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

WATER-SUPPLY PAPER 324

SURFACE WATER SUPPLY OF THE UNITED STATES

1912

PART IV. ST. LAWRENCE RIVER BASIN

BY

C. C. COVERT, A. H. HORTON
AND W. G. HOYT

WASHINGTON
GOVERNMENT PRINTING OFFICE
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SURFACE WATER SUPPLY OF ST. LAWRENCE RIVER BASIN, 1912.

By C. C. COVERT, A. H. HORTON, and W. G. HOYT.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 12 reports presenting results of measurements of flow made on streams in the United States during the calendar year 1912.

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 civil 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 year ending June 30—

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1913, inclusive	150,000

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

Measurements of stream flow have been made at about 2,000 points in the United States and also at many points in small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, and in the Hawaiian

Islands. During 1912 gaging stations were maintained by the Survey and the cooperating organizations at about 1,500 points, and many discharge measurements were 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.

PUBLICATIONS.

A report for each calendar year has been prepared embodying the stream-flow data collected during that year. An index to the reports containing stream-flow measurements prior to 1904 has been published as Water-Supply Paper 119. Circulars are also available giving complete lists of the gaging stations maintained by the Survey to date, and a list of the reports relating to the water supply of the country.

Prior to 1902 gage heights and discharge measurements were published in water-supply papers of bulletins and estimates of monthly discharge in annual reports; since 1902 both classes of data have been published in water-supply papers, and they are now being published in 12 parts, as shown in the following table:

Papers on surface water supply of the United States, 1912.

Part.[a]	No.	Title.
I	321	North Atlantic coast basins.
II	322	South Atlantic coast and eastern Gulf of Mexico basins.
III	323	Ohio River basin.
IV	324	St. Lawrence River basin.
V	325	Upper Mississippi River and Hudson Bay basins.
VI	326	Missouri River basin.
VII	327	Lower Mississippi River basin
VIII	328	Western Gulf of Mexico basins.
IX	329	Colorado River basin.
X	330	Great Basin.
XI	331	Pacific coast basins in California.
XII	332	North Pacific coast basins.

[a] For the purpose of uniformity in the presentation of reports, a general plan has been agreed upon by the United States Reclamation Service, the United States Forest Service, the United States Weather Bureau, and the United States Geological Survey, according to which the area of the United States has been divided into 12 parts, whose boundaries coincide with natural drainage lines indicated by the parts of the report.

A list of reports containing stream-flow data is presented in the following table:

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

[A=Annual Report; B=Bulletin; WS=Water-Supply Paper.]

Report.	Character of data.	Year.
10th, A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge	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.
WS 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.
WS 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
WS 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.
WS 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
WS 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.
WS 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
WS 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
WS 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
WS 75	Monthly discharge	1901.
WS 82 to 85	Complete data	1902.
WS 97 to 100	do	1903.
WS 124 to 135	do	1904.
WS 165 to 178	do	1905.
WS 201 to 214	Complete data, except descriptions	1906.
WS 241 to 252	Complete data	1907–8.
WS 261 to 272	do	1909.
WS 281 to 292	do	1910.
WS 301 to 312	do	1911.
WS 321 to 332	do	1912.

NOTE.—No data regarding stream flow are given in the 15th and 17th annual reports.

The table which follows gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1912. The data for any particular station will be found in the reports covering the years during which the station was maintained. For example, data for any station in the area covered by Part I are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, and 321, which contain records for the New England streams from 1903 to 1912. The year covered by the report is indicated at the head of the column in which the paper is listed.

Numbers of water-supply papers containing results of stream measurements, 1899–1912.

	1899 [a]	1900 [b]	1901	1902	1903	1904	1905	1906	1907–8	1909	1910	1911	1912
North Atlantic coast (St. John River to York River)	35	47, [c] 48	65, 75	82	97	[d] 124, [e] 125, [f] 126	[d] 165, [e] 166, [f] 167	[d] 201, [e] 202, [f] 203	241	261	281	301	321
South Atlantic coast and eastern Gulf of Mexico (James River to the Mississippi)	[g] 35, 36	48	65, 75	[g] 82, 83	[g] 97, 98	[f] 126, 127	[f] 167, 168	[f] 203, 204	242	262	282	302	322
Ohio River basin	36	48, [h] 49	65, 75	83	98	128	169	205	243	263	283	303	323
St. Lawrence River and Great Lakes	36	49	65, 75	[i] 82, 83	97	129	170	206	244	264	284	304	324
Hudson Bay and upper Mississippi River	36	49	[j] 65, 66, 75	[j] 83, 85	[j] 98, 99, [k] 100	[j] 128, 130	171	207	245	265	285	305	325
Missouri River	[l] 36, 37	49, [m] 50	66, 75	84	[k] 99	130, [n] 131	172	208	246	266	286	306	326
Lower Mississippi River	37	50	[j] 65, 66, 75	[j] 83, 84	[j] 98, 99	[f] 128, 131	[j] 169, 173	[j] 205, 209	247	267	287	307	327
Western Gulf of Mexico	37	50	66, 75	84	99	132	174	210	248	268	288	308	328
Colorado River	[o] 37, 38	50	66, 75	85	100	133	175, [p] 177	211	249	269	289	309	329
Great Basin	38, [q] 39	51	66, 75	85	100	133, [r] 134	176, [r] 177	212, [r] 213	250, [r] 251	270, [r] 271	290	310	330
Pacific coast in California	38, [s] 39	51	66, 75	85	100	134	177	213	251	271	291	311	331
North Pacific coast	38	51	66, 75	85	100	135	[t] 177, 178	214	252	272	292	312	332

[a] Rating tables and index to Water-Suply Papers 35–39 contained in Water-Supply Paper 39. Estimates for 1899 in Twenty-first Annual Report, part 4.
[b] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Estimates for 1900 in Twenty-second Annual Report, part 4.
[c] Wissahickon and Schuylkill Rivers to James River.
[d] New England rivers only.
[e] Hudson River to Delaware River, inclusive.
[f] Susquehanna River to Yadkin River, inclusive.
[g] James River only.
[h] Scioto River.
[i] Lake Ontario and tributaries to St. Lawrence River proper.
[j] Tributaries of Mississippi from east.
[k] Hudson Bay only.
[l] Gallatin River.
[m] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.
[n] Platte and Kansas rivers.
[o] Green and Gunnison rivers and Grand River above junction with Gunnison.
[p] Below junction with Gila.
[q] Mohave River only.
[r] Great Basin in California, excepting Truckee and Carson drainage basins.
[s] Kings and Kern rivers and south Pacific coast drainage basins.
[t] Rogue, Umpqua, and Siletz rivers only.

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:

Albany, N. Y., Room 18, Federal Building.
Atlanta, Ga., Post Office Building.
Newport, Ky., Federal Building.
St. Paul, Minn., Old Capitol Building.
Helena, Mont., Montana National Bank Building.
Denver, Colo., 302 Chamber of Commerce Building.
Salt Lake City, Utah, Federal Building.
Boise, Idaho, 615 Idaho Building.
Portland, Oreg., 416 Couch Building.
Tacoma, Wash., Federal Building.
San Francisco, Cal., 505 Custom House.
Los Angeles, Cal., Federal Building.
Sante Fe, N. Mex., Capitol Building.
Honolulu, Hawaii, Kapiolani Building.

A list of the Geological Survey's publications will be sent on application to the Director of the United States Geological Survey, Washington, D. C.

DEFINITION OF TERMS.

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

"Second-foot" is an abbreviation for cubic foot per second and is the unit for the rate of discharge of water flowing in a stream 1 foot wide, 1 foot deep, at a rate of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the following table of equivalents.

"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 in 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 work.

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 in second-feet per square mile.	Run-off 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 partial month multiply the values for one day by the number of days.

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

Discharge in second-feet.	Run-off in 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 partial month multiply values for one day by the number of days.

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 covers 1 square mile 1.131 feet or 13.572 inches deep.
1 second-foot for one year equals 31,536,000 cubic feet.
1 second-foot equals about 1 acre-inch per hour.
1 second-foot for one day 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-feet.
100 United States gallons per minute for one day equals 0.442 acre-foot.
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.
1⅓ horsepower equals about 1 kilowatt.

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

EXPLANATION OF DATA.

For each regular current-meter gaging station the following data are given: Description of the station, list of discharge measurements, table of daily gage heights, table of daily discharges, table of monthly and yearly discharges and run-off. For stations located at weirs or dams the gage-height table is omitted.

In addition to statements regarding the location and installation of current-meter stations, the descriptions give information in regard to any conditions which may affect the constancy of the relation of gage height to discharge, covering such points as ice, logging, shifting channels, and backwater; also information regarding diversions which decrease the total flow at the measuring section. Statements are also made regarding the accuracy and reliability of the data.

The table of daily gage heights records the daily fluctuations of the surface of the river as found from the mean of the gage readings taken each day, usually in the morning and in the evening. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. All gage heights affected by the presence of ice in the streams or by backwater from obstructions are published as recorded, with suitable footnotes. The rating table is not applicable for such periods unless the proper corrections to the gage heights are known and applied. Attention is called to the fact that the zero of the gage is placed at an arbitrary datum and has no relation to zero flow or the bottom of the river. In general the zero is located somewhat below the lowest known flow, so that negative readings shall not occur.

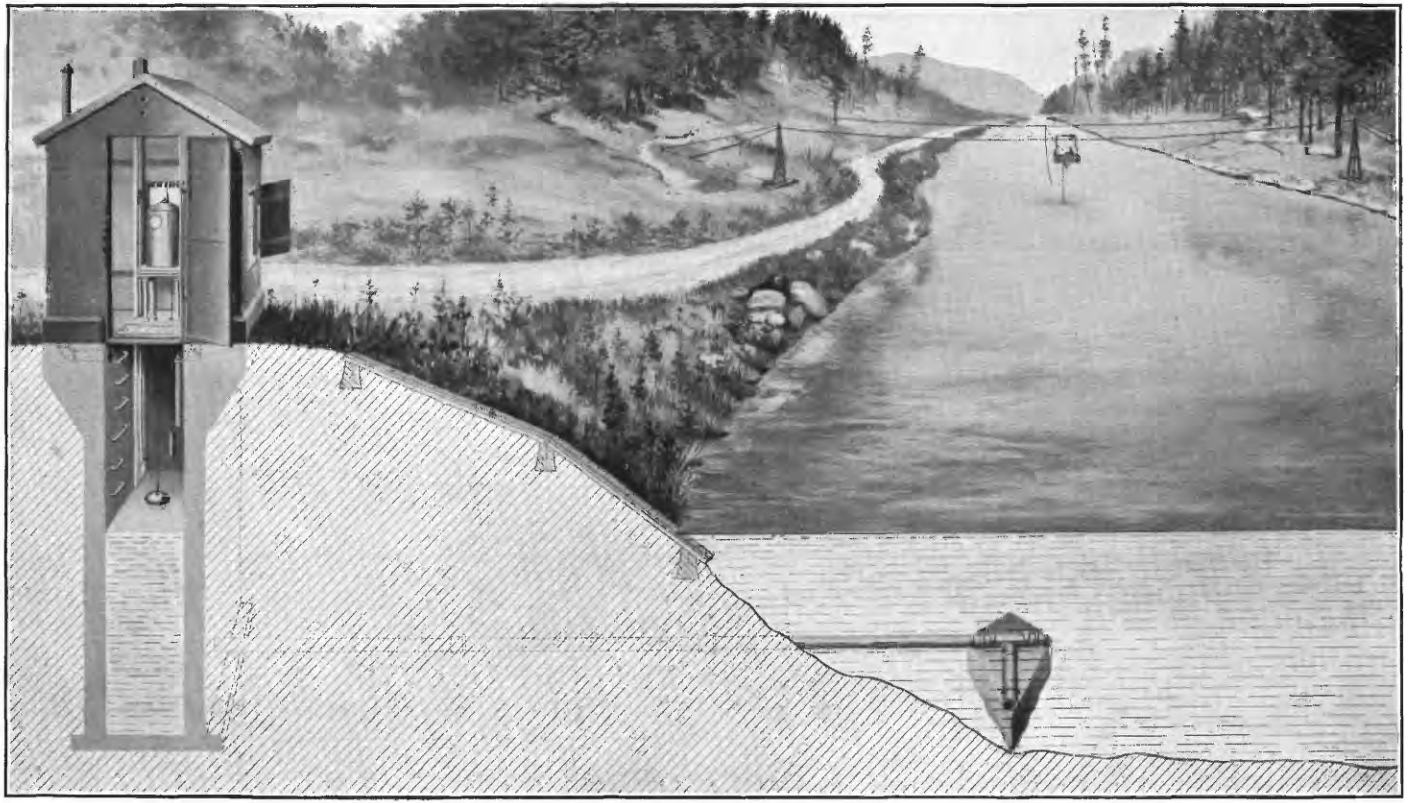
The discharge measurements and gage heights are the base data from which rating tables, daily discharge tables, and monthly discharge tables are computed.

The rating table gives, either directly or by interpolation, the discharge in second-feet corresponding to every stage of the river recorded during the period for which it is applicable. It is not published in this report, but can be determined from the tables of daily gage heights and daily discharge by plotting gage heights in feet as ordinates and discharge in second-feet as abscissas.

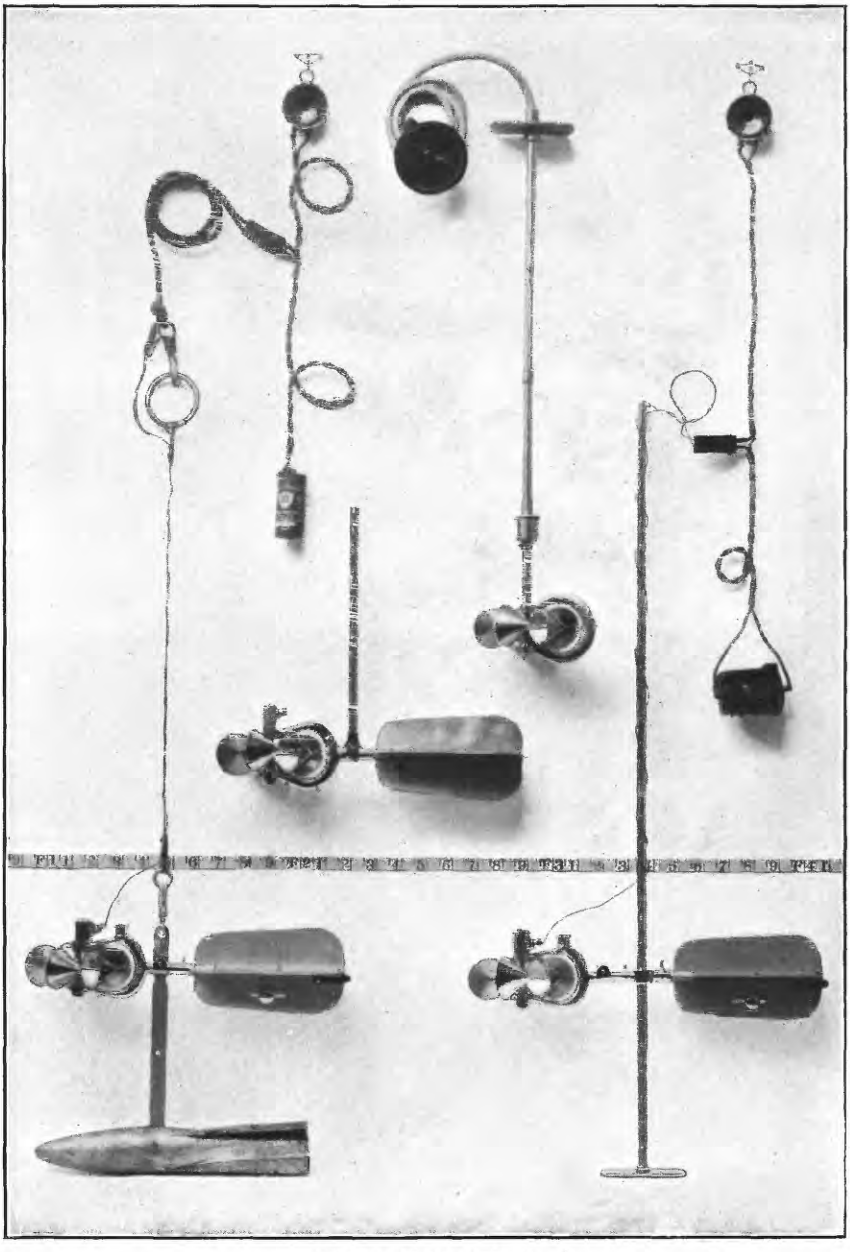
The table of daily discharges gives the discharges in second-feet corresponding to the observed gage heights as determined from the rating tables.

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 pages 9–10, are based.

The base data presented in this report, unless otherwise stated in description of station, have been collected by the methods commonly



TYPICAL GAGING STATIONS.



PRICE CURRENT METERS.

used at current-meter gaging stations and described in standard textbooks.

Plate I shows typical gaging stations. Plate II shows the current meters used in the work.

ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

The accuracy of stream-flow data depends primarily on the natural conditions at the gaging station and on the methods and care with which the data are collected. Errors of the first group depend on the degree of permanency of channel and of permanency of the relation between discharge and stage.

Errors of the second class are due, first, to errors in observation of stage; second, to errors in measurements of flow; and, third, to errors due to misinterpretation of stage and flow data.

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" or "approximate" within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

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

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 runoff 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, and they should, therefore, be considered as only approximate, particularly for periods of irrigation or of low water. For these errors it is as a rule not feasible to make adequate correction.

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 examining and adjusting to his own

needs 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 determinations of daily discharge allow more detailed studies of the variation in flow by which the period of deficiency may be determined.

It should be borne in mind that the observations in each succeeding year may be expected to throw new light on data already collected and published, and the engineer who makes use of the figures presented in these papers should verify all ratings and make such adjustments for earlier years as may seem necessary.

COOPERATION.

The work in Minnesota during 1912 has been done with State cooperation under terms of an act of the legislature of 1909 as embodied in joint resolution 19, which reads as follows:

> Whereas the water supplies, water powers, navigation of our rivers, drainage of our lands, and the sanitary condition of our streams and their watersheds generally form one great asset and present one great problem, therefore: *Be it resolved by the house of representatives, the senate concurring*, That the State Drainage Commission be, and is hereby, directed to investigate progress in other States toward the solution of said problem in such States, to investigate and determine the nature of soil problem in this State.

The work has been carried on in conjunction with the State Drainage Commission, George A. Ralph, chief engineer.

Assistance has been rendered by the Oliver Iron Mining Co., who paid salary of observer on Menominee River near Iron Mountain, and to H. G. Roby, resident engineer of the Peninsular Power Co., for assistance and information.

The gaging stations on the Wolf River in the Menominee Indian Reservation were maintained in cooperation with the Office of Indian Affairs, under an allotment made available January 1, 1912.

Cooperation with the State Water Supply Commission of New York was made possible by the provisions of the Fuller bill, chapter 569, laws of 1907, and carried on under agreements between the State Water Supply Commission and the United States Geological Survey. New York State cooperation, under the direction of the State engineer and surveyor, has been carried on under agreements authorized by an act of the State legislature, being paragraph 11 of chapter 420, laws of 1900.

Special acknowledgment is also due to the board of water commissioners, Auburn, N. Y., J. Walter Ackerman, chairman.

The work in Vermont during 1912 has been done in cooperation with the State of Vermont, Allen M. Fletcher, governor.

DIVISION OF WORK.

The field data in the Lake Superior and part of Lake Michigan drainage basins were collected under the direction of W. G. Hoyt, district engineer, by S. B. Soulé.

The field data in the Lake Michigan, Lake Huron, and Lake Erie drainage basins were collected under the direction of A. H. Horton, by P. S. Monk.

The field data in the St. Lawrence drainage basin in New York and Vermont were collected under the direction of C. C. Covert, by O. W. Hartwell, G. H. Canfield, C. S. De Golyer, Frank Weber, J. G. Mathers, and R. S. Barnes.

The ratings, special estimates, and studies of the completed data for stations outside of New York and Vermont were made by A. H. Horton, W. G. Hoyt, H. J. Jackson, and J. G. Mathers.

The computations were made under the direction of H. J. Jackson by H. D. Padgett, C. L. Batchelder, and M. I. Walters.

The ratings, special estimates, and studies of the completed data for stations in New York and Vermont were made by C. C. Covert, O. W. Hartwell, and J. G. Mathers. The computations were made under the direction of O. W. Hartwell, by J. G. Mathers, G. H. Canfield, C. S. De Golyer, Frank Weber, and R. S. Barnes.

The report was edited by Mrs. B. D. Wood.

STREAMS TRIBUTARY TO LAKE SUPERIOR.

POPLAR RIVER AT LUTSEN, MINN.

Location.—About 800 feet above mouth of river in sec. 34, T. 60, R. 3 W.

Records available.—May 6 to November 4, 1911; August 22 to December 31, 1912.

Drainage area.—144 square miles.

Gage.—From May 16 to November 4, 1911, the readings were taken from a staff gage about 400 feet above the mouth of the river. On August 26, 1912, a staff gage was bolted to the rock wall on the right bank about 800 feet above the mouth and in a pool between two distinct falls.

Channel.—The bed at the old site is heavy gravel; that at the new site is solid rock and the control point is the rock crest of the falls below.

Winter flow.—Because of the nature of the control below, ice will probably not cause excessive backwater.

Artificial control.—The flow of the river is controlled to some extent by two dams above the station, the nearest being that of the National Paper & Pulp Co., 2½ miles above the mouth of the river.

Accuracy.—Between May 6 and November 4, 1911, the relation between gage height and discharge at the gage section was at times affected by backwater from deposits of gravel washed up into the mouth of the river during storms on Lake Superior. The present gage is so located that, except for temporary drift lodging on the rapids below, the records should be reliable.

The following discharge measurement was made by S. B. Soulé:

August 22, 1912: Gage height, 1.00 feet; discharge, 25.4 second-feet. Measurement made at wading section about 200 feet below gage. Old gage read 13.07 feet.

Daily gage height, in feet, of Poplar River at Lutsen, Minn., for 1912.

[C. A. A. Nelson, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.08	1.36	1.00	.....	16	.....	1.21	1.19	0.98	.....
2	.....	1.05	1.31	.98	.....	17	.....	1.22	1.16	.98	.....
3	.....	1.06	1.26	.98	.....	18	.....	1.31	1.14	.98	.....
4	.....	1.11	1.22	.98	.....	19	.....	1.26	1.11	.95	.....
5	.....	1.79	1.20	.98	.....	20	.....	1.26	1.06	.95	.....
6	.....	2.45	1.20	.98	.....	21	.....	1.38	1.05	.95	0.75
7	.....	2.20	1.08	.98	0.9	22	1.00	1.41	1.04	.95	.....
8	.....	1.89	1.08	1.00	.....	23	1.00	1.36	1.02	.95	.....
9	.....	1.72	1.06	1.02	.....	24	.98	1.34	1.02	.95	.....
10	.....	1.66	1.05	1.02	.....	25	.98	1.38	1.02	.95	.....
11	.....	1.58	1.05	1.02	.....	26	.98	1.65	1.01	.94	.....
12	.....	1.49	1.29	1.02	.....	27	1.00	1.65	1.00	.92	.....
13	.....	1.42	1.26	1.00	.....	28	1.01	1.58	1.00	.92	.7
14	.....	1.32	1.24	1.00	.8	29	1.04	1.51	1.00	.92	.....
15	.....	1.26	1.21	.99	.....	30	1.06	1.42	1.00	.92	.....
						31	1.08	.....	1.00	.....	.....

BEAVER BAY RIVER AT BEAVER BAY, MINN.

Location.—Bridge at Beaver Bay a few hundred yards above the mouth of the river.

Records available.—July 26, 1911, to December 31, 1912.

Gage.—Staff, read from July 26, 1911, to April 9, 1912, when it was washed away. On April 22, a chain gage was fastened to the steel highway bridge. The chain gage is in the same section and is referred to the same datum as the staff gage.

Channel.—Practically permanent; bank high and rocky; bed and control point solid rock.

Winter flow.—Measurements made during the winter season of 1911 and 1912 show that the control point remains open and that the open-water rating curve is applicable throughout the year except at certain times noted under "Accuracy."

Accuracy.—At times of exceptionally high sea on Lake Superior a bar is formed, causing backwater at the gage, which lasts as long as the high sea is running. When the lake becomes normal the water washes through the bar and the regular rating curve applies. This condition has occurred once since the station was established, during the month of December, 1912. Except for such periods the records should be good.

Discharge measurements of Beaver Bay River at Beaver Bay, Minn., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Jan. 12[a]	S. B. Soulé	0.75	13.1
Mar. 27[a]	.....do	.66	8.0
27[a]	.....do	.66	7.5
28[a]	.....do	.66	7.0
28[a]	.....do	.65	7.9
Apr. 25[b]	Hoyt and Soulé	2.91	256
Aug. 23[a]	W. G. Hoyt	.85	15.5

[a] Made by wading at various sections above gage.
[b] Made from boat about 750 feet below gage.

Daily gage height, in feet, of Beaver Bay River at Beaver Bay, Minn., for 1911–12.

[Louis Lorntson, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.							1911.						
1	.....	3.2	1.6	2.4	1.55	.....	16	.....	1.65	2.3	2.05	2.4	.....
2	.....	3.1	1.2	2.25	1.45	.....	17	.....	1.5	2.1	2.8	.....	.....
3	.....	2.7	1.1	2.3	1.35	.....	18	.....	1.45	1.95	2.7	.....	1.48
4	.....	2.3	1.6	2.85	1.2	1.25	19	.....	1.35	2.0	2.4	.....	.....
5	.....	2.05	4.65	2.7	1.2	.....	20	.....	1.25	2.0	2.2	1.7	.....
6	.....	1.85	4.6	2.55	1.45	.....	21	.....	1.35	2.0	2.0	.....	1.35
7	.....	3.1	4.2	2.35	1.65	.....	22	.....	1.5	2.05	2.0	.....	.....
8	.....	3.4	3.7	2.2	1.65	1.2	23	.....	1.4	2.0	2.0	1.7	.....
9	.....	3.2	3.2	2.1	2.0	.....	24	.....	1.25	1.9	1.9	.....	.....
10	.....	3.1	2.95	1.95	2.4	.....	25	.....	1.2	1.8	1.85	.....	.....
11	.....	2.95	2.95	1.9	2.25	1.7	26	1.75	1.1	1.8	1.75	.....	1.25
12	.....	2.65	2.75	1.85	1.95	.....	27	1.4	1.1	1.9	1.75	1.4	.....
13	.....	2.15	2.45	1.8	2.25	.....	28	1.58	1.05	2.1	1.75	.....	1.2
14	.....	1.9	2.3	1.8	2.25	1.65	29	2.05	1.0	*2.65	1.6	.....	.....
15	.....	1.8	2.5	1.75	2.3	.....	30	1.85	1.05	2.6	1.55	1.3	.....
							31	1.8	1.4	.....	1.6	.....	.....

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1	1.1	0.7	.....	1.58	3.5	2.25	1.05	0.7	2.2	1.9	0.9	.....
2	.....	.....	.....	1.88	4.0	2.1	1.05	.8	2.0	1.7	.9	.....
3	.....	.....	.....	2.2	4.4	2.9	1.25	.75	1.7	1.55	1.0	.....
4	1.1	.....	0.7	3.2	5.0	2.75	1.2	.55	1.8	1.4	1.1	.....
5	.....	.65	.....	4.8	4.8	2.8	1.1	.65	1.9	1.45	.95	1.05
6	.....	.....	.....	.....	4.4	2.75	1.08	.75	2.0	1.4	1.1	.....
7	.....	.....	.75	.....	4.0	2.5	.95	.7	2.0	1.35	1.15	.....
8	.9	.65	.....	.....	4.0	2.2	.85	.8	1.9	1.25	1.1	.....
9	.....	.....	.....	.....	3.5	2.1	.8	1.3	1.8	1.2	1.1	.....
10	.....	.....	.....	3.5	4.2	2.0	.7	1.2	1.7	1.25	1.05	.....
11	.8	.....	.....	3.2	4.8	2.1	.78	1.3	1.45	1.4	1.0	.....
12	.....	.....	.5	3.5	4.4	2.0	.95	1.2	1.35	1.7	1.0	.52
13	.....	.....	.....	3.0	3.7	2.1	1.0	.88	1.15	1.8	1.25	.....
14	.....	.....	.5	3.4	3.2	2.1	1.1	.88	1.1	1.72	1.2	.....
15	.75	.....	.....	3.6	3.2	3.0	.92	.75	1.1	1.62	1.05	.....
16	.....	.....	.....	3.5	3.0	3.7	.9	.75	1.1	1.58	1.0	.....
17	.....	.....	.....	3.1	2.8	3.5	.85	1.08	1.2	1.48	1.0	.....
18	.8	.....	.5	3.0	2.7	2.9	.75	.9	1.2	1.38	.9	.....
19	.....	.....	.....	2.9	2.6	2.5	.7	.9	1.15	1.28	.8	1.85
20	.....	.....	.....	2.8	2.5	2.3	.6	.78	1.3	1.2	.8	.....
21	.....	.....	.55	2.9	2.5	2.1	.65	.8	1.35	1.1	.9	.....
22	.7	.....	.....	2.85	2.5	1.9	.7	.7	1.5	1.1	.8	.....
23	.....	.....	.....	2.8	2.5	1.7	.8	.65	1.65	.08	1.0	.....
24	.....	.....	.....	2.8	2.4	1.52	.88	.98	1.55	1.05	.9	.....
25	.7	.....	.7	2.9	2.4	1.38	.68	.9	1.90	1.0	1.0	.....
26	.....	.....	.....	5.4	2.4	1.18	.72	1.0	2.6	1.0	1.2	2.05
27	.....	.....	.....	5.4	2.85	1.15	.65	.92	2.45	1.1	.9	.....
28	.....	.....	.8	4.6	3.1	1.0	.6	1.9	2.2	1.5	1.1	.....
29	.6	.8	.....	3.7	2.8	1.05	.55	2.1	2.3	1.1	1.0	.....
30	.....	.....	.....	3.0	2.6	1.2	.3	2.0	1.70	1.1	1.0	.....
31	.....	.....	.....	.....	3.2	.....	.6	1.9	.....	1.0	.....	.....

NOTE.—Water over top of gage Apr. 5 to 9, 1912, and gage heights estimated from observer's notes to be about 5.8, 5.4, 5, and 4 feet, respectively, on those days. Staff gage taken out by ice on Apr. 9, 1912, and gage heights Apr. 10 to 21, 1912, determined by measuring down to water surface from a reference point at site of gage. Chain gage installed Apr. 22, 1912. Relation of gage height to discharge during December, 1912, was affected by the formation of a bar and by ice which was thus afforded opportunity to form. See "Accuracy" in station description.

Daily discharge, in second-feet, of Beaver Bay River at Beaver Bay, Minn., for 1911–12.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.							16		55	132	94	152	48
1		370	51	152	48	32	17		44	100	250	130	45
2		335	29	124	41	32	18		41	82	225	100	43
3		225	25	132	36	31	19		36	87	152	80	40
4		132	51	262	29	31	20		31	87	115	59	38
5		94	940	225	29	30	21		36	87	87	59	36
6		72	920	188	41	30	22		44	94	87	59	35
7		335	760	142	55	29	23		38	87	87	59	34
8		440	560	115	55	29	24		31	77	77	55	33
9		370	370	100	87	40	25		29	67	72	50	32
10		335	290	82	152	50	26	63	25	67	63	45	31
11		290	290	77	124	59	27	38	25	77	63	38	30
12		212	238	72	82	58	28	50	23	100	63	36	29
13		108	164	67	124	57	29	94	21	212	51	34	27
14		77	132	67	124	55	30	72	23	200	48	33	26
15		67	175	63	132	51	31	67	38		51		25

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1912.											
1	25	9		50	480	124	23	12	115	77	18
2				75	680	100	23	15	87	59	18
3				115	840	275	31	14	59	48	21
4	25		9	370	1,080	238	29	8	67	38	25
5		7		1,000	1,000	250	25	10	77	41	20
6				1,400	840	238	24	14	87	38	25
7			11	1,200	680	175	20	12	87	36	27
8	17	7		1,100	680	115	16	15	77	31	25
9				680	480	100	15	33	67	29	25
10				480	760	87	12	29	59	31	23
11	13			370	1,000	100	14	33	41	38	21
12			4	480	840	87	20	29	36	59	21
13				305	560	100	21	17	27	67	31
14			4	440	370	100	25	17	25	61	29
15	11			520	370	305	19	14	25	53	23
16				480	305	560	18	14	25	50	21
17				335	250	480	16	24	29	43	21
18	13		4	305	225	275	14	18	29	27	18
19				275	200	175	12	18	27	32	15
20				250	175	132	9	14	33	29	15
21			4	275	175	100	10	15	36	25	18
22	9			262	175	77	12	12	44	25	15
23				250	175	59	15	10	55	24	21
24				250	152	45	17	20	48	23	18
25	9		9	275	152	37	11	18	77	21	21
26				1,240	152	28	13	21	200	21	29
27				1,240	262	27	10	19	164	25	18
28			13	920	335	21	9	77	115	44	25
29	5	13		560	250	23	8	100	132	25	21
30				305	200	29	3	87	59	25	21
31					370		9	77		21	

NOTE.—Daily discharge computed from a rating table well defined between 7 and 132 second-feet (gage heights 0.5 and 2.3 feet), fairly well defined between 152 and 305 second-feet (gage heights 2.4 and 3 feet). Above 305 second-feet (gage height 3 feet) the curve is an extension and above discharge 680 second-feet (gage height 4 feet), is subject to an error of about 10 per cent. Discharge Nov. 17, 1911, to Mar. 31, 1912, computed from semi-weekly gage heights. Ordinarly ice has no effect upon relation of gage height to discharge at this station. Discharge Dec. 1 to 31, 1912, estimated, because of bar and ice, from weekly gage heights, climatologic records, and discharge measurement made Jan. 14, 1913. Mean discharge Dec. 1 to 31, 1912, estimated 10 second-feet, varying from about 6 to 23 second-feet. Daily discharge Apr. 5 to 9, 1912, estimated from observer's notes as to height of water surface above top of gage.

Monthly discharge of Beaver Bay River at Beaver Bay, Minn., for 1911–12.

[Drainage area, 120 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1911.						
August	440	21	129	1.08	1.24	A.
September	940	25	218	1.82	2.03	B.
October	262	48	111	.925	1.07	B.
November	152	29	71.6	.597	.67	C.
December	59	25	37.6	.313	.36	B.
1912.						
January	.....	.....	20	.167	.19	B.
February	.....	.....	10	.083	.09	B.
March	.....	.....	7	.058	.07	C.
April	[a]1,400	50	527	4.39	4.90	C.
May	1,080	152	458	3.82	4.40	C.
June	560	21	149	1.24	1.38	B.
July	31	3	16.2	.135	.16	C.
August	100	8	26.3	.219	.25	B.
September	200	25	67	.558	.62	A.
October	77	21	37.9	.316	.36	B.
November	31	15	21.6	.180	.20	B.
December	.....	.....	10	.083	.10	C.
The year	[a]1,400	3	112	.933	12.72	

[a] Estimated.

NOTE.—See footnotes to table of daily discharge.

ST. LOUIS RIVER NEAR THOMSON, MINN.

Location.—Just below the tailrace of the Great Northern power house, 3 miles east of Thomson in sec. 11, T. 48 N., R. 16 W.

Records available.—October 5, 1909, to December 31, 1912.

Drainage area.—3,420 square miles.

Gage.—Chain, read four times each day (except Sunday), at 8 and 11 a. m., 2 and 5 p. m. Average of four readings taken as the mean for the day; datum of gage unchanged.

Channel.—Practically permanent at low stages; at high stages may shift slightly, as shown by the 1912 discharge measurements.

Discharge measurements.—Made from a cable 1,500 feet below the staff gage.

Artificial control.—The flow at the station is to a certain extent regulated by reservoirs above. The dam at Thomson is designed to hold 24 hours' supply of water for the power plant, and logging dams control the discharge from a large part of the entire area above the station. The gage heights show considerable fluctuation caused by the operation of the turbine gates at the power plant, which is operated on a 24-hour schedule, though with varying load.

Winter flow.—Previous to November, 1910, the relation of gage height to discharge at this station was probably not materially affected by ice. During 1911 and 1912 it has been found that the presence of ice renders the gage heights useless as an indication of discharge. During such periods the estimates of flow have been furnished by the Great Northern Power Co., computed from the amount of water passing through their turbines.

Accuracy.—The daily estimates are liable to errors due to fluctuation in the stage caused by the operation of the power house. The daily range in stage is not great, however, and it is believed that errors will compensate for a month, so that the monthly averages should be accurate within 10 per cent. No statement is available relative to the accuracy of the records furnished by the power company.

The discharge measurement made May 17, 1912, indicates that the discharge rating table (based on discharge measurement made Apr. 15, 1911) used to compute the values of daily discharge published in Water-Supply Paper 304, page 20, gave discharges too large above 7,000 second-feet as follows: At 7,000 second-feet, about 4 per cent large; at 8,000 second-feet, about 7 per cent large; at 9,000 second-feet, about 9 per cent large; at 10,000 second-feet, about 11 per cent large; at 11,000 second-feet, about 12 per cent large.

Cooperation.—Gage heights throughout the year and records of flow when ice affects the relation of gage height to discharge are furnished through the courtesy of the Great Northern Power Co., of Duluth.

Discharge measurements of St. Louis River near Thomson, Minn., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
May 17	S. B. Soulé	5.67	9,580
June 26	W. G. Hoyt	2.47	2,720
Aug. 9	S. B. Soulé	.46	574

Daily gage height, in feet, of St. Louis River near Thomson, Minn., for 1912.

[Gus Forsell, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1.05	4.2	5.3	1.8	1.6	.....	1.2	1.0
2	1.15	3.8	4.4	1.5	1.6	.....	1.4	.95
3	1.35	4.9	4.5	1.3	.50	0.70	1.4	.....
4	1.6	5.3	4.6	1.5	.....	.60	1.4	.8
5	2.0	6.1	4.3	2.0	.60	.80	1.4	.75
6	2.6	6.7	3.9	1.35	.55	.90	.....	.8
7	2.3	7.0	3.8	1.1	.55	.90	1.35	.8
8	2.3	6.2	3.4	.50	.50	.90	1.3	.75
9	2.4	6.3	.....	1.3	.45	1.2	1.15	.8
10	2.2	5.8	2.6	.85	.55	1.7	1.3	.....
11	2.3	6.0	2.3	.80	.....	1.8	1.1	.8
12	2.3	5.7	2.9	1.2	.85	1.9	1.1	.75
13	.....	5.6	2.7	1.9	.78	1.9	.....	.85
14	.....	5.1	3.0	.....	.65	1.8	1.15	.75
15	1.9	5.6	2.4	1.05	.55	.....	1.05	.....
16	1.9	5.3	2.8	2.3	.45	1.8	1.4	.6
17	1.9	5.7	3.9	2.3	.40	1.6	1.1	.....
18	1.8	5.2	3.9	2.4	.....	1.5	1.05	.6
19	1.6	4.5	3.7	2.1	.50	1.5	1.1	.48
20	1.8	4.8	3.4	2.0	.00	1.45	.....	.15
21	.....	4.5	3.4	.....	.00	1.35	1.7	.24
22	1.9	4.0	3.7	.90	.95	.....	2.3	.24
23	2.4	.....	.....	1.8	.40	.90	2.2	.11
24	1.8	.....	2.9	2.1	.40	.85	1.6	.00
25	1.7	4.0	3.0	1.5	.....	1.1	1.1	.22
26	2.6	3.8	2.6	.90	.10	1.0	.85	.....
27	3.5	4.3	2.1	.75	.95	.90	.....	.23
28	4.0	5.2	1.9	.02	.50	1.05	.9	.00
29	5.1	5.3	1.6	.....	.60	.....	1.1	.00
30	4.1	5.0	1.6	.50	.60	1.15	1.0	.....
31	.....	5.0	.....	.50	.60	.....	1.0	.....

Daily discharge, in second-feet, of St. Louis River near Thomson, Minn., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	372	379	387	1,040	5,910	8,630	1,830	1,610	693	1,180	1,000	523
2	379	361	398	1,140	5,050	6,370	1,500	1,610	716	1,390	955	482
3	422	336	403	1,340	7,590	6,600	1,280	600	740	1,390	890	622
4	397	340	407	1,610	8,630	6,840	1,500	635	670	1,390	820	599
5	438	344	407	2,070	10,700	6,140	2,070	670	820	1,390	780	519
6	633	341	382	2,910	12,300	5,260	1,340	635	910	1,360	820	397
7	667	339	393	2,480	13,200	5,050	1,090	635	910	1,340	820	426
8	677	331	382	2,480	11,000	4,250	600	600	910	1,280	780	378
9	848	330	388	2,620	11,300	3,580	1,280	565	1,180	1,140	820	370
10	1,040	330	375	2,340	9,930	2,910	865	635	1,720	1,280	820	390
11	1,330	261	336	2,480	10,400	2,480	820	780	1,830	1,090	820	390
12	936	196	327	2,480	9,670	3,380	1,180	865	1,950	1,090	780	358
13	625	338	343	2,300	9,410	3,060	1,950	804	1,950	1,120	865	246
14	392	326	342	2,120	8,110	3,540	1,500	705	1,830	1,140	780	375
15	340	328	364	1,950	9,410	2,620	1,040	635	1,830	1,040	720	372
16	355	329	384	1,950	8,630	3,220	2,480	565	1,830	1,390	670	385
17	310	320	417	1,950	9,670	5,260	2,480	530	1,610	1,090	670	463
18	309	240	411	1,830	8,370	5,260	2,620	565	1,500	1,040	670	390
19	314	171	399	1,610	6,600	4,840	2,200	600	1,500	1,090	586	406
20	283	346	425	1,830	7,330	4,250	2,070	330	1,440	1,400	392	423
21	343	333	418	1,890	6,600	4,250	1,490	330	1,340	1,720	437	406
22	327	349	439	1,950	5,470	4,840	910	955	1,120	2,480	437	428
23	382	368	447	2,620	5,470	4,110	1,830	530	910	2,340	374	395
24	425	401	471	1,830	5,470	3,380	2,200	530	865	1,610	330	401
25	423	402	442	1,720	5,470	3,540	1,500	450	1,090	1,090	426	426
26	401	394	452	2,910	5,050	2,910	910	370	1,000	865	429	428
27	384	386	465	4,440	6,140	2,200	780	955	910	880	432	342
28	386	378	553	5,470	8,370	1,950	338	600	1,040	910	330	360
29	387	385	656	8,110	8,630	1,610	469	670	1,090	1,090	330	331
30	388	.....	675	5,690	7,850	1,610	600	670	1,140	1,000	330	361
31	384	.....	724	.....	7,850	.....	600	670	.....	1,000	.....	310

NOTE.—Daily discharge computed from a rating curve well defined between 530 and 10,400 second-feet (gage heights 0.4 and 6 feet). Discharge Jan. 1 to Mar. 30, and Dec. 1 to 31, estimated, because of ice, from kilowatt output at Great Northern Power plant plus water passing over dam. Table as published for this period furnished by Great Northern Power Co., of Duluth. Discharge interpolated for days when gage was not read.

Monthly discharge of St. Louis River near Thomson, Minn., for 1912.

[Drainage area, 3,420 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	1,330	283	493	0.144	0.17	
February	402	171	334	.098	.11	
March	724	327	433	.127	.15	
April	8,110	1,040	2,570	.751	.84	C.
May	13,200	5,050	8,240	2.41	2.78	B.
June	8,630	1,610	4,130	1.21	1.35	B.
July	2,620	338	1,400	.409	.47	B.
August	1,610	330	687	.201	.23	B.
September	1,950	670	1,230	.360	.40	B.
October	2,480	865	1,280	.374	.43	B.
November	1,000	330	644	.188	.21	C.
December	622	246	410	.120	.14	
The year	13,200	171	1,830	.535	7.28	

NOTE.—See footnotes to table of daily discharge.

WHITEFACE RIVER AT MEADOWLANDS, MINN.

Location.—At the highway bridge at Meadowlands, in sec. 14, T. 53 N., R. 19 W., half a mile below the nearest tributary, a small stream entering from the east.

Records available.—June 7, 1909, to December 31, 1912.

Drainage area.—442 square miles.

Gage.—Vertical staff; datum unchanged since establishment.

Channel.—Shifting at bridge, nearly permanent at control section.

Discharge measurements.—Made from highway bridge except during extremely low water, when wading measurements are made.

Regulation.—The flow is controlled to a large extent by logging dams above. The opening and shutting of the gates of these dams causes fluctuations in gage heights of several feet at the gaging station.

Accuracy.—Logs collect on the control section some 2 miles below the gage, causing a varying amount of backwater at the gage. Prior to 1912 the flow during such periods of the year has been computed from a number of rating curves, some of which have been applied indirectly. During 1912 the flow during periods of backwater has been computed, using gage height at a chain gage established below the rapids applied to a rating curve which has been developed for that point.

Discharge measurements of Whiteface River at Meadowlands, Minn., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*			*Feet.*	*Sec.-feet.*
Apr. 24	S. B. Soulé	4.24	163	Aug. 11[c]	S. B. Soulé	3.51	44
May 18[a]	do	7.10	966	11[d]	do	3.50	45
Aug. 11[b]	do	3.52	38				

[a] Lower gage 4.17.
[b] Lower gage 1.80. Current very sluggish.
[c] Lower gage 1.80.
[d] Lower gage 1.79.

Daily gage height, in feet, of Whiteface River at Meadowlands, Minn., for 1912.

[A. F. Johnson, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	6.0	6.2	4.2	3.5	3.8	4.2	3.5
2	.....	6.0	6.8	4.1	3.5	3.8	4.1	3.5
3	.....	8.7	6.6	4.0	3.4	3.8	4.1	3.5
4	.....	9.2	6.3	4.0	3.4	3.8	4.0	3.5
5	.....	9.3	6.0	4.0	3.4	3.8	4.0	3.5
6	.....	9.0	5.9	3.8	3.4	3.8	4.0	3.5
7	.....	9.1	5.8	3.7	3.4	3.8	3.9	3.5
8	.....	8.7	5.8	3.6	3.4	3.8	3.8	3.5
9	.....	7.9	5.6	3.6	3.4	3.8	3.8	3.5
10	4.7	7.2	5.5	3.6	3.5	3.8	3.8	.....
11	4.8	7.4	5.4	3.8	3.5	3.8	3.8	.....
12	4.7	7.9	5.3	3.8	3.5	3.8	3.8	.....
13	4.6	6.9	5.2	3.7	3.5	3.8	3.8	.....
14	5.0	7.8	5.6	3.8	3.5	3.7	3.75	.....
15	5.3	7.2	6.3	3.8	3.5	3.7	3.7	.....
16	4.85	7.8	7.1	3.8	3.45	3.7	3.6	.....
17	4.5	6.9	7.6	3.8	3.45	3.7	3.65	.....
18	4.4	6.8	7.7	3.8	3.4	3.7	3.65	.....
19	4.25	7.2	7.3	3.8	3.4	3.7	3.6	.....
20	4.3	6.9	7.0	3.8	3.4	3.7	3.6	.....
21	4.4	7.2	6.4	3.8	3.45	3.7	3.6	.....
22	4.3	7.7	6.0	3.8	3.45	3.7	3.6	.....
23	4.6	7.3	5.7	3.7	3.45	3.7	3.6	.....
24	4.25	7.3	5.5	3.6	3.5	3.7	3.6	.....
25	4.6	6.5	5.4	3.6	3.65	3.7	3.55	.....
26	5.2	6.5	5.2	3.6	3.8	3.8	3.55	.....
27	6.4	7.5	4.8	3.6	3.6	3.8	3.5	.....
28	7.0	7.6	4.6	3.6	3.65	4.1	3.5	.....
29	7.4	8.1	4.4	3.5	3.7	4.4	3.5	.....
30	7.0	7.5	4.2	3.5	3.8	4.3	3.5	.....
31	.....	6.5	.....	3.5	3.8	.....	3.5	.....

NOTE.—Relation of gage height to discharge affected by backwater from log jams about Apr. 27 to May 9, 11, 12, 14 to 17, and 19 to 31.

Daily discharge, in second-feet, of Whiteface River at Meadowlands, Minn., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	.....	660	151	50	90	151	50
2	.....	.....	870	135	50	90	135	50
3	.....	.....	800	120	40	90	135	50
4	.....	.....	695	120	40	90	120	50
5	.....	.....	590	120	40	90	120	50
6	.....	.....	560	90	40	90	120	50
7	.....	.....	530	76	40	90	105	50
8	.....	.....	530	62	40	90	90	50
9	.....	.....	470	62	40	90	90	50
10	247	1,020	440	62	50	90	90	.....
11	269	1,020	415	90	50	90	90	.....
12	247	1,020	390	90	50	90	90	.....
13	227	905	365	76	50	90	90	.....
14	315	.....	470	90	50	76	83	.....
15	390	.....	695	90	50	76	76	.....
16	280	.....	980	90	45	76	62	.....
17	207	.....	1,180	90	45	76	69	.....
18	187	870	1,220	90	40	76	69	.....
19	160	.....	1,060	90	40	76	62	.....
20	169	.....	940	90	40	76	62	.....
21	187	.....	730	90	45	76	62	.....
22	169	.....	590	90	45	76	62	.....
23	227	.....	500	76	45	76	62	.....
24	160	.....	440	62	50	76	62	.....
25	227	.....	415	62	69	76	56	.....
26	365	.....	365	62	90	90	56	.....
27	380	.....	269	62	62	90	50	.....
28	420	.....	227	62	69	135	50	.....
29	460	.....	187	50	76	187	50	.....
30	500	.....	151	50	90	169	50	.....
31	.....	.....	.....	50	90	.....	50	.....

NOTE.—Discharge Apr. 27 to May 9, May 11, 12, 14 to 17 and 19 to 31 estimated because of log jams from flow of Whiteface River below Meadowlands, Minn.
Mean discharge May 1 to 9 estimated 920 second-feet.
Mean discharge May 14 to 17 estimated 760 second-feet.
Mean discharge May 19 to 31 estimated 820 second-feet.
Backwater from ice probably began about Nov. 18.

Monthly discharge of Whiteface River at Meadowlands, Minn., for 1912.

[Drainage area, 442 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
April 10–30	[a] 500	160	276	0.624	0.49	B.
May	.....	.....	865	1.96	2.26	B.
June	1,220	151	591	1.34	1.50	A.
July	151	50	83.9	.190	.22	B.
August	90	40	52.3	.118	.14	C.
September	187	76	91.8	.208	.23	B.
October	151	50	81.3	.184	.21	B.
November 1–9	50	50	50	.113	.04	C.

[a] Estimated.

NOTE.—See footnotes to tables of daily gage height and daily discharge.

WHITEFACE RIVER BELOW MEADOWLANDS, MINN.

Location.—About 2½ miles below the gaging station on Whiteface River at Meadowlands, half a mile below the beginning of decided rapids and about 10 miles above the confluence of Whiteface and St. Louis rivers.

Records available.—April 28 to November 18, 1912.

Drainage area.—446 square miles.

Channel.—Heavy gravel and rocks; probably permanent.

Discharge measurements.—Made by wading and from the highway bridge in sec. 14, T. 83 N., R. 19 W., at which is located the gage of the station on Whiteface River at Meadowlands.

Regulation.—The flow is controlled to a large extent by logging dams above. The operation of these gates causes fluctuation in gage heights of several feet at the gage section.

Accuracy.—The channel is permanent and few logs lodge below the section, so that backwater is seldom present except from ice. Measurements made during 1913 show that the 1912 curve is reliable. The records should therefore be good.

Daily gage height, in feet, of Whiteface River below Meadowlands, Minn., for 1912.

[A. A. Jochim, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	3.65	4.05	2.5	1.75	2.2	2.6	1.81
2	.....	3.25	4.4	2.45	1.71	2.25	2.55	1.74
3	.....	3.45	4.3	2.4	1.69	2.2	2.45	1.72
4	.....	4.5	4.1	2.35	1.65	2.2	2.4	1.82
5	.....	5.1	4.0	2.3	1.65	2.15	2.35	1.72
6	.....	5.2	4.0	2.25	1.72	2.3	2.3	1.80
7	.....	5.2	3.9	2.2	1.75	2.5	2.2	1.80
8	.....	5.2	3.75	2.2	1.70	2.55	2.25	1.80
9	.....	5.0	3.4	2.2	1.74	2.55	2.15	1.80
10	.....	4.8	3.45	2.1	1.81	2.45	2.1	1.80
11	.....	4.8	3.35	2.0	1.81	2.3	2.1	1.80
12	.....	4.8	3.35	2.05	1.79	2.2	2.05	1.81
13	.....	4.6	3.3	2.15	1.78	2.2	2.1	1.81
14	.....	4.3	3.35	2.35	1.72	2.1	2.05	1.78
15	.....	4.4	3.6	2.4	1.71	2.1	2.05	1.66
16	.....	4.7	5.0	2.4	1.71	2.1	2.0	1.72
17	.....	3.75	5.2	2.4	1.81	2.05	2.0	1.70
18	.....	4.7	5.1	2.3	1.79	2.05	2.1	1.71
19	.....	4.4	5.0	2.2	1.79	2.05	1.98	.....
20	.....	4.3	4.7	2.1	1.80	1.96	1.98	.....
21	.....	4.0	4.3	2.0	1.76	2.05	1.95	.....
22	.....	4.1	4.0	1.94	1.70	2.05	1.92	.....
23	.....	4.2	3.7	1.98	1.71	2.0	1.89	.....
24	.....	4.1	3.45	2.0	1.71	1.96	1.89	.....
25	.....	3.95	3.25	1.96	1.70	2.05	1.85	.....
26	.....	3.35	3.15	1.91	1.72	2.1	1.84	.....
27	.....	4.8	2.9	1.84	1.78	2.2	1.82	.....
28	3.2	5.4	2.8	1.82	1.81	2.35	1.82	.....
29	3.45	5.1	2.6	1.88	1.85	2.5	1.82	.....
30	3.6	4.8	2.5	1.76	2.0	2.6	1.82	.....
31	.....	4.4	.....	1.68	2.1	.....	1.82	.....

Daily discharge, in second-feet, of Whiteface River below Meadowlands, Minn., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	489	620	142	42	86	166	46
2	.....	356	802	131	40	94	154	42
3	.....	421	752	120	40	86	131	41
4	.....	854	662	111	38	86	120	46
5	.....	1,200	620	102	38	79	111	41
6	.....	1,260	620	94	41	102	102	45
7	.....	1,260	580	86	42	142	86	45
8	.....	1,260	524	86	40	154	94	45
9	.....	1,140	404	86	42	154	79	45
10	.....	1,020	421	72	46	131	72	45
11	.....	1,020	388	60	46	102	72	45
12	.....	1,020	388	66	44	86	66	46
13	.....	906	372	79	44	86	72	46
14	.....	752	388	111	41	72	66	44
15	.....	802	472	120	40	72	66	38
16	.....	960	1,140	120	40	72	60	41
17	.....	524	1,260	120	46	66	60	41
18	.....	960	1,200	102	44	66	72	40
19	.....	802	1,140	86	44	66	58	.....
20	.....	752	960	72	45	56	58	.....
21	.....	620	752	60	43	66	56	.....
22	.....	662	620	55	40	66	53	.....
23	.....	706	506	58	40	60	50	.....
24	.....	662	421	60	40	56	50	.....
25	.....	600	356	56	40	66	48	.....
26	.....	388	325	52	41	72	47	.....
27	.....	1,020	250	47	44	86	46	.....
28	340	1,390	220	46	46	111	46	.....
29	421	1,200	166	50	48	142	46	.....
30	472	1,020	142	43	60	166	46	.....
31	.....	802	.....	39	72	.....	46	.....

NOTE.—Daily discharge computed from a fairly well defined rating curve which was determined from a gage height comparison with gage at Meadowlands in conjunction with discharge measurements made May 18 and Aug. 11, 1912.

Monthly discharge of Whiteface River below Meadowlands, Minn., for 1912.

[Drainage area, 446 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
May	1,390	356	865	1.94	2.24	A.
June	1,260	142	582	1.30	1.45	B.
July	142	39	81.7	.183	.21	B.
August	72	38	43.8	.098	.11	B.
September	166	56	91.6	.205	.23	B.
October	166	46	74.2	.16	.19	B.
November 1–18	46	38	43.4	.097	.06	B.

CLOQUET RIVER AT INDEPENDENCE, MINN.

Location.—At the highway bridge at Independence post office in sec. 26, T. 52 N., R. 17 W., just below a small tributary entering from the north.

Records available.—June 28, 1909, to December 31, 1912.

Drainage area.—698 square miles.

Gage.—Vertical staff; datum unchanged since establishment.

Channel.—Practically permanent except when affected by log jams.

Discharge measurements.—Made from bridge.

Winter flow.—Affected by ice. See footnote to table of daily discharge.

Artificial control.—Cloquet River is used extensively for log driving, and the run-off from by far the greater part of the drainage area above Independence is controlled by logging dams. This control causes violent fluctuations in the gage heights during the day, amounting at times to several feet, and consequently the mean daily gage height which is the mean of three readings taken morning, noon, and night, can be considered only approximate. The chief purpose of the records is to show the approximate mean monthly discharge and total discharge.

Accuracy.—The wing dam of logs which was placed in the river below the gage in 1911 was removed June 5, 1912. Measurements made after June 5, 1912, indicate that conditions have changed slightly from what they were before the dam was installed. The winter records are very good. For open-water accuracy see note under "artificial control."

Cooperation.—Records of flow from the logging reservoirs were furnished by the Great Northern Power Co. of Duluth for the periods January 1–March 31, and December 1–31, 1912.

Discharge measurements of Cloquet River at Independence, Minn., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-feet.*
Jan. 14[a]	S. B. Soulé	6.17	87.8
Feb. 24[b]	do	7.03	180
Mar. 29[c]	do	7.42	267
May 18	do	6.55	946
Aug. 10[d]	do	4.84	264
Sept. 29[e]	do	3.96	71.1
29[f]	do	3.96	62.0

[a] Complete ice cover. Average thickness of ice 1.95 feet. Average distance water surface to top of ice, 0.28 feet.
[b] Complete ice cover. Average thickness of ice 3.08 feet. Average distance water surface to top of ice, 0.31 feet.
[c] Complete ice cover. Average thickness of ice 3.09 feet. Average distance water surface to top of ice, 0.16 feet.
[d] Wing dam of logs has been removed.
[e] Wading, 1,100 feet above gage.
[f] Wading, 1,300 feet above gage.

Daily gage height, in feet, of Cloquet River at Independence, Minn., for 1912.

