic data.

REGULATION.—Some diurnal fluctuation is caused during the spring months by the operation of a grist mill a short distance upstream.

ACCURACY.—Results excellent except for winter months and after weir was destroyed.

Discharge measurements of Alplaus Kill near Charlton, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 3	C. S. De Golyer	9.88	17.8	Feb. 19	O. W. Hartwell	[a]10.67	41.9
31	R. M. Adams	[a]9.64	.7	25	H. W. Fear	11.62	404
Jan. 5	C. H. Pierce	[a]9.64	.4	27	R. M. Adams	10.48	116
14	H. W. Fear	[a]10.76	16.4	27	do	10.50	114
23	R. W. Adams	[a]10.13	23.8	Mar. 12	H. W. Fear	10.10	44.7
23	do	[a]10.50	31.5	Apr. 2	R. M. Adams	9.90	20.4
23	do	[a]10.45	31.0	23	E. D. Burchard	9.76	8.7
30	do	[a]9.96	10.1	23	do	9.74	8.2
30	do	[a]9.99	11.0	Aug. 19	C. C. Covert	9.25	6.0
Feb. 12	O. W. Hartwell	[a]9.91	9.4	Sept. 5	do	9.81	8.6
18	H. W. Fear	[a]11.22	66.4	25	E. D. Burchard	9.84	8.3

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Alplaus Kill near Charlton, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.06	.....	11	.....	68	21	15	2.0	286	22	15
2	.04	.....	18	.....	48	19	20	2.0	78	46	12
3	.06	0.15	12	.....	53	18	20	1.72	51	154	9.8
4	.05	.....	6.7	.....	42	21	15	.67	31	421	8.3
5	.04	.....	4.5	.....	28	21	12	.56	20	159	7.3
6	.03	.....	2.0	.....	27	27	9.4	.51	.....	82	6.8
7	.04	.....	5.5	.....	21	34	7.3	.85	.....	70	7.3
8	.14	.33	3.1	.....	39	31	9.4	.85	.....	86	11
9	.06	.56	4.0	.....	47	31	9.4	.79	267	47	8.3
10	.05	.46	3.1	.....	45	32	6.7	.67	70	33	7.6
11	.07	.41	2.7	.....	48	128	5.0	.73	34	27	5.6
12	.06	.92	.98	.....	59	117	5.0	.98	25	21	4.8
13	.05	.41	.92	.....	45	48	5.0	1.05	70	32	30
14	.06	.73	2.4	.....	53	32	9.4	.79	149	20	430
15	.07	.....	8.0	.....	61	25	6.7	.92	44	16	60
16	.16	5.5	11	.....	47	21	5.0	2.4	25	15	.....
17	.73	.....	16	.....	34	18	7.3	1.72	24	9.4	.....
18	.41	.....	10	.....	25	16	10	1.72	18	7.0	.....
19	1.05	.....	10	.....	25	14	8.7	1.45	12	6.0	.....
20	3.1	.....	5.0	.....	37	12	5.5	3.1	12	5.0	.....
21	2.4	1.19	2.4	.....	38	10	4.5	2.4	11	4.6	.....
22	1.12	.92	2.0	.....	37	8.7	8.0	2.7	14	228	.....
23	.46	.62	2.0	.....	50	7.3	6.1	1.72	47	257	.....
24	.46	.....	11	.....	70	6.7	5.0	4.0	16	81	.....
25	.37	4.5	5.5	447	63	6.7	4.0	2.7	12	82	8.3
26	.25	2.4	.....	130	63	7.3	3.5	1.72	42	33	.....
27	.62	3.5	.....	115	28	5.5	4.5	1.05	472	21	.....
28	.....	9.4	.....	80	30	5.5	3.5	.85	95	21	.....
29	.....	5.5	.....	.....	25	14	2.7	.67	103	16	.....
30	.....	4.0	.....	.....	18	22	2.4	1.05	44	21	.....
31	.....	.....	.....	.....	20	.....	2.4	.....	30	21	.....

NOTE.—Discharge determined from three rating curves applicable as follows: Oct. 1 to July 26, well defined; July 27 to Aug. 21, poorly defined; Aug. 22 to Sept. 30, poorly defined. Discharge relation affected by ice Dec. 26 to Feb. 24, mean discharge estimated as follows: Oct. 28 to Nov. 2, 0.32 second-feet; Nov. 4–7, 0.16 second-feet; Nov. 15, 2.1 second-feet; Nov. 17–20, 13 second-feet; Nov. 24, 2.4 second-feet; Dec. 26–31, 2.6 second-feet; Jan. 1–10, 9.2 second-feet; Jan. 11–20, 95.9 second-feet; Jan. 21–31, 11 second-feet; Feb. 1–10, 70 second-feet; Feb. 11–20, 88 second-feet; Feb. 21–24, 176 second-feet; July 6–8, 106 second-feet; Sept. 16–30, 14 second-feet.

Monthly discharge of Alplaus Kill near Charlton, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 24.9 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	3.1	0.03	0.437	0.018	0.02	A.
November	.....	.....	3.30	.133	.15	B.
December	18	.....	5.66	.227	.26	B.
January	.....	.....	37.8	1.52	1.75	C.
February	.....	.....	109	4.38	4.56	C.
March	70	18	41.7	1.67	1.92	A.
April	128	5.5	27.0	1.08	1.20	B.
May	20	2.4	7.69	.309	.36	A.
June	4.0	.51	1.48	.059	.07	A.
July	472	11	78.1	3.14	3.62	D.
August	421	4.6	66.6	2.67	3.08	D.
September	430	.....	27.8	1.12	1.25	D.
The year	472	.03	33.4	1.34	18.24	

DELAWARE RIVER BASIN.

EAST BRANCH OF DELAWARE RIVER AT FISH EDDY, N. Y.

LOCATION.—At New York, Ontario & Western Railway bridge at Fish Eddy, Delaware County, 5½ miles above confluence of east and west branches of Delaware River.

DRAINAGE AREA.—790 square miles (measured on post route map).

RECORDS AVAILABLE.—November 19, 1912, to September 30, 1915. Records were obtained at Hancock, about 4 miles below, October 14, 1902, to December 31, 1912. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Vertical staff in three sections on piers of railroad bridge. A high-water section on right abutment of highway bridge 300 feet upstream was used for gage heights above 6 feet previous to July, 1913. Read twice daily by John Fininegan.

DISCHARGE MEASUREMENTS.—Made from the highway bridge 200 feet above railroad bridge or by wading.

CHANNEL AND CONTROL.—Coarse gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 12.8 feet at 3.55 p. m., January 19 (discharge, approximately 20,800 second-feet); minimum stage recorded, 1.64 feet at 5 p. m. October 12, 14, and 15 (discharge, 97 second-feet).

1912–1915: Maximum stage 17.4 feet during the afternoon of March 27, 1913, determined by leveling from flood marks (approximate discharge, 33,500 second-feet); minimum stage recorded, 1.64 feet at 5 p. m. October 12, 14, and 15, 1914; (discharge, 97 second-feet).

WINTER FLOW.—Discharge relation somewhat affected by ice.

ACCURACY.—Results fair.

Discharge measurements of East Branch of Delaware River at Fish Eddy, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 26	R. M. Adams	[a] 3.82	399	June 20	E. D. Burchard	2.70	534
Jan. 14	do	5.09	3,160	July 12	O. W. Hartwell	6.48	4,780
Feb. 22	do	4.30	2,170	15	do	5.38	2,920
Apr. 9	O. W. Hartwell	3.58	1,480	Sept. 29	C. C. Covert	3.49	1,070
June 18	E. D. Burchard	2.63	491				

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of East Branch of Delaware River at Fish Eddy, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	134	134	434	.....	7,560	3,180	1,220	1,320	710	920	780	1,410
2	124	110	434	.....	5,080	2,790	1,100	1,320	685	1,000	745	1,240
3	120	115	456	.....	4,070	2,430	1,100	1,240	590	590	885	1,080
4	120	124	434	.....	2,670	2,310	1,070	1,160	560	435	2,100	1,000
5	115	127	391	.....	3,180	2,310	1,070	1,160	530	745	3,320	920
6	117	124	391	.....	4,230	2,200	1,100	1,160	480	920	2,430	780
7	120	120	370	12,500	4,730	1,770	1,340	1,160	435	680	2,100	780
8	110	122	434	8,390	2,670	1,570	1,390	1,160	412	2,430	1,690	960
9	110	129	504	6,570	2,310	1,480	1,480	1,160	390	10,400	1,590	815
10	115	124	456	3,610	2,090	1,390	2,090	1,320	370	5,620	1,320	710
11	108	127	412	1,480	2,090	1,340	12,500	1,240	390	3,320	1,160	620
12	99	129	.....	1,480	1,870	1,770	11,300	1,160	1,040	4,230	1,000	530
13	101	127	.....	6,000	1,870	1,390	6,960	1,080	505	3,320	960	560
14	97	132	.....	4,070	1,390	1,260	4,900	1,040	458	4,730	850	590
15	97	145	.....	3,320	6,380	1,220	3,910	960	650	3,460	780	590
16	145	222	.....	2,790	9,700	1,220	2,550	920	885	3,610	1,000	505
17	256	456	.....	2,090	4,730	1,220	1,990	850	590	2,430	815	480
18	222	370	.....	5,080	3,180	1,100	1,890	920	505	1,790	680	745
19	274	350	.....	19,000	3,180	1,100	1,890	850	480	2,320	620	815
20	330	412	.....	8,600	2,920	965	1,890	780	590	3,610	530	850
21	292	330	.....	4,900	2,430	965	1,890	710	505	2,210	480	3,050
22	239	330	.....	3,460	2,310	930	1,690	1,080	480	1,790	3,610	3,910
23	206	292	.....	2,920	2,310	930	1,410	1,160	458	1,500	6,760	2,100
24	173	274	.....	6,570	4,560	1,100	1,410	920	505	1,240	3,320	1,690
25	153	256	.....	3,320	15,800	1,140	1,320	1,000	435	1,080	4,070	1,320
26	153	292	.....	2,790	8,180	1,100	1,240	1,160	390	1,000	3,180	1,410
27	139	330	.....	2,550	5,620	965	1,240	1,160	310	1,500	2,430	1,590
28	134	530	.....	2,310	4,070	1,100	1,240	1,000	310	1,040	1,990	1,160
29	134	504	.....	.....	.....	1,100	1,320	850	330	1,500	1,890	1,000
30	170	412	.....	.....	.....	1,180	1,320	780	480	1,080	1,890	920
31	161	.....	.....	.....	.....	1,220	.....	745	.....	920	1,790	.....

NOTE.—Discharge determined from three fairly well defined rating curves applicable as follows: Oct. 1 to Dec. 12, Jan. 7 to Apr 11, and Apr. 12 to Sept 30. Discharge relation apparently affected by ice Dec. 12 to Jan 6; mean discharge estimated as follows: Dec. 12–21, 310 second-feet; Dec 22–31, 362 second-feet; Jan. 1–6, 276 second-feet. Discharge Jan 29–31 estimated at 2,050 second-feet.

Monthly discharge of East Branch of Delaware River at Fish Eddy, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 790 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	330	97	157	0.199	0.23	B.
November	530	110	242	.306	.34	B
December	504	.....	369	.467	.54	B
January	19,000	.....	3,920	4.96	5.72	C.
February	15,800	1,390	4,330	5.48	5.71	C
March	3,180	930	1,480	1.87	2.16	B
April	12,500	1,070	2,560	3.24	3.62	B
May	1,320	710	1,050	1.33	1.53	B.
June	1,040	310	515	.652	.73	B
July	10,400	435	2,300	2.91	3.36	B.
August	6,760	480	1,830	2.32	2.68	B
September	3,910	480	1,140	1.44	1.61	B.
The year	19,000	97	1,640	2.08	28.23	

DELAWARE RIVER AT PORT JERVIS, N. Y

LOCATION.—At the toll bridge at Port Jervis, Orange County, 1 mile above Neversink River and 6 miles below Mongaup River.

DRAINAGE AREA.—3,250 square miles.

RECORDS AVAILABLE.—October 12, 1904, to September 30, 1915. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Staff gage in two sections; the lower section inclined, about 30 feet downstream from left abutment; the upper section vertical and attached to downstream end of left abutment; prior to June 20, 1914, a chain gage on the bridge was used; gage read twice daily after July 1, 1914, by Mrs. Bella Fuller.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.3 feet at 3 p. m. February 25 (discharge, 45,200 second-feet); minimum stage recorded, 0.93 feet at 8 a. m. and 3 p. m. October 13 (discharge, 292 second-feet).

1904–1915: Maximum stage recorded, 16.0 feet at 8 a. m. March 28, 1914 (discharge, 92,700 second-feet); minimum stage recorded, 0.60 foot at 8 a. m. September 22 and 23, 1908 (discharge, 175 second-feet).

WINTER FLOW.—Discharge relation somewhat affected by ice.

ACCURACY.—Results good.

Discharge measurements of Delaware River at Port Jervis, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 29	C. S. De Golyer	1.19	447	July 13	O. W. Hartwell	5.17	10,700
Apr. 10	O. W. Hartwell	3.62	4,990	14	....do	4.90	9,450
June 23	E. D. Burchard	2.15	1,650				

Daily discharge, in second-feet, of Delaware River at Port Jervis, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	442	429	1,380	.....	3,830	11,600	2,480	4,640	2,890	1,750	2,480	4,920
2	422	416	1,180	.....	14,600	11,600	2,480	4,360	2,680	2,480	2,480	4,090
3	403	403	1,110	.....	11,600	8,270	2,480	4,360	2,480	3,580	2,680	3,830
4	396	442	1,180	.....	9,060	7,520	2,290	4,090	2,200	3,340	4,920	3,340
5	378	442	1,240	.....	7,890	5,510	2,290	4,360	2,100	3,110	14,600	3,110
6	354	429	1,240	.....	7,160	5,820	2,290	4,090	1,920	3,830	10,300	2,890
7	390	416	1,240	.....	8,270	5,210	3,110	4,090	1,750	3,580	8,270	2,680
8	490	410	1,530	32,000	9,460	4,640	3,580	4,090	1,590	2,480	6,810	2,890
9	442	378	2,640	16,800	7,520	4,360	4,090	3,830	2,100	33,500	7,520	2,890
10	372	366	2,430	11,200	5,210	3,830	4,360	4,090	1,590	23,200	6,140	2,890
11	378	448	2,040	7,890	4,640	3,830	11,200	3,580	1,590	12,100	5,510	2,890
12	342	455	1,860	6,810	4,360	3,580	26,800	3,340	1,370	8,270	4,920	2,290
13	292	442	1,530	17,400	4,090	5,820	19,800	4,920	1,300	10,300	4,360	2,100
14	324	436	.....	18,000	5,210	3,110	13,500	3,110	1,300	9,460	3,830	2,290
15	354	469	.....	12,600	7,520	3,110	10,700	2,890	1,240	9,870	3,340	2,100
16	403	651	.....	9,870	35,800	3,110	8,660	2,890	1,920	6,810	3,580	2,290
17	660	830	.....	8,660	22,500	2,890	7,890	2,890	1,840	5,820	3,340	2,200
18	880	1,180	.....	9,870	12,600	2,680	6,810	3,110	2,680	6,140	3,340	2,100
19	880	1,310	.....	31,200	8,660	2,480	5,820	2,890	2,100	4,920	2,680	5,510
20	990	1,110	.....	38,100	7,890	2,290	5,210	2,680	2,100	4,360	2,480	2,890
21	935	990	.....	21,200	7,890	2,290	4,920	2,680	1,840	5,820	2,290	4,640
22	935	830	.....	13,500	7,520	2,290	4,360	4,360	1,670	4,360	2,680	8,270
23	935	830	.....	10,700	7,160	2,480	4,360	6,470	1,670	3,830	12,100	7,160
24	732	830	.....	10,300	9,060	2,480	4,360	6,140	1,750	3,830	10,700	5,210
25	644	780	.....	12,100	41,200	2,680	4,090	5,210	1,750	3,340	8,270	4,090
26	585	685	.....	9,060	33,500	3,110	3,830	4,640	2,680	3,340	9,060	3,830
27	490	780	.....	7,520	20,500	3,340	3,580	4,640	1,440	3,830	6,140	3,340
28	483	935	.....	6,810	13,500	3,340	3,340	4,640	1,300	3,580	5,210	3,830
29	455	935	.....	6,140	.....	3,110	3,340	4,090	1,170	3,340	5,210	3,340
30	436	1,530	.....	4,640	.....	2,890	5,210	3,580	1,050	3,580	5,510	2,890
31	442	.....	.....	3,580	.....	2,680	.....	3,340	.....	2,890	6,140	.....

NOTE.—Discharge determined from two well-defined rating curves applicable Oct. 1 to Dec. 13 and Jan. 8 to Sept. 30. Discharge relation affected by ice Dec. 14 to Jan. 7; discharge estimated as follows: Dec. 14–31, 1,410 second-feet; Jan. 1–7, 1,290 second-feet.

Monthly discharge of Delaware River at Port Jervis, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 3,250 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	990	292	538	0.166	0.19	B.
November	1,530	366	686	.211	.24	B.
December	2,640	.....	1,480	.455	.52	C.
January	38,100	.....	10,800	3.32	3.83	B.
February	41,200	3,580	12,100	3.72	3.87	B.
March	11,600	2,290	4,260	1.31	1.51	A.
April	26,800	2,290	6,240	1.92	2.14	A.
May	6,470	2,680	4,000	1.23	1.42	A.
June	2,890	1,050	1,840	.566	.63	B.
July	33,500	1,750	6,470	1.99	2.29	A.
August	14,600	2,290	5,710	1.76	2.03	A.
September	8,270	2,100	3,560	1.10	1.23	A.
The year	41,200	292	4,760	1.46	19.90	

DELAWARE RIVER AT RIEGELSVILLE, N. J.

LOCATION.—At the toll suspension bridge between Riegelsville, Warren County, N. J., and Riegelsville, Pa., 600 feet above Musconetcong River and 9 miles below Lehigh River.

DRAINAGE AREA.—6,430 square miles.

RECORDS AVAILABLE.—July 3, 1906, to September 30, 1915.

GAGE.—Staff in three sections installed November 14, 1914, on left bank at upstream side of bridge; lower section inclined, middle and upper sections vertical; prior to November 14, 1914, chain gage attached to upstream side of bridge; gage read twice a day, to quarter-tenths, by J. H. Deemer.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Large bowlders; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 17.6 feet at 8 a. m. February 26 (discharge, 86,100 second-feet); minimum stage recorded, 1.78 feet at 8 a. m. November 6 (discharge, 1,170 second-feet).

1906–1915: Maximum stage [1] recorded, 25.0 feet March 28, 1913 (approximate discharge, 144,000 second-feet); minimum stage recorded, 1.78 feet November 6, 1914 (discharge 1,170 second-feet).

WINTER FLOW.—Discharge relation not seriously affected by ice.

DIVERSIONS.—The Delaware division of the Pennsylvania canal diverts 200 to 300 second-feet from Lehigh River near its mouth from about the last of March to the middle of December each year.

ACCURACY.—Results good.

The following discharge measurement was made by G. C. Stevens: November 17, 1914: Gage height, 2.93 feet; discharge, 3,170 second-feet. Canal was measured November 16, 1914, and discharge found to be 214 second-feet.