[Herbert Haakensen, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	4.75	.....	.....	7.1	5.3	7.4	4.85	3.86	4.6	4.1	4.8
2	.....	.....	.....	.....	7.3	7.9	4.55	4.45	4.5	4.55	4.65
3	.....	.....	.....	.....	6.7	8.3	5.9	5.1	4.45	4.8	4.7
4	6.2	.....	7.25	7.1	5.85	8.2	6.2	5.2	4.5	5.0	4.7
5	.....	.....	.....	.....	7.3	7.6	4.85	5.1	4.45	5.05	4.7
6	.....	.....	.....	.....	8.2	7.3	4.65	5.0	4.4	5.15	4.7
7	.....	.....	7.15	.....	7.3	7.2	5.7	5.25	4.5	5.2	4.8
8	5.3	.....	.....	7.0	8.0	6.3	5.05	5.15	4.6	5.0	4.8
9	.....	.....	.....	.....	7.8	5.25	4.75	5.3	4.65	4.95	4.75
10	.....	.....	.....	.....	7.6	4.6	5.3	4.85	4.7	4.9	4.55
11	5.35	.....	7.2	5.55	7.2	6.7	6.5	4.75	4.95	4.85	4.35
12	.....	.....	.....	.....	7.5	6.5	6.1	4.7	4.95	4.8	4.45
13	.....	.....	.....	.....	6.4	6.9	4.75	4.65	5.0	4.75	4.3
14	6.2	.....	7.4	4.3	7.2	5.25	5.85	4.7	4.9	4.7	4.2
15	5.8	.....	.....	4.3	7.5	4.65	7.6	4.45	4.75	4.7	4.15
16	.....	.....	.....	4.3	7.9	4.6	7.8	4.65	4.65	4.6	3.91
17	.....	.....	.....	4.2	8.3	4.65	7.7	4.85	4.85	4.7	4.1
18	6.1	.....	7.45	4.3	6.6	4.6	6.8	4.8	4.8	4.65	4.0
19	.....	.....	.....	4.7	7.0	4.5	6.6	4.55	4.65	4.6	4.15
20	.....	.....	.....	4.7	7.2	5.1	4.75	4.6	4.8	6.15	4.1
21	.....	.....	7.5	6.2	5.25	5.7	4.3	4.4	4.75	6.7	4.05
22	6.4	.....	.....	6.0	5.7	6.1	7.2	4.3	4.7	6.6	4.65
23	.....	.....	.....	4.95	5.9	5.6	6.2	4.3	4.7	6.4	4.6
24	.....	7.0	.....	4.85	5.7	6.0	5.7	4.15	4.7	6.0	4.75
25	6.5	.....	7.4	6.1	6.8	5.7	5.2	4.1	4.8	6.0	5.0
26	.....	7.15	.....	6.2	7.6	5.2	4.6	4.05	4.8	5.9	4.95
27	.....	.....	.....	6.0	6.3	4.7	4.35	4.0	4.9	5.5	5.0
28	.....	.....	7.45	6.8	7.3	4.8	4.05	4.0	4.9	5.45	5.0
29	.....	7.25	7.4	6.2	7.1	5.25	3.89	4.45	4.35	5.1	5.0
30	.....	.....	.....	7.0	8.3	4.8	3.84	4.45	4.05	4.9	5.0
31	.....	.....	.....	.....	8.3	.....	3.80	4.55	.....	4.8	.....

NOTE.—Relation of gage height to discharge affected by ice Jan. 1 to Apr. 13, and Nov. 22 to Dec. 31.

Daily discharge, in second-feet, of Cloquet River at Independence, Minn., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	.....	317	1,530	274	60	193	85	257
2	.....	1,450	1,930	179	152	165	179	208
3	.....	1,000	2,250	845	370	152	257	224
4	.....	524	2,170	1,080	415	165	330	224
5	.....	1,450	1,690	274	370	152	350	224
6	.....	2,170	2,390	208	330	140	392	224
7	.....	1,450	2,250	700	440	165	415	257
8	.....	2,010	1,180	350	392	193	330	257
9	.....	1,850	440	240	465	208	311	240
10	.....	1,690	193	465	274	224	292	179
11	.....	1,370	1,600	1,370	240	311	274	129
12	.....	1,610	1,370	1,000	224	311	257	152
13	.....	800	1,850	240	208	330	240	118
14	90	1,370	440	808	224	292	224	100
15	90	1,610	208	2,820	152	240	224	92
16	90	1,930	193	3,120	208	208	193	64
17	78	2,250	208	2,970	274	274	224	85
18	90	930	193	1,720	257	257	208	73
19	158	1,220	165	1,480	179	208	193	92
20	158	1,370	370	240	193	257	1,040	85
21	685	302	700	118	140	240	1,600	79
22	590	461	1,000	2,250	118	224	1,480	.....
23	217	545	635	1,080	118	224	1,270	.....
24	192	461	920	700	92	224	920	.....
25	635	1,070	700	415	85	257	920	.....
26	685	1,690	415	193	79	257	845	.....
27	590	740	224	129	73	292	575	.....
28	1,070	1,450	257	79	73	292	548	.....
29	685	1,300	440	62	152	129	370	.....
30	1,220	2,250	257	58	152	79	292	.....
31	.....	2,250	.....	55	179	.....	257	.....

NOTE.—Daily discharge computed from two rating tables well defined between 60 and 2,000 second-feet. On June 5, 1912, the wing dam below the bridge was entirely removed. One rating table applies prior to this date, and the other subsequent to it.

Discharge Jan. 1 to Apr. 13 and Nov. 22 to Dec. 31 estimated, because of ice, from discharge measurements and records of daily flow (Jan 1 to Mar 31 and Dec. 1 to 31), at outlet of Fish Lake reservoir, sec. 29, T. 52 N., R. 15 W., and Island Lake reservoir, sec. 15, T. 52 N., R. 15 W., furnished by Great Northern Power Co.

Mean discharge Jan. 1 to 6 estimated 200 second-feet, varying from about 126 to 260 second-feet.
Mean discharge Jan. 7 to 15 estimated 90 second-feet, varying from about 85 to 95 second-feet.
Mean discharge Jan. 16 to Feb. 2 estimated 155 second-feet, varying from about 135 to 200 second-feet.
Mean discharge Feb. 3 to 15 estimated 100 second-feet, varying from about 85 to 125 second-feet.
Mean discharge Feb. 16 to 27 estimated 170 second-feet, varying from about 140 to 200 second-feet.
Mean discharge Mar. 1 to 31 estimated 190 second-feet.
Mean discharge Apr. 1 to 13 estimated 170 second-feet, varying from about 90 to 250 second-feet.
Mean discharge Nov. 22 to 30 estimated 92 second-feet, varying from about 90 to 95 second-feet.
Mean discharge Dec. 1 to 31, estimated 130 second-feet.

Monthly discharge of Cloquet River at Independence, Minn., for 1912.

[Drainage area, 698 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	.....	.....	150	0.215	0.25	D.
February	.....	.....	140	.201	.22	D.
March	.....	.....	190	.272	.31	C.
April	.....	.....	318	.456	.51	C.
May	2,250	302	1,320	1.89	2.18	A.
June	2,390	165	939	1.35	1.51	B.
July	3,120	55	823	1.18	1.36	B.
August	465	60	216	.309	.36	A.
September	330	79	222	.318	.35	A.
October	1,600	85	487	.698	.80	B.
November	257	64	140	.201	.22	C.
December	.....	.....	130	.186	.21	D.
The year	3,120	55	425	.609	8.28	

NOTE.—See footnotes to tables of daily gage height and daily discharge.

STREAMS TRIBUTARY TO LAKE MICHIGAN.

ESCANABA RIVER NEAR ESCANABA, MICH.

Location.—At highway bridge between Escanaba and Gladstone, Mich., about 9 miles north of Escanaba and 4 miles above mouth of river, T. 40 N., R. 23 W., at quarter-section corner between secs. 24 and 25.

Records available.—August 25, 1903, to March 31, 1909; June 1, 1909, to December 31, 1912. Discharge measurements only April, May, and July, 1903.

Drainage area.—800 square miles.

Gage.—Standard chain, attached to bridge; new gage installed November 15, 1910.

Channel.—Probably permanent.

Discharge measurements.—Made from downstream side of bridge.

Winter flow.—Affected by ice which exists some years for nearly 4 months.

Accuracy.—Relation between gage height and discharge, during the logging season, affected by backwater from log jams. All gage readings for 1912 are correct, provided the new chain (installed Nov. 15, 1910) has not stretched, and provided, also, that the structure to which the gage is attached has not changed since July 16, 1908.

Daily gage height, in feet, of Escanaba River near Escanaba, Mich., for 1912.

[Miss Olive Beauchamp, observer.]

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

NOTE.—Relation of gage height to discharge affected by ice Jan. 1 to Mar. 31, and Nov. 30 to Dec. 31. The ice went out sometime between Apr. 1 and 5.

Daily discharge, in second-feet, of Escanaba River near Escanaba, Mich., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	2,530	2,860	1,810	350	410	1,180	550	790
2	2,860	2,530	1,420	300	350	1,300	630	790
3	3,400	2,380	1,420	410	350	1,300	630	710
4	4,650	2,380	1,300	410	350	1,180	710	710
5	5,120	3,030	1,180	350	300	970	710	790
6	5,360	3,400	1,180	350	350	880	630	710
7	5,440	4,000	1,070	410	480	710	630	710
8	5,530	3,790	970	630	710	710	550	710
9	5,610	3,790	970	630	1,070	880	550	790
10	3,210	2,860	880	550	1,420	970	630	710
11	2,530	2,860	790	630	2,090	970	630	790
12	2,860	2,380	1,070	550	2,230	1,070	710	790
13	3,400	2,380	1,680	480	1,950	970	1,950	790
14	2,860	1,950	1,680	410	1,810	1,070	1,950	790
15	3,590	1,680	1,550	410	1,420	880	1,810	710
16	5,120	1,420	1,420	410	970	880	1,550	710
17	3,790	1,420	1,550	350	1,070	880	1,300	710
18	3,400	1,420	1,420	350	970	880	1,070	710
19	3,030	1,300	1,180	300	1,070	880	970	630
20	2,860	1,300	1,070	300	710	970	880	630
21	3,210	1,420	970	300	710	970	880	630
22	3,400	1,550	880	350	710	970	1,070	710
23	4,000	2,380	710	300	710	1,070	1,300	710
24	4,430	3,210	710	410	710	1,180	1,180	630
25	4,430	2,860	630	410	710	1,300	1,300	710
26	4,000	2,530	550	410	710	1,420	1,070	710
27	4,210	2,230	480	480	710	1,180	1,070	710
28	3,790	2,530	410	350	710	1,180	970	630
29	3,590	3,030	410	350	710	1,070	970	790
30	3,210	2,530	350	410	710	1,070	880	900
31	.....	2,530	.....	410	710	.....	880	.....

NOTE.—Daily discharge determined from a rating curve well defined about 300 second-feet. Discharge Apr. 1 to 5 may be somewhat high because of ice effect. Discharge Nov. 30 estimated by comparison with Menominee River.

Monthly discharge of Escanaba River near Escanaba, Mich., for 1912.

[Drainage area, 800 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	.....	.....	900	1.12	1.29	D.
February	.....	.....	850	1.06	1.14	D.
March	.....	.....	830	1.04	1.20	D.
April	5,610	2,530	3,850	4.81	5.37	B.
May	4,000	1,300	2,450	3.06	3.53	B.
June	1,810	350	1,060	1.32	1.47	B.
July	630	300	412	.515	.59	B.
August	2,230	300	900	1.12	1.29	B.
September	1,420	710	1,030	1.29	1.44	B.
October	1,950	550	987	1.23	1.42	B.
November	900	630	727	.909	1.01	B.
December	.....	.....	650	.812	.94	D.
The year	5,610	300	1,220	1.52	20.69	

NOTE.—Discharge Jan. 1 to Mar. 31 and Nov. 30 to Dec. 31 estimated by comparison with the record of flow of Menominee River.

MENOMINEE RIVER NEAR IRON MOUNTAIN, MICH.

Location.—At the Homestead highway bridge, 3½ miles south of Iron Mountain, Mich.

Records available.—September 4, 1902, to March 31, 1909; June 5, 1909, to December 31, 1912.

Drainage area.—2,420 square miles.

Gage.—Standard chain, attached to the bridge May 18, 1904; the original gage was a staff on the right abutment of the bridge.

Channel.—Probably permanent.

Artificial control.—The flow of the river is to a certain extent controlled by logging dams.

Winter flow.—It is reported under good authority that owing to the presence of a stream of water from the Iron Mountain mines flowing into the river a short distance above the gage, and to the fact that there are heavy rapids below the gage, ice seldom causes backwater at the gage.

Accuracy.—Records will have to be used with caution, as no discharge measurements have been made since 1910 and backwater may be caused by ice and logs during certain portions of the year.

Cooperation.—Gage checked with level and information regarding ice furnished by H. G. Roby, resident engineer, Peninsular Power Co., of Madison, Wis.

Daily gage height, in feet, of Menominee River near Iron Mountain, Mich., for 1912.

[A. J. St. Arnauld, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.3	3.6	3.2	3.4	7.0	6.0	2.7	2.2	5.0	2.2	2.2	2.0
2	3.3	3.2	3.2	3.5	6.0	6.0	2.2	2.1	5.0	2.3	2.2	2.6
3	3.3	3.6	3.2	3.5	7.1	5.8	1.9	2.1	4.8	2.2	2.2	2.6
4	3.3	3.6	3.0	3.5	8.0	5.8	1.9	2.1	4.8	2.2	2.2	2.6
5	3.3	3.1	2.8	4.7	8.5	5.4	1.9	2.0	4.6	2.2	2.2	3.0
6	3.3	3.1	2.8	5.9	9.7	5.2	2.2	2.0	4.4	2.2	2.2	3.6
7	4.8	3.0	2.8	7.4	10.9	5.0	2.2	2.5	4.0	2.3	2.2	3.8
8	4.8	3.5	2.8	8.3	11.0	4.2	2.1	3.3	3.8	2.0	2.2	3.2
9	4.6	3.5	2.8	8.0	10.6	4.2	2.1	3.6	3.6	1.9	2.2	2.8
10	4.4	3.5	3.2	7.5	10.0	3.8	2.3	4.2	3.6	2.0	2.2	2.6
11	4.0	3.3	3.1	6.5	9.0	3.6	2.3	8.1	4.0	2.0	2.3	2.6
12	3.6	3.0	2.9	6.7	9.0	3.8	2.2	7.9	4.0	2.8	2.3	2.4
13	3.3	3.0	2.9	7.2	8.7	3.8	1.9	7.3	3.9	5.4	2.3	2.3
14	3.0	3.0	2.9	6.7	8.4	4.0	1.8	6.1	3.6	5.1	2.2	2.3
15	3.0	3.0	3.1	5.5	8.2	4.0	1.8	5.4	3.4	5.0	2.2	2.3
16	3.0	3.3	3.1	7.7	7.7	4.6	1.6	5.0	3.2	4.5	2.1	2.3
17	3.0	3.6	3.2	5.5	6.3	4.4	1.7	5.0	3.1	4.0	2.0	2.3
18	3.0	3.3	3.2	5.5	5.8	4.2	1.6	5.0	3.0	3.6	1.8	2.3
19	3.0	3.3	3.3	5.4	5.6	4.0	1.6	5.0	2.9	3.1	1.8	2.3
20	3.0	3.6	3.3	5.0	4.8	4.0	1.6	5.0	3.0	3.1	1.6	2.3
21	2.9	3.3	3.3	7.5	4.6	3.7	1.6	5.0	3.1	2.9	1.7	2.3
22	2.7	3.3	3.3	7.2	6.4	3.7	1.6	5.0	3.1	2.9	1.6	2.3
23	2.5	3.3	3.3	7.6	7.2	3.6	1.6	5.1	3.1	2.9	1.6	2.3
24	4.0	3.3	3.3	8.0	7.7	2.9	2.0	5.0	3.1	2.6	1.6	2.2
25	4.0	3.3	3.3	8.3	7.2	2.7	2.1	4.7	3.0	2.6	1.6	2.3
26	4.0	3.3	3.3	8.7	7.0	2.6	2.0	4.4	2.9	2.6	1.7	2.3
27	4.0	3.2	3.4	9.0	6.7	2.5	1.9	4.5	2.7	2.6	1.7	2.5
28	4.0	3.2	3.6	9.0	7.1	2.5	1.9	4.7	2.7	2.4	1.7	2.2
29	3.6	3.2	3.9	9.0	7.1	2.5	2.1	4.7	2.7	2.2	1.7	2.0
30	3.1	.....	3.9	7.0	6.8	2.5	2.2	4.9	2.6	2.2	1.9	2.0
31	3.0	.....	3.8	.....	6.8	.....	2.3	5.1	.....	2.2	.....	2.0

NOTE.—Apparently no backwater from ice during 1912.

Daily discharge, in second-feet, of Menominee River near Iron Mountain, Mich., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,440	2,660	2,360	2,510	5,660	4,680	2,010	1,680	3,750	1,680	1,680	1,560
2	2,440	2,360	2,360	2,580	4,680	4,680	1,680	1,620	3,750	1,750	1,680	1,940
3	2,440	2,660	2,360	2,580	5,760	4,490	1,500	1,620	3,580	1,680	1,680	1,940
4	2,440	2,660	2,220	2,580	6,740	4,490	1,500	1,620	3,580	1,680	1,680	1,940
5	2,440	2,290	2,080	3,500	7,220	4,110	1,500	1,560	3,420	1,680	1,680	2,220
6	2,440	2,290	2,080	4,580	8,710	3,930	1,680	1,560	3,260	1,680	1,680	2,660
7	3,580	2,220	2,080	6,080	10,200	3,750	1,680	1,880	2,960	1,750	1,680	2,810
8	3,580	2,580	2,080	7,080	10,300	3,110	1,620	2,440	2,810	1,560	1,680	2,360
9	3,420	2,580	2,080	6,740	9,800	3,110	1,620	2,660	2,660	1,500	1,680	2,080
10	3,260	2,580	2,360	6,180	9,070	2,810	1,750	3,110	2,660	1,560	1,680	1,940
11	2,960	2,440	2,290	5,160	7,890	2,660	1,750	6,860	2,960	1,560	1,750	1,940
12	2,660	2,220	2,150	5,360	7,890	2,810	1,680	6,640	2,960	2,080	1,750	1,820
13	2,440	2,220	2,150	5,860	7,440	2,810	1,500	5,970	2,880	4,110	1,750	1,750
14	2,220	2,220	2,150	5,360	7,100	2,960	1,440	4,780	2,660	3,840	1,680	1,750
15	2,220	2,220	2,290	4,200	6,970	2,960	1,440	4,110	2,510	3,750	1,680	1,750
16	2,220	2,440	2,290	6,400	6,400	3,420	1,340	3,750	2,360	3,340	1,620	1,750
17	2,220	2,660	2,360	4,200	4,960	3,260	1,390	3,750	2,290	2,960	1,560	1,750
18	2,220	2,440	2,360	4,200	4,490	3,110	1,340	3,750	2,220	2,660	1,440	1,750
19	2,220	2,440	2,440	4,110	4,300	2,960	1,340	3,750	2,150	2,290	1,440	1,750
20	2,220	2,660	2,440	3,750	3,580	2,960	1,340	3,750	2,220	2,290	1,340	1,750
21	2,150	2,440	2,440	6,180	3,420	2,740	1,340	3,750	2,290	2,150	1,390	1,750
22	2,010	2,440	2,440	5,860	5,060	2,740	1,340	3,750	2,290	2,150	1,340	1,750
23	1,880	2,440	2,440	6,300	5,860	2,660	1,340	3,840	2,290	2,150	1,340	1,750
24	2,960	2,440	2,440	6,740	6,400	2,150	1,560	3,750	2,290	1,940	1,340	1,680
25	2,960	2,440	2,440	7,080	5,860	2,010	1,620	3,500	2,220	1,940	1,340	1,750
26	2,960	2,440	2,440	7,440	5,660	1,940	1,560	3,260	2,150	1,940	1,390	1,750
27	2,960	2,360	2,510	7,890	5,360	1,880	1,500	3,340	2,010	1,940	1,390	1,880
28	2,960	2,360	2,660	7,890	5,760	1,880	1,500	3,500	2,010	1,820	1,390	1,680
29	2,660	2,360	2,880	7,890	5,760	1,880	1,620	3,500	2,010	1,680	1,390	1,560
30	2,290	.....	2,880	5,660	5,460	1,880	1,680	3,660	1,940	1,680	1,500	1,560
31	2,220	.....	2,810	.....	5,460	.....	1,750	3,840	.....	1,680	.....	1,560

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Menominee River near Iron Mountain, Mich., for 1912.

[Drainage area, 2,420 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	3,580	1,880	2,580	1.07	1.23	C.
February	2,660	2,220	2,430	1.00	1.08	C.
March	2,880	2,080	2,370	.979	1.13	C.
April	7,890	2,510	5,400	2.23	2.49	B.
May	10,300	3,420	6,430	2.66	3.07	B.
June	4,680	1,880	3,030	1.25	1.40	B.
July	2,010	1,340	1,550	.640	.74	B.
August	6,860	1,560	3,440	1.42	1.64	B.
September	3,750	1,940	2,640	1.09	1.22	B.
October	4,110	1,500	2,140	.884	1.02	B.
November	1,750	1,340	1,550	.640	.71	B.
December	2,810	1,560	1,870	.773	.89	B.
The year	10,300	1,340	2,950	1.22	16.62	

WOLF RIVER AT KESHENA, WIS.

Location.—At the highway bridge at Keshena, 3 miles below the outlet of the West Branch of Wolf River, which enters from the right.

Records available.—May 9, 1907, to March 31, 1909; February 10, 1911, to December 31, 1912.[1]

Drainage area.—797 square miles.

[1] See also Water powers of Wisconsin: Bull Wisconsin Geol. and Nat. Hist. Survey No. 20, 1908, pp. 100–102.

Gage.—A vertical staff gage has been maintained at the same datum since installation. The gage was read twice daily up to October 1, 1911. Since that date mean of three readings (morning, noon, and evening) taken as mean for day.

Channel.—Gravel; smooth and practically permanent.

Discharge measurements.—Made from the bridge.

Artificial control.—The river and main tributaries above Keshena are controlled to some extent by logging dams.

Winter flow.—During the winter solid ice forming in the vicinity of the gage causes 1 to 3 feet of backwater. At times during the winter slush and frazil ice collect under this ice cover, making it impossible to make discharge measurements. The ice forms at the falls above Keshena and floats in the river as far as backwater from the dam at Shawano.

Accuracy.—During open-water season the accuracy depends upon the accuracy with which the mean gage height is determined. Conditions favor the accurate determination of discharge.

Discharge measurements of Wolf River at Keshena, Wis., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 13[a]	S. B. Soulé	3.96	342
Oct. 29	do	2.25	889
31	do	2.20	870

[a] Complete ice cover. Average thickness of ice, 2.4 feet.

Daily gage height, in feet, of Wolf River at Keshena, Wis., for 1912.

[R. and N. Gauthier, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.4	4.1	2.6	2.4	3.0	3.4	1.4	2.2	5.7	2.2	2.4	2.0
2	5.5	4.0	2.6	2.6	3.0	3.3	1.6	2.0	6.7	2.0	2.3	2.8
3	5.6	4.1	2.5	2.6	3.0	3.2	1.6	2.0	5.6	2.2	2.1	2.9
4	5.7	4.2	2.4	2.7	3.1	3.0	1.9	1.8	5.0	2.3	2.0	2.8
5	4.7	4.3	2.4	2.8	3.7	3.0	2.1	1.8	4.6	2.4	2.0	2.8
6	4.7	4.2	2.3	2.9	4.0	2.8	1.8	1.7	4.2	2.2	2.0	2.8
7	4.8	4.0	2.2	3.0	3.8	2.7	1.9	2.0	4.0	2.2	2.0	2.7
8	5.2	3.9	2.2	3.2	3.5	2.6	2.0	2.4	3.6	2.4	2.0	2.7
9	5.4	3.6	2.3	3.4	3.4	2.4	2.1	3.1	3.5	2.4	2.2	2.6
10	5.5	3.7	2.2	3.2	3.2	2.4	2.0	3.9	3.3	2.3	2.2	3.0
11	5.4	3.6	2.1	3.2	3.0	2.4	2.1	4.6	3.5	2.4	2.1	2.8
12	5.4	3.7	2.0	3.2	3.1	2.3	2.0	4.2	3.2	2.5	2.2	2.6
13	5.3	3.6	1.9	3.1	3.2	2.4	2.0	4.3	3.1	2.8	2.2	3.0
14	5.2	3.6	1.6	3.2	3.2	2.3	2.0	4.0	2.8	2.8	2.5	3.8
15	4.7	3.6	1.5	3.3	3.1	2.3	2.1	3.8	2.8	2.8	2.3	4.5
16	4.7	3.6	1.6	3.3	3.1	2.3	2.0	3.4	2.8	2.4	2.3	4.5
17	4.5	3.5	1.7	3.2	3.2	2.2	2.1	3.5	3.2	2.4	2.2	4.5
18	4.5	3.4	1.7	3.0	3.0	2.0	2.0	3.6	3.1	2.3	2.3	4.4
19	4.4	3.4	1.7	2.8	2.9	2.0	1.8	3.6	2.9	2.5	2.2	4.3
20	4.5	3.5	1.6	2.8	2.9	2.0	1.6	3.5	2.7	2.2	2.2	4.4
21	4.6	3.6	1.5	2.8	2.8	1.8	1.6	3.2	2.7	2.3	2.2	4.5
22	4.5	3.5	1.4	3.4	2.8	1.6	1.6	2.8	2.6	2.5	2.2	4.4
23	4.4	3.4	1.5	3.6	2.8	1.6	1.7	2.8	2.6	2.5	2.1	4.7
24	4.3	3.3	1.6	3.5	2.9	1.5	5.7	2.6	2.6	2.2	2.3	5.1
25	4.3	3.2	1.7	3.4	2.8	1.5	5.2	2.7	2.8	2.3	2.1	5.4
26	4.3	3.2	1.8	3.3	2.8	1.6	4.7	2.5	2.7	2.2	2.0	5.5
27	4.2	3.0	1.8	3.4	3.0	1.6	4.2	2.4	2.7	2.3	1.9	5.4
28	4.4	2.8	1.8	3.3	3.3	1.4	3.4	2.5	2.7	2.2	2.0	5.5
29	4.3	2.8	1.9	3.2	3.4	1.4	2.9	2.8	2.8	2.4	2.0	5.4
30	4.2	.....	1.7	3.1	3.4	1.4	2.5	2.4	2.7	2.4	1.9	5.4
31	4.2	.....	2.1	.....	3.5	.....	2.3	2.3	.....	2.4	.....	5.3

NOTE.—Relation of gage height to discharge affected by ice Jan. 1 to about Mar. 30 and about Dec. 10 to 31.

Daily discharge, in second-feet, of Wolf River at Keshena, Wis., for 1912.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	962	1,280	1,530	536	869	3,140	869	962	780
2	1,060	1,280	1,460	614	780	3,910	780	915	1,170
3	1,060	1,280	1,400	614	780	3,060	869	824	1,220
4	1,110	1,340	1,280	737	695	2,620	915	780	1,170
5	1,170	1,720	1,280	824	695	2,330	962	780	1,170
6	1,220	1,920	1,170	695	654	2,060	869	780	1,170
7	1,280	1,790	1,110	737	780	1,920	869	780	1,110
8	1,400	1,590	1,060	780	962	1,660	962	780	1,110
9	1,530	1,530	962	824	1,340	1,590	962	869	1,060
10	1,400	1,400	962	780	1,850	1,460	915	869	.....
11	1,400	1,280	962	824	2,330	1,590	962	824	.....
12	1,400	1,340	915	780	2,060	1,400	1,010	869	.....
13	1,340	1,400	962	780	2,120	1,340	1,170	869	.....
14	1,400	1,400	915	780	1,920	1,170	1,170	1,010	.....
15	1,460	1,340	915	824	1,790	1,170	1,170	915	.....
16	1,460	1,340	915	780	1,530	1,170	962	915	.....
17	1,400	1,400	869	824	1,590	1,400	962	869	.....
18	1,280	1,280	780	780	1,660	1,340	915	915	.....
19	1,170	1,220	780	695	1,660	1,220	1,010	869	.....
20	1,170	1,220	780	614	1,590	1,110	869	869	.....
21	1,170	1,170	695	614	1,400	1,110	915	869	.....
22	1,530	1,170	614	614	1,170	1,060	1,010	869	.....
23	1,660	1,170	614	654	1,170	1,060	1,010	824	.....
24	1,590	1,220	575	3,140	1,060	1,060	869	915	.....
25	1,530	1,170	575	2,770	1,110	1,170	915	824	.....
26	1,460	1,170	614	2,400	1,010	1,110	869	780	.....
27	1,530	1,280	614	2,060	962	1,110	915	737	.....
28	1,460	1,460	536	1,530	1,010	1,110	869	780	.....
29	1,400	1,530	536	1,220	1,170	1,170	962	780	.....
30	1,340	1,530	536	1,010	962	1,110	962	737	.....
31	.....	1,590	.....	915	915	.....	962	.....	.....

NOTE.—Daily discharge computed from a rating curve well defined between 400 and 2,000 second-feet. Discharge Jan. 1 to Mar. 30 and Dec. 10 to 31 estimated, because of ice, from two discharge measurements, observer's reports, climatologic records, and flow of West Branch Wolf River at Neopit. Mean discharge, Jan. 1 to 31 estimated 620 second-feet, varying from about 770 to 470 second-feet; mean discharge Feb. 1 to 29 estimated 380 second-feet, varying from about 460 to 340 second-feet; mean discharge Mar. 1 to 30 estimated 430 second-feet, varying from about 350 to 700 second-feet; mean discharge Dec. 10 to 31 estimated 920 second-feet, varying from about 1,040 to 840 second-feet.

Monthly discharge of Wolf River at Keshena, Wis., for 1912.

[Drainage area, 797 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	.....	.....	620	0.778	0.90	C.
February	.....	.....	380	.477	.51	C.
March	824	.....	443	.556	.64	C.
April	1,660	962	1,340	1.68	1.87	A.
May	1,920	1,170	1,380	1.73	1.99	A.
June	1,530	536	897	1.13	1.26	A.
July	3,140	536	1,020	1.28	1.48	A.
August	2,330	654	1,280	1.61	1.86	A.
September	3,910	1,060	1,590	1.99	2.22	A.
October	1,170	780	949	1.19	1.37	A.
November	1,010	737	846	1.06	1.18	A.
December	1,220	.....	974	1.22	1.41	C.
The year	3,910	.....	978	1.23	16.69	

NOTE.—See note to table of daily discharge.

WEST BRANCH OF WOLF RIVER AT NEOPIT, WIS.

Location.—At the dam and power plant at Neopit, a station of the Wisconsin Northern Railroad, 20 miles north of Shawano.

Records available.—January 25 to December 31, 1912.

Drainage area.—108 square miles.

Gage.—Vertical staff.

Determination of flow.—An attempt in 1911 to measure the flow by current meter a short distance below the dam proved unsatisfactory, and it was decided to rate the turbine and spillway. The power is developed by means of a timber dam, about 14 feet high, which backs the water upstream for a considerable distance and forms a service reservoir. The spillway is a rectangular opening about 13 feet wide, which is closed by means of stop planks. Little water leaks through the dam, but considerable passes between the planks when all are in place. The power house is at the dam and is equipped with a 35-inch Leffel-Samson turbine, belted to a 60-kilowatt generator, which is used chiefly for lighting. The turbine takes water from the service reservoir through a rectangular flume, which is 9 feet wide by 6 feet deep and is lined with smooth planks. The turbine was rated by means of current meter measurements in the flume. The spillway and leakage through the boards were rated by measurements in the sluiceway. Gages were placed in the pond and below the dam to show the head on the turbine. Readings of both gages, voltage, amperage, and number of planks removed from the spillway were recorded seven times each day, at 6, 7, and 10 a. m., 12 m., 3, 6, and 10 p. m. These readings were then weighted in accordance with the elapsed interval.

Accuracy.—Current meter measurements made October 30, 1912, and January 29, 1913, indicate that the records were being carefully taken and that the computations give results well within 10 per cent.

Daily discharge, in second-feet, of West Branch of Wolf River at Neopit, Wis., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	147	135	107	128	141	138	124	70	.....	.....	142	175
2	140	166	141	128	129	133	122	80	.....	.....	139	208
3	139	122	113	123	152	144	112	130	.....	.....	119	208
4	135	155	91	165	229	160	167	120	.....	.....	141	197
5	137	135	130	169	244	129	61	115	.....	.....	148	183
6	93	150	101	212	217	140	123	122	.....	.....	148	190
7	67	149	91	211	211	171	222	149	.....	.....	146	129
8	147	98	84	172	186	167	61	208	.....	.....	143	122
9	109	115	86	196	149	127	145	313	.....	.....	85	130
10	109	108	134	189	169	156	158	429	.....	.....	149	149
11	135	146	98	216	187	167	134	345	.....	.....	161	142
12	111	124	82	236	182	185	131	182	.....	.....	160	130
13	111	147	94	141	162	150	148	214	.....	.....	170	129
14	89	123	115	205	188	137	160	217	.....	.....	170	134
15	99	128	111	208	221	90	117	170	.....	.....	165	129
16	100	144	95	217	157	137	123	141	.....	.....	162	146
17	89	134	135	214	182	118	142	174	.....	.....	95	149
18	106	162	84	62	184	147	140	.....	.....	.....	115	147
19	100	163	123	137	181	156	87	.....	.....	.....	110	119
20	104	167	92	180	158	130	126	.....	.....	.....	83	135
21	138	155	79	235	158	99	118	.....	.....	.....	75	145
22	133	114	112	198	234	95	101	.....	.....	.....	82	129
23	99	123	106	233	164	115	352	.....	.....	.....	117	113
24	133	112	131	147	131	152	999	.....	.....	.....	159	157
25	141	141	108	84	153	95	648	.....	.....	.....	149	134
26	118	121	108	188	141	105	217	.....	.....	.....	121	151
27	136	98	133	206	185	114	141	.....	.....	.....	127	123
28	147	114	143	322	202	180	183	.....	.....	.....	112	118
29	125	108	103	115	179	90	136	.....	.....	.....	131	179
30	169	.....	150	165	153	113	73	.....	.....	.....	175	118
31	124	.....	166	.....	180	.....	253	.....	.....	137	.....	104

Monthly discharge of West Branch of Wolf River at Neopit, Wis., for 1912.

[Drainage area, 108 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area)	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	169	67	120	1.11	1.28	B.
February	167	98	133	1.23	1.33	B.
March	166	79	111	1.03	1.19	B.
April	322	62	180	1.67	1.86	B.
May	244	129	178	1.65	1.90	B.
June	185	90	135	1.25	1.40	B.
July	999	61	188	1.74	2.01	B.
August 1-17	429	70	187	1.73	1.09	B.
November	175	75	133	1.23	1.37	B.
December	208	104	146	1.35	1.56	B.

GRAND RIVER AT GRAND RAPIDS, MICH.

Location.—At Fulton Street Bridge in Grand Rapids, Mich.

Records available.—March 12, 1901, to December 31, 1912.

Drainage area.—4,900 square miles.

Gage.—Staff, attached to bridge. In November, 1907, a new staff gage with zero corresponding to the city datum was attached to the abutment of the bridge. Readings on this gage were first reported in December, 1907. The zero of the gage in use prior to November, 1907, was 0.55 foot below the city datum; all gage readings, however, were corrected to the city datum and all published gage heights are therefore referred to the same datum.

Discharge measurements.—Made from downstream side of the bridge.

Winter flow.—Somewhat affected by ice.

Artificial control.—The operation of power plants above the station may modify the low-water flow.

Accuracy.—The two or three measurements made at this station since 1905 indicate that the 1905 discharge curve is not applicable after that year.

Cooperation.—Records furnished by the city engineer of Grand Rapids.

Daily gage height, in feet, of Manistee River near Sherman, Mich., for 1912.

[Miss Margaret Munn, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.9	2.8	2.3	3.0	2.8	5.5	2.3	2.3	2.9	2.7	2.5	3.0
2	2.9	2.8	2.3	3.0	2.8	4.8	2.2	2.3	3.2	2.6	2.6	3.5
3	2.9	2.6	2.6	2.9	2.8	4.1	2.2	2.3	3.4	2.7	2.6	3.8
4	2.9	2.6	2.4	2.9	2.8	3.8	2.2	2.3	3.4	2.7	2.6	3.8
5	2.9	2.4	2.4	3.8	2.7	3.6	2.3	2.2	3.6	2.8	2.6	3.7
6	2.9	2.5	2.3	5.2	2.8	3.5	2.4	2.2	3.5	2.8	2.6	3.7
7	3.3	2.6	2.4	5.3	2.8	3.3	2.8	2.2	3.3	2.6	2.7	3.6
8	3.4	2.4	2.4	5.2	2.8	3.2	3.2	2.3	3.3	2.5	2.8	3.5
9	3.4	2.3	2.5	5.0	2.7	3.1	3.0	2.8	3.6	2.5	2.8	3.3
10	3.4	2.3	2.5	4.5	2.6	3.0	2.7	3.3	3.5	2.6	2.8	3.1
11	3.2	2.3	2.4	4.2	2.7	2.9	2.6	3.2	3.5	2.6	2.9	3.0
12	3.2	2.4	2.4	4.2	3.0	2.9	2.4	2.9	3.3	2.9	2.9	2.9
13	3.2	2.4	2.4	4.2	3.3	3.0	2.5	2.7	3.2	3.0	3.5	2.8
14	3.4	2.4	2.4	4.2	3.4	3.0	2.6	2.5	3.0	3.0	3.9	2.7
15	3.4	2.4	2.1	4.2	3.3	2.9	2.6	2.4	3.1	3.0	4.0	3.0
16	3.4	2.6	2.3	4.0	3.2	2.8	2.5	2.4	3.0	2.9	4.0	3.1
17	3.4	2.7	2.3	3.8	3.1	2.8	2.4	2.4	2.7	2.8	3.8	3.2
18	3.4	2.7	2.4	3.7	3.0	2.7	2.4	2.5	2.8	2.7	3.5	3.0
19	3.5	2.9	2.5	3.6	2.9	2.7	2.4	2.6	3.3	2.7	3.4	3.0
20	3.4	2.8	2.7	3.5	3.4	2.6	2.3	2.6	3.2	2.7	3.4	2.9
21	3.3	2.6	2.6	3.4	3.9	2.6	2.3	2.6	3.0	2.7	3.3	2.9
22	3.2	1.8	2.5	3.3	4.1	2.6	2.3	2.7	3.0	2.7	3.3	2.8
23	3.2	2.0	2.4	3.8	4.5	2.5	2.3	2.6	3.0	2.8	3.3	2.8
24	3.1	2.0	2.4	3.7	4.8	2.5	2.6	2.6	2.9	2.8	3.2	2.7
25	3.0	2.3	2.3	3.6	4.7	2.4	2.6	2.5	2.9	2.7	3.2	2.8
26	2.9	2.6	2.3	3.4	4.5	2.4	2.6	2.5	2.8	2.7	3.2	2.8
27	2.8	2.5	2.4	3.3	4.2	2.4	2.4	2.5	2.7	2.6	3.2	2.7
28	2.8	2.5	2.5	3.2	5.2	2.3	2.5	2.6	2.7	2.6	3.1	2.7
29	2.8	2.3	2.6	3.0	6.2	2.3	2.6	2.6	2.7	2.6	3.0	2.7
30	2.9	.....	2.9	2.9	6.4	2.3	2.4	2.7	2.7	2.5	3.0	2.7
31	2.8	.....	3.0	.....	5.9	.....	2.4	2.8	.....	2.5	.....	2.7

NOTE.—Relation of gage height to discharge affected by ice Jan. 7 to 31. Gage heights Jan. 7 to 28 are to top of ice.

Daily gage height, in feet, of Grand River at Grand Rapids, Mich., for 1912.

[A. J. Seys and Chas. Darling, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.9	0.4	10.0	3.3	5.4	−1.1	1.4	.....	−0.3	0.2	.....
2	2.5	.8	.3	11.7	3.5	.....	−1.1	1.4	.....	− .4	.2	2.7
3	2.6	.9	.....	13.0	3.2	3.8	−1.22	1.4	−0.3	− .55	.....	3.3
4	2.8	.....	.4	13.6	3.0	3.2	.....	.....	− .65	− .5	.4	3.8
5	3.6	.9	.4	14.3	.....	2.7	−1.2	.3	− .82	− .6	1.1	3.9
6	3.7	.8	.4	15.2	2.4	2.4	−1.2	.2	− .8	.....	2.0	4.3
7	.....	.8	.4	16.0	2.2	1.8	.....	− .1	− .7	− .5	4.2	4.2
8	3.8	.8	.4	15.8	1.8	1.9	−1.0	− .08	.....	− .85	5.8	.....
9	4.0	.8	.4	15.3	1.7	.....	− .75	− .1	−1.0	− .85	6.4	3.0
10	4.2	.8	.....	14.2	1.4	.4	.0	1.2	− .9	− .4	.....	2.1
11	4.0	.....	.2	12.9	1.4	.4	− .5	.....	−1.0	.5	5.2	1.6
12	3.6	.9	.2	11.6	.....	.4	− .85	1.3	−1.05	2.8	4.5	1.0
13	3.0	.8	.2	10.2	3.3	.1	− .52	1.0	−1.1	.....	4.5	1.6
14	.....	.8	.2	.....	4.9	− .2	.....	.9	−1.1	3.3	5.4	1.8
15	2.8	.8	.1	8.2	5.6	− .4	− .58	.6	.....	3.0	6.4	.....
16	2.6	.7	.2	7.2	5.8	.....	− .62	.4	− .7	2.5	6.9	2.
17	2.5	.5	.....	6.5	5.9	.0	− .58	− .2	− .2	2.1	.....	2.3
18	2.4	.....	.2	6.4	5.7	− .3	− .85	.....	.0	1.7	6.2	2.2
19	2.5	.3	.4	6.3	.....	− .3	−1.05	− .1	.2	1.4	5.3	1.6
20	2.2	.4	1.4	6.2	5.2	− .2	−1.15	.1	.2	.....	4.5	1.4
21	.....	.6	2.4	.....	5.6	− .65	.....	.1	.2	.6	4.0	.5
22	2.2	.....	3.8	6.1	6.6	− .83	1.2	.2	.....	.4	3.2	.....
23	2.0	.8	4.2	5.2	7.8	.....	1.6	.2	.0	.7	2.8	.0
24	1.9	.4	.....	4.5	9.4	− .75	3.6	.1	.0	.6	.....	.3
25	1.8	.....	4.6	4.0	10.1	− .9	3.8	.....	− .1	.3	2.9	.....
26	1.7	.1	4.6	3.6	.....	−1.0	3.6	− .3	− .2	.2	2.4	.4
27	1.5	.2	4.8	3.2	8.8	−1.0	3.2	− .3	− .3	.....	2.2	.6
28	.....	.2	5.4	.....	7.7	− .8	.....	− .1	− .4	.0	.....	.2
29	1.2	.2	6.4	2.8	7.2	−1.1	2.2	− .55	.....	− .2	1.9	.0
30	1.0	.....	7.6	3.0	.....	.....	2.2	− .68	− .3	− .1	1.8	.2
31	.9	.....	.....	.....	6.1	.....	1.7	− .60	.....	− .2	.....	.....

NOTE.—The ice on the river was half a foot thick Jan. 12. No other information available regarding ice.

MANISTEE RIVER NEAR SHERMAN, MICH.

Location.—At north bridge, 1 mile from Sherman, Mich., immediately above the mouth of Wheeler Creek.

Records available.—July 10, 1903, to December 31, 1912.

Drainage area.—900 square miles.

Gage.—Standard chain; datum unchanged.

Channel.—Probably permanent.

Discharge measurements.—Made from downstream side of bridge.

Winter flow.—Special studies are necessary to determine the winter flow as the stream freezes over. The constancy of flow is remarkable, and is due to the fact that the supply is derived from springs and ground water. The maximum recorded mean flow for any month from 1903 to 1908 is only two and one-half times the minimum recorded flow. Consequently a fairly close estimate of the discharge for the periods during which ice is present can be made by using climatological data and the general records.

Accuracy.—Observations in 1910–11 indicate that the relation of gage height to discharge remains unchanged but may at times be affected by backwater from log jams.

Cooperation.—Station maintained in cooperation with William G. Fargo.

STREAMS TRIBUTARY TO LAKE HURON.

AU SABLE RIVER AT BAMFIELD, MICH.

Location.—At remains of old wooden highway bridge at Bamfield, near Glennie post offce, Mich., in the NW. ¼ sec. 14, T. 25 N., R. 5 E., about 600 feet above the mouth of Bamfields Creek.

Records available.—August 27, 1902, to December 31, 1912.

Drainage area.—1,420 square miles.

Gage.—Staff, fastened to wooden crib pier of the old bridge about 600 feet above the steel bridge; datum unchanged.

Channel.—Probably permanent.

Discharge measurements.—Made from the steel bridge about 600 feet below the wooden bridge at which measurements were formerly made. The steel bridge was begun in March and completed in July, 1907; part of the wooden bridge was removed when the steel bridge was finished. Bamfields Creek, which enters immediately above the steel bridge, carries only a few second-feet of water.

Winter flow.—The river is frozen over two or three months each year, but open places, probably caused by inflow from springs, are found throughout the winter.

Accuracy.—The relation between gage height and discharge is affected for short periods during the logging season by backwater from log jams and at times during the winter by backwater from anchor ice. Changes made in the channel below the gage when the new bridge was erected caused slight backwater at the gage. A measurement made in September, 1912, indicates a marked change in the relation between discharge and gage height subsequent to March, 1909.

Cooperation.—Station maintained in cooperation with William G. Fargo.

The following discharge measurement was made by P. S. Monk:

September 18, 1912: Gage height 2.30 feet; discharge, 1,450 second-feet.

Daily gage height, in feet, of Au Sable River at Bamfield, Mich., for 1912.

[Mrs. W. H. Bamfield, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.1	.....	.....	2.1	2.3	4.0	1.6	1.5	2.1	1.7	1.9	2.9
2	2.2	.....	.....	2.0	2.2	3.5	1.7	1.5	2.6	1.7	1.9	3.5
3	2.4	.....	.....	2.0	2.2	3.3	1.7	1.6	3.0	1.7	2.0	3.6
4	.....	.....	.....	2.2	2.2	3.2	1.8	1.6	2.8	1.8	1.9	3.4
5	.....	.....	.....	3.2	2.1	3.0	2.0	1.7	2.7	1.8	1.9	3.2
6	.....	.....	3.3	4.2	2.1	2.8	1.9	1.6	2.5	1.7	2.0	3.1
7	.....	3.4	.....	4.6	2.1	2.8	2.0	1.6	2.2	1.7	2.2	3.0
8	.....	.....	.....	4.5	2.0	2.6	2.1	1.7	2.1	1.6	2.4	3.0
9	.....	.....	.....	4.0	2.0	2.5	2.0	1.8	2.0	1.6	2.3	3.0
10	4.1	.....	.....	3.7	2.0	2.4	1.9	1.8	2.1	1.7	2.2	3.1
11	.....	.....	.....	3.5	1.9	2.4	1.9	2.0	2.1	1.8	2.1	2.9
12	.....	.....	.....	3.5	2.4	2.4	1.8	2.0	2.0	2.1	2.0	2.6
13	.....	.....	3.4	3.4	2.6	2.4	1.7	1.9	2.0	2.4	2.6	2.9
14	.....	3.3	.....	3.5	2.8	2.3	1.9	1.7	1.9	2.3	3.6	2.6
15	.....	.....	.....	3.6	2.4	2.2	2.2	1.6	2.1	2.1	3.3	2.3
16	.....	.....	.....	3.5	2.3	2.2	2.4	1.5	2.2	2.0	3.4	2.2
17	3.2	.....	.....	3.5	2.6	2.0	2.0	1.5	2.4	1.9	3.4	2.3
18	.....	.....	2.6	3.3	2.5	2.0	1.9	1.8	2.4	1.9	2.2	2.3
19	.....	.....	2.5	3.1	2.4	2.0	1.8	2.0	2.3	1.9	2.8	2.1
20	.....	.....	2.4	2.9	2.9	2.0	1.7	2.0	2.3	1.8	2.5	2.1
21	.....	3.2	2.2	2.9	3.8	1.9	1.6	1.9	2.2	1.8	2.4	2.1
22	.....	.....	1.9	2.7	3.9	1.9	1.5	2.0	2.1	1.8	2.5	2.1
23	.....	.....	2.0	2.8	4.3	1.8	1.5	2.0	2.1	2.0	2.6	2.1
24	3.2	.....	1.9	2.7	4.6	1.8	1.6	2.0	2.0	2.0	2.7	2.1
25	.....	.....	1.8	2.8	4.0	1.8	1.8	1.9	2.0	2.0	2.7	2.1
26	.....	.....	1.7	2.6	3.8	1.7	1.7	1.9	2.0	1.9	2.6	2.1
27	.....	.....	1.7	2.5	3.7	1.7	1.7	1.8	1.9	1.8	2.6	2.0
28	.....	3.5	1.8	2.4	3.9	1.7	1.5	1.8	1.8	1.8	2.5	2.0
29	.....	.....	1.9	2.4	4.8	1.6	1.5	2.0	1.8	1.9	2.6	2.0
30	.....	.....	2.1	2.3	5.2	1.6	1.5	2.0	1.7	1.9	2.6	2.0
31	3.4	.....	2.3	.....	4.5	.....	1.5	2.0	.....	1.9	.....	2.0

NOTE.—Relation of gage height to discharge affected by ice Jan. 1 to about Mar. 17; anchor ice in the river Dec. 9 and probably at other times during December.

Daily discharge, in second-feet, of Manistee River near Sherman, Mich., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,210	1,170	987	1,250	1,170	2,410	987	987	1,210	1,140	1,060	1,250
2	1,210	1,170	987	1,250	1,170	2,060	952	987	1,330	1,100	1,100	1,460
3	1,210	1,100	1,100	1,210	1,170	1,730	952	987	1,420	1,140	1,100	1,590
4	1,210	1,100	1,020	1,210	1,170	1,590	952	987	1,420	1,140	1,100	1,590
5	1,210	1,020	1,020	1,590	1,140	1,500	987	952	1,500	1,170	1,100	1,550
6	1,210	1,060	987	2,260	1,170	1,460	1,020	952	1,460	1,170	1,100	1,550
7	.....	1,100	1,020	2,310	1,170	1,380	1,170	952	1,380	1,100	1,140	1,500
8	.....	1,020	1,020	2,260	1,170	1,330	1,330	987	1,380	1,060	1,170	1,460
9	.....	987	1,060	2,160	1,140	1,290	1,250	1,170	1,500	1,060	1,170	1,380
10	.....	987	1,060	1,910	1,100	1,250	1,140	1,380	1,460	1,100	1,170	1,290
11	.....	987	1,020	1,770	1,140	1,210	1,100	1,330	1,460	1,100	1,210	1,250
12	.....	1,020	1,020	1,770	1,250	1,210	1,020	1,210	1,380	1,210	1,210	1,210
13	.....	1,020	1,020	1,770	1,380	1,250	1,060	1,140	1,330	1,250	1,460	1,170
14	.....	1,020	1,020	1,770	1,420	1,250	1,100	1,060	1,250	1,250	1,640	1,140
15	.....	1,020	917	1,770	1,380	1,210	1,100	1,020	1,290	1,250	1,680	1,250
16	.....	1,100	987	1,680	1,330	1,170	1,060	1,020	1,250	1,210	1,680	1,290
17	.....	1,140	987	1,590	1,290	1,170	1,020	1,020	1,140	1,170	1,590	1,330
18	.....	1,140	1,020	1,550	1,250	1,140	1,020	1,060	1,170	1,140	1,460	1,250
19	.....	1,210	1,060	1,500	1,210	1,140	1,020	1,100	1,380	1,140	1,420	1,250
20	.....	1,170	1,140	1,460	1,420	1,100	987	1,100	1,330	1,140	1,420	1,210
21	.....	1,100	1,100	1,420	1,640	1,100	987	1,100	1,250	1,140	1,380	1,210
22	.....	819	1,060	1,380	1,730	1,100	987	1,140	1,250	1,140	1,380	1,170
23	.....	883	1,020	1,550	1,910	1,060	987	1,100	1,250	1,170	1,380	1,170
24	.....	883	1,020	1,550	2,060	1,060	1,100	1,100	1,210	1,170	1,330	1,140
25	.....	987	987	1,500	2,010	1,020	1,100	1,060	1,210	1,140	1,330	1,170
26	.....	1,100	987	1,420	1,910	1,020	1,100	1,060	1,170	1,140	1,330	1,170
27	.....	1,060	1,020	1,380	1,770	1,020	1,020	1,060	1,140	1,100	1,330	1,140
28	.....	1,060	1,060	1,330	2,260	987	1,060	1,100	1,140	1,100	1,290	1,140
29	.....	987	1,100	1,250	2,790	987	1,100	1,100	1,140	1,100	1,250	1,140
30	.....	.....	1,210	1,210	2,900	987	1,020	1,140	1,140	1,060	1,250	1,140
31	.....	.....	1,250	.....	2,630	.....	1,020	1,170	.....	1,060	.....	1,140

NOTE.—Daily discharge determined from a rating curve well defined below 1,700 second-feet.

Monthly discharge of Manistee River near Sherman, Mich., for 1912.

[Drainage area, 900 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	.....	.....	1,150	1.28	1.48	C.
February	1,210	819	1,050	1.17	1.26	A.
March	1,250	917	1,040	1.16	1.34	A.
April	2,310	1,210	1,600	1.78	1.99	A.
May	2,900	1,100	1,560	1.73	1.99	A.
June	2,410	987	1,270	1.41	1.57	A.
July	1,330	952	1,060	1.18	1.36	A.
August	1,380	952	1,080	1.20	1.38	A.
September	1,500	1,140	1,300	1.44	1.61	A.
October	1,250	1,060	1,140	1.27	1.46	A.
November	1,680	1,060	1,310	1.46	1.63	A.
December	1,590	1,140	1,280	1.42	1.64	A.
The year	2,900	819	1,240	1.38	18.71	

NOTE.—Mean discharge Jan. 7–31 estimated 1,140 second-feet by comparison with flow at adjacent stations.

TITTABAWASSEE RIVER AT FREELAND, MICH.

Location.—At the highway bridge at Freeland, Mich.

Records available.—August 22, 1903, to August 3, 1906; October 28, 1906, to December 31, 1909; January 1 to December 31, 1912.

Drainage area.—2,550 square miles.

Cooperation.—Data for 1912 were collected and furnished by G. S. Williams, consulting engineer, Ann Arbor, Mich.

Daily discharge, in second-feet, of Tittabawassee River at Freeland, Mich., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,300	1,290	1,455	23,600	3,800	9,450	1,380	1,373	1,380	1,180	1,920	2,190
2	2,160	1,260	1,465	22,900	3,600	8,450	1,410	1,540	1,380	1,250	2,170	2,250
3	1,960	1,240	1,480	21,900	3,600	6,600	1,390	1,000	2,070	1,520	3,850	3,120
4	1,805	1,260	1,500	17,450	3,150	5,380	1,375	1,065	2,840	2,020	4,150	5,000
5	1,755	1,275	1,515	15,400	2,940	4,250	1,370	1,190	2,070	2,560	4,060	2,770
6	1,680	1,300	1,530	19,000	2,740	4,050	1,370	1,450	1,750	2,950	3,870	7,500
7	1,640	1,300	1,555	22,400	2,570	3,680	1,370	1,600	1,600	3,500	3,700	5,820
8	1,620	1,390	1,580	21,400	2,400	3,290	1,375	1,980	1,550	3,680	3,600	4,550
9	1,620	1,300	1,595	17,450	2,240	2,940	1,370	2,400	1,510	3,900	4,070	4,470
10	1,615	1,300	1,595	12,100	2,070	2,400	1,370	2,420	1,260	4,250	5,180	3,700
11	1,595	1,310	1,585	9,450	2,065	2,270	1,375	2,650	1,060	3,880	5,620	3,960
12	1,570	1,330	1,560	8,700	2,740	2,250	1,400	2,400	930	3,500	7,850	3,500
13	1,520	1,345	1,550	8,100	4,550	2,250	1,420	2,080	1,110	2,940	9,300	3,340
14	1,500	1,315	1,545	6,800	7,250	2,235	1,415	1,700	1,380	2,760	8,800	3,120
15	1,480	1,300	1,545	7,250	7,400	2,190	1,440	1,350	1,600	2,400	8,500	3,020
16	1,480	1,300	1,540	8,150	6,380	2,150	1,460	1,200	1,840	2,080	7,400	2,940
17	1,485	1,300	1,530	7,980	6,380	2,070	1,540	1,175	2,000	1,940	5,620	2,920
18	1,480	1,315	1,550	7,500	7,760	1,920	1,535	1,150	2,070	1,770	4,620	2,890
19	1,455	1,315	1,760	7,050	6,380	1,860	1,600	1,180	2,250	1,600	4,350	2,940
20	1,435	1,330	2,150	7,050	6,150	1,700	1,680	1,240	2,400	1,600	3,880	3,010
21	1,390	1,345	2,460	6,870	21,400	1,630	1,820	1,350	2,750	1,830	3,500	3,000
22	1,360	1,365	2,620	6,140	32,400	1,600	2,070	1,300	2,780	1,920	3,300	2,900
23	1,340	1,390	2,770	5,490	32,000	1,600	2,480	1,280	2,760	2,070	3,120	2,840
24	1,305	1,410	2,770	5,080	27,000	1,525	3,600	1,240	2,400	2,250	2,920	2,690
25	1,300	1,435	2,890	4,600	20,900	1,520	4,550	1,220	1,970	2,240	2,680	2,600
26	1,300	1,425	3,230	4,550	15,400	1,470	4,660	1,200	1,940	2,000	2,520	2,520
27	1,300	1,450	3,680	4,460	8,830	1,445	4,570	1,240	1,760	1,700	2,400	2,400
28	1,340	1,450	4,150	4,250	8,920	1,410	4,350	1,280	1,600	1,670	2,330	2,250
29	1,295	1,440	4,500	4,060	10,450	1,390	3,470	1,300	1,450	1,600	2,240	2,160
30	1,295	.....	13,600	3,950	12,100	1,375	2,500	1,350	1,300	1,540	2,190	2,040
31	1,295	.....	18,800	.....	10,200	.....	2,080	1,360	.....	1,520	.....	1,800

Monthly discharge of Tittabawassee River at Freeland, Mich., for 1912.

[Drainage area, 2,550 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
January	2,300	1,300	1,540	0.604	0.70
February	1,450	1,240	1,340	.525	.57
March	18,800	1,460	3,000	1.18	1.36
April	23,600	3,950	10,700	4.20	4.69
May	32,400	2,060	9,220	3.62	4.17
June	9,450	1,380	2,880	1.13	1.26
July	4,660	1,370	2,090	.820	.95
August	2,650	1,000	1,490	.584	.67
September	2,840	930	1,830	.718	.80
October	4,250	1,180	2,310	.906	1.04
November	9,300	1,920	4,320	1.69	1.89
December	7,500	1,800	3,230	1.27	1.46
The year	32,400	930	3,660	1.44	19.61

HURON RIVER AT DEXTER, MICH.

Location.—At the highway bridge at Dexter, Mich., one-fourth mile below the mouth of Mill Creek.

Records available.—September 1, 1904, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Standard chain, attached to bridge; installed March 26, 1908, at the same datum as the staff gage which was in use until March 12, 1908, when it was carried out by ice; datum unchanged.

Channel.—The high water that carried out the gage produced permanent change in the bed of the river; a small headrace runs to an abandoned mill on the left bank, but at ordinary stages little or no water flows into this canal; at high stages a small amount of water may pass around the gage through this race.

Discharge measurements.—Made from a boat several hundred feet below the gage or from the bridge to which the gage is attached.

Winter flow.—As the current is swift, little ice forms at this section.

Accuracy.—Relation between gage height and discharge that existed prior to March 12, 1908, was altered as the result of the change in the river bed produced at that time; gage heights are only slightly affected by ice. The station was inspected September 23, 1912, when the chain was found to be 0.13 too long. It was correct on October 17, 1908. Gage readings published for 1909, 1910, and 1911 should be corrected on account of this elongation of the chain.

Cooperation.—Station maintained in cooperation with the Eastern Michigan Edison Co., Washtenaw division, Ann Arbor, Mich.

The following discharge measurement was made by P. S. Monk:
September 23, 1912: Gage height, 0.05 feet; discharge, 265 second-feet.

Daily gage height, in feet, of Huron River at Dexter, Mich., for 1912.