Daily discharge, in second-feet, of Delaware River at Riegelsville, N. J., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,500	1,280	2,600	3,260	15,000	25,600	5,650	8,820	6,250	2,700	4,800	10,500
2	1,500	1,420	2,600	3,030	33,300	21,600	5,360	8,160	5,950	2,810	5,950	9,160
3	1,500	1,350	2,400	2,700	36,900	18,800	5,360	7,830	5,650	5,650	6,870	7,830
4	1,420	1,420	2,400	2,810	21,600	15,400	5,080	7,510	5,360	6,560	11,600	7,190
5	1,350	1,280	2,400	2,810	18,800	13,900	5,950	7,830	5,080	6,870	20,700	6,250
6	1,500	1,200	2,200	2,810	23,000	12,700	5,650	8,160	4,800	6,250	25,600	5,950
7	1,420	1,350	2,600	23,500	29,300	12,700	5,950	7,830	4,530	5,950	19,300	6,250
8	1,420	1,280	5,650	33,900	26,100	12,000	6,870	7,510	4,260	5,360	17,500	5,950
9	1,500	1,350	5,650	36,900	19,700	10,900	7,190	7,190	4,000	5,360	16,700	5,950
10	1,660	1,420	6,560	21,600	14,600	10,200	7,190	7,190	3,750	35,700	15,400	6,250
11	1,500	1,420	5,650	16,300	12,400	9,500	8,820	6,870	3,500	19,300	12,400	5,360
12	1,420	1,280	5,080	15,800	12,400	9,500	30,400	6,250	3,500	12,700	10,900	5,080
13	1,500	1,280	4,530	56,700	13,900	8,820	35,700	6,560	3,750	10,200	12,000	4,530
14	1,420	1,420	5,360	51,100	13,100	8,160	25,000	6,560	4,000	12,700	10,500	4,260
15	1,280	1,280	3,750	34,500	14,600	8,160	18,800	5,950	3,500	12,700	9,500	4,260
16	1,580	2,500	3,380	25,600	33,300	7,830	15,400	5,360	4,530	11,600	8,820	4,260
17	2,100	3,380	3,260	20,700	47,000	7,830	13,500	5,650	4,000	8,820	8,490	4,000
18	2,200	2,810	3,380	22,600	29,300	7,190	11,600	5,360	4,530	7,510	7,510	4,000
19	2,400	2,810	3,140	43,100	22,600	6,870	10,500	5,650	4,800	7,830	6,560	4,800
20	2,700	2,810	3,500	68,200	18,800	6,560	9,500	5,360	4,260	7,190	5,950	5,360
21	2,400	3,380	4,000	48,400	17,100	6,250	9,160	5,080	4,260	6,870	5,650	8,820
22	2,400	2,300	4,530	32,100	15,800	6,560	8,490	7,510	4,000	7,510	8,820	9,500
23	2,200	2,200	3,260	24,500	15,400	6,250	8,160	12,400	3,750	6,560	18,000	13,900
24	2,010	2,010	3,140	23,000	17,500	6,250	8,160	12,000	3,750	5,650	24,000	9,840
25	2,100	1,920	3,030	21,100	62,400	5,950	8,160	11,600	3,500	5,360	17,100	7,510
26	1,920	1,660	2,810	20,200	78,600	6,250	7,510	10,900	3,500	5,080	13,500	6,560
27	1,830	1,920	2,600	17,500	54,600	6,250	7,190	9,500	3,380	5,080	12,400	6,250
28	1,580	2,010	2,700	15,400	33,900	6,870	7,510	9,160	3,030	5,650	10,200	5,650
29	1,420	2,100	2,810	13,500	.....	6,560	6,870	8,490	2,920	5,650	9,500	5,650
30	1,580	2,200	3,500	10,200	.....	5,950	7,190	7,830	2,700	5,080	10,500	5,080
31	1,500	.....	3,500	8,160	.....	5,950	.....	7,190	.....	5,080	11,200	.....

NOTE.—Discharge determined from a well-defined rating curve.

[1] It has been estimated that the flood of Oct. 10–11, 1903, reached a stage of 41.5 feet, corresponding to a discharge of 275,000 second-feet.

Monthly discharge of Delaware River at Riegelsville, N. J., for the year ending Sept. 30, 1915.

[Drainage area, 6,430 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	2,700	1,280	1,740	0.309	0.36	B.
November	3,380	1,200	1,870	.330	.37	B.
December	6,560	2,200	3,610	.574	.66	A.
January	68,200	2,700	23,300	3.62	4.17	A.
February	78,600	12,400	26,800	4.17	4.34	A.
March	25,600	5,950	9,780	1.55	1.79	A.
April	35,700	5,080	10,600	1.68	1.87	A.
May	12,400	5,080	7,720	1.24	1.43	A.
June	6,250	2,700	4,160	.686	.77	A.
July	35,700	2,700	8,300	1.33	1.53	A.
August	25,600	4,800	12,200	1.93	2.22	A.
September	13,900	4,000	6,530	1.05	1.17	A.
The year	78,600	1,200	9,620	1.53	20.68	

NOTE.—To allow for water diverted by the canal 250 second-feet was added to the computed mean discharge, Oct. 1 to Dec. 10 and Mar. 8 to Sept. 30, before computing discharge per square mile; first three columns of table therefore indicate actual quantity of water in the river; the two remaining columns represent the total run-off from drainage area above Riegelsville, including the discharge of the canal.

BEAVER KILL AT COOKS FALLS, N. Y.

LOCATION.—At covered highway bridge in Cooks Falls, Delaware County.

DRAINAGE AREA.—236 square miles (measured on post route and topographic maps.)

RECORDS AVAILABLE.—July 25, 1913, to September 30, 1915. Data also in annual report of State engineer and surveyor.

GAGE.—Vertical staff in two sections, bolted to rock on left bank under the bridge. Read twice daily by J. L. Rosa.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Coarse gravel, boulders, and solid ledge; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.7 feet at 8 a. m. February 25 (discharge, approximately 6,240 second-feet); minimum stage recorded, 0.8 foot from 5 p. m. October 9 to 8 a. m. October 15 (discharge, 39 second-feet).

1913–1915: Maximum stage recorded, 10.9 feet at 5 p. m. March 28, 1914 (discharge, approximately 7,770 second-feet); minimum stage recorded, 0.80 foot at 5 p. m. September 19 and from 5 p. m. October 9 to 8 a. m. October 15, 1914 (discharge, 39 second-feet).

WINTER FLOW.—Discharge relation occasionally affected by ice.

ACCURACY.—Results good.

Discharge measurements of Beaver Kill at Cooks Falls, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 23	R. M. Adams	3.15	717	June 21	E. D. Burchard	1.41	138
Mar. 12	do	1.95	260	July 15	O. W. Hartwell	2.88	624
13	do	2.01	328	Sept. 28	C. C. Covert	2.70	486
Apr. 10	O. W. Hartwell	3.22	714				

Daily discharge, in second-feet, of Beaver Kill at Cooks Falls, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	55	51	195	.....	1,660	930	263	525	293	278	371	525
2	49	55	208	.....	1,390	830	235	490	293	293	355	455
3	49	49	208	.....	980	645	208	455	263	263	387	387
4	49	49	195	.....	880	565	222	455	235	208	930	355
5	49	49	182	.....	780	525	208	455	208	263	490	323
6	49	49	170	.....	930	490	235	490	208	263	455	323
7	44	49	158	4,350	880	455	387	438	182	208	565	339
8	43	49	147	1,940	735	404	387	735	182	1,210	490	525
9	40	61	249	1,090	645	355	490	605	158	2,400	455	387
10	39	59	263	690	565	355	830	490	136	1,090	387	323
11	39	49	208	355	490	339	3,670	455	147	830	355	293
12	39	47	182	421	455	308	2,880	421	182	735	323	263
13	39	44	182	2,090	930	278	1,800	387	158	930	323	235
14	39	44	147	1,150	455	323	1,210	355	147	1,090	293	263
15	39	59	140	930	2,720	293	1,040	355	147	645	293	263
16	140	339	.....	780	2,320	293	880	355	323	490	355	235
17	136	355	.....	780	1,460	235	735	421	208	645	278	182
18	125	490	.....	2,560	880	208	735	371	170	525	249	182
19	170	438	.....	5,640	605	235	645	404	170	404	208	421
20	182	235	.....	2,720	645	235	605	371	182	1,520	182	371
21	125	170	.....	1,660	645	235	525	293	147	735	182	2,480
22	90	140	.....	1,090	690	235	490	735	136	605	4,050	1,800
23	104	118	.....	1,270	735	263	490	565	154	490	2,640	980
24	61	94	.....	1,520	3,050	293	490	455	140	455	1,330	735
25	61	125	.....	1,270	4,980	371	490	421	118	387	1,800	645
26	55	125	.....	1,040	2,480	355	455	404	114	355	1,150	645
27	55	182	.....	830	1,590	293	387	355	98	735	880	735
28	49	208	.....	645	1,330	308	355	323	140	490	735	525
29	49	182	.....	565	.....	323	490	293	110	735	645	438
30	51	182	.....	455	.....	323	645	308	110	455	645	404
31	55	.....	.....	421	.....	323	.....	293	.....	355	645	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 16 to Jan. 6; discharge estimated from record of flow of East Branch of Delaware River at Fish Eddy as follows: Dec. 16–31, 156 second-feet; Jan. 1–6, 84 second-feet.

Monthly discharge of Beaver Kill at Cooks Falls, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 236 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	182	39	70.0	0.296	0.34	A.
November	490	44	138	.585	.65	A.
December	.....	.....	172	.729	.84	C.
January	5,640	.....	1,190	5.04	5.81	C.
February	4,980	455	1,280	5.42	5.64	C.
March	930	208	375	1.59	1.83	B.
April	3,670	208	749	3.17	3.54	B.
May	735	293	435	1.84	2.12	B.
June	323	98	175	.742	.83	A.
July	2,400	208	648	2.74	3.16	B.
August	4,050	182	724	3.07	3.54	B.
September	2,480	182	535	2.27	2.53	B.
The year	5,640	39	536	2.27	30.83	

WEST BRANCH OF DELAWARE RIVER AT HALE EDDY, N. Y.

LOCATION.—At the highway bridge 400 feet west of the Erie Railroad station in the village of Hale Eddy, Delaware County, 8 miles below power dam of the Deposit Electric Co., and 8¼ miles above junction with East Branch of Delaware River.

DRAINAGE AREA.—611 square miles (measured on post route map).

RECORDS AVAILABLE.—November 15, 1912, to September 30, 1915. Records were obtained at Hancock, about 6 miles below, from October 15, 1902, to December 31, 1912. Data also in annual reports of the State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Vertical staff in four sections attached to rocks near right abutment and to the abutment. Read twice daily by William Seeley.

DISCHARGE MEASUREMENTS.—Made from the highway bridge or by wading.

CHANNEL AND CONTROL.—Coarse gravel and bowlders. Control is about three-fourths mile below the gage and is practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 13.9 feet at 8 p. m. July 8 (discharge, 20,000 second-feet); minimum stage recorded, 1.3 feet at 5 p. m. November 6 and 9 (discharge, 53 second-feet).

1912–1915: Maximum stage recorded,[a] 15.3 feet at 5 p. m. March 27, 1913; (discharge, approximately 25,000 second-feet); minimum stage recorded, 1.0 foot at 6 p. m. September 21, 1913 (discharge, 34 second-feet).

WINTER FLOW.—Discharge relation seriously affected by ice.

ACCURACY.—Results good.

Discharge measurements of West Branch of Delaware River at Hale Eddy, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 30	C. S. De Golyer	1.63	84	Feb. 22	R. M. Adams	3.89	1,260
Dec. 26	R. M. Adams	[b] 5.20	339	June 24	E. D. Burchard	2.06	212
Jan. 13	do	5.32	2,340				

[a] The observer states that on Oct. 10, 1893, the water rose to an elevation indicated by a nail in a tree near the gage. This nail is at gage height 20.3 feet. No data available indicating whether present rating table is applicable to this gage height.

[b] Discharge relation affected by ice.

Daily discharge, in second-feet, of West Branch of Delaware River at Hale Eddy, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	88	76	220	.....	1,580	1,900	552	700	325	1,070	640	498
2	81	76	260	.....	2,330	1,740	525	760	280	940	700	445
3	81	70	260	.....	1,580	1,350	498	760	240	1,280	1,420	370
4	76	81	220	.....	1,140	1,000	470	700	240	1,000	3,920	325
5	70	61	200	.....	1,140	880	420	760	220	1,000	2,420	280
6	70	66	152	.....	1,280	1,070	552	760	138	820	2,420	280
7	70	70	182	.....	2,420	1,000	880	640	165	640	2,060	260
8	76	70	165	4,420	1,420	880	940	760	165	6,130	1,740	260
9	66	70	152	2,810	1,070	760	1,000	880	126	11,400	1,500	260
10	76	106	165	1,900	880	640	1,420	760	138	4,810	1,420	260
11	70	88	165	1,280	820	640	4,040	640	152	3,010	1,140	260
12	70	88	138	1,140	940	580	4,950	610	138	3,920	1,000	200
13	66	88	96	2,240	1,210	498	3,450	552	96	3,010	940	260
14	66	70	.....	1,820	1,420	525	2,510	525	126	3,560	760	348
15	70	96	.....	1,280	4,810	498	1,900	470	126	2,420	760	302
16	76	152	.....	1,140	5,820	470	1,980	420	138	1,740	640	280
17	152	200	.....	1,000	2,420	445	1,420	445	126	1,980	760	200
18	126	152	.....	2,710	2,240	395	1,280	470	115	1,740	525	165
19	138	165	.....	7,460	1,580	348	1,140	420	126	1,280	445	370
20	138	165	.....	4,680	1,350	420	1,000	370	165	1,420	395	200
21	165	138	.....	3,120	1,280	395	880	348	182	1,140	348	302
22	138	.....	.....	1,980	1,280	420	760	610	138	940	640	325
23	115	.....	.....	1,660	1,420	445	760	580	182	1,420	1,580	348
24	96	.....	.....	2,420	3,010	640	700	470	152	1,140	1,000	325
25	96	.....	.....	1,740	6,770	700	700	470	182	880	880	200
26	96	.....	.....	1,580	3,920	1,140	640	498	152	760	760	200
27	115	.....	.....	1,280	3,120	880	552	580	96	940	760	325
28	88	.....	.....	1,140	2,060	760	525	525	115	.760	552	348
29	106	.....	.....	760	.....	760	700	420	115	760	525	240
30	76	280	.....	640	.....	700	610	370	138	760	610	200
31	70	.....	.....	470	.....	640	.....	325	.....	610	640	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Nov. 22–29 and Dec. 14 to Jan. 6; discharge estimated as follows: Nov. 22–29, 170 second-feet; Dec. 14–22, 107 second-feet; Dec. 23–31, 298 second-feet; Jan. 1–7, 970 second-feet.

Monthly discharge of West Branch of Delaware River at Hale Eddy, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 611 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	165	66	93.1	0.152	0.18	B.
November	.....	61	126	.207	.23	B.
December	.....	.....	194	.318	.37	C.
January	.....	.....	1,850	3.03	3.49	B.
February	6,770	820	2,150	3.52	3.66	B.
March	1,900	348	759	1.24	1.43	A.
April	4,950	420	1,260	2.06	2.30	A.
May	880	325	568	.930	1.07	A.
June	325	96	160	.262	.29	B.
July	11,400	610	2,040	3.34	3.85	A.
August	3,920	348	1,100	1.80	2.08	A.
September	498	165	288	.471	.53	A.
The year	11,400	61	877	1.44	19.48	

SUSQUEHANNA RIVER BASIN.

SUSQUEHANNA RIVER AT CONKLIN, N.Y.

LOCATION.—At the highway bridge just below Conklin, Broome County, 5 miles below Big Snake Creek, and 8 miles above Chenango River.

DRAINAGE AREA.—2,350 square miles.

RECORDS AVAILABLE.—November 13, 1912, to September 30, 1915. Records were obtained at Binghamton, 8 miles below, July 31, 1901, to December 31, 1912. Data also in annual reports of the State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Stevens water-stage recorder on left bank installed October 4, 1914; prior to that date, staff in two sections—the lower section inclined, the upper vertical—attached to left abutment. Recorder inspected by Mrs. Cora Ames.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Coarse gravel and bowlders.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 16.15 feet at 12 o'clock midnight, July 8 (discharge, 40,500 second-feet); minimum stage from water-stage recorder, 1.88 feet at 5 p. m., October 11 (discharge, 200 second-feet).

1901–1915: Maximum stage recorded, 19.74 feet at the former station in Binghamton, at 7.40 a. m. March 2, 1902 (discharge, approximately 62,500 second-feet); minimum stage recorded, 1.32 feet at 8.20 a. m. and 4 p. m. September 16, 1913 (discharge, 106 second-feet).

WINTER FLOW.—Discharge relation somewhat affected by ice.

ACCURACY.—Results good.

Discharge measurements of Susquehanna River at Conklin, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 3	E. D. Burchard	2.35	523	Feb. 4	R. M. Adams	a 6.33	4,170
Nov. 2	C. S. De Golyer	2.21	368	20	....do	6.10	5,360
Dec. 23	R. M. Adams	a 2.94	654	Mar. 11	....do	4.55	2,850
Jan. 11	....do	a 5.82	4,730	June 25	E. D. Burchard	3.02	935

a Discharge relation affected by ice.

Daily discharge, in second-feet, of Susquehanna River at Conklin, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	551	360	890	.....	3,330	7,330	2,210	2,750	1,040	1,750	2,280	2,000
2	572	375	890	.....	6,400	6,860	2,070	2,670	954	7,560	1,810	1,810
3	440	395	1,020	.....	5,390	5,380	2,000	2,750	874	9,240	9,500	1,570
4	422	370	1,110	.....	3,950	4,640	2,000	2,510	796	6,170	15,200	1,310
5	422	375	1,040	.....	2,910	4,140	1,880	2,590	712	5,170	19,400	1,200
6	395	350	962	.....	2,830	3,860	2,000	2,510	656	4,530	13,100	1,170
7	385	355	922	.....	3,160	3,770	2,510	2,360	677	4,140	9,000	1,100
8	385	330	842	.....	3,500	3,500	3,420	2,360	600	15,800	7,330	1,060
9	375	350	858	.....	2,830	3,420	3,950	2,440	565	37,900	6,400	1,020
10	370	365	882	.....	2,440	2,990	5,060	2,510	565	30,200	6,400	1,160
11	345	360	874	5,060	2,210	2,830	7,560	2,140	551	17,400	5,060	1,400
12	350	370	866	3,770	2,140	2,590	12,100	1,880	518	12,100	4,230	1,130
13	355	375	761	7,100	2,360	2,360	10,500	1,690	488	13,100	3,860	1,200
14	335	375	906	5,720	3,160	2,210	7,800	1,570	558	12,300	3,680	2,750
15	325	375	733	4,840	9,740	2,210	5,940	1,630	551	9,740	3,500	5,060
16	365	452	.....	4,140	21,100	2,210	5,060	1,520	524	7,800	3,770	3,590
17	385	551	.....	3,420	17,700	2,140	4,430	1,460	558	6,860	3,240	2,510
18	355	754	.....	6,400	11,000	2,000	3,680	1,350	565	5,500	2,830	2,210
19	458	826	.....	15,800	7,100	1,880	3,420	1,520	551	4,740	2,590	2,440
20	470	740	.....	18,700	5,390	1,810	3,080	1,460	600	4,430	2,360	2,280
21	586	677	.....	.....	4,740	1,810	2,830	1,350	649	3,860	2,360	1,940
22	656	579	.....	.....	4,430	1,880	2,510	1,570	782	3,240	2,360	2,070
23	551	614	.....	.....	4,740	1,880	2,360	1,750	1,020	2,990	4,330	2,210
24	452	565	.....	.....	11,000	2,070	2,280	1,750	890	2,510	4,230	1,880
25	440	572	.....	.....	24,400	2,510	2,140	1,520	874	2,210	3,330	1,570
26	440	600	.....	.....	21,800	3,330	2,000	1,520	930	2,140	2,990	1,520
27	422	649	.....	.....	12,800	4,040	1,880	1,690	810	2,590	2,510	1,570
28	390	874	.....	.....	8,520	3,080	1,810	1,630	740	2,510	2,140	2,000
29	370	1,130	.....	.....	.....	2,670	2,000	1,460	628	2,670	1,940	1,810
30	395	1,040	.....	.....	.....	2,670	2,510	1,260	621	2,510	2,070	1,630
31	375	.....	.....	.....	.....	2,360	.....	1,100	.....	2,140	2,210	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 16 to Feb. 23; discharge for this period only approximate. No record of gage height obtained Feb. 10–13 and Mar. 6–9; discharge estimated. Mean discharge estimated as follows: Dec. 16–31, 751 second-feet; Jan. 1–10, 4,820 second-feet; Jan. 21–31, 4,430 second-feet.

Monthly discharge of Susquehanna River at Conklin, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 2,350 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	656	325	424	0.180	0.21	A.
November	1,130	330	537	.229	.26	A.
December	1,110	.....	825	.351	.40	C.
January	18,700	.....	5,540	2.36	2.72	C.
February	24,400	2,140	7,540	3.21	3.34	B.
March	7,330	1,810	3,110	1.32	1.52	B.
April	12,100	1,810	3,770	1.60	1.78	A.
May	2,750	1,100	1,880	.800	.92	A.
June	1,040	488	695	.296	.33	A.
July	37,900	1,750	7,930	3.37	3.88	A.
August	19,400	1,810	5,030	2.14	2.47	A.
September	5,060	1,020	1,870	.796	.89	A.
The year	37,900	325	3,240	1.38	18.72	

CHENANGO RIVER NEAR CHENANGO FORKS, N. Y.

LOCATION.—About 1½ miles below Tioughnioga River, 2 miles by road below Chenango Forks post office, Broome County, and 11½ miles above Binghamton and the mouth.

DRAINAGE AREA.—1,420 square miles.

See "Diversions."

RECORDS AVAILABLE.—November 11, 1912, to September 30, 1915. Records were obtained at Binghamton July 31, 1901, to December 31, 1911. Data also in annual reports of State engineer and surveyor and State of New York Conservation Commission.

GAGE.—Stevens water-stage recorder on left bank installed October 2, 1914; prior to that date inclined staff on left bank. Recorder inspected by Erastus Ingraham.

DISCHARGE MEASUREMENTS.—Made from a cable near gage or by wading.

CHANNEL AND CONTROL.—Sand, gravel, and small cobblestones; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 12.04 feet at 11 a. m. February 25 (discharge, 27,200 second-feet); minimum stage, from water-stage recorder, 2.52 feet at noon November 7 (discharge, 241 second-feet).

1901–1915: Maximum stage recorded, 12.04 feet at 11 a. m. February 25, 1915 (discharge 27,200 second-feet), minimum stage recorded, 4.6 feet at the former station in Binghamton at 8 a. m. August 28, 1909 (discharge, 10 second-feet).

WINTER FLOW.—Discharge relation somewhat affected by ice.

DIVERSIONS.—The run-off from 30 square miles at head of Chenango River and from 18.2 square miles on Tioughnioga River is stored in reservoirs and diverted to the Erie canal, and is not included in the following tables. These two areas have been subtracted from the total area of 1,468 square miles.

ACCURACY.—Results good.

Discharge measurements of Chenango River near Chenango Forks, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 3	C. S. De Golyer	2.59	253	Jan. 10	R. M. Adams	6.21	6,150
3	do	2.63	270	Mar. 10	do	4.00	1,920
Dec. 25	R. M. Adams	[a] 3.35	563	June 26	E. D. Burchard	2.98	533

[a] Discharge relation affected by ice.

Daily discharge, in second-feet, of Chenango River near Chenango Forks, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	352	279	744	.....	2,530	5,140	1,700	1,560	702	10,300	1,190	1,310
2	322	285	938	.....	4,440	4,440	1,590	1,710	631	7,050	3,150	1,090
3	297	279	1,170	.....	3,720	3,620	1,560	1,560	593	4,120	3,240	975
4	285	279	1,030	.....	2,970	2,970	1,460	1,380	521	4,440	8,260	888
5	285	261	875	.....	2,620	2,790	1,680	1,400	496	4,220	7,700	815
6	273	261	755	.....	2,790	2,700	1,950	1,280	446	4,330	5,500	755
7	261	255	692	7,700	3,520	2,530	3,720	1,090	454	2,700	5,880	755
8	267	261	692	16,200	3,060	2,360	4,120	1,480	430	9,400	4,900	791
9	279	285	724	10,600	2,530	2,030	5,620	1,840	406	17,800	5,620	900
10	267	291	744	6,530	2,110	2,030	6,790	1,380	390	10,000	5,020	1,680
11	261	297	724	4,660	2,110	1,870	8,540	1,130	382	6,010	3,810	1,330
12	261	303	692	4,010	2,030	1,710	9,100	975	360	7,700	3,150	988
13	291	309	574	7,440	2,530	1,590	6,530	938	322	6,790	3,060	2,360
14	279	352	504	6,140	2,620	1,620	4,550	1,060	315	5,500	2,790	7,180
15	261	330	.....	4,660	7,440	1,640	3,520	950	338	4,220	2,280	4,900
16	279	470	.....	3,810	13,800	1,590	2,970	803	487	3,340	2,440	3,720
17	382	888	.....	3,340	9,700	1,530	2,620	1,000	538	2,970	2,030	3,150
18	454	755	.....	6,270	5,880	1,410	2,280	1,270	446	2,530	1,710	2,970
19	414	546	.....	1,300	4,330	1,330	2,030	1,060	382	2,110	1,460	2,530
20	438	574	.....	11,800	3,810	1,370	1,870	875	462	1,950	1,300	2,280
21	438	530	.....	7,700	3,520	1,470	1,680	827	504	1,790	1,200	2,790
22	390	496	.....	4,660	3,340	1,410	1,470	1,640	430	1,560	2,620	3,240
23	352	462	.....	3,810	4,550	1,380	1,410	1,740	530	1,400	4,660	2,280
24	338	504	.....	3,520	12,400	1,950	1,420	1,370	682	1,230	2,790	1,840
25	297	530	.....	3,150	25,800	2,280	1,260	1,240	702	1,170	2,360	1,650
26	303	512	.....	3,060	17,400	3,810	1,160	1,200	564	1,810	1,870	1,680
27	291	660	.....	2,700	9,100	2,880	1,010	1,480	470	2,280	1,600	3,810
28	291	1,170	.....	2,360	6,530	2,360	1,040	1,270	406	2,190	1,380	2,620
29	279	938	.....	2,030	.....	2,440	2,030	975	368	1,870	1,380	1,950
30	285	779	.....	1,650	.....	2,030	1,790	839	602	1,620	1,420	1,660
31	285	.....	.....	1,640	.....	1,820	.....	744	.....	1,300	1,520	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice Dec. 15 to Jan. 6; discharge estimated as follows: Dec. 15–31, 546 second-feet; Jan. 1–6, 819 second-feet. These data supersede those published in the 1915 Annual Report of the State engineer and surveyor.

Monthly discharge of Chenango River near Chenango Forks, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 1,420 square miles.a]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	454	261	315	0.222	0.26	A.
November	1,170	255	471	.332	.37	A.
December	.....	.....	650	.458	.53	B.
January	16,200	.....	4,750	3.34	3.85	B.
February	25,800	2,030	5,970	4.21	4.38	B.
March	5,140	1,330	2,260	1.59	1.83	A.
April	9,100	1,010	2,950	2.08	2.32	A.
May	1,840	744	1,230	.866	1.00	A.
June	702	315	479	.337	.38	A.
July	17,800	1,170	4,370	3.08	3.55	A.
August	8,260	1,190	3,140	2.21	2.55	A.
September	7,180	755	2,160	1.52	1.70	A.
The year	25,800	255	2,380	1.68	22.72	

a See "Diversions" in station description.

CHEMUNG RIVER AT CHEMUNG, N. Y.

LOCATION.—At the new highway bridge, about midway between Chemung, Chemung County, N.Y., and Willawana, Pa., half a mile upstream from the State line and about 10 miles above the mouth.

DRAINAGE AREA.—2,440 square miles.

RECORDS AVAILABLE.—September 11, 1903, to September 30, 1915. Data also in the annual reports of the New York state engineer and surveyor and State of New York Conservation Commission.

GAGE.—Tape gage on the new highway bridge; read twice daily by D. L. Orcutt.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Sand and gravel; somewhat shifting.

EXTREMES OF STAGE.—Maximum stage recorded during the year, 16.42 feet at 1 p. m., February 25 (discharge, 47,000 second-feet); minimum stage recorded, 1.84 feet at 6 a. m., October 8, and 6.30 a. m., November 6 (discharge, 175 second-feet).

1903–1915: Maximum stage recorded, 16.5 feet at 6.30 a. m., March 27, 1913 (discharge, 52,500 second-feet); minimum stage recorded, 1.47 feet at 7 a. m., August 14, 1911 (discharge, 49 second-feet).

WINTER FLOW.—Discharge relation affected by ice.

REGULATION.—Power is developed above the station, the largest plant being at Elmira, N. Y.

ACCURACY.—Results good.

Discharge measurements of Chemung River at Chemung, N. Y., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 5	C. S. De Golyer	1.90	209	Mar. 12	R. M. Adams	3.53	1,610
5	do	1.90	200	May 6	C. C. Covert	4.16	2,680
Feb. 16	R. M. Adams	12.29	28,900	June 13	do	2.17	392
17	do	8.60	14,700	Sept. 27	do	2.45	564
19	do	6.10	6,870				

Daily discharge, in second-feet, of Chemung River at Chemung, N. Y., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	239	204	412	.....	1,900	5,570	2,050	2,200	808	3,220	2,860	1,370
2	216	210	412	.....	5,820	4,640	1,900	2,520	725	3,600	10,100	1,140
3	210	204	474	.....	5,570	3,800	1,760	2,050	645	8,900	7,720	1,040
4	210	204	605	.....	4,210	2,860	1,620	1,760	645	7,720	15,800	895
5	204	199	560	.....	3,410	2,690	1,490	2,360	605	4,860	8,900	850
6	194	184	488	.....	3,410	2,520	2,050	2,690	545	3,800	9,500	808
7	189	184	467	18,600	4,000	2,360	8,010	2,050	516	2,360	7,720	850
8	180	194	474	30,600	3,410	2,200	7,150	2,360	460	8,600	5,090	1,200
9	189	222	474	11,000	2,860	1,900	8,300	2,860	446	30,600	4,420	1,200
10	184	210	523	6,070	2,360	1,760	9,200	2,200	406	11,300	3,410	940
11	239	239	560	4,420	2,050	1,760	10,100	1,760	406	5,820	3,220	808
12	216	239	568	3,410	2,200	1,760	8,900	1,490	406	7,430	2,520	725
13	199	251	453	2,360	3,410	1,490	6,070	1,310	372	6,870	2,690	685
14	216	251	426	2,360	4,860	1,490	4,210	1,200	366	6,600	2,360	685
15	216	263	.....	2,860	17,900	1,620	3,220	1,090	366	4,210	1,900	685
16	251	392	.....	2,860	30,200	1,900	2,690	990	460	2,860	1,760	645
17	276	1,430	.....	2,520	15,100	2,200	2,360	990	446	4,640	1,620	645
18	282	1,090	.....	3,410	9,500	1,900	2,200	1,140	453	8,300	1,490	605
19	326	808	.....	13,700	6,870	1,620	1,900	1,090	366	3,600	1,310	725
20	326	685	.....	14,000	5,820	1,760	1,620	940	333	2,690	1,140	2,050
21	366	575	.....	8,600	5,570	2,050	1,490	850	333	2,200	1,040	1,200
22	352	516	.....	5,570	6,600	2,050	1,370	1,140	320	1,760	11,600	1,090
23	288	419	.....	4,420	9,800	2,050	1,250	2,050	339	1,560	9,500	990
24	276	419	.....	3,800	29,000	3,220	1,140	1,620	372	1,490	5,570	765
25	234	419	.....	3,410	44,200	4,210	1,140	1,430	412	1,370	3,410	685
26	251	419	.....	3,040	22,600	6,070	1,040	1,430	379	1,140	3,040	645
27	288	433	.....	2,690	11,600	4,420	940	1,370	326	4,210	2,200	560
28	194	392	.....	2,690	7,430	3,410	2,050	1,370	301	5,090	1,760	545
29	199	552	.....	2,050	.....	3,410	4,860	1,140	257	2,860	1,490	545
30	210	467	.....	1,310	.....	2,860	3,410	940	339	2,360	1,760	516
31	204	.....	.....	1,310	.....	2,360	.....	850	.....	2,520	1,620	.....

NOTE.—Discharge determined from a well-defined rating curve. Discharge relation affected by ice from Dec. 15 to Jan. 6; discharge estimated as follows: Dec. 15–31, 379 second-feet; Jan. 1–6, 615 second-feet.

Monthly discharge of Chemung River at Chemung, N. Y., for the year ending Sept. 30, 1915.

[Drainage area, 2,440 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	366	180	239	0.098	0.11	B.
November	1,430	184	409	.168	.19	B.
December	.....	.....	430	.176	.20	C.
January	30,600	.....	5,190	2.13	2.46	C.
February	44,200	1,900	9,700	3 98	4.14	B.
March	6,070	1,490	2,710	1.11	1.28	B.
April	10,100	940	3,520	1.44	1.61	A.
May	2,860	850	1,590	.652	.75	A.
June	808	257	438	.179	.20	A.
July	30,600	1,140	5,310	2.17	2.50	B.
August	15,800	1,140	4,470	1.83	2.11	A.
September	2,050	516	870	.357	.40	A.
The year	44,200	180	2,870	1.18	15.95	

PATUXENT RIVER BASIN.

PATUXENT RIVER NEAR BURTONSVILLE, MD.

LOCATION.—At the Columbia turnpike bridge, 1½ miles northeast of Burtonsville, Montgomery County, and about 4 miles northwest of Laurel.

DRAINAGE AREA.—127 square miles measured on topographic maps.

RECORDS AVAILABLE.—July 21, 1911, to June 15, 1912 (records furnished by United States Engineer Office); July 21, 1913, to September 30, 1915.

GAGE.—Stevens water-stage recorder referred to a staff gage in three sections on left bank about 80 feet below highway bridge; prior to July 23, 1914, a vertical staff fastened to left side of bridge pier; datum of recorder is 1.29 feet below that of gage on pier. Recorder is inspected weekly by Columbus Brashears.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Banks are lined with trees and brush and overflow at stage of about 10 feet. Control is a flat gravel bar about 300 feet below bridge. Current is swift under bridge, but sluggish below bridge to control. Discharge measurements indicate that control remained practically permament from 1911 to 1914, but shifted during the floods of January and February, 1915.

EXTREMES OF DISCHARGE.—Maximum stage during year, 14.6 feet about 9 a. m. January 13, as indicated by flood mark on staff gage (discharge, 5,100 second-feet, based on poorly defined rating curve and may be subject to large error); minimum stage, from water-stage recorder, 1.52 feet at 4 a. m. November 8 (discharge, 15.6 second-feet).

1911–1915: Maximum stage recorded, 14.6 feet at about 9 a. m. January 13, 1915 (discharge, 5,100 second-feet, based on poorly defined rating curve and may be subject to large error); minimum stage, 0.18 foot August 25, 1911 (discharge, 6 second-feet).

WINTER FLOW.—Discharge relation affected by ice during severe winters only.

ACCURACY.—Results fair prior to installation of recorder, as stream fluctuates rapidly during floods. Rating curves well defined except at high stages; gage-height record satisfactory and results good after installation of recorder.

Discharge measurements of Patuxent River near Burtonsville, Md., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 13	G. C. Stevens	14.0	[a] 4,790	June 2	Stevens and Dean	6.75	1,520
14	Stevens and Burchard	3.64	368	12	H. J. Dean	2.04	78.4
14	....do	3.56	357	12	G. C. Stevens	2.04	80.5
Feb. 4	E. D. Burchard	3.18	317	Sept. 23	Bailey and Walters	1.95	58.4
4	....do	3.14	316				

[a] Surface velocity observed and coefficient of 0.85 used to reduce to mean velocity.; results poor.

Daily discharge, in second-feet, of Patuxent River near Burtonsville, Md., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	31.0	34	39	156	341	154	103	86	62	65	41	97
2	.....	36	38	158	2,830	147	103	81	773	58	41	82
3	.....	33	38	122	530	140	107	79	686	53	46	72
4	.....	35	38	140	338	133	117	88	221	51	1,010	70
5	.....	35	37	114	290	135	119	90	147	51	119	68
6	.....	36	44	208	354	168	111	81	119	52	401	86
7	.....	34	114	977	280	190	105	77	107	52	92	82
8	.....	25.6	153	196	232	232	101	75	90	53	86	72
9	.....	32	94	128	190	234	99	127	81	53	115	72
10	.....	26.4	70	106	177	190	99	84	72	54	82	72
11	.....	32	65	102	175	177	107	72	68	54	62	73
12	29.0	35	63	1,490	170	162	119	119	75	90	507	131
13	27.2	38	61	3,620	170	145	103	197	90	62	560	81
14	29.0	35	130	390	168	145	96	101	111	58	270	73
15	37	89	84	278	192	141	92	84	99	51	90	68
16	78	196	83	216	309	137	90	113	119	67	75	67
17	61	61	80	230	190	133	88	127	99	68	67	65
18	41.5	47.5	78	521	168	125	86	96	150	50	64	73
19	.....	44	74	351	156	125	84	84	86	747	58	145
20	.....	42.5	97	246	147	137	84	79	81	190	54	.....
21	.....	40.5	259	202	145	129	86	84	72	84	58	.....
22	.....	41.5	210	170	139	123	81	121	75	70	62	.....
23	.....	39	130	176	139	121	84	180	75	64	49	61
24	.....	45	122	210	383	119	88	97	65	60	45	55
25	36	41.5	114	194	349	115	84	88	62	57	45	54
26	36	39	94	212	208	111	82	77	62	55	41	51
27	34	39	114	164	168	107	90	68	61	51	37.5	47.5
28	32	38	114	158	161	105	109	65	57	51	340	45
29	35	38	135	134	.....	107	111	62	54	50	306	41
30	35	39	369	126	.....	105	99	79	53	46	713	37.5
31	37	.....	325	126	.....	105	.....	77	.....	41	166	.....