[D. M. Litchfield, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.22	0.6	1.2	3.5	1.4	0.42	−0.20	−0.12	−0.30	−0.05	0.38	0.22
2	.5	.6	1.2	3.4	1.2	.40	− .20	− .18	− .35	− .08	.6	.25
3	.48	.6	1.0	3.2	1.1	.38	− .40	− .20	− .30	− .10	.6	.30
4	.5	.6	1.0	3.8	.8	.5	− .42	− .20	− .32	− .10	.5	.28
5	.7	.6	1.0	4.3	.7	.42	− .40	− .05	− .28	− .10	.5	.28
6	1.5	.6	1.0	4.4	.6	.38	− .40	− .18	− .25	− .10	.6	.28
7	1.6	.6	.8	4.4	.6	.30	− .38	− .20	− .25	− .05	1.0	.22
8	1.6	.6	.8	4.4	.5	.30	− .40	− .18	− .30	− .02	1.0	.20
9	1.9	.6	.6	4.2	.48	.30	− .50	− .15	− .25	.00	.9	.20
10	2.0	.5	.5	3.9	.35	.22	− .45	− .18	− .28	.02	.75	.15
11	1.9	.38	.6	3.6	.32	.20	− .48	− .10	− .30	.12	.7	.15
12	2.0	.40	.6	3.2	.48	.18	− .48	− .18	− .30	.10	.6	.18
13	1.6	.30	.5	3.0	.65	− .08	− .42	− .10	− .30	.18	.6	.28
14	1.25	.30	.5	2.8	.95	− .10	− .40	− .15	− .32	.12	.6	.12
15	1.1	.32	.8	2.5	.85	− .08	− .40	− .20	− .10	.10	.6	.10
16	1.05	.32	1.0	2.2	1.1	− .02	− .20	− .22	− .10	.10	.5	.10
17	.8	.30	1.05	2.0	1.2	− .10	− .25	− .30	− .08	.12	.5	.10
18	.7	.40	1.5	2.0	1.05	− .10	− .25	− .30	.08	.18	.45	.10
19	.6	.40	3.2	2.0	.9	− .10	− .10	− .15	.05	.20	.42	.05
20	.5	.48	4.3	1.8	.9	− .10	− .15	− .10	.02	.18	.38	.00
21	.38	.5	3.8	1.6	.85	− .10	− .12	− .15	.02	.15	.38	− .02
22	.40	1.0	3.7	1.6	.9	− .10	− .20	− .20	.08	.20	.38	.25
23	.40	1.15	3.0	1.5	.7	− .20	− .40	− .28	.08	.22	.30	.28
24	.45	1.1	2.4	1.6	.65	− .22	− .30	− .30	.0	.20	.30	.00
25	.40	1.0	1.9	1.4	.6	− .30	− .30	− .10	.0	.15	.30	− .05
26	.40	1.15	1.8	1.25	.5	− .10	− .30	− .10	− .02	.12	.30	.00
27	.45	1.15	1.9	1.1	.40	− .08	− .32	− .08	− .05	.12	.30	.00
28	.40	1.2	2.1	1.05	.42	− .12	− .25	− .05	− .10	.12	.30	.02
29	.40	1.2	2.3	1.2	.5	− .18	− .15	− .10	.0	.10	.25	.00
30	.40	.....	2.9	1.5	.42	− .18	− .12	− .10	.0	.12	.20	.00
31	.40	.....	3.1	.....	.40	.....	− .10	− .10	.....	.15	.....	.02

NOTE.—Relation of gage height to discharge affected by ice Jan. 5 to Mar. 25. Ice 0.4 to 0.5 foot thick; many ice jams during this period. Gage heights to top of ice Feb. 22, 28, 29 and Mar. 1-5.

TITTABAWASSEE RIVER AT FREELAND, MICH.

Location.—At the highway bridge at Freeland, Mich.

Records available.—August 22, 1903, to August 3, 1906; October 28, 1906, to December 31, 1909; January 1 to December 31, 1912.

Drainage area.—2,550 square miles.

Cooperation.—Data for 1912 were collected and furnished by G. S. Williams, consulting engineer, Ann Arbor, Mich.

Daily discharge, in second-feet, of Tittabawassee River at Freeland, Mich., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,300	1,290	1,455	23,600	3,800	9,450	1,380	1,373	1,380	1,180	1,920	2,190
2	2,160	1,260	1,465	22,900	3,600	8,450	1,410	1,540	1,380	1,250	2,170	2,250
3	1,960	1,240	1,480	21,900	3,600	6,600	1,390	1,000	2,070	1,520	3,850	3,120
4	1,805	1,260	1,500	17,450	3,150	5,380	1,375	1,065	2,840	2,020	4,150	5,000
5	1,755	1,275	1,515	15,400	2,940	4,250	1,370	1,190	2,070	2,560	4,060	2,770
6	1,680	1,300	1,530	19,000	2,740	4,050	1,370	1,450	1,750	2,950	3,870	7,500
7	1,640	1,300	1,555	22,400	2,570	3,680	1,370	1,600	1,600	3,500	3,700	5,820
8	1,620	1,390	1,580	21,400	2,400	3,290	1,375	1,980	1,550	3,680	3,600	4,550
9	1,620	1,300	1,595	17,450	2,240	2,940	1,370	2,400	1,510	3,900	4,070	4,470
10	1,615	1,300	1,595	12,100	2,070	2,400	1,370	2,420	1,260	4,250	5,180	3,700
11	1,595	1,310	1,585	9,450	2,065	2,270	1,375	2,650	1,060	3,880	5,620	3,960
12	1,570	1,330	1,560	8,700	2,740	2,250	1,400	2,400	930	3,500	7,850	3,500
13	1,520	1,345	1,550	8,100	4,550	2,250	1,420	2,080	1,110	2,940	9,300	3,340
14	1,500	1,315	1,545	6,800	7,250	2,235	1,415	1,700	1,380	2,760	8,800	3,120
15	1,480	1,300	1,545	7,250	7,400	2,190	1,440	1,350	1,600	2,400	8,500	3,020
16	1,480	1,300	1,540	8,150	6,380	2,150	1,460	1,200	1,840	2,080	7,400	2,940
17	1,485	1,300	1,530	7,980	6,380	2,070	1,540	1,175	2,000	1,940	5,620	2,920
18	1,480	1,315	1,550	7,500	7,760	1,920	1,535	1,150	2,070	1,770	4,620	2,890
19	1,455	1,315	1,760	7,050	6,380	1,860	1,600	1,180	2,250	1,600	4,350	2,940
20	1,435	1,330	2,150	7,050	6,150	1,700	1,680	1,240	2,400	1,600	3,880	3,010
21	1,390	1,345	2,460	6,870	21,400	1,630	1,820	1,350	2,750	1,830	3,500	3,000
22	1,360	1,365	2,620	6,140	32,400	1,600	2,070	1,300	2,780	1,920	3,300	2,900
23	1,340	1,390	2,770	5,490	32,000	1,600	2,480	1,280	2,760	2,070	3,120	2,840
24	1,305	1,410	2,770	5,080	27,000	1,525	3,600	1,240	2,400	2,250	2,920	2,690
25	1,300	1,435	2,890	4,600	20,900	1,520	4,550	1,220	1,970	2,240	2,680	2,600
26	1,300	1,425	3,230	4,550	15,400	1,470	4,660	1,200	1,940	2,000	2,520	2,520
27	1,300	1,450	3,680	4,460	8,830	1,445	4,570	1,240	1,760	1,700	2,400	2,400
28	1,340	1,450	4,150	4,250	8,920	1,410	4,350	1,280	1,600	1,670	2,330	2,250
29	1,295	1,440	4,500	4,060	10,450	1,390	3,470	1,300	1,450	1,600	2,240	2,160
30	1,295	.....	13,600	3,950	12,100	1,375	2,500	1,350	1,300	1,540	2,190	2,040
31	1,295	.....	18,800	.....	10,200	.....	2,080	1,360	.....	1,520	.....	1,800

Monthly discharge of Tittabawassee River at Freeland, Mich., for 1912.

[Drainage area, 2,550 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
January	2,300	1,300	1,540	0.604	0.70
February	1,450	1,240	1,340	.525	.57
March	18,800	1,460	3,000	1.18	1.36
April	23,600	3,950	10,700	4.20	4.69
May	32,400	2,060	9,220	3.62	4.17
June	9,450	1,380	2,880	1.13	1.26
July	4,660	1,370	2,090	.820	.95
August	2,650	1,000	1,490	.584	.67
September	2,840	930	1,830	.718	.80
October	4,250	1,180	2,310	.906	1.04
November	9,300	1,920	4,320	1.69	1.89
December	7,500	1,800	3,230	1.27	1.46
The year	32,400	930	3,660	1.44	19.61

HURON RIVER AT DEXTER, MICH.

Location.—At the highway bridge at Dexter, Mich., one-fourth mile below the mouth of Mill Creek.

Records available.—September 1, 1904, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Standard chain, attached to bridge; installed March 26, 1908, at the same datum as the staff gage which was in use until March 12, 1908, when it was carried out by ice; datum unchanged.

Channel.—The high water that carried out the gage produced permanent change in the bed of the river; a small headrace runs to an abandoned mill on the left bank, but at ordinary stages little or no water flows into this canal; at high stages a small amount of water may pass around the gage through this race.

Discharge measurements.—Made from a boat several hundred feet below the gage or from the bridge to which the gage is attached.

Winter flow.—As the current is swift, little ice forms at this section.

Accuracy.—Relation between gage height and discharge that existed prior to March 12, 1908, was altered as the result of the change in the river bed produced at that time; gage heights are only slightly affected by ice. The station was inspected September 23, 1912, when the chain was found to be 0.13 too long. It was correct on October 17, 1908. Gage readings published for 1909, 1910, and 1911 should be corrected on account of this elongation of the chain.

Cooperation.—Station maintained in cooperation with the Eastern Michigan Edison Co., Washtenaw division, Ann Arbor, Mich.

The following discharge measurement was made by P. S. Monk:
September 23, 1912: Gage height, 0.05 feet; discharge, 265 second-feet.

Daily gage height, in feet, of Huron River at Dexter, Mich., for 1912.

[D. M. Litchfield, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.22	0.6	1.2	3.5	1.4	0.42	−0.20	−0.12	−0.30	−0.05	0.38	0.22
2	.5	.6	1.2	3.4	1.2	.40	− .20	− .18	− .35	− .08	.6	.25
3	.48	.6	1.0	3.2	1.1	.38	− .40	− .20	− .30	− .10	.6	.30
4	.5	.6	1.0	3.8	.8	.5	− .42	− .20	− .32	− .10	.5	.28
5	.7	.6	1.0	4.3	.7	.42	− .40	− .05	− .28	− .10	.5	.28
6	1.5	.6	1.0	4.4	.6	.38	− .40	− .18	− .25	− .10	.6	.28
7	1.6	.6	.8	4.4	.6	.30	− .38	− .20	− .25	− .05	1.0	.22
8	1.6	.6	.8	4.4	.5	.30	− .40	− .18	− .30	− .02	1.0	.20
9	1.9	.6	.6	4.2	.48	.30	− .50	− .15	− .25	.00	.9	.20
10	2.0	.5	.5	3.9	.35	.22	− .45	− .18	− .28	.02	.75	.15
11	1.9	.38	.6	3.6	.32	.20	− .48	− .10	− .30	.12	.7	.15
12	2.0	.40	.6	3.2	.48	.18	− .48	− .18	− .30	.10	.6	.18
13	1.6	.30	.5	3.0	.65	− .08	− .42	− .10	− .30	.18	.6	.28
14	1.25	.30	.5	2.8	.95	− .10	− .40	− .15	− .32	.12	.6	.12
15	1.1	.32	.8	2.5	.85	− .08	− .40	− .20	− .10	.10	.6	.10
16	1.05	.32	1.0	2.2	1.1	− .02	− .20	− .22	− .10	.10	.5	.10
17	.8	.30	1.05	2.0	1.2	− .10	− .25	− .30	− .08	.12	.5	.10
18	.7	.40	1.5	2.0	1.05	− .10	− .25	− .30	.08	.18	.45	.10
19	.6	.40	3.2	2.0	.9	− .10	− .10	− .15	.05	.20	.42	.05
20	.5	.48	4.3	1.8	.9	− .10	− .15	− .10	.02	.18	.38	.00
21	.38	.5	3.8	1.6	.85	− .10	− .12	− .15	.02	.15	.38	− .02
22	.40	1.0	3.7	1.6	.9	− .10	− .20	− .20	.08	.20	.38	.25
23	.40	1.15	3.0	1.5	.7	− .20	− .40	− .28	.08	.22	.30	.28
24	.45	1.1	2.4	1.6	.65	− .22	− .30	− .30	.0	.20	.30	.00
25	.40	1.0	1.9	1.4	.6	− .30	− .30	− .10	.0	.15	.30	− .05
26	.40	1.15	1.8	1.25	.5	− .10	− .30	− .10	− .02	.12	.30	.00
27	.45	1.15	1.9	1.1	.40	− .08	− .32	− .08	− .05	.12	.30	.00
28	.40	1.2	2.1	1.05	.42	− .12	− .25	− .05	− .10	.12	.30	.02
29	.40	1.2	2.3	1.2	.5	− .18	− .15	− .10	.0	.10	.25	.00
30	.40	.....	2.9	1.5	.42	− .18	− .12	− .10	.0	.12	.20	.00
31	.40	.....	3.1	.....	.40	.....	− .10	− .10	.....	.15	.....	.02

NOTE.—Relation of gage height to discharge affected by ice Jan. 5 to Mar. 25. Ice 0.4 to 0.5 foot thick; many ice jams during this period. Gage heights to top of ice Feb. 22, 28, 29 and Mar. 1-5.

HURON RIVER AT GEDDES, MICH.

Location.—At dam and power plant of the Eastern Michigan Edison Co. at Geddes, Mich., half a mile above mouth of Fleming Creek.

Records available.—February 1, 1904, to December 31, 1912.

Drainage area.—757 square miles.

Determination of discharge.—The flow of the river at this point is computed from records of the operation of the power plant and records of the depth of the flow over the dam.

Cooperation.—The estimates are made and furnished by G. S. Williams, consulting engineer, Ann Arbor, Mich.

Daily discharge, in second-feet, of Huron River at Geddes, Mich., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	420	213	245	2,527	855	462	144	254	235	353	631	529
2	282	197	244	2,278	757	410	87	255	275	337	899	567
3	287	216	246	2,100	715	440	82	226	368	335	889	572
4	268	178	242	2,128	661	401	90	144	259	350	886	560
5	270	220	248	2,576	689	392	94	210	293	343	748	453
6	310	204	255	2,616	593	397	85	157	304	368	893	614
7	331	208	247	2,674	576	358	45	157	334	360	1,075	589
8	309	198	253	2,560	536	332	97	167	302	327	972	593
9	264	209	251	2,451	555	240	86	247	327	372	1,022	600
10	290	217	280	2,433	470	306	101	237	296	402	943	465
11	286	202	253	2,151	425	259	86	239	316	432	836	514
12	270	272	276	2,005	457	262	91	270	307	470	821	337
13	269	211	250	1,920	583	240	94	409	286	523	868	377
14	200	197	294	1,849	639	228	66	370	288	529	825	441
15	214	202	281	1,737	591	232	102	307	334	447	869	467
16	219	199	242	1,518	694	161	90	338	315	442	800	564
17	216	205	370	1,503	724	265	93	273	342	413	874	435
18	235	207	853	1,505	679	218	84	210	385	460	797	371
19	237	246	2,078	1,443	700	205	105	451	398	416	756	321
20	228	296	2,030	1,273	662	190	124	253	403	478	718	336
21	220	311	1,384	1,070	640	184	90	424	376	511	698	384
22	217	222	1,218	1,154	1,124	182	112	316	504	501	668	240
25	218	221	1,156	1,036	697	139	94	299	481	488	634	485
24	232	232	1,297	877	603	183	146	269	413	542	617	404
25	214	239	1,208	875	534	150	145	230	392	534	660	217
26	222	246	1,218	819	543	136	150	349	400	493	437	427
27	217	241	1,433	693	488	113	148	256	386	442	506	506
28	206	253	1,542	589	510	141	124	344	382	446	626	641
29	200	240	1,672	723	495	128	215	294	429	430	514	391
30	212	.....	2,055	955	354	94	264	334	422	417	498	572
31	211	.....	2,277	.....	478	.....	226	272	.....	384	.....	460

Monthly discharge of Huron River at Geddes, Mich., for 1912.

[Drainage area, 757 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
January	420	200	251	0.332	0.38
February	311	178	224	.296	.32
March	2,280	242	835	1.10	1.27
April	2,670	589	1,670	2.21	2.47
May	1,120	354	614	.811	.94
June	462	94	248	.328	.37
July	264	45	115	.152	.18
August	451	144	276	.365	.42
September	504	235	352	.465	.52
October	542	327	430	.568	.65
November	1,080	437	766	1.01	1.13
December	641	217	466	.616	.71
The year	2,280	45	519	.686	9.36

HURON RIVER AT FLAT ROCK, MICH.

Location.—At the highway bridge at Flat Rock, Mich., 2,000 feet below the crossing of the Detroit, Toledo & Ironton Railroad.

Records available.—August 6, 1904, to December 31, 1911.

Drainage area.—1,000 square miles.

Gage.—Staff; datum unchanged.

Channel.—Probably permanent.

Discharge measurements.—Made from downstream side of bridge.

Artificial control.—At ordinary stages the flow of the river is controlled by a dam and power plant immediately above the station, but the operation of this plant is assumed to have little effect on the diurnal fluctuations of stage.

Winter flow.—Ice jams form below the station and cause backwater at the gage; in general the section above the station is kept open by the power plant.

Accuracy.—Station was inspected September 25, 1912; a measurement on this date indicates a marked change in the relation between gage height and discharge since October 16, 1908.

Cooperation.—Station maintained in cooperation with the Eastern Michigan Edison Co., Washtenaw division, Ann Arbor, Mich.

The following discharge measurement was made by P. S. Monk:
September 25, 1912: Gage height, 175 feet; discharge, 302 second-feet.

Daily gage height, in feet, of Huron River at Flat Rock, Mich., for 1912.

[C. L. Metler, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.4	2.4	3.2	8.4	4.6	2.7	0.7	1.3	1.1	1.7	2.0	2.0
2	2.9	2.4	3.1	8.3	4.2	2.5	.7	1.5	1.1	1.6	2.5	2.0
3	2.4	2.4	3.1	8.1	4.2	2.2	1.0	1.4	.6	1.6	2.6	2.3
4	2.8	2.2	2.9	7.8	3.8	2.5	.8	1.2	.85	1.6	3.0	2.3
5	2.9	2.3	3.0	8.0	3.6	2.2	.6	.8	1.3	1.4	3.2	2.5
6	2.9	2.5	3.0	8.3	3.2	2.1	.5	1.1	1.1	1.4	3.8	2.5
7	3.0	2.6	3.0	8.3	3.3	2.0	.6	1.3	.9	1.15	4.4	2.5
8	2.8	2.4	2.8	8.3	3.3	1.9	.6	1.15	1.0	1.5	4.5	2.5
9	3.8	2.2	2.8	8.3	3.0	1.7	.5	.75	.95	1.5	4.3	2.0
10	3.6	2.5	2.9	8.0	2.8	1.6	.9	.9	.8	1.4	3.9	2.3
11	3.2	2.2	2.6	8.0	2.5	1.6	.9	1.0	1.1	1.6	3.5	2.5
12	3.0	2.2	3.0	7.6	2.3	1.6	.8	1.05	1.0	1.6	3.6	2.2
13	3.0	2.0	3.0	7.4	3.6	1.4	.8	1.25	1.0	1.6	3.2	2.4
14	2.6	2.5	3.0	7.2	3.6	1.5	.7	1.7	1.1	1.7	3.2	2.1
15	2.4	2.4	3.2	7.0	3.8	1.6	.7	1.3	1.0	2.0	3.2	2.2
16	2.4	2.4	3.1	6.8	4.0	1.6	.85	1.45	1.0	1.9	3.0	2.0
17	2.4	2.4	3.0	6.6	4.6	1.5	1.0	1.1	.8	1.9	2.8	2.0
18	2.6	2.4	4.0	6.4	4.6	1.8	.8	1.1	1.2	1.8	2.5	2.0
19	2.6	2.3	7.0	6.2	3.0	1.5	.8	.95	1.2	1.8	2.5	2.0
20	2.6	2.4	8.2	6.0	3.6	1.5	.75	1.8	1.3	1.8	2.3	1.8
21	2.5	3.3	9.6	5.8	3.6	1.4	.85	1.7	1.6	1.6	2.5	1.5
22	2.4	3.4	.....	5.8	4.4	1.3	1.1	1.7	1.6	2.4	2.5	1.9
23	2.4	3.1	.....	5.8	4.7	.9	.7	1.7	1.8	2.2	2.3	2.0
24	2.4	3.0	9.4	5.4	3.9	.75	1.25	1.35	2.0	2.2	2.3	2.0
25	2.2	3.2	8.6	5.1	3.4	1.1	.95	1.2	1.8	2.3	2.0	2.0
26	2.4	3.6	8.2	4.8	2.8	1.2	1.05	.95	1.8	2.1	2.5	1.8
27	2.4	3.4	8.3	4.4	2.8	.9	.9	.65	1.7	1.9	2.2	1.7
28	2.2	3.4	8.3	4.1	3.0	.7	.8	1.2	1.7	1.4	2.0	1.8
29	2.2	3.3	8.7	3.8	2.8	.7	.95	1.25	1.5	2.0	1.8	1.9
30	2.5	.....	8.6	4.2	2.8	.7	1.4	1.1	1.4	1.9	2.3	1.9
31	2.4	.....	.....	.....	2.7	.....	1.3	1.1	.....	1.9	.....	2.4

NOTE.—River frozen over from the first part of January to Mar. 20; heavy ice jam Mar. 21 to 24. Gage was taken out by ice Mar. 24, and was replaced a short time afterwards. During the interval readings were made on a temporary gage. No information regarding ice in December.

STREAM TRIBUTARY TO LAKE ERIE.

CATTARAUGUS CREEK AT VERSAILLES, N. Y.

Location.—On a three-span highway bridge in the village of Versailles, about 6 miles below Gowanda, 2¼ miles above the mouth of Clear Creek (coming in from the right) and about 8 miles above the mouth of the stream.

Records available.—September 23, 1910, to December 31, 1912. Data published also in annual reports of the State Water Supply Commission of New York, New York State Conservation Commission, and New York State engineer and surveyor.

Drainage area.—467 square miles.

Gage.—Chain, fastened to the upstream side of the first span from the right-hand end of the bridge; read twice daily; datum unchanged.

Channel.—Rock and gravel; considered permanent.

Discharge measurements.—Made from the downstream side of the bridge.

Winter flow.—Relation of gage height to discharge somewhat affected by ice.

Accuracy.—Discharge rating curve well defined; data as published are good.

Discharge measurements of Cattaraugus Creek at Versailles, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 16[a]	C. S. De Golyer	6.36	256
Mar. 26	G. H. Canfield	5.75	727
27	.....do	6.09	1,125
27	.....do	5.79	782
28	.....do	6.47	1,760
30	.....do	7.57	4,610
July 12	Frank Weber	5.20	279

[a] Measurement under complete ice cover.

Daily gage height, in feet, of Cattaraugus Creek at Versailles, N. Y., for 1912.

[James A. Palmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.3	6.95	7.35	8.9	6.35	5.25	4.90	5.10	7.7	5.65	5.08	5.58
2	6.1	7.0	7.15	8.5	5.95	5.22	4.88	5.02	6.6	5.42	5.00	7.15
3	5.85	6.85	7.1	6.95	5.85	5.45	4.92	5.12	5.70	5.28	5.45	7.2
4	5.63	6.85	7.1	6.7	5.75	5.25	5.25	5.10	5.38	5.18	5.48	6.4
5	5.50	6.85	7.0	7.4	5.70	5.22	5.32	5.05	5.30	5.10	5.45	5.95
6	5.47	6.85	7.05	8.0	5.78	5.12	5.12	4.92	5.22	5.12	5.42	7.25
7	5.43	6.85	7.0	8.3	6.3	5.12	5.10	4.90	5.20	5.08	5.60	6.3
8	5.47	6.85	6.9	7.1	6.15	5.12	4.95	4.98	5.12	5.05	6.15	6.05
9	5.97	6.85	7.0	6.5	5.95	5.10	4.95	4.92	5.05	5.08	5.90	5.85
10	6.45	6.85	6.9	5.9	5.75	5.08	4.90	4.98	5.00	5.15	6.05	5.48
11	6.85	6.8	6.9	5.9	5.65	5.08	5.38	5.02	5.08	5.28	5.75	5.58
12	6.9	6.75	6.95	6.8	5.45	5.08	5.25	4.98	5.12	5.15	5.58	5.35
13	6.8	6.7	6.1	6.65	5.65	5.05	5.15	5.08	5.12	5.12	5.48	5.15
14	6.85	6.65	6.9	6.4	5.78	5.05	5.25	5.08	5.02	5.12	5.65	5.68
15	6.85	6.6	7.15	6.3	5.72	5.05	5.10	5.05	5.02	5.05	5.52	5.62
16	6.8	6.6	7.2	7.1	5.88	5.08	5.45	5.88	5.22	5.02	5.52	5.62
17	7.0	6.6	7.5	6.55	6.05	5.22	5.15	5.92	5.32	5.08	5.52	5.70
18	7.2	6.65	8.0	6.0	5.85	5.12	5.02	5.92	5.30	5.05	5.48	5.90
19	7.35	6.6	7.9	5.95	5.65	5.08	5.02	5.02	5.32	5.02	5.42	6.2
20	7.45	6.75	7.8	5.92	5.58	5.05	5.05	5.08	5.20	5.08	5.50	5.75
21	.....	6.9	6.75	5.95	5.58	4.98	5.25	4.95	5.05	5.02	5.42	5.58
22	.....	6.8	6.35	6.0	5.52	5.00	5.12	4.92	5.08	5.18	5.45	5.42
23	.....	6.7	6.05	6.3	5.45	5.02	5.02	5.05	5.15	7.4	5.38	5.32
24	.....	6.8	6.05	6.1	5.42	5.05	4.98	5.08	5.38	6.25	5.35	5.25
25	.....	7.0	5.9	6.1	5.32	5.02	5.02	4.98	5.25	6.45	5.38	5.22
26	.....	7.2	5.7	6.05	5.32	5.05	5.08	5.08	5.12	6.15	5.40	5.12
27	.....	7.8	6.05	6.0	5.28	5.02	5.08	5.32	5.02	5.75	5.48	5.18
28	7.05	7.7	6.5	5.8	5.20	5.02	5.0	5.38	5.02	5.55	5.48	5.22
29	7.15	7.6	8.8	7.35	5.25	5.02	4.98	5.35	5.02	5.35	5.52	5.32
30	7.05	.....	7.5	7.0	5.22	4.95	5.0	5.12	5.02	5.32	5.58	6.95
31	6.95	.....	7.4	.....	5.38	.....	5.02	6.1	.....	5.22	.....	6.45

NOTE.—Relation of gage height to discharge affected by ice Jan. 8 to Mar. 14.

Daily discharge, in second-feet, of Cattaraugus Creek at Versailles, N. Y., for 1910–1912.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1910.					1910.				
1	.....	166	1,720	1,720	16	.....	183	1,300	448
2	.....	111	1,920	1,630	17	.....	149	1,160	586
3	.....	85	1,230	1,230	18	.....	166	1,030	586
4	.....	166	772	968	19	.....	149	1,010	817
5	.....	143	586	907	20	.....	149	907	794
6	.....	257	586	666	21	.....	137	817	708
7	.....	1,230	686	686	22	.....	606	794	606
8	.....	539	708	636	23	166	740	850	686
9	.....	313	772	586	24	143	405	2,230	705
10	.....	271	5,060	708	25	189	475	2,820	686
11	.....	245	3,780	686	26	166	850	1,920	740
12	.....	207	1,820	626	27	166	539	1,300	686
13	.....	183	1,460	539	28	166	1,630	1,300	686
14	.....	183	1,380	636	29	166	1,460	2,230	2,940
15	.....	183	1,300	586	30	166	1,300	1,630	3,780
					31	.....	1,160	.....	1,630

Daily discharge, in second-feet, of Cattaraugus Creek at Versailles, N. Y., for 1910–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	1,820	1,030	1,030	850	2,570	327	245	137	636	1,030	794	1,820
2	6,190	1,010	850	850	1,820	313	183	137	539	2,340	708	1,380
3	4,250	772	686	772	1,030	327	137	166	448	1,030	586	1,230
4	1,820	1,160	567	907	772	271	137	1,100	343	1,540	511	907
5	1,310	740	448	6,460	636	327	137	686	343	1,630	492	817
6	1,010	539	539	5,060	539	327	137	567	3,070	1,230	511	794
7	1,030	492	366	6,100	511	271	271	292	3,480	968	1,030	817
8	1,030	666	539	2,020	475	257	183	708	5,060	884	1,820	1,010
9	1,460	740	606	1,630	422	271	166	366	1,230	850	907	1,380
10	6,790	636	2,450	1,460	422	257	195	327	772	740	666	2,120
11	6,790	492	1,460	1,300	475	257	207	226	686	686	686	1,820
12	4,550	492	4,080	1,230	271	257	183	195	606	708	850	1,920
13	3,480	492	1,820	968	137	257	137	195	636	606	1,160	5,960
14	3,200	636	2,450	1,030	422	257	137	195	586	511	1,160	2,940
15	3,930	1,380	2,690	1,230	389	245	111	166	586	511	1,230	3,200
16	1,540	1,160	1,820	968	389	207	111	539	586	539	1,160	2,340
17	1,100	6,100	1,460	1,010	343	195	137	366	405	539	1,030	2,120
18	884	5,400	1,030	448	366	195	327	292	422	606	7,540	1,720
19	932	2,940	794	794	666	195	183	226	405	586	2,230	1,160
20	932	1,630	932	1,030	1,160	195	327	166	405	586	1,820	850
21	1,160	1,460	1,030	1,010	405	166	271	137	343	539	1,630	884
22	1,160	1,010	1,920	1,030	343	137	245	195	343	422	1,380	1,010
23	1,030	772	2,450	850	327	226	245	207	343	606	1,300	2,690
24	586	794	1,030	817	343	226	195	207	271	636	2,340	1,300
25	686	817	817	666	366	195	195	327	475	586	1,720	1,100
26	740	1,230	1,460	606	343	207	226	366	389	606	1,380	1,030
27	1,300	2,230	4,560	539	271	389	195	448	327	567	1,160	1,630
28	5,740	1,160	3,340	539	313	636	195	2,570	343	586	1,160	932
29	2,120	.....	1,630	492	292	448	207	4,400	327	475	3,070	1,720
30	1,380	.....	1,460	606	271	271	195	1,300	389	405	2,230	1,100
31	1,030	.....	1,160	.....	271	.....	137	740	.....	475	.....	1,030
1912.												
1	1,460	.....	.....	9,340	1,540	292	85	195	5,060	636	183	567
2	1,160	.....	.....	7,900	968	271	75	149	2,020	422	137	3,340
3	850	.....	.....	2,820	850	448	95	207	686	313	448	3,480
4	616	.....	.....	2,230	740	292	292	195	389	245	475	1,630
5	492	.....	.....	4,080	686	271	343	166	327	195	448	968
6	466	.....	.....	6,100	772	207	207	95	271	207	422	3,630
7	431	.....	.....	7,180	1,460	207	195	85	257	183	586	1,460
8	.....	.....	.....	3,200	1,230	207	111	127	207	166	1,230	1,100
9	.....	.....	.....	1,820	968	195	111	95	166	183	907	850
10	.....	.....	.....	907	740	183	85	127	137	226	1,100	475
11	.....	.....	.....	907	636	183	389	149	183	313	740	567
12	.....	.....	.....	2,450	448	183	292	127	207	226	567	366
13	.....	.....	.....	2,120	636	166	226	183	207	207	475	226
14	.....	.....	.....	1,630	772	166	292	183	149	207	636	666
15	.....	.....	3,340	1,460	708	166	195	166	149	166	511	606
16	.....	.....	3,480	3,200	884	183	448	884	271	149	511	606
17	.....	.....	4,400	1,920	1,100	271	226	932	343	183	511	686
18	.....	.....	6,100	1,030	850	207	149	932	327	166	475	907
19	.....	.....	5,740	968	636	183	149	149	343	149	422	1,300
20	.....	.....	5,400	932	567	166	166	183	257	183	492	740
21	.....	.....	2,340	968	567	127	292	111	166	149	422	567
22	.....	.....	1,540	1,030	511	137	207	95	183	245	448	422
23	.....	.....	1,100	1,460	448	149	149	166	226	4,080	389	343
24	.....	.....	1,100	1,160	422	166	127	183	389	1,380	366	292
25	.....	.....	907	1,160	343	149	149	127	292	1,720	389	271
26	.....	.....	686	1,100	343	166	183	183	207	1,230	405	207
27	.....	.....	1,100	1,030	313	149	183	343	149	740	475	245
28	.....	.....	1,820	794	257	149	137	389	149	539	475	271
29	.....	.....	8,980	3,930	292	149	127	366	149	366	511	342
30	.....	.....	4,400	2,940	271	111	137	207	149	343	567	2,820
31	.....	.....	4,080	.....	389	.....	149	1,160	.....	271	.....	1,720

NOTE.—Daily discharge determined from a rating curve well defined below 2,000 second-feet. Daily discharge Jan. 1 to 5 and 10 to 12, 1911, reduced somewhat on account of ice jams. Daily discharge for other short periods during 1911 may be in error because of ice jams.

Monthly discharge of Cattaraugus Creek at Versailles, N. Y., for 1910–1912.

[Drainage area, 467 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1910.						
September 23–30	189	143	166	0.356	0.11	A.
October	1,630	85	464	.994	1.15	A.
November	5,060	586	1,500	3.21	3.58	A.
December	3,780	448	964	2.06	2.38	C.
1911.						
January			1,870	4.00	4.61	D.
February	6,100	492	1,360	2.91	3.03	C.
March	4,500	366	1,530	3.28	3.78	B.
April	6,460	448	1,440	3.08	3.44	A.
May	2,570	137	560	1.20	1.38	A.
June	636	137	270	.578	.64	A.
July	327	111	189	.405	.47	A.
August	4,400	137	579	1.24	1.43	A.
September	5,060	271	826	1.77	1.98	A.
October	2,340	405	775	1.66	1.91	A.
November	7,540	492	1,480	3.17	3.54	A.
December	5,920	794	1,640	3.51	4.05	A.
The year	7,540	111	1,040	2.23	30.26	
1912.						
January			470	1.01	1.16	D.
February			290	.621	.67	D.
March	8,980		2,050	4.39	5.06	C.
April	9,340	794	2,590	5.55	6.19	A.
May	1,540	257	689	1.48	1.71	A.
June	448	111	197	.422	.47	A.
July	448	75	193	.413	.48	A.
August	1,160	85	279	.597	.69	A.
September	5,060	137	467	1.00	1.12	A.
October	4,080	149	509	1.09	1.26	A.
November	1,100	137	524	1.12	1.25	A.
December	3,630	207	1,020	2.18	2.51	A.
The year	9,340	75	747	1.66	22.57	

NOTE.—Discharge Jan. 8 to Mar. 14, 1912, estimated by means of comparison with adjacent stations.
Mean discharge Jan. 8–31 estimated 380 second-feet.
Mean discharge Mar. 1–14 estimated 500 second-feet.

STREAMS TRIBUTARY TO LAKE ONTARIO.

LITTLE TONAWANDA CREEK AT LINDEN, N. Y.

Location.—At the stone-arch highway bridge in the village of Linden, 600 feet northeast of the Erie Railroad station and 3 miles above the junction with Tonawanda Creek.

Records available.—July 8 to December 31, 1912.

Drainage area.—20.7 square miles.

Gage.—Vertical staff, on the right-hand upstream abutment of the bridge; lower 2 feet enameled-iron gage, graduated to hundredths of a foot; upper 4 feet of bronze, graduated to half tenths. An auxiliary bronze gage fastened to the right-hand downstream abutment of the bridge is used to check the rating of the upper gage.

Channel.—A standard Francis weir, 2.01 feet long and 8 inches high, has been constructed under the upstream side of the bridge. When the stage gets above the depth of this weir, it flows over a 2-inch plank about 13 feet long, including the 2 feet of weir. The crest of the weir is at gage height 0.03 foot.

Discharge measurements.—Made from a cable and car 1,000 feet above the gage at high stages and by wading above the weir at low stages.

Accuracy.—At gage height 0.69 or below the flow is confined to the weir, and for such periods the accuracy of the computations will be the accuracy of any Francis weir; for stages above gage height 0.69 the weir has been rated with a current meter, and the accuracy of the data so obtained should also be excellent.

Discharge measurements of Little Tonawanda Creek at Linden, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
1912.		*Feet.*	*Sec.-ft.*
July 8	Frank Weber	(a)	1.14
Oct. 3	J. G. Mathers	0.38	1.31
3	.....do	.38	1.40
3	.....do	.38	1.37
Dec. 5	C. S. DeGolyer	1.11	17.9
5	.....do	1.08	16.5
7	.....do	1.19	24.9

a Gage not installed.

Daily gage height, in feet, of Little Tonawanda Creek at Linden, N. Y., for 1912.

[C. L. Schenck, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	0.34	0.51	0.38	0.52	0.83	16	0.48	0.24	0.39	0.30	0.88	0.84
2	.....	.35	.69	.41	.50	1.43	17	.39	.24	.34	.30	.84	.86
3	.....	.38	.65	.40	.50	1.79	18	.36	.38	.37	.30	.82	.90
4	.....	.34	.55	.39	.46	1.30	19	.35	.33	.40	.32	.80	1.00
5	.....	.32	.48	.35	.45	1.14	20	.34	.32	.50	.30	.80	.87
6	.....	.31	.44	.33	.44	1.44	21	.37	.36	.40	.30	.76	.88
7	.....	.30	.40	.32	.52	1.20	22	.40	.40	.36	.28	.74	.86
8	.....	.30	.38	.31	.90	1.02	23	.36	.92	.40	.42	.72	.86
9	.....	.30	.38	.31	.98	.92	24	.34	.96	.46	.69	.72	.88
10	0.44	.30	.34	.34	.90	1.02	25	.33	.79	.52	.86	.82	.87
11	.39	.30	.34	.34	.82	.94	26	.33	.72	.43	.84	.78	.86
12	.36	.30	.34	.32	.78	.88	27	.30	.70	.39	.78	.84	.89
13	.35	.28	.32	.32	.75	.84	28	.30	.62	.38	.72	.80	.80
14	.54	.28	.31	.31	.95	.82	29	.46	.58	.36	.66	.84	.88
15	.39	.26	.32	.31	.88	.83	30	.35	.52	.36	.60	.85	.94
							31	.34	.47	.....	.54	.....	1.29

NOTE.—To reduce gage heights to heads on the weir, subtract 0.03 foot.

Daily discharge, in second-feet, of Little Tonawanda Creek at Linden, N. Y., for 1912.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	1.12	2.12	1.34	2.18	6.3	16	1.93	0.63	1.39	0.91	7.8	6.6
2	.....	1.17	3.36	1.51	2.05	37.4	17	1.39	.63	1.12	.91	6.6	7.2
3	.....	1.34	3.07	1.45	2.05	66.2	18	1.23	1.34	1.28	.91	6.0	8.4
4	.....	1.12	2.38	1.39	1.81	27.5	19	1.17	1.07	1.45	1.01	5.5	12.0
5	.....	1.01	1.93	1.17	1.74	18.1	20	1.12	1.01	2.05	.91	5.5	7.5
6	.....	.96	1.68	1.07	1.68	38.2	21	1.28	1.23	1.45	.91	4.6	7.8
7	.....	.91	1.45	1.01	2.18	21.2	22	1.45	35.0	1.23	.82	4.2	7.2
8	1.14	.91	1.34	.96	8.4	12.8	23	1.23	9.1	1.45	1.56	3.8	7.2
9	.....	.91	1.34	.96	11.2	9.1	24	1.12	10.5	1.81	3.36	3.8	7.8
10	1.68	.91	1.12	1.12	8.4	12.8	25	1.07	5.2	2.18	7.2	6.0	7.5
11	1.39	.91	1.12	1.12	6.0	9.8	26	1.07	3.8	1.62	6.6	5.0	7.2
12	1.23	.91	1.12	1.01	5.0	7.8	27	.91	3.48	1.39	5.0	6.6	8.1
13	1.17	.82	1.01	1.01	4.4	6.6	28	.91	2.86	1.34	3.8	5.5	5.5
14	2.32	.82	.96	.96	10.1	6.0	29	1.81	2.58	1.23	3.14	6.6	7.8
15	1.39	.72	1.01	.96	7.8	6.3	30	1.17	2.18	1.23	2.72	6.9	9.8
							31	1.12	1.87	.....	2.32	.....	25.4

NOTE.—Daily discharge determined from a rating curve based on the Francis weir formula. Above gage height 0.69 foot the entire length of the wooden dam is considered as a weir. The discharge measurements that have been made check the curve quite closely.

Monthly discharge of Little Tonawanda Creek at Linden, N. Y., for 1912.

[Drainage area, 22 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Millions of gallons.	
July 10-31	2.32	0.91	1.33	0.060	0.05	18.9	A.
August	35.0	.63	3.09	.140	.16	60.9	A.
September	3.36	.96	1.57	.071	.08	30.4	A.
October	7.2	.82	1.91	.087	.10	38.3	A.
November	11.2	1.68	5.31	.241	.27	103.	A.
December	66.2	5.5	13.8	.627	.72	276.	A.

GENESEE RIVER AND TRIBUTARIES.

GENESEE RIVER AT ST. HELENA, N. Y.

Location.—At the steel highway bridge about 6 miles above the mouth of Silver Lake outlet (coming in from the left), 9½ miles above Canaseraga Creek (coming in from the right), and 5½ miles below the village of Portageville and the site of the proposed storage dam of the State of New York Conservation Commission.

Records available.—August 14, 1908, to December 31, 1912. Published also in annual reports of the State Water Supply Commission of New York, 1910, the New York State engineer and surveyor, and the Conservation Commission of New York.

Drainage area.—1,030 square miles.

Gage.—Chain, fastened to the upstream side of the bridge, middle span; read twice daily; datum unchanged. Since August 24, 1911, a Gurley automatic water-stage register with intake pipe to the well a few feet downstream from the chain gage; datum same as chain gage, but slope of water surface makes readings different.

Channel.—Gravel and rocks; fairly permanent.

Discharge measurements.—At high stages made from the bridge; at low stages, by wading near the bridge.

Winter flow.—Relation between gage height and discharge usually but slightly affected by ice; determination of winter discharge considered good.

Accuracy.—Discharge rating curve is well defined and data as published are considered excellent.

Discharge measurements of Genesee River at St. Helena, N. Y., in 1912.

Date.	Hydrographer.	Gage height.		Discharge.
		Chain.	Recording.	
		Feet.	*Feet.*	*Sec.-ft.*
Jan. 4[a]	C. S. De Golyer	2.78	2.72	502
4	do	2.63	2.58	480
Feb. 17[b]	do	3.32	3.29	211
Mar. 10[b]	G. H. Canfield	4.54	4.47	740
22	do	4.44	4.38	2,470
22	do	4.41	4.31	2,440
June 16[c]	Frank Weber	2.02	2.01	196
Oct. 25	C. S. De Golyer	3.34	3.24	954
25	do	3.52	3.40	1,130
29[c]	do	2.84	2.77	552

[a] Some slush ice and ice near shore.
[b] Measurements made under complete ice cover.
[c] Measurements made by wading.

Daily gage height, in feet, from automatic and chain gages, of Genesee River at St. Helena, N. Y., for 1912.

[Herman Piper, observer.]

Day.	January.		February.		March.		April.		May.		June.	
	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.
1	.....	3.2	3.34	2.6	4.50	4.9	8.55	8.6	4.75	5.0	2.56	2.6
2	.....	3.0	3.33	2.7	4.28	4.6	8.13	8.6	4.14	4.2	2.46	2.5
3	.....	2.9	3.32	2.65	4.14	4.4	6.54	6.4	3.82	3.9	2.53	2.55
4	2.71	2.65	3.29	2.6	4.05	4.3	5.38	5.4	3.58	3.7	2.72	2.8
5	2.59	2.55	3.30	2.5	3.99	4.2	6.30	6.6	3.38	3.45	2.48	2.55
6	2.39	2.46	3.31	2.45	3.93	4.2	2.62	7.4	3.34	3.4	2.38	2.48
7	2.47	2.7	3.28	2.5	3.89	4.2	7.39	7.4	3.40	3.55	2.33	2.44
8	2.80	2.75	3.29	2.45	3.93	4.2	6.80	6.9	3.26	3.4	2.28	2.39
9	2.82	2.46	3.28	2.5	4.08	4.2	5.36	5.4	3.12	3.15	2.21	2.24
10	2.70	2.65	3.28	2.45	4.48	4.6	5.28	5.4	3.11	3.2	2.20	2.20
11	2.74	2.8	3.28	2.4	4.48	4.5	4.67	4.7	3.02	3.1	2.13	2.10
12	2.83	2.9	.....	2.5	4.33	4.4	4.64	4.7	2.86	2.95	2.12	2.08
13	2.85	2.8	.....	2.85	4.27	4.3	5.54	5.6	3.04	3.1	1.99	2.04
14	2.85	2.7	.....	2.8	4.18	4.2	4.77	4.8	3.16	3.25	2.10	2.16
15	2.89	2.8	.....	3.0	4.22	4.2	4.96	5.7	3.07	3.1	2.06	2.14
16	3.23	2.9	.....	2.7	5.92	5.9	4.95	5.0	3.79	3.7	2.04	2.16
17	3.42	2.85	.....	3.25	6.32	6.5	4.37	4.4	5.74	5.9	2.09	2.11
18	3.37	2.9	3.31	3.15	7.17	7.3	4.09	4.2	4.56	4.7	2.06	2.08
19	3.49	3.0	3.35	3.35	7.11	7.0	3.99	4.1	3.95	4.0	2.04	2.09
20	4.41	4.2	3.49	3.3	7.26	7.3	3.78	3.85	3.65	3.25	2.00	2.02
21	4.36	4.1	3.67	3.4	5.38	5.4	3.58	3.65	3.42	3.5	2.05	2.04
22	4.10	3.2	4.17	4.3	4.39	4.4	3.48	3.55	3.38	3.55	2.00	2.04
23	3.98	2.8	4.15	4.2	4.08	4.1	3.87	3.9	3.35	3.45	1.75	1.94
24	3.86	3.5	4.20	4.3	3.93	4.2	3.90	4.0	3.06	3.2	1.99	2.02
25	3.71	3.0	4.42	4.5	3.60	3.55	3.73	3.8	2.88	3.0	1.97	2.01
26	3.61	2.8	4.45	4.6	3.38	3.4	3.44	3.55	2.76	2.8	1.96	2.00
27	3.54	2.7	4.72	4.8	3.41	3.55	3.26	3.4	2.67	2.7	1.75	1.66
28	3.46	2.65	4.95	5.1	4.20	4.7	3.14	3.2	2.57	2.65	1.75	1.74
29	3.40	2.6	4.82	5.0	7.95	8.9	4.50	4.6	2.54	2.6	1.83	1.71
30	3.40	2.7	.....	.....	8.35	8.2	6.50	6.5	2.57	2.6	1.70	1.71
31	3.36	2.5	.....	.....	7.24	6.9	.....	.....	2.73	2.8	.....	.....

Daily gage height, in feet, from automatic and chain gages, of Genesee River at St. Helena, N. Y., for 1912—Continued.

Day.	July.		August.		September.		October.		November.		December.	
	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.
1	1.74	1.61	1.68	1.65	2.20	2.16	3.37	2.9	2.45	2.5	2.53	2.6
2	1.79	1.76	1.85	1.85	3.40	3.8	4.00	4.0	2.52	2.55	2.78	2.75
3	1.82	1.72	1.88	1.82	3.45	3.5	3.26	3.3	2.61	2.7	5.42	5.6
4	1.51	1.20	1.88	1.78	3.05	3.1	2.94	3.0	2.53	2.55	4.20	4.3
5	1.79	1.82	2.02	2.09	2.67	2.75	2.78	2.8	2.46	2.49	3.71	3.9
6	1.77	1.74	1.95	2.08	2.50	2.5	2.62	2.65	2.39	2.46	4.84	5.6
7	1.52	1.46	1.86	1.89	2.54	2.6	2.52	2.55	2.50	2.46	4.42	4.5
8	1.85	1.80	1.78	1.79	2.35	2.42	2.42	2.44	4.56	4.9	3.69	3.8
9	1.76	1.79	1.76	1.86	2.25	2.21	2.38	2.44	4.03	4.4	3.17	3.2
10	1.60	1.58	1.75	1.72	2.16	2.24	2.41	2.5	4.19	4.4	3.05	3.1
11	2.01	1.85	1.52	1.52	2.07	2.10	2.83	2.8	3.71	3.9	3.10	3.25
12	2.18	2.21	1.70	1.75	2.00	2.04	2.94	3.0	3.39	3.45	2.84	2.9
13	2.16	2.22	1.83	1.86	2.07	2.12	2.66	2.7	3.18	3.3	2.55	2.65
14	2.06	2.09	1.99	2.09	1.87	1.85	2.56	2.6	3.12	3.3	2.63	2.65
15	2.05	2.08	1.87	1.84	1.82	2.14	2.41	2.5	3.08	3.25	2.70	2.7
16	.....	2.02	1.79	1.71	2.41	2.21	2.31	2.35	2.96	3.05	2.77	2.75
17	.....	1.84	1.72	1.65	3.06	3.1	2.26	2.29	2.86	2.9	2.73	2.75
18	1.91	1.88	1.56	1.54	2.68	2.75	2.21	2.29	2.83	2.9	2.76	2.8
19	1.86	1.82	1.91	1.96	2.58	2.65	2.20	2.31	2.78	2.9	2.94	3.05
20	1.75	1.78	1.83	1.82	2.56	2.6	2.16	2.22	2.76	2.9	3.02	3.2
21	1.57	1.54	1.84	1.85	2.44	2.48	.....	2.24	2.74	2.8	2.83	2.9
22	2.01	2.09	1.83	1.92	2.29	2.34	.....	2.16	2.65	2.7	2.70	2.7
23	1.82	1.82	1.84	1.85	2.26	2.32	.....	3.05	2.57	2.6	2.63	2.7
24	1.82	1.85	1.83	1.84	2.30	2.36	.....	3.8	2.52	2.6	2.63	2.65
25	1.73	1.68	1.75	1.78	3.03	3.15	.....	3.4	2.59	2.7	2.60	2.6
26	1.85	1.81	2.02	2.00	3.21	3.35	3.59	3.65	2.64	2.7	2.55	2.65
27	2.03	2.09	2.48	2.95	2.99	2.95	3.22	3.3	2.66	2.8	2.54	2.55
28	1.88	1.80	2.85	2.9	3.04	3.15	2.91	3.0	2.65	2.7	2.40	2.45
29	2.03	2.04	2.45	2.49	2.75	2.8	2.74	2.85	2.60	2.7	2.24	2.18
30	1.91	1.91	2.29	2.35	2.86	3.0	2.60	2.8	2.58	2.7	2.65	2.7
31	1.78	1.81	2.18	2.24	.....	.....	2.50	2.55	.....	.....	3.51	3.75

NOTE.—Relation of gage height to discharge affected by ice Jan. 4 to Mar. 16. Gage heights for both chain and automatic gages presented for the purpose of comparison. The gage heights given for the automatic gage are the means of hourly readings for 24-hour periods; those for the chain gage are the means of two readings which are usually taken at 8 a. m. and 5 p. m. The readings on the two gages do not agree exactly, owing to the fact that the mouth of the intake pipe to the automatic gage is a few feet downstream from the chain gage and that the slope between the gages varies with the stage.

Daily discharge, in second-feet, from automatic and chain gages of Genesee River at St. Helena, N. Y., for 1912.

Day.	January.		February.		March.		April.		May.		June.	
	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.
1	1,070	.....	340	.....	785	.....	17,100	15,900	3,240	3,600	432	424
2	881	.....	320	.....	644	.....	14,900	15,900	2,150	2,100	379	377
3	789	.....	300	.....	570	.....	8,160	7,120	1,680	1,620	416	400
4	628	.....	280	.....	526	.....	4,680	4,470	1,360	1,340	522	530
5	536	.....	280	.....	498	.....	7,360	7,720	1,110	1,060	390	400
6	398	.....	280	.....	473	.....	12,400	10,400	1,060	1,010	341	368
7	400	.....	240	.....	456	.....	11,300	10,400	1,130	1,160	319	351
8	610	.....	240	.....	473	.....	9,040	8,660	980	1,010	298	329
9	600	.....	240	.....	540	.....	4,630	4,470	840	785	269	270
10	470	.....	240	.....	772	.....	4,430	4,470	830	830	265	255
11	470	.....	240	.....	772	.....	3,080	3,000	748	740	238	219
12	500	.....	240	.....	674	.....	3,030	3,000	620	625	234	212
13	480	.....	240	.....	638	.....	5,100	4,940	766	740	189	199
14	460	.....	230	.....	590	.....	3,280	3,200	880	875	227	241
15	460	.....	230	.....	611	.....	3,680	5,190	793	740	210	233
16	670	.....	230	.....	3,000	.....	3,660	3,600	1,640	1,340	206	241
17	770	.....	231	.....	7,430	7,420	2,530	2,440	5,650	5,720	224	223
18	500	.....	247	.....	10,400	10,000	2,080	2,100	2,870	3,000	213	212
19	750	.....	259	.....	10,200	8,980	1,920	1,940	1,860	1,780	206	216
20	1,450	.....	301	.....	10,800	10,000	1,620	1,550	1,440	875	192	193
21	1,360	.....	363	.....	4,680	4,470	1,360	1,280	1,150	1,110	210	199
22	1,100	.....	585	.....	2,560	2,440	1,230	1,160	1,110	1,160	192	199
23	960	.....	575	.....	2,060	1,940	1,750	1,620	1,080	1,060	119	168
24	910	.....	600	.....	1,840	2,100	1,790	1,780	784	830	189	193
25	700	.....	733	.....	1,380	1,160	1,550	1,480	635	660	182	189
26	620	.....	752	.....	1,110	1,010	1,180	1,160	548	530	179	186
27	550	.....	934	.....	1,140	1,160	980	1,010	492	474	119	95
28	480	.....	1,100	.....	2,250	3,000	860	830	437	449	119	114
29	420	.....	1,000	.....	14,000	17,500	2,760	2,810	421	424	140	106
30	400	.....	.....	.....	16,000	13,900	8,020	7,420	437	424	106	106
31	360	.....	.....	.....	10,700	8,660	.....	.....	529	530	.....	.....

Daily discharge, in second-feet, from automatic and chain gages of Genesee River at St. Helena, N. Y., for 1912—Continued.

Day.	July.		August.		September.		October.		November.		December.	
	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.	Auto.	Chain.
1	116	84	101	93	265	241	1,100	590	374	377	416	424
2	129	118	146	142	1,130	1,480	1,940	1,780	410	400	562	502
3	137	109	154	134	1,190	1,110	980	920	458	474	4,780	1,940
4	64	20	154	123	775	740	681	660	416	400	2,250	2,270
5	129	134	199	216	492	502	562	530	374	373	1,520	1,620
6	124	114	175	212	400	377	464	449	345	359	3,420	4,940
7	66	56	148	153	421	424	410	400	400	359	2,620	2,620
8	146	128	127	125	327	342	360	350	2,870	3,400	1,500	1,480
9	121	126	121	145	285	259	341	350	1,980	2,440	890	830
10	82	78	119	109	249	270	355	377	2,230	2,440	775	740
11	196	142	66	66	216	219	598	530	1,520	1,620	820	875
12	257	259	106	116	192	199	681	660	1,120	1,060	605	590
13	249	263	140	145	216	226	486	474	900	920	426	449
14	213	216	189	216	151	142	432	424	840	920	469	449
15	210	212	151	139	137	233	355	377	802	875	510	474
16	193	193	129	106	355	259	310	313	697	700	555	502
17	139	139	111	93	784	740	289	289	620	590	529	502
18	163	150	74	70	498	502	269	289	598	590	548	530
19	148	134	163	174	442	429	265	297	562	590	681	700
20	119	123	140	134	432	424	249	263	548	590	748	830
21	76	70	143	142	369	368	270	270	535	530	598	590
22	196	216	140	162	302	309	241	241	481	474	510	474
23	137	134	143	142	289	301	700	700	437	424	469	474
24	137	142	140	139	306	317	1,480	1,480	410	424	469	449
25	114	100	119	123	757	785	1,110	1,010	448	474	453	424
26	146	131	199	186	930	965	1,370	1,280	475	474	426	449
27	202	216	390	625	722	625	940	920	486	530	421	400
28	154	128	612	590	766	785	658	660	481	474	350	355
29	202	199	374	373	542	530	535	560	453	474	281	248
30	163	159	302	313	620	660	453	530	442	474	481	474
31	127	131	257	270	.....	.....	400	400	.....	.....	1,260	1,410

NOTE.—Daily discharge Jan. 1–3 and Mar. 17 to Dec. 31 determined from a well-defined rating curve. The same rating curve was used for both sets of gage heights by applying a well-defined table of relation. (See First Ann. Rept. New York Conservation Commission.) Discharge Jan. 4 to Mar. 16 determined by means of a rating curve based on measurements made with ice present and assuming a gradual change from open water to complete ice cover on Feb. 10. On days for which there are no automatic gage heights the chain-gage heights were used to determine discharge. Daily estimates from chain-gage readings for periods during which ice was present not published because of their lower accuracy.

Monthly discharge of Genesee River at St. Helena, N. Y., for 1912.

[Drainage area, 1,030 square miles.]

Month.	Discharge (second-feet).										Run-off (depth in inches on drainage area).
	Maximum.						Minimum.	Mean.		Per square mile.	
	Automatic gage.				Chain gage.			Automatic gage.	Chain gage.		
	Day.	Hour.	Crest gage height.	Crest discharge.	Date.	24-hour discharge.					
January	20	12.45 p. m.	4.76	3,260	.....	.....	360	669	.....	0.650	0.75
February	28	9.45 p. m.	5.03	3,840	.....	.....	230	409	.....	.397	.43
March	30	1.00 a. m.	9.51	22,700	29	17,500	456	3,500	.....	3.40	3.92
April	1	4.00 a. m.	9.26	21,200	1-2	15,900	860	4,850	4,700	4.71	5.26
May	17	3.00 a. m.	6.25	7,200	17	5,720	421	1,270	1,250	1.23	1.42
June	4	5.30 a. m.	2.83	598	4	530	106	244	248	.237	.26
July	12	3.30 a. m.	2.18	257	13	263	64	150	143	.146	.17
August	27	5.30 p. m.	3.61	1,390	27	625	66	178	186	.173	.20
September	2	4.30 p. m.	3.94	1,850	2	1,480	137	485	492	.471	.53
October	2	12.30 a. m.	4.53	2,820	2	1,780	241	622	593	.604	.70
November	8	8.30 a. m.	4.78	3,300	8	3,400	345	757	808	.735	.82
December	3	5.45 a. m.	5.95	6,260	3	4,940	281	979	1,030	.950	1.10
The year	Mar. 30	1.00 a. m.	9.51	22,700	Mar. 29	17,500	64	1,180	.....	1.15	15.56

Discharge for automatic gage rated as follows: Mar., B; April-June, A; July and Aug., B; Sept. to Dec., A.

GENESEE RIVER AT JONES BRIDGE, NEAR MOUNT MORRIS, N. Y.

Location.—At the highway bridge known as Jones Bridge, about 5 miles below the village of Mount Morris, 6 miles by river above the village of Geneseo, 1¾ miles below the inflow of Canaseraga Creek (coming in from the right) and about 1¾ miles above the mouth of Beads Creek (coming in from the left).

Records available.—May 22, 1903, to Apr. 30, 1906; Aug. 12, 1908, to Dec. 31, 1912. Published also in reports of State engineer and surveyor of New York, State Water Supply Commission of New York, and Conservation Commission of New York.

Drainage area.—1,410 square miles.

Gage.—Chain, fastened to upstream side of highway bridge; read twice daily; datum unchanged.

Channel.—Sandy clay; liable to shift, but measurements have shown it to be fairly permanent in recent years.

Discharge measurements.—Made at all stages from footbridge erected on the outriggers of the bridge.

Winter flow.—Relation between gage height and discharge for the winter months considerably affected by ice. Volume of flow during the winter months determined chiefly by comparison with the flow of the Genesee at Rochester and at St. Helena.

Accuracy.—Discharge curve well developed and data as published for open-water periods believed to be very good.

Discharge measurements of Genesee River at Jones Bridge, near Mount Morris, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 13[a]	G. H. Canfield	7.34	857
July 18[b]	Frank Weber	3.90	257

[a] Partly open at bridge. Control frozen. [b] Wading under bridge.

Daily gage height, in feet, of Genesee River at Jones Bridge, near Mount Morris, N. Y., for 1912.