NOTE.—Discharge determined as follows: Oct. 1 to Feb. 2, from a rating curve well defined below and fairly well defined above 1,000 second-feet; Feb. 3 to Sept. 30, from a rating curve well defined between 40 and 2,200 second-feet. Recorder not operating Oct. 2–11, 19–24, Feb. 28 to Mar. 3, July 5–10, and Sept. 20–22; discharge estimated as follows: Oct. 2–11, 30 second-feet; Oct. 19–24, 38 second-feet; Sept. 20–22, 80 second-feet; discharge interpolated Feb. 28 to Mar. 3 and July 5–10; discharge obtained by averaging hourly discharge for Nov. 15–16, Dec. 7–8, 14, 21–22, 29–31, Jan. 6–7, 12–14, 18, Feb. 1–3, 16, 24–25, May 13, 22–23, June 2–3, 18, July 19–20, Aug. 4, 6, 12–14, and 28–30.

Monthly discharge of Patuxent River near Burtonsville, Md., for the year ending Sept. 30, 1915.

[Drainage area, 127 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	78	.....	35.7	0.281	0.32	B.
November	196	25.6	44.9	.354	.40	A.
December	369	37	112	.882	1.02	A.
January	3,620	102	375	2.95	3.40	B.
February	2,830	139	325	2.56	2.67	B.
March	234	105	142	1.12	1.29	A.
April	119	81	97.6	.769	.86	A.
May	197	62	94.8	.746	.86	A.
June	773	53	132	1.04	1.16	A.
July	747	41	84.1	.662	.76	A.
August	1,010	37.5	184	1.45	1.67	A.
September	145	37.5	72.7	.572	.64	A.
The year	3,620	.....	141	1.11	15.05	

POTOMAC RIVER BASIN.

POTOMAC RIVER AT POINT OF ROCKS, MD.

LOCATION.—At the steel highway bridge at Point of Rocks, Frederick County, about one-third mile below Catoctin Creek and 6 miles above Monocacy River.

DRAINAGE AREA.—9,650 square miles.

RECORDS AVAILABLE.—February 17, 1895, to September 30, 1915.

GAGE.—Chain, attached to bridge, read once daily by G. H. Hickman. Datum constant since September 2, 1902; prior to this date datum was 0.45 foot higher than at present. Sea-level elevation of gage datum is 200.54 feet.

DISCHARGE MEASUREMENTS.—Made from the bridge.

CHANNEL AND CONTROL.—Practically permanent. The control is a ledge a few hundred feet below the station, the ledge extending completely across the river except for one relatively unimportant channel.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 19.2 feet at 10 a. m., June 4 (discharge 132,000 second-feet); minimum stage recorded, 0.43 foot at 2 p. m., November 14 (discharge 643 second-feet).

1895–1914: Maximum stage recorded, 29.0 feet on March 2, 1902 (discharge 219,000 second-feet); minimum stage, 0.38 foot on September 10, 1914 (discharge, 540 second-feet).

WINTER FLOW.—Discharge relation little affected by ice.

CANAL.—The Chesapeake & Ohio Canal parallels the Potomac on the Maryland side. The average discharge of the canal is 75 to 100 second-feet. The discharge is not included in the following tables.

ACCURACY.—Results excellent except at extreme low water, when measuring conditions are not good.

The following discharge measurement was made by Stevens and Elwood:
November 7, 1914: Gage height, 0.65 foot; discharge, 1,180 second-feet.

Daily discharge, in second-feet, of Potomac River at Point of Rocks, Md., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,410	834	1,100	4,500	10,000	16,300	5,020	4,500	3,860	3,390	1,580	9,530
2	1,010	1,080	1,220	5,380	27,500	14,100	4,840	5,020	24,800	2,940	1,240	9,070
3	922	1,150	1,510	10,500	121,000	12,000	4,500	4,840	109,000	2,660	5,020	6,520
4	834	1,100	1,740	8,620	83,800	10,500	4,670	4,330	127,000	2,940	6,920	5,750
5	706	1,260	1,340	5,020	44,500	10,000	4,500	4,330	65,600	3,240	12,500	5,020
6	1,100	1,510	2,380	5,380	33,500	9,530	4,330	3,860	48,400	2,800	19,800	5,020
7	1,150	1,100	3,540	9,530	23,600	9,070	4,010	3,860	36,300	2,800	14,600	3,540
8	706	1,120	13,000	80,500	22,300	9,070	3,860	3,540	21,100	2,660	10,500	7,330
9	1,220	1,510	15,700	66,400	20,400	9,070	3,860	3,390	14,600	2,520	5,750	6,520
10	1,390	1,220	13,000	37,100	19,800	10,000	4,170	3,240	9,530	2,380	4,500	5,020
11	1,170	878	12,000	21,700	15,200	9,070	4,500	4,840	10,500	2,380	4,500	5,020
12	966	769	11,500	27,500	14,100	9,070	4,670	5,020	5,380	2,660	9,530	4,500
13	922	685	12,000	57,300	13,000	10,000	5,380	4,840	6,520	2,520	8,620	4,010
14	966	643	8,620	56,400	10,000	9,070	5,750	4,500	6,130	2,800	4,500	3,700
15	878	727	8,180	33,500	24,200	8,180	5,750	4,330	9,530	2,520	3,860	3,540
16	727	966	3,700	22,900	37,100	7,330	5,380	4,840	14,100	2,380	3,540	3,240
17	1,150	1,220	3,540	19,800	34,200	8,180	5,020	5,750	14,600	2,250	4,010	2,940
18	2,250	2,080	3,140	26,100	19,800	7,330	4,670	5,380	12,500	2,660	3,700	2,940
19	2,380	2,940	3,540	77,200	16,300	8,180	4,330	5,020	10,500	3,090	3,540	2,800
20	2,800	2,660	3,540	84,600	15,200	7,330	4,010	5,750	9,070	3,090	3,700	7,750
21	2,120	2,380	4,010	63,900	14,100	7,330	4,170	4,840	8,620	2,800	3,860	6,130
22	1,990	2,520	4,330	37,100	12,000	6,130	4,170	7,330	7,750	2,940	8,180	11,000
23	1,940	2,660	4,500	22,900	10,000	6,130	3,860	15,200	7,330	3,240	10,000	7,750
24	1,790	2,800	6,520	20,400	14,600	5,750	3,540	14,600	5,020	2,940	3,540	6,130
25	1,460	2,120	8,620	16,300	31,500	5,750	3,090	11,500	4,840	2,800	3,240	5,750
26	1,260	1,910	9,070	14,100	26,100	4,670	4,010	9,070	3,540	2,520	3,540	5,020
27	1,910	1,710	5,380	12,000	25,500	5,020	4,010	7,750	4,170	2,380	4,500	4,670
28	1,960	1,660	5,750	11,000	17,400	4,670	4,010	5,750	3,860	2,250	5,750	4,010
29	1,940	1,560	4,330	10,000	.....	5,750	3,860	5,380	3,700	2,120	11,000	3,090
30	1,760	1,460	4,670	10,000	.....	5,380	3,090	5,380	3,540	2,120	10,000	3,090
31	727	.....	4,500	9,070	.....	5,020	.....	5,020	.....	1,910	14,100	.....

NOTE.—Discharge determined from a rating curve well defined except at extreme low stages.

Monthly discharge of Potomac River at Point of Rocks, Md., for the year ending Sept. 30, 1915.

[Drainage area, 9,650 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	2,800	706	1,400	0.145	0.17	B.
November	2,940	643	1,540	.160	.18	B.
December	15,700	1,100	6,000	.622	.72	A.
January	84,600	4,500	28,600	2.96	3.41	A.
February	121,000	10,000	27,000	2.80	2.92	A.
March	16,300	4,670	8,230	.853	.98	A.
April	5,750	3,090	4,370	.453	.51	A.
May	15,200	3,240	5,900	.611	.70	A.
June	127,000	3,540	20,400	2.11	2.35	A.
July	3,390	1,910	2,670	.277	.32	A.
August	19,800	1,240	6,760	.699	.81	A.
September	11,000	2,800	5,350	.554	.62	A.
The year	127,000	643	9,730	1.01	13.69	

MONOCACY RIVER NEAR FREDERICK, MD.

LOCATION.—At county bridge on toll road leading from Frederick, Frederick County, to Mount Pleasant, about 3,000 feet below Tuscarora Creek (entering from the right) and about 2,000 feet above Israel Creek (entering from the left).

DRAINAGE AREA.—660 square miles.

RECORDS AVAILABLE.—August 4, 1896, to September 30, 1915.

GAGE.—Chain attached to downstream side of right span of bridge; read once daily (oftener during floods) by Eugene L. Derr.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Banks lined with trees and brush; overflow at high stages; bed composed of gravel and bowlders and shifting during extreme floods. Control not well defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 27.2 feet at 11 a. m. January 13 (discharge, determined from extension of rating curve, 21,700 second-feet); minimum stage recorded, 3.75 feet on several days in October (discharge, 30 second-feet).

1896–1915: Maximum stage January 13, 1915 (see preceding paragraph); minimum stage, 3.54 feet on several days in October, 1910 (discharge, 15 second-feet).

WINTER FLOW.—Discharge relation affected by ice only during severe winters.

ACCURACY.—Gage-height record reliable; discharge relation subject to change at high stages; rating curves poorly defined at high stages; results good at low and medium stages only.

Discharge measurements of Monocacy River near Frederick, Md., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 6	Stevens and Elwood	3.98	66.7	Apr. 20	Stevens and Zens	4.72	246
Feb. 4	G. C. Stevens	8.73	2,500				

Daily discharge, in second-feet, of Monocacy River near Frederick, Md., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	30	59	89	545	1,960	1,230	302	226	370	226	146	950
2	30	59	89	498	17,100	1,000	302	212	4,940	318	122	682
3	30	59	89	370	7,980	900	286	184	14,800	212	5,840	525
4	30	59	101	331	2,710	800	286	226	2,260	198	9,460	465
5	43	59	113	259	2,260	800	270	212	1,890	212	2,030	445
6	43	59	113	227	3,370	850	255	184	1,480	212	13,000	1,680
7	43	50	167	13,000	2,870	850	255	184	1,110	171	2,100	10,800
8	43	50	1,250	7,360	1,820	850	255	184	850	184	1,000	3,030
9	43	50	1,110	2,330	1,170	1,060	240	184	485	171	850	2,100
10	30	50	593	1,230	900	1,000	240	171	615	171	705	1,230
11	30	68	498	1,100	800	950	405	158	570	68	615	850
12	30	68	370	9,570	950	900	445	240	525	198	1,290	950
13	30	68	331	20,900	1,110	728	425	405	485	270	6,940	705
14	43	68	259	8,310	1,110	638	286	302	1,540	171	1,060	548
15	59	312	197	4,180	2,400	615	270	240	570	171	615	525
16	390	2,580	227	2,200	5,240	570	255	212	525	68	525	445
17	212	2,130	370	2,200	2,330	570	240	240	485	318	445	388
18	182	259	370	6,040	1,610	570	240	270	548	158	405	388
19	126	197	259	5,740	1,230	548	240	226	485	134	352	425
20	78	153	276	2,180	1,110	505	240	226	465	158	335	660
21	78	113	331	1,960	950	485	240	212	445	134	318	660
22	59	101	259	1,350	900	465	240	2,260	388	122	425	950
23	59	101	370	1,110	850	445	226	2,710	335	134	1,000	485
24	59	89	643	1,110	8,730	425	226	660	302	122	425	370
25	59	89	545	1,890	9,780	405	226	592	270	122	405	335
26	59	89	545	1,820	2,630	370	212	445	255	99	370	302
27	59	89	618	1,170	2,260	370	212	405	286	78	286	270
28	59	78	593	1,110	1,350	352	212	335	270	88	525	286
29	59	89	569	950	.....	335	226	302	255	110	3,550	255
30	59	89	1,110	615	.....	318	240	352	226	134	2,180	240
31	59	.....	1,050	615	.....	302	.....	425	.....	318	3,460	.....

NOTE.—Discharge determined as follows: Oct. 1 to Jan. 6, from a rating curve well defined between 50 and 140 second-feet and fairly well defined above 140 second-feet except at extremely high stages; Jan. 23 to Sept. 30, from a rating curve well defined between 50 and 3,500 second-feet and only approximate above 5,000 second-feet; Jan. 7–22, by indirect method for shifting channels.

Monthly discharge of Monocacy River near Frederick, Md., for the year ending Sept. 30, 1915.

[Drainage area, 660 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	432	30	71.4	0.108	0.12	A.
November	2,580	50	246	.373	.42	B.
December	1,250	89	436	.661	.76	B.
January	20,900	227	3,300	5.00	5.76	D.
February	17,100	800	3,120	4.73	4.92	C.
March	1,230	302	652	.988	1.14	A.
April	445	212	267	.405	.45	A.
May	2,710	158	425	.644	.74	A.
June	14,800	226	1,270	1.92	2.14	B.
July	318	68	169	.256	.30	A.
August	13,000	122	1,960	2.97	3.42	B.
September	10,800	240	1,060	1.61	1.80	B.
The year	20,900	30	1,070	1.62	21.96	

OCCOQUAN CREEK NEAR OCCOQUAN, VA.

LOCATION.—At Frank Davis's farm, about 1 mile above Beaverdam Creek, and about 4½ miles upstream and northwest of Occoquan, Prince William County.

DRAINAGE AREA.—546 square miles measured on topographic map.

RECORDS AVAILABLE.—February 14, 1913, to September 30, 1915.

GAGE.—Friez water stage recorder on left bank installed April 27, 1913, referred to an inclined staff on left bank about 150 feet upstream. Inspected twice a week by Miss Sadie Bradley. Previous to this date a temporary vertical staff on opposite bank.

DISCHARGE MEASUREMENTS.—Made from cable about 75 feet below the recorder, or by wading.

CHANNEL AND CONTROL.—Gravel and large rocks; control is practically permanent. Point of zero flow at 0.4 foot gage height.

EXTREMES OF DISCHARGE.—Maximum stage during year, 21.2 feet during the afternoon of January 13, determined from flood mark on gage house (discharge determined from extension of rating curve, 20,900 second-feet); minimum stage recorded during year, 1.47 feet at 2.30 p. m. October 3; discharge, 12 second-feet.

1913–1915 maximum stage, 21.2 feet during the afternoon of January 13, 1915, determined from flood marks on gage house (discharge determined from extension of rating curve, 20,900 second-feet); minimum stage recorded, 1.39 feet, September 13–18, 1913; discharge 9.7 second-feet.

WINTER FLOW.—Discharge relation affected by ice.

ACCURACY.—Well-defined rating curve has been developed. Results excellent except at extreme high and low stages.

No discharge measurements made during the year.

Daily discharge, in second-feet, of Occoquan Creek near Occoquan, Va., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	13.0	17.0	31	516	439	478	121	160	72	70	39	500
2	12.5	17.5	30	313	10,600	408	118	116	1,750	68	198	311
3	12.0	18.0	32	208	7,870	365	121	100	12,400	75	146	234
4	12.5	19.5	33	161	2,250	321	129	105	3,130	68	2,410	196
5	13.5	20.0	37	120	1,580	285	140	111	1,110	66	1,730	165
6	14.0	19.5	40	129	2,010	360	132	92	670	75	460	138
7	14.0	18.5	97	3,370	2,320	807	120	77	510	75	318	130
8	14.0	19.0	329	2,230	1,350	2,030	116	71	404	71	178	136
9	14.0	20.5	288	904	835	1,470	110	68	314	62	345	118
10	15.0	21.0	172	608	592	835	105	65	252	55	333	96
11	15.5	22.0	138	409	488	640	106	58	210	48	201	80
12	15.5	21.5	172	4,530	496	508	116	64	184	53	138	71
13	16.0	22.0	174	18,300	520	410	120	120	168	50	163	64
14	16.0	22.5	389	9,240	470	360	113	176	314	47	243	59
15	16.5	61	445	1,750	435	336	102	121	304	46	150	56
16	22.0	213	230	1,060	1,450	308	98	88	415	43	121	50
17	30	261	144	828	865	277	97	73	350	41	135	48
18	41	125	106	3,270	589	250	97	62	229	105	175	44
19	61	81	91	3,020	445	225	91	65	296	81	92	48
20	45	60	91	1,260	365	219	85	70	251	72	72	54
21	35	46	132	970	340	219	84	70	200	82	71	64
22	34	38	722	612	322	200	81	67	148	67	85	85
23	32	33	466	490	301	183	81	558	118	59	84	68
24	26	29	302	646	1,100	174	77	228	102	53	80	62
25	22.5	28	196	639	4,140	163	78	120	84	47	73	58
26	21.0	30	140	1,400	1,280	158	82	86	81	43	61	52
27	19.5	30	110	745	737	146	80	77	226	39	49	46
28	20.0	31	92	600	570	140	81	60	183	35	59	36
29	19.5	31	92	495	.....	136	400	59	98	35	992	35
30	18.0	32	189	354	.....	132	295	61	77	33	1,850	36
31	17.0	.....	838	325	.....	129	.....	68	.....	32	1,820	.....

NOTE.—Discharge determined from a rating curve well defined between 13 and 9,820 second-feet. Discharge estimated because of ice Dec. 16–19 and 26–29. Discharge Nov. 15–17, Dec. 7–9, 14–15, 21–23, 30–31, Jan. 1–2, 9–16, 30–31, Feb. 1–6, 25, and June 2–4 obtained by averaging values for two-hour periods. Discharge Jan. 3–8, 17–29, Feb. 7–24, 26–28, Mar. 1–22, Apr. 29–30, May 1, 23–24, June 5–21, 27–28, Aug. 2–19, 29–31, and Sept. 1–6 obtained by use of a discharge integrator.

Monthly discharge of Occoquan Creek near Occoquan, Va., for the year ending Sept. 30, 1915.

[Drainage area, 546 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	61	12.0	21.9	0.040	0.05	A.
November	261	17.0	46.9	.086	.10	A.
December	838	30	205	.375	.43	A.
January	18,300	120	1,920	3.52	4.06	A.
February	10,600	301	1,600	2.93	3.05	A.
March	2,030	129	409	.749	.86	A.
April	400	77	119	.218	.24	A.
May	558	58	107	.196	.23	A.
June	12,400	72	822	1.51	1.68	A.
July	105	32	57.9	.106	.12	A.
August	2,410	39	415	.760	.88	A.
September	500	35	105	.192	.21	A.
The year	18,300	12.0	479	.877	11.91	

RAPPAHANNOCK RIVER BASIN.

RAPPAHANNOCK RIVER NEAR FREDERICKSBURG, VA.

LOCATION.—About 3½ miles above Fredericksburg, Spotsylvania County, and about 1½ miles above the dam of the Spottsylvania Power Co.

DRAINAGE AREA.—1,590 square miles.

RECORDS AVAILABLE.—September 19, 1907, to September 30, 1915

GAGE.—Vertical staff on right bank installed November 4, 1913, to replace chain gage destroyed October 31, 1913. Original gage was a vertical staff, which was destroyed February 14, 1908, and replaced February 20, 1908, by a chain gage under the cable. All three gages were referred to the same datum and the locations were practically the same. Gage read twice daily by J. W. Franklin.

DISCHARGE MEASUREMENTS.—Made from cable at the gage. At extreme low water measurements can be made by wading or from a bridge over the power canal below the dam.

CHANNEL AND CONTROL.—Both banks wooded; right bank will overflow at stage of about 15 feet, left bank at about 12 feet. One channel, bed composed of bowlders and somewhat rough. Current sluggish at extreme low water. Control is a rocky section a few hundred feet below the gage, and has remained practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.0 feet January 13, determined by leveling from flood marks (discharge determined from extension of rating curve, 36,300 second-feet); minimum stage recorded, 0.38 foot afternoon of October 6 (discharge, 88 second-feet).

1907–1915: Maximum stage recorded, 11.0 feet January 13, determined by leveling from flood marks (discharge determined from extension of rating curve 36,300 second-feet); minimum stage recorded, 0.30 foot at 3 p. m. August 21, 1914 (discharge 72 second-feet).

WINTERFLOW.—Discharge relation not seriously affected by ice.

ACCURACY.—Rating curve well defined except at extreme low and high stages. Gage-height record reliable and results good.

The following discharge measurements was made by G. C. Stevens:

January 20, 1915: Gage height, 3.92 feet; discharge, 4,970 second-feet.

Daily discharge, in second-feet, of Rappahannock River near Fredericksburg, Va., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	108	225	369	2,080	1,920	2,570	918	750	918	560	502	4,140
2	110	216	388	1,770	19,600	2,400	918	616	6,190	656	578	2,240
3	110	212	462	1,420	15,000	2,000	918	542	18,200	656	805	2,240
4	106	212	455	1,220	7,380	1,840	918	598	10,900	534	13,700	2,000
5	101	208	448	1,100	4,850	1,700	918	636	4,850	578	20,100	1,770
6	92	208	1,100	860	5,360	1,840	918	687	3,290	805	5,630	1,560
7	104	204	2,570	6,800	4,610	2,920	860	518	2,570	636	2,570	2,400
8	115	191	3,100	4,600	3,700	3,290	860	462	2,240	526	1,700	2,080
9	121	216	2,240	3,300	3,100	2,570	860	502	1,770	462	2,570	1,700
10	121	235	1,620	2,300	2,570	2,080	805	486	1,480	448	2,240	1,560
11	121	245	1,770	1,800	2,400	1,840	750	448	1,350	432	1,420	1,350
12	121	212	1,620	9,000	2,240	1,700	860	486	1,220	402	1,040	1,220
13	113	208	1,620	36,300	2,080	1,620	805	805	1,100	440	4,370	1,100
14	115	204	2,570	18,000	2,000	1,480	750	1,100	1,040	425	2,000	1,040
15	118	388	2,080	6,000	1,920	1,480	750	687	1,920	369	1,350	918
16	1,040	6,770	1,350	3,800	2,570	1,420	750	486	3,100	369	3,290	805
17	3,490	2,400	860	3,000	2,400	1,350	750	440	2,240	418	2,080	750
18	1,280	1,280	918	6,500	2,080	1,280	740	502	1,560	355	1,280	718
19	750	975	918	6,000	1,700	1,220	708	486	1,220	462	1,040	2,400
20	534	750	1,220	5,100	1,620	1,220	687	486	1,220	410	805	2,240
21	425	645	1,700	4,850	1,560	1,280	666	486	1,100	1,350	740	1,220
22	355	607	3,290	3,290	1,480	1,220	666	542	918	1,040	975	1,480
23	317	542	2,000	2,740	1,480	1,160	687	560	860	805	1,100	1,040
24	294	526	1,480	2,400	1,840	1,100	740	526	750	636	750	918
25	300	410	1,280	2,570	12,000	1,100	729	486	687	687	718	805
26	288	402	1,160	3,100	5,630	1,040	687	448	666	502	729	740
27	276	402	918	2,740	3,490	1,040	656	382	687	440	607	687
28	260	382	918	2,400	2,920	1,040	616	388	750	410	626	656
29	235	382	1,220	2,240	.....	1,040	578	388	687	369	10,900	607
30	216	382	2,000	1,920	.....	975	805	440	616	740	5,910	1,700
31	216	.....	2,920	1,770	.....	918	.....	645	.....	645	9,030	.....

NOTE.—Gage removed by ice Jan. 7; replaced Jan. 20. Crest height of flood Jan. 13 determined by leveling from flood marks on bank Jan. 20.

Discharge determined from rating curve well defined above 500 second-feet and fairly well defined below. Discharge Jan. 7–12 and 14–19 estimated by comparison with records for adjacent streams.

Monthly discharge of Rappahannock River near Fredericksburg, Va., for the year ending Sept. 30, 1915.

[Drainage area, 1,590 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October	3,490	92	386	0.243	0.28	B.
November	6,770	191	675	.425	.47	A.
December	3,290	369	1,500	.943	1.09	A.
January	36,300	860	4,870	3.06	3.53	C.
February	19,600	1,480	4,270	2.69	2.80	A.
March	3,290	918	1,600	1.01	1.16	A.
April	918	578	776	.488	.54	A.
May	1,100	382	549	.345	.40	A.
June	18,200	616	2,540	1.60	1.78	A.
July	1,350	355	567	.357	.41	A.
August	20,100	502	3,260	2.05	2.36	A.
September	4,140	607	1,470	.925	1.03	A.
The year	36,300	92	1,860	1.17	15.85	

MISCELLANEOUS MEASUREMENTS.

Miscellaneous discharge measurements in North Atlantic slope basins during the year ending Sept. 30, 1915.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Oct. 7	Pemigewasset River.	Merrimack River..	Gaging station at Plymouth, N. H...	−0.08	149
Aug. 28	....do.....	....do.....	....do.....	1.96	1,090
Sept. 29	West Branch of Westfield River.	Westfield River...	Steel highway bridge in Chester, Mass.	2.44	35
Nov. 7	Womenshenuk Brook.	Housatonic River	Mouth, about one-eighth mile southeast of Gaylordsville, Conn.	.....	1.0
8	Tenmile River.....	....do.....	Mouth, about 2 miles northwest of Gaylordsville, Conn.	.....	26
June 18	Goose Creek.....	Potomac River...	Former gaging station at Evergreen Mills, near Leesburg, Va.	2.34	363

INDEX.

STREAM-GAGING STATIONS

AND

PUBLICATIONS RELATING TO WATER RESOURCES

PART I. NORTH ATLANTIC SLOPE BASINS

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES.

PART I. NORTH ATLANTIC SLOPE BASINS.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, professional papers, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below.

PART I. North Atlantic slope basins.
II. South Atlantic slope and eastern Gulf of Mexico basins.
III. Ohio River basin.
IV. St. Lawrence River basin.
V. Upper Mississippi River and Hudson Bay basins.
VI. Missouri River basin.
VII. Lower Mississippi River basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins (in three volumes).

This appendix contains, in addition to the annotated list of publications relating specifically to the section, a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects; also brief references to reports published by State and other organizations (p. XXII).

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below:

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will on application furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey as follows:

Boston, Mass., Customhouse.
Albany, N. Y., Room 19, Federal Building.
Atlanta, Ga., Post Office Building.
Madison, Wis., c/o Railroad Commission of Wisconsin.
St. Paul, Minn., Old Capitol Building.
Austin, Tex., Old Post Office Building.
Helena, Mont., Montana National Bank Building.
Denver, Colo., 403 New Post Office Building.
Phoenix, Ariz., 417 Fleming Building.
Salt Lake City, Utah, 421 Federal Building.
Boise, Idaho, 615 Idaho Building.
Tacoma, Wash., 406 Federal Building.
Portland, Oreg., 416 Couch Building.
San Francisco, Cal., 328 Customhouse.
Los Angeles, Cal., 619 Federal Building.
Honolulu, Hawaii, Kapiolani Building.

A list of the Geological Survey's publications may be obtained by applying to the Director, United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS.

Stream-flow records have been obtained at more than 3,800 points in the United States, and the data obtained have been published in the reports indicated in the following table:

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

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

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge and descriptive information	1884 to Sept., 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings	1893 and 1894.
16th A, pt. 2	Descriptive information only	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
W 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
W 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
W 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
W 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
W 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
W 75	Monthly discharge	1901.
W 82 to 85	Complete data	1902.
W 97 to 100	do	1903.
W 124 to 135	do	1904.
W 165 to 178	do	1905.
W 201 to 214	do	1906.
W 241 to 252	do	1907–8.
W 261 to 272	do	1909.
W 281 to 292	do	1910.
W 301 to 312	do	1911.
W 321 to 332	do	1912.
W 351 to 362	do	1913.
W 381 to 394	do	1914.
W 401 to 415	do	1915.

NOTE.—No data regarding stream flow are given in the 15th and 17th annual reports.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The following table gives, by years and drainage basins, the numbers of papers on surface-water supply published from 1899 to 1914. The data for any particular station will be found in the reports covering the years during which the station was maintained. For example, data from 1902 to 1915 for any station in the area covered by Part III are published in Water-Supply Papers 83, 98, 128, 169, 205, 243, 263, 283, 303, 323, 353, 383, and 403, which contain records for the Ohio River basin for those years.

Numbers of water-supply papers containing results of stream measurements, 1899–1915.

Year.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												North Pacific slope basins.		
	North Atlantic slope (St. John River to York River).	South Atlantic and eastern Gulf of Mexico (James River to the Mississippi).	Ohio River.	St. Lawrence River and Great Lakes.	Hudson Bay and upper Mississippi River.	Missouri River.	Lower Mississippi River.	Western Gulf of Mexico.	Colorado River.	Great Basin.	Pacific slope in California.	Pacific slope in Washington and upper Columbia River.	Snake River basin.	Lower Columbia River and Pacific slope in Oregon.
1899[a]	35	[b] 35, 36	36	36	36	[c] 36, 37	37	37	[d] 37, 38	38, [e] 39	38, [f] 39	38	38	38
1900[g]	47, [h] 48	48	48, [i] 49	49	49	49, [j] 50	50	50	50	51	51	51	51	51
1901	65, 75	65, 75	65, 75	65, 75	[k] 65, 66, 75	66, 75	[k] 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902	82	[b] 82, 83	83	[l] 82, 83	[k] 83, 85	84	[k] 83, 84	84	85	85	85	85	85	85
1903	97	[b] 97, 98	98	97	[k]98, 99, [m] 100	99	[k] 98, 99	99	100	100	100	100	100	100
1904	[n] 124, [o] 125, [p] 126	[p] 126, 127	128	129	[k] 128, 130	130, [q] 131	[k] 128, 131	132	133	133, [r] 134	134	135	135	135
1905	[n] 165, [o] 166, [p] 167	[p] 167, 168	169	170	171	172	[k] 169, 173	174	175, [s] 177	176, [r] 177	177	178	178	[t] 177, 178
1906	[n] 201, [o] 202, [p] 203	[p] 203, 204	205	206	207	208	[k] 205, 209	210	211	212, [r] 213	213	214	214	214
1907–8	241	242	243	244	245	246	247	248	249	250, [r] 251	251	252	252	252
1909	261	262	263	264	265	266	267	268	269	270, [r] 271	271	272	272	272
1910	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912	321	322	323	324	325	326	327	328	329	330	331	332A	332B	332C
1913	351	352	353	354	355	356	357	358	359	360	361	362A	362B	362C
1914	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915	401	402	403	404	405	406	407	408	409	410	411	412	413	414

[a] Rating tables and index to Water-Supply Papers 35-39 contained in Water-Supply Paper 39. Estimates for 1899 in Twenty-first Annual Report, Part IV.
[b] James River only.
[c] Gallatin River.
[d] Green and Gunnison rivers and Grand River above junction with Gunnison.
[e] Mohave River only.
[f] Kings and Kern rivers and south Pacific slope basins.
[g] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Estimates for 1900 in Twenty-second Annual Report, Part IV.
[h] Wissahickon and Schuylkill rivers to James River.
[i] Scioto River.
[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.
[k] Tributaries of Mississippi from east.
[l] Lake Ontario and tributaries to St. Lawrence River.
[m] Hudson Bay only.
[n] New England rivers only.
[o] Hudson River to Delaware River, inclusive.
[p] Susquehanna River to Yadkin River, inclusive.
[q] Platte and Kansas rivers.
[r] Great Basin in California except Truckee and Carson river basins.
[s] Below junction with Gila.
[t] Rogue, Umpqua, and Siletz rivers only.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in regular order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

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

PRINCIPAL STREAMS.

The principal streams flowing into the Atlantic Ocean between St. John River (Maine–New Brunswick) and York River, Va., are the St. Croix, Machias, Union, Penobscot, Kennebec, Androscoggin, Saco, Merrimack, Mystic, Blackstone, Connecticut, Hudson, Delaware, Susquehanna, Potomac, and Rappahannock. The streams drain wholly or in part the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia.

This part contains, in addition to the annotated list of publications relating specifically to the section, a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects; also brief references to reports published by State and other organizations (p. XXII).

GAGING STATIONS.[1]

NOTE.—Dash after date indicates that station was being maintained September 30, 1915. Period after a date indicates discontinuance.

ST. JOHN RIVER BASIN.

St. John River near Dickey, Maine, 1910–11.
St. John River at Fort Kent, Maine, 1905–
St. John River at Van Buren, Maine, 1908–
Allagash River near Allagash, Maine, 1910–11.
St. Francis River at St. Francis, Maine, 1910–11.
Fish River at Wallagrass, Maine, 1903–1908; 1911.
Madawaska River at St. Rose du Degele, Quebec, 1910–11.
Aroostook River at Fort Fairfield, Maine, 1903–1910.

ST. CROIX RIVER BASIN.

St. Croix River near Woodland (Sprague Falls), Maine, 1902–1911.
St. Croix River at Baring, Maine, 1914.
West Branch of St. Croix River at Baileyville, Maine, 1910–1912.

[1] St. John River to York River, inclusive.

MACHIAS RIVER BASIN.

Machias River at Whitneyville, Maine, 1903–

UNION RIVER BASIN.

Union River, West Branch (head of Union River), at Amherst, Maine, 1909–
Union River, West Branch, near Mariaville, Maine, 1909.
Union River at Ellsworth, Maine, 1909.
East Branch of Union River near Waltham, Maine, 1909.
Webb Brook at Waltham, Maine, 1909.
Green Lake (head of Reeds Brook) at Green Lake, Maine, 1909–1912.
Reeds Brook [Green Lake Stream] at Lakewood, Maine, 1909–1913.
Branch Lake (head of Branch Lake Stream) near Ellsworth, Maine, 1909–1915.
Branch Lake Stream near Ellsworth, Maine, 1909–1914.

PENOBSCOT RIVER BASIN.

Penobscot River, West Branch (head of Penobscot River), at Millinocket, Maine, 1901–
Penobscot River at West Enfield, Maine, 1901–
Penobscot River at Sunkhaze rips, near Costigan, Maine, 1899–1900.
East Branch of Penobscot River at Grand Lake dam, Maine, 1912.
East Branch of Penobscot River at Grindstone, Maine, 1902–
Mattawamkeag River at Mattawamkeag, Maine, 1902–
Piscataquis River near Foxcroft, Maine, 1902–
Passadumkeag Stream:
Cold Stream Pond (head of Cold Stream), Maine, 1900–1911 (record of opening and closing of pond).
Cold Stream at Enfield, Maine, 1904–1906.
Kenduskeag Stream near Bangor, Maine, 1908–
Orland River:
Phillips Lake outlet near East Holden, Maine, 1904–1908.

ST. GEORGE RIVER BASIN.

St. George River at Union, Maine, 1913–

KENNEBEC RIVER BASIN.

Moose River (head of Kennebec River) near Rockwood, Maine, 1902–1908; 1910–1912.
Moosehead Lake (on Kennebec River) at Greenville, Maine, 1903–1906 (stage only).
Moosehead Lake at east outlet, Maine (stage only), 1895–
Kennebec River at The Forks, Maine, 1901–
Kennebec River at Bingham, Maine, 1907–1910.
Kennebec River at North Anson, Maine, 1901–1907.
Kennebec River at Waterville, Maine, 1892–
Kennebec River at Gardiner, Maine, 1785–1910 (record of opening and closing of navigation).
Roach River at Roach River, Maine, 1901–1908.
Dead River near The Forks, Maine, 1901–1907; 1910–
Carrabassett River at North Anson, Maine, 1901–1907.
Sandy River near Farmington, Maine, 1910–
Sandy River near Madison, Maine, 1904–1908.
Sebasticook River at Pittsfield, Maine, 1908–
Messalonskee Stream at Waterville, Maine, 1903–1905.
Cobbosseecontee Lake (on Cobbosseecontee Stream), Maine, 1839–1911 (dates of opening and closing).
Cobbosseecontee Stream at Gardiner, Maine, 1890–

ANDROSCOGGIN RIVER BASIN.

Rangeley Lake (head of Androscoggin River), Maine, 1879–1911 (dates of opening and closing).
Androscoggin River at Errol dam, N. H., 1905–
Androscoggin River at Gorham, N. H., 1903 (fragmentary).
Androscoggin River at Shelburne, N. H., 1903–1907; 1910.
Androscoggin River at Rumford Falls, Maine, 1892–1903; 1905–
Androscoggin River at Dixfield, Maine, 1902–1908.
Magalloway River at Aziscohos dam, Maine, 1912–
Auburn Lake, Maine, 1890–1911 (date of opening).
Little Androscoggin River at Bisco Falls, near South Paris, Maine, 1913–

PRESUMPSCOT RIVER BASIN.

Presumpscot River at outlet of Sebago Lake, Maine, 1887–

SACO RIVER BASIN.

Saco River near Center Conway, N. H., 1903–1912.
Saco River at West Buxton, Maine, 1907–

MERRIMACK RIVER BASIN.

Pemigewasset River (head of Merrimack River) at Plymouth, N. H., 1886–1913.
Merrimack River at Franklin Junction, N. H., 1903–
Merrimack River at Garvins Falls, N. H., 1904–
Merrimack River at Lowell, Mass., 1848–1861; 1866–1915.
Merrimack River at Lawrence, Mass., 1880–
Middle Branch of Pemigewasset River at North Woodstock, N. H., 1911–12.
Lake Winnepesaukee at Lakeport, N. H., 1860–1911. (Stage only.)
Contoocook River at West Hopkinton, N. H., 1903–1907.
Suncook River at East Pembroke, N. H., 1904–5.
Souhegan River at Merrimack, N. H., 1909–1914.
Nashua River:
South Branch of Nashua River, Clinton, Mass., 1896–
Concord River at Lowell, Mass., 1901–
Sudbury River at Framingham, Mass., 1875–
Lake Cochituate at Cochituate, Mass., 1863–

MYSTIC RIVER BASIN.

Mystic Lake (on Mystic River) near Boston, Mass., 1878–1897.

CHARLES RIVER BASIN.

Charles River at Waltham, Mass., 1903–1909.

TAUNTON RIVER BASIN.

Matfield River (head of Taunton River) at Elmwood, Mass., 1909–10.
Satucket River near Elmwood, Mass., 1909–10.

PROVIDENCE RIVER BASIN.

Providence River:
Seekonk River:
Tenmile River near Rumford, R. I., 1909.
Blackstone River at Woonsocket, R. I., 1904–5.
Blackstone River at Albion, R. I., 1914–15.
Blackstone River at Berkeley, R. I., 1901–2.
Branch River at Branch Village, R. I., 1909–10; 1912–13.
Woonasquatuckett River at Olneyville, R. I., 1910.