[J. W. Trewer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.4	.....	8.8	26.2	11.6	4.95	3.61	3.61	4.3	5.4	4.75	4.9
2	6.3	.....	8.6	26.1	8.9	4.75	3.56	3.66	5.8	8.0	4.7	5.1
3	5.9	.....	7.3	23.9	7.8	4.85	3.57	3.78	6.7	6.1	4.8	12.2
4	5.8	.....	7.0	17.8	7.0	5.0	3.47	3.92	6.2	5.5	4.8	8.6
5	8.1	.....	6.8	16.2	6.5	4.75	3.61	3.90	5.4	5.2	4.75	7.1
6	.....	.....	6.6	22.5	6.3	4.6	4.05	4.05	5.1	5.0	4.6	9.2
7	.....	.....	6.6	21.8	6.4	4.45	3.61	4.05	4.9	4.9	4.6	9.8
8	.....	.....	6.7	21.8	6.2	4.4	3.61	3.82	4.9	4.7	8.4	7.3
9	.....	.....	7.0	16.0	6.0	4.35	3.48	3.69	4.5	4.65	8.1	6.1
10	.....	.....	7.6	13.3	5.7	4.2	4.55	3.68	4.25	4.55	8.2	5.6
11	.....	.....	7.8	10.9	5.6	4.2	4.1	3.54	4.2	5.0	7.0	5.8
12	.....	.....	7.5	9.9	5.5	4.25	4.4	3.55	4.2	5.5	6.2	5.6
13	.....	.....	7.4	13.2	5.6	4.15	4.35	3.66	4.25	5.0	5.9	6.4
14	.....	.....	7.4	10.7	5.9	4.05	4.25	3.49	4.15	4.9	5.7	6.3
15	.....	.....	8.2	10.5	5.7	4.1	4.1	3.82	3.82	4.7	5.7	6.2
16	.....	.....	13.8	11.3	6.3	3.95	4.2	3.78	4.15	4.5	5.6	5.5
17	.....	.....	22.6	10.0	13.4	4.05	4.05	3.69	5.7	4.45	5.4	5.5
18	.....	.....	24.7	8.6	10.4	4.15	3.88	3.56	5.1	4.4	5.3	5.2
19	.....	.....	25.0	8.3	8.3	4.05	3.89	3.75	4.95	4.35	5.2	5.4
20	.....	.....	24.7	7.6	7.3	3.99	3.71	3.79	4.85	4.35	5.1	5.5
21	.....	.....	18.2	7.0	6.6	3.98	3.60	3.91	4.7	4.3	5.1	5.2
22	.....	.....	11.0	6.8	6.2	4.0	3.81	4.15	4.4	4.2	5.1	5.2
23	.....	.....	9.8	6.5	6.4	3.82	3.85	4.0	4.35	4.35	4.9	5.1
24	.....	.....	8.8	7.8	5.8	3.87	3.88	4.1	4.5	7.1	4.8	5.2
25	.....	.....	7.6	7.4	5.4	4.1	3.91	3.82	5.2	6.0	4.85	5.0
26	.....	.....	6.9	6.7	5.2	4.05	3.64	3.95	6.1	6.7	5.0	5.0
27	.....	.....	7.3	6.3	5.0	3.92	3.71	4.2	5.4	6.0	5.0	5.0
28	.....	10.2	8.4	6.0	4.85	3.77	3.81	5.7	5.7	5.5	5.1	4.6
29	.....	9.9	20.7	7.1	4.8	3.75	3.82	5.4	5.2	5.2	5.0	4.5
30	.....	.....	25.8	17.4	4.9	3.71	4.0	4.45	5.0	5.0	4.95	5.0
31	.....	.....	24.2	.....	5.2	.....	3.71	4.2	.....	4.85	.....	6.2

NOTE.—Relation of gage height to discharge affected by ice Jan. 5 to Mar. 16.

Daily discharge, in second-feet, of Genesee River at Jones Bridge, near Mount Morris, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,450	.....	.....	16,500	4,870	687	175	175	402	910	595	664
2	1,400	.....	.....	16,400	2,980	595	162	188	1,120	2,400	572	760
3	1,180	.....	.....	14,700	2,270	641	165	222	1,620	1,280	618	5,220
4	1,120	.....	.....	9,800	1,790	710	141	267	1,340	960	618	2,790
5	.....	.....	.....	8,520	1,500	595	175	260	910	810	595	1,850
6	.....	.....	.....	13,600	1,400	528	311	311	760	710	528	3,190
7	.....	.....	.....	13,000	1,450	463	175	311	664	664	528	3,610
8	.....	.....	.....	13,000	1,340	442	175	234	664	572	2,660	1,970
9	.....	.....	.....	8,360	1,230	422	143	195	484	550	2,460	1,280
10	.....	.....	.....	6,200	1,060	364	506	193	383	506	2,530	1,010
11	.....	.....	.....	4,380	1,010	364	328	158	364	710	1,790	1,120
12	.....	.....	.....	3,680	960	383	442	160	364	960	1,340	1,010
13	.....	.....	.....	6,120	1,010	346	422	188	383	710	1,180	1,450
14	.....	.....	.....	4,240	1,180	311	383	146	346	664	1,060	1,400
15	.....	.....	.....	4,100	1,060	328	328	234	234	572	1,060	1,340
16	.....	.....	.....	4,660	1,400	277	364	222	346	484	1,010	960
17	.....	.....	13,600	3,750	6,280	311	311	195	1,060	463	910	960
18	.....	.....	15,300	2,790	4,030	346	254	162	760	442	860	810
19	.....	.....	15,600	2,600	2,600	311	257	213	687	422	810	910
20	.....	.....	15,300	2,150	1,970	291	201	225	641	422	760	960
21	.....	.....	10,100	1,790	1,560	287	172	263	572	402	760	810
22	.....	.....	4,450	1,670	1,340	294	231	346	442	364	760	810
23	.....	.....	3,610	1,500	1,450	234	244	294	422	422	664	760
24	.....	.....	2,920	2,270	1,120	250	254	328	484	1,850	618	810
25	.....	.....	2,150	2,030	910	328	263	234	810	1,230	641	710
26	.....	.....	1,730	1,620	810	311	182	277	1,280	1,620	710	710
27	.....	.....	1,970	1,400	710	267	201	364	910	1,230	710	710
28	.....	.....	2,660	1,230	641	219	231	1,060	1,060	960	760	528
29	.....	.....	12,100	1,850	618	213	234	910	810	810	710	484
30	.....	.....	16,200	9,480	664	201	294	463	710	710	687	710
31	.....	.....	14,900	.....	810	.....	201	364	.....	641	.....	1,340

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Genesee River at Jones Bridge, near Mount Morris, N. Y., for 1912.

[Drainage area, 1,410 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	.....	.....	780	0.553	0.64	C.
February	.....	.....	580	.411	.44	C.
March	16,200	.....	4,500	3.19	3.68	B.
April	16,500	1,230	6,110	4.33	4.83	A.
May	6,280	618	1,680	1.19	1.37	A.
June	710	201	377	.267	.30	A.
July	506	141	256	.182	.21	A.
August	1,060	146	296	.210	.24	A.
September	1,620	234	701	.497	.55	A.
October	2,400	364	821	.582	.67	A.
November	2,660	528	983	.697	.78	A.
December	5,220	484	1,340	.950	1.10	A.
The year	16,500	141	1,540	1.09	14.81	

NOTE.—Discharge Jan. 5 to Mar. 16 estimated by means of comparison with discharge at Rochester and St. Helena.
Mean discharge Jan. 5–31 estimated 705 second-feet.
Mean discharge Mar. 1–16 estimated 430 second-feet.

GENESEE RIVER AT ROCHESTER, N. Y.

Location.—At the highway bridge known locally as Elmwood Avenue Bridge, at the north end of South Park, 3½ miles above the center of the city of Rochester, 3¼ miles below the mouth of Black Creek (coming in from the left), and 7½ miles above the mouth of the river.

Records available.—February 9, 1904, to December 31, 1912, published also in annual reports of the State engineer and surveyor, the State Water Supply Commission, and the Conservation Commission of the State of New York. Elevation of water surface, measurements, and records of flow of Genesee River at Rochester during flood stages, and low water previous to 1904, published in annual reports of the State engineer and surveyor, 1902–3–4, and in Water-Supply Papers 24, 65, and 97.

Drainage area.—2,360 square miles.

Gage.—Prior to 1910 a staff gage bolted to the downstream end of the first pier from the right-hand abutment was read once daily. From December, 1910, to December, 1912, gage heights recorded by a Gurley automatic water stage register in the pump house immediately below the bridge on the right-hand bank. Elevation of zero of gage, 506.848 Barge Canal datum and 245.591 Rochester City datum. Gage datum unchanged since installation of the station.

Channel.—Gravel; smooth; considered permanent.

Discharge measurements.—Made from bridge at which the staff gage is located. Prior to 1904 measurements and elevations of water surface taken in conjunction with the water flowing over and around Johnson-Seymour dam in the city of Rochester.

Winter flow.—Affected by ice for short periods, although, as a rule, the channel is open.

Accuracy.—Discharge rating curve well developed for all stages; published data considered good for periods of open water.

Cooperation.—Gage attended by Mr. G. A. Bailey, of the Rochester Light & Railway Co.

Discharge measurements of Genesee River at Rochester, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 13[a]	C. S. De Golyer	1.76	342
Mar. 15[b]	G. H. Canfield	3.10	1,830

[a] Measurement made under complete ice cover, about 1,500 feet above bridge.
[b] Measurement made under complete ice cover, about 1,000 feet below gage.

Daily gage height, in feet, of Genesee River at Rochester, N. Y., for 1912.

[G. A. Bailey, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.14	2.04	3.85	9.4	5.5	1.76	1.04	1.04	1.09	1.44	0.58	1.41
2	2.09	1.99	3.37	9.9	4.0	1.78	1.07	1.03	1.00	2.02	1.11	1.41
3	2.03	1.93	2.95	10.1	3.2	1.54	1.05	1.02	1.63	2.15	1.00	1.74
4	2.06	1.89	2.65	9.7	2.8	1.28	1.05	1.03	2.09	1.74	1.00	3.72
5	1.94	1.88	2.45	8.4	2.49	1.52	1.07	1.01	1.86	1.53	.77	2.99
6	.....	1.85	2.32	7.6	2.32	1.85	1.07	1.05	1.57	1.41	.62	2.46
7	.....	1.80	2.24	8.0	2.28	1.75	1.06	1.02	1.40	1.33	1.03	3.44
8	.....	1.77	2.24	8.2	2.30	1.68	1.04	1.02	1.32	1.30	1.56	3.20
9	2.14	1.78	2.34	8.1	2.21	1.65	.98	1.00	1.25	1.24	2.76	2.45
10	2.29	1.80	2.43	6.8	2.09	1.58	.98	.99	1.19	1.19	2.56	1.92
11	2.25	1.80	2.57	5.5	2.00	1.56	1.16	.99	1.13	1.19	2.51	1.84
12	2.04	1.76	2.76	4.6	1.92	1.54	1.24	.....	1.08	1.26	2.17	2.05
13	1.91	1.77	2.74	4.5	1.88	1.52	1.22	.....	1.03	1.48	1.95	2.56
14	1.90	1.74	2.69	4.8	1.90	1.48	1.18	.92	1.02	1.37	1.81	2.33
15	1.79	1.74	3.32	4.3	1.96	1.41	1.20	.91	1.02	1.30	1.75	1.96
16	1.76	1.76	5.4	4.45	1.99	1.40	1.44	.90	1.00	1.23	1.71	1.70
17	1.75	1.76	7.5	4.3	3.5	1.34	1.26	.91	.96	1.15	1.60	1.64
18	1.73	1.75	6.6	3.7	4.8	1.34	1.12	.96	.95	1.10	1.54	1.59
19	1.72	1.74	7.1	3.4	3.85	1.36	1.04	.92	1.17	1.05	1.51	1.59
20	1.86	2.23	8.6	3.2	3.1	1.34	1.01	.93	1.54	.98	1.46	1.64
21	2.13	3.44	9.0	2.95	2.85	1.26	1.03	.98	1.44	.89	1.44	1.70
22	2.72	3.18	7.7	2.75	2.85	1.23	1.02	.97	1.34	.92	1.44	1.61
23	2.84	2.70	5.2	2.9	2.8	1.25	1.01	1.02	1.30	.95	1.38	1.69
24	2.72	2.81	4.05	3.2	2.7	1.19	1.03	1.02	1.21	.95	1.38	1.45
25	2.60	2.85	3.5	3.15	2.33	1.19	1.03	1.00	1.20	1.80	1.37	1.48
26	2.45	3.07	3.05	2.9	2.07	1.18	1.00	.94	1.19	1.85	1.36	1.43
27	2.29	3.39	2.9	2.6	1.93	1.18	.97	.96	1.21	1.89	1.36	1.41
28	2.17	3.85	3.8	2.37	1.78	1.16	.98	1.02	1.67	1.89	1.42	1.42
29	2.14	4.05	5.9	2.24	1.73	1.09	1.03	1.44	1.69	1.56	1.40	1.45
30	2.10	.....	7.8	3.85	1.66	1.04	1.08	1.34	1.47	1.34	1.38	1.32
31	2.07	.....	8.9	.....	1.67	.....	1.05	1.19	.....	1.14	.....	1.41

NOTE.—Mean gage height obtained by averaging hourly readings for each 24-hour period. Relation of gage height to discharge affected by ice Jan. 4 to Mar. 17.

Daily discharge, in second-feet, of Genesee River at Rochester, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,850	740	3,110	22,800	9,900	1,240	354	354	396	782	102	743
2	1,760	640	2,250	24,700	5,800	1,270	380	346	320	1,640	414	743
3	1,650	580	1,610	25,400	3,940	916	362	337	1,040	1,870	320	1,210
4	1,660	520	1,200	24,000	3,100	588	362	346	1,760	1,210	320	5,130
5	1,440	500	958	19,200	2,480	888	380	328	1,390	902	178	3,480
6	1,400	460	812	16,400	2,180	1,380	380	362	958	743	118	2,430
7	1,400	420	730	17,800	2,100	1,220	371	337	730	646	345	4,470
8	1,500	360	730	18,500	2,140	1,120	354	337	634	610	944	3,940
9	1,600	360	834	18,200	1,980	1,080	306	320	555	544	3,020	2,410
10	1,840	360	934	13,900	1,760	972	306	313	490	490	2,620	1,480
11	1,660	360	1,100	9,900	1,600	944	462	313	433	490	2,520	1,360
12	1,340	334	1,340	7,380	1,480	916	544	297	388	566	1,910	1,690
13	1,100	340	1,310	7,100	1,420	888	522	281	345	834	1,520	2,620
14	1,080	321	1,250	7,940	1,450	834	481	264	337	694	1,320	2,190
15	880	321	2,170	6,580	1,540	743	500	257	337	610	1,220	1,540
16	840	334	6,700	6,970	1,580	730	782	250	320	533	1,160	1,150
17	780	334	16,100	6,580	4,600	658	566	257	292	452	1,000	1,060
18	760	328	13,200	5,080	7,940	658	424	292	285	405	916	986
19	700	321	14,800	4,380	5,440	682	354	264	471	362	874	986
20	880	720	20,000	3,940	3,720	658	328	271	916	306	808	1,060
21	1,170	2,370	21,400	3,400	3,200	566	346	306	782	244	782	1,150
22	2,000	1,950	16,800	3,000	3,200	533	337	299	658	264	782	1,020
23	2,140	1,260	9,060	3,300	3,100	555	328	337	610	285	706	1,140
24	1,960	1,410	5,930	3,940	2,900	490	346	337	511	285	706	795
25	1,700	1,460	4,600	3,830	2,190	490	346	320	500	1,300	694	834
26	1,500	1,780	3,610	3,300	1,730	481	320	278	490	1,380	682	769
27	1,200	2,280	3,300	2,700	1,500	481	299	292	511	1,440	682	743
28	1,000	3,110	5,320	2,270	1,270	462	306	337	1,100	1,440	756	756
29	920	3,510	11,100	2,030	1,200	396	346	782	1,140	944	730	795
30	860	.....	17,100	5,440	1,090	354	388	658	821	658	706	634
31	780	.....	21,000	.....	1,100	.....	362	490	.....	443	.....	743

NOTE.—Daily discharge Jan. 1-3 and Mar. 17 to Dec. 31 determined from a fairly well defined rating curve. Discharge Feb. 10 to Mar. 15 determined from a rating curve based on measurements with ice present; discharge Jan. 4 to Feb. 9 estimated by assuming that the conditions of flow were changing gradually from open water to complete ice cover; discharge Mar. 16 estimated; discharge Aug. 12 and 13 interpolated.

Monthly discharge of Genesee River at Rochester, N. Y., for 1912.

[Drainage area 2,360 square miles.]

Month.	Maximum.				Minimum.	Mean.	Per square mile.	Run-off depth in inches.	Accuracy.
	Day.	Hour.	Gage height.	Discharge.					
			Feet.	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*	*Sec.-ft.*		
January	23	9.00 p. m.	2.93	a 2,300	a 700	1,330	0.564	0.65	B.
February	29	11.45 a. m.	4.09	a 3,550	a 320	958	.406	.44	B.
March	20	10.45 p. m.	9.26	22,300	a 730	6,790	2.88	3.32	B.
April	3	12.45 p. m.	10.10	25,500	2,000	10,000	4.24	4.73	A.
May	1	5.00 a. m.	5.87	11,000	1,060	2,860	1.21	1.40	A.
June	2	6.00 a. m.	1.92	1,480	320	773	.328	.37	A.
July	16	3.15 a. m.	1.53	902	271	395	.167	.19	B.
August	29	1.30 p. m.	1.50	860	238	341	.144	.17	B.
September	3	11.30 p. m.	2.16	1,890	257	651	.276	.31	A.
October	2	9.45 p. m.	2.43	2,370	232	754	.319	.37	A.
November	9	8.30 p. m.	2.88	3,260	102	962	.408	.46	A.
December	4	10.30 a. m.	3.91	5,580	610	1,610	.682	.79	A.
The year	Apr. 3	12.45 p. m.	10.10	25,500	102	2,280	.966	13.20	

a Discharge from ice rating.

CANASERAGA CREEK NEAR DANSVILLE, N. Y.

Location.—At the highway bridge 1 mile due west from the village of Dansville, about 2,200 feet below the mouth of Mill Brook (coming in from the right) and about 22 miles above the mouth of the creek.

Records available.—July 21, 1910, to December 31, 1912. Data published also in annual reports of State Water Supply Commission, State Conservation Commission, and State engineer and surveyor, State of New York.

Drainage area.—167 square miles.

Gage.—Staff, bolted to the downstream side of the left-hand abutment; read twice daily; datum unchanged.

Channel.—Sand and gravel; shifts during high water.

Discharge measurements.—At high stages made from the bridge; at low stages, by wading below the bridge.

Winter flow.—The relation of gage height to discharge is affected by ice.

Accuracy.—Discharge rating curves somewhat uncertain because of shifting channels. Estimates as published only fair.

Discharge measurements of Canaseraga Creek near Dansville, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 12[a]	G. H. Canfield	2.61	97.3	July 19[b]	Frank Weber	2.13	33.4
17	do	4.21	1,500	Sept. 23[c]	J. G. Mathers	2.09	29.2
18	do	3.58	984	23[c]	do	2.10	31.0
23	do	2.67	263	Oct. 26[c]	C. S. De Golyer	2.37	75.3
24	do	2.53	200	26[c]	do	2.37	73.5
Apr. 4	G. K. Larrison	3.05	409	28[c]	do	2.27	50.9
Apr. 6	do	3.82	1,120				

[a] Made one-fourth mile below station; ice at control.
[b] Made by wading above bridge.
[c] Made by wading below gage.

Daily gage height, in feet, of Canaseraga Creek near Dansville, N. Y., for 1912.

[Floyd Harter, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.69	.....	.....	4.2	3.2	2.72	2.22	2.12	2.38	2.40	2.22	2.32
2	2.54	.....	.....	4.5	3.05	2.72	2.22	2.18	3.18	2.22	2.18	2.30
3	2.34	.....	.....	3.3	2.98	2.82	2.25	2.28	2.92	2.20	2.22	2.40
4	.....	.....	.....	3.1	2.88	2.72	2.20	2.32	2.48	2.15	2.18	2.70
5	.....	.....	.....	4.0	2.72	2.72	2.22	2.22	2.22	2.18	2.20	2.62
6	.....	.....	.....	4.15	2.62	2.75	2.32	2.32	2.16	2.15	2.18	2.72
7	.....	.....	.....	4.1	2.72	2.60	2.30	2.22	2.12	2.18	2.62	2.55
8	.....	.....	.....	3.3	2.78	2.48	2.22	2.13	2.10	2.18	2.82	2.32
9	.....	.....	.....	3.2	2.55	2.42	4.2	2.12	2.13	2.18	2.62	2.28
10	.....	.....	.....	3.05	2.45	2.35	3.55	2.12	2.12	2.22	2.48	2.30
11	.....	.....	.....	2.98	2.50	2.32	3.2	2.10	2.12	2.15	2.32	2.32
12	.....	.....	.....	2.98	2.58	2.32	3.2	2.14	2.15	2.18	2.32	2.32
13	.....	.....	2.15	2.88	2.70	2.32	2.90	2.08	2.12	2.15	2.28	2.30
14	.....	.....	1.92	3.0	2.52	2.28	3.3	2.02	2.18	2.12	2.32	2.38
15	.....	.....	3.65	3.3	2.48	2.22	2.72	2.02	2.22	2.08	2.28	2.35
16	.....	.....	3.8	3.1	3.4	2.28	2.52	2.00	2.30	2.05	2.25	2.42
17	.....	.....	3.9	2.92	2.35	2.28	2.38	2.08	2.18	2.10	2.32	2.42
18	.....	.....	4.1	3.1	3.3	2.22	2.32	2.28	2.40	2.08	2.30	2.55
19	.....	.....	3.85	2.82	3.2	2.20	2.20	2.22	2.22	2.08	2.25	2.50
20	.....	.....	3.7	2.2	3.1	2.22	2.20	2.30	2.22	2.10	2.25	2.48
21	.....	.....	3.2	1.95	2.95	2.22	2.30	2.22	2.18	2.05	2.22	2.42
22	.....	.....	2.92	2.22	2.82	2.28	2.22	2.22	2.18	2.08	2.25	2.42
23	.....	.....	2.65	2.30	2.82	2.22	2.18	2.58	2.15	2.42	2.22	2.42
24	.....	.....	2.55	2.01	2.78	2.22	2.15	2.45	2.55	2.48	2.32	2.42
25	.....	.....	2.65	1.90	2.70	2.18	2.12	2.22	2.58	2.38	2.35	2.40
26	.....	.....	2.65	1.82	2.72	2.20	2.38	2.28	2.30	2.38	2.32	2.45
27	.....	.....	3.05	1.78	2.75	2.22	2.18	2.28	2.18	2.38	2.30	2.58
28	.....	.....	3.52	1.72	2.70	2.20	2.12	2.22	2.15	2.30	2.28	2.48
29	.....	.....	5.2	2.30	2.72	2.25	2.10	2.20	2.28	2.28	2.25	2.65
30	.....	.....	3.95	3.4	2.65	2.22	2.13	2.18	2.78	2.28	2.28	2.98
31	.....	.....	3.7	.....	2.65	.....	2.10	2.12	.....	2.25	.....	2.92

NOTE.—Definite information regarding effect of ice is lacking, but backwater from ice may have affected the relation between gage height and discharge during March.

Daily discharge, in second-feet, of Canaseraga Creek near Dansville, N. Y., for 1910–1912.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.							16	.....	22	22	20	38	.....
1	.....	25	33	25	28	49	17	.....	25	25	22	33	.....
2	.....	25	25	20	30	61	18	.....	28	25	22	33	.....
3	.....	28	42	20	25	81	19	.....	38	28	18	49	.....
4	.....	28	30	18	30	69	20	.....	28	25	18	42	.....
5	.....	25	25	18	30	65							
							21	25	25	22	22	33	.....
6	.....	25	38	25	30	49	22	22	25	22	25	30	.....
7	.....	28	28	55	28	45	23	25	22	22	22	38	.....
8	.....	25	25	28	28	33	24	28	20	38	25	30	.....
9	.....	25	28	25	45	42	25	25	22	28	42	81	.....
10	.....	49	25	25	69	38							
							26	25	33	25	33	69	.....
11	.....	33	22	22	98	.....	27	25	25	25	33	55	.....
12	.....	25	22	25	49	.....	28	30	25	22	30	75	.....
13	.....	25	22	22	30	.....	29	25	22	22	33	65	.....
14	.....	25	25	20	33	.....	30	38	22	25	30	49	.....
15	.....	22	22	22	20	.....	31	25	22	.....	33	.....	.....

Daily discharge, in second-feet, of Canaseraga Creek, near Danville, N. Y., for 1910–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1			550	105	140	105	30	10	115	77	83	120
2			550	75	208	105	28	10	55	110	77	108
3			390	85	166	75	25	12	53	63	71	115
4			301	90	140	61	20	33	32	77	49	120
5			350	468	130	85	12	28	61	71	63	90
6			310	450	110	81	18	20	61	49	67	100
7			208	1,140	90	61	20	18	36	355	105	108
8			218	700	98	69	18	22	120	283	69	120
9			301	372	90	49	22	18	77	283	132	105
10			515	320	69	45	20	10	44	194	100	140
11			700	274	69	75	22	18	32	120	81	120
12			930	197	61	110	20	10	42	125	108	150
13			1,190	175	49	130	22	12	53	90	110	550
14			1,520	225	49	105	20	10	36	73	105	390
15			1,520	184	45	75	15	30	32	73	125	261
16			745	140	33	55	20	85	33	57	105	390
17		142	515	175	69	42	75	42	33	49	132	366
18		700	620	160	75	38	55	61	30	73	366	261
19		880	620	135	49	33	33	42	42	53	222	241
20		700	450	184	49	30	61	22	39	42	190	132
21		450	301	160	55	33	30	20	29	44	138	88
22		320	301	175	49	42	28	22	28	57	120	110
23		148	288	233	55	33	25	22	32	67	105	222
24		81	184	184	75	30	22	30	38	49	122	233
25		175	350	140	105	33	20	69	36	53	112	187
26		384	390	115	81	30	18	42	47	42	108	158
27		700	1,460	90	61	42	15	22	33	61	105	315
28		660	1,080	69	55	69	12	175	36	57	95	218
29			320	45	33	49	12	190	49	49	158	163
30			218	42	30	30	12	115	57	55	125	172
31			148		45		10	110		93		288
1912.												
1	261			1,520	480	200	50	34	84	89	50	71
2	204			1,880	380	200	50	43	466	50	43	66
3	145			620	338	250	56	62	302	46	50	89
4				480	280	200	46	71	110	38	43	190
5				1,290	200	200	50	50	50	43	46	158
6				1,460	158	215	71	71	40	38	43	200
7				1,400	200	150	66	50	34	43	158	132
8				560	230	110	50	36	31	43	250	71
9				480	132	94	1,520	34	36	43	158	62
10				380	102	78	800	34	34	50	110	66
11				338	115	71	480	31	34	38	71	71
12				338	143	71	480	37	38	43	71	71
13			98	280	190	71	290	28	34	38	62	66
14			49	350	122	62	560	21	43	34	71	84
15			930	560	110	50	200	21	50	28	62	78
16			1,080	410	650	62	122	18	66	24	56	94
17			1,190	302	605	62	84	28	43	31	71	94
18			1,410	410	560	50	71	62	89	28	66	132
19			1,140	250	480	46	46	50	50	28	56	115
20			980	46	410	50	46	66	50	31	56	110
21			550	14	320	50	66	50	43	24	50	94
22			372	50	250	62	50	50	43	28	56	94
23			245	66	250	50	43	143	38	94	50	94
24			208	19	230	50	38	102	132	110	71	94
25			245	10	190	43	34	50	143	84	78	89
26			245	6	200	46	84	62	66	84	71	102
27			450	4	215	50	43	62	43	84	66	143
28			808	3	190	46	34	50	38	66	62	110
29			2,820	66	200	56	31	46	62	62	56	170
30			1,240	650	170	50	36	43	230	62	62	338
31			980		170		31	34		56		302

NOTE.—Daily discharge for 1910 and 1911, and from Jan. 1 to 3 and Mar. 13 to Apr. 3, 1912, determined from a poorly defined rating curve; discharge June 18, 1911, interpolated.

Monthly discharge of Canaseraga Creek near Dansville, N. Y., for 1910–1912.

[Drainage area, 167 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1910.						
July 21-31	38	22	26.6	0.159	0.07	C.
August	49	20	26.4	.158	.18	C.
September	42	22	26.3	.157	.18	C.
October	55	18	25.7	.154	.18	C.
November	98	25	43.4	.260	.29	C.
1911.						
February 17-28	880	81	445	2.66	1.19	D.
March	1,520	148	566	3.39	3.91	D.
April	1,140	42	230	1.38	1.54	B.
May	208	30	78.5	.470	.54	B.
June	130	30	60.7	.363	.40	B.
July	75	10	24.5	.147	.17	C.
August	190	10	42.9	.257	.30	C.
September	120	28	47.0	.281	.31	C.
October	355	42	95.0	.569	.66	B.
November	366	49	118	.707	.79	B.
December	550	88	198	1.19	1.37	B.
1912.						
March	2,820	49	529	3.17	3.66	D.
April	1,880	3	475	2.84	3.17	B.
May	650	102	267	1.60	1.84	B.
June	250	43	93.2	.558	.62	B.
July	1,520	31	182.	1.09	1.26	B.
August	143	18	49.6	.297	.34	B.
September	466	31	84.1	.504	.56	B.
October	110	24	50.3	.301	.35	B.
November	250	43	73.8	.442	.49	B.
December	338	62	118	.707	.82	B.

NOTE.—Mean discharge Mar. 1 to 12, 1912, estimated 110 second-feet by means of comparison with adjacent stations.

KESHEQUA CREEK AT SONYEA, N. Y.

Location.—On the second highway bridge in the village of Sonyea, 2¼ miles above its confluence with Canaseraga Creek and about 4 miles downstream from Tuscarora.

Records available.—July 22, 1910, to December 31, 1912. Data also in annual reports of State Water Supply Commission, New York State Conservation Commission, and State engineer and surveyor, State of New York.

Drainage area.—67 square miles.

Gage.—Staff, fastened to a pile on the right bank directly back of and across from the Craig Colony power house; used for low-water readings. Chain gage installed October 25, 1910, on upstream side of second bridge; used since that date. Gage read twice daily. The zeros of these gages are not set at the same datum.

Channel.—Sand and gravel; shifts at high stages.

Discharge measurements.—At high stages made from either bridge; at low stages, by wading.

Winter flow.—Relation of gage height to discharge affected by ice.

Accuracy.—Discharge rating curves somewhat uncertain because of shifting channels. Estimates as published only fair.

Dischage measurements of Keshequa Creek at Sonyea, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 14[a]	G. H. Canfield.....	5.38	81.2	Apr. 6	G. K. Larrison	4.63	385
16[b]	.....do.....	5.87	630	July 17[c]	Frank Weber.....	3.17	7.3
17[b]	.....do.....	4.99	286	19[c]	.....do.....	3.03	3.7
19	.....do.....	4.45	255	Sept. 21[d]	J. G. Mathers.....	3.11	5.8
19	.....do.....	5.06	556	21[d]	.....do.....	3.10	5.5
23	.....do.....	3.56	50.0	Oct. 26	C. S. DeGolyer.....	3.74	41.9
Apr. 5	G. K. Larrison.....	5.28	791	28	.....do.....	3.42	16.8

[a] Made under complete ice cover.
[b] Obstructed by ice.
[c] Made by wading below gage.
[d] Made by wading ¼ mile above gage.

Daily gage height, in feet, of Keshequa Creek at Sonyea, N. Y., for 1912.

[F. E. Reynolds, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.80	.....	5.4	4.8	3.98	3.38	3.00	3.02	3.30	3.22	3.25	3.45
2	3.65	.....	5.3	5.2	3.85	3.35	2.95	3.08	3.52	3.20	3.20	3.50
3	3.60	.....	.....	4.22	3.75	3.32	2.98	3.22	3.65	3.15	3.25	3.80
4	3.55	.....	.....	3.68	3.68	3.30	2.95	3.12	3.42	3.12	3.25	3.72
5	3.42	.....	.....	5.1	3.62	3.30	3.08	3.15	3.20	3.10	3.25	4.20
6	.....	.....	.....	4.7	3.65	3.30	3.18	3.10	3.15	3.05	3.25	4.82
7	.....	.....	5.3	5.5	3.65	3.28	3.08	3.08	3.08	3.05	3.35	3.92
8	.....	.....	.....	4.9	3.58	3.25	2.98	3.08	3.05	3.10	3.70	3.68
9	.....	.....	.....	4.18	3.58	3.18	2.90	2.98	3.02	3.10	3.85	3.55
10	.....	.....	.....	4.15	3.58	3.15	3.40	3.08	3.00	3.10	3.72	3.55
11	.....	.....	.....	4.00	3.48	3.15	3.55	3.00	3.00	3.18	3.62	3.50
12	.....	.....	.....	4.08	3.42	3.20	3.68	3.10	3.00	3.15	3.38	3.40
13	.....	.....	5.2	4.15	3.58	3.20	3.32	3.10	2.98	3.20	3.35	3.30
14	.....	.....	5.2	4.02	3.60	3.18	3.52	3.10	2.95	3.18	3.35	3.20
15	.....	.....	6.0	4.18	3.60	3.15	3.32	3.05	3.22	3.15	3.35	3.20
16	.....	.....	6.1	4.05	4.18	3.05	3.20	2.98	3.52	3.10	3.32	3.22
17	.....	.....	5.7	3.90	4.25	3.08	3.18	2.98	3.48	3.20	3.30	3.25
18	.....	.....	5.0	3.90	3.90	3.12	3.10	3.08	3.38	3.20	3.30	3.25
19	4.7	.....	4.9	3.88	3.72	3.10	3.02	3.10	3.22	3.18	3.30	3.30
20	4.65	5.0	4.7	3.85	3.70	3.12	3.05	3.05	3.10	3.20	3.30	3.40
21	4.55	4.8	3.80	3.70	3.60	3.10	3.02	3.12	3.05	3.52	3.25	3.35
22	4.55	4.75	3.75	3.78	3.70	3.10	3.02	3.20	3.05	3.48	3.25	3.25
23	.....	4.7	3.70	4.00	3.60	3.10	3.08	3.08	3.05	3.62	3.25	3.20
24	.....	5.0	3.60	3.85	3.60	3.08	3.00	3.05	3.20	3.72	3.25	3.30
25	.....	5.2	3.58	3.80	3.45	3.00	3.05	3.05	3.20	3.45	3.30	3.40
26	.....	5.7	3.48	3.70	3.35	3.18	3.25	3.20	3.18	3.35	3.30	3.48
27	.....	5.6	4.65	3.65	3.28	3.08	3.15	3.15	3.15	3.30	3.42	3.42
28	.....	5.5	4.95	3.60	3.30	3.02	3.00	3.15	3.10	3.28	3.42	3.25
29	.....	5.4	6.0	4.20	3.38	3.00	3.00	3.08	3.12	3.20	3.42	3.40
30	.....	.....	4.65	4.35	3.45	3.00	3.00	3.05	3.18	3.20	3.45	3.40
31	.....	.....	4.65	.....	3.45	.....	3.02	3.02	.....	.....	.....	3.35

NOTE.—Relation of gage height to discharge affected by ice Jan. 6 to Mar. 17.

Daily discharge, in second-feet, of Keshequa Creek at Sonyea, N. Y., for 1911–12.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.										
1	68	72	51	13	4	3	8	12	14	30
2	53	60	65	14	3	3	5	36	13	32
3	53	78	65	14	4	4	4	14	12	23
4	53	68	51	10	5	10	5	13	12	18
5	53	430	39	9	3	6	6	12	12	14
6	41	285	30	9	4	4	18	12	14	26
7	36	245	39	9	6	6	10	203	32	26
8	41	137	36	9	7	5	355	41	41	36
9	60	128	30	8	5	4	330	32	43	43
10	355	119	26	8	4	4	113	21	36	47
11	515	100	26	8	4	4	28	30	26	47
12	670	68	26	9	4	4	36	32	26	108
13	405	56	20	23	4	3	28	30	28	458
14	330	53	18	14	2	3	14	23	26	128
15	210	51	18	12	3	4	14	14	26	175
16	128	47	18	9	3	4	8	14	30	128
17	68	51	20	8	20	5	6	12	32	149
18	60	53	18	8	14	4	6	14	192	78
19	65	53	18	6	5	4	7	14	265	47
20	68	53	14	5	4	4	5	14	41	26
21	68	53	12	6	5	3	5	14	41	26
22	137	53	10	6	6	3	5	18	41	28
23	108	53	13	6	6	2	6	15	41	169
24	93	51	41	6	5	2	5	14	330	51
25	68	47	26	5	4	7	4	14	159	36
26	72	47	21	4	6	8	6	13	41	36
27	485	47	13	3	6	6	7	12	36	113
28	203	41	9	8	6	26	8	12	43	53
29	93	30	7	4	3	18	8	12	68	36
30	100	26	6	4	2	21	14	12	36	36
31	78	.....	7	.....	3	8	.....	15	.....	36
1912.										
1	90	485	95	15	3	3	11	9	10	18
2	80	735	65	14	3	5	23	8	8	21
3	80	217	48	12	3	9	34	6	10	55
4	80	65	38	11	3	6	17	6	10	43
5	80	670	31	11	5	6	8	5	10	160
6	80	430	34	11	7	5	6	4	10	426
7	80	950	34	10	5	5	5	4	14	80
8	80	533	27	10	3	5	4	5	40	38
9	70	195	27	7	2	3	3	5	65	25
10	70	185	27	6	16	5	3	5	43	25
11	60	137	20	6	25	3	3	7	31	21
12	60	155	17	8	38	5	3	6	15	16
13	50	177	27	8	12	5	3	8	14	11
14	50	140	29	7	23	5	3	7	14	8
15	500	190	29	6	12	4	9	6	14	8
16	750	155	154	4	8	3	23	5	12	9
17	600	102	178	5	7	3	20	8	11	10
18	530	102	75	6	5	5	15	8	11	10
19	470	97	43	5	3	5	9	7	11	11
20	365	87	40	6	4	4	5	8	11	16
21	55	58	29	5	3	6	4	23	10	14
22	48	73	40	5	3	8	4	20	10	10
23	40	122	29	5	5	5	4	31	10	8
24	29	82	29	5	3	4	8	43	10	11
25	27	73	18	3	4	4	8	18	11	16
26	20	55	14	7	10	8	7	14	11	20
27	340	48	10	5	6	6	6	11	17	17
28	500	29	11	3	3	6	5	10	17	10
29	1,250	160	15	3	3	5	6	8	17	16
30	405	212	18	3	3	4	7	8	18	16
31	405	.....	18	.....	3	3	.....	9	.....	14

NOTE.—Daily discharge for the open-water period in 1911 and 1912, except Apr. 8–30, 1912, determined from two fairly well defined rating curves, one applicable Jan. 1 to Dec. 31, 1911, and Mar. 30 to Apr. 7, 1912, and the other Jan. 1 to Mar. 29 and May 1 to Dec. 31, 1912. Discharge Apr. 8–30, 1912, obtained by the indirect method for shifting channels. Discharge Mar. 1–17, 1912, estimated by means of measurements made during the period and from climatologic records.

Monthly discharge of Keshequa Creek at Sonyea, N. Y., for 1911–12.

[Drainage area, 67 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1911.						
March	670	36	156	2.33	2.69	D.
April	430	26	88.5	1.32	1.47	B.
May	65	6	25.6	.382	.44	B.
June	23	3	8.6	.128	.14	C.
July	20	2	5.2	.078	.09	C.
August	26	2	6.2	.092	.11	C.
September	355	4	35.8	.534	.60	B.
October	203	12	24.0	.358	.41	B.
November	330	12	58.6	.875	.98	B.
December	458	14	72.9	1.09	1.26	B.
1912.						
March			237	3.06	3.53	D.
April	950	29	224	3.34	3.73	D.
May	178	10	40.9	.610	.70	B.
June	15	3	7.1	.106	.12	C.
July	38	2	7.5	.112	.13	C.
August	9	3	4.9	.073	.08	C.
September	34	3	8.9	.133	.15	C.
October	43	4	10.4	.155	.18	C.
November	65	8	16.5	.246	.27	C.
December	426	8	37.5	.560	.65	B.

CANADICE LAKE OUTLET NEAR HEMLOCK, N. Y.

Location.—In outlet at foot of lake. Canadice Lake is tributary to Genesee River through Hemlock Lake outlet and Honeoye Creek.

Records available.—April, 1903, to December 31, 1912. Data also found in annual reports of the New York State engineer and surveyor and the reports of the city engineer of Rochester, N. Y.

Drainage area.—12.6 square miles, of which 0.7 square mile is lake surface.

Gage.—Hook, in channel above gate.

Discharge measurements.—Outlet is measured over a standard, thin-edged weir with a 5-foot crest and two end contractions, so arranged with needle timbers at the ends that the length may be increased to 14.96 with no end contractions during high water. The weir crest stands 3 feet above the stream channel and is never submerged by backwater. Two additional rectangular gates, each 1 foot square, with three complete contractions and a fourth partial contraction at the bottom, afford by-passes during high water. The depth of water on the weir is read each morning to hundredths of a foot by means of the hook gage. Each change of the gates is also noted. Corrections are made for velocity of approach for the higher stages. All computations are made by the Francis formula.

Diversions.—No water is diverted from Canadice Lake above the station.

Artificial control.—The outflow of the lake at the dam above the weir is controlled by the gates.

Winter flow.—The pool above the weir is free from ice throughout the winter.

Accuracy.—Records are considered excellent.

Cooperation.—The observations and computations are made by engineers of the city engineer's office of Rochester, N. Y., under the direction of E. A. Fisher, city engineer, and John F. Skinner, principal assistant city engineer.

Monthly discharge of Canadice Lake outlet near Hemlock, N. Y., for 1912.

[Drainage area, 12.6 square miles.]

Month.	Discharge in second-feet.		Run-off (depth in inches on drainage area).	Mean elevation of lake above low water mark.
	Mean.	Per square mile.		
				Feet.
January	9.788	0.777	0.90	1.277
February	8.443	.670	.72	.864
March	16.338	1.30	1.50	1.599
April	48.852	3.88	4.33	2.873
May	15.062	1.19	1.37	2.633
June	9.492	.753	.84	2.017
July	7.584	.602	.69	1.468
August	5.297	.420	.48	.952
September	5.198	.413	.46	.884
October	5.630	.447	.52	.741
November	6.547	.520	.58	.661
December	7.217	.573	.66	1.138
The year	12.115	.962	13.05	1.430

NOTE.—Leakage through and under weir measured in May, 1912, and found to be 0.6 second-foot. This amount has been added to the weir records for the whole year.

OWASCO OUTLET NEAR AUBURN, N. Y.

Location.—On the farm of George Ridley, 3¾ miles below the State dam at the outlet of Owasco Lake, 2 miles below the center of the city of Auburn.

Records available.—November 17 to December 31, 1912.

Drainage area.—206 square miles.

Gage.—Gurley automatic water stage register installed over a concrete well 3½ feet square and 6 feet deep (inside dimensions) and sheltered by a concrete house 5 by 6 feet (inside dimensions). The gage well is connected with the river by a 4-inch cast-iron pipe.

Channel.—The gage heights registered by this gage are controlled by a low concrete weir located a short distance below the gage. The crest of this weir is 1 foot wide and the slopes of both upstream and downstream faces are 0.5 : 1. A small horizontal apron was built on a level with the bed of the stream, extending downstream 2½ feet from the toe of the dam. The left-hand end of the dam, for a distance of 50 feet, has a mean elevation of gage height 1.28 feet; the remaining 50 feet of the crest of the dam is at gage height 2.12 feet.

Discharge measurements.—Made by wading directly opposite the gage at low stages and from a cable and car at the same section at high stages.

Winter flow.—No data.

Diversions.—An average flow of about 10 second-feet is pumped from Owasco Lake for the municipal water supply of the city of Auburn. It is not known what proportion of this gets back into the stream above the gaging station.

Accuracy.—Discharge measurements already made have been very consistent and estimates are excellent.

Discharge measurements of Owasco Outlet near Auburn, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Sept. 22	C. C. Covert		111
Nov. 21[a]	G. H. Canfield	2.53	319
22[a]	do	2.53	318
23[a]	do	2.73	418
24[a]	do	1.88	79.3
24[a]	do	2.14	147
28[b]	do	1.46	9.7
28[c]	do	1.44	8.4
30[a]	do	2.75	436

[a] Made by wading at gage.
[b] Made by wading 60 feet below gage.
[c] Made by wading 200 feet below gage.

NOTE.—At the time measurement No. 5 was made the low-water section of the control was just full.

Daily gage height, in feet, of Owasco Outlet near Auburn, N. Y., for 1912.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		1.88	11		2.61	21	2.45	2.41
2		2.51	12		2.60	22	2.48	2.40
3		2.48	13		2.52	23	2.45	2.42
4		2.46	14		2.27	24	2.06	2.42
5		2.48	15		1.66	25	2.50	2.39
6		2.58	16		2.07	26	2.46	2.40
7		2.64	17	1.59	2.13	27	2.54	2.38
8		2.45	18	2.37	2.41	28	1.75	2.39
9		2.39	19	2.28	2.44	29	2.34	2.33
10		2.64	20	2.36	2.41	30	2.19	2.36
						31		2.38

NOTE.—Mean daily gage height obtained by averaging hourly readings for each 24-hour period.

Daily discharge, in second-feet, of Owasco Outlet near Auburn, N. Y., for 1912.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		792	11		358	21	278	259
2		308	12		353	22	293	255
3		293	13		313	23	278	264
4		283	14		198	24	125	264
5		293	15		37.4	25	303	250
6		343	16		128	26	283	255
7		373	17	26.5	144	27	323	246
8		278	18	241	259	28	52.7	250
9		250	19	202	273	29	228	223
10		373	20	237	259	30	166	237
						31		246

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Owasco Outlet near Auburn, N. Y., for 1912.

[Drainage area, 206 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
November 17-30	323	[a] 26.5	217	1.05	.55	A.
December	373	[a] 37.4	256	1.24	1.43	A.

[a] Sunday.

ONEIDA RIVER AT CAUGHDENOY, N. Y.

Location.—At Caughdenoy, about 6 miles above the old Euclid station at Oak Orchard State dam, half a mile below the mouth of Caughdenoy Creek (which enters from the north) and 5 miles below Lake Oneida.

Records available.—August 30, 1902, to December 31, 1909 (at Euclid); January 1, 1910, to December 31, 1912 (at Caughdenoy, which replaces the Euclid station). Data published also in annual reports of New York State engineer and surveyor.

Drainage area.—1,377 square miles.

Gage.—Staff, about 150 feet upstream from the dam, on the right-hand side of the stream.

Discharge measurements.—Discharge measured over a masonry dam 415 feet long, completed at Caughdenoy during the summer of 1909. This dam has a practically level crest at elevation 369.4 feet, and an ogee cross section with a slope or batter on the upstream portion of the crest of 1 foot rise in 2 feet horizontal width. The downstream part of the crest is rounded, with a radius of 3.24 feet. The discharge over the dam has been computed from formulas derived from United States Geological Survey experiments on a dam of ogee cross section similar in form, and a correction has been made for velocity of approach.

Diversions.—During the summer, and also to some extent during the winter, water is diverted past the left-hand end of the dam through the Caughdenoy lock. An estimate of the amount of water so diverted has been made and included in the calculated discharge of the river.

Cooperation.—Records furnished complete for publication by the New York State engineer and surveyor.

Daily discharge, in second-feet, of Oneida River at Caughdenoy, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,728	1,566	1,240	4,958	6,921	4,356	1,303	453	570	1,703	1,703	2,655
2	3,633	1,621	1,282	5,395	6,496	3,858	1,282	480	659	1,945	1,945	2,737
3	3,570	1,512	1,282	6,082	6,276	3,728	1,219	570	659	2,021	1,703	2,922
4	3,570	1,512	1,303	6,408	6,082	3,858	1,219	570	570	2,021	1,824	3,258
5	3,258	1,566	1,324	6,408	5,696	3,793	1,282	659	659	1,945	1,776	3,570
6	3,258	1,566	1,367	6,496	5,322	3,728	1,240	711	659	2,072	1,703	2,600
7	3,258	1,457	1,367	6,921	5,138	3,258	1,219	746	659	2,072	1,621	3,570
8	3,106	1,367	1,240	7,548	4,958	2,922	1,199	659	746	2,021	1,703	3,570
9	2,737	1,409	1,282	8,748	4,584	3,106	1,119	711	832	1,945	1,824	3,258
10	2,600	1,409	1,282	8,896	4,222	2,710	1,000	659	832	1,824	1,872	3,570
11	2,600	1,367	1,303	8,650	4,054	2,600	815	659	832	1,703	1,945	3,570
12	2,600	1,409	1,324	8,551	4,662	2,545	851	570	746	1,703	2,072	2,600
13	2,545	1,409	1,367	8,453	4,356	2,490	815	659	832	1,703	2,463	3,258
14	2,463	1,409	1,457	7,421	4,021	2,600	888	412	832	1,512	2,330	3,258
15	2,330	1,409	1,457	6,496	3,956	2,545	1,000	412	926	1,512	2,072	2,922
16	2,463	1,409	1,485	6,408	4,054	2,436	926	480	1,019	1,566	2,198	2,922
17	2,545	1,219	1,512	6,496	4,188	2,330	780	570	1,119	1,621	2,330	3,258
18	2,774	1,119	1,621	6,716	4,188	2,278	780	659	1,119	1,566	2,330	2,922
19	2,436	1,019	2,072	8,601	4,154	2,224	641	659	1,159	1,566	2,384	2,600
20	2,330	1,119	2,278	10,308	4,356	2,122	746	570	1,079	1,621	2,384	2,600
21	2,198	1,219	2,490	10,068	4,584	2,072	659	570	1,079	1,703	2,330	2,922
22	2,278	1,219	3,106	9,584	4,923	2,021	641	659	1,219	1,621	2,330	6,716
23	1,945	1,119	3,411	7,716	4,584	1,945	605	570	1,282	1,512	2,384	3,258
24	2,021	1,119	3,411	9,338	3,858	1,800	534	570	1,824	1,621	2,330	3,258
25	1,970	1,199	3,506	9,141	4,356	1,676	498	570	1,703	1,824	2,330	2,922
26	1,945	1,282	3,411	9,043	4,021	1,676	480	534	1,824	1,872	2,278	2,737
27	1,872	1,282	3,258	7,337	3,891	1,676	480	480	1,945	2,021	2,198	2,737
28	1,824	1,324	3,258	7,716	3,728	1,621	480	570	1,872	2,072	2,330	2,463
29	1,945	1,324	3,633	8,360	3,891	1,621	480	480	1,945	2,072	2,600	2,463
30	1,824	.....	4,021	7,085	4,054	1,539	480	480	1,996	2,021	2,600	2,600
31	1,703	.....	4,154	.....	3,858	.....	480	480	.....	1,945	.....	2,922

Monthly discharge of Oneida River at Caughdenoy, N. Y., for 1912.

[Drainage area, 1,377 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).
	Maximum.	Minimum.	Mean.	Per square mile.	
January	3,728	1,703	2,559	1.86	2.14
February	1,621	1,019	1,343	.975	1.05
March	4,154	1,240	2,145	1.56	1.80
April	10,308	4,958	7,712	5.60	6.25
May	6,921	3,728	4,627	3.36	3.87
June	4,356	1,539	2,571	1.87	2.09
July	1,303	480	843	.612	.706
August	746	412	575	.418	.482
September	1,996	570	1,107	.804	.897
October	2,072	1,512	1,804	1.31	1.51
November	2,600	1,621	2,130	1.54	1.72
December	6,716	2,463	3,117	2.26	2.61
The year	10,308	412	2,540	1.85	25.125

SALMON RIVER AT STILLWATER BRIDGE, NEAR REDFIELD, N. Y.

Location.—On Stillwater highway bridge, 6¼ miles by road east of Altmar, one-fourth mile above the proposed dam of the Ontario Power Co., seven-eighths mile below Pennock Brook (coming in from the right), and 7 miles below the mouth of North Branch (coming in from the right).

Records available.—June 24, 1911, to December 31, 1912.

Drainage area.—191 square miles.

Gage.—Chain, attached to upstream side of bridge; datum unchanged.

Channel.—Small stone and gravel.

Discharge measurements.—Made from the bridge or by wading.

Winter flow.—Relation of gage height to discharge affected by ice.

Accuracy.—Conditions for making measurements and records are good.

Cooperation.—Gage heights furnished by the Ontario Power Co., Niagara Falls, N. Y.

Discharge measurements of Salmon River at Stillwater Bridge, near Redfield, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 25[a]	Frank Weber	3.55	325
Mar. 13[a]	C. S. De Golyer	[b] 2.81	205
Apr. 16	do	[c] 9.76	7,040
18	do	[d] 7.89	4,430
Oct. 16	J. G. Mathers	2.65	312

[a] Measurements made under complete ice cover.
[b] Staff gage, 0.83.
[c] Staff gage, 4.88.
[d] Staff gage, 3.85.

Daily gage height, in feet, of Salmon River at Stillwater Bridge, near Redfield, N. Y., for 1912.

[A. Hall and Ralph Lindner, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.6	.....	.....	5.3	5.2	4.4	1.72	1.57	1.68	4.8	2.75	2.2
2	3.5	.....	.....	5.4	5.1	3.8	1.70	1.55	1.72	4.9	2.95	3.6
3	3.4	.....	.....	5.1	5.0	4.0	1.70	1.74	1.68	3.8	2.8	7.4
4	3.2	.....	.....	4.8	4.6	3.7	1.70	1.82	1.86	4.4	2.65	5.9
5	3.7	.....	.....	4.5	4.3	3.3	1.95	1.76	1.79	4.2	2.5	4.7
6	3.6	.....	.....	5.8	4.5	3.0	1.84	1.71	2.35	3.3	2.5	5.2
7	3.3	.....	3.0	7.6	4.7	2.9	1.76	1.62	2.05	2.95	3.2	5.7
8	3.4	.....	.....	8.2	4.2	2.65	1.70	1.61	1.98	2.65	5.7	4.6
9	3.3	.....	.....	7.0	4.0	2.5	1.69	1.59	1.86	2.5	5.4	3.8
10	3.5	.....	.....	5.9	3.8	2.4	1.64	1.93	1.92	2.7	4.6	3.7
11	3.6	.....	.....	5.5	3.5	2.3	1.62	2.50	2.35	2.8	3.9	3.4
12	3.4	.....	.....	5.0	3.5	2.25	1.62	2.25	2.65	2.75	3.5	3.5
13	3.2	.....	2.8	5.1	4.3	2.3	1.62	2.10	2.20	3.7	3.4	3.6
14	.....	.....	2.8	6.4	4.3	2.25	1.77	2.00	2.00	3.3	4.6	3.6
15	.....	.....	3.0	9.0	3.9	2.15	1.70	1.98	1.98	2.95	4.6	3.4
16	.....	.....	3.8	10.0	3.7	2.2	1.92	1.82	4.00	2.65	4.2	3.4
17	.....	.....	3.9	9.8	5.0	2.9	1.72	1.74	2.95	2.5	3.5	3.2
18	.....	.....	4.3	7.9	5.5	2.55	1.64	1.74	2.50	2.4	3.3	3.1
19	.....	.....	4.4	8.1	4.3	2.3	1.67	1.80	2.75	2.8	3.0	4.0
20	.....	.....	4.5	6.2	3.9	2.15	1.64	1.77	2.45	3.4	3.0	4.8
21	.....	.....	4.2	5.9	6.1	2.1	1.76	1.74	2.40	3.0	3.1	4.5
22	.....	.....	4.2	7.0	6.4	2.05	2.35	1.84	2.35	2.7	3.3	4.2
23	.....	.....	4.0	10.1	5.3	1.98	1.95	1.82	2.50	3.1	3.3	3.9
24	.....	.....	3.9	7.0	4.3	1.92	1.80	1.85	4.70	4.2	3.2	3.7
25	.....	3.55	3.7	5.8	4.2	1.88	1.68	1.86	4.80	5.4	3.2	3.4
26	.....	.....	3.3	6.2	3.6	1.84	1.66	1.88	4.20	5.0	3.1	3.7
27	.....	.....	3.4	7.0	3.2	1.80	1.66	2.25	3.40	4.6	3.0	3.4
28	.....	.....	3.6	6.8	3.0	1.78	1.63	2.05	2.85	3.9	2.8	3.0
29	.....	3.4	4.2	5.6	5.7	1.78	1.60	1.87	3.20	3.4	2.6	3.0
30	.....	.....	5.0	5.0	6.6	1.75	1.60	1.76	2.80	3.0	2.4	3.3
31	.....	.....	5.0	.....	5.5	.....	1.57	1.68	.....	2.8	.....	3.9

NOTE.—Relation of gage height to discharge affected by ice Jan. 5 to Apr. 4.

Daily discharge, in second-feet, of Salmon River at Stillwater Bridge, near Redfield, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	598	.....	.....	514	1,440	935	99	72	91	1,160	340	200
2	564	.....	.....	532	1,360	672	95	68	99	1,220	396	598
3	532	.....	.....	690	1,290	754	95	103	91	672	353	3,780
4	469	.....	.....	840	1,040	634	95	118	126	935	313	2,050
5	.....	.....	.....	985	885	500	144	106	112	840	274	1,100
6	.....	.....	.....	1,960	985	410	122	97	236	500	274	1,440
7	.....	.....	.....	4,040	1,100	381	106	81	166	396	469	1,870
8	.....	.....	.....	4,860	840	313	95	79	151	313	1,870	1,040
9	.....	.....	.....	3,260	754	274	93	75	126	274	1,600	672
10	.....	.....	.....	2,050	672	249	84	140	138	326	1,040	634
11	.....	.....	.....	1,690	564	224	81	274	236	353	712	532
12	.....	.....	.....	1,290	564	212	81	212	313	340	564	564
13	.....	.....	.....	1,360	885	224	81	177	200	634	532	598
14	.....	.....	.....	2,560	885	212	108	155	155	500	1,040	598
15	.....	.....	.....	5,980	712	188	95	151	151	396	1,040	532
16	.....	.....	.....	7,380	634	200	138	118	754	313	840	532
17	.....	.....	.....	7,100	1,290	381	99	103	396	274	564	469
18	.....	.....	.....	4,440	1,690	287	84	103	274	249	500	439
19	.....	.....	.....	4,720	885	224	90	114	340	353	410	754
20	.....	.....	.....	2,350	712	188	84	108	262	532	410	1,160
21	.....	.....	.....	2,050	2,250	177	106	103	249	410	439	985
22	.....	.....	.....	3,260	2,560	166	236	122	236	326	500	840
23	.....	.....	.....	7,520	1,520	151	144	118	274	439	500	712
24	.....	.....	.....	3,260	885	138	114	124	1,100	840	469	634
25	.....	.....	.....	1,960	840	130	91	126	1,160	1,600	469	532
26	.....	.....	.....	2,350	598	122	88	130	840	1,290	439	634
27	.....	.....	.....	3,260	469	114	88	212	532	1,040	410	532
28	.....	.....	.....	3,020	410	110	82	166	367	381	353	410
29	.....	.....	.....	1,780	1,870	110	77	128	469	249	300	410
30	.....	.....	.....	1,290	2,780	104	77	106	353	410	249	500
31	.....	.....	.....	.....	1,690	.....	72	91	.....	353	.....	712

NOTE.—Daily discharge determined from a well-defined rating curve. Discharge Apr. 1 to 4 determined from a rating curve based on measurements made with ice present.

Monthly discharge of Salmon River at Stillwater Bridge, near Redfield, N. Y., for 1912.