PAWTUXET RIVER BASIN.

Pawtuxet River at Harris, R. I., 1909.

PAWCATUCK RIVER BASIN.

Pawcatuck River:
Wood River at Hope Valley, R. I., 1909–10.

THAMES RIVER BASIN.

Thames River:
Quinebaug River:
Shetucket River at Willimantic, Conn., 1904–5.

CONNECTICUT RIVER BASIN.

Connecticut River at Orford, N. H., 1900–
Connecticut River at Sunderland, Mass., 1904–
Connecticut River at Holyoke, Mass., 1880–1899.
Connecticut River at Hartford, Conn., 1896–1908.
Israel River above South Branch near Jefferson Highlands, N. H., 1903–1906.
Israel River below South Branch at Jefferson Highlands, N. H., 1903–1907.
Passumpsic River at Pierce's Mills, near St. Johnsbury, Vt., 1909–
Passumpsic River at St. Johnsbury Center, Vt., 1903.
Ammonoosuc River at Bretton Woods, N. H., 1903–1907.
Zealand River near Twin Mountain, N. H., 1903–1907.
Little River at Twin Mountain, N. H., 1904–5.
White River at Sharon, Vt., 1903–1904; 1909–1913.
White River at West Hartford, Vt., 1915–
Ashuelot River at Winchester, N. H., 1903–1904.
Ashuelot River at Hinsdale, N. H., 1907–1911.
Millers River at Wendell, Mass., 1909–1913.
Millers River at Erving, Mass., 1914–
Moss Brook at Wendell, Mass., 1909–10.
Deerfield River at Hoosac Tunnel, Mass., 1909–1913.
Deerfield River at Charlemont, Mass., 1913–
Deerfield River at Shelburne Falls, Mass., 1907–1913.
Deerfield River at Deerfield, Mass., 1904–5.
Ware River (head of Chicopee River) at Ware, Mass., 1904–1911.
Ware River at Gibbs Crossing, Mass., 1912–
Burnshirt River near Templeton, Mass., 1909.
Swift River at West Ware, Mass., 1910–
Quaboag River at West Warren, Mass., 1903–1907.
Quaboag River at West Brimfield, Mass., 1909–
Westfield River at Knightville, Mass., 1909–
Westfield River at Russell, Mass., 1904–5.
Westfield River near Westfield, Mass., 1914–
Middle Branch of Westfield River at Goss Heights, Mass., 1910–
Westfield Little River near Westfield, Mass, 1905–
Borden Brook near Westfield, Mass., 1910–
Farmington River near New Boston, Mass., 1913–
Salmon River at Leesville, Conn., 1905–6.

HOUSATONIC RIVER BASIN.

Housatonic River near Great Barrington, Mass., 1913–
Housatonic River at Falls Village, Conn., 1912–
Housatonic River at Gaylordsville, Conn., 1900–1914.
Tenmile River at Dover Plains, N. Y., 1901–1903.
Pomperaug River at Bennetts Bridge, Conn., 1913–

MIANUS RIVER BASIN.

Mianus River at Bedford, N. Y., 1903.
Mianus River near Stamford, Conn., 1903.

BYRAM RIVER BASIN.

Byram River, West Branch (head of Byram River), near Port Chester, N. Y., 1903.
Byram River at Pemberwick, Conn., 1903.
East Branch of Byram River near Greenwich, Conn., 1903.
Middle Branch of Byram River near Riverville, Conn., 1903.

HUDSON RIVER BASIN.

Hudson River at North Creek, N. Y., 1907–
Hudson River at Thurman, N. Y., 1907–
Hudson River at Corinth, N. Y., 1904–1912.
Hudson River at Spier Falls, N. Y., 1912–
Hudson River at Fort Edward, N. Y., 1899–1908.
Hudson River at Mechanicville, N. Y., 1890–
Cedar River near Indian Lake, N. Y., 1911–
Indian Lake reservoir near Indian Lake, N. Y., 1900–
Indian River near Indian Lake, N. Y., 1912–1914; 1915–
Schroon Lake (on Schroon River) at Pottersville, N. Y., 1908–1911.
Schroon River at Riverbank, N. Y., 1907–
Schroon River at Warrensburg, N. Y., 1895–1902.
Sacandaga River at Wells, N. Y., 1907–1911.
Sacandaga River near Hope, N. Y., 1911–
Sacandaga River at Northville, N. Y., 1907–1910.
Sacandaga River near Hadley, N. Y., 1907–1910.
Sacandaga River (at cable) at Hadley, N. Y., 1911–
Sacandaga River at Union Bag & Paper Co.'s mill at Hadley, N. Y., 1909–1911.
West Branch of Sacandaga River at Whitehouse, N. Y., 1910.
West Branch of Sacandaga River at Blackbridge, near Wells, N. Y., 1911–
Batten Kill at Battenville, N. Y., 1908.
Fish Creek at Burgoyne, N. Y., 1905; 1908.
Hoosic River near Eagle Bridge, N. Y., 1910–
Hoosic River at Buskirk, N. Y., 1903–1908.
Mohawk River at Ridge Mills, near Rome, N. Y., 1898–1900.
Mohawk River at Utica, N. Y., 1901–1903.
Mohawk River at Little Falls, N. Y., 1898–1909; 1912–
Mohawk River at Rocky Rift dam, near Indian Castle, N. Y., 1901.
Mohawk River at Tribes Hill, N. Y., 1912.
Mohawk River at Schenectady, N. Y., 1899–1901.
Mohawk River at Rexford Flats, N. Y., 1898–1901.
Mohawk River at Vischer Ferry dam, N. Y., 1913–
Mohawk River at Dunsbach Ferry, N. Y., 1898–1909.
Ninemile Creek at Stittville, N. Y., 1898–99.
Oriskany Creek at Coleman, N. Y., 1904–1906.
Oriskany Creek at Wood-road bridge near Oriskany, N. Y., 1901–1904.
Oriskany Creek at State dam near Oriskany, N. Y., 1898–1900.
Saquoit Creek at New York Mills, N. Y., 1898–1900.
Nail Creek at Utica, N. Y., 1904.
Reels Creek near Deerfield, N. Y., 1901–1904.
Reels Creek at Utica, N. Y., 1901–2.
Johnson Brook at Deerfield, N. Y., 1903–1905.

Hudson River tributaries—Continued.
Mohawk River tributaries—Continued.
Starch Factory Creek at New Hartford, N. Y., 1903–1906.
Graefenberg Creek at New Hartford, N. Y., 1903–1906.
Sylvan Glen Creek at New Hartford, N. Y., 1903–1906.
West Canada Creek at Wilmurt, N. Y., 1912–13.
West Canada Creek at Twin Rock bridge, near Trenton Falls, N. Y., 1900–1909.
West Canada Creek at Poland, N. Y., 1913.
West Canada Creek at Middleville, N. Y., 1898–1901.
West Canada Creek at Kast Bridge, N. Y., 1905–1909; 1912–13.
East Canada Creek at Dolgeville, N. Y., 1898–1909; 1912.
Caroga Creek 3 miles above junction with Mohawk River, N. Y., 1898–99.
Cayadutta Creek at Johnstown, N. Y., 1899–1900.
Schoharie Creek at Prattsville, N. Y., 1902–1913.
Schoharie Creek at Schoharie Falls, above Mill Point, N. Y., 1900–1901.
Schoharie Creek at Mill Point, N. Y., 1900–1903.
Schoharie Creek at Fort Hunter, N. Y., 1898–1901.
Schoharie Creek at Erie Canal aqueduct, below Fort Hunter, N. Y., 1900.
Alplaus Kill near Charlton, N. Y., 1913–
Quacken Kill at Quackenkill, N. Y., 1894.
Normans Kill at Frenchs Mill, N. Y., 1891.
Kinderhook Creek at Wilsons dam, near Garfield, N. Y., 1892–1894.
Kinderhook Creek at East Nassau, N. Y., 1892–1894.
Kinderhook Creek at Rossman, N. Y., 1906–1909; 1911–1914.
Catskill Creek at South Cairo, N. Y., 1901–1907.
Esopus Creek at Olivebridge, N. Y., 1903–4.
Esopus Creek near Olivebridge, N. Y., 1906–1913.
Esopus Creek at Kingston, N. Y., 1901–1909.
Esopus Creek at Mount Marion, N. Y., 1907–1913.
Rondout Creek at Rosendale, N. Y., 1901–1903; 1906–1913.
Diversion to Delaware and Hudson Canal at Rosendale, N. Y., 1901–1903; 1906.
Wallkill River at Newpaltz, N. Y., 1901–1903.
Wappinger Creek at Wappinger Falls, N. Y., 1903–1905.
Fishkill Creek at Glenham, N. Y., 1901–1903.
Foundry Brook at Cold Spring, N. Y., 1902–3.
Croton River at Croton dam, near Croton Lake, N. Y., 1870–1899.

PASSAIC RIVER BASIN.

Passaic River at Millington, N. J., 1903–1906.
Passaic River near Chatham, N. J., 1902–1911.
Passaic River at Two Bridges (Mountain View), N. J., 1901–1903.
Rockaway River at Boonton, N. J., 1903–4.
Pompton River at Pompton Plains, N. J., 1903–4.
Pompton River at Two Bridges (Mountain View), N. J., 1901–1903.
Ramapo River near Mahwah, N. J., 1903–1906; 1908.
Wanaque River at Wanaque, N. J., 1903–1905.

RARITAN RIVER BASIN.

Raritan River, South Branch (head of Raritan River), at Stanton, N. J., 1903–1906.
Raritan River at Finderne, N. J., 1903–1907.
Raritan River at Boundbrook, N. J., 1903–1909.
North Branch of Raritan River at Pluckemin, N. J., 1903–1906.
Millstone River at Millstone, N. J., 1903–4.

DELAWARE RIVER BASIN.

Delaware River, East Branch (head of Delaware River), at Fish's Eddy, N. Y., 1912–
Delaware River, East Branch, at Hancock, N. Y., 1902–1912.
Delaware River at Port Jervis, N. Y., 1904–
Delaware River at Riegelsville, N. J., 1906–
Delaware River at Lambertville, N. J., 1897–1908.
Beaver Kill at Cooks Falls, N. Y., 1913–
West Branch of Delaware River at Hale Eddy, N. Y., 1912–
West Branch of Delaware River at Hancock, N. Y., 1902–1912.
Mongaup River near Rio, N. Y., 1909–1913.
Neversink River at Godeffroy, N. Y., 1903; 1909–10; 1911–1914.
Neversink River at Port Jervis, N. Y., 1902–3.
Paulins Kill at Columbia, N. J., 1908–9.
Lehigh River at South Bethlehem, Pa., 1902–1905; 1909–1913.
Lehigh River at Easton, Pa., 1909.
Musconetcong River at Asbury, N. J., 1903.
Musconetcong River near Bloomsbury, N. J., 1903–1907.
Tohickon Creek at Point Pleasant, Pa., 1883–1889; 1901–1913.
Neshaminy Creek below Forks, Pa., 1884–1913.
Schuylkill River near Philadelphia, Pa., 1898–1912.
Perkiomen Creek near Frederick, Pa., 1884–1913.
Wissahickon Creek near Philadelphia, Pa., 1897–1902; 1905–6.

SUSQUEHANNA RIVER BASIN.

Susquehanna River at Colliersville, N. Y., 1907–8.
Susquehanna River at Conklin, N. Y., 1912–
Susquehanna River at Binghampton, N. Y., 1901–1912.
Susquehanna River at Wysox, Pa., 1908–9.
Susquehanna River at Wilkes-Barre, Pa., 1899–1913.
Susquehanna River at Danville, Pa., 1899–1913.
Susquehanna River at Harrisburg, Pa., 1891–1913.
Susquehanna River at McCall Ferry, Pa., 1902–1909.
Chenango River at South Oxford, N. Y., 1903.
Chenango River near Greene, N. Y., 1908.
Chenango River near Chenango Forks, N. Y., 1912–
Chenango River at Binghampton, N. Y., 1901–1912.
Eaton Brook, Madison County, N. Y., 1835.
Madison Brook, Madison County, N. Y., 1835.
Tioughnioga River at Chenango Forks, N. Y., 1903.
Cayuta Creek at Waverly, N. Y., 1898–1902. (Data in Water-Supply Paper 109 only.)
Chemung River at Chemung, N. Y., 1903– (Data for period prior to 1905 published in Water-Supply Paper 109.)
West Branch of Susquehanna River at Williamsport, Pa., 1895–1913.
West Branch of Susquehanna River at Allenwood, Pa., 1899–1902.
Juniata River at Newport, Pa., 1899–1913.
Broad Creek at Mill Green, Md., 1905–1909.
Octoraro Creek at Rowlandsville, Md., 1896–1899.
Deer Creek near Churchville, Md., 1905–1909.

GUNPOWDER RIVER BASIN.

Gunpowder Falls at Glencoe, Md., 1905–1909.
Little Gunpowder Falls near Belair, Md., 1905–1909.

PATAPSCO RIVER BASIN.

Patapsco River at Woodstock, Md., 1896–1909.

PATUXENT RIVER BASIN.

Patuxent River near Burtonsville, Md., 1911–12; 1913–
Patuxent River at Laurel, Md., 1896–1898.

POTOMAC RIVER BASIN.

Potomac River, North Branch (head of Potomac River), at Piedmont, W. Va., 1899–1906.
Potomac River, North Branch, at Cumberland, Md., 1894–1897.
Potomac River at Great Cacapon, W. Va., 1895.
Potomac River at Point of Rocks, Md., 1895–
Potomac River at Great Falls, Md., 1886–1891.
Potomac River at Chain Bridge, near Washington, D. C., 1892–1895.
Savage River at Bloomington, Md., 1905–6.
Georges Creek at Westernport, Md., 1905–6.
Wills Creek near Cumberland, Md., 1905–6.
South Branch of Potomac River near Springfield, W. Va., 1894–1896; 1899–1906.
Opequan Creek near Martinsburg, W. Va., 1905–6.
Tuscarora Creek at Martinsburg, W. Va., 1905.
Antietam Creek near Sharpsburg, Md., 1897–1905.
North River (head of South Fork of Shenandoah River, which is continuation of main stream) at Port Republic, Va., 1895–1899.
South Fork of Shenandoah River near Front Royal, Va., 1899–1906.
Shenandoah River at Millville, W. Va., 1895–1909.
Cooks Creek at Mount Crawford, Va., 1905–6.
Middle River:
Lewis Creek near Staunton, Va., 1905–6.
South River at Basic City, Va., 1905–6.
South River at Port Republic, Va., 1895–1899.
Elk Run at Elkton, Va., 1905–6.
Hawksbill Creek near Luray, Va., 1905–6.
North Fork of Shenandoah River near Riverton, Va., 1899–1906.
Passage Creek at Buckton, Va., 1905–6.
Monocacy River near Frederick, Md., 1896–
Goose Creek near Leesburg, Va., 1909–1912.
Rock Creek at Zoological Park, D. C., 1897–1900.
Rock Creek at Lyons Mill, D. C., 1892–1894.
Occoquan Creek near Occoquan, Va., 1913–

RAPPAHANNOCK RIVER BASIN.

Rappahannock River near Fredericksburg, Va., 1907–

REPORTS ON WATER RESOURCES OF NORTH ATLANTIC COAST.[1]

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-supply papers are of octavo size.

*24. Water resources of the State of New York, Part I, by G. W. Rafter. 1899. 99 pp., 13 pls. 15c.

Describes the principal rivers of New York and their more important tributaries, and gives data on temperature, precipitation, evaporation, and stream flow.

*25. Water resources of the State of New York, Part II, by G. W. Rafter. 1899. 100 pp., 12 pls. 15c.

Contains discussion of water storage projects on Genesee and Hudson rivers, power development at Niagara Falls, descriptions and early history of State canals, and a chapter on the use and value of the water power of the streams and canals; also brief discussion of the water yield of sand areas of Long Island.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along rivers of the United States, also brief descriptions of many of the streams, including St. Croix, Penobscot, Kennebec, Androscoggin, Saco, Merrimack, Connecticut, Housatonic, Hudson, Mohawk, Delaware, Lehigh, Schuylkill, Susquehanna, Juniata, Potomac, and James rivers.

57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. (See No. 149.) 5c.

61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp. 5c.

Nos. 57 and 61 contain information as to depth, diameter, yield, and head of water in borings more than 400 feet deep; under head "Remarks" give information concerning temperature, quality of water, purposes of boring, etc. The lists are arranged by States, and the States are arranged alphabetically. Revised edition published in 1905 as Water-Supply Paper 149 (q. v.).

*69. Water powers of the State of Maine, by H. A. Pressey. 1902. 124 pp., 14 pls. 20c.

Discusses briefly the geology and forests of Maine and in somewhat greater detail the drainage areas, lake storage, and water powers of the St. Croix, Penobscot, Kennebec, Androscoggin, Presumpscot, Saco, and St. John rivers, and the minor coastal streams; mentions also developed tidal powers.

72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the water of Raritan, Passaic, and Hudson rivers and their tributaries and the damage resulting from pollution.

76. Observations on the flow of rivers in the vicinity of New York City, by H. A. Pressey. 1903. 108 pp., 13 pls. 15c.

Describes methods of measuring stream flow in open channels and under ice, and the quality of the river water as determined by tests of turbidity, color, alkalinity, and permanent hardness. The streams considered are Catskill, Esopus, Rondout, and Fishkill creeks, and Wallkill, Tenmile, and Housatonic rivers.

79. Normal and polluted waters in northeastern United States, by M. O. Leighton. 1903. 192 pp. 10c.

Defines essential qualities of water for various uses, the impurities in rain, surface, and underground waters, the meaning and importance of sanitary analyses, and the principal sources of pollution; chiefly "a review of the more readily available records" of examination of water supplies derived from streams in the Merrimack, Connecticut, Housatonic, Delaware, and Ohio River basins; contains many analyses.

---

[1] For stream-measurement reports see tables on pages V and VI.

88. The Passaic flood of 1902, by G. B. Hollister and M. O. Leighton. 1903. 56 pp., 15 pls. 15c.

Describes the topography of the area drained by the Passaic and its principal tributaries; discusses flood flow and losses caused by the floods, and makes comparison with previous floods; suggests construction of dam at Mountain View to control flood flow. See also No. 92.

92. The Passaic flood of 1903, by M. O. Leighton. 1904. 48 pp., 7 pls. 5c.

Discusses flood damages and preventive measures. See No. 88.

102. Contributions to the hydrology of eastern United States, 1903; M. L. Fuller, geologist in charge. 1904. 522 pp. 30c.

Contains brief reports on the wells and springs of the New England States and New York. The reports comprise tabulated well records giving information as to location, owner, depth, yield, head, etc., supplemented by notes as to elevation above sea, material penetrated, temperature, use, and quality; many miscellaneous analyses.

106. Water resources of the Philadelphia district, by Florence Bascom. 1904. 75 pp., 4 pls. 5c.

Describes the physiography, stratigraphic geology, rainfall, streams, ponds, springs, deep and artesian wells, and public water supplies of the area mapped on the Germantown, Norristown, Philadelphia, and Chester atlas sheets of the United States Geological Survey; compares quality of Delaware and Schuykill River waters.

108. Quality of water in the Susquehanna River drainage basin, by M. O. Leighton, with an introductory chapter on physiographic features, by G. B. Hollister. 1904. 76 pp., 4 pls. 15c.

109. Hydrography of the Susquehanna River drainage basin, by J. C. Hoyt and R. H. Anderson. 1905. 215 pp., 29 pls. 25c.

The scope of No. 108 is sufficiently indicated by its title. No. 109 describes the physical features of the area drained by the Susquehanna and its tributaries, contains the results of measurements of flow at the gaging stations, and discusses precipitation, floods, low water, and water power.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.

Contains brief reports on water resources, surface and underground, of districts in the North Atlantic slope drainage basins, as shown by the following list:

Drilled wells of the Triassic area of the Connecticut Valley, by W. H. C. Pynchon.

Triassic rocks of the Connecticut Valley as a source of water supply, by M. L. Fuller. Scope indicated by title.

Water resources of the Taconic quadrangle, New York, Massachusetts, and Vermont, by F. B. Taylor. Discusses rainfall, drainage, water powers, lakes and ponds, underground waters, and mineral springs; also quality of spring water as indicated by chemical and sanitary analyses of Sand Spring, near Williamstown.

Water resources of the Watkins Glen quadrangle, New York, by Ralph S. Tarr. Discusses the use of the surface and underground waters for municipal supplies and their quality as indicated by examination of Sixmile and Fall creeks, and sanitary analyses of well water at Ithaca.

Water resources of the central and southwestern highlands of New Jersey, by Laurence La Forge. Treats of population, industries, climate, and soils, lakes, ponds, swamps and rivers, mineral springs (with analyses), water power, and the Morris Canal; present and prospective sources and quality of municipal supplies.

Water resources of the Chambersburg and Mercersburg quadrangles, Pennsylvania, by George W. Stose. Describes streams and springs.

Water resources of the Curwensville, Patton, Ebensburg, and Barnesboro quadrangles, Pennsylvania, by F. G. Clapp. Treats briefly of surface and underground waters and their use for municipal supplies; gives analyses of waters at Cresson Springs.

Water resources of the Accident and Grantsville quadrangles, Maryland, by G. C. Martin.

Water resources of the Frostburg and Flintstone quadrangles, Maryland and West Virginia, by G. C. Martin.

114. Underground waters of eastern United States, M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.

Contains brief reports on water supplies of the North Atlantic States as follows:

Maine, by W. S. Bayley.

New Hampshire, by M. L. Fuller.

Vermont, by G. H. Perkins.

Massachusetts and Rhode Island, by W. O. Crosby.

Connecticut, by H. E. Gregory.

New York, by F. B. Weeks.

New Jersey, by G. N. Knapp.

Pennsylvania, by M. L. Fuller.
Delaware, by N. H. Darton.
Maryland, by N. H. Darton and M. L. Fuller.
District of Columbia, by N. H. Darton and M. L. Fuller.
Virginia, by N. H. Darton and M. L. Fuller.

Each of these reports discusses the resources of the public and private water supplies and related subjects, and gives list of pertinent publications; mineral springs are listed and sales of mineral water are reported.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Contains chapter on measurement of rate of underflow on Long Island, N. Y.

144. The normal distribution of chlorine in the natural waters of New York and New England, by D. D. Jackson. 1905. 31 pp., 5 pls. 10c.

Discusses common salt in coast and inland waters, salt as an index to pollution of streams and wells, the solutions and methods used in chlorine determinations, and the use of the normal chlorine map; gives charts and tables for chlorine in the New England States and New York.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains several brief reports relating chiefly to areas in the North Atlantic coast drainage basins, as follows:

Water resources of the Portsmouth-York region, New Hampshire and Maine, by George Otis Smith. Gives results of investigations made for the War Department to determine water supplies available for forts at mouth of harbor.

Water supply from glacial gravels near Augusta, Maine, by George Otis Smith. Describes the Silver Lake system of ponds near Augusta and the series of springs at the head of Spring Brook.

Water resources of the Pawpaw and Hancock quadrangles, West Virginia, Maryland, and Pennsylvania, by George W. Stose and George C. Martin. Describes rocks, springs, and streams in the area at the northernmost bend of the Potomac; discusses history of development, character of water (with analysis), flow, and origin of Berkeley Springs.

Water of a gravel-filled valley near Tully, N. Y., by George B. Hollister. Describes character of the sands and gravels, the volume of the springs issuing from them, deposits of tufa, the waters of the lakes, and the composition of the spring and lake waters; analyses.

147. Destructive floods in United States in 1904, by E. C. Murphy and others. 206 pp., 18 pls. 15c.

Describes floods on Susquehanna and Mohawk rivers and near Johnstown, Pa.

149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.

Gives by States (and within the States by counties), location, depth, diameter, yield, height of water, and other available information, concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.

155. Fluctuations of the water level in wells, with special reference to Long Island, New York, by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuation due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground water developments, and to indeterminate causes.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

Contains accounts of floods in North Atlantic slope drainage basins as follows: Flood on Poquonnock River, Connecticut, by T. W. Norcross; flood on the Unadilla and Chenango rivers, New York, by R. E. Horton and C. C. Covert; also estimates of flood discharge and frequency on Kennebec, Androscoggin, Merrimack, Connecticut, Hudson, Passaic, Raritan, Delaware, Susquehanna, and Potomac rivers; gives index to literature on floods on American streams.

*185. Investigations on the purification of Boston sewage, with a history of the sewage-disposal problem, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and recent tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography.

*192. The Potomac River basin (Geographic history; Rainfall and stream flow; Pollution, typhoid fever, and character of water; Relation of soils and forest cover to quality and quantity of surface water; Effect of industrial wastes on fishes), by H. N. Parker, Bailey Willis, R. H. Bolster, W. W. Ashe, and M. C. Marsh. 1907. 364 pp., 10 pls. 60c.

Scope indicated by title.

*198. Water resources of the Kennebec River basin, Maine, by H. K. Barrows, with a section on the quality of Kennebec River water, by G. C. Whipple. 1907. 235 pp. 7 pls. 30c.

Describes physical characteristics and geology of the basin, the flow of the streams, evaporation, floods, developed and undeveloped water powers, water storage, log driving, and lumbering; under quality of water discusses effect of tides, pollution, and the epidemic of typhoid fever in 1902–3; contains gazetteer of rivers, lakes, and ponds.

*223. Underground waters of southern Maine, by F. G. Clapp, with records of deep wells, by W. S. Bayley. 1909. 268 pp., 24 pls. 55c.

Describes physiography, rivers, water-bearing rocks, amount, source, and temperature of the ground waters, recovery of waters by springs, collecting galleries and tunnels, and wells; discusses well-drilling methods, municipal water supplies, and the chemical composition of the ground waters; gives details for each county.

232. Underground-water resources of Connecticut, by H. E. Gregory, with a study of the occurrence of water in crystalline rocks, by E. E. Ellis. 1909. 200 pp. 5 pls. 20c.

Describes physiographic features, drainage, forests, climate, population and industries, and rocks; circulation, amount, temperature, and contamination of ground water; discusses the ground waters of the crystalline rocks, the Triassic sandstones and traps, and the glacial drift; the quality of the ground waters (with analyses); well construction; temperature, volume, character, uses, and production of spring waters.

236. The quality of surface waters in the United States, Part I, Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.

Describes collection of samples, method of examination, preparation of solutions, accuracy of estimates, and expression of analytical results; gives results of analyses of waters of Androscoggin, Hudson, Raritan, Delaware, Susquehanna, Lehigh, Potomac, and Shenandoah rivers.

*258. Underground-water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 123 pp., 2 pls. 15c.

Contains four brief reports pertaining especially to districts in the North Atlantic coast drainage area:

Occurrence and composition of well waters in the slates of Maine, by F. G. Clapp. Analyses.
Occurrence and composition of well waters in the granites of New England, by F. G. Clapp. Discusses proportion of successful wells and water supply and depth. Analyses.
Composition of mineral springs in Maine, by F. G. Clapp.
Saline artesian waters of the Atlantic Coastal Plain, by Samuel Sanford.
Underground waters near Manassas, Va., by F. G. Clapp.

279. Water resources of the Penobscot River basin, Maine, by H. K. Barrows and C. C. Babb. 1912. 285 pp., 19 pls. 65c.

Describes the topography, drainage, geology, forests, population, industries, transportation lines, and precipitation in the basin; gives results of investigations of stream flow at gaging stations; discusses relation of run-off to precipitation, evaporation, floods, low water, developed and undeveloped water powers, storage, log driving, and lumbering; contains gazetteer of rivers, lakes, and ponds.

374. Ground water in the Hartford, Stamford, Salisbury, Willimantic, and Saybrook areas, Connecticut, by H. E. Gregory and A. J. Ellis. 1916. 150 pp., 13 pls. 30c.

Describes occurrence of ground water, methods of developing, and requirements for municipal use. Gives, by towns, a description of the surface and ground water and of the public water supply, and records of wells and springs.

397. Ground water in the Waterbury area, Connecticut, by A. J. Ellis, under direction of H. E. Gregory. 1916. 73 pp., 4 pls. 15c.

Describes the geology of the area, the occurrence of ground water, its use for private and municipal supply, and methods of developing. Discusses under towns the population and industries, topography, water-bearing formations, surface and ground water, and public supplies, and gives records of wells and springs.

415. Surface waters of Massachusetts, by C. H. Pierce and H. J. Dean. 1916. 433 pp., 12 pls. 45c.

A compilation of available stream-flow data, including the classic records collected on the Merrimack at Lowell and Lawrence, on the Connecticut at Holyoke, and on the Cochituate at Sudbury, by the Metropolitan Water and Sewerage Board, as well as records covering shorter periods; prepared in cooperation with the Commonwealth of Massachusetts. Contains a gazetteer of streams, lakes, and ponds.

424. Surface waters of Vermont, by C. H. Pierce. In press April, 1917.

A compilation of available stream-flow data; prepared in cooperation with the Commonwealth of Vermont.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however, may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*Sixth Annual Report of the United States Geological Survey, 1884–85, J. W. Powell, Director. 1885. xxix, 570 pp., 65 pls. Cloth $2.00. Contains:

* Sea-coast swamps of the eastern United States, by N. S. Shaler. pp. 353–398. Describes the coast swamps of New England; discusses economic problems connected with marine swamps; gives a detailed account of selected areas of salt marsh lands, and a list of the principal areas of salt marshes between the Hudson River and Portland, Maine.

*Tenth Annual Report of the United States Geological Survey, 1888–89, J. W. Powell, Director. 1890. 2 parts. Pt. I—Geology, xv, 774 pp., 98 pls. Cloth $2.35. Contains:

* General account of the fresh-water morasses of the United States, with a description of the Dismal Swamp district of Virginia and North Carolina, by N. S. Shaler, pp. 255–339, Pls. 6 to 19. Scope indicated by title.

Fourteenth Annual Report of the United States Geological Survey, 1892–93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II.—Accompanying papers, xx, 597 pp., 73 pls. Cloth $2.10. Contains:

*The potable waters of the eastern United States, by W J McGee, pp. 1 to 47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

PROFESSIONAL PAPERS.

Professional papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked with an asterisk may, however, be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Professional papers are of quarto size.

*44. Underground-water resources of Long Island, N. Y., by A. C. Veatch, C. S. Slichter, Isaiah Bowman, W. O. Crosby, and R. E. Horton. 1906. 394 pp., 34 pls. $1.25.

Describes the geologic formations, the source of the ground waters, and requisite conditions for flowing wells; the springs, streams, ponds, and lakes; artesian and deep wells; fluctuation of ground-water table; blowing wells; waterworks; discusses measurements of velocity of underflow, the results of sizing and filtration tests, and the utilization of stream waters; gives well records and notes (with chemical analyses) concerning representative wells.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of the paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*138. Artesian well prospects in the Atlantic Coastal Plain region, by N. H. Darton. 1896. 232 pp., 19 pls.

Describes the general geologic structure of the Atlantic Coastal Plain region and summarizes the conditions affecting subterranean water in the Coastal Plain; discusses the general geologic relations in New York, southern New Jersey, Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, and eastern Georgia; gives for each of the States a list of the deep wells and discusses well prospects. The notes on the wells that follow the tabulated lists contain many well sections and analyses of the waters.

264. Record of deep well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

Discusses the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to the geologist; describes the general methods of work; gives tabulated records of wells in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Virginia, and detailed records of wells at Pleasantville and Atlantic Highlands, N. J., and Tully, N. Y. These wells were selected because they give definite stratigraphic information.

298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Gives an account of progress in the collection of well records and samples; contains tabulated records of wells in Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia, and detailed records of wells in Newcastle County, Del.; Cumberland County, Maine; Anne Arundel, St. Mary, and Talbot counties, Md.; Hampshire County, Mass.; Monmouth County, N. J.; Saratoga County, N. Y.; and Lycoming and Somerset counties, Pa. The wells of which detailed sections are given were selected because they afford valuable stratigraphic information.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped.[1] The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water maps show the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

Folios 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but 80 or 90 per cent of the folios are usable. They will be sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive (except reprints), also to the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sells for 25 cents a copy, except that some folios which contain an unusually large amount of matter sell at higher prices. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy, except folio 193, which sells for 75 cents a copy. A discount of 40 per cent is allowed on an order for folios or for folios together with topographic maps amounting to $5 or more at the retail rate.

All the folios contain descriptions of the drainage of the quadrangles. The folios in the following list contain also brief discussions of the underground waters in con-

[1] Index maps showing areas in the North Atlantic slope basins covered by topographic maps and by geologic folios will be mailed on receipt of request addressed to the Director, U. S. Geological Survey, Washington, D. C.

nection with the economic resources of the areas and more or less information concerning the utilization of the water resources.

An asterisk (*) indicates that the stock of the folio is exhausted.

*13. Fredericksburg, Virginia-Maryland, 1894. 5c.

23. Nomini, Maryland-Virginia, 1896. 5c.

*70. Washington, District of Columbia-Maryland-Virginia, 1901.

*83. New York City (Paterson, Harlem, Staten Island, and Brooklyn quadrangles), New York-New Jersey, 1902.
Discusses the present and future water supply of New York City.

136. St. Marys, Maryland-Virginia, 1906. 5c.
Discusses artesian wells.

137. Dover, Delaware-Maryland-New Jersey, 1906. 5c.
Describes the shallow and deep wells used as sources of water supply; gives section of well at Middletown, Del.

149. Penobscot Bay, Maine, 1907. 5c.
Describes the wells and springs; gives analysis of spring water from North Bluehill.

152. Patuxent, Maryland-District of Columbia, 1907. 5c.
Discusses the springs, shallow wells, and artesian wells.

*157. Passaic, New Jersey-New York, 1908.
Discusses the underground water of the quadrangle, including the cities of Newark, Hoboken, Jersey City, Paterson, Elizabeth, Passaic, Plainfield, Rahway, and Perth Amboy, and a portion of the city of New York; gives a list of the deep borings in the New Jersey portion of the quadrangle, and notes concerning wells on Staten Island, Long Island, Hoffman Island, and Governors Island.

158. Rockland, Maine, 1908. 5c.
Describes the water supply in Knox County, Maine, of which Rockland is the principal city; discusses the water obtained from wells drilled in limestone and granite, and the city water supply of Camden, Rockport, Rockland, and Thomaston.

160. Accident-Grantsville, Maryland-Pennsylvania-West Virginia, 1908. 5c.
Under "Mineral Resources" the folio describes Youghiogheny and Castleman rivers, Savage River, and Georges Creek, and the spring waters; notes possibility of obtaining artesian water.

*161. Franklin Furnace, New Jersey, 1908.
Describes the streams, water powers, and ground waters of a district in northwestern New Jersey, mainly in Sussex County but including also a small part of Morris County; gives tabulated list of water powers and of bored wells.

*162. Philadelphia (Norristown, Germantown, Chester, and Philadelphia quadrangles), Pennsylvania-New Jersey-Delaware, 1909.
Describes the underground waters of the Piedmont Plateau and the Coastal Plain, and gives a tabulated list of wells; discusses the water supply of Philadelphia and Camden, also suburban towns; gives analysis of filtered water of Pickering Creek.

167. Trenton, New Jersey-Pennsylvania,[1] 1909. 5c.
Describes streams tributary to Raritan and Delaware rivers (including estimates of capacity with and without storage) and the springs and wells; discusses also the public water supply of Trenton and suburban towns.

169. Watkins Glen-Catatonk, New York, 1909. 5c.
Describes the rivers, which include tributaries of the Susquehanna and the St. Lawrence, the lakes and swamps, and, under "Economic geology," springs and shallow and deep wells; discusses also water supply at Ithaca.

170. Mercersburg-Chambersburg, Pennsylvania,[2] 1909. 5c.
Describes the underground waters, including limestone springs, sandstone springs, and wells, and mentions briefly the sources of the water supplies of the principal towns.

182. Choptank, Maryland, 1912.[2] 5c.
The Choptank quadrangle includes the entire width of Chesapeake Bay and portions of many large estuaries.

---

[1] Octavo edition only.

[2] Issued in two editions—library (18 by 22 inches) and octavo (6 by 9 inches). Specify edition desired.

189. Barnesboro-Patton, Pennsylvania, 1913. 25c.
Discusses the water supply of various towns in the quadrangle.

191. Raritan, New Jersey,[1] 1914.
Discusses briefly the surface and ground waters of the quadrangle, the quality, and the utilization of streams for power; gives analysis of water from Raritan River and from Schooley Mountain Spring near Hackettstown.

192. Eastport, Maine, 1914. 25c.
Includes brief account of the water supply of the quadrangle and of the utilization of streams for power.

MISCELLANEOUS REPORTS.

Other Federal bureaus and State and other organizations have, from time to time, published reports relating to the water resources of various sections of the country. Notable among those pertaining to the North Atlantic States are the reports of the Maine State Water Storage Commission (Augusta), the New Hampshire Forestry Commission (Concord), the Metropolitan Water and Sewerage Board (Boston, Mass.), the New York State Water-Supply Commission (Albany), the New York State Conservation Commission (Albany), the New York State engineer and surveyor (Albany), the various commissions on water supply of New York City, the Geological Survey of New Jersey (Trenton), State boards of health, and the Tenth Census (vol. 16).

The following reports deserve special mention:

Water power of Maine, by Walter Wells, Augusta, 1869.

Hydrology of the State of New York, by G. W. Rafter: New York State Museum Bull. 85, 1905.

Hydrography of Virginia, by N. C. Grover and R. H. Bolster: Virginia Geol. Survey Bull. 3, 1906.

Underground-water resources of the Coastal Plain province of Virginia, by Samuel Sanford: Virginia Geol. Survey Bull. 5, 1913.

Surface water supply of Virginia, by G. C. Stevens: Virginia Geol. Survey Bull. 10, 1916.

Many of these reports can be obtained by applying to the several commissions, and most of them can be consulted in the public libraries of the larger cities.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations:

WATER-SUPPLY PAPERS.

*1. Pumping water for irrigation, by H. M. Wilson. 1896. 57 pp., 9 pls.
Describes pumps and motive powers, windmills, water wheels, and various kinds of engines; also storage reservoirs to retain pumped water until needed for irrigation.

[1] Issued in two editions—library (18 by 22 inches), 25c., and octavo (6 by 9 inches), 50c. Specify edition desired.