[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.		
January			250	1.31	1.51	C.
February			200	1.05	1.13	C.
March			323	1.69	1.95	C.
April	7,520	514	2,950	15.4	17.18	A.
May	2,780	410	1,130	5.92	6.82	A.
June	935	104	293	1.53	1.71	A.
July	236	72	101	.529	.61	B.
August	274	68	125	.654	.75	B.
September	1,160	91	333	1.74	1.94	A.
October	1,600	249	578	3.03	3.49	A.
November	1,870	249	589	3.08	3.43	A.
December	3,780	200	854	4.47	5.15	A.
The year	7,520	68	642	3.36	45.67	

NOTE.—Discharge Jan. 5 to Apr. 4 determined by means of a curve applicable to flow under ice cover, and climatologic records.
Mean discharge Jan. 5–31 estimated 210 second-feet.

SALMON RIVER NEAR PULASKI, N. Y.

Location.—At a highway bridge known locally as Fox's bridge, about 2½ miles above the village of Pulaski, 2¼ miles above Trout Brook (coming in from the left), and 6½ miles above the mouth of the river.

Records available.—September 5, 1900, to June 30, 1907; August 16, 1908, to December 6, 1908; July 14, 1910, to December 31, 1912. Published in reports of the New York State engineer and surveyor, State of New York Water Supply Commission, and Conservation Commission.

Drainage area.—260 square miles[1] (measured on United States Geological Survey topographic sheets).

Gage.—A chain gage was installed July 23, 1902, the zero of which is 1.20 feet below the zero of the original staff gage, which was attached to the upstream end of the center pier of the bridge and was read from September 5, 1900, to the winter of 1901–2, when it was destroyed by ice; datum of chain gage unchanged since established.

Channel.—Gravel; fairly permanent.

Discharge measurements.—Made either by wading or from the bridge.

Winter flow.—Relation of gage height to discharge affected by ice.

Accuracy.—Open-water curve well developed. Published data considered good.

Discharge measurements of Salmon River near Pulaski, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 13	C. S. De Golyer	4.78	2,050
17	do	7.45	9,430
Oct. 18	J. G. Mathers	3.00	314

[1] Drainage area revised.

Daily gage height, in feet, of Salmon River near Pulaski, N. Y., for 1912.

[Seymour J. Fox, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.45	.....	.....	6.6	4.6	4.35	2.60	2.40	2.50	4.5	3.22	3.15
2	3.45	.....	.....	5.2	4.5	3.9	2.58	2.40	2.50	4.45	3.22	3.42
3	3.35	.....	.....	4.9	4.5	3.85	2.58	2.60	2.50	3.9	3.25	5.9
4	3.15	.....	.....	4.4	4.3	3.9	2.55	2.62	2.60	4.0	3.15	5.2
5	3.10	.....	.....	4.5	4.1	3.65	2.60	2.55	2.60	4.1	3.15	4.5
6	3.00	.....	.....	5.4	4.15	3.45	2.65	2.50	3.02	3.6	3.05	4.3
7	.....	.....	.....	6.6	4.25	3.38	2.58	2.48	3.00	3.35	3.22	4.9
8	.....	.....	.....	6.9	4.05	3.28	2.60	2.42	2.80	3.25	5.1	4.3
9	.....	.....	.....	5.9	3.9	3.18	2.55	2.40	2.65	3.10	4.8	3.6
10	.....	.....	.....	5.4	3.75	3.05	2.50	2.48	2.58	3.15	4.4	3.6
11	.....	.....	.....	5.2	3.6	3.00	2.50	3.12	2.85	3.25	4.0	3.45
12	.....	.....	.....	4.75	3.55	3.02	2.50	2.90	3.25	3.20	3.75	3.30
13	.....	.....	.....	4.85	4.05	3.05	2.48	2.75	2.95	3.6	3.6	3.40
14	.....	.....	.....	5.5	4.05	3.00	2.50	2.75	2.80	3.55	4.2	3.55
15	.....	.....	.....	7.0	3.85	2.90	2.55	2.72	2.80	3.32	4.5	3.55
16	.....	.....	.....	7.5	3.75	2.92	2.68	2.60	3.65	3.18	4.1	3.5
17	.....	.....	.....	7.2	4.5	3.30	2.62	2.52	3.38	3.05	3.75	3.38
18	.....	.....	.....	6.3	4.8	3.10	2.52	2.42	3.08	2.95	3.65	3.40
19	.....	.....	.....	6.5	4.2	3.02	2.50	2.50	3.02	3.05	3.40	4.0
20	.....	.....	.....	5.6	3.9	2.95	2.48	2.52	3.05	3.48	3.45	4.2
21	.....	.....	.....	5.3	5.1	2.90	2.52	2.50	3.00	3.30	3.5	4.15
22	.....	.....	.....	5.9	5.7	2.82	2.90	2.50	2.95	3.15	3.5	3.95
23	.....	.....	.....	7.4	4.6	2.80	2.75	2.50	2.92	3.12	3.55	3.8
24	.....	.....	.....	6.0	4.2	2.75	2.60	2.58	4.1	3.9	3.5	3.8
25	.....	.....	.....	5.2	4.05	2.72	2.50	2.60	4.3	4.5	3.6	3.5
26	.....	.....	.....	5.3	3.8	2.68	2.50	2.68	4.1	4.4	3.5	3.40
27	.....	.....	.....	5.6	3.55	2.65	2.50	2.70	3.7	4.2	3.5	3.40
28	.....	.....	.....	5.6	3.4	2.65	2.42	2.70	3.32	3.95	3.40	3.36
29	.....	.....	.....	4.9	4.9	2.65	2.42	2.65	3.2	3.5	3.28	3.28
30	.....	.....	.....	4.6	5.6	2.60	2.40	2.60	3.5	3.38	3.35	3.38
31	.....	.....	.....	.....	5.2	.....	2.40	2.60	.....	3.22	.....	3.83

NOTE.—Relation of gage height to discharge affected by ice Jan. 7 to Apr. 1.

Daily discharge, in second-feet, of Salmon River near Pulaski, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	642	.....	.....	3,000	1,800	1,500	152	88	118	1,680	479	432
2	642	.....	.....	2,750	1,680	1,020	145	88	118	1,620	479	620
3	570	.....	.....	2,240	1,680	978	145	152	118	1,020	500	4,250
4	432	.....	.....	1,560	1,440	1,020	135	160	152	1,120	432	2,750
5	400	.....	.....	1,680	1,220	802	152	135	152	1,220	432	1,680
6	340	.....	.....	3,140	1,280	642	172	118	352	760	370	1,440
7	.....	.....	.....	6,330	1,380	591	145	112	340	570	479	2,240
8	.....	.....	.....	7,380	1,170	521	152	94	235	500	2,570	1,440
9	.....	.....	.....	4,250	1,020	452	135	88	172	400	2,090	760
10	.....	.....	.....	3,140	888	370	118	112	145	432	1,560	760
11	.....	.....	.....	2,750	760	340	118	413	260	500	1,120	642
12	.....	.....	.....	2,020	720	352	118	285	500	465	888	535
13	.....	.....	.....	2,160	1,170	370	112	213	312	760	760	605
14	.....	.....	.....	3,340	1,170	340	118	213	235	720	1,330	720
15	.....	.....	.....	7,750	978	285	135	200	235	549	1,680	720
16	.....	.....	.....	9,660	888	296	183	152	802	452	1,220	680
17	.....	.....	.....	8,500	1,680	535	160	125	591	370	888	591
18	.....	.....	.....	5,370	2,090	400	125	94	388	312	802	605
19	.....	.....	.....	6,000	1,330	352	118	118	352	370	605	1,120
20	.....	.....	.....	3,550	1,020	312	112	125	370	665	642	1,330
21	.....	.....	.....	2,940	2,570	285	125	118	340	535	680	1,280
22	.....	.....	.....	4,250	3,770	245	285	118	312	432	680	1,070
23	.....	.....	.....	9,270	1,800	235	213	118	296	413	720	930
24	.....	.....	.....	4,510	1,330	213	152	145	1,220	1,620	680	930
25	.....	.....	.....	2,750	1,170	200	118	152	1,440	1,680	760	680
26	.....	.....	.....	2,940	930	183	118	183	1,220	1,560	680	605
27	.....	.....	.....	3,550	720	172	118	191	845	1,330	680	605
28	.....	.....	.....	3,550	605	172	94	191	549	1,070	605	577
29	.....	.....	.....	2,240	2,240	172	94	172	465	680	521	521
30	.....	.....	.....	1,800	3,550	152	88	152	680	591	570	591
31	.....	.....	.....	.....	2,750	.....	88	152	.....	479	.....	958

NOTE.—Daily discharge determined from a well-defined rating curve. Discharge Apr. 1 estimated.

Monthly discharge of Salmon River near Pulaski, N. Y., for 1912.

[Drainage area, 260 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January			340	1.31	1.51	C.
February			270	1.04	1.12	C.
March			440	1.69	1.95	C.
April	9,660	1,560	4,150	16.0	17.85	B.
May	3,770	605	1,510	5.81	6.70	B.
June	1,500	152	450	1.73	1.93	B.
July	285	88	137	.527	.61	B.
August	413	88	154	.592	.68	B.
September	1,440	118	444	1.71	1.91	B.
October	1,680	312	783	3.01	3.47	B.
November	2,570	370	863	3.32	3.70	B.
December	4,250	432	1,050	4.04	4.66	B.
The year	9,660	88	879	3.38	46.09	

NOTE.—Discharge Jan. 7 to Apr. 1 estimated from the discharge at Stillwater Bridge. Mean discharge Jan. 7–31 estimated 300 second-feet.

ORWELL BROOK NEAR ALTMAR, N. Y.

Location.—At highway bridge 1½ miles by road northwest of Altmar and one-eighth mile above confluence with Salmon River.

Records available.—June 23, 1911, to December 31, 1912.

Drainage area.—22.1 square miles.

Gage.—Standard chain, attached to downstream side of bridge.

Channel.—Curved above the bridge and current rather swift; bed composed of small stone and gravel; two channels above bridge, but one at gage.

Discharge measurements.—Made by wading at low stages, from bridge at high stages.

Winter flow.—Relation of gage height to discharge affected by ice.

Accuracy.—The discharge rating curve has been fairly well developed; estimates good.

Cooperation.—Gage heights furnished by the Ontario Power Co., Niagara Falls, N. Y.

Discharge measurements of Orwell Brook near Altmar, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 13	C. S. De Golyer	3.54	204
17	....do	3.96	282
Oct. 16	J. G. Mathers	2.13	26.1

Daily gage height, in feet, of Orwell Brook near Altmar, N. Y., for 1912.

[Mrs. A. G. White, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.44	.....	.....	3.70	2.48	2.65	1.91	1.90	1.98	3.2	2.25	2.35
2	2.37	.....	.....	3.75	2.42	2.5	1.90	1.90	1.99	2.68	2.25	3.15
3	2.30	.....	.....	3.40	2.38	2.62	1.89	2.12	2.00	2.42	2.20	3.6
4	2.44	.....	.....	3.20	2.34	2.51	1.90	2.02	1.98	2.60	2.18	2.85
5	2.65	.....	.....	3.45	2.29	2.45	1.90	2.00	2.29	2.42	2.18	2.64
6	3.20	.....	.....	4.40	2.38	2.35	1.89	1.98	1.98	2.32	2.18	2.70
7	3.35	.....	.....	5.1	2.40	2.29	1.85	1.95	1.96	2.24	2.48	2.70
8	3.10	.....	.....	4.7	2.34	2.24	1.85	1.95	1.95	2.18	3.1	2.58
9	3.25	.....	.....	4.0	2.34	2.20	1.85	1.95	1.95	2.12	2.98	2.40
10	3.25	.....	.....	3.75	2.32	2.16	1.84	2.02	2.02	2.20	2.69	2.45
11	3.20	.....	.....	3.55	2.28	2.15	1.85	2.10	2.25	2.20	2.48	2.35
12	3.10	.....	.....	3.40	2.32	2.15	1.85	2.02	2.20	2.25	2.40	2.38
13	.....	.....	.....	3.65	2.5	2.14	1.82	2.00	2.12	2.32	2.40	3.0
14	.....	.....	3.95	4.1	2.48	2.12	1.91	2.10	2.04	2.22	3.15	2.72
15	.....	.....	3.85	4.9	2.38	2.09	1.85	2.02	2.16	2.18	3.05	2.62
16	.....	.....	3.65	4.7	2.48	2.14	1.88	2.00	2.32	2.14	2.68	2.60
17	.....	.....	2.65	4.2	2.82	2.35	1.82	1.98	2.18	2.12	2.55	2.52
18	.....	.....	2.80	3.55	2.72	2.18	1.82	2.00	2.20	2.20	2.55	2.32
19	.....	.....	2.88	3.7	2.51	2.10	1.82	2.08	2.22	2.22	2.40	3.1
20	.....	.....	2.90	3.1	2.46	2.10	1.82	2.01	2.12	2.20	2.40	2.78
21	.....	.....	2.95	2.99	3.45	2.09	1.98	1.98	2.08	2.15	2.38	2.70
22	.....	.....	2.95	3.20	3.30	2.04	2.00	1.98	2.05	2.15	2.35	2.62
23	.....	.....	2.86	4.0	2.70	2.00	1.92	1.98	2.30	2.15	2.35	2.55
24	.....	.....	2.62	3.3	2.68	2.00	1.90	2.00	2.52	2.40	2.38	2.55
25	.....	.....	2.55	2.98	2.59	2.00	1.84	2.00	2.72	2.78	2.40	2.50
26	.....	.....	2.46	2.79	2.44	1.96	1.86	2.00	2.45	2.75	2.45	2.45
27	.....	.....	2.46	2.72	2.34	1.95	1.85	2.15	2.32	2.70	2.42	2.38
28	.....	.....	2.58	2.62	2.29	1.95	1.82	2.12	2.22	2.52	2.34	2.30
29	.....	.....	3.00	2.61	3.5	1.95	1.85	2.02	2.22	2.44	2.31	2.48
30	.....	.....	3.45	2.58	3.32	1.92	1.85	2.00	2.0	2.32	2.35	2.40
31	.....	.....	3.50	.....	2.98	.....	1.86	1.98	.....	2.25	.....	2.65

NOTE.—Relation of gage height to discharge affected by ice Jan. 13 to some time in March.

Daily discharge, in second-feet, of Orwell Brook near Altmar, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	.....	.....	232	54	72	13	13	16	149	34	42
2	.....	.....	.....	241	49	56	13	13	17	76	34	142
3	.....	.....	.....	181	45	68	13	24	17	49	30	215
4	.....	.....	.....	149	42	57	13	18	16	66	29	98
5	.....	.....	.....	190	37	52	13	17	37	49	29	71
6	.....	.....	.....	368	45	42	13	16	16	40	29	78
7	.....	.....	.....	520	47	37	11	15	15	33	53	78
8	.....	.....	.....	431	42	33	11	15	15	29	134	64
9	.....	.....	.....	288	42	30	11	15	15	24	116	47
10	.....	.....	.....	241	40	27	11	18	18	30	77	52
11	.....	.....	.....	406	36	26	11	23	34	30	54	42
12	.....	.....	.....	181	40	26	11	18	30	34	47	45
13	.....	.....	.....	224	56	26	10	17	24	40	47	119
14	.....	.....	.....	307	54	24	13	23	19	32	142	81
15	.....	.....	.....	475	45	22	11	18	27	29	126	68
16	.....	.....	.....	431	54	26	12	17	40	26	76	66
17	.....	.....	.....	327	94	42	10	16	29	24	61	58
18	.....	.....	.....	206	81	29	10	17	30	30	61	40
19	.....	.....	.....	232	57	23	10	22	32	32	47	134
20	.....	.....	.....	134	52	23	10	18	24	30	47	88
21	.....	.....	.....	118	190	22	16	16	22	26	45	78
22	.....	.....	.....	149	165	19	17	16	20	26	42	68
23	.....	.....	.....	288	78	17	14	16	38	26	42	61
24	.....	.....	.....	165	76	17	13	17	58	47	45	61
25	.....	.....	.....	116	65	17	11	17	81	88	47	56
26	.....	.....	.....	90	51	15	11	17	52	84	52	52
27	.....	.....	.....	81	42	15	11	26	40	78	49	45
28	.....	.....	.....	68	37	15	10	24	32	58	42	38
29	.....	.....	.....	67	198	15	11	18	32	51	39	54
30	.....	.....	.....	64	168	14	11	17	17	40	42	47
31	.....	.....	.....	.....	116	.....	11	16	.....	34	.....	72

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Orwell Brook near Altmar, N. Y., for 1912.

[Drainage area, 22.1 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
April	520	64	232	10.5	11.71	B.
May	198	36	70.9	3.21	3.70	A.
June	72	14	30.2	1.37	1.53	B.
July	17	10	11.8	.539	.62	B.
August	26	13	17.8	.813	.94	B.
September	81	15	28.8	1.32	1.47	B.
October	149	24	45.5	2.06	2.38	A.
November	142	29	57.3	2.59	2.89	A.
December	215	38	72.9	3.30	3.80	A.

BLACK RIVER NEAR BOONVILLE, N. Y.

Location.—At highway bridge 2 or 3 miles northeast of Boonville, an equal distance by river downstream from Hawkinsville, and about 1 mile above the mouth of Sugar River, a small tributary from the left.

Records available.—February 16, 1912, to December 31, 1912, data also published in first annual report of Conservation Commission, State of New York.

Drainage area.—303 square miles.

Gage.—Standard chain, fastened to the downstream side of the bridge. A staff gage, reading from 6 to 13 feet, is fastened to the downstream right-hand abutment and is used for high-water readings.

Channel.—Rough and bowldery; practically permanent.

Discharge measurements.—At high stages from a cable about one-quarter mile above the gage; at low stages, by wading near the cable section.

Winter flow.—Relation of gage height to discharge affected by ice.

Diversions.—A portion of the flow of Black River is diverted past the gaging station through a feeder which takes water at the State dam at Forestport and delivers its flow to the summit level of the Black River canal at Boonville. A portion of the flow passes northward, supplying the Black River canal from Boonville, to the head of slack-water navigation at the foot of Lyon Falls. The remainder is diverted from the drainage basin and flows into the Erie Canal at Rome. To determine the amount diverted past the station and out of the drainage basin measurements are made in the Forestport feeder at a farm bridge near Speny Hill, 1 mile northeast of Boonville. Measurements of northward flow in the Black River canal are made at a farm bridge half a mile north of Boonville; measurements of the southward flow at a farm bridge about three-fourths of a mile southeast from Boonville. The Forestport feeder is open for service about May 1 for the purpose of feeding the Erie Canal, which opens about May 15, although the Black River canal does not open until later. When navigation is closed on the Erie Canal the feeder gates are closed also and the surplus water runs over the dam into Black River. Some water leaks through the feeder gates and flows through the feeder into Lansing Kill and Mohawk River. Results of measurements made at this place in the past are published in reports of the State engineer and surveyor of New York.

Storage.—A reservoir built by the State at Forestport about 8 miles upstream, stores about 2,000,000,000 cubic feet. About a mile above the station is a site of which a dam 110 feet high would impound 3,300,000,000 cubic feet of water.

Accuracy.—A well-defined discharge rating curve has been developed. The records do not give the total discharge of the drainage area. See "Diversions."

Discharge measurements of Black River near Boonville, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 3[a]	G. H. Canfield	5.66	354
15[b]	Frank Weber	5.03	255
Apr. 15	C. S. DeGolyer	8.67	3,560
15	....do	8.93	4,060
22	....do	8.00	2,750
May 21	Frank Weber	7.15	1,970
July 26[c]	G. J. Lyon	3.32	55.1
28[c]	....do	3.27	46.2
Oct. 27	J. G. Mathers	5.35	544

[a] Measurement made under complete ice cover at cable.
[b] Measurement made at wading section, 200 feet above bridge, under complete ice cover.
[c] Measurements made by wading 100 feet below cable.

Discharge measurements of Forestport feeder near Boonville, N. Y., in 1912.

Date.	Hydrographer.	Gage height.[a]	Discharge.
		Feet.	*Sec.-ft.*
July 26	G. J. Lyon	1.31	[b] 215
Oct. 27[c]	J. G. Mathers	1.02	[b] 275

[a] Distance from reference point to water surface. Reference point is top of mudsill at left, upstream side of bridge.
[b] Amount of water diverted from Black River above the gaging station.
[c] No flow northward in Black River canal at the time this measurement was made.

Discharge measurements of Black River canal (south) at Boonville, N. Y., in 1912.

Date.	Hydrographer.	Gage height.[a]	Discharge.
		Feet.	*Sec.-ft.*
July 26	G. J. Lyon	0.88	[b] 155
Oct. 27	J. G. Mathers	1.05	[b] 234

[a] Distance from reference point to water surface. Reference point is top of mudsill at right upstream side of bridge.
[b] Amount of water diverted permanently to Erie Canal.

Daily gage height, in feet, of Black River near Boonville, N. Y., for 1912.

[W. D. Charbonneau, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.8	5.8	5.6	6.7	7.3	7.5	3.52	3.28	3.18	4.45	4.55	4.7
2	5.5	5.65	5.6	6.8	7.6	6.8	3.42	3.28	3.32	5.35	4.9	5.25
3	5.4	5.7	5.5	7.0	7.6	6.2	3.35	3.32	3.72	5.45	5.45	6.4
4	5.3	5.65	5.6	7.2	7.3	6.0	3.48	3.32	3.72	5.5	5.6	7.0
5	5.3	5.5	5.3	7.1	6.7	6.6	3.42	3.38	3.70	5.35	5.55	6.4
6	4.95	5.4	5.25	7.3	6.2	5.9	3.32	3.28	3.70	4.95	5.4	6.2
7	5.0	5.5	5.2	8.0	6.1	5.4	3.38	3.26	3.52	4.7	5.45	6.3
8	5.45	5.45	5.3	8.7	6.2	4.95	3.48	3.28	3.56	4.6	6.2	6.2
9	5.3	5.2	5.2	8.6	6.2	4.6	3.40	3.28	3.48	4.5	6.8	6.3
10	5.9	5.35	5.25	7.8	6.0	4.32	3.42	3.35	3.40	4.7	6.5	6.0
11	6.0	5.25	5.2	7.2	5.7	4.25	3.32	3.38	3.42	4.6	6.4	5.6
12	6.1	5.2	5.15	6.9	5.55	4.22	3.38	3.38	3.42	4.5	6.2	5.65
13	6.2	5.15	5.1	6.8	5.55	4.12	3.32	3.38	3.28	4.6	5.4	5.55
14	6.3	5.1	5.15	7.1	6.2	4.18	3.32	3.32	3.26	4.4	5.7	5.5
15	6.4	5.0	5.5	8.7	6.1	4.22	3.32	3.39	3.62	4.5	5.55	5.3
16	6.0	5.0	7.6	9.9	5.9	3.92	3.28	3.48	5.15	4.48	4.7	5.25
17	6.3	5.2	8.3	10.4	6.4	3.72	3.32	3.35	5.3	4.42	4.95	5.3
18	6.3	5.2	9.3	9.7	6.2	3.67	3.32	3.32	5.2	4.22	5.35	5.35
19	6.4	5.3	8.8	9.2	6.1	3.58	3.38	3.38	5.0	4.10	5.7	6.2
20	6.5	5.5	8.1	8.3	6.1	3.42	3.32	3.30	5.1	4.45	5.6	6.3
21	6.4	6.0	7.7	8.0	7.2	3.32	3.45	3.22	5.0	4.6	5.6	6.4
22	6.5	6.4	7.0	8.1	7.8	3.18	3.65	3.22	5.0	4.48	5.6	5.8
23	6.3	6.2	6.9	9.9	7.4	3.30	3.68	3.32	4.9	4.44	5.6	5.6
24	5.9	6.2	6.6	9.2	7.0	3.42	3.55	3.35	4.95	4.6	5.6	5.65
25	5.65	6.3	6.5	8.3	6.4	3.58	3.42	3.32	5.25	5.0	5.5	5.8
26	5.5	6.2	6.3	7.8	6.2	3.52	3.32	3.38	5.45	5.4	5.55	5.5
27	5.5	6.4	6.0	7.8	6.2	3.72	3.22	3.28	5.3	5.4	5.4	5.3
28	5.6	6.1	6.1	8.1	6.1	3.62	3.22	3.28	5.35	5.2	5.15	5.4
29	5.6	5.7	6.2	7.7	6.5	3.52	3.32	3.22	5.1	5.0	5.0	5.15
30	5.9	.....	6.3	7.2	8.1	3.58	3.22	3.12	4.75	4.7	4.9	5.3
31	5.8	.....	6.6	.....	8.1	.....	3.18	3.22	.....	4.6	.....	5.7

NOTE.—Relation of gage height to discharge affected by ice Jan. 8 to Mar. 19.

Daily discharge, in second-feet, of Black River near Boonville, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	795	373	341	1,460	2,050	2,270	74	49	40	238	262	305
2	630	349	341	1,540	2,380	1,540	63	49	53	558	370	512
3	580	357	325	1,740	2,380	1,060	56	53	100	605	605	1,210
4	535	349	341	1,940	2,050	920	70	53	100	630	680	1,740
5	535	325	295	1,840	1,460	1,370	63	59	97	558	655	1,210
6	390	310	288	2,050	1,060	855	53	49	97	390	580	1,060
7	410	325	280	2,860	990	580	59	47	74	305	605	1,140
8	520	318	295	3,750	1,060	390	70	49	79	275	1,060	1,060
9	430	280	280	3,620	1,060	275	61	49	70	250	1,540	1,140
10	570	302	288	2,620	920	209	63	56	61	305	1,290	920
11	550	288	280	1,940	735	194	53	59	63	275	1,210	680
12	540	280	272	1,640	655	188	59	59	63	250	1,060	708
13	530	272	265	1,540	655	168	53	59	49	275	580	655
14	520	265	272	1,840	1,060	180	53	53	47	227	735	630
15	520	250	325	3,750	990	188	53	60	87	250	655	535
16	420	250	856	5,380	855	131	49	70	470	245	305	512
17	456	280	1,390	6,100	1,210	100	53	56	535	232	390	535
18	456	280	1,920	5,100	1,060	93	53	53	490	188	558	558
19	473	295	2,450	4,410	990	82	59	59	410	164	735	1,060
20	490	325	2,980	3,240	990	63	53	51	450	238	680	1,140
21	473	405	2,500	2,860	1,940	53	66	44	410	275	680	1,210
22	490	473	1,740	2,980	2,620	40	90	44	410	245	680	795
23	456	439	1,640	5,380	2,160	51	94	53	370	236	680	680
24	389	439	1,370	4,410	1,740	63	78	56	390	275	680	708
25	349	456	1,290	3,240	1,210	82	63	53	512	410	630	795
26	325	439	1,140	2,620	1,060	74	53	59	605	580	655	630
27	325	473	920	2,620	1,060	100	44	49	535	580	580	535
28	341	422	990	2,980	990	87	44	49	558	490	470	580
29	341	357	1,060	2,500	1,290	74	53	44	450	410	410	470
30	389	.....	1,140	1,940	2,980	82	44	36	320	305	370	535
31	373	.....	1,370	.....	2,980	.....	40	44	.....	275	.....	735

NOTE.—Daily discharge Jan. 17 to Mar. 15 determined from a rating curve based on two measurements made when ice was present. Discharge Jan. 8 to 16, and Mar. 16 to 19, estimated by making a gradual change between the open water and ice curves. Discharge during open-water period determined from a rating curve fairly well defined below 4,100 second-feet.

Monthly discharge of Black River near Boonville, N. Y., for 1912.

[Drainage area, 303 square miles.]

Month.	Discharge in second-feet.			Accuracy.
	Maximum.	Minimum.	Mean.	
January	795	325	471	C.
February	473	250	344	C.
March	2,980	265	943	C.
April	6,100	1,460	3,000	A.
May	2,980	655	1,440	A.
June	2,270	40	385	A.
July	94	40	59.3	A.
August	70	36	52.0	A.
September	605	40	266	A.
October	630	164	340	A.
November	1,540	262	680	A.
December	1,740	305	806	A.
The year	6,100	36	730	

BLACK RIVER NEAR FELTS MILLS, N. Y.

Location.—At the dam of the Lefevre Paper Co., formerly owned by the Black River Traction Co., about 1½ miles above the village of Felts Mills. The dam is 9 miles upstream from Watertown and 7 miles upstream from the old Huntingtonville gaging station.

Records available.—February, 1897, to December, 1901, at Huntingtonville dam, August 29, 1902, to December 31, 1912, at Felts Mills. Data also in annual reports of the State engineer and surveyor, State of New York.

Drainage area.—1,851 square miles.

Gage.—Vertical staff, attached to a crib at the left-hand side of the stream above the mill; correction is made to gage readings for velocity of approach during the high water.

Discharge.—Previous to August 16, 1910, records were kept of the flow over a dam about 100 feet upstream from the paper mill. This dam was of sawed timber resting on a limestone foundation and its main crest was 380.6 feet long. During the summer of 1910 a new concrete dam was constructed about 100 feet downstream. This dam has a main crest for low and medium stages 300.45 feet long and 3.75 feet wide. Upstream face vertical; downstream semiogee section. Main crest of dam about 6 feet high. On the right-hand side is an additional section, of greater elevation, 48.2 feet long; on the left-hand side, angling upstream, is a section 139.7 feet long, making the total length of the dam for high-water discharge approximately 488.4 feet. A wood-pulp mill constructed at the left-hand end of the dam has been in operation since 1907. The mill contains one 45-inch and four 72-inch Smith-McCormick turbines. The discharge over the spillways has been calculated by means of the weir formula, using coefficients derived from experiments by the United States Geological Survey on a dam of similar cross section. Record is kept of the hours run and of the gate opening of each wheel as well as the head under which the turbines operate.

Winter flow.—Affected by ice. No correction attempted.

Artificial control.—Power plants and storage above the station.

Accuracy.—Results believed to be good for a station of this type.

Cooperation.—Records obtained and computations made by engineers of the New York State engineer's department, which furnishes the data to the Survey.

Daily discharge, in second-feet, of Black River near Felts Mills, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3,054	1,599	2,394	7,148	10,168	13,735	1,148	951	a 1,240	1,938	2,355	a1,405
2	3,251	1,760	2,192	8,120	9,024	a13,201	1,116	951	1,491	5,467	2,589	2,029
3	3,340	1,798	a 2,434	8,120	8,120	10,719	1,320	741	1,435	3,396	a 2,738	6,706
4	3,431	a 1,814	1,509	8,612	7,490	9,269	467	a 788	1,816	2,754	3,105	6,444
5	3,348	1,311	1,826	7,961	a 6,232	7,490	1,341	1,159	2,001	3,053	2,754	6,188
6	2,105	2,463	1,614	11,476	5,606	5,644	1,116	923	1,759	a 1,941	2,509	6,315
7	a 2,600	2,647	2,105	a24,751	5,766	4,480	a 1,006	1,309	1,653	2,002	2,355	6,188
8	1,515	2,647	1,983	22,505	5,418	3,741	1,367	1,127	a 1,322	2,075	5,244	a5,226
9	1,986	2,233	1,983	19,643	5,529	a 3,028	1,116	826	1,399	2,015	5,603	5,088
10	2,055	2,325	a 2,128	17,362	4,991	2,876	1,213	1,161	1,309	1,705	a4,216	3,778
11	1,635	a 1,881	1,387	15,234	4,653	3,107	1,116	a 931	1,361	1,705	4,762	3,384
12	1,696	1,619	1,812	12,429	a 3,830	2,876	1,116	1,213	1,116	1,816	3,983	3,197
13	1,696	2,192	1,812	10,982	3,267	2,381	1,116	923	1,341	a2,035	3,384	2,355
14	a 2,405	2,325	1,470	a12,565	4,385	2,381	a859	1,358	1,341	2,431	3,578	2,280
15	1,184	2,325	1,758	11,981	5,058	2,274	1,514	1,182	a 1,240	2,208	3,880	a1,848
16	1,957	2,192	1,812	16,179	4,480	a 1,916	1,309	1,161	1,494	2,137	3,677	2,431
17	1,986	1,942	a 3,202	24,592	4,953	1,853	1,116	1,349	2,355	2,002	a 2,844	2,280
18	2,055	a 2,353	2,971	28,033	6,232	1,799	1,213	a 859	2,509	1,938	3,105	2,208
19	1,725	1,430	4,669	27,574	a 6,365	1,399	1,116	917	2,137	1,816	2,800	2,840
20	2,267	2,128	5,410	22,231	6,499	2,355	1,083	923	1,876	a 1,848	2,714	3,197
21	a 3,083	2,128	5,525	a20,180	8,612	2,469	a 1,160	923	2,069	2,137	2,906	3,197
22	2,492	2,064	5,190	14,580	9,980	1,759	1,514	983	a 1,491	2,208	2,631	a2,844
23	3,106	2,606	4,977	14,786	10,345	a 1,082	1,309	951	1,583	2,069	2,431	3,015
24	2,947	2,606	a 5,294	18,242	10,532	1,148	1,367	951	1,876	1,938	a 2,429	2,315
25	2,647	a 2,827	3,749	19,899	10,168	1,435	1,271	a 931	2,069	3,196	2,714	2,035
26	1,197	2,033	3,919	16,410	a 8,779	1,174	1,224	1,341	2,355	4,748	2,450	2,754
27	2,259	2,606	3,348	13,482	7,961	1,367	1,165	1,341	2,753	a 3,508	2,714	2,208
28	a 2,273	2,606	3,348	a11,629	6,499	1,341	a 720	1,116	2,678	4,339	2,800	2,137
29	878	2,463	4,385	11,436	7,069	1,320	981	1,387	a 1,405	3,384	2,260	a1,082
30	1,942	.....	5,606	11,244	9,801	a 931	937	1,399	1,876	2,840	2,097	1,836
31	1,717	.....	a 8,507	.....	12,029	.....	969	1,309	.....	2,671	.....	2,335

a Sunday.

Monthly discharge of Black River near Felts Mills, N. Y., for 1912.

[Drainage area, 1,851 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area.)
	Maximum.	Minimum.	Mean.	Per square mile.	
January	3,431	878	2,253	1.22	1.41
February	2,827	1,311	2,170	1.17	1.26
March	8,507	1,387	3,236	1.75	2.02
April	28,033	7,148	15,646	8.45	9.43
May	12,029	3,267	7,092	3.83	4.42
June	13,735	931	3,685	1.99	2.22
July	1,514	720	1,141	.616	.710
August	1,399	741	1,077	.582	.671
September	2,753	1,116	1,745	.943	1.05
October	5,467	1,705	2,559	1.38	1.59
November	5,603	2,097	3,129	1.69	1.89
December	6,706	1,082	3,263	1.76	2.03
The year	28,033	720	3,900	2.11	28.701

MOOSE RIVER AT MOOSE RIVER, N. Y.

Location.—In the village of Moose River, about 3 miles downstream from McKeever station on the Adirondack division of the New York Central & Hudson River Railroad, 5 miles below the mouth of South Branch of Moose River (coming in from the left), and nearly 20 miles above the junction of Black and Moose rivers at Lyons Falls.

Records available.—June 5, 1900, to December 31, 1912. Data also in annual reports of the New York State engineer and surveyor and State Water Supply Commission of New York.

Drainage area.—370 square miles (revised; measured on United States Geological Survey topographic sheets).

Gage.—Staff, in two sections, fastened to the left bank a short distance above cable; read twice daily. The elevation of the gage zero was changed February 28, 1903, from 15.36 to 15.53.

Channel.—Composed of cobble and bowlders; fairly permanent; current smooth; depth comparatively uniform. Just above the station is a small island on which ice and log jams occasionally form. Velocity from dam at McKeever to the station relatively slow; below the station velocity very high.

Discharge measurements.—Made from a cable (erected July, 1903), which has a clear span of 269 feet.

Artificial control.—A timber dam at McKeever is used for power and for the regulation of flow for log driving. During portions of the year, therefore, two gage readings a day may not give a representative mean.

Winter flow.—The stream freezes over in winter and is covered with alternate layers of ice and snow which render the determination of discharge difficult.

Accuracy.—Discharge rating curve for open channel fairly accurate. Published data for periods of open water considered good.

Discharge measurements of Moose River at Moose River, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 16[a]	Frank Weber	1.90	310
17[a]	....do	2.36	403
Apr. 20[b]	C. S. De Golyer	6.00	3,710
20	....do	5.75	3,930
Oct. 25	Frank Weber	4.20	2,120

[a] Measurement made under complete ice cover.
[b] Results doubtful, owing to logs interfering with work. Probably backwater effect.

Daily gage height, in feet, of Moose River at Moose River, N. Y., for 1912.

[Chris Hannan, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.0				4.6	4.4	0.6	0.8	0.25	1.6	3.0	1.8
2	2.8		2.6		4.3	3.8	.9	.7	.65	1.8	3.6	2.8
3	2.7	0.9			4.6	3.3	.6	.9	1.15	1.9	3.4	4.1
4	2.6				4.4	3.0	.0	.9	1.1	2.0	3.2	4.0
5	2.4				4.2	2.6	.5	.8	.95	1.6	2.8	3.4
6	2.2			3.9	4.0	2.3	.55	.9	.9	1.6	2.5	2.8
7	2.0				3.8	2.4	.65	.8	1.05	1.45	3.5	2.4
8	2.4				3.8	2.2	.75	.8	1.0	1.4	4.9	2.0
9	2.6		2.5		3.6	2.0	.8	.7	1.1	1.3	4.7	1.7
10	2.5	.8			3.2	2.0	.7	.7	1.0	1.4	4.1	1.6
11	2.5				3.0	1.9	.7	.8	.9	1.5	3.1	1.6
12	2.4				3.0	1.7	.6	.8	.85	1.6	2.8	1.8
13	2.6			2.6	2.9	1.5	.5	.8	.0	1.8	2.4	1.9
14	2.7			3.0	3.0	1.2	.0	.75	.6	2.0	2.2	2.0
15				4.6	2.9	.85	.5	.9	.95	2.0	2.8	2.2
16		1.9	3.0	7.8	2.9	.00	.65	.8	1.4	2.0	2.8	2.4
17		2.2		8.5	3.5	1.05	.7	.7	1.8	1.9	2.4	2.4
18				7.5	3.8	1.1	.8	.9	1.6	1.8	2.0	2.2
19				6.7	3.8	1.35	.8	.8	1.6	1.8	2.0	1.9
20	2.2			5.6	4.1	1.3	.8	.65	1.45	1.9	2.0	1.8
21				5.4	4.6	1.25	.75	.5	1.35	1.8	2.0	1.8
22				5.7	5.0	.95	.95	.0	1.45	2.0	2.0	2.2
23			3.1	9.0	4.8	1.05	.9	.6	1.8	2.0	2.0	2.4
24		2.3		6.4	4.4	1.0	.9	.65	2.0	2.8	2.0	2.2
25				5.4	3.9	.95	.95	.8	2.0	3.8	2.0	2.4
26				5.2	3.6	.95	1.0	1.35	2.0	3.9	1.9	2.4
27	.9			5.4	3.7	.85	.9	1.1	2.2	3.6	2.0	2.2
28				5.8	4.0	.8	.25	1.0	2.2	3.4	1.8	2.0
29				5.6	4.4	.7	.6	1.0	1.9	3.1	1.8	2.2
30			3.1	4.7	5.7	.00	.8	1.1	1.6	3.0	1.9	2.4
31					5.0		.8	.75		2.8		2.4

NOTE.—Relation of gage height to discharge affected by ice Jan. 9 to Apr. 12.

Daily discharge, in second-feet, of Moose River at Moose River, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1,150				2,500	2,300	195	240	128	465	1,150	535
2	1,020				2,210	1,760	265	215	205	535	1,590	1,020
3	965				2,500	1,360	195	265	330	570	1,430	2,030
4	910				2,300	1,150	90	265	315	610	1,290	1,940
5	800				2,120	910	175	240	278	465	1,020	1,430
6	700				1,940	750	185	265	265	465	855	1,020
7	610				1,760	800	205	240	302	420	1,510	800
8	595				1,760	700	228	240	290	405	2,810	610
9					1,590	610	240	215	315	375	2,600	500
10					1,290	610	215	215	290	405	2,030	465
11					1,150	570	215	240	265	435	1,220	465
12					1,150	500	195	240	252	465	1,020	535
13				910	1,080	435	175	240	90	535	800	570
14				1,150	1,150	345	90	228	195	610	700	610
15				2,500	1,080	252	175	265	278	610	1,020	700
16				6,220	1,080	90	205	240	405	610	1,020	800
17				7,060	1,510	302	215	215	535	570	800	800
18				5,860	1,760	315	240	265	465	535	610	700
19				4,900	1,760	390	240	240	465	535	610	570
20				3,580	2,030	375	240	205	420	570	610	535
21				3,360	2,500	360	228	175	390	535	610	535
22				3,700	2,920	278	278	90	420	610	610	700
23				7,660	2,700	302	265	195	535	610	610	800
24				4,540	2,300	290	265	205	610	1,020	610	700
25				3,360	1,850	278	278	240	610	1,760	610	800
26				3,140	1,590	278	290	390	610	1,850	570	800
27				3,360	1,670	252	265	315	700	1,590	610	700
28				3,820	1,940	240	128	290	700	1,430	535	610
29				3,580	2,300	215	195	290	570	1,220	535	700
30				2,600	3,700	90	240	315	465	1,150	570	800
31					2,920		240	228		1,020		800

NOTE.—Daily discharge Jan. 1–8 and Apr. 13 to Dec. 31 determined from a well-defined rating curve.

Monthly discharge of Moose River at Moose River, N. Y., for 1912.

[Drainage area, 370 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	1,150	130	482	1.30	1.50	D.
February	440	115	268	.724	.78	D.
March	640	440	535	1.45	1.67	D.
April	7,660	680	2,700	7.30	8.14	C.
May	3,700	1,080	1,940	5.24	6.04	B.
June	2,300	90	570	1.54	1.72	B.
July	290	90	215	.581	.67	B.
August	390	90	242	.654	.75	B.
September	700	90	390	1.05	1.17	B.
October	1,850	375	741	2.00	2.31	B.
November	2,810	535	1,020	2.76	3.08	B.
December	2,030	465	793	2.14	2.47	B.
The year	7,660	90	824	2.23	30.30	

NOTE.—Discharge Jan. 8 to Apr. 12 estimated by means of an ice rating curve, observer's notes, and climatologic records.

MIDDLE BRANCH OF MOOSE RIVER AT OLD FORGE, N. Y.

Location.—About 300 feet below the highway bridge in Old Forge and about 400 feet below the dam.

Records available.—November 9, 1911, to December 31, 1912; published also in annual report of New York State Conservation Commission.

Drainage area.—51.5 square miles.

Gage.—Vertical staff, graded to feet and tenths, reading from 1 foot to 7 feet, spiked to birch tree on left bank of stream 300 feet below highway bridge.

Channel.—Fairly straight from dam to a point about 200 feet below the gage, where the river turns abruptly to the right and flows over a rock reef, which is the control point for the gage. Channel fairly uniform from dam to point of control. Right bank high and wooded; left bank from the highway bridge to within about 50 feet of the gage, defined by a stone wall about 3 feet above ordinary low water.

Discharge measurements.—Made from the highway bridge at high stages and by wading opposite the fish hatchery at medium and low stages.

Winter flow.—The river is kept open throughout the year by the State fish hatchery just above the station.

Accuracy.—Rating curve fairly well developed. Estimates good.

Discharge measurements of Middle Branch of Moose River at Old Forge, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 26	G. H. Canfield	1.20	174
Apr. 19[a]	C. S. De Golyer	3.61	142
19[a]	do	3.96	342

[a] Backwater at gage from North Branch of Moose River.

Daily gage height, in feet, of Middle Branch of Moose River at Old Forge, N. Y., for 1912.

[Vernon S. Ervin, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.75	1.20	2.32	1.00	3.4	3.6	1.42	2.0	2.1	2.1	2.45	2.4
2	2.75	1.90	2.32	1.00	3.0	2.75	1.75	2.0	2.1	2.1	2.45	2.4
3	2.75	2.60	2.32	1.00	2.7	2.65	1.75	2.0	2.1	2.1	2.45	2.4
4	2.75	2.60	2.32	1.00	2.0	2.0	1.75	2.0	2.1	2.1	2.45	2.4
5	2.70	2.60	2.30	1.00	1.85	1.80	1.75	2.0	2.1	2.1	2.45	2.4
6	2.70	1.9	2.30	1.00	2.3	1.80	1.75	2.0	2.1	2.1	2.45	2.4
7	2.70	1.2	2.30	1.00	2.7	1.80	1.75	2.0	2.1	2.1	2.45	2.4
8	1.85	1.2	2.30	1.00	2.7	1.80	1.75	2.0	2.1	2.1	2.45	2.4
9	1.00	1.65	2.30	1.00	2.3	1.80	1.75	2.0	2.1	2.1	2.45	2.4
10	1.00	2.1	2.29	1.00	2.0	1.80	1.75	2.0	2.1	2.1	2.45	2.4
11	1.00	2.1	2.28	1.02	2.2	1.80	1.75	2.0	2.1	2.1	2.45	2.4
12	1.68	2.1	2.28	1.15	2.45	1.80	1.75	2.0	2.1	2.1	2.45	2.4
13	2.35	2.1	2.28	1.21	2.7	1.45	1.75	1.96	2.1	2.1	2.45	2.4
14	2.35	2.25	2.28	1.44	2.45	1.10	1.75	1.92	2.1	2.1	2.45	2.4
15	2.35	2.4	2.28	1.74	2.2	1.10	1.75	1.46	2.1	2.1	2.45	2.4
16	2.35	2.4	2.28	2.55	2.45	1.10	1.75	1.0	2.1	2.1	2.45	2.4
17	2.35	2.4	2.28	4.1	2.7	1.45	1.75	1.0	2.1	2.1	2.45	2.4
18	2.35	2.4	2.25	4.4	2.7	1.80	1.75	1.0	2.1	2.1	2.45	2.4
19	2.35	2.4	2.25	4.1	2.7	1.80	1.75	1.0	2.1	2.1	2.45	2.4
20	2.35	2.35	1.68	4.0	2.8	1.80	1.75	1.0	2.1	2.1	2.45	2.4
21	2.35	2.35	1.00	3.6	3.2	1.80	1.75	1.0	2.1	2.1	2.4	2.4
22	1.68	2.35	1.00	3.8	3.7	1.45	1.88	1.0	2.1	2.1	2.4	2.4
23	1.00	2.35	1.00	4.4	3.8	1.10	2.0	1.92	2.1	2.1	2.4	2.4
24	1.05	2.34	1.00	4.8	3.8	1.10	2.0	1.92	2.1	2.3	2.4	2.4
25	1.10	2.32	1.00	4.6	3.4	1.10	2.0	1.92	2.1	2.45	2.4	2.4
26	1.20	2.32	1.00	4.4	3.0	1.10	2.0	2.01	2.1	2.45	2.4	2.4
27	1.20	2.32	1.00	4.2	2.05	1.10	2.0	2.1	2.1	2.45	2.4	2.4
28	1.20	2.32	1.00	4.1	1.10	1.10	2.0	2.1	2.1	2.45	2.4	2.4
29	1.20	2.32	1.00	4.0	2.5	1.10	2.0	2.1	2.1	2.45	2.4	2.4
30	1.20	.....	1.00	3.8	3.9	1.10	2.0	2.1	2.1	2.45	2.4	2.4
31	1.20	.....	1.00	.....	3.9	.....	2.0	2.1	.....	2.45	.....	2.4

NOTE.—No backwater from ice during 1912. High water in the North Branch caused backwater at the gage Apr. 17 to 19.

Daily discharge, in second-feet, of Middle Branch of Moose River at Old Forge, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	204	17	130	10	328	368	28	84	98	98	152	143
2	204	72	130	10	251	204	56	84	98	98	152	143
3	204	177	130	10	195	186	56	84	98	98	152	143
4	204	177	130	10	84	84	56	84	98	98	152	143
5	195	177	127	10	66	61	56	84	98	98	152	143
6	195	72	127	10	127	61	56	84	98	98	152	143
7	195	17	127	10	195	61	56	84	98	98	152	143
8	66	17	127	10	195	61	56	84	98	98	152	143
9	10	46	127	10	127	61	56	84	98	98	152	143
10	10	98	126	10	84	61	56	84	98	98	152	143
11	10	98	124	11	112	61	56	84	98	98	152	143
12	49	98	124	15	152	61	56	84	98	98	152	143
13	135	98	124	18	195	30	56	79	98	98	152	143
14	135	220	124	30	152	13	56	74	98	98	152	143
15	135	143	124	55	112	13	56	31	98	98	152	143
16	135	143	124	168	152	13	56	10	98	98	152	143
17	135	143	124	342	195	30	56	10	98	98	152	143
18	135	143	220	500	195	61	56	10	98	98	152	143
19	135	143	220	342	195	61	56	10	98	98	152	143
20	135	135	49	451	213	61	56	10	98	98	152	143
21	135	135	10	368	289	61	56	10	98	98	143	143
22	49	135	10	409	388	30	70	10	98	98	143	143
23	10	135	10	538	409	13	84	74	98	98	143	143
24	12	133	10	626	409	13	84	74	98	127	143	143
25	13	130	10	582	328	13	84	74	98	152	143	143
26	17	130	10	538	251	13	84	85	98	152	143	143
27	17	130	10	494	91	13	84	98	98	152	143	143
28	17	130	10	472	13	13	84	98	98	152	143	143
29	17	130	10	451	160	13	84	98	98	152	143	143
30	17	.....	10	409	430	13	84	98	98	152	143	143
31	17	.....	10	.....	430	.....	84	98	.....	152	.....	143

NOTE.—Daily discharge determined from a rating curve fairly well defined below 250 second-feet. Discharge Apr. 17 to 19 estimated from two discharge measurements and flow over dam because of backwater at gage.

Monthly discharge of Middle Branch of Moose River at Old Forge, N. Y., for 1912.

[Drainage area, 51.5 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	204	10	95.1	1.85	2.13	A.
February	220	17	118	2.29	2.47	A.
March	220	10	88.6	1.72	1.98	A.
April	626	10	231	4.49	5.01	B.
May	430	13	210	4.08	4.70	B.
June	368	13	60.2	1.17	1.30	B.
July	84	28	63.7	1.24	1.43	A.
August	98	10	66.4	1.29	1.49	A.
September	98	98	98.0	1.90	2.12	A.
October	152	98	111	2.15	2.49	A.
November	152	143	149	2.90	3.24	A.
December	143	143	143	2.78	3.20	A.
The year	626	10	119	2.31	31.56	

STREAMS TRIBUTARY TO ST. LAWRENCE RIVER.

OSWEGATCHIE RIVER NEAR OGDENSBURG, N. Y.

Location.—At the steel highway bridge known locally as Eel Weir bridge, about 1 mile below the mouth of the outlet of Black Lake and 5½ miles above the city of Ogdensburg and the mouth of the river.

Records available.—April 22, 1903, to December 31, 1912. Data published also in annual reports of the State Water Supply Commission, State Conservation Commission, and State engineer and surveyor, State of New York.

Drainage area.—1,580 square miles.

Gage.—Chain, fastened to the upstream side of the bridge; read once daily; datum unchanged.

Channel.—Rocky and partly artificial, the rock having been removed underneath the bridge by blasting to increase the bridge opening.

Discharge measurements.—Usually made from the bridge. None made during 1912.

Artificial control.—Two dams in the vicinity of the gage: One at Heuvelton, about 5 miles above; one at Rensselaer Falls, 10 miles above.

Winter flow.—Not affected by ice, as the current at the station is swift.

Accuracy.—Rating curve fairly well developed; open-water curve used throughout the year.

Daily gage height, in feet, of Oswegatchie River near Ogdensburg, N. Y., for 1912.

[Joseph H. La Rue, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.4	4.9	4.9	7.2	6.5	8.1	5.0	4.6	4.8	5.4	6.0	6.1
2	6.2	4.8	4.9	7.5	6.4	8.4	5.0	4.6	4.8	5.5	5.9	6.1
3	6.0	4.8	4.9	7.6	6.3	8.7	5.0	4.6	4.85	5.4	5.8	6.2
4	5.9	4.8	4.8	7.7	6.2	8.6	5.0	4.6	4.9	5.4	5.8	7.2
5	5.8	4.8	4.8	7.8	6.0	8.4	4.9	4.6	4.9	5.4	5.8	7.6
6	5.7	4.8	4.8	8.2	5.85	8.4	4.8	4.6	4.9	5.45	5.7	7.9
7	5.7	4.8	4.8	8.7	5.8	8.0	4.8	4.6	4.9	5.4	5.7	7.7
8	5.6	4.8	4.8	9.6	5.8	7.6	4.8	4.6	5.0	5.3	5.9	7.6
9	5.6	4.8	4.8	9.8	5.75	7.2	4.8	4.7	5.0	5.3	6.2	7.6
10	5.5	4.8	4.7	9.9	5.65	7.0	4.7	4.7	5.0	5.3	6.6	7.6
11	5.5	4.8	4.7	9.8	5.6	6.8	4.7	4.7	5.0	5.3	6.8	7.4
12	5.5	4.8	4.7	9.6	5.4	6.7	4.7	4.7	5.0	5.2	6.9	7.1
13	5.4	4.7	4.7	9.2	5.5	6.6	4.6	4.7	5.0	5.2	6.9	7.0
14	5.3	4.7	4.7	9.0	5.55	6.2	4.6	4.65	5.0	5.2	7.1	6.9
15	5.3	4.7	4.7	8.8	5.4	6.1	4.6	4.6	4.9	5.2	7.2	6.8
16	5.2	4.7	4.8	8.4	5.3	6.0	4.5	4.6	4.9	5.2	7.2	6.7
17	5.1	4.7	4.8	8.2	5.3	6.0	4.5	4.6	4.9	5.2	7.3	6.6
18	5.0	4.7	4.9	8.2	5.55	5.9	4.5	4.6	4.9	5.2	7.3	6.5
19	5.0	4.7	4.9	8.2	5.75	5.85	4.6	4.6	4.9	5.2	7.2	6.5
20	5.0	4.7	5.2	8.1	5.95	5.65	4.5	4.6	4.9	5.2	7.1	6.5
21	5.0	4.7	5.9	8.0	6.4	5.5	4.6	4.6	5.05	5.2	6.8	6.5
22	4.9	4.7	6.4	8.0	6.4	5.5	4.5	4.6	5.2	5.2	6.7	6.6
23	4.9	4.7	6.3	7.8	6.8	5.4	4.5	4.6	5.3	5.2	6.6	6.4
24	4.9	4.8	6.3	7.6	6.9	5.3	4.5	4.6	5.3	5.2	6.6	6.3
25	4.9	4.8	6.2	7.6	7.0	5.2	4.5	4.6	5.4	5.3	6.6	6.2
26	4.9	4.9	6.2	7.5	7.2	5.2	4.5	4.6	5.4	5.5	6.4	6.2
27	4.9	4.9	6.2	7.4	7.1	5.1	4.55	4.6	5.4	5.8	6.4	6.2
28	4.9	4.9	6.2	7.2	7.0	5.05	4.6	4.6	5.45	5.85	6.2	6.1
29	4.9	4.9	6.2	7.0	7.0	5.0	4.6	4.6	5.4	5.95	6.2	6.1
30	4.9	.....	6.4	6.7	7.0	5.0	4.6	4.65	5.4	6.2	6.1	6.1
31	4.9	.....	6.7	.....	7.6	.....	4.6	4.7	.....	6.0	.....	6.2

NOTE.—Relation of gage height to discharge at this station not materially affected by ice.

Daily discharge, in second-feet, of Oswegatchie River near Ogdensburg, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4,600	1,030	1,030	6,960	4,890	9,660	1,200	580	870	1,970	3,440	3,730
2	4,020	870	1,030	7,850	4,600	10,600	1,200	580	870	2,180	3,160	3,730
3	3,440	870	1,030	8,150	4,310	11,500	1,200	580	950	1,970	2,890	4,020
4	3,160	870	870	8,450	4,020	11,200	1,200	580	1,030	1,970	2,890	6,960
5	2,890	870	870	8,750	3,440	10,600	1,030	580	1,030	1,970	2,890	8,150
6	2,640	870	870	9,960	3,020	10,600	870	580	1,030	2,080	2,640	9,050
7	2,640	870	870	11,500	2,890	9,350	870	580	1,030	1,970	2,640	8,450
8	2,400	870	870	14,300	2,890	8,150	870	580	1,200	1,770	3,160	8,150
9	2,400	870	870	14,900	2,760	6,960	870	720	1,200	1,770	4,020	8,150
10	2,180	870	720	15,200	2,520	6,360	720	720	1,200	1,770	5,180	8,150
11	2,180	870	720	14,900	2,400	5,780	720	720	1,200	1,770	5,780	7,550
12	2,180	870	720	14,300	1,970	5,480	720	720	1,200	1,570	6,070	6,660
13	1,970	720	720	13,000	2,180	5,180	580	720	1,200	1,570	6,070	6,360
14	1,770	720	720	12,400	2,290	4,020	580	650	1,200	1,570	6,660	6,070
15	1,770	720	720	11,800	1,970	3,730	580	580	1,030	1,570	6,960	5,780
16	1,570	720	870	10,600	1,770	3,440	450	580	1,030	1,570	6,960	5,480
17	1,380	720	870	9,960	1,770	3,440	450	580	1,030	1,570	7,250	5,180
18	1,200	720	1,030	9,960	2,290	3,160	450	580	1,030	1,570	7,250	4,890
19	1,200	720	1,030	9,960	2,760	3,020	580	580	1,030	1,570	6,960	4,890
20	1,200	720	1,570	9,660	3,300	2,520	450	580	1,030	1,570	6,660	4,890
21	1,200	720	3,160	9,350	4,600	2,180	580	580	1,290	1,570	5,780	4,890
22	1,030	720	4,600	9,350	4,600	2,180	450	580	1,570	1,570	5,480	5,180
23	1,030	720	4,310	8,750	5,780	1,970	450	580	1,770	1,570	5,180	4,600
24	1,030	870	4,310	8,150	6,070	1,770	450	580	1,770	1,570	5,180	4,310
25	1,030	870	4,020	8,150	6,360	1,570	450	580	1,970	1,770	5,180	4,020
26	1,030	1,030	4,020	7,850	6,960	1,570	450	580	1,970	2,180	4,600	4,020
27	1,030	1,030	4,020	7,550	6,660	1,380	515	580	1,970	2,890	4,600	4,020
28	1,030	1,030	4,020	6,960	6,360	1,290	580	580	2,080	3,020	4,020	3,730
29	1,030	1,030	4,020	6,360	6,360	1,200	580	580	1,970	3,300	4,020	3,730
30	1,030	.....	4,600	5,480	6,360	1,200	580	650	1,970	4,020	3,730	3,730
31	1,030	.....	5,480	.....	8,150	.....	580	720	.....	3,440	.....	4,020

NOTE.—Daily discharge determined from a fairly well-defined rating curve.

Monthly discharge of Oswegatchie River near Ogdensburg, N. Y., for 1912.

[Drainage area, 1,580 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	4,600	1,030	1,880	1.19	1.37	B.
February	1,030	720	841	.532	.57	C.
March	5,480	720	2,080	1.32	1.52	B.
April	15,200	5,480	10,000	6.33	7.06	A.
May	8,150	1,770	4,070	2.58	2.97	A.
June	11,500	1,200	5,040	3.19	3.56	A.
July	1,200	450	686	.434	.50	C.
August	720	580	612	.387	.45	C.
September	2,080	870	1,320	.835	.93	C.
October	4,020	1,570	2,010	1.27	1.46	B.
November	7,250	2,640	4,910	3.11	3.47	A.
December	9,050	3,730	5,570	3.53	4.07	A.
The year	15,200	450	3,240	2.05	27.93	

EAST BRANCH OF OSWEGATACHIE RIVER AT NEWTON FALLS, N. Y.

Location.—Six hundred feet below the lower dam of the Newton Falls Paper Co., in the village of Newton Falls; 4 miles above the mouth of Little River (coming in from the left) and 10 miles below the outlet of Cranberry Lake.

Records available.—October 6 to December 31, 1912.

Drainage area.—166 square miles, of which 12.8 square miles is water surface in Cranberry Lake.

Gage.—A staff set vertically in a concrete pier; read twice daily.

Channel.—One channel at all stages; bed consists of small bowlders and gravel, covered with waste from the pulp mill above.

Discharge measurements.—At low stages made by wading 100 yards above the gage; at high stages, from a cable and car 30 feet above the gage.