*3. Sewage irrigation, by G. W. Rafter: 1897. 100 pp., 4 pls. 10c. (See Water-Supply Paper 22.)

Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.

*8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.

Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kans.; describes instruments and methods and draws conclusions.

*14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood. 1898. 91 pp., 1 pl. 10c.

Discusses efficiency of pumps and water lifts of various types.

*20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.

Includes tables and descriptions of wind wheels, makes comparisons of wheels of several types, and discusses results.

*22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.

Gives résumé of Water-Supply Paper No. 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers, and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage utilization and disposal.

32. Water resources of Puerto Rico, by H. M. Wilson. 1899. 48 pp., 17 pls. 15c.

Describes briefly topography, climate, rivers, irrigation methods, soils, forestation, water power, and transportation facilities.

*41. The windmill: Its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls.

*42. The windmill: Its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp., 2 pls. 10c.

Nos. 41 and 42 give details of results of experimental tests with windmills of various types.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along rivers of the United States, also brief descriptions of many of the streams. Arrangement geographic. Many river profiles are scattered through other reports on surface waters in various parts of the United States.

*56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.

Describes the methods used by the Survey in 1901–2. See also Nos. 64, 94, and 95.

64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.

Describes methods of measuring velocity of water and of measuring and computing stream flow and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged edition published as Water-Supply Paper 95.

*67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.

Discusses origin, depth, and amount of underground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of underground water; surface and deep zones of flow, and recovery of waters by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing well; describes artesian wells at Savannah, Ga.

72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.

77. The water resources of Molokai, Hawaiian Islands, by Waldemar Lindgren. 1903. 62 pp., 4 pls. 10c.

Describes briefly the topography, geology, coral reefs, climate, soils, vegetation, forests, fauna of the island, the springs, running streams, and wells, and discusses the utilization of the surface and underground waters.

*80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.
Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall, run-off, and evaporation formulas; discusses effect of forests on rainfall and run-off.

87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.
First edition was published in Part II of the Twelfth Annual Report.

*94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.
Gives instruction for field and office work relating to measurements of stream flow by current meters. See also No. 95.

*95. Accuracy of stream measurements (second, enlarged edition), by E. C. Murphy. 1904. 169 pp., 6 pls.
Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. See also No. 94.

103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)
Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.
Contains the following reports of general interest. The scope of each paper is indicated by its title.
Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.
The California or "stovepipe" method of well construction, by Charles S. Slichter.
Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.
Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.
Experiments relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.
Notes on the hydrology of Cuba, by M. L. Fuller.

113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.
The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., and the contamination of rock wells and of streams by waste oil and brine.

114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.
Contains report on "Occurrence of underground waters," by M. L. Fuller, discussing sources, amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential condition of artesian flows, and general conditions affecting underground waters in eastern United States.

115. River surveys and profiles made during 1903, arranged by W. C. Hall and J. C. Hoyt. 1905. 115 pp., 4 pl. 10c.
Contains results of surveys made to determine location of undeveloped power sites.

119. Index to the hydrographic progress reports of the United States Geological Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.
Scope indicated by title.

120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879–1904, by M. L. Fuller. 1905. 128 pp. 10c.
Scope indicated by title.

122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.
Defines and classifies underground waters, gives common-law rules relating to their use, and cites State legislative acts affecting them.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses the capacity of sand to transmit water, describes measurements of underflow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal., and on Long Island, N. Y.; gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

143. Experiments on steel-concrete pipes on a working scale, by J. H. Quinton. 1905. 61 pp., 4 pls.

Scope indicated by title.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains brief reports of general interest as follows:

Drainage of ponds into drilled wells, by Robert E. Horton. Discusses efficiency, cost, and capacity of drainage wells, and gives statistics of such wells in southern Michigan.

Construction of so-called fountain and geyser springs, by Myron L. Fuller.

A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15c.

Contains brief account of the organization of the hydrographic [water-resources] branch and the Reclamation Service, reports of conferences and committees, circulars of instruction, and many brief reports on subjects closely related to reclamation, and a bibliography of technical papers by members of the service. Of the papers read at the conference those listed below (scope indicated by title) are of more or less general interest:

Proposed State code of water laws, by Morris Bien.

Power engineering applied to irrigation problems, by O. H. Ensign.

Estimates on tunneling in irrigation projects, by A. L. Fellows.

Collection of stream-gaging data, by N. C. Grover.

Diamond-drill methods, by G. A. Hammond.

Mean-velocity and area curves, by F. W. Hanna.

Importance of general hydrographic data concerning basins of streams gaged, by R. E. Horton.

Effect of aquatic vegetation on stream flow, by R. E. Horton.

Sanitary regulations governing construction camps, by M. O. Leighton.

Necessity of draining irrigated land, by Thos. H. Means.

Alkali soils, by Thos. H. Means.

Cost of stream-gaging work, by E. C. Murphy.

Equipment of a cable gaging station, by E. C. Murphy.

Silting of reservoirs, by W. M. Reed.

Farm-unit classification, by D. W. Ross.

Cost of power for pumping irrigating water, by H. A. Storrs.

Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in United States in 1904, by E. C. Murphy and others. 206 pp., 18 pls. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and area of cross section.

150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

Scope indicated by title.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls. 10c.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Scope indicated by title.

*155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuation due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground-water developments, and to indeterminate causes.

*160. Underground-water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905, lists of publications relating to underground waters, and contains the following brief reports of general interest:

Significance of the term "artesian," by Myron L. Fuller.
Representation of wells and springs on maps, by Myron L. Fuller.
Total amount of free water in the earth's crust, by Myron L. Fuller.
Use of fluorescein in the study of underground waters, by R. B. Dole.
Problems of water contamination, by Isaiah Bowman.
Instances of improvement of water in wells, by Myron L. Fuller.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.

Scope indicated by title.

*179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.

Describes grain distillation, treatment of slop, sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.

*180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.

Scope indicated by title.

*185. Investigations on the purification of Boston sewage, with a history of the sewage-disposal problem, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and recent tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification by intermittent sand filtration and coarse material; gives bibliography.

*186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl.

Gives history of pollution by acid-iron wastes at Shelby, Ohio, and resulting litigation; discusses effect of acid-iron liquors on sewage purification processes, recovery of copperas from acid-iron wastes, and other processes for disposal of pickling liquor.

*187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.

Scope indicated by title.

*189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls. 5c.

Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of amounts and character of water used, raw material and finished product, and mechanical filtration.

*194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of the State of Missouri *v.* the State of Illinois and the Sanitary district of Chicago), by M. O. Leighton. 1907. 369 pp., 2 pls. 40c.

Scope indicated by amplification of title.

*196. Water supply of Nome region, Seward Peninsula, Alaska, 1906, by J. C. Hoyt and F. F. Henshaw. 1907. 52 pp., 6 pls. 15c.

Gives results of measurements of flow of Alaskan streams; discusses available water supply for ditch and pipe lines and power development; presents notes for investors.

*200. Weir experiments, coefficients, and formulas (revision of paper No. 150), by R. E. Horton. 1907. 195 pp., 38 pls. 35c.

Scope indicated by title.

*218. Water-supply investigations in Alaska, 1906–7 (Nome and Kougarok regions, Seward Peninsula; Fairbanks district, Yukon-Tanana region), by F. F. Henshaw and C. C. Covert. 1908. 156 pp., 12 pls. 25c.

Describes the drainage basins, gives results of observations at the gaging stations, and discusses the water supply of the ditch and pipe lines, and possibilities of development; gives also meteorological records.

*226. The pollution of streams by sulphite pulp waste, a study of possible remedies, by E. B. Phelps. 1909. 37 pp., 1 pl. 10c.

Describes manufacture of sulphite pulp, the waste liquors, and the experimental work leading to suggestions as to methods of preventing stream pollution.

228. Water-supply investigations of the Yukon-Tanana region, Alaska, 1907 and 1908, Fairbanks, Circle, and Rampart districts, by C. C. Covert and C. E. Ellsworth. 1909. 108 pp., 7 pls. 20c.

Describes the drainage basins; gives results of observations at gaging stations; discusses the water supplies of the ditch and pipe lines and possibilities of hydraulic development.

*229. The disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 1909. 91 pp., 1 pl. 15c.

Scope indicated by title.

*234. Papers on the conservation of water resources. 1909. 96 pp., 2 pls. 15c.

Contains the following papers, whose scope is indicated by their titles: Distribution of rainfall, by Henry Gannett; Floods, by M. O. Leighton; Developed water powers, compiled under the direction of W. M. Steuart, with discussion by M. O. Leighton; Undeveloped water powers, by M. O. Leighton; Irrigation, by F. H. Newell; Underground waters, by W. C. Mendenhall; Denudation, by R. B. Dole and Herman Stabler; Control of catchment areas, by H. N. Parker.

*235. The purification of some textile and other factory wastes, by Herman Stabler and G. H. Pratt. 1909. 76 pp. 10c.

Discusses waste waters from wool scouring, bleaching, and dyeing cotton yarn, bleaching cotton piece goods, and manufacture of oleomargarine, fertilizer, and glue.

236. The quality of surface waters in the United States, Part I.—Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.

Describes collection of samples, method of examination, preparation of solutions, accuracy of estimates, and expression of analytical results.

238. The public utility of water powers and their governmental regulation, by René Tavernier and M. O. Leighton. 1910. 161 pp. 15c.

Discusses hydraulic power and irrigation, French, Italian, and Swiss legislation relative to the development of water powers, and laws proposed in the French parliament; reviews work of bureau of hydraulics and agricultural improvement of the French department of agriculture, and gives résumé of Federal and State water-power legislation in the United States.

255. Underground waters for farm use, by M. L. Fuller. 1910. 58 pp., 17 pls. 15c.

Discusses rocks as sources of water supply and the relative safety of supplies from different materials; springs, and their protection; open or dug and deep wells, their location, yield, relative cost, protection, and safety; advantages and disadvantages of cisterns and combination wells and cisterns.

257. Well-drilling methods, by Isaiah Bowman. 1911. 139 pp., 4 pls. 15c.

Discusses amount, distribution, and disposal of rainfall, water-bearing rocks, amount of underground water and artesian conditions, and oil and gas bearing formations; gives history of well drilling in Asia, Europe, and the United States; describes in detail the various methods and the machinery used; discusses loss of tools and geologic difficulties; contamination of well waters and methods of prevention; tests of capacity and measurement of depth; and costs of sinking wells.

*258. Underground-water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 123 pp., 2 pls. 15c.

Contains the following papers (scope indicated by titles) of general interest:

Drainage by wells, by M. L. Fuller.

Freezing of wells and related phenomena, by M. L. Fuller.

Pollution of underground waters in limestone, by G. C. Matson.

Protection of shallow wells in sandy deposits, by M. L. Fuller.

Magnetic wells, by M. L. Fuller.

259. The underground waters of southwestern Ohio, by M. L. Fuller and F. G. Clapp, with a discussion of the chemical character of the waters, by R. B. Dole. 1912. 228 pp., 9 pls. 35c.

Describes the topography, climate, and geology of the region, the water-bearing formations, the source, mode of occurrence, and head of the waters, and municipal supplies; gives details by counties; discusses in supplement, under chemical character, method of analysis and expression of results, mineral constituents, effect of the constituents on waters for domestic, industrial, or medicinal uses, methods of purification, and chemical composition; many analyses and field assays. The matter in the supplement was also published in Water-Supply Paper 254 (The underground waters of north-central Indiana).

274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation.

280. Gaging stations maintained by the United States Geological Survey, 1888–1910, and Survey publications relating to water resources, compiled by B. D. Wood. 1912. 102 pp. 10c.

314. Surface water supply of Seward Peninsula, Alaska, by F. F. Henshaw and G. L. Parker, with a sketch of the geography and geology by P. S. Smith, and a description of methods of placer mining by A. H. Brooks. 1913. 317 pp., 17 pls. 45c.

Contains results of work at gaging stations.

315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.

Discusses ground, lake, and river waters as public supplies, development of waterworks systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water and municipal water softening.

318. Water resources of Hawaii, 1909–1911, by W. F. Martin and C. H. Pierce. 1913. 552 pp., 15 pls. 50c.

Describes the general features of the islands and gives results of measurements of streams and of observations of rainfall and evaporation; contains gazetteer and a glossary of Hawaiian words in common use.

334. The Ohio Valley flood of March–April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 22 pls. 20c.

Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.

336. Water resources of Hawaii, 1912, by C. H. Pierce and G. K. Larrison. 1914. 392 pp. 50c.

Contains results of stream measurements on the islands in 1912.

337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 77 pp., 7 pls. 15c.

Discusses methods of measuring the winter flow of streams.

342. Surface water supply of the Yukon-Tanana region, Alaska, by C. E. Ellsworth and R. W. Davenport. 1915. 343 pp., 13 pls. 45c.

Presents results of six years' observations of the water supply of the Yukon-Tanana region, discusses climate and precipitation, and gives station records.

*345. Contributions to the hydrology of the United States, 1914. N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c.

*(e) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53–65. 5c. Scope indicated by title.

(f) The discharge of Yukon River at Eagle, Alaska, by E. A. Porter and R. W. Davenport, pp. 67–77, pls. 4 and 5. 5c. Describes briefly the location and size of the Yukon basin, the climatic conditions in the basin, and methods of collecting hydrometric data; compares run-off with precipitation, and gives table showing the discharge of some of the large rivers in the United States as compared with the discharge of the Yukon and the Nile.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of the geyser water of Yellowstone National Park, hot springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado and Utah, Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls. 20c.

Describes methods of installing recording and other gages and of constructing gage wells, shelters, and structures for making discharge measurements and artificial controls.

372. A water-power reconnaissance in south-central Alaska, by C. E. Ellsworth and R. W. Davenport, with a section on southeastern Alaska, by J. C. Hoyt. 1915. 173 pp., 22 pls. 20c.

373. Water resources of Hawaii, 1913, by G. K. Larrison. 1915. 190 pp. 20c.

Contains results of stream measurements on the islands in 1913.

375. Contributions to the hydrology of the United States, 1915. N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls.

(c) Relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77–84.

(e) A method for correcting river discharge for changing stage, by B. E. Jones, pp. 117–130.

(f) Conditions requiring the use of automatic gages in obtaining stream-flow records, by C. H. Pierce, pp. 131–139.

400. Contributions to the hydrology of the United States, 1916. N. C. Grover, chief hydraulic engineer.

(a) The people's interest in water-power resources, by G. O. Smith, pp. 1–8.

(c) The measurement of silt-laden streams, by Raymond C. Pierce, pp. 39–51.

(d) Accuracy of stream-flow data, by N. C. Grover and J. C. Hoyt, pp. 53–59.

PROFESSIONAL PAPERS.

72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate, population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee river basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

86. The transportation of débris by running water, by G. K. Gilbert, based on experiments made with the assistance of E. C. Murphy. 1914. 263 pp., 3 pls. 70c.

The results of an investigation which was carried on in a specially equipped laboratory at Berkeley, Cal., and was undertaken for the purpose of learning "the laws which control the movement of bed load and especially to determine how the quantity of load is related to the stream's slope and discharge and to the degree of comminution of the débris."

A highly technical report.

BULLETINS.

*32. Lists and analyses of the mineral springs of the United States (a preliminary study), by A. C. Peale. 1886. 235 pp.

Defines mineral waters, lists the springs by States, and gives tables of analyses so far as available.

264. Record of deep well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Bulletins 264 and 298 discuss the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to the geologist; describes the general methods of work; gives tabulated records of wells by States, and detailed records selected as affording valuable stratigraphic information.

*319. Summary of the controlling factors of artesian flows, by Myron L. Fuller. 1908. 44 pp., 7 pls. 10c.

Describes underground reservoirs, the sources of underground waters, the confining agents, the primary and modifying factors of artesian circulation, the essential and modifying factors of artesian flow, and typical artesian systems.

*479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pp. 5c.

Discusses the expression of chemical analyses, the chemical character of water and the properties of natural waters; gives a classification of waters based on property values and reacting values, and discusses the character of the waters of certain rivers as interpreted directly from the results of analyses; discusses also the relation of water properties to geologic formations, silica in river water, and the character of the water of the Mississippi and the Great Lakes and St. Lawrence River as indicated by chemical analyses.

ANNUAL REPORTS.

*Fifth Annual Report of the United States Geological Survey, 1883–84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. $2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlin, pp. 125 to 173, Pl. 21. Scope indicated by title.

*Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II—Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Irrigation in India, by H. M. Wilson, pp. 363–561, Pls. 107 to 146. See Water-supply Paper 87.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. Pt. III—Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*American irrigation engineering, by H. M. Wilson, C. E., pp. 101–349, Pls. 111 to 146. Discusses the economic aspects of irrigation, alkaline drainage, silt, and sedimentation; gives brief history and legislation; describes canals; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

Fourteenth Annual Report of the United States Geological Survey, 1892–93, J. W. Powell, Director, 1893. (Pt. II, 1894.) 2 parts. *Pt. II—Accompanying papers, xx, 597 pp., 73 pls. $2.10. Contains:

*The potable waters of the eastern United States, by W J McGee, pp. 1 to 47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49–88, Pls. 3 and 4. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral spring resorts; contains also some analyses.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II—Papers chiefly of a theoretic nature, v, 958 pp., 172 pls. $2.65. Contains:

*Principles and conditions of the movements of ground water, by F. H. King, pp. 59–294, Pls. 6 to 16. Discusses the amount of water stored in sandstone, in soil, and in other rocks; the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through rigid, porous media and through sands, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295–384, Pl. 17. Scope indicated by title.

Twentieth Annual Report of the United States Geological Survey, 1898–99, Charles D. Walcott, Director. 1899. (Parts II, III, IV, V, and VII, 1900.) 7 parts in 8 vols. and separate case of maps with Pt. V. *Pt. IV—Hydrography, vii, 660 pp., 75 pls. $1.40. Contains:

*Hydrography of Nicaragua, by A. P. Davis, pp. 563–637, Pls. 64 to 75. Describes the topographic features of the boundary, the lake basin, and Rio San Juan; gives a brief résumé of the boundary dispute; discusses rainfall, temperature, and relative humidity, evaporation, resources, and productions, the ship, railway and canal projects; gives the history of the investigations by the Canal Commission, and results of measurements on the Rio Grande, on streams tributary to Lake Nicaragua, and on Rio San Juan and its tributaries.

Twenty-second Annual Report of the United States Geological Survey, 1900–1901, Charles D. Walcott, Director. 1901. (Parts III and IV, 1902.) 4 parts. Pt. IV—Hydrography, 690 pp., 65 pls. $2.20. Contains:

*Hydrography of the American Isthmus, by A. P. Davis, pp. 507–630, Pls. 37 to 50. Describes the physiography, temperature, rainfall, and winds of Central America; discusses the hydrography of the Nicaragua Canal route and the Panama Canal route; gives estimated monthly discharges of many of the streams, and rainfall and evaporation tables at various points.

INDEX BY AREAS AND SUBJECTS.

[A=Annual Reports; M=Monograph; B=Bulletin; P=Professional Paper; W=Water-Supply Paper; GF=Geologic folio. For titles see preceding pages.]

[1] Many of the reports contain brief subject bibliographies. See abstracts.

[2] Many analyses of river, spring, and well waters are scattered through publications, as noted in abstracts.

INDEX OF STREAMS.