Winter flow.—No information; effect of ice is probably diminished by the operation of the paper mill.

Artificial control.—The dams of the paper mill cause some daily fluctuation—probably not enough to affect the accuracy of the records. Seasonal flow is largely controlled by a dam at Cranberry Lake and the range of gage heights will probably not be more than 5 feet.

Accuracy.—A well-defined discharge curve has been developed for ordinary stages. No high-water measurements have yet been made. Estimates good.

Cooperation.—Gage heights furnished by the Newton Falls Paper Co.

Discharge measurements of East Branch of Oswegatchie River at Newton Falls, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 6[a]	C. S. De Golyer	0.30	41.4
9	....do	1.95	276
Dec. 16	Frank Weber	2.95	558
16	R. S. Barnes	2.57	454

[a] Made by wading 400 feet above gage.

Daily gage height, in feet, of East Branch of Oswegatchie River at Newton Falls, N. Y., for 1912.

[Chas. H. Corp, observer.]

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	.....	1.8	0.58	11	2.0	2.6	2.6	21	2.25	2.1	2.4
2	.....	2.1	2.25	12	1.8	2.45	2.6	22	2.2	2.3	1.7
3	.....	.60	2.8	13	.40	2.5	2.6	23	2.1	2.4	2.7
4	.....	2.35	2.8	14	2.25	2.6	2.5	24	1.85	.52	2.4
5	.....	2.2	2.6	15	2.1	2.5	1.5	25	1.65	2.4	2.4
6	0.30	2.0	2.8	16	1.9	2.35	2.7	26	1.7	2.4	2.4
7	2.1	2.0	2.6	17	1.7	1.6	2.4	27	.55	2.15	2.3
8	2.2	1.9	2.0	18	1.65	2.6	2.4	28	2.3	2.1	2.25
9	1.8	2.1	2.6	19	1.65	2.4	2.6	29	2.1	2.1	1.4
10	1.75	2.35	2.6	20	.52	2.2	2.5	30	2.05	2.1	2.7
								31	1.8	.....	2.4

NOTE.—Mean daily gage height obtained by weighting individual observations according to the number of hours for which each one applies, as determined from observer's notes concerning operation of mill and sluice gates.

Daily discharge, in second-feet, of East Branch of Oswegatchie River at Newton Falls, N. Y., for 1912.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	.....	244	63	11	290	452	452	21	353	314	394
2	.....	314	353	12	244	408	452	22	340	366	222
3	.....	65	512	13	49	422	452	23	314	394	482
4	.....	380	512	14	353	452	422	24	255	59	394
5	.....	340	452	15	314	422	183	25	212	394	394
6	42	290	512	16	266	380	482	26	222	394	394
7	314	290	452	17	222	202	394	27	61	327	366
8	340	266	290	18	212	452	394	28	366	314	353
9	244	314	452	19	212	394	452	29	314	314	165
10	233	380	452	20	59	340	422	30	302	314	482
								31	244	.....	394

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of East Branch of Oswegatchie River at Newton Falls, N. Y., for 1912.

[Drainage area, 166 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
October 6–31	366	42	245	1.48	1.43	A.
November	452	59	333	2.01	2.24	A.
December	512	63	393	2.37	2.37	A.

RAQUETTE RIVER AT RAQUETTE FALLS, NEAR COREYS, N. Y.

Location.—Six miles above Axton, which is 2½ miles south of Coreys, 5 miles below the outlet of Long Lake and 2 miles below the mouth of Moose Creek.

Records available.—August 27, 1908, to November 10, 1912. Published also in annual reports of New York State Water-Supply Commission and New York State engineer and surveyor.

Drainage area.—418 square miles.

Gage.—A staff fastened to the right bank in a comparatively smooth section between two small falls; read once during the open-water period and weekly during the ice period; datum unchanged since station was established.

Channel.—Rough, composed of large bowlders; permanent; one channel at all stages.

Discharge measurements.—Made from a car and cable about 10 feet above the gage.

Winter flow.—Relation of gage height to discharge somewhat affected by ice.

Accuracy.—Open-water discharge curve well defined: log jams liable to occur.

Discharge measurements of Raquette River at Raquette Falls, near Coreys, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 19[a]	Frank Weber	2.04	251
Apr. 16	.....do	5.25	2,560
17	.....do	5.75	3,400
25	.....do	6.55	4,260
May 18[b]	.....do	4.87	1,850
19[b]	.....do	4.68	1,680
July 18	G. H. Canfield	1.42	124
18	.....do	1.42	130
18[c]	.....do	1.41	125
Sept. 12	Frank Weber	2.11	289
12	.....do	2.11	286

[a] Measurements made under complete ice cover.
[b] Log jam below gage.
[c] Wading 2 miles below gage.

Daily gage height, in feet, of Raquette River at Raquette Falls, near Coreys, N. Y., for 1912.

[C. A. De Lancett, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	3.7	.....	2.2	2.4	5.7	5.1	1.8	1.4	1.6	2.7	3.4
2	3.6	.....	.....	2.5	5.6	5.1	1.8	1.38	2.0	2.8	3.4
3	3.5	.....	.....	2.5	5.4	4.9	1.7	1.5	2.1	2.75	3.4
4	3.5	.....	.....	2.7	5.2	4.7	1.7	1.7	2.3	2.7	3.4
5	3.4	2.4	.....	2.8	5.0	4.6	1.8	1.7	2.2	2.65	3.5
6	3.2	.....	.....	3.0	4.9	4.5	1.9	1.6	2.5	2.6	3.5
7	.....	.....	.....	3.5	4.9	4.4	1.8	1.6	2.5	2.6	3.5
8	3.1	.....	1.4	3.9	4.9	4.2	1.7	1.55	2.35	2.55	4.1
9	.....	.....	.....	4.4	4.9	4.1	1.6	1.6	2.2	2.5	4.0
10	.....	.....	.....	4.6	4.9	4.0	1.5	1.6	2.1	2.45	3.9
11	.....	.....	.....	4.6	5.0	3.9	1.6	1.6	2.1	2.4	.....
12	.....	.....	.....	4.5	5.0	3.8	1.5	2.1	2.0	2.45	.....
13	.....	.....	.....	4.5	5.1	3.7	1.40	2.0	2.0	2.45	.....
14	.....	.....	.....	4.5	4.9	3.6	1.6	1.9	1.9	2.4	.....
15	2.9	.....	1.8	4.6	4.8	3.5	1.5	1.8	1.9	2.4	.....
16	.....	.....	.....	5.1	4.6	3.4	1.7	1.7	2.5	2.4	.....
17	.....	.....	.....	5.8	4.6	3.3	1.55	1.6	2.4	2.45	.....
18	.....	2.2	.....	6.0	4.7	3.1	1.42	1.6	2.4	2.5	.....
19	.....	2.04	.....	6.3	4.7	3.0	1.42	1.6	2.4	2.9	.....
20	.....	.....	.....	6.3	4.7	2.9	1.38	1.55	2.4	2.8	.....
21	.....	.....	.....	6.2	5.2	2.8	1.38	1.5	2.45	2.8	.....
22	3.6	.....	2.3	6.1	5.7	2.7	2.0	1.5	2.5	2.85	.....
23	.....	1.8	.....	6.3	5.7	2.6	1.85	1.5	2.55	2.9	.....
24	.....	.....	.....	6.7	5.6	2.5	1.7	1.6	2.6	2.9	.....
25	.....	.....	.....	6.7	5.6	2.4	1.6	1.7	2.6	3.2	.....
26	.....	.....	.....	6.5	5.3	2.3	1.55	1.8	2.6	3.2	.....
27	.....	.....	.....	6.5	5.3	2.2	1.5	2.15	2.6	3.3	.....
28	3.3	.....	.....	6.0	5.1	2.1	1.42	2.1	2.65	3.3	.....
29	.....	.....	2.4	6.0	4.9	2.0	1.50	2.0	2.6	3.3	.....
30	.....	.....	.....	5.8	5.2	1.9	1.45	1.9	2.6	3.35	.....
31	.....	.....	.....	.....	5.1	.....	1.41	1.7	.....	3.35	.....

NOTE.—Relation of gage height to discharge affected by ice Jan. 7 to Mar. 18, but as the velocity at this station is relatively high the effect of ice is not great. A log jam caused backwater at the gage May 6 to May 25.

Daily discharge, in second-feet, of Raquette River at Raquette Falls, near Coreys, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	1,200	530	295	372	3,240	2,440	202	123	159	484	854
2	1,120	490	270	407	3,100	2,440	202	120	252	528	854
3	1,040	450	245	407	2,820	2,200	180	140	280	506	854
4	1,040	400	220	484	2,560	1,960	180	180	339	484	854
5	970	355	195	528	2,320	1,850	202	180	309	464	920
6	830	350	170	626	1,880	1,750	226	159	407	444	920
7	800	345	145	920	1,880	1,650	202	159	407	444	920
8	770	340	115	1,220	1,880	1,470	180	150	356	426	1,380
9	740	335	125	1,650	1,880	1,380	159	159	309	407	1,300
10	700	330	140	1,850	1,880	1,300	140	159	280	390	1,220
11	670	325	150	1,850	2,000	1,220	159	159	280	372	.....
12	630	320	160	1,750	2,000	1,140	140	280	252	390	.....
13	600	315	170	1,750	2,100	1,060	123	252	252	390	.....
14	560	310	180	1,750	1,880	990	159	226	226	372	.....
15	530	305	190	1,850	1,780	920	140	202	226	372	.....
16	570	300	210	2,440	1,600	854	180	180	407	372	.....
17	610	295	230	3,380	1,600	792	150	159	372	390	.....
18	650	295	250	3,660	1,690	678	126	159	372	407	.....
19	690	251	270	4,100	1,690	626	126	159	372	576	.....
20	740	235	290	4,100	1,690	576	120	150	372	528	.....
21	780	220	315	3,940	2,200	528	120	140	390	528	.....
22	820	205	339	3,800	2,800	484	252	140	407	552	.....
23	800	190	343	4,100	2,800	444	214	140	426	576	.....
24	780	205	348	4,740	2,670	407	180	159	444	576	.....
25	760	220	352	4,740	2,670	372	159	180	444	734	.....
26	740	235	357	4,420	2,680	339	150	202	444	734	.....
27	720	250	362	4,420	2,680	309	140	294	444	792	.....
28	690	265	367	3,660	2,440	280	126	280	464	792	.....
29	650	280	372	3,660	2,200	252	140	252	444	792	.....
30	610	.....	372	3,380	2,560	226	132	226	444	823	.....
31	570	.....	372	.....	2,440	.....	125	180	.....	823	.....

NOTE.—Daily discharge determined as follows: Jan. 1 to 6, from a well-defined rating curve; Mar. 19 to May 5 and May 26 to Dec. 31, from a fairly well-defined curve; May 6 to 25, from a rating curve based on two measurements made while the log jam existed; for the period during which ice was present, Jan. 7 to Mar. 18, estimated by means of a rating curve based on one measurement made with ice present, and the shape of the open-water rating curves. Discharge interpolated for days on which gage was not read.

Monthly discharge of Raquette River at Raquette Falls, near Coreys, N. Y., for 1912.

[Drainage area, 418 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	1,200	530	754	1.80	2.08	C.
February	530	190	308	.737	.79	C.
March	372	115	255	.610	.70	C.
April	4,740	372	2,530	6.05	6.75	B.
May	3,240	1,600	2,250	5.38	6.20	B.
June	2,440	226	1,030	2.46	2.74	A.
July	252	120	162	.388	.45	A.
August	294	120	182	.435	.50	A.
September	464	159	353	.844	.94	A.
October	823	372	531	1.27	1.46	A.
November 1–10	1,380	854	1,010	2.42	.90	A.

RAQUETTE RIVER AT PIERCEFIELD, N. Y.

Location.—About three-fourths mile above the head of Black Rapids and half a mile below the dam of the International Paper Co. at Piercefield.

Records available.—August 20, 1908, to December 31, 1912. Data also in annual reports of the State Water-Supply Commission and the State engineer and surveyor, State of New York.

Drainage area.—723 square miles.

Gage.—A chain gage fastened to a large stump installed September 4, 1910, to replace the vertical staff which was fastened to the same stump and was used from August 20, 1908, to September 3, 1910. The datum of the chain gage was the same as that of the original staff gage; from January 1, 1911, to December 31, 1912, the datum of the chain gage was 2 feet lower. During 1912, a Stevens automatic gage was installed in a galvanized sheet-iron house (4 by 6 feet inside dimensions). The instrument is set over a concrete well 3½ feet square (inside dimensions) and 15 feet deep. The well is connected with the river by a 4-inch cast-iron water pipe 60 feet long. A shear gate valve is set at the inner end of the pipe for use in cleaning the well. The outer end of the pipe terminates in a concrete box 1 foot square (inside dimensions) connected with the river by three small intake pipes, 2 inches in diameter, their outer ends protected with a screen. The river at this point contains a considerable amount of wood pulp, and this special construction was deemed necessary to keep the pulp out of the intake pipe. The station is shown in Plate III, *B* (p. 96).

Channel.—The channel opposite the gage is a deep pond in which velocity is not perceptible. The control of this pond is at the head of Black Rapids and is permanent.

Discharge measurements.—Made from a cable (span 171 feet) at the section formerly used for boat measurements just above Black Rapids.

Winter flow.—The rapids controlling the stream at the gage rarely freeze and measurements made with ice present indicate that the relation between gage height and discharge is little if at all affected by ice. Open-water discharge rating curve is usually applicable throughout the year.

Artificial control.—The dam of the International Paper Co. controls the flow of the stream at the station during low-water periods, but the mill is usually run for 24 hours each day, except Sundays. The numerous lakes in the upper part of the drainage basin afford considerable storage, most of which is controlled.

Accuracy.—Although the discharge at this station is somewhat affected by artificial control, the records are believed to be good; with automatic gage, they should be excellent.

Cooperation.—The recording gage is attended by an employee of the International Paper Co.

Discharge measurements of Raquette River at Piercefield, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 31[a]	Frank Weber	5.38	1,030
Feb. 20[a]	do	4.00	454
July 16	G. H. Canfield	3.80	424
Oct. 25	Frank Weber	5.50	1,110

[a] Made under complete ice cover 1½ miles below gage.

Daily gage height, in feet, of Raquette River at Piercefield, N. Y., for 1912.

[W. B. Graves, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	7.1	4.5	4.4	4.2	10.6	7.2	4.4	3.8	2.1	3.35	5.8	6.2
2	6.9	4.6	4.3	4.3	10.5	7.0	4.2	3.5	1.4	3.6	5.8	6.3
3	6.9	4.5	1.7	4.3	10.3	7.2	4.2	2.0	3.3	4.6	4.4	6.2
4	7.1	2.25	1.85	4.3	10.4	7.2	4.2	1.55	3.9	5.1	6.0	6.2
5	6.8	4.6	4.1	4.4	9.2	7.2	4.2	3.25	4.0	5.3	5.9	6.3
6	6.6	4.6	4.2	4.3	9.1	7.2	4.3	3.8	4.0	3.1	6.0	6.3
7	6.6	4.4	4.3	3.8	9.1	7.2	2.6	3.8	4.1	4.1	6.0	6.2
8	6.4	4.4	4.3	4.2	8.8	7.1	4.2	3.8	2.7	5.7	6.0	6.0
9	5.8	4.5	4.3	4.6	8.8	6.8	3.6	3.6	3.8	5.4	6.0	6.1
10	5.2	4.4	1.6	4.6	8.8	7.2	3.4	2.75	4.3	5.2	5.5	6.2
11	5.5	2.25	1.9	4.6	8.6	6.8	4.2	1.55	4.2	5.4	6.4	6.4
12	5.8	4.6	4.0	4.9	7.8	6.8	3.1	3.5	4.1	5.2	7.2	6.2
13	5.8	4.7	4.2	4.8	7.9	6.6	2.9	3.8	4.1	3.3	7.3	6.2
14	5.8	4.6	4.3	4.8	7.8	6.6	1.88	3.8	4.2	5.6	7.2	6.1
15	5.8	4.6	4.3	5.6	7.7	6.6	2.55	3.8	2.8	5.2	7.2	5.8
16	5.8	4.5	4.3	6.0	7.6	6.2	3.7	3.4	3.8	5.4	7.2	6.2
17	5.8	4.5	1.65	6.8	7.6	6.5	3.6	2.8	4.0	5.3	6.6	6.3
18	5.4	2.0	1.75	6.8	7.4	6.3	3.6	1.65	4.1	5.6	7.4	6.3
19	4.4	4.4	4.2	7.2	7.5	6.4	1.75	3.5	4.1	5.2	7.6	6.2
20	3.8	4.5	4.2	7.5	7.4	6.2	1.5	3.8	4.2	2.9	7.8	6.3
21	3.8	4.5	4.1	7.2	7.2	6.0	1.4	3.8	4.0	5.4	7.6	6.2
22	3.8	4.5	4.1	8.1	7.3	6.0	3.45	3.8	3.4	5.4	7.4	4.7
23	3.8	4.5	4.1	8.6	7.2	4.6	3.8	3.7	3.8	5.6	7.4	4.8
24	5.0	4.5	1.7	9.0	7.2	5.5	3.8	2.75	4.1	5.3	6.2	4.8
25	5.2	1.9	2.05	9.6	7.1	6.2	3.8	1.55	4.2	5.0	6.5	4.8
26	5.2	2.05	4.1	9.7	6.4	5.8	1.85	3.3	4.2	5.2	6.6	5.5
27	5.2	4.4	4.1	10.5	6.8	5.8	1.8	3.9	4.1	3.1	6.5	5.8
28	2.75	4.4	4.1	9.8	7.2	5.5	1.55	3.8	4.2	5.6	6.6	5.8
29	5.2	4.4	4.2	10.7	7.5	5.5	3.6	3.7	2.85	5.4	6.5	5.0
30	5.3	.....	4.3	11.4	7.4	2.45	3.8	3.8	4.0	5.5	6.4	5.4
31	5.4	.....	4.0	.....	7.3	.....	3.8	3.8	.....	5.4	.....	5.8

NOTE.—Relation of gage height to discharge at this station not affected by ice.

Daily gage height, in feet, of Raquette River at Piercefield, N. Y., for 1912.

[Automatic gage.]

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	.....	5.67	6.16	11	.....	6.96	6.47	21	.....	7.13	6.10
2	.....	5.82	6.32	12	.....	7.01	6.44	22	5.08	6.65	5.55
3	.....	4.73	6.36	13	.....	7.03	6.42	23	5.35	6.88	5.68
4	.....	5.87	6.40	14	.....	7.09	6.15	24	5.15	6.44	5.77
5	.....	5.96	6.45	15	.....	7.19	6.16	25	5.04	6.85	5.46
6	.....	5.89	6.46	16	.....	7.18	6.30	26	5.37	6.67	5.95
7	.....	5.92	6.78	17	.....	6.99	6.21	27	3.66	6.60	6.00
8	.....	5.91	6.23	18	.....	7.33	6.20	28	4.72	6.54	5.99
9	.....	6.23	6.60	19	.....	7.25	6.15	29	5.46	6.43	5.07
10	.....	6.40	6.49	20	.....	7.12	6.14	30	5.48	6.32	5.88
								31	5.56	.....	5.94

NOTE.—Mean daily gage height obtained by averaging hourly readings for each 24-hour period.

Daily discharge, in second-feet, of Raquette River at Piercefield, N Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	2,290	650	615	545	6,100	2,380	615	425	96	303	1,280	1,560
2	2,110	690	580	580	5,980	2,200	545	342	44	369	1,280	1,630
3	2,110	650	64	580	5,740	2,380	545	88	290	690	615	1,560
4	2,290	110	76	580	5,860	2,380	545	54	455	895	1,420	1,560
5	2,020	690	515	615	4,430	2,380	545	278	485	990	1,350	1,630
6	1,860	690	545	580	4,320	2,380	580	425	485	244	1,420	1,630
7	1,860	615	580	425	4,320	2,380	147	425	515	515	1,420	1,560
8	1,700	615	580	545	3,980	2,290	545	425	161	1,220	1,420	1,420
9	1,280	650	580	690	3,980	2,020	369	369	425	1,040	1,420	1,490
10	940	615	57	690	3,980	2,380	316	169	580	940	1,100	1,560
11	1,100	110	80	690	3,760	2,020	545	54	545	1,040	1,700	1,700
12	1,280	690	485	810	2,950	2,020	244	342	515	940	2,380	1,560
13	1,280	730	545	770	3,050	1,860	196	425	515	290	2,470	1,560
14	1,280	690	580	770	2,950	1,860	78	425	545	1,100	2,380	1,490
15	1,280	690	580	1,160	2,850	1,860	141	425	177	940	2,380	1,280
16	1,280	650	580	1,420	2,750	1,560	397	316	425	1,040	2,380	1,560
17	1,280	650	60	2,020	2,750	1,780	369	177	485	990	1,860	1,630
18	1,040	88	68	2,020	2,560	1,630	369	60	515	1,160	2,560	1,630
19	615	615	545	2,380	2,650	1,700	68	342	515	940	2,750	1,560
20	425	650	545	2,650	2,560	1,560	50	425	545	196	2,950	1,630
21	425	650	515	2,380	2,380	1,420	44	425	485	1,040	2,750	1,560
22	425	650	515	3,250	2,470	1,420	329	425	316	1,040	2,560	730
23	425	650	515	3,760	2,380	690	425	397	425	1,160	2,560	770
24	850	650	64	4,200	2,380	1,100	425	169	515	990	1,560	770
25	940	80	92	4,900	2,290	1,560	425	54	545	850	1,780	770
26	940	92	515	5,020	1,700	1,280	76	290	545	940	1,860	1,100
27	940	615	515	5,980	2,020	1,280	72	455	515	244	1,780	1,280
28	169	615	515	5,140	2,380	1,100	54	425	545	1,160	1,860	1,280
29	940	615	545	6,220	2,650	1,100	369	397	186	1,040	1,780	850
30	990	.....	580	7,060	2,560	130	425	425	485	1,100	1,700	1,040
31	1,040	.....	485	.....	2,470	.....	425	425	.....	1,040	.....	1,280

Daily discharge, in second-feet, of Raquette River at Piercefield, N. Y., for 1912.

[Automatic gage.]

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	.....	1,200	1,530	11	.....	2,160	1,760	21	.....	2,320	1,490
2	.....	1,290	1,640	12	.....	2,210	1,730	22	886	1,900	1,130
3	.....	740	1,670	13	.....	2,230	1,720	23	1,020	2,090	1,210
4	.....	1,330	1,700	14	.....	2,280	1,520	24	918	1,730	1,260
5	.....	1,390	1,740	15	.....	2,370	1,530	25	868	2,060	1,080
6	.....	1,340	1,750	16	.....	2,360	1,630	26	1,020	1,920	1,380
7	.....	1,360	2,000	17	.....	2,190	1,570	27	386	1,860	1,420
8	.....	1,360	1,580	18	.....	2,500	1,560	28	738	1,810	1,410
9	.....	1,580	1,860	19	.....	2,420	1,520	29	1,080	1,720	882
10	.....	1,700	1,770	20	.....	2,310	1,520	30	1,090	1,640	1,340
								31	1,140	.....	1,380

NOTE.—Daily discharge determined from a well-defined rating curve.

A. DAM ON RAQUETTE RIVER AT HANNAWA FALLS, N. Y.

B. GAGING STATION ON RAQUETTE RIVER AT PIERCEFIELD, N. Y.

Monthly discharge of Raquette River at Piercefield, N. Y., for 1912.

[Drainage area, 723 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	2,290	169	1,210	1.67	1.92	A.
February	730	80	557	.769	.83	B.
March	615	57	423	.585	.67	B.
April	7,060	425	2,280	3.15	3.51	A.
May	6,100	1,700	3,330	4.61	5.32	A.
June	2,380	130	1,740	2.41	2.69	A.
July	615	44	332	.459	.53	A.
August	455	54	319	.441	.51	A.
September	580	44	429	.593	.66	B.
October	1,220	244	853	1.18	1.36	A.
November	2,950	615	1,890	2.61	2.91	A.
December	1,700	730	1,380	1.91	2.20	A.
The year	7,060	44	1,220	1.69	23.11	B.
Automatic gage.						
October 22–31	1,140	386	915	1.27	0.47	A.
November	2,700	740	1,850	2.56	2.86	A.
December	2,150	882	1,520	2.10	2.42	A.

RAQUETTE RIVER AT MASSENA SPRINGS, N. Y.

Location.—At highway bridge at Massena Springs, N. Y., 1,000 feet above the New York Central & Hudson River Railroad Bridge, used for freight transfer from the railroad station to the Massena power plant, 8 miles below Raymondville and 10 miles above the mouth of the stream.

Records available.—September 21, 1903, to October 17, 1903; April 9, 1904, to December 31, 1912. Data also in annual reports of the United States Geological Survey, State Water Supply Commission, and the State engineer and surveyor, State of New York.

Drainage area.—1,170 square miles.

Gage.—Chain, attached to upstream side of concrete bridge on February 2, 1912. Original gage was a vertical staff fastened to a stone wall on the left bank about 50 feet upstream from the present bridge. This was replaced August 16, 1906, by a standard chain gage fastened to the old highway bridge just above the present bridge. The datum of the chain gage was set 1.00 lower than that of the staff gage to prevent negative gage heights. The chain gage was set on the concrete bridge at such a datum that readings should be comparable with those at the former site.

Channel.—Bed of river of coarse gravel and small bowlders; permanent; current good at all points.

Discharge measurements.—Made from new bridge.

Artificial control.—The operation of a number of power plants above the station has marked effect on the low water discharge of the stream. These plants are usually run for 24-hour power, but are closed on Sundays. The effect of the Sunday closing is shown in the stream for several days.

Winter flow.—Ice forms at this station to a thickness of 3 feet and considerably affects the relation of gage height to discharge for December, January, February, and March.

Accuracy.—Conditions are fair at the new bridge, but the rating curve is somewhat changed. Determinations of monthly discharge are considered good, but those of daily discharge may be somewhat in error for low-water periods, due to artificial control. Monthly estimates for periods during which ice is present also subject to errors.

Discharge measurements of Raquette River at Massena Springs, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 1[a]	G. H. Canfield	[b] 4.28	696	Apr. 20	Frank Weber	9.01	8,270
2[a]	Frank Weber	4.72	916	May 15	do	[c] 5.68	4,050
24[a]	do	4.81	896	July 26	G. H. Canfield	1.58	395
Mar. 14[a]	C. S. De Golyer	3.64	498	27[d]	do	1.63	378
Apr. 12	Frank Weber	6.66	4,810	Oct. 21	J. G. Mathers	2.79	1,053
13	do	6.64	4,610	24	do	2.02	620
19	do	9.29	8,610	25	do	3.41	1,530

[a] Measurement made under complete ice cover.
[b] Gage in old position on steel highway bridge.
[c] Gage in new position on concrete highway bridge.
[d] Made by wading near site of old bridge.

Daily gage height, in feet, of Raquette River at Massena Springs, N. Y., for 1912.

[F. L. Babcock, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.4	4.9	4.2	7.6	8.2	9.0	1.9	1.65	1.7	3.2	3.0	4.2
2	.....	4.7	4.0	7.4	8.0	8.0	2.25	1.65	1.6	3.1	3.0	4.0
3	.....	.....	4.0	7.0	7.6	7.4	2.25	1.75	1.8	3.0	3.2	4.0
4	8.4	.....	4.4	5.8	7.4	6.8	1.95	1.55	1.85	3.0	3.2	4.4
5	.....	.....	4.4	7.4	7.0	6.7	1.3	1.75	2.0	2.8	3.3	5.5
6	.....	4.4	4.4	12.8	7.0	6.7	1.8	2.1	2.35	3.0	3.4	6.1
7	.....	.....	4.4	13.6	6.8	6.4	2.0	2.1	2.6	3.0	4.2	6.0
8	.....	.....	4.4	12.4	6.7	6.1	2.5	2.05	2.6	3.1	5.9	5.8
9	.....	.....	4.4	10.0	6.6	5.8	2.1	1.95	2.6	3.0	5.8	5.8
10	.....	.....	4.2	9.0	6.5	5.8	1.65	2.1	2.6	2.6	5.6	5.6
11	6.8	.....	4.0	8.6	6.2	5.8	1.45	1.85	2.05	3.1	5.0	5.6
12	.....	4.6	4.0	6.9	6.0	5.2	1.75	2.05	1.75	3.2	5.0	5.4
13	.....	.....	4.4	6.6	6.0	5.2	1.65	2.35	2.0	3.1	5.4	5.2
14	.....	.....	3.6	6.6	5.8	5.0	1.6	2.1	2.8	3.0	5.8	5.2
15	.....	.....	4.0	6.8	5.6	4.6	1.85	1.95	2.6	3.0	5.8	5.3
16	.....	.....	4.4	7.3	5.6	4.6	1.85	1.8	2.6	2.9	5.7	5.5
17	.....	4.4	5.0	8.1	5.8	4.8	1.75	1.75	2.5	2.45	5.6	6.2
18	.....	.....	4.6	9.1	6.0	4.0	1.6	1.6	2.4	2.3	5.4	7.0
19	6.5	4.4	5.4	9.4	6.0	4.2	1.5	1.85	2.4	2.8	4.8	6.9
20	.....	3.8	6.0	9.0	5.8	4.0	1.45	2.0	2.6	2.9	5.0	6.8
21	.....	3.8	6.0	8.8	6.0	3.7	1.35	1.8	2.6	2.8	4.9	6.6
22	.....	3.8	5.8	8.8	6.4	3.6	1.25	1.85	2.8	2.8	4.8	6.6
23	.....	3.7	5.4	8.9	6.6	3.4	2.4	1.85	2.8	2.8	4.7	6.6
24	.....	5.0	5.4	9.4	6.5	3.2	1.8	1.95	2.9	2.6	4.6	6.5
25	4.9	4.8	5.2	9.4	6.7	3.0	1.75	2.9	3.0	3.4	4.8	6.4
26	.....	4.6	4.8	9.3	6.6	2.8	1.6	2.45	3.0	3.8	4.9	6.5
27	.....	4.5	4.8	9.1	6.5	2.8	1.55	2.15	3.0	3.4	4.8	6.4
28	.....	4.2	4.8	8.9	6.6	2.9	2.6	1.9	3.1	3.4	4.7	6.3
29	.....	4.2	6.0	8.6	6.9	2.8	1.7	1.45	3.2	3.3	4.6	6.4
30	.....	.....	7.0	8.4	8.0	2.6	1.7	.7	3.2	3.2	4.4	6.4
31	.....	.....	7.0	.....	10.2	.....	1.9	1.45	.....	3.0	.....	6.2

NOTE.—The gage was removed from old highway bridge Feb. 2. See gage in station description. Relation of gage height to discharge affected by ice Jan. 1 to Apr. 8.

Daily discharge, in second-feet, of Raquette River at Massena Springs, N. Y., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	955	675	2,000	6,870	8,050	515	398	420	1,360	1,200	2,220
2	.....	865	605	2,000	6,590	6,590	705	398	375	1,280	1,200	2,040
3	.....	835	605	2.000	6,040	5,780	705	442	465	1,200	1,360	2,040
4	.....	805	745	3,000	5.780	5,020	540	355	490	1,200	1,360	2,410
5	.....	775	745	4,000	5,270	4,900	261	442	565	1,060	1,440	3,520
6	.....	745	745	4,000	5,270	4,900	465	620	765	1,200	1,520	4,180
7	.....	755	745	4,000	5,020	4,530	565	620	925	1,200	2,220	4,070
8	.....	770	745	4,000	4,900	4,180	860	592	925	1,280	3,960	3,850
9	.....	785	745	9,590	4,770	3,850	620	540	925	1,200	3,850	3,850
10	.....	800	675	8,050	4,650	3,850	398	620	925	925	3,630	3,630
11	.....	815	605	7,450	4,290	3,850	316	490	592	1,280	3,010	3,630
12	.....	825	605	5,140	4,070	3,210	442	592	442	1,360	3,010	3,410
13	.....	810	745	4,770	4,070	3,210	398	765	565	1,280	3,410	3,210
14	.....	795	490	4,770	3,850	3,010	375	620	1,060	1,200	3,850	3,210
15	.....	780	605	5,020	3,630	2,610	490	540	925	1,200	3,850	3,310
16	.....	760	745	5,640	3,630	2,610	490	261	925	1,130	3,740	3,520
17	.....	745	1,000	6,730	3,850	2,810	442	442	860	828	3,630	4,290
18	.....	745	825	8,200	4,070	2,040	375	375	795	735	3,410	5,270
19	.....	745	1,200	8,650	4,070	2,220	335	490	795	1,060	2,810	5,140
20	.....	545	1,540	8,050	3,850	2,040	316	565	925	1,130	3,010	5,020
21	.....	545	1,540	7,750	4,070	1,770	279	465	925	1,060	2,910	4,770
22	.....	545	1,420	7,750	4,530	1,680	244	490	1,060	1,060	2,810	4,770
23	.....	515	1,200	7,900	4,770	1,520	795	490	1,060	1,060	2,710	4,770
24	.....	1,000	1,200	8,650	4,650	1.360	465	540	1,130	925	2,610	4,650
25	.....	910	1,100	8,650	4,900	1,200	442	1,130	1,200	1,520	2,810	4,530
26	.....	825	910	8,500	4,770	1,060	375	828	1,200	1,860	2,910	4,650
27	.....	785	910	8,200	4,650	1,060	355	648	1,200	1,520	2,810	4,530
28	.....	675	910	7,900	4,770	1,130	925	515	1,280	1,520	2,710	4,410
29	.....	675	1,540	7,450	5,140	1,060	420	316	1,360	1,440	2,610	4,530
30	.....	.....	2,000	7,160	6,590	925	420	86	1,360	1,360	2,410	4,530
31	.....	.....	2,000	.....	9,910	.....	515	316	.....	1,200	.....	4,290

NOTE.—Daily discharge Apr. 9 to Dec. 31, determined from a well-defined rating curve. Daily discharge Feb. 1 to Apr. 8, obtained by means of a well-defined rating curve based on measurements made under ice cover and comparison with the discharge at Piercefield.

Monthly discharge of Raquette River at Massena Springs, N. Y., for 1912.

[Drainage area, 1,170 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
January	.....	.....	[a] 1,500	1.28	1.48	D.
February	1,000	515	763	.652	.70	C.
March	[a] 2,000	490	972	.831	.96	C.
April	9,590	[a] 2,000	6,230	5.32	5.94	B.
May	9,910	3,630	4,940	4.22	4.86	B.
June	8,050	925	3,070	2.62	2.92	B.
July	925	244	479	.409	.47	A.
August	1,130	86	516	.441	.51	A.
September	1,360	375	881	.753	.84	A.
October	1,860	735	1,210	1.03	1.19	A.
November	3,960	1,200	2,760	2.36	2.63	B.
December	5,270	2,040	3,940	3.37	3.88	B.
The year	9,910	86	2,270	1.94	26.38	

[a] Estimated by means of comparison with the discharge at Piercefield.

BOG RIVER NEAR TUPPER LAKE, N. Y.

Location.—Mouth of Bog River, head of Tupper Lake, 1½ miles below junction of Bog River and the outlet from Round Pond.

Records available.—August 24, 1908, to June 30, 1912. Published also in annual reports of the New York State Water-Supply Commission and the New York State engineer and surveyor.

Drainage area.—132 square miles.

Gage.—Staff, fastened to the left wing wall of an unused dam; read once daily; datum unchanged.

Channel.—Possibly shifting, as the bed is composed of rock on one side and gravel on the other. The crest of the dam with the brink of the adjacent falls forms a control point considered permanent.

Discharge measurements.—Made from a cable about 1½ miles above the gage and immediately below the mouth of the outlet of Round Pond.

Artificial control.—The flow is more or less regulated during the spring for log driving. The operation of a small power plant on the main stream causes some fluctuation in the daily gage heights during the low-water periods in the summer.

Winter flow.—The gage heights are usually not observed during December to March on account of ice.

Accuracy.—Discharge curve fairly well developed. Estimates good.

Discharge measurements of Bog River near Tupper Lake, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 17	Frank Weber	2.52	331
17	....do	2.57	336

Daily gage height, in feet, and discharge, in second-feet, of Bog River near Tupper Lake, N. Y., for 1912.

[B. O. Lott, observer.]

Day.	March.		April.		May.		June.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	.....	.....	2.4	285	4.0	940	3.5	700
1	.....	.....	2.4	285	3.6	745	3.4	655
3	.....	.....	2.4	285	3.2	570	3.4	655
4	.....	.....	2.5	315	3.0	490	3.4	655
5	.....	.....	2.6	350	2.8	420	3.4	655
6	.....	.....	2.6	350	2.8	420	3.4	655
7	.....	.....	2.6	350	2.7	385	3.3	610
8	.....	.....	2.6	350	2.6	350	3.0	490
9	.....	.....	2.5	315	2.6	350	2.8	420
10	.....	.....	2.6	350	2.5	315	2.6	350
11	.....	.....	2.6	350	2.4	285	2.5	315
12	.....	.....	2.6	350	2.5	315	2.4	285
13	.....	.....	2.6	350	2.5	315	2.4	285
14	.....	.....	2.8	420	2.5	315	2.3	255
15	.....	.....	2.9	455	2.4	285	2.1	205
16	.....	.....	3.5	700	2.4	285	2.0	180
17	.....	.....	4.5	1,190	2.5	315	1.9	160
18	.....	.....	4.6	1,240	2.6	350	1.8	140
19	.....	.....	4.6	1,240	2.6	350	1.7	120
20	.....	.....	4.5	1,190	2.7	385	1.6	105
21	.....	.....	4.4	1,140	2.8	420	1.6	105
22	2.2	230	4.6	1,240	3.1	530	1.5	90
23	.....	230	4.6	1,240	3.6	745	1.5	90
24	.....	230	4.6	1,240	3.5	700	1.5	90
25	2.2	230	4.6	1,240	3.4	655	1.5	90
26	.....	240	4.6	1,240	3.3	610	1.4	75
27	.....	250	4.6	1,240	3.3	610	1.4	75
28	2.3	255	4.6	1,240	3.3	610	1.3	60
29	.....	255	4.5	1,190	3.5	700	1.3	60
30	.....	255	4.2	1,040	3.7	790	1.3	60
31	2.3	255	.....	.....	3.7	790	.....	.....

NOTE.—The relation of gage height to discharge probably affected by ice from Mar. 22 to 31. Daily discharge determined from a fairly well defined rating curve.

Monthly discharge of Bog River near Tupper Lake, N. Y., for 1912.

[Drainage area, 132 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
April	1,240	285	759	5.75	6.42	C.
May	940	285	495	3.75	4.32	B.
June	700	60	290	2.20	2.46	B.

ST. REGIS RIVER AT BRASHER CENTER, N. Y.

Location.—At the steel highway bridge in the village of Brasher Center, 5 miles downstream from Brasher Falls, 6¼ miles below the junction of East and West branches of St. Regis River, and about 12 miles above the mouth.

Records available.—August 22, 1910, to December 31, 1912. Data published also in annual reports of State Water-Supply Commission and State Conservation Commission of New York.

Drainage area.—621 square miles.

Gage.—Chain, fastened to downstream side of bridge; read twice daily; datum unchanged.

Channel.—Very rough; composed of gravel and large bowlders; considered permanent. At high stages current swift and water rough.

Discharge measurements.—At low stages made by wading about 500 feet above the bridge; at high stages, from the bridge.

Winter flow.—Relation of gage height to discharge affected by ice.

Accuracy.—Discharge rating curve well defined. Estimates good.

Discharge measurements of St. Regis River at Brasher Center, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 21[a]	Frank Weber	5.64	442
Apr. 11	.....do	6.18	3,600
14	.....do	5.85	2,870
18	.....do	6.70	5,440
May 14	.....do	5.09	1,410
July 25[b]	G. H. Canfield	4.15	341
Oct. 23	J. G. Mathers	4.38	523

[a] Complete ice cover, control frozen. [b] Made by wading.

Daily gage height, in feet, of St. Regis River at Brasher Center, N. Y., for 1912.

[Joseph Vanier, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	6.3	.....	.....	7.7	5.35	6.5	4.17	4.26	4.40	5.3	4.65	4.85
2	6.6	.....	.....	7.2	5.3	6.2	4.17	4.28	4.48	5.1	4.6	5.1
3	6.8	.....	.....	6.8	5.15	6.0	4.13	4.22	4.75	5.0	4.65	6.4
4	7.0	.....	.....	6.6	4.9	5.7	4.06	4.32	4.8	4.9	4.7	5.6
5	7.0	.....	.....	6.6	4.9	5.5	4.03	4.45	4.8	4.75	4.6	5.5
6	7.4	.....	.....	8.4	5.0	5.35	4.13	4.5	4.9	4.6	4.6	5.5
7	.....	.....	.....	8.0	5.05	5.25	4.13	4.46	4.95	4.6	4.7	5.4
8	.....	.....	.....	7.2	5.15	5.25	4.05	4.48	4.9	4.55	6.0	5.3
9	.....	.....	.....	6.7	5.15	5.2	4.03	4.38	4.8	4.48	5.95	5.2
10	.....	.....	.....	6.5	5.15	5.0	4.01	4.3	4.6	4.40	5.8	5.1
11	.....	.....	.....	6.2	5.15	4.9	4.05	4.29	4.7	4.45	5.5	5.0
12	.....	.....	.....	6.2	5.05	4.85	4.03	4.26	4.7	4.5	5.25	5.0
13	.....	.....	.....	6.2	5.0	4.9	3.99	4.3	4.65	4.6	5.15	5.15
14	.....	.....	.....	5.9	5.05	4.9	3.95	4.32	4.6	4.7	5.5	5.3
15	.....	.....	.....	6.0	5.05	4.85	3.97	4.3	4.5	4.7	5.5	5.35
16	.....	.....	.....	6.9	4.95	4.8	4.05	4.3	4.7	4.6	5.4	4.9
17	.....	.....	.....	6.7	5.0	4.7	4.07	4.22	4.9	4.6	5.3	5.1
18	.....	.....	.....	6.7	5.25	4.7	4.03	4.18	4.9	4.5	5.2	5.25
19	.....	.....	.....	6.7	5.35	4.65	3.99	4.20	4.9	4.5	5.1	5.0
20	.....	.....	.....	6.6	5.25	4.44	3.95	4.18	5.1	4.48	5.0	5.1
21	.....	5.64	.....	6.4	4.85	4.5	4.00	4.16	5.15	4.35	4.9	5.5
22	.....	.....	.....	5.5	5.6	4.46	4.27	4.15	5.1	4.18	4.9	5.85
23	.....	.....	.....	5.9	5.6	4.43	4.37	4.18	5.1	4.28	4.95	6.2
24	.....	.....	.....	6.2	5.6	4.37	4.37	4.22	5.15	4.42	4.95	6.2
25	.....	.....	.....	6.3	5.45	4.35	4.18	4.25	5.2	4.85	4.95	6.2
26	.....	.....	.....	5.9	5.25	4.34	4.15	4.35	5.1	5.1	4.9	6.1
27	.....	.....	.....	5.95	5.15	4.30	4.10	4.75	5.1	5.2	4.8	5.95
28	.....	.....	.....	5.6	5.05	4.27	4.04	4.9	5.1	5.1	4.75	5.75
29	.....	.....	.....	5.35	6.2	4.27	4.08	4.7	5.2	4.9	4.8	5.6
30	.....	.....	.....	5.5	7.2	4.19	4.22	4.5	5.3	4.8	4.75	5.6
31	.....	.....	.....	.....	7.2	.....	4.25	4.42	.....	4.6	.....	5.9

NOTE.—Relation of gage height to discharge affected by ice from Jan. 1 to Mar. 31.

Daily discharge, in second-feet, of St. Regis River at Brasher Center, N. Y., for 1910–1912.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.							1910.						
1	.....	.....	250	250	897	455	16	.....	.....	329	329	834	.....
2	.....	.....	238	238	897	616	17	.....	.....	309	400	722	.....
3	.....	.....	309	238	722	569	18	.....	.....	296	423	569	.....
4	.....	.....	284	329	834	722	19	.....	.....	296	362	616	.....
5	.....	.....	273	377	834	834	20	.....	.....	238	400	669	.....
6	.....	.....	309	438	960	722	21	.....	.....	250	329	505	.....
7	.....	.....	1,240	1,390	1,100	.....	22	.....	329	250	238	522	.....
8	.....	.....	1,390	1,900	960	.....	23	.....	273	273	250	522	.....
9	.....	.....	1,030	1,720	834	.....	24	.....	213	238	329	455	.....
10	.....	.....	722	1,390	834	.....	25	.....	244	250	616	616	.....
11	.....	.....	569	1,030	1,170	.....	26	.....	267	238	1,470	616	.....
12	.....	.....	446	778	1,240	.....	27	.....	329	250	1,810	616	.....
13	.....	.....	377	522	1,100	.....	28	.....	198	284	1,900	616	.....
14	.....	.....	329	400	960	.....	29	.....	166	296	1,720	569	.....
15	.....	.....	309	400	778	.....	30	.....	30	250	1,640	505	.....
							31	.....	213	.....	1,170	.....	.....

Daily discharge, in second-feet, of St. Regis River at Brasher Center, N. Y., for 1910–1912—Continued.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.									
1	2,530	3,740	925	690	438	342	561	619	1,760
2	2,130	5,440	860	638	415	279	590	860	1,760
3	2,330	4,040	990	690	308	262	561	925	1,430
4	1,940	3,740	990	742	296	279	742	742	1,200
5	1,510	2,960	925	690	342	308	1,270	638	1,060
6	10,000	2,740	990	619	392	342	1,590	638	860
7	10,000	2,230	1,060	742	446	925	1,430	742	990
8	9,000	2,130	801	590	438	990	1,200	1,130	860
9	7,450	1,940	860	619	376	860	990	1,430	1,200
10	5,060	1,850	1,130	552	472	590	860	1,350	1,430
11	4,360	1,760	801	561	342	454	590	1,350	1,850
12	3,740	1,760	990	590	279	524	542	1,350	2,130
13	4,360	1,430	1,130	362	369	498	690	1,060	3,460
14	5,440	1,350	1,430	342	322	524	619	1,060	3,460
15	5,830	1,510	1,510	296	296	590	524	990	2,740
16	5,830	690	1,680	342	342	524	507	925	2,530
17	5,830	1,060	1,430	296	322	472	524	990	1,850
18	5,060	860	1,200	472	302	438	590	1,130	1,760
19	3,460	925	860	415	322	542	690	1,510	1,940
20	3,740	690	742	498	415	542	285	1,430	1,760
21	3,080	742	860	392	454	524	638	1,350	1,680
22	3,740	801	990	369	415	415	638	1,350	1,590
23	3,740	990	801	308	392	392	590	1,130	2,230
24	3,200	860	638	296	392	415	619	628	2,330
25	3,200	3,080	524	342	454	392	498	990	1,940
26	3,740	2,230	524	279	384	498	590	860	1,940
27	4,040	1,680	742	362	472	860	580	860	1,760
28	3,740	1,350	742	240	342	1,270	561	925	1,760
29	4,040	1,350	690	302	498	561	552	1,590	.....
30	3,740	1,060	742	225	472	498	524	1,850	.....
31	.....	925	.....	240	524	.....	619	.....	.....
1912.									
1	9,630	1,850	4,700	356	423	542	1,760	801	1,060
2	7,450	1,760	3,740	356	438	619	1,430	742	1,430
3	5,830	1,510	3,200	328	392	925	1,270	801	4,360
4	5,060	1,130	2,530	285	472	990	1,130	860	2,330
5	5,060	1,130	2,130	267	590	990	925	742	2,130
6	12,900	1,270	1,850	328	638	1,130	742	742	2,130
7	11,000	1,350	1,680	328	600	1,200	742	860	1,940
8	7,450	1,510	1,680	279	619	1,130	690	3,200	1,760
9	5,440	1,510	1,590	267	524	990	619	3,080	1,590
10	4,700	1,510	1,270	256	454	742	542	2,740	1,430
11	3,740	1,510	1,130	279	446	860	590	2,130	1,270
12	3,740	1,350	1,060	267	423	860	638	1,680	1,270
13	3,740	1,270	1,130	245	454	801	742	1,510	1,510
14	2,960	1,350	1,130	225	472	742	860	2,130	1,760
15	3,200	1,350	1,060	235	454	638	860	2,130	1,850
16	6,220	1,200	990	279	454	860	742	1,940	1,130
17	5,440	1,270	860	291	392	1,130	742	1,740	1,430
18	5,440	1,680	860	267	362	1,130	638	1,590	1,680
19	5,440	1,850	801	245	376	1,130	638	1,430	1,270
20	5,060	1,680	580	225	362	1,430	619	1,270	1,430
21	4,360	1,060	638	250	349	1,510	498	1,130	2,130
22	2,130	2,330	600	431	342	1,430	362	1,130	2,850
23	2,960	2,330	571	516	362	1,430	438	1,200	3,740
24	3,740	2,330	516	516	392	1,510	561	1,200	3,740
25	4,040	2,040	498	362	415	1,590	1,060	1,200	3,740
26	2,960	1,680	489	342	498	1,430	1,430	1,130	3,460
27	3,080	1,510	454	308	925	1,430	1,590	990	3,080
28	2,330	1,350	431	273	1,130	1,430	1,430	925	2,640
29	1,850	3,740	431	296	860	1,590	1,130	990	2,330
30	2,130	7,450	369	392	638	1,760	990	925	2,330
31	.....	7,450	.....	415	561	.....	742	.....	2,960

NOTE.—Daily discharge for 1910 determined from a rating curve based on one measurement and the shape of the rating curve for 1911–12. Daily discharge for 1911 and 1912 determined from a rating curve well defined below 7,000 second-feet. Daily discharge Apr. 6 to 8, 1911, estimated on account of ice jams.

Monthly discharge of St. Regis River at Brasher Center, N. Y., for 1910–1912.

[Drainage area, 621 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1910.						
August 22–31	329	30	226	0.364	0.14	B.
September	1,390	238	404	.651	.73	B.
October	1,900	238	800	1.29	1.49	B.
November	1,240	455	769	1.24	1.38	B.
December	.....	.....	700	1.13	1.30	D.
1911.						
January	.....	.....	1,250	2.01	2.32	D.
February	.....	.....	730	1.18	1.23	D.
March	.....	.....	1,600	2.58	2.97	D.
April	.....	1,510	4,530	7.29	8.13	C.
May	5,440	690	1,870	3.01	3.47	A.
June	1,680	524	952	1.53	1.71	A.
July	742	225	455	.733	.85	A.
August	524	279	388	.625	.72	A.
September	1,270	262	537	.865	.97	A.
October	1,590	285	702	1.13	1.30	A.
November	1,850	619	1,080	1.74	1.94	A.
December	3,460	860	1,820	2.93	3.38	B.
The year	.....	.....	1,330	2.14	28.99	
1912.						
January	.....	.....	780	1.26	1.45	D.
February	.....	.....	370	.596	.64	D.
March	.....	.....	460	.741	.85	D.
April	12,900	1,850	4,970	8.00	8.93	B.
May	7,450	1,060	2,010	3.24	3.74	A.
June	4,700	369	1,300	2.09	2.33	A.
July	516	225	313	.504	.58	A.
August	1,130	342	510	.821	.95	A.
September	1,760	542	1,130	1.82	2.03	A.
October	1,760	362	876	1.41	1.63	A.
November	3,200	742	1,430	2.30	2.57	A.
December	4,360	1,060	2,190	3.53	4.07	A.
The year	12,900	225	1,360	2.19	29.77	

NOTE.—Discharge for Dec. 7, 1910, to Mar. 31, 1911, and Dec. 29, 1911, to Mar. 31, 1912, estimated by means of comparison with the flow of Raquette and Oswegatchie Rivers.
Mean discharge Dec. 7–31, 1910, estimated 710 second-feet.
Mean discharge Dec. 29–31, 1911, estimated 1,700 second-feet.

DEER RIVER AT IRONTON, N. Y.

Location.—About 1,000 feet below steel highway bridge in the village of Brasher Iron Works (railroad station is Ironton) and 2 miles above the confluence of Deer River with St. Regis River in Helena. There are no important tributaries between the gage and the mouth of the river. A small creek enters from the left about 1 mile above the station.

Records available.—July 25 to December 31, 1912.

Drainage area.—206 square miles.

Gage.—Inclined staff gage 32 feet long, reading from 0.5 to 11.0 feet, about 1,000 feet below the bridge and 500 feet below the remains of an old wooden dam; an auxiliary vertical staff, fastened on the upstream side of the right abutment, is to be used as a reference while making measurements and to determine the effect of the removal of the dam below.

Channel.—Bed at the bridge is solid rock and smooth. A gravel control about 300 feet below the gage is probably permanent.

Discharge measurements.—Made from the bridge during medium and high stages and by wading a short distance above at low stages.

Winter flow.—Relation of gage height to discharge will probably be affected by ice during the winter months.

Accuracy.—Rating curve good for low stages. Upper portion not well defined. Estimates as published good.

Cooperation.—Gage heights furnished by M. W. Lantry, Hogansburg, N. Y.

Discharge measurements of Deer River at Ironton, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
July 25[a]	G. H. Canfield	1.13	51.3
Oct. 22	J. G. Mathers	1.68	130
25	....do	2.66	397

[a] Measurement made by wading.

Daily gage height, in feet, and discharge, in second-feet, of Deer River at Ironton, N. Y., for 1912.

[Alex. Barlow, observer.]

Day.	July.		August.		September.		October.		November.		December.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	.....	.....	1.39	84	1.49	98	2.85	465	1.9	175	2.3	279
2	.....	.....	1.38	82	1.66	126	2.5	341	2.0	199	4.8	1,680
3	.....	.....	1.35	78	1.85	164	2.3	279	1.92	180	5.8	2,810
4	.....	.....	1.52	102	1.80	153	2.2	251	1.8	153	3.3	656
5	.....	.....	1.64	122	1.72	137	2.05	212	1.75	143	3.0	524
6	.....	.....	1.58	112	1.60	115	1.91	177	1.7	133	3.1	566
7	.....	.....	1.49	98	1.88	171	1.95	187	2.1	225	3.0	524
8	.....	.....	1.44	91	2.4	309	1.78	149	5.8	2,810	2.45	325
9	.....	.....	1.44	91	2.1	225	1.70	133	4.0	1,050	2.25	265
10	.....	.....	1.46	93	1.99	197	1.76	145	3.3	656	2.5	341
11	.....	.....	1.42	88	1.95	187	1.75	143	2.8	446	2.45	325
12	.....	.....	1.31	72	2.2	251	1.80	153	2.6	375	2.55	358
13	.....	.....	1.44	91	1.92	180	2.1	225	2.5	341	2.65	392
14	.....	.....	1.42	88	1.89	173	1.98	194	4.1	1,120	2.9	484
15	.....	.....	1.35	78	1.85	164	1.88	171	3.6	808	2.6	375
16	.....	.....	1.31	72	2.55	358	1.78	149	3.3	656	2.5	341
17	.....	.....	1.28	69	2.2	251	1.71	135	3.1	566	2.7	410
18	.....	.....	1.15	54	2.1	225	1.61	117	2.95	504	2.85	465
19	.....	.....	1.12	51	2.5	341	1.68	129	2.6	375	3.8	920
20	.....	.....	1.06	45	2.8	446	1.74	141	2.7	410	3.2	610
21	.....	.....	1.19	58	2.8	446	1.61	117	2.6	375	3.4	704
22	.....	.....	1.16	55	2.45	325	1.62	119	2.4	309	3.4	704
23	.....	.....	1.20	59	2.3	279	1.58	113	2.25	265	3.4	704
24	.....	.....	1.19	58	2.8	446	1.60	115	2.2	251	3.5	754
25	1.12	51	1.52	102	2.65	392	2.4	309	2.1	225	3.8	920
26	1.09	48	1.69	131	2.5	341	2.7	410	2.25	265	3.7	864
27	1.10	49	2.15	238	3.1	566	2.45	325	2.35	294	3.6	808
28	1.11	50	2.05	212	2.7	410	2.25	265	2.3	279	3.6	808
29	1.22	61	1.72	137	2.75	428	2.1	225	2.35	294	3.4	704
30	1.36	79	1.44	91	3.5	754	2.55	358	2.55	358	3.3	656
31	1.35	78	1.64	122	.....	.....	1.95	187	.....	.....	3.9	980

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Deer River at Ironton, N. Y., for 1912.

[Drainage area, 206 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
July 25–31	79	48	59.4	0.288	0.07	A.
August	238	45	94.3	.458	.53	A.
September	754	98	289	1.40	1.56	A.
October	465	113	208	1.01	1.16	A.
November	2,810	133	475	2.31	2.58	A.
December	2,810	265	686	3.33	3.84	A.

LAKE CHAMPLAIN AT BURLINGTON, VT.

Location.—On the south side of the roadway leading to the dock of the Champlain Transportation Co. at Burlington, Vt., at a point about 80 feet from the road at the foot of King Street.

Records available.—May, 1907, to December 31, 1912.

Gage.—Staff; read once daily. Comparison of gage readings, made under the direction of Prof. A. D. Butterfield on calm days during 1907–8, indicate that the zero of the gage at Burlington is at practically the same elevation as that of the gage at Fort Montgomery, namely, 92.50 feet above mean sea level.

Cooperation.—Gage heights at Burlington furnished through the courtesy of Mr. D. A. Loomis, general manager of the Champlain Transportation Co.

Daily gage height, in feet, of Lake Champlain at Burlington, Vt., for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	2.30	.....	3.50	7.20	6.08	3.80	2.05	.....	1.90	2.38	2.90
2	2.80	2.30	1.72	3.78	6.89	.....	3.70	2.00	1.50	1.90	2.35	2.90
3	2.80	2.30	.....	3.90	6.80	6.40	3.60	2.00	1.48	1.88	.....	2.90
4	2.80	.....	.....	3.90	6.70	6.40	3.60	.....	1.48	1.88	2.35	2.90
5	2.70	2.30	1.72	3.98	.....	6.40	3.50	2.00	1.45	1.88	2.40	2.90
6	2.65	.....	.....	4.25	6.60	6.30	3.50	1.95	1.45	.....	2.40	3.00
7	.....	.....	.....	.....	6.40	6.20	.....	1.90	1.43	1.85	2.40	3.03
8	2.57	.....	.....	5.39	6.20	6.10	3.30	1.90	.....	1.85	2.70	.....
9	2.55	.....	1.74	6.00	6.10	.....	3.20	1.90	1.43	1.80	3.00	3.05
10	2.40	2.10	.....	6.29	6.00	6.00	.....	1.85	1.40	1.80	.....	3.00
11	2.40	.....	.....	6.38	5.93	5.90	.....	.....	1.40	1.78	3.20	2.97
12	2.30	.....	1.74	6.41	.....	5.83	3.00	1.85	1.40	1.75	3.22	2.98
13	2.28	.....	.....	6.49	5.70	5.75	2.90	1.85	1.38	.....	3.30	2.95
14	.....	2.10	.....	.....	5.60	5.66	.....	1.80	1.38	1.75	3.35	2.95
15	2.15	.....	.....	6.45	5.50	5.50	2.75	1.80	.....	1.70	3.40	2.93
16	2.15	.....	1.78	6.65	5.50	.....	2.60	1.75	1.40	1.70	3.50	2.90
17	2.18	2.00	.....	6.87	5.50	5.40	2.55	1.75	1.45	1.70	3.50	2.90
18	2.18	1.90	1.88	7.05	5.50	5.20	2.50	.....	1.50	1.70	3.48	2.90
19	2.18	.....	2.05	7.20	.....	5.00	2.48	1.75	1.60	1.70	3.45	2.90
20	2.18	1.70	2.20	7.32	5.50	4.90	2.48	1.72	1.60	.....	3.40	2.90
21	.....	.....	2.28	.....	5.50	4.82	.....	1.70	1.65	1.70	3.40	2.90
22	2.25	.....	2.48	7.25	5.65	4.70	2.50	1.70	.....	1.70	3.40	.....
23	2.47	1.72	2.58	7.33	5.65	.....	2.50	1.70	1.80	1.80	3.40	2.95
24	2.60	.....	.....	7.35	5.63	4.60	2.40	1.65	1.88	1.85	3.60	2.98
25	2.60	.....	2.65	7.42	5.60	4.50	2.30	1.62	1.90	1.92	3.58	2.98
26	2.60	1.72	2.68	7.48	5.60	4.50	2.30	1.56	1.90	2.28	3.42	2.95
27	2.60	.....	2.68	7.55	.....	4.20	2.20	1.53	1.88	.....	3.40	2.93
28	.....	.....	2.70	.....	.....	4.10	.....	1.50	1.88	2.50	3.20	2.93
29	2.60	1.72	2.82	7.55	.....	4.00	2.20	1.50	.....	2.45	3.10	.....
30	2.60	.....	3.00	7.30	5.90	.....	2.10	1.50	1.90	2.42	3.00	2.90
31	2.60	.....	.....	.....	5.95	.....	2.05	1.50	.....	2.40	.....	2.90

NOTE.—Lake frozen completely over Jan. 26. Thickest ice noted 14 inches. No information as to date on which the lake opened. Ice was 5½ inches thick Apr. 10.

RICHELIEU RIVER AT FORT MONTGOMERY, N. Y.

Location.—About half a mile from the head of Richelieu River at the outlet of Lake Champlain, about 1 mile northeast of the village of Rouses Point and three-eighths of a mile south of the Canadian boundary; in the fort.

Records available.—1875 to 1912; data published in the reports of the Deep Waterways Survey, the annual reports of the State engineer and surveyor of the State of New York, and in the water-supply papers of the United States Geological Survey.

Drainage area.—8,180 square miles at Chambly.

Gage.—Staff; read once daily. Elevation of gage zero at Fort Montgomery is 92.50 feet above mean sea level; high-water level is at elevation 101.6 feet; probably lowest elevation recorded at Fort Montgomery is 91.9 feet November 13, 1908. Gage heights are given as sea-level elevations.

Determination of flow.—The daily discharge of the lake has been determined from observations of depth and discharge over the Chambly dam, 35 miles below the head of Richelieu River, made in 1898 by the United States Board of Deep Waterways. A discharge rating curve has been constructed from the observations at Chambly dam and the gage readings at Rouses Point. The area tributary to the river between Rouses Point and Chambly is 310 square miles.

Winter flow.—Relation of gage height to discharge probably affected by ice, as the entire surface of Lake Champlain freezes over nearly every winter.

Cooperation.—Observations of gage heights are made under the direction of the Corps of Engineers of the United States Army. Gage readings reported weekly to the Survey through the courtesy of Maj. Edward Burr.

Accuracy.—Estimates of daily discharge since 1907 are withheld pending verification of the rating curve.

Daily gage height, in feet, of Richelieu River at Fort Montgomery, N. Y., for 1911–12.

[Wm. McComb, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	93.9	94.3	94.2	95.3	98.6	96.25	94.55	93.6	93.05	93.0	93.3	93.9
2	93.95	.....	94.15	95.3	98.5	96.05	94.55	93.6	93.2	92.9	93.3	93.9
3	93.95	94.4	94.1	95.35	98.5	96.0	94.5	93.65	92.95	92.95	93.45	93.8
4	94.05	94.45	94.1	95.3	98.6	95.95	94.45	93.6	92.95	93.45	93.5	93.9
5	94.35	94.35	94.05	95.4	98.65	95.9	94.4	93.5	93.0	92.95	93.45	94.0
6	94.25	94.4	94.05	95.45	98.5	95.8	94.5	93.45	93.15	92.85	93.45	93.9
7	94.35	94.4	94.1	95.8	98.35	95.7	94.25	93.45	92.95	92.95	93.5	93.9
8	94.45	94.35	94.05	96.3	98.35	95.65	94.3	93.6	92.95	93.15	93.4	93.85
9	94.4	94.35	94.1	96.4	98.2	95.55	94.25	93.4	93.2	93.05	93.4	94.0
10	94.45	94.3	94.05	96.65	98.05	95.5	94.3	93.35	93.0	93.05	93.7	94.0
11	94.6	94.3	94.0	97.0	98.05	95.5	94.15	93.25	93.0	93.1	93.5	94.15
12	94.35	94.35	94.05	97.2	98.0	95.65	94.15	93.25	92.9	93.05	93.9	93.95
13	94.5	94.3	94.0	97.3	97.8	95.6	94.05	93.3	92.9	93.0	93.45	94.05
14	94.45	94.25	94.05	.....	97.8	95.45	94.1	93.25	92.95	93.05	93.5	94.25
15	94.4	94.35	94.05	.....	97.9	95.4	94.0	93.25	93.4	93.1	93.5	94.45
16	94.45	94.25	94.1	.....	97.5	95.3	94.15	93.15	93.0	93.0	93.4	94.45
17	94.4	94.3	94.15	.....	97.5	95.25	94.1	93.15	92.9	93.1	93.5	94.55
18	94.5	94.25	94.2	.....	97.4	95.3	93.9	93.25	92.95	93.2	93.4	94.65
19	94.55	94.3	94.25	98.15	97.3	95.25	93.9	93.1	93.0	93.15	93.65	94.7
20	94.4	94.25	94.25	98.25	97.4	95.15	94.0	93.1	92.9	93.2	93.6	94.8
21	94.45	94.2	94.25	98.3	97.2	95.05	93.9	93.2	92.95	93.3	93.55	94.75
22	94.35	94.2	94.2	98.35	97.0	95.1	93.8	93.4	92.95	93.35	93.6	95.0
23	94.35	94.25	94.25	98.3	96.9	94.9	93.75	92.95	93.0	93.35	93.9	94.8
24	94.35	94.2	94.25	98.3	97.0	94.9	93.95	93.15	93.15	93.45	93.65	95.0
25	94.3	94.25	94.3	98.2	96.7	95.0	93.95	93.1	92.9	93.5	93.6	95.2
26	94.3	94.25	94.35	98.25	96.7	94.9	93.7	93.15	92.95	93.4	93.7	95.25
27	94.3	94.2	94.5	98.3	96.6	94.95	93.65	93.15	93.2	93.5	93.7	95.7
28	94.25	94.2	94.65	98.25	96.6	94.8	93.6	93.2	92.9	93.5	93.9	95.2
29	94.45	.....	94.85	98.35	96.4	94.6	93.75	93.0	93.0	93.65	94.0	95.3
30	94.3	.....	95.05	98.4	96.3	94.6	93.65	93.0	92.9	93.3	93.9	95.25
31	94.3	.....	95.2	.....	96.2	.....	93.6	93.05	.....	93.45	.....	95.3
1912.												
1	95.2	94.5	94.2	95.75	99.4	98.5	96.2	94.45	93.9	94.25	95.2	95.5
2	95.25	94.5	94.2	95.9	99.3	98.7	96.0	94.5	93.9	94.2	94.75	96.0
3	95.2	94.4	94.15	96.2	99.15	98.8	96.1	94.3	93.8	94.45	94.75	95.3
4	95.2	94.4	94.15	96.3	99.0	98.8	96.0	94.35	93.75	94.25	95.1	95.6
5	95.15	94.4	94.1	96.4	98.9	98.7	95.95	94.3	93.8	94.3	94.8	95.5
6	95.1	94.4	94.15	96.5	99.0	98.8	95.9	94.4	93.7	94.25	94.9	95.7
7	95.1	94.45	94.1	97.0	98.7	98.5	95.85	94.35	93.9	94.4	94.8	95.5
8	95.1	94.35	94.05	97.7	98.6	98.7	95.75	94.4	93.8	94.2	95.0	95.8
9	95.1	94.4	94.1	98.35	98.4	98.3	95.6	94.5	93.7	94.3	95.2	95.6
10	95.00	94.3	94.05	98.6	98.3	98.4	95.6	94.5	93.9	94.1	95.35	95.9
11	94.95	94.3	94.1	98.75	98.4	98.2	95.5	94.2	93.8	94.15	95.55	95.5
12	94.95	94.25	94.1	98.8	98.3	98.3	95.5	94.25	93.8	94.45	95.6	95.5
13	94.95	94.3	94.05	98.8	98.3	97.9	95.5	94.2	93.9	94.15	95.5	95.6
14	95.0	94.3	94.15	98.85	98.0	98.0	95.4	94.25	94.05	94.1	95.7	95.65
15	94.8	94.25	94.15	98.95	98.0	98.05	95.4	94.05	93.85	94.0	95.65	95.5
16	94.8	94.2	94.25	98.95	97.9	97.9	95.1	94.05	93.8	94.1	95.7	95.4
17	94.8	94.2	94.3	99.2	97.9	97.55	95.2	94.0	94.0	94.25	95.9	95.3
18	94.8	94.2	94.4	99.5	98.0	97.5	95.1	94.15	94.05	94.15	95.8	95.3
19	94.7	94.2	94.5	99.6	97.8	97.3	95.0	94.05	94.0	94.4	96.0	95.3
20	94.8	94.25	94.6	99.7	97.9	97.4	95.05	93.9	94.1	93.9	95.8	95.25
21	94.75	94.15	94.8	99.8	97.8	97.2	95.2	94.0	94.15	93.95	96.0	95.35
22	94.6	94.25	94.95	100.0	97.95	97.1	94.8	94.1	94.4	94.2	95.7	95.3
23	94.6	94.15	95.0	99.7	98.7	97.05	94.7	93.9	94.5	94.0	95.7	95.35
24	94.6	94.2	95.0	99.9	98.2	96.9	94.7	93.85	94.35	93.95	95.7	95.35
25	94.6	94.1	95.0	99.9	98.0	96.8	94.7	93.8	94.25	94.25	95.5	95.4
26	94.55	94.1	95.1	100.05	98.1	96.6	94.6	93.9	94.3	94.6	95.8	95.4
27	94.6	94.2	95.15	100.25	98.1	96.55	94.6	93.75	94.3	94.7	95.8	95.25
28	94.55	94.2	95.0	99.6	98.1	96.6	94.55	93.85	94.25	94.65	95.6	.....
29	94.55	94.2	95.2	99.6	97.5	96.3	94.5	93.7	94.2	94.9	95.7	(a)
30	94.5	.....	95.35	99.5	97.9	96.2	94.5	93.75	94.25	94.8	95.6	(a)
31	94.5	.....	95.6	.....	98.1	.....	94.5	93.8	.....	94.8	.....	(a)

a Lake closed.

SARANAC RIVER NEAR PLATTSBURG, N. Y.

Location.—At the Lozier dam of the Plattsburg Gas & Electric Co., about 6 miles above the mouth of the river at Plattsburg, N. Y.

Records available.—March 27, 1903, to December 31, 1912.

Drainage area.—624 square miles.

Gages.—The crest gage is a vertical staff located at the angle in the wing wall at the right hand end of the racks. The tail race gage is a vertical staff spiked to the crib dike between the tail race and the river about 50 feet below the power house.

Discharge measurements.—The record at this station includes the flow over a spillway crest 171.75 feet in length, the discharge through two 5-feet waste gages, when open, and the discharge through four 33-inch Victor turbines, controlled by automatic governors. Experiments have been made at Cornell University hydraulic laboratory on a model ogee section of the dam from which coefficients have been derived for the calculation of the discharge over the dam. The ratings of the waste gates and the turbines are not available.

Accuracy.—Since the turbine and waste gate ratings are not available, the data for this station is being held up until these ratings can be made.

Cooperation.—Records at this station are furnished by the Plattsburg Gas & Electric Co., Herbert A. Stutchbury, superintendent.

Discharge measurements of Saranac River near Plattsburg, N. Y., in 1912.

Date.	Hydrographer.	Gage height.[a]	Discharge.
		Feet.	*Sec. ft.*
Aug. 30	G. J. Lyon	2.06	300
30	....do	2.79	557
31	....do	1.99	292
31	....do	1.84	259
31	....do	2.23	382

[a] Gage in tail race.

AUSABLE RIVER AT AUSABLE FORKS, N. Y.

Location.—In the village of Ausable Forks, immediately below the junction of the East and West branches and about 15 miles above the mouth of the river.

Records available.—August 17, 1910, to December 31, 1912. Data also in annual reports of the New York State Water Supply Commission and New York State Conservation Commission.

Drainage area.—487 square miles.

Gage.—Chain, on the left bank, about 100 feet below the junction of East and West branches of Ausable River; read twice daily; datum unchanged.

Channel.—Bed of sand and gravel; liable to shift; channel divided by an island.

Discharge measurements.—Made from a cable about 1½ miles below the gage. At this place the river flows in one channel.

Winter flow.—Ice may form on the riffles below the gage and either divert or cause backwater.

Accuracy.—Conditions at the measuring section good. Very good discharge rating curve developed. Estimates good.

Discharge measurements of Ausable River at Ausable Forks, N. Y., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 28[a]	G. H. Canfield	3.62	183
Apr. 9	Frank Weber	5.00	2,340
10	....do	4.55	1,430
17	C. C. Covert	6.02	5,270
May 13[b]	Frank Weber	4.44	1,290
July 29	G. H. Canfield	3.59	182

[a] Made under complete ice cover at cable; river nearly open at gage and just below.
[b] A very sudden rise took place near the finish of this measurement.

Daily gage height, in feet, of Ausable River at Ausable Forks, N. Y., for 1912.

[A. S. Baker, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	4.30	3.60	3.68	4.56	4.08	4.85	3.56	3.56	3.68	4.32	3.94	3.86
2	4.34	3.60	3.65	4.34	4.24	4.5	3.33	3.56	3.96	4.14	4.22	3.91
3	4.28	3.64	3.66	4.04	4.16	4.36	3.54	3.62	3.98	3.98	4.00	4.75
4	4.14	3.60	3.67	3.98	4.14	4.28	3.43	3.64	3.84	3.92	3.95	4.45
5	4.06	3.74	3.66	4.41	4.04	4.19	4.06	3.68	3.84	3.80	3.90	4.26
6	3.95	3.59	3.64	5.7	4.35	4.07	3.68	3.69	4.04	3.82	3.90	4.44
7	3.82	3.58	3.68	7.2	4.6	4.05	3.68	3.66	4.04	3.78	3.92	4.65
8	3.96	3.60	3.63	6.3	4.7	3.98	3.67	3.64	3.98	3.72	5.9	4.30
9	3.88	3.72	3.66	4.9	4.55	3.9	3.64	3.62	3.84	3.64	5.0	4.05
10	3.94	3.68	3.65	4.6	4.4	3.88	3.60	3.61	3.72	3.72	4.6	4.12
11	3.96	3.60	3.57	4.40	4.21	3.84	3.72	3.63	3.82	3.77	4.10	4.04
12	4.11	3.64	3.58	4.30	4.26	3.82	3.75	4.00	3.84	3.76	4.00	3.93
13	4.02	3.60	3.62	4.34	4.6	3.80	3.58	3.79	3.76	4.34	4.28	3.97
14	4.00	3.57	3.59	4.34	4.7	3.78	3.64	3.76	3.70	4.08	4.55	3.96
15	3.78	3.56	3.60	5.25	4.35	3.82	3.73	3.72	3.61	4.00	4.75	3.86
16	3.86	3.56	3.66	6.6	4.20	3.82	3.64	3.72	4.02	3.94	4.6	3.87
17	3.86	3.58	3.92	5.9	4.9	3.70	3.61	3.68	4.14	3.82	4.28	3.97
18	3.82	3.53	4.08	4.8	4.75	3.75	3.60	3.58	3.92	3.81	4.20	3.98
19	3.72	3.60	4.17	5.4	4.45	3.72	3.59	3.63	4.41	3.84	4.01	4.25
20	3.67	3.56	4.44	4.9	4.34	3.74	3.58	3.63	4.7	3.93	4.01	3.80
21	3.61	3.60	4.22	4.6	6.1	3.67	3.33	3.57	4.6	3.82	4.00	3.18
22	3.71	3.60	4.04	4.6	5.9	3.71	3.77	3.57	4.40	3.74	3.95	3.14
23	3.64	3.88	3.86	6.2	5.1	3.68	3.78	3.56	4.08	3.79	3.96	4.02
24	3.60	3.64	3.70	5.05	4.65	3.63	3.71	3.54	4.18	4.38	3.95	4.12
25	3.66	3.62	3.72	4.7	4.7	3.60	3.66	3.58	4.03	6.0	3.99	4.18
26	3.70	3.70	3.76	4.40	4.6	3.58	3.62	3.66	4.01	4.95	3.96	4.15
27	3.70	3.64	3.68	4.6	4.26	3.64	3.53	3.96	3.89	4.6	3.94	4.08
28	3.64	3.60	3.74	4.7	4.26	3.56	3.54	3.99	3.88	4.35	3.92	3.92
29	3.81	3.64	4.24	4.40	4.7	3.56	3.58	3.88	3.94	4.16	3.91	3.84
30	3.75	.....	4.31	4.2	5.7	3.54	3.62	3.82	4.6	4.00	3.88	3.80
31	3.70	.....	4.32	.....	5.2	.....	3.56	3.72	.....	3.98	.....	3.82

NOTE.—Relation of gage height to discharge affected by ice from about Jan. 6 to Mar. 15.

Daily discharge, in second-feet, of Ausable River at Ausable Forks, N. Y., for 1910–1912.

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1910.							1910.						
1	.....	.....	194	231	348	292	16	.....	.....	202	210	399	555
2	.....	.....	194	231	292	292	17	.....	329	226	210	292	473
3	.....	.....	202	399	329	257	18	.....	249	202	231	273	452
4	.....	.....	257	311	441	273	19	.....	311	210	210	367	616
5	.....	.....	388	311	694	301	20	.....	257	187	226	265	473
6	.....	.....	1,130	348	889	301	21	.....	226	202	202	409	339
7	.....	.....	707	543	748	431	22	.....	226	194	210	367	452
8	.....	.....	231	473	388	367	23	.....	210	210	226	329	431
9	.....	.....	231	367	311	292	24	.....	210	194	257	301	388
10	.....	.....	292	399	388	399	25	.....	210	167	292	339	452
11	.....	.....	167	508	388	301	26	.....	210	181	241	311	748
12	.....	.....	292	388	473	431	27	.....	187	273	367	257	409
13	.....	.....	210	292	348	441	28	.....	187	265	1,180	311	311
14	.....	.....	210	311	339	543	29	.....	210	249	762	257	348
15	.....	.....	194	257	329	616	30	.....	181	273	367	301	348
							31	.....	167	.....	329	.....	776

Daily discharge, in second-feet, of Ausable River at Ausable Forks, N. Y., for 1910–1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1911.												
1	.....	.....	330	473	4,250	441	265	140	202	226	273	566
2	.....	.....	199	555	9,130	603	187	147	174	292	339	462
3	.....	.....	422	578	2,690	441	249	147	174	257	348	329
4	.....	.....	185	629	1,700	358	194	154	174	273	329	409
5	.....	.....	199	409	1,080	378	181	127	181	1,080	218	348
6	.....	.....	296	2,450	932	282	181	122	590	804	249	329
7	.....	.....	407	4,880	1,000	339	194	167	832	520	339	273
8	.....	.....	217	2,340	1,600	249	174	181	409	320	762	282
9	.....	.....	211	962	1,900	452	147	194	218	348	590	320
10	.....	.....	189	1,050	1,900	520	174	160	226	329	452	234
11	.....	.....	196	990	1,600	485	167	167	210	329	452	578
12	.....	.....	217	1,000	1,800	578	140	134	226	265	531	1,700
13	.....	.....	446	1,300	1,420	1,330	167	140	241	226	1,210	4,250
14	.....	.....	388	2,570	776	1,020	117	147	210	218	681	2,000
15	.....	.....	426	3,940	707	818	117	140	210	226	485	1,230
16	.....	.....	585	2,340	508	904	154	167	249	218	388	832
17	.....	.....	538	1,510	1,280	790	167	140	202	181	362	790
18	.....	.....	277	1,250	520	532	202	127	273	265	409	655
19	.....	.....	215	976	707	399	273	117	210	1,100	430	452
20	.....	.....	245	1,130	681	358	210	154	210	846	367	776
21	.....	.....	286	1,070	485	329	167	241	167	655	348	578
22	.....	.....	259	976	555	301	167	147	241	720	292	367
23	.....	.....	369	976	496	282	122	167	210	860	257	1,420
24	.....	.....	1,700	889	629	320	147	160	181	668	311	1,700
25	.....	188	485	1,230	734	160	154	210	292	496	329	976
25	.....	205	832	1,800	707	420	194	160	226	388	134	776
27	.....	422	1,260	2,220	532	265	358	154	257	348	234	554
28	.....	578	2,000	3,210	399	241	160	167	210	339	265	496
29	.....	.....	1,100	3,940	399	249	160	226	226	241	616	889
30	.....	.....	776	3,940	292	257	160	257	257	241	616	1,700
31	.....	.....	567	.....	265	.....	194	218	.....	265	.....	1,700
1912.												
1	1,000	155	218	1,440	694	2,000	167	167	257	1,040	520	431
2	1,070	155	199	1,070	918	1,330	51	167	543	776	889	485
3	976	181	205	642	804	1,100	154	210	567	567	590	1,800
4	776	155	211	567	776	976	92	226	409	496	532	1,250
5	668	249	205	1,180	642	846	668	257	409	367	473	947
6	426	150	192	4,250	1,080	681	257	265	642	388	473	1,230
7	310	145	218	9,510	1,510	655	257	241	642	348	496	1,600
8	434	155	185	6,210	1,700	567	249	226	567	292	4,880	1,000
9	362	233	205	2,110	1,420	473	226	210	409	226	2,340	655
10	416	205	199	1,510	1,160	452	194	202	292	292	1,510	748
11	434	155	148	1,160	874	409	292	218	388	339	720	642
12	587	181	154	1,000	947	388	320	590	409	329	590	508
13	493	155	178	1,070	1,510	367	181	358	329	1,070	976	555
14	472	139	159	1,070	1,700	348	226	329	273	694	1,420	543
15	278	134	165	2,940	1,080	388	301	292	202	590	1,800	431
16	345	134	241	7,270	860	388	226	292	616	520	1,510	441
17	345	145	496	4,880	2,110	273	292	257	776	388	976	555
18	310	118	694	1,900	1,800	320	194	181	496	378	860	567
19	233	165	818	3,350	1,250	292	187	218	1,180	409	603	932
20	199	142	1,230	2,110	1,070	311	181	218	1,700	508	603	367
21	162	165	889	1,510	5,530	249	51	174	1,510	388	590	14
22	225	165	642	1,510	4,880	282	339	174	1,160	311	532	9
23	181	384	431	5,870	2,570	257	348	167	694	358	543	616
24	155	192	273	2,450	1,600	218	282	154	832	1,130	532	748
25	193	178	292	1,700	1,700	194	241	181	629	5,200	578	832
26	218	232	329	1,160	1,510	181	210	241	603	2,220	543	790
27	218	192	257	1,510	947	226	147	543	462	1,510	520	694
28	181	165	311	1,700	947	167	154	578	452	1,080	496	496
29	302	192	918	1,160	1,700	167	181	452	520	804	485	409
30	256	.....	1,020	860	4,250	154	210	388	1,510	590	452	367
31	218	.....	1,040	.....	2,820	.....	167	292	.....	567	.....	388

NOTE.—Daily discharge determined from a well-defined rating curve. For the period during which ice was present, Feb. 25 to Mar. 23, 1911, and Jan. 6 to Mar. 15, 1912, coefficients varying from 80 to 90 per cent were applied to the open-water discharge. These coefficients are based on discharge measurements but the daily discharge for these periods can be considered only approximate.

Monthly discharge of Ausable River at Ausable Forks, N. Y., for 1910–1912.

[Drainage area, 487 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
1910.						
August 17–31	329	167	225	0.462	0.26	A.
September	1,130	167	271	.556	.62	A.
October	1,180	202	351	.721	.83	A.
November	889	257	383	.786	.88	A.
December	776	257	423	.869	1.00	B.
1911.						
March	2,000	185	510	1.05	1.21	B.
April	4,880	473	1,720	3.53	3.94	A.
May	9,130	265	1,340	2.75	3.17	A.
June	1,330	160	470	.965	1.08	A.
July	358	117	182	.374	.43	A.
August	257	117	164	.337	.39	A.
September	832	167	256	.526	.59	A.
October	1,100	181	437	.897	1.03	A.
November	1,210	134	421	.864	.96	A.
December	4,250	234	902	1.85	2.13	A.
1912.						
January	1,070	155	401	.823	.95	B.
February	384	118	176	.361	.39	B.
March	1,230	148	410	.842	.97	B.
April	9,510	567	2,490	5.11	5.70	A.
May	5,530	642	1,690	3.47	4.00	A.
June	2,000	154	489	1.00	1.12	A.
July	668	51	224	.460	.53	A.
August	590	154	273	.561	.65	A.
September	1,700	202	649	1.33	1.48	A.
October	5,200	226	780	1.60	1.84	A.
November	4,880	452	934	1.92	2.14	A.
December	1,800	9	679	1.39	1.60	A.
The year	9,510	9	765	1.57	27.37	

EAST CREEK NEAR RUTLAND, VT.

Location.—At Lester Bridge, on the road from Rutland to Brandon, Vt., about 3 miles north of Rutland, 2½ miles below the union of the two branches which drain Blue Ridge Mountain, and 3½ miles above the confluence with Otter River.

Records available.—August 9, 1911, to December 31, 1912.

Drainage area.—47 square miles.

Gage.—Vertical staff, fastened to the left-hand downstream side of the bridge.

Channel.—Probably permanent.

Discharge measurements.—Made from the bridge or by wading. None made during 1912.

Artificial control.—The flow of the stream is regulated by two dams near the headwaters and one dam about a mile below the station. The upper dams store considerable water. The relation between gage height and discharge is not affected by backwater from the dam below.

Accuracy.—Diurnal fluctuation of discharge caused by the operation of the mills above the station makes the computation of the mean daily flow, based on two observations, incorrect. It is considered advisable, however, to publish the gage reader's observations pending studies to determine the best use of them.

Daily gage height, in feet, of East Creek near Rutland, Vt., for 1912.

[M. Lester, observer.]

Day.	March.		April.		May.		June.		July.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
1	.....	.....	4.05	4.35	4.0	4.08	.....	.....	3.35	3.5
2	.....	.....	3.82	4.2	3.85	3.9	4.7	4.75	3.3	3.55
3	.....	.....	3.7	3.7	3.8	3.9	4.7	4.7	3.5	3.5
4	.....	.....	3.65	3.8	3.72	3.8	4.62	4.6	3.4	3.6
5	.....	.....	3.72	4.75	3.68	3.6	4.55	4.5	3.55	3.62
6	.....	.....	4.2	5.0	3.6	3.9	4.25	4.3	3.4	3.6
7	.....	.....	4.6	5.35	3.75	3.82	4.25	4.0	3.45	3.48
8	.....	.....	5.12	4.7	3.7	3.8	3.85	3.9	3.5	3.65
9	.....	.....	3.88	3.8	3.62	4.0	3.72	3.7	3.4	3.9
10	.....	.....	3.75	3.85	3.75	4.0	3.75	3.62	3.65	3.68
11	.....	.....	3.8	3.82	3.8	3.6	3.4	3.4	3.55	3.6
12	.....	.....	3.7	4.15	3.6	3.6	3.25	3.5	3.5	3.55
13	.....	.....	4.0	4.02	3.75	3.8	3.55	3.65	3.5	3.6
14	.....	.....	4.0	3.8	3.85	3.9	3.42	3.6	3.65	3.65
15	.....	3.8	3.75	4.4	3.72	3.88	3.48	3.5	3.4	3.55
16	3.85	3.7	4.35	5.0	3.7	4.05	3.42	3.68	3.4	3.55
17	3.7	4.0	4.7	4.7	4.65	4.5	3.6	3.6	3.3	3.7
18	3.85	4.3	4.62	4.52	4.02	4.15	3.45	3.6	3.48	3.6
19	3.9	4.45	4.95	5.0	4.1	4.2	3.4	3.5	3.65	3.78
20	4.2	4.0	4.7	4.75	4.3	4.4	3.35	3.9	3.55	3.7
21	3.8	4.0	4.7	4.7	4.6	4.68	3.3	3. 2	3.55	3.75
22	3.88	3.7	4.65	4.62	4.85	4.7	3.3	3.6	3.9	3.7
23	3.7	3.78	4.7	4.7	4.62	4.6	3.25	3.4	3.55	3.75
24	3.65	3.6	4.55	4.75	4.45	4.5	3.22	3.6	3.6	3.7
25	3.5	3.62	4.6	4.6	4.12	4.0	3.2	3.58	3.6	3.75
26	3.6	3.65	4.55	4.6	3.88	3.9	3.22	3.7	3.6	3.7
27	3.5	3.85	4.75	4.55	3.75	3.8	3.3	3.7	3.55	3.7
28	3.58	3.9	4.5	4.35	3.7	3.75	3.25	3.6	3.58	3.7
29	3.85	4.7	4.3	4.3	3.5	3.85	3.2	3.55	3.75	3.78
30	3.95	4.05	4.25	4.25	4.3	4.8	3.5	3.42	3.7	3.75
31	3.72	4.2	.....	.....	5.0	5.35	.....	.....	3.7	3.8

Day.	August.		September.		October.		November.		December.	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
1	3.75	3.7	3.55	3.85	3.22	3.98	3.6	3.92	3.55	3.5
2	3.6	3.7	3.98	3.95	3.65	3.85	3.7	3.8	3.42	4.4
3	3.65	3.9	3.7	3.8	3.45	3.7	3.55	3.6	3.65	4.0
4	3.85	3.8	3.7	3.75	3.4	3.82	3.5	3.8	3.88	4.05
5	3.7	3.8	3.6	3.7	3.4	3.78	3.65	3.68	3.7	4.0
6	3.9	3.75	3.9	3.85	3.4	3.82	3.5	3.65	3.95	4.05
7	3.7	3.7	3.5	3.72	3.6	3.85	3.5	3.95	3.6	4.02
8	3.68	3.65	3.55	3.7	3.48	3.9	4.25	4.0	3.6	3.6
9	3.6	3.85	3.5	3.62	3.4	3.92	3.8	3.62	3.55	4.0
10	3.58	3.7	3.6	3.7	3.25	3.9	3.5	3.8	3.7	3.85
11	3.75	3.7	3.55	3.9	3.2	4.0	3.65	3.9	3.68	3.95
12	3.85	3.9	3.8	3.8	3.2	3.88	3.72	3.92	3.6	3.9
13	3.75	3.55	3.78	3.9	3.32	3.45	3.7	3.95	3.7	3.9
14	3.8	3.82	3.7	3.8	3.25	3.82	3.75	3.9	3.6	3.85
15	3.8	3.95	3.58	3.8	3.15	3.78	3.8	3.85	3.6	3.78
16	3.9	3.8	4.2	3.75	3.4	3.8	3.5	3.72	3.55	3.9
17	3.8	3.72	3.4	3.8	3.45	3.9	3.6	3.52	3.75	3.88
18	3.65	3.52	3.3	3.7	3.4	3.88	3.6	3.7	3.65	3.85
19	3.6	3.85	3.55	3.95	3.35	3.8	3.5	3.72	4.0	4.2
20	3.48	3.7	4.15	4.12	3.3	3.75	3.55	3.9	4.05	3.92
21	3.7	3.88	4.2	3.9	3.1	3.92	3.6	3.85	3.7	3.9
22	3.88	3.75	3.65	3.8	3.12	3.88	3.62	3.7	3.68	3.5
23	3.7	3.8	3.48	3.85	3.25	4.6	3.6	3.72	3.55	3.88
24	3.5	3.72	3.45	3.78	4.45	4.7	3.55	3.42	3.5	3.72
25	3.52	3.65	3.4	3.45	4.6	4.28	3.4	3.8	3.6	3.5
26	3.55	3.92	3.32	3.72	4.05	4.22	3.6	3.85	3.7	3.9
27	3.8	3.7	3.75	3.75	3.85	3.72	3.62	3.85	3.58	3.8
28	3.35	3.82	3.3	3.8	3.7	3.8	3.7	3.5	3.65	3.68
29	3.8	3.75	3.22	3.7	3.68	3.78	3.5	4.0	3.5	3.4
30	3.58	3.8	3.8	3.75	3.7	3.75	3.65	3.65	3.45	4.15
31	3.6	3.85	.....	.....	3.6	3.7	.....	.....	4.0	4.1

NOTE.—Ice went out of the creek about Mar. 15. Gage read about 6 a. m. and 6 p. m.

WINOOSKI RIVER AT MONTPELIER, VT.

Location.—At the covered wooden highway bridge near the Central Vermont Railroad station in Montpelier and near the plant of the Colton Manufacturing Co., just above the mouth of Dog River.

Records available.—May 19, 1909, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Chain, attached to the highway bridge; datum unchanged.

Channel.—Probably permanent.

Discharge measurements.—Made from a footbridge about half a mile below the highway bridge.

Winter flow.—Relation between gage height and discharge during the winter months is sometimes affected by ice.

Accuracy.—Diurnal fluctuation of discharge, caused by artificial control of the stream above this station, makes the computation of the mean daily flow based on two observations incorrect. A portable automatic gage was set up at this station on October 11, 1912, and a continuous record of gage heights was obtained from 4 p. m. until midnight October 12 and from 1 p. m. October 14 until October 17. The hourly gage heights recorded by this instrument are shown in the following table. Estimates of daily flow made from these hourly gage heights and from semidaily readings for October 12, 15, 16, and 17 show that estimates of daily flow based on two readings would be in error 37 per cent, 52 per cent, 61 per cent, and 66 per cent, respectively. As a good rating curve has been developed, however, it is considered advisable to publish the gage reader's observations, together with the rate of flow corresponding to each.

Hourly gage heights of Winooski River at Montpelier, Vt., from portable automatic gage.

Hour.	October.					
	11.	12.	14.	15.	16.	17.
1	.....	3.43	.....	4.12	4.22	3.97
2	.....	3.47	.....	4.11	4.19	3.97
3	.....	3.53	.....	4.08	4.18	3.96
4	.....	3.55	.....	4.08	4.15	3.95
5	.....	3.55	.....	4.07	4.14	3.94
6	.....	3.55	.....	4.04	4.14	3.94
7	.....	4.07	.....	4.54	4.54	4.20
8	.....	4.07	.....	4.59	4.54	4.52
9	.....	4.07	.....	4.59	4.53	4.49
10	.....	4.07	.....	4.55	4.54	4.37
11	.....	4.06	.....	4.58	4.54	4.19
Noon.	.....	4.03	.....	4.37	4.27	4.29
1	.....	4.14	4.61	4.53	4.52	4.25
2	.....	4.21	4.66	4.57	4.52	4.53
3	.....	4.22	4.67	4.55	4.53	4.53
4	4.35	4.22	4.66	4.65	4.53	4.50
5	4.42	4.23	4.46	4.65	4.53	4.48
6	4.26	4.24	4.29	4.37	4.25	4.10
7	3.81	4.25	4.53	4.36	4.00	4.22
8	3.79	4.21	4.46	4.34	4.00	4.25
9	3.78	4.20	4.40	4.34	4.00	4.26
10	3.59	4.23	4.28	4.32	4.00	4.25
11	3.59	4.26	4.19	4.29	4.00	4.25
Midnight.	3.58	4.76	4.20	4.26	3.98	4.25

Discharge measurements of Winooski River at Montpelier, Vt., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 19[a]	G. H. Canfield	4.77	174
Sept. 4[b]	J. G. Mathers	4.08	203
Oct. 12[c]	C. S. De Golyer	4.01	180
13[c]	.....do	4.85	554
14[c]	.....do	4.51	341

[a] Made under complete ice cover 2,000 feet downstream from bridge.
[b] Made at foot bridge below gage.
[c] Made by wading below the gage.

Daily gage height, in feet, and discharge, in second-feet, of Winooski River at Montpelier, Vt., for 1912.

[Raymond Colton, observer.]

Day.	January.				February.				March.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	4.6	.....	4.6	.....	.....	.....	5.0	.....	.....	.....	5.0	.....
2	4.65	.....	4.65	.....	.....	.....	4.9	.....	.....	.....	4.9	.....
3	4.6	.....	4.6	.....	.....	.....	4.7	.....	.....	.....	4.9	.....
4	4.6	.....	4.6	.....	.....	.....	4.8	.....	.....	.....	5.05	.....
5	4.5	.....	4.5	.....	.....	.....	4.8	.....	.....	.....	5.1	.....
6	4.5	.....	4.5	.....	.....	.....	4.85	.....	.....	.....	5.0	.....
7	4.6	.....	4.6	.....	.....	.....	4.8	.....	.....	.....	5.05	.....
8	4.6	.....	4.6	.....	.....	.....	4.9	.....	.....	.....	5.2	.....
9	4.65	.....	4.65	.....	.....	.....	4.8	.....	.....	.....	5.0	.....
10	4.6	.....	4.6	.....	.....	.....	4.8	.....	.....	.....	4.9	.....
11	.....	.....	.....	.....	.....	.....	4.9	.....	.....	.....	5.2	.....
12	4.7	.....	4.7	.....	.....	.....	4.9	.....	.....	.....	5.2	.....
13	4.7	.....	4.7	.....	.....	.....	4.8	.....	.....	.....	5.4	.....
14	.....	.....	.....	.....	.....	.....	4.9	.....	.....	.....	5.3	.....
15	4.9	.....	4.9	.....	.....	.....	4.8	.....	.....	.....	5.25	.....
16	4.7	.....	4.7	.....	.....	.....	4.8	.....	.....	.....	5.4	.....
17	5.1	.....	5.0	.....	.....	.....	4.7	.....	.....	.....	5.4	.....
18	4.9	.....	4.9	.....	.....	.....	4.9	.....	.....	.....	5.9	.....
19	4.7	.....	4.7	.....	.....	.....	4.7	.....	.....	.....	6.5	.....
20	5.0	.....	5.0	.....	.....	.....	4.7	.....	.....	.....	7.5	.....
21	4.9	.....	4.9	.....	.....	.....	4.8	.....	.....	.....	6.9	.....
22	4.8	.....	4.8	.....	.....	.....	5.0	.....	.....	.....	6.1	.....
23	4.8	.....	4.8	.....	.....	.....	5.05	.....	.....	.....	6.1	.....
24	4.9	.....	4.9	.....	.....	.....	4.9	.....	.....	.....	5.3	.....
25	4.8	.....	4.8	.....	.....	.....	5.0	.....	.....	.....	5.2	.....
26	4.85	.....	4.85	.....	.....	.....	4.9	.....	.....	.....	4.9	.....
27	4.8	.....	4.8	.....	.....	.....	5.0	.....	.....	.....	4.9	.....
28	4.75	.....	4.75	.....	.....	.....	5.0	.....	.....	.....	7.1	.....
29	4.8	.....	4.8	.....	.....	.....	5.0	.....	.....	.....	9.3	.....
30	4.7	.....	4.7	.....	.....	.....	.....	.....	.....	.....	8.9	.....
31	4.8	.....	4.8	.....	.....	.....	.....	.....	.....	.....	8.1	.....

Daily gage height, in feet, and discharge, in second-feet, of Winooski River at Montpelier, Vt., for 1912—Continued.

Day.	April.				May.				June.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	.....	.....	5.8	1,210	5.2	775	5.1	710	8.7	4,600	8.3	4,050
2	.....	.....	5.9	1,300	5.1	710	5.0	650	7.4	2,900	7.2	2,660
3	.....	.....	6.3	1,660	4.9	590	4.95	620	7.0	2,420	6.6	1,970
4	.....	.....	6.3	1,660	5.0	650	5.05	680	6.3	1,660	6.3	1,660
5	.....	.....	7.4	2,900	5.0	650	5.0	650	6.0	1,380	6.1	1,470
6	.....	.....	7.9	3,530	5.2	775	6.0	1,380	6.2	1,560	5.8	1,210
7	.....	.....	14.4	15,000	5.8	1,210	5.3	840	5.4	910	5.5	980
8	11.9	9,500	9.9	6,340	5.2	775	5.1	710	5.3	840	5.35	875
9	9.0	5,020	8.4	4,180	5.0	650	5.05	680	5.2	775	5.1	710
10	7.3	2,780	7.7	3,270	5.1	710	5.0	650	5.3	840	5.2	775
11	7.3	2,780	7.5	3,020	5.0	650	4.8	535	5.3	840	5.3	840
12	7.1	2,540	7.7	3,270	4.8	535	4.7	480	5.2	775	5.1	710
13	7.6	3,140	7.1	2,540	4.8	535	4.8	535	5.1	710	5.1	710
14	7.5	3,020	7.6	3,140	6.6	1,970	6.1	1,470	5.0	650	4.8	535
15	7.7	3,270	8.6	4,460	5.4	910	5.4	910	4.8	535	4.7	480
16	9.9	6,340	10.9	7,900	5.6	1,060	5.2	775	4.7	480	4.75	508
17	10.0	6,490	9.3	5,440	7.5	3,020	7.2	2,660	4.6	430	4.55	406
18	8.3	4,050	8.5	4,320	6.2	1,560	6.0	1,380	4.55	406	4.5	381
19	8.2	3,920	8.0	3,660	5.6	1,060	5.4	910	4.5	381	4.5	381
20	8.1	3,790	7.5	3,020	5.3	840	5.4	910	4.4	334	4.5	381
21	7.5	3,020	7.2	2,660	9.3	5,440	8.7	4,600	4.6	430	4.4	334
22	7.1	2,540	6.8	2,190	8.4	4,180	7.8	3,400	4.4	334	4.4	334
23	8.6	4,460	7.6	3,140	7.4	2,900	7.4	2,900	4.4	334	4.4	334
24	7.1	2,540	7.2	2,660	6.8	2,190	6.6	1,970	4.4	334	4.4	334
25	6.7	2,080	6.4	1,760	6.4	1,760	6.3	1,660	4.5	381	4.4	334
26	6.3	1,660	6.35	1,710	6.2	1,560	5.8	1,210	4.45	358	4.4	334
27	6.2	1,560	6.0	1,380	5.6	1,060	5.6	1,060	4.3	289	4.3	289
28	5.9	1,300	5.8	1,210	5.4	910	5.3	840	4.3	289	4.2	246
29	5.7	1,130	5.7	1,130	5.5	980	6.7	2,080	4.2	246	4.2	246
30	5.5	980	5.3	840	9.6	5,890	9.8	6,190	4.25	268	4.25	268
31	.....	.....	.....	.....	9.8	6,190	10.1	6,640	4.2	246	4.2	246

Daily gage height, in feet, and discharge, in second-feet, of Winooski River at Montpelier, Vt., for 1912—Continued.

Day.	July.				August.				September.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	4.2	246	4.2	246	4.3	289	4.2	246	4.0	168	4.1	206
2	4.1	206	4.2	246	4.2	246	4.2	246	3.9	132	4.2	246
3	4.0	168	4.0	168	4.2	246	4.3	289	4.6	430	4.4	334
4	3.9	132	3.8	100	4.3	289	4.5	381	4.25	268	4.2	246
5	3.8	100	3.65	62	4.3	289	4.3	289	4.3	289	4.2	246
6	3.6	51	3.5	33	4.3	289	4.3	289	4.35	312	4.4	334
7	3.5	33	3.5	33	4.3	289	4.3	289	4.4	334	4.45	358
8	3.45	26	3.4	19	4.3	289	4.3	289	4.0	168	4.0	168
9	3.5	33	3.6	51	4.3	289	4.3	289	4.2	246	4.25	268
10	3.6	51	3.6	51	4.3	289	4.4	334	4.1	206	4.1	206
11	4.0	168	4.1	206	4.5	381	4.5	381	4.2	246	4.2	246
12	4.4	334	4.3	289	4.5	381	4.6	430	4.2	246	4.4	334
13	4.3	289	4.2	246	4.3	289	4.25	268	4.15	226	4.15	226
14	4.3	289	4.2	246	4.1	206	4.1	206	4.15	226	4.2	246
15	4.3	289	4.3	289	4.0	168	4.1	206	4.7	480	5.0	650
16	4.2	246	4.3	289	4.1	206	4.15	226	4.8	535	4.9	590
17	4.2	246	4.2	246	4.1	206	4.2	246	4.9	590	4.7	480
18	4.2	246	4.15	226	4.3	289	4.3	289	4.8	535	4.8	535
19	4.1	206	4.1	206	4.1	206	4.0	168	4.75	508	4.8	535
20	4.0	168	3.9	132	4.0	168	4.0	168	4.9	590	5.6	1,060
21	3.6	51	4.0	168	4.1	206	4.1	206	5.5	980	5.3	840
22	4.7	480	4.2	246	4.1	206	4.1	206	5.0	650	4.8	535
23	4.5	381	4.3	289	3.8	100	3.9	132	4.6	430	4.5	381
24	4.3	289	4.3	289	3.7	73	3.6	51	4.6	430	4.5	381
25	4.2	246	4.1	206	3.6	51	3.6	51	4.5	381	4.5	381
26	3.9	132	3.65	62	4.1	206	4.05	187	4.5	381	4.4	334
27	4.0	168	4.0	168	4.0	168	4.0	168	4.4	334	4.35	312
28	4.05	187	4.0	168	4.05	187	4.0	168	4.4	334	4.5	381
29	4.0	168	4.0	168	4.0	168	4.0	168	5.4	910	5.4	910
30	4.1	206	4.2	246	4.1	206	4.1	206	4.9	590	4.75	508
31	4.2	246	4.3	289	3.9	132	3.9	132	.....	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Winooski River at Montpelier, Vt., for 1912—Continued.

Day.	October.				November.				December.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	4.7	480	4.7	480	4.7	480	4.7	480	4.8	535	4.8	535
2	4.65	455	4.5	381	4.7	480	4.8	535	4.7	480	4.7	480
3	4.4	334	4.4	334	4.6	430	4.65	455	5.0	650	4.8	535
4	4.25	268	4.1	206	4.6	430	4.6	430	4.8	535	4.8	535
5	4.2	246	4.0	168	4.6	430	4.5	381	5.3	840	5.4	910
6	3.9	132	3.8	100	4.6	430	4.7	480	5.2	775	5.0	650
7	4.3	289	4.3	289	4.6	430	4.6	430	5.0	650	4.8	535
8	4.3	289	4.3	289	7.0	2,420	6.8	2,190	4.8	535	4.8	535
9	4.3	289	4.2	246	6.2	1,560	6.0	1,380	4.8	535	4.9	590
10	4.3	289	4.3	289	5.4	910	5.3	840	4.8	535	4.8	535
11	4.1	206	4.2	246	5.0	650	5.1	710	4.7	480	4.8	535
12	4.1	206	4.1	206	5.4	910	5.4	910	4.8	535	4.8	535
13	4.7	480	4.5	381	5.2	775	5.0	650	4.8	535	4.7	480
14	4.4	334	4.4	334	7.0	2,420	6.9	2,300	4.7	480	4.8	535
15	4.4	334	4.6	430	6.3	1,660	6.0	1,380	4.8	535	4.8	535
16	4.4	334	4.4	334	5.4	910	5.3	840	4.6	430	4.65	455
17	4.35	312	4.3	289	5.3	840	5.3	840	4.6	430	4.7	480
18	4.25	268	4.25	268	5.2	775	5.0	650	4.7	480	4.7	480
19	4.0	168	3.9	132	4.8	535	4.8	535	5.0	650	5.3	840
20	3.9	132	3.9	132	4.8	535	4.8	535	5.1	710	4.8	535
21	4.3	289	4.3	289	4.7	480	4.8	535	4.8	535	4.6	430
22	4.15	226	4.1	206	4.8	535	4.8	535	4.35	312	4.3	289
23	4.0	168	4.4	334	4.8	535	4.8	535	4.3	289	4.3	289
24	10.2	6,790	8.8	4,740	4.8	535	4.9	590	4.3	289	4.3	289
25	8.0	3,660	7.3	2,780	4.8	535	4.8	535	4.4	334	4.4	334
26	6.3	1,660	6.0	1,380	4.8	535	4.8	535	4.4	334	4.35	312
27	5.5	980	5.3	840	4.9	590	4.8	535	4.4	334	4.55	406
28	5.0	650	5.1	710	4.8	535	4.8	535	4.5	381	4.5	381
29	4.7	480	4.7	480	4.8	535	4.8	535	4.5	381	4.45	358
30	4.7	480	4.9	590	4.7	480	4.75	508	4.5	381	4.5	381
31	4.7	480	4.7	480					5.1	710	5.2	775

NOTE.—Relation of gage height to discharge affected by ice from first part of January until the latter part of March; from the beginning of the period, ice forming rapidly until 30 inches thick, gage heights were read to water surface. Readings were taken at 8.30 a. m. and 4.30 p. m. Daily discharge determined from a rating curve well defined below 8,000 second-feet.

WORCESTER BRANCH OF WINOOSKI RIVER AT MONTPELIER, VT.

Location.—At Montpelier, a short distance below the plant of the Lane Manufacturing Co., near the junction of Worcester Branch with the main stream.

Records available.—May 15, 1909, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Vertical staff, fastened to a stone wall and tree about 100 feet below the plant; datum unchanged.

Channel.—Probably permanent.

Discharge measurements.—Made from a steel highway bridge about 300 feet below the gage.

Winter flow.—Relation between gage height and discharge during the winter months is materially affected by ice.

Accuracy.—Diurnal fluctuation of discharge, caused by artificial control of the stream above this station, makes the computation of the mean daily flow, based on two observations, inaccurate, but as a good rating curve has been developed it is considered advisable to publish the gage reader's observations together with the rate of flow corresponding to each.

Discharge measurements of Worcester Branch of Winooski River at Montpelier, Vt., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 20[a]	G. H. Canfield	1.59	30.6
Sept. 4[b]	J. G. Mathers	1.45	69.9
Oct. 12[b]	C. S. De Golyer	1.11	22.7
13[b]	.....do	2.79	329
14[b]	.....do	1.95	131

[a] Made under complete ice cover of first bridge below gage.
[b] Made by wading near the gage.

Daily gage height, in feet, and discharge, in second-feet, of Worcester Branch of Winooski River at Montpelier, Vt., for 1912.

[S. A. Luke, observer.]

Day.	February.				March.			
	A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1					1.5	66		
2					1.4	54		
3							1.4	54
4					1.5	66		
5					1.6	79		
6					1.6	79		
7					1.7	94		
8					1.7	94		
9					1.6	79		
10							1.7	94
11					1.7	94		
12					1.65	86		
13					1.7	94		
14					1.7	94		
15					1.8	110		
16					1.9	127		
17							2.4	234
18					2.5	258		
19					2.7	309		
20					2.8	335		
21	1.5	66			2.7	309		
22	1.55	72			2.4	234		
23	1.6	79			2.3	210		
24	1.5	66					1.7	94
25					1.8	110		
26	1.5	66			1.7	94		
27	1.4	54			1.5	66		
28	1.45	60			1.6	79		
29	1.5	66			2.9	362		
30					4.7	954		
31							3.9	666

Daily gage height, in feet, and discharge, in second-feet, of Worcester Branch of Winooski River at Montpelier, Vt., for 1912—Continued.

Day.	April.				May.				June.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	4.4	842	3.8	632	2.0	145	2.0	145	5.4	1,230	4.1	734
2	3.2	447	3.0	390	1.9	127	1.9	127	3.0	390	2.8	335
3	2.7	309	2.6	283	1.8	110	1.7	94	2.8	335	3.2	447
4	2.4	234	2.3	210	1.8	110	1.8	110	2.8	335	2.5	258
5	2.0	145	2.7	309	.....	.....	1.6	79	2.4	234	2.2	187
6	4.0	700	4.5	878	1.8	110	2.9	362	2.1	165	2.0	145
7	5.7	1,350	10.0	3,540	2.4	234	2.1	165	2.3	210	2.1	165
8	10.0	3,540	6.0	1,480	2.05	155	1.9	127	2.0	145	1.9	127
9	4.0	700	3.8	632	1.85	118	1.8	110	2.0	145	1.7	94
10	3.2	447	3.9	666	1.8	110	1.8	110	1.6	79	1.7	94
11	2.8	335	3.2	447	1.7	94	1.7	94	1.4	54	1.8	110
12	3.2	447	4.0	700	.....	.....	1.6	79	1.3	43	1.5	66
13	3.4	506	4.0	700	1.6	79	1.7	94	1.4	54	1.6	79
14	3.5	536	.....	.....	2.7	309	2.2	187	1.4	54	1.6	79
15	3.5	536	4.5	878	2.0	145	1.9	127	1.3	43	1.5	66
16	4.5	878	7.5	2,180	1.7	94	2.0	145	.....	.....	1.5	66
17	5.8	1,400	4.7	954	3.6	568	3.5	536	1.5	66	1.4	54
18	4.0	700	4.5	878	3.3	476	2.8	335	1.3	43	1.5	66
19	4.0	700	4.2	770	.....	.....	2.4	234	1.3	43	1.4	54
20	3.6	568	3.2	447	2.1	165	2.4	234	1.2	34	1.4	54
21	.....	.....	3.3	476	6.1	1,530	5.0	1,070	1.2	34	1.3	43
22	3.2	447	3.1	418	3.9	666	3.2	447	1.2	34	1.3	43
23	5.5	1,270	4.3	806	3.9	666	3.1	418	.....	.....	1.2	34
24	3.3	476	3.0	390	2.8	335	2.6	283	1.1	25	1.2	34
25	2.9	362	2.8	335	2.7	309	2.8	335	1.1	25	1.3	43
26	2.8	335	2.6	283	.....	.....	2.3	210	1.0	17	1.25	38
27	2.6	283	2.8	335	2.1	165	2.0	145	.9	10	1.3	43
28	2.6	283	2.4	234	1.9	127	1.8	110	1.0	17	1.4	54
29	2.3	210	1.9	127	1.8	110	2.4	234	1.0	17	1.0	17
30	2.0	145	1.9	127	4.6	916	4.4	842	.....	.....	1.0	17
31	.....	.....	.....	.....	5.0	1,070	4.9	1,030	.....	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Worcester Branch of Winooski River at Montpelier, Vt., for 1912—Continued.

Day.	July.				August.				September.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	1.0	17	1.2	34	1.0	17	1.4	54	.....	.....	1.2	34
2	1.0	17	1.0	17	.6	1	1.3	43	1.1	25	1.3	43
3	.8	5	1.3	43	.7	3	1.2	34	1.5	66	1.5	66
4	.9	10	.8	5	.....	.....	1.0	17	1.3	43	1.5	66
5	.9	10	1.2	34	1.1	25	1.3	43	1.2	34	1.4	54
6	.7	3	1.3	43	1.2	34	1.4	54	1.15	30	1.3	43
7	.....	.....	.6	1	1.1	25	1.3	43	1.2	34	1.3	43
8	.7	3	1.0	17	1.1	25	1.3	43	.....	.....	1.1	25
9	.6	1	.5	0	1.0	17	1.3	43	1.15	30	1.3	43
10	.4	0	.5	0	1.1	25	1.0	17	1.1	25	1.2	34
11	.4	0	1.2	34	1.1	25	1.1	25	1.1	25	1.3	43
12	.5	0	1.3	43	1.1	25	1.3	43	1.1	25	1.4	54
13	.4	0	.4	0	1.2	34	1.3	43	1.1	25	1.2	34
14	.....	.....	.6	1	1.2	34	1.3	43	1.1	25	1.2	34
15	.7	3	1.1	25	1.2	34	1.5	66	.....	.....	2.0	145
16	.4	0	1.2	34	1.2	34	1.4	54	3.0	390	2.4	234
17	.6	1	1.4	54	1.0	17	1.0	17	1.7	94	1.9	127
18	.7	3	1.4	54	.....	.....	1.0	17	1.3	43	1.5	66
19	1.0	17	1.3	43	1.0	17	1.1	25	2.7	309	2.5	258
20	.6	1	.7	3	.9	10	1.1	25	2.5	258	2.2	187
21	.....	.....	.9	10	.8	5	1.1	25	2.2	187	2.0	145
22	1.3	43	1.3	43	1.0	17	1.1	25	.....	.....	1.9	127
23	1.2	34	1.4	54	.8	5	1.0	17	1.4	54	1.6	79
24	1.2	34	1.4	54	.9	10	1.0	17	1.3	43	1.5	66
25	1.1	25	1.3	43	.....	.....	1.0	17	1.3	43	1.5	66
26	.9	10	1.3	43	1.0	17	1.3	43	1.2	34	1.45	60
27	.8	5	.9	10	2.2	187	2.0	145	1.2	34	1.5	66
28	.....	.....	1.0	17	1.4	54	1.3	43	1.35	48	1.5	66
29	.8	5	1.2	34	1.1	25	1.5	66	.....	.....	1.2	34
30	.7	3	1.3	43	1.1	25	1.3	43	1.7	94	1.8	110
31	.7	3	1.4	54	1.1	25	1.3	43	.....	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Worcester Branch of Winooski River at Montpelier, Vt., for 1912—Continued.

Day.	October.				November.				December.			
	A. M.		P. M.		A. M.		P. M.		A. M.		P. M.	
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
1	1.7	94	1.5	66	1.5	66	1.6	79	.....	.....	1.5	66
2	1.2	34	1.5	66	1.9	127	2.1	25	1.3	43	1.5	66
3	1.2	34	1.5	66	.....	.....	1.8	110	3.7	600	2.9	362
4	1.2	34	1.3	43	1.5	66	1.5	66	3.5	536	2.8	335
5	.....	.....	1.1	25	1.6	79	1.5	66	2.1	165	2.0	145
6	1.1	25	1.4	54	1.5	66	1.6	79	2.5	258	2.9	362
7	1.1	25	1.3	43	1.5	66	1.9	127	2.7	309	2.5	258
8	1.2	34	1.3	43	5.8	1,400	3.9	666	.....	.....	2.0	145
9	1.2	34	1.25	38	3.1	418	2.7	309	1.7	94	1.8	110
10	1.2	34	1.2	34	.....	.....	2.6	283	1.7	94	1.9	127
11	1.1	25	1.4	54	2.6	283	2.3	210	1.7	94	1.6	79
12	1.1	25	1.2	34	1.9	127	1.7	94	1.6	79	1.6	79
13	2.8	335	.....	.....	1.9	127	2.0	145	1.3	43	1.3	43
14	1.8	110	1.9	127	2.6	283	2.8	335	1.35	48	1.5	66
15	1.8	110	2.0	145	3.1	418	2.8	335	.....	.....	1.5	66
16	1.7	94	1.9	127	2.5	258	2.3	210	1.5	66	1.5	66
17	1.4	54	1.5	66	.....	.....	2.1	165	1.3	43	1.45	60
18	1.3	43	1.5	66	2.0	145	1.8	110	1.3	43	1.5	66
19	1.2	34	1.4	54	1.9	127	1.8	110	1.5	66	2.7	309
20	.....	.....	1.3	43	1.8	110	1.7	94	2.6	283	2.2	187
21	1.3	43	1.3	43	1.7	94	1.7	94	1.5	66	1.6	79
22	1.2	34	1.3	43	1.9	127	1.9	127	.....	.....	1.4	54
23	1.1	25	1.5	66	1.7	94	1.8	110	1.5	66	1.5	66
24	8.5	2,680	4.5	878	.....	.....	1.6	79	1.5	66	1.45	60
25	5.1	1,110	3.9	666	1.7	94	1.8	110	.....	.....	1.4	54
26	3.1	418	2.9	362	1.7	94	1.7	94	1.4	54	1.4	54
27	.....	.....	2.5	258	1.6	79	1.6	79	1.35	48	1.4	54
28	2.2	187	2.1	165	1.5	66	1.5	66	1.3	43	1.4	54
29	1.9	127	1.9	127	1.4	54	1.5	66	.....	.....	1.3	43
30	1.8	110	1.8	110	1.4	54	1.5	66	1.2	34	1.4	54
31	1.6	79	1.6	79	.....	.....	.....	.....	1.6	79	1.5	66

NOTE.—Gage heights read about 6.50 a. m. and 4.30 p. m. Daily discharge determined from a well-defined rating curve.

DOG RIVER AT NORTHFIELD, VT.

Location.—At the highway bridge in Northfield, Vt., near the Norwich University grounds. Union Brook flows into Dog River a short distance below this station.

Records available.—May 14, 1909, to December 14, 1912. Records from May 14, 1909, to August 23, 1910, from lower bridge. Records from August 23, 1910, to December 31, 1912, at present location.

Drainage area.—57 square miles.

Gage.—Vertical staff, attached to highway bridge.

Datum.—Unchanged.

Channel.—Probably permanent.

Discharge measurements.—Made from highway bridge at high stages and by wading at low stages.

Winter flow.—Relation between gage height and discharge during the winter months is seriously affected by ice.

Accuracy.—The rating curve for this station is good. Diurnal fluctuation, due to power operations, exists to some extent, but it is not thought that it will materially affect computations based on semidaily observations.

Discharge measurements of Dog River at Northfield, Vt., in 1911–12.

Date.	Hydrographer.	Gage height.	Discharge.
1911.		*Feet.*	*Sec.-ft.*
June 19[a]	G. H. Canfield	1.00	12.0
1912.			
Sept. 13[b]	J. G. Mathers	1.28	29.0

[a] Made by wading 100 feet above the bridge. Through a typographical error this measurement was given incorrectly in Water Supply Paper 204.
[b] Made by wading 50 feet below the bridge.

Daily gage height, in feet, of Dog River at Northfield, Vt., for 1912.

[Florence Doyle, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.65	.....	.....	2.7	1.94	3.9	1.08	0.90	0.95	1.21	1.85	1.74
2	1.52	.....	.....	2.2	1.93	2.9	1.00	.92	1.30	1.28	1.95	1.70
3	1.52	.....	.....	2.0	1.81	2.9	1.04	1.12	1.14	1.18	1.82	2.9
4	1.60	.....	.....	1.86	1.75	2.65	.99	1.02	1.06	1.14	1.72	2.3
5	1.52	.....	.....	2.95	1.71	2.45	.94	.95	1.06	1.18	1.76	2.05
6	1.46	.....	.....	4.8	2.1	2.25	.86	1.02	1.08	1.10	1.71	2.5
7	.....	.....	.....	6.1	2.05	2.3	1.01	.90	1.04	1.10	1.92	2.3
8	.....	.....	.....	4.9	1.88	2.1	1.00	.92	1.00	1.06	3.5	2.1
9	.....	.....	.....	3.4	1.86	1.86	.94	.90	.96	1.04	2.65	1.85
10	.....	.....	.....	3.2	1.85	1.82	.92	.96	.92	1.10	2.35	1.88
11	.....	.....	.....	3.0	1.72	1.92	1.06	1.01	1.05	1.09	2.2	1.82
12	.....	.....	.....	3.2	1.66	1.84	1.00	1.10	1.08	1.15	2.1	1.58
13	.....	.....	.....	3.4	1.72	1.79	.98	.94	.96	1.14	2.4	1.60
14	.....	.....	.....	3.8	1.91	1.65	1.02	1.05	.98	1.06	2.4	1.58
15	.....	.....	.....	4.0	1.68	1.52	1.00	1.02	.96	1.18	2.45	1.62
16	.....	.....	1.50	5.6	1.95	1.56	.92	.96	1.72	1.15	2.1	1.62
17	.....	.....	1.54	4.4	3.2	1.55	.88	.96	1.26	1.14	2.0	1.55
18	.....	.....	1.56	3.9	2.6	1.45	.90	.94	1.10	1.08	2.0	1.52
19	.....	.....	1.74	3.9	2.25	1.42	1.22	.99	1.14	1.07	1.90	2.1
20	.....	.....	2.1	3.2	2.3	1.37	1.00	.98	1.42	1.06	1.84	1.75
21	.....	.....	1.68	3.2	4.2	1.32	1.06	.90	1.95	1.10	1.80	1.50
22	.....	.....	1.66	3.0	3.1	1.29	1.44	.90	1.49	1.05	1.80	1.55
23	.....	.....	1.56	3.6	2.9	1.24	1.14	.94	1.32	1.58	1.76	1.48
24	.....	.....	1.51	2.9	2.6	1.20	.98	.92	1.28	5.2	1.72	1.40
25	.....	.....	1.44	2.85	2.35	1.18	.99	.92	1.22	3.4	1.80	1.35
26	.....	.....	1.35	2.7	2.2	1.19	.96	1.00	1.15	2.4	1.78	1.40
27	.....	.....	1.42	2.7	2.1	1.15	.92	1.26	1.24	2.25	1.74	1.40
28	.....	.....	1.52	2.4	1.88	1.11	.90	1.02	1.12	2.1	1.70	1.40
29	.....	.....	2.4	2.25	2.45	1.08	.90	.96	1.15	1.88	1.60	1.38
30	.....	.....	2.6	2.05	4.0	1.06	.90	.94	1.5	1.82	1.66	1.49
31	.....	.....	2.45	.....	3.9	.....	.94	.94	.....	1.7	.....	2.05

NOTE.—Relation of gage heights to discharge affected by ice Jan. 7 to Mar. 15.

Daily discharge, in second-feet, of Dog River at Northfield, Vt., for 1912.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	.....	192	92	419	17	8	10	25	82	71
2	.....	123	91	223	12	9	31	30	94	67
3	.....	99	78	223	14	19	20	23	79	223
4	.....	84	72	184	12	13	16	20	69	136
5	.....	231	68	156	10	10	16	23	73	105
6	.....	682	111	130	6	13	17	18	68	163
7	.....	1,320	105	136	13	8	14	18	90	136
8	.....	718	86	111	12	9	12	16	332	111
9	.....	312	84	84	10	8	10	14	184	82
10	.....	274	82	79	9	10	9	18	142	86
11	.....	239	69	90	16	13	15	17	123	79
12	.....	274	63	81	12	18	17	21	111	55
13	.....	312	69	76	11	10	10	20	149	57
14	.....	293	89	62	13	15	11	16	149	55
15	.....	443	65	50	12	13	10	23	156	59
16	48	1,030	94	53	9	10	69	21	111	59
17	52	553	274	52	7	10	28	20	99	52
18	53	419	177	44	8	10	18	17	99	50
19	71	419	130	41	25	12	20	16	88	111
20	111	274	136	37	12	11	41	16	81	72
21	65	274	496	33	16	8	94	18	77	48
22	63	239	256	30	43	8	47	15	77	52
23	53	353	223	27	20	10	33	55	73	46
24	49	223	177	24	11	9	30	838	69	39
25	43	215	142	23	12	9	25	312	77	35
26	35	192	123	23	10	12	21	149	75	39
27	41	192	111	21	9	28	27	130	71	39
28	50	149	86	19	8	13	19	111	67	39
29	149	130	156	17	8	10	21	86	57	37
30	177	105	443	16	8	10	48	79	63	47
31	156	.....	419	.....	10	10	.....	67	.....	105

NOTE.—Daily discharge determined from a well-defined rating curve.

Monthly discharge of Dog River at Northfield, Vt., for 1912.

[Drainage area, 57 square miles.]

Month.	Discharge in second-feet.				Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.		
March 16–31	177	35	76.0	1.33	0.79	A.
April	1,320	84	345	6.05	6.75	A.
May	496	63	151	2.65	3.06	A.
June	419	16	85.5	1.50	1.67	A.
July	43	6	12.7	.223	.26	B.
August	28	8	11.5	.202	.23	B.
September	94	9	25.3	.444	.50	B.
October	838	14	72.6	1.27	1.46	A.
November	332	57	103	1.81	2.02	A.
December	223	35	76.0	1.33	1.53	A.

LAMOILLE RIVER AT JOHNSON, VT.

Location.—At the highway bridge in the town of Johnson on the main road from the railroad station to the post office, about 400 feet above the mouth of Gihon River.

Records available.—July 14, 1910, to December 31, 1912; from July 28, 1909, to July 13, 1910, a station was maintained on the Lamoille at Morrisville.

Drainage area.—Not measured.

Gage.—Chain, fastened to the hand rail of the bridge.

Channel.—Probably permanent; bed composed of gravel; ledge rock projects from the left bank; a small gravel riffle about 350 feet below the bridge will prevent backwater at the gage.

Discharge measurements.—At high stages made from footbridge; at low stages, by wading about 500 feet above the bridge.

Accuracy.—Diurnal fluctuation of discharge, caused by artificial control of the stream above this station, makes the computation of the mean daily flow, based on two observations, inaccurate, but as a good rating curve has been developed it is considered advisable to publish the gage reader's observations, together with the rate of flow corresponding to each.

Discharge measurements of Lamoille River at Johnson, Vt., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 24[a]	G. H. Canfield	3.70	155
Aug. 29	J. G. Mathers	2.57	206
Oct. 19	C. S. De Golyer	2.69	238

[a] Measurement made under complete ice cover at bridge.

Daily gage height, in feet, and discharge, in second-feet, of Lamoille River at Johnson, Vt., for 1912.

[F. M. Ward, observer.]

Day.	January.						February.					
	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	7.00	3.05	.....	12.00	3.15	.....	.....	.....	.....	.....	.....	.....
2	7.00	3.15	.....	12.00	3.25	.....	.....	.....	.....	.....	.....	.....
3	7.00	3.35	.....	12.00	3.25	.....	.....	.....	.....	.....	.....	.....
4	7.00	3.15	.....	12.00	3.25	.....	.....	.....	.....	.....	.....	.....
5	7.00	3.15	.....	12.00	3.25	.....	.....	.....	.....	.....	.....	.....
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.00	3.6	.....
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.00	3.45	.....
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.00	3.45	.....
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.00	3.45	.....

Day.	March.						April.					
	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	.....	.....	.....	.....	.....	.....	7.00	7.0	.....	6.00	7.0	.....
2	.....	.....	.....	.....	.....	.....	7.00	6.4	.....	6.00	6.3	.....
3	.....	.....	.....	.....	.....	.....	7.00	5.6	.....	6.00	5.2	.....
4	.....	.....	.....	.....	.....	.....	7.00	5.0	.....	6.00	5.1	.....
5	.....	.....	.....	.....	.....	.....	7.00	5.1	.....	6.00	5.3	.....
6	.....	.....	.....	.....	.....	.....	7.00	8.3	.....	5.00	10.3	.....
7	.....	.....	.....	.....	.....	.....	9.00	12.3	.....	5.00	12.2	.....
8	.....	.....	.....	.....	.....	.....	7.00	16.0	.....	6.00	11.3	.....
9	.....	.....	.....	.....	.....	.....	7.00	7.8	3,490	6.00	7.3	3,090
10	.....	.....	.....	2.00	4.0	.....	7.00	6.2	2,230	6.00	6.2	2,230
11	.....	.....	.....	12.00	3.9	.....	7.00	5.5	1,740	6.00	5.9	2,020
12	.....	.....	.....	12.00	3.7	.....	7.00	5.6	1,810	6.00	6.2	2,230
13	.....	.....	.....	12.00	3.6	.....	7.00	5.9	2,020	5.00	6.2	2,230
14	.....	.....	.....	12.00	3.6	.....	10.00	6.4	2,370	5.00	6.5	2,450
15	.....	.....	.....	12.00	3.45	.....	7.00	8.2	3,810	6.00	8.5	.....
16	.....	.....	.....	12.00	3.7	.....	7.00	10.3	.....	6.00	11.6	.....
17	.....	.....	.....	2.00	4.0	.....	7.00	12.0	.....	6.00	10.0	.....
18	.....	.....	.....	12.00	4.6	.....	7.00	8.3	3,890	6.00	7.8	3,490
19	7.00	5.8	.....	6.00	4.7	.....	7.00	8.3	3,890	6.00	7.2	3,010
20	7.00	5.0	.....	6.00	5.2	.....	7.00	7.2	3,010	5.00	6.5	2,450
21	.....	.....	.....	.....	.....	.....	10.00	7.0	2,850	5.00	6.8	2,690
22	.....	.....	.....	.....	.....	.....	7.00	5.2	1,530	6.00	6.0	2,090
23	.....	.....	.....	.....	.....	.....	7.00	9.8	.....	6.00	9.7	.....
24	.....	.....	.....	.....	.....	.....	7.00	7.2	3,010	6.00	5.8	1,950
25	.....	.....	.....	.....	.....	.....	7.00	5.3	1,600	6.00	5.4	1,670
26	.....	.....	.....	.....	.....	.....	7.00	5.2	1,530	6.00	5.3	1,600
27	.....	.....	.....	.....	.....	.....	7.00	4.3	965	6.00	5.2	1,530
28	.....	.....	.....	.....	.....	.....	7.00	4.1	855	6.00	4.1	855
29	.....	.....	.....	6.00	5.7	.....	7.00	4.2	910	6.00	4.1	855
30	.....	.....	.....	12.00	7.5	.....	7.00	3.7	650	6.00	3.7	650
31	.....	.....	.....	12.00	7.0	.....	.....	.....	.....	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Lamoille River at Johnson, Vt., for 1912—Continued.

Day.	May.						June.					
	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	7.00	4.0	800	6.00	4.3	965	7.00	8.8	.....	5.00	7.6	3,330
2	7.00	3.8	700	6.00	3.45	532	8.00	7.3	3,090	5.00	7.0	2,850
3	7.00	3.7	650	5.00	3.35	488	7.00	5.0	1,400	6.00	5.6	1,810
4	7.00	3.25	445	5.00	3.15	405	7.00	4.7	1,200	6.00	4.9	1,330
5	9.00	3.45	532	5.00	3.35	488	7.00	5.3	1,600	6.00	4.8	1,260
6	7.00	3.05	365	6.00	3.6	600	7.00	4.3	965	6.00	4.1	855
7	7.00	3.7	650	6.00	3.6	600	7.00	4.2	910	6.00	4.3	965
8	7.00	3.35	488	6.00	3.4	510	7.00	4.0	800	6.00	4.4	1,020
9	7.00	3.3	465	6.00	3.3	465	7.00	3.8	700	5.00	3.45	532
10	7.00	3.3	465	6.00	3.4	510	7.00	3.25	445	6.00	3.3	465
11	7.00	3.25	445	5.00	3.15	405	7.00	3.25	445	6.00	3.45	532
12	8.00	3.15	405	5.00	3.25	445	7.00	3.25	445	6.00	3.35	488
13	7.00	3.25	445	6.00	3.45	532	7.00	3.35	488	6.00	3.45	532
14	7.00	4.5	1,080	6.00	4.7	1,200	7.00	3.25	445	6.00	3.15	405
15	7.00	4.0	800	6.00	3.7	650	7.00	3.05	365	5.00	2.95	328
16	7.00	4.3	965	6.00	4.4	1,020	8.00	2.95	328	5.00	3.05	365
17	7.00	4.8	1,260	6.00	5.9	2,020	7.00	3.35	488	6.00	3.25	445
18	7.00	5.6	1,810	5.00	4.9	1,330	7.00	3.15	405	6.00	3.05	365
19	9.00	4.6	1,140	5.00	4.4	1,020	7.00	2.95	328	6.00	2.75	258
20	7.00	3.7	650	6.00	3.9	750	7.00	2.85	292	6.00	2.65	227
21	7.00	6.6	2,530	6.00	7.0	2,850	7.00	2.65	227	6.00	2.65	227
22	7.00	5.9	2,020	6.00	4.8	1,260	7.00	2.75	258	5.00	2.65	227
23	7.00	5.4	1,670	6.00	5.3	1,600	8.00	2.65	227	5.00	2.55	199
24	7.00	4.5	1,080	6.00	4.6	1,140	7.00	2.35	151	6.00	2.45	174
25	7.00	4.8	1,260	5.00	4.6	1,140	7.00	2.55	199	6.00	2.45	174
26	7.00	4.4	1,020	5.00	4.0	800	7.00	2.4	162	6.00	2.6	212
27	7.00	3.9	750	6.00	3.6	600	7.00	2.6	212	6.00	2.6	212
28	7.00	3.35	488	6.00	3.25	445	7.00	2.5	186	6.00	2.4	162
29	7.00	3.15	405	6.00	3.7	650	7.00	2.35	151	5.00	2.4	162
30	7.00	4.0	800	6.00	4.3	965	8.00	2.35	151	5.00	2.25	130
31	7.00	7.0	2,850	6.00	7.6	3,330	.....	.....	.....	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Lamoille River at Johnson, Vt., for 1912—Continued.

Day.	July.						August.					
	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	7.00	2.25	130	6.00	2.35	151	7.00	2.25	130	6.00	2.3	140
2	7.00	2.25	130	6.00	2.35	151	7.00	2.25	130	6.00	2.35	151
3	7.00	2.15	109	6.00	2.3	140	7.00	2.45	174	5.00	2.75	258
4	7.00	2.25	130	6.00	2.15	109	8.00	2.55	199	5.00	2.35	151
5	7.00	2.2	119	6.00	2.1	99	7.00	2.4	162	6.00	2.6	212
6	7.00	1.95	73	5.00	2.05	90	7.00	2.4	162	6.00	2.45	174
7	7.00	1.95	73	5.00	1.95	73	7.00	2.35	151	6.00	2.3	140
8	7.00	2.05	90	6.00	2.15	109	7.00	2.3	140	6.00	2.35	151
9	7.00	1.95	73	6.00	2.05	90	7.00	2.4	162	6.00	2.3	140
10	7.00	2.0	81	6.00	2.2	119	7.00	2.4	162	5.00	2.4	162
11	7.00	2.15	109	6.00	2.2	119	7.00	2.25	130	5.00	2.35	151
12	7.00	2.15	109	6.00	2.2	119	7.00	2.45	174	6.00	2.75	258
13	7.00	2.1	99	6.00	2.25	130	7.00	2.45	174	6.00	2.45	174
14	7.00	2.05	90	5.00	1.95	73	7.00	2.45	174	6.00	2.35	151
15	7.00	2.1	99	6.00	2.3	140	7.00	2.5	186	6.00	2.4	162
16	7.00	2.05	90	6.00	2.25	130	7.00	2.35	151	6.00	2.3	140
17	7.00	2.1	99	6.00	2.25	130	7.00	2.35	151	5.00	2.25	130
18	7.00	2.15	109	6.00	2.25	130	8.00	2.25	130	5.00	2.25	130
19	7.00	2.1	99	6.00	2.2	119	7.00	2.15	109	6.00	2.05	90
20	7.00	2.1	99	6.00	2.35	151	7.00	2.3	140	6.00	2.35	151
21	7.00	2.25	130	5.00	2.25	130	7.00	2.25	130	6.00	2.2	119
22	7.00	2.15	109	6.00	2.25	130	7.00	2.23	125	6.00	2.25	130
23	7.00	2.15	109	6.00	2.35	151	7.00	2.25	130	6.00	2.25	130
24	7.00	2.05	90	6.00	2.25	130	7.00	2.35	151	6.00	2.3	140
25	7.00	2.1	99	6.00	2.3	140	7.00	2.5	186	5.00	2.6	212
26	7.00	2.1	99	6.00	2.15	109	7.00	2.65	227	6.00	2.55	199
27	7.00	2.1	99	5.00	2.2	119	7.00	2.9	310	6.00	3.35	488
28	8.00	2.15	109	5.00	2.25	130	7.00	2.9	310	6.00	2.95	328
29	7.00	2.1	99	6.00	2.3	140	7.00	2.6	212	6.00	2.4	162
30	7.00	2.4	162	6.00	2.4	162	7.00	2.5	186	6.00	2.4	162
31	7.00	2.25	130	6.00	2.3	140	7.00	2.4	162	5.00	2.35	151

Daily gage height, in feet, and discharge, in second-feet, of Lamoille River at Johnson, Vt., for 1912—Continued.

Day.	September.						October.					
	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	2.4	162	5.00	2.3	140	7.00	2.8	275	1.00	2.9	310
2	7.00	2.25	130	6.00	2.35	151	7.00	2.95	328	1.00	2.95	328
3	7.00	2.35	151	6.00	2.3	140	7.00	2.8	275	1.00	2.7	242
4	7.00	2.4	162	6.00	2.4	162	7.00	2.75	258	1.00	2.7	242
5	7.00	2.4	162	6.00	2.4	162	7.00	2.7	242	5.00	2.65	227
6	7.00	2.7	242	6.00	2.7	242	8.00	2.5	186	5.00	2.5	186
7	7.00	2.6	212	5.00	2.7	242	7.00	2.3	140	1.00	2.4	162
8	7.00	2.3	140	6.00	2.4	162	7.00	2.5	186	1.00	2.6	212
9	7.00	2.2	119	6.00	2.3	140	7.00	2.55	199	1.00	2.6	212
10	7.00	2.3	140	6.00	2.2	119	7.00	2.55	199	1.00	2.55	199
11	7.00	2.4	162	6.00	3.0	345	7.00	2.6	212	1.00	2.7	242
12	7.00	2.9	310	6.00	2.75	258	7.00	2.6	212	5.00	2.8	275
13	7.00	2.6	212	6.00	2.5	186	7.00	2.9	310	5.00	3.0	345
14	7.00	2.5	186	5.00	2.3	140	7.00	3.1	385	1.00	3.2	425
15	8.00	2.3	140	5.00	2.4	162	7.00	2.8	275	1.00	2.85	292
16	7.00	3.2	425	6.00	3.4	510	7.00	2.8	275	1.00	2.9	310
17	7.00	2.95	328	6.00	2.7	242	7.00	2.8	275	1.00	2.7	242
18	7.00	2.8	275	6.00	2.9	310	7.00	2.8	275	1.00	2.7	242
19	7.00	4.1	855	6.00	3.9	750	7.00	2.7	242	1.00	2.7	242
20	7.00	4.3	965	6.00	4.2	910	8.00	2.6	212	5.00	2.6	212
21	7.00	4.0	800	5.00	3.9	750	7.00	2.3	140	1.00	2.45	174
22	8.00	3.4	510	5.00	3.4	510	7.00	2.65	227	1.00	2.62	218
23	7.00	2.9	310	6.00	3.0	345	7.00	2.7	242	1.00	2.6	212
24	7.00	2.9	310	6.00	3.0	345	7.00	11.0	.....	1.00	10.6	.....
25	7.00	2.7	242	6.00	2.75	258	7.00	8.2	3,810	1.00	8.0	3,650
26	7.00	2.6	212	6.00	2.6	212	7.00	6.4	2,370	1.00	6.2	2,230
27	7.00	2.6	212	6.00	2.5	186	8.00	6.0	2,090	1.00	5.9	2,020
28	7.00	2.55	199	5.00	2.4	162	7.00	3.6	600	1.00	3.8	700
29	8.00	2.4	162	5.00	2.7	242	7.00	3.7	650	1.00	3.6	600
30	7.00	2.9	310	6.00	3.1	385	7.00	2.7	242	1.00	3.2	425
31	.....	.....	.....	.....	.....	.....	7.00	3.2	425	1.00	3.1	385

Daily gage height, in feet, and discharge, in second-feet, of Lamoille River at Johnson, Vt., for 1912—Continued.

Day.	November.						December.					
	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	7.00	3.1	385	1.00	3.2	425	8.00	3.3	465	4.00	3.0	345
2	7.00	3.2	425	1.00	3.6	600	7.00	2.7	242	1.00	2.8	275
3	8.00	3.4	510	1.00	3.3	465	7.00	5.3	1,600	1.00	5.0	1,400
4	7.00	3.1	385	1.00	3.2	425	7.00	4.1	855	1.00	4.2	910
5	7.00	3.0	345	1.00	3.1	385	7.00	3.8	700	1.00	3.8	700
6	7.00	2.9	310	1.00	3.1	385	7.00	3.7	650	1.00	4.2	910
7	7.00	3.0	345	1.00	3.1	385	7.00	4.3	965	1.00	4.4	1,020
8	7.00	8.3	3,890	1.00	8.0	3,650	8.00	4.0	800	3.00	3.4	510
9	7.00	5.6	1,810	1.00	5.1	1,460	7.00	3.1	385	1.00	3.2	425
10	8.00	5.0	1,400	4.00	4.7	1,200	7.00	3.0	345	1.00	3.2	425
11	7.00	3.7	650	1.00	3.6	600	7.00	3.0	345	1.00	3.3	465
12	7.00	3.5	555	1.00	4.3	965	7.00	3.1	385	1.00	3.2	425
13	7.00	3.3	465	1.00	3.2	425	7.00	3.0	345	1.00	3.0	345
14	7.00	3.9	750	1.00	5.1	1,460	7.00	3.0	345	1.00	3.15	405
15	7.00	4.9	1,330	1.00	5.1	1,460	8.00	3.1	385	3.00	2.9	310
16	7.00	4.5	1,080	1.00	4.6	1,140	7.00	3.0	345	1.00	3.1	385
17	8.00	4.3	965	4.00	4.5	1,080	7.00	3.0	345	1.00	3.4	510
18	7.00	4.0	800	1.00	4.1	855	7.00	3.1	385	1.00	3.2	425
19	7.00	3.2	425	1.00	3.4	510	7.00	3.0	345	1.00	4.1	855
20	7.00	3.3	465	1.00	3.4	510	7.00	4.0	800	1.00	4.1	855
21	7.00	3.4	510	1.00	4.3	965	7.00	3.5	555	1.00	3.6	600
22	7.00	2.6	212	1.00	2.7	242	8.00	3.9	750	4.00	3.7	650
23	7.00	2.35	151	1.00	3.3	465	7.00	3.3	465	1.00	3.4	510
24	7.00	3.0	345	5.00	3.2	425	7.00	3.4	510	1.00	3.5	555
25	7.00	3.1	385	1.00	3.2	425	7.00	3.5	555	1.00	3.6	600
26	7.00	3.4	510	1.00	3.5	555	7.00	3.0	345	1.00	3.1	385
27	7.00	3.2	425	1.00	3.25	445	7.00	3.1	385	1.00	3.2	425
28	7.00	3.1	385	3.00	3.2	425	7.00	3.2	425	1.00	3.0	345
29	7.00	2.85	292	1.00	2.8	275	8.00	3.3	465	4.00	3.1	385
30	7.00	3.1	385	1.00	3.0	345	7.00	3.0	345	1.00	3.1	385
31							7.00	3.2	425	1.00	3.3	465

NOTE.—Discharge determined from a rating curve well defined below 5,000 second-feet.

MISSISQUOI RIVER NEAR RICHFORD, VT.

Location.—At the highway bridge 200 feet below the Central Vermont Railroad bridge, 3 miles downstream from Richford, about 3 miles below the mouth of North Branch and 2 miles above the mouth of Trout River.

Records available.—May 29, 1909, to December 31, 1912.

Drainage area.—300 square miles.

Gage.—Chain, fastened to the downstream side of the bridge; installed June 26, 1911. From May 29, 1909, to December 31, 1910, the gage was just below the plant of the Sweat, Comings Co.; this site was found unsatisfactory because of the great daily fluctuation caused by the operation of the turbines.

Channel.—Deep; banks not liable to be overflowed; bed composed of gravel, bowlders, and rock ledge; current sluggish at low stages. A well-defined riffle about half a mile downstream protects the gage from backwater from the mills below.

Discharge measurements.—At high stages made from downstream side of bridge; at low stages by wading.

Accuracy.—Diurnal fluctuation of discharge, caused by artificial control of the stream above the station, makes the computation of the mean daily flow, based on two observations, inaccurate, but as a good rating curve has been developed it is considered advisable to publish the gage reader's observations, together with the rate of flow corresponding to each.

Discharge measurements of Missisquoi River near Richford, Vt., in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 26[a]	G. H. Canfield	6.42	190
Aug. 27	J. G. Mathers	6.65	835
27	....do	6.58	790
Oct. 18	C. S. De Golyer	5.94	407
18	....do	5.81	360

[a] Made under complete ice cover.

Daily gage height, in feet, and discharge, in second-feet, of Missisquoi River near Richford, Vt., for 1912.

[P. Sloan, observer.]

Day.	March.						April.					
	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												
2				2.00	6.5							
3							8.30	7.0				
4												
5							9.00	7.6				
6							9.00	8.7				
7	9.00	6.4					7.30	16.0		5.30	15.4	
8							6.30	18.2		6.00	16.2	
9										5.30	13.0	
10							7.00	11.4	4,960			
11										5.15	10.2	3,820
12	10.00	6.7					7.00	9.8	3,450			
13							7.00	9.0	2,730			
14										4.15	10.8	4,390
15										5.00	12.3	
16							7.30	13.0		5.30	14.1	
17							7.00	14.7		5.15	14.9	
18							9.30	13.8				
19	9.00	8.0					8.30	12.1	5,650	4.30	11.6	5,150
20							7.30	11.0	4,580			
21												
22							6.45	10.3	3,920	5.15	10.0	3,630
23	9.00	7.4					9.45	14.0		4.30	14.6	
24							8.00	13.8				
25							7.45	11.1	4,680			
26							8.00	9.3	3,000	6.30	8.8	2,550
27							7.00	8.3	2,120			
28												
29							8.15	7.7	1,620			
30										4.30	7.3	1,310
31												

Daily gage height, in feet, and discharge, in second-feet, of Missisquoi River near Richford, Vt., for 1912—Continued.

Day.	May.						June.					
	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	7.30	7.0	1,090				5.45	14.7				
2				6.00	6.7	880						
3	9.00	6.6	815	4.30	6.6	815	5.45	11.0	4,580	6.30	10.4	4,010
4	7.15	6.45	718				6.00	9.9	3,540			
5	7.45	6.25	590				8.30	9.0	2,730			
6	7.00	6.2	560	4.30	6.4	685	5.45	7.8	1,700	4.00	7.1	1,160
7	7.15	6.5	750				7.30	8.2	2,030	6.45	8.0	1,860
8	6.30	6.4	685				5.45	7.7	1,620			
9	7.30	6.3	620	7.00	6.3	620	6.00	7.1	1,160			
10	7.00	6.5	750	6.30	6.6	815	5.45	6.8	950	6.30	6.7	880
11	9.00	6.6	815				5.45	7.1	1,160	7.00	7.0	1,090
12	7.00	6.2	560	4.30	6.2	560	5.30	6.8	950			
13				5.00	6.8	950	5.15	6.8	950			
14	6.30	7.3	1,310	7.00	7.4	1,380	5.45	6.5	750	4.15	6.5	750
15				7.30	6.9	1,020	6.00	6.3	620			
16	6.45	6.7	880				6.30	6.1	500			
17	7.00	7.2	1,240	4.00	7.6	1,540	5.45	6.1	500	4.30	6.0	445
18	6.45	9.5	3,180				5.30	5.95	420	5.00	5.85	370
19							5.30	5.75	326			
20	8.00	7.7	1,620	4.00	7.5	1,460	5.30	5.7	304			
21	7.45	8.3	2,120	5.00	8.0	1,860	6.00	5.65	284	5.00	5.65	284
22				5.15	7.8	1,700	5.30	5.6	264			
23	7.45	7.6	1,540				6.30	5.45	210	4.00	5.3	162
24	9.00	7.4	1,380	4.30	7.3	1,310	5.30	5.3	162			
25	6.45	8.8	2,550				5.30	5.4	193			
26							8.00	5.5	227	4.15	5.55	246
27	7.15	7.1	1,160	4.45	6.9	1,020	5.30	5.5	227	4.30	5.45	210
28	6.00	6.6	815				5.45	5.45	210	4.15	5.4	193
29	6.30	6.9	1,020	4.15	11.2	4,770	5.30	5.4	193			
30	5.45	10.7	4,300	4.45	10.7	4,300						
31	6.00	11.2	4,770	4.15	12.0	5,550						

Daily gage height, in feet, and discharge, in second-feet, of Missisquoi River near Richford, Vt., for 1912—Continued.

Day.	July.						August.					
	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	5.15	5.1	108	4.30	5.0	84	5.45	4.8	45	5.15	4.85	54
2	5.30	4.6	18	4.15	4.5	9	5.30	4.8	45	5.30	4.8	45
3	5.30	4.7	30	4.15	4.8	45	6.30	4.9	63	.....	.....	.....
4	5.30	5.0	84	.....	.....	.....	6.30	5.2	134	.....	.....	.....
5	5.30	4.9	63	4.00	4.95	74	5.45	5.25	148	4.30	5.3	162
6	5.45	4.9	63	.....	.....	.....	5.30	5.25	148	4.15	5.15	121
7	6.00	5.0	84	4.30	4.9	63	5.45	5.05	96	5.00	5.0	84
8	5.30	4.9	63	4.15	4.9	63	5.30	4.9	63	.....	.....	.....
9	5.30	4.8	45	4.30	4.8	45	5.30	4.85	54	4.15	4.85	54
10	5.15	4.8	45	4.30	4.8	45	5.45	4.9	63	.....	.....	.....
11	5.30	4.85	54	4.15	5.0	84	.....	.....	.....	.....	.....	.....
12	5.30	5.1	108	.....	.....	.....	5.30	5.15	121	4.30	5.6	264
13	5.30	5.0	84	.....	.....	.....	5.45	6.1	500	4.15	6.0	445
14	.....	.....	.....	.....	.....	.....	5.30	5.8	347	4.30	5.8	347
15	5.30	4.9	63	4.45	4.85	54	5.45	5.65	284	4.45	5.6	264
16	5.30	4.85	54	4.30	4.8	45	5.45	5.45	210	7.00	5.4	193
17	5.30	4.8	45	.....	.....	.....	5.45	5.4	193	.....	.....	.....
18	5.30	4.75	38	4.30	4.65	24	.....	.....	.....	.....	.....	.....
19	5.30	4.7	30	4.15	4.7	30	5.45	5.1	108	4.30	5.0	84
20	5.45	4.8	45	.....	.....	.....	5.30	5.0	84	5.00	5.0	84
21	6.30	4.75	38	.....	.....	.....	5.30	5.0	84	5.15	4.9	63
22	5.30	4.9	63	4.15	5.0	84	5.30	4.95	74	5.15	4.9	63
23	5.30	4.9	63	.....	.....	.....	6.00	4.9	63	4.00	4.85	54
24	5.45	4.8	45	5.00	4.8	45	6.00	4.8	45	.....	.....	.....
25	5.30	4.75	38	.....	.....	.....	.....	.....	.....	6.30	7.9	1,780
26	5.30	4.8	45	4.30	4.75	38	5.45	7.6	1,540	4.00	7.5	1,465
27	5.45	4.8	45	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	.....	.....	.....	.....	.....	.....	6.00	6.6	815	4.45	6.4	680
29	7.30	4.8	45	4.45	4.85	54	6.00	6.25	590	.....	.....	.....
30	5.45	4.85	54	5.00	4.8	45	.....	.....	.....	4.30	6.0	445
31	5.30	4.8	45	.....	.....	.....	5.45	5.9	394	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Missisquoi River near Richford, Vt., for 1912—Continued.

Day.	September.						October.					
	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							6.45	7.6	1,540	3.30	7.5	1,460
2	6.15	5.6	264	4.30	5.6	264	6.45	7.4	1,380	3.30	7.3	1,310
3	6.00	5.4	193				6.30	6.9	1,020			
4	6.15	5.3	162	4.00	5.3	162	6.30	6.5	750	4.30	6.6	815
5							6.45	6.4	685			
6				6.30	6.2	560				4.00	6.1	500
7	6.30	6.45	718				6.30	6.0	445	4.15	6.0	445
8							6.45	6.1	500	4.30	6.05	472
9	6.15	6.6	815	4.30	6.4	685	7.30	5.95	420	4.30	5.9	394
10	6.00	6.1	500	4.30	6.1	500	6.30	5.95	420	4.30	5.95	420
11	6.00	7.8	1,700	4.00	8.4	2,200	6.30	6.0	445	4.30	6.0	445
12	6.30	8.1	1,940				6.30	6.1	500			
13	6.15	7.1	1,160	4.30	6.8	950						
14	6.00	6.5	750				6.30	6.6	815	4.30	6.4	685
15							6.30	6.2	560	4.30	6.2	560
16	6.30	7.3	1,310				6.45	6.1	500	4.15	6.0	445
17	6.00	6.7	880	4.30	6.5	750	6.30	6.0	445	5.00	6.0	445
18	8.30	6.3	620	5.00	6.8	950	6.30	5.9	394			
19	6.45	8.5	2,280	4.30	8.7	2,460	6.30	5.8	347			
20	6.30	10.6	4,200	3.45	9.5	3,180						
21	6.30	9.2	2,910				7.15	6.05	472	4.30	6.0	445
22							6.30	5.9	394	4.30	5.9	394
23	6.30	7.6	1,540	2.30	7.4	1,380	6.45	5.8	347			
24	6.45	7.2	1,240	4.00	7.0	1,090	6.45	8.5	2,280	4.15	9.6	3,270
25	6.45	6.8	950				6.45	10.6	4,200	4.00	10.8	4,390
26	6.30	6.5	750				6.30	9.7	3,360			
27	6.45	6.15	530	4.30	6.05	472						
28	6.45	6.0	445				6.30	8.2	2,030	4.30	7.9	1,780
29				4.00	6.6	815	7.45	7.6	1,540	3.30	7.2	1,240
30	6.45	7.8	1,700	4.30	7.9	1,780	7.30	6.9	1,020	4.30	6.8	950
31							7.45	6.6	815			

Daily gage height, in feet, and discharge, in second-feet, of Missisquoi River near Richford, Vt., for 1912—Continued.

Day.	November.						December.					
	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	8.30	6.5	750									
2	7.00	6.8	950				8.15	7.4	1,360			
3							7.00	9.5	3,180			
4	7.15	6.3	620	4.30	6.3	620	7.30	9.1	2,820			
5	7.30	6.2	560				7.00	7.8	1,700			
6	7.45	6.1	500	4.30	6.0	445	7.00	7.4	1,380			
7	8.00	6.1	500	4.30	8.1	1,940	7.00	8.0	1,860			
8	7.30	12.0	5,550	3.00	11.7	5,250						
9	7.30	11.0	4,580				8.45	6.6	815			
10							7.00	6.6	815			
11	7.15	8.2	2,030	4.00	7.9	1,780	7.30	7.7	1,620			
12	7.30	7.6	1,540	3.30	7.4	1,380	8.00	7.5	1,460			
13	7.30	7.2	1,240	4.00	7.3	1,310	6.30	7.4	1,380			
14	7.45	8.2	2,030	4.00	8.6	2,370	7.30	7.9	1,780			
15	8.45	9.4	3,090	4.00	9.2	2,910						
16	7.30	8.8	2,550				8.15	8.8	2,550			
17							7.45	8.6	2,370			
18	7.15	7.4	1,380	4.00	7.3	1,310	7.30	8.4	2,200			
19	7.30	7.1	1,160				7.15	9.0	2,730			
20	7.30	6.9	1,020				7.30	12.2	5,750			
21	7.45	7.2	1,240				8.30	9.6	3,270			
22	7.00	7.4	1,380									
23	7.00	7.1	1,160				7.45	10.0	3,630			
24							8.00	9.7	3,360			
25	7.45	6.7	880	2.15	6.9	1,020						
26				3.30	6.8	950						
27	8.30	6.6	815									
28	8.15	6.5	750									
29	7.30	6.25	590									
30	8.15	6.2	560									

NOTE.—Daily discharge determined from a fairly well-defined rating curve. All discharges above 1,500 second-feet depend on a single measurement.

CLYDE RIVER AT WEST DERBY, VT.

Location.—Just below plant of the Newport Electric Light Co., at West Derby, Vt.

Records available.—May 25, 1909, to December 31, 1912.

Drainage area.—Not measured.

Gage.—Staff, in two sections; low section about 75 feet below the plant; high-water section nailed to a tree on the right bank 10 feet farther downstream; datum unchanged.

Channel.—Bed rough; fall of river rapid near and below the station.

Discharge measurements.—Made from highway bridge about half a mile below the gage.

Artificial control.—At West Derby are two dams, both operated under the same management; at the upper dam part of the water is used by a paper mill and the remainder is delivered to the water wheels at the electric plant through a steel penstock; the total operating head from this dam is about 108 feet. All the flow from the second dam is diverted to the wheels in the power house, giving a head of about 30 feet. Practically no water is stored at the upper dam, but a pond of considerable size may be made by building a dam above this point.

Accuracy.—Diurnal fluctuation of discharge, caused by artificial control of the stream above this station, makes the computation of the mean daily flow, based on two observations, inaccurate; but as a good rating curve has been developed it is considered advisable to publish the gage reader's observations, together with the rate of flow corresponding to each.

The following measurement was made by J. G. Mathers:
August 26, 1912: Gage height, 2.20 feet; discharge, 134 second-feet.

Daily gage height, in feet, and discharge, in second-feet, of Clyde River at West Derby, Vt., for 1912.

[E. C. Rogers, observer.]

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	8.30	2.50	228	5.30	2.50	228	7.35	3.3	790	6.45	3.2	690
2	7.00	2.53	241	6.00	2.58	263	8.10	3.2	690	6.55	3.15	645
3	8.15	2.62	282	5.45	2.58	263	7.45	3.05	558	6.35	3.05	558
4	9.30	2.68	312	6.15	2.55	250	7.20	3.05	558	5.15	3.0	516
5	8.50	2.60	272	4.15	2.62	282	8.40	3.0	516	6.15	3.0	516
6	8.00	2.60	272	5.50	2.85	410	6.40	3.0	516	6.45	2.95	479
7	8.00	3.0	516	4.30	3.45	940	7.30	2.95	479	6.50	2.90	442
8	10.30	3.65	1,160	5.00	3.65	1,160	7.55	2.9	442	6.30	2.88	429
9	8.00	3.7	1,210	5.20	3.75	1,260	8.50	2.88	429	7.00	2.88	429
10	7.45	3.7	1,210	4.15	3.7	1,210	7.20	2.88	429	4.50	2.88	429
11	8.50	3.6	1,100	5.15	3.5	990	7.30	2.82	391	4.40	2.82	391
12	6.20	3.5	990	5.30	3.4	890	8.15	2.80	378	6.00	2.80	378
13	8.20	3.4	890	6.00	3.4	890	8.40	2.80	378	5.50	2.78	367
14	7.30	3.35	840	5.30	3.35	840	7.45	2.82	391	5.30	2.82	391
15	7.45	3.4	890	5.00	3.5	990	8.45	2.85	410	7.00	2.88	429
16	7.30	3.55	1,040	6.25	3.7	1,210	8.00	2.90	442	6.45	2.92	457
17	8.20	3.9	1,430	3.20	4.0	1,540	6.50	2.98	501	7.00	3.0	516
18	7.35	4.2	1,760	3.50	4.25	1,820	6.30	2.92	457	7.00	2.90	442
19	9.20	4.2	1,760	3.30	4.15	1,700	8.15	2.92	457	5.00	2.90	442
20	8.10	4.0	1,540	6.20	3.9	1,430	8.20	2.88	429	5.25	2.88	429
21	7.40	3.8	1,320	4.20	3.7	1,210	7.45	2.92	457	6.45	2.92	457
22	8.10	3.65	1,160	5.20	3.6	1,100	6.15	2.90	442	6.30	2.88	429
23	7.45	3.65	1,160	5.20	3.65	1,160	8.45	2.90	442	6.30	2.90	442
24	7.45	3.7	1,210	6.40	3.85	1,380	7.30	2.85	410	6.35	2.88	429
25	6.20	3.8	1,320	6.15	3.85	1,380	8.00	2.90	442	4.50	2.88	429
26	7.30	3.7	1,210	6.50	3.65	1,160	8.15	2.85	410	6.50	2.85	410
27	8.35	3.6	1,100	6.20	3.5	990	7.50	2.82	391	6.15	2.75	350
28	7.10	3.5	990	6.45	3.4	890	7.30	2.75	350	6.45	2.70	322
29	7.15	3.4	890	5.10	3.4	890	7.00	2.72	333	6.45	2.80	378
30	6.40	3.35	840	7.00	3.3	790	7.10	2.88	429	6.15	2.92	457
31							8.20	3.0	516	6.25	3.15	645

Daily gage height, in feet, and discharge, in second-feet, of Clyde River at West Derby, Vt., for 1912—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	6.15	3.3	790	5.00	3.3	790	8.00	2.25	145	7.15	2.18	128
2	7.00	3.4	890	6.30	3.4	890	7.35	2.20	132	6.00	2.15	121
3	8.30	3.4	890	7.00	3.4	890	7.50	2.20	132	6.50	2.12	114
4	7.45	3.35	840	7.30	3.35	840	8.00	2.15	121	5.00	2.10	110
5	8.10	3.3	790	6.15	3.3	790	8.00	2.10	110	6.15	2.08	106
6	6.30	3.3	790	7.15	3.2	690	7.10	2.12	114	6.30	2.10	110
7	6.30	3.3	790	6.45	3.2	690	9.50	2.10	110	7.00	2.05	101
8	8.35	3.1	600	6.10	3.1	600	7.50	2.10	110	7.15	2.00	92
9	7.20	3.05	558	6.30	3.05	558	9.00	2.10	110	7.00	2.00	92
10	7.00	3.0	516	6.45	2.98	501	8.00	2.05	101	6.00	1.98	89
11	6.45	2.95	479	6.15	2.92	457	6.30	2.08	106	7.00	2.00	92
12	7.00	2.90	442	6.00	2.85	410	7.10	2.08	106	5.45	1.95	84
13	8.00	2.82	391	6.45	2.80	378	7.40	2.05	101	5.30	2.02	96
14	6.30	2.78	367	5.30	2.78	367	7.30	2.00	92	7.00	1.98	89
15	7.00	2.72	333	5.45	2.72	333	7.15	2.00	92	6.15	1.92	80
16	7.00	2.75	350	6.00	2.70	322	8.25	2.00	92	6.00	1.90	77
17	7.50	2.70	322	6.20	2.65	297	7.35	1.98	89	6.15	1.88	75
18	7.40	2.62	282	5.30	2.60	272	7.40	1.90	77	5.45	1.82	67
19	8.00	2.58	263	7.10	2.60	272	8.00	1.88	75	6.25	1.88	75
20	7.00	2.60	272	6.00	2.52	237	7.30	1.90	77	6.40	1.80	65
21	7.25	2.55	250	7.10	2.52	237	7.55	1.90	77	5.30	1.90	77
22	7.35	2.50	228	6.00	2.42	198	8.10	1.98	89	7.25	1.95	84
23	7.45	2.45	209	6.30	2.45	209	7.50	1.95	84	6.50	1.88	75
24	8.00	2.38	184	6.00	2.40	190	6.30	1.90	77	6.00	1.90	77
25	7.00	2.32	164	6.45	2.38	184	6.50	1.95	84	5.10	1.90	77
26	7.25	2.38	184	7.00	2.38	184	6.20	1.95	84	6.15	1.88	75
27	8.30	2.32	164	7.15	2.32	164	6.55	1.92	80	6.15	1.82	67
28	6.55	2.32	164	.....	.....	.....	7.55	1.95	84	7.00	1.90	77
29	8.00	2.30	158	6.50	2.22	137	7.00	2.05	101	6.20	1.85	71
30	7.00	2.22	137	6.00	2.22	137	6.30	1.88	75	6.30	1.88	75
31	.....	.....	.....	.....	.....	.....	6.45	1.98	89	6.30	1.95	84

Daily gage height, in feet, and discharge, in second-feet, of Clyde River at West Derby, Vt., for 1912—Continued.

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	6.50	1.92	80	6.00	1.90	77	7.00	2.30	158	5.00	2.30	158
2	7.10	1.88	75	6.00	1.95	84	6.30	2.32	164	6.25	2.30	158
3	8.00	1.95	84	6.10	1.92	80	6.35	2.30	158	5.20	2.25	145
4	8.00	2.00	92	4.00	1.98	89	6.55	2.18	128	5.50	2.20	132
5	5.30	1.98	89	5.45	1.98	89	7.05	2.18	128	5.30	2.12	114
6	6.30	1.98	89	6.15	1.90	77	7.00	2.12	114	5.45	2.10	110
7	5.30	1.98	89	5.45	1.98	89	7.15	2.12	114	4.30	2.18	128
8	6.45	2.05	101	6.15	1.98	89	7.00	2.18	128	5.45	2.15	121
9	6.15	2.05	101	6.30	2.02	96	6.20	2.18	128	5.30	2.12	114
10	7.50	2.02	96	5.30	2.00	92	7.15	2.18	128	5.20	2.15	121
11	7.45	2.00	92	6.40	2.00	92	8.30	2.32	164	4.00	2.25	145
12	6.30	2.18	128	6.15	2.15	121	8.50	2.30	158	5.30	2.25	145
13	7.55	2.18	128	6.00	2.12	114	7.40	2.12	114	5.10	2.20	132
14	6.00	2.20	132	5.45	2.20	132	7.15	2.28	153	5.15	2.25	145
15	7.00	2.18	128	5.15	2.15	121	6.45	2.18	128	5.00	2.20	132
16	7.50	2.20	132	6.30	2.20	132	6.50	2.32	164	5.15	2.20	132
17	6.45	2.18	128	6.45	2.18	128	7.10	2.22	137	5.30	2.20	132
18	8.30	2.15	121	4.45	2.12	114	8.00	2.20	132	5.00	2.35	174
19	6.35	2.10	110	6.30	1.98	89	8.20	2.40	190	5.10	2.40	190
20	6.30	2.00	92	5.40	2.00	92	7.20	2.50	228	4.45	2.52	237
21	6.00	2.05	101	5.00	2.02	96	7.50	2.60	272	5.00	2.60	272
22	6.35	2.02	96	6.00	1.92	80	6.20	2.60	272	5.40	2.60	272
23	7.15	2.00	92	6.00	2.00	92	7.00	2.60	272	5.15	2.62	282
24	7.35	1.95	84	6.10	1.92	80	.....	.....	.....	5.10	2.65	297
25	11.00	2.20	132	4.30	2.22	137	6.30	2.62	282	5.15	2.60	272
26	6.30	2.20	132	5.30	2.25	145	6.40	2.60	272	5.45	2.52	237
27	7.45	2.28	153	5.15	2.30	158	6.35	2.52	237	5.15	2.50	228
28	8.00	2.30	158	6.30	2.32	164	6.10	2.48	220	5.40	2.45	209
29	8.00	2.35	174	6.00	2.38	184	7.20	2.40	190	.....	.....	.....
30	6.30	2.38	184	6.50	2.32	164	6.00	2.48	220	6.35	2.40	190
31	7.00	2.32	164	6.00	2.32	164	.....	.....	.....	.....	.....	.....

Daily gage height, in feet, and discharge, in second-feet, of Clyde River at West Derby, Vt., for 1912—Continued.

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	6.50	2.40	190	4.10	2.42	198	6.30	2.42	198	4.15	2.45	209
2	7.00	2.42	198	4.40	2.42	198	6.20	2.40	190	4.20	2.38	184
3	7.30	2.45	209	5.15	2.42	198	8.00	2.38	184	4.45	2.35	174
4	7.30	2.45	209	5.25	2.45	209	6.30	2.38	184	4.30	2.32	164
5	7.00	2.42	198	5.45	2.40	190	8.25	2.35	174	4.45	2.32	164
6	8.00	2.40	190	5.15	2.40	190	7.20	2.32	164	4.35	2.32	164
7	8.00	2.38	184	5.00	2.35	174	7.10	2.35	174	4.15	2.38	184
8	7.30	2.35	174	5.15	2.35	174	7.00	2.55	250	4.15	2.60	272
9	7.00	2.30	158	5.25	2.30	158	6.45	2.60	272	4.10	2.62	282
10	6.45	2.38	184	5.25	2.35	174	.....	.....	.....	4.25	2.70	322
11	6.45	2.35	174	4.30	2.30	158	6.30	2.72	333	4.45	2.75	350
12	7.25	2.25	145	5.30	2.28	153	7.50	2.75	350	4.15	2.75	350
13	7.20	2.30	158	5.15	2.30	158	8.15	2.70	322	4.10	2.72	333
14	7.20	2.25	145	4.30	2.28	153	7.45	2.80	378	4.20	2.78	367
15	7.10	2.32	164	5.00	2.32	164	7.30	2.80	378	4.30	2.78	367
16	6.50	2.35	174	5.00	2.32	164	8.05	2.72	333	4.45	2.75	350
17	6.35	2.32	164	6.50	2.30	158	7.25	2.72	333	4.15	2.70	322
18	7.30	2.32	164	5.00	2.32	164	7.25	2.70	322	4.10	2.68	312
19	6.40	2.30	158	4.20	2.32	164	7.10	2.68	312	4.15	2.65	297
20	10.00	2.28	153	5.35	2.25	145	7.20	2.62	282	4.30	2.60	272
21	6.30	2.25	145	5.00	2.22	137	7.55	2.58	263	4.15	2.55	250
22	6.55	2.22	137	5.15	2.20	132	7.15	2.55	250	4.30	2.50	228
23	.....	.....	.....	4.45	2.22	137	7.15	2.52	237	4.20	2.50	228
24	8.00	2.35	174	4.25	2.32	164	8.00	2.55	250	4.15	2.52	237
25	7.30	2.38	184	4.45	2.40	190	7.45	2.52	237	4.10	2.52	237
26	7.00	2.38	184	4.20	2.45	209	7.15	2.52	237	4.15	2.55	250
27	7.00	2.40	190	5.30	2.52	237	7.35	2.50	228	4.15	2.50	228
28	7.30	2.48	220	4.45	2.45	209	7.30	2.45	209	4.30	2.48	220
29	7.20	2.55	250	4.30	2.52	237	7.35	2.45	209	4.10	2.42	198
30	7.20	2.52	237	4.40	2.52	237	8.00	2.40	190	4.15	2.38	184
31	7.00	2.50	228	4.30	2.50	228	.....	.....	.....	.....	.....	.....

Day.	December.						Day.	December.					
	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	7.45	2.38	184	4.25	2.38	184	16	7.55	2.32	164	4.15	2.30	158
2	7.10	2.35	174	.....	.....	.....	17	8.00	2.35	174	4.00	2.30	158
3	7.20	2.42	198	.....	.....	.....	18	7.30	2.30	158	3.30	2.30	158
4	7.50	2.45	209	4.20	2.48	220	19	7.50	2.35	174	4.00	2.60	272
5	7.50	2.50	228	4.15	2.50	228	20	8.00	2.50	228	4.40	2.50	228
6	7.45	2.52	237	4.10	2.55	250	21	8.00	2.60	272	4.25	2.65	297
7	7.50	2.55	250	4.20	2.55	250	22	.....	.....	.....	4.05	2.92	457
8	7.55	2.52	237	4.00	2.55	250	23	7.30	2.80	378	4.30	2.50	228
9	7.50	2.52	237	4.15	2.50	228	24	7.50	2.62	282	4.15	2.60	272
10	8.10	2.52	237	4.10	2.48	220	25	8.00	2.60	272	4.25	2.50	228
11	7.50	2.48	220	4.10	2.45	209	26	7.30	2.48	220	4.15	2.48	220
12	7.45	2.45	209	.....	.....	.....	27	7.30	2.42	198	3.50	2.45	209
13	7.55	2.60	272	4.30	2.62	282	28	7.15	2.42	198	4.15	2.40	190
14	7.25	2.68	312	4.00	2.38	184	29	8.00	2.38	184	4.15	2.38	184
15	7.45	2.35	174	4.35	2.35	174	30	7.00	2.40	190	4.00	2.40	190
							31	7.30	2.40	190	4.15	2.38	184

NOTE.—Possibly slight backwater from ice during the first week in April. Daily discharge determined from a well-defined rating curve.

MISCELLANEOUS MEASUREMENTS.

The following miscellaneous measurements were made on streams in the St. Lawrence River basin in 1912:

Miscellaneous measurements in St. Lawrence River drainage basin in 1912.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Aug. 20	Pigeon River	Lake Superior	Near mouth		78.9
20	Brule River	do	do	0.25	32.5
21	Devil Track River	do	do		16.2
21	do	do	do		11.7
22	Cascade River	do	do		29.8
22	Temperance River	do	do		27.6
23	Cross River	do	do		12.7
23	Manitou River	do	do		34.0
23	Baptism River	do	do		28.7
Sept. 20	Au Sable River	Lake Huron	Redheads, Mich	1.12	1,030
17	do	do	Oscoda, Mich	1.46	1,220
Apr. 6[a]	Canaseraga Creek	Genesee River	Shakers Crossing, N. Y	[b] 16.33	1,970
July 16	do	do	do	[b] 3.63	236
16	Mount Morris power canal	do	Mount Morris, N.Y	[c] 2.52	215
29	Black River	Lake Ontario	Port Leyden, N. Y	15.16	233
Oct. 17	Beaver River	Black River	Beaver River, N. Y	[d] 4.70	[e] 184
18	do	do	do	[d] 4.70	[f] 139
18	do	do	do	[d] 4.70	[g] 263
Dec. 18	South Branch of Oswegatchie River.	Oswegatchie River	Hyatt, N. Y	[h] 9.78	578
Feb. 20[i]	Winooski River	Lake Champlain	Above Stevens Branch, near Montpelier, Vt.	2.67	150
June 15	do	do	do	3.27	226
Sept. 5	do	do	do	2.75	130
Oct. 12	do	do	do	2.30	47

[a] Measurement affected by backwater from Genesee River.
[b] Gage datum is 25 feet below reference point on downstream horizontal tiebar 20 feet from left end of bridge.
[c] Gage at highway bridge below mills.
[d] Distance from block on gatehouse to water surface.
[e] Gate No. 1 open.
[f] Gate No. 4 open 2 feet.
[g] Gates Nos. 1 and 4 open 2 feet each.
[h] Distance to water surface from top of downstream left corner of right abutment.
[i] Measurement made under complete ice cover.

SUMMARY OF MEAN DISCHARGE PER SQUARE MILE.

The following summary of discharge per square mile is given to allow ready comparison of relative rates of run-off from different areas in the St. Lawrence River drainage basin. It shows in a general way the seasonal distribution of run-off, and the effect of snow, ground, surface, and artificial storage. The most important fact worth noting is the almost entire lack of uniformity or agreement between any two streams, which indicates that the discharge of each stream is a law unto itself, and that all projects dependent upon stream flow, if they are to be developed along the safest and most economical lines, must be based on records of stream flow collected with great care over a long series of years as near the location of the project under consideration as possible.

Summary of discharge, in second-feet per square mile, for river stations in the St. Lawrence River drainage basin in 1912.

Station.	Drainage area.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
Beaver Bay River at Beaver Bay, Minn.	*Sq. m.* 120	0.17	0.08	0.06	4.39	3.82	1.24	0.14	0.22	0.56	0.32	0.18	0.08	0.93
St. Louis River near Thomson, Minn.	3,420	.14	.10	.13	.75	2.41	1.21	.41	.20	.36	.37	.19	.12	.54
Whiteface River at Meadowlands, Minn.	442	....	....	....	.....	1.96	1.34	.19	.12	.21	.18	....	....	....
Whiteface River below Meadowlands, Minn.	446	....	....	....	.....	1.94	1.30	.18	.10	.20	.17	....	....	....
Cloquet River at Independence, Minn.	698	.22	.20	.27	.46	1.89	1.35	1.18	.31	.32	.70	.20	.19	.61
Escanaba River at Escanaba, Mich.	800	1.12	1.06	1.04	4.81	3.06	1.32	.52	1.12	1.29	1.23	.91	.81	1.52
Menominee River near Iron Mountain, Mich.	2,420	1.07	1.00	.98	2.23	2.66	1.25	.64	1.42	1.09	.88	.64	.77	1.22
Wolf River at Keshena, Wis.	797	.78	.48	.56	1.68	1.73	1.13	1.28	1.61	1.99	1.19	1.06	1.22	1.23
West Branch of Wolf River at Neopit, Wis.	108	1.11	1.23	1.03	1.67	1.65	1.25	1.74	....	....	....	1.23	1.35	....
Manistee River near Sherman, Mich.	900	1.28	1.17	1.16	1.78	1.73	1.41	1.18	1.20	1.44	1.27	1.46	1.42	1.38
Tittabawasee River at Freeland, Mich.	2,550	.60	.52	1.18	4.20	3.62	1.13	.82	.58	.72	.91	1.69	1.27	1.44
Huron River at Geddes, Mich.	757	.33	.30	1.10	2.21	.81	.33	.15	.36	.46	.57	1.01	.62	.69
Cattaraugus Creek at Versailles, N. Y.	467	1.01	.62	4.39	5.55	1.48	.42	.41	.60	1.00	1.09	1.12	2.18	1.66
Little Tonawanda Creek at Linden, N. Y.	22	....	....	....	.....	....	....	....	.14	.07	.09	.24	.63	....
Genesee River at St. Helena, N. Y.	1,030	.65	.40	3.40	4.71	1.23	.24	.15	.17	.47	.60	.74	.95	1.15
Genesee River at Jones Bridge, N. Y.	1,410	.55	.41	3.19	4.33	1.19	.27	.18	.21	.50	.58	.70	.95	1.09
Genesee River at Rochester, N. Y.	2,360	.56	.41	2.88	4.24	1.21	.33	.17	.14	.28	.32	.41	.68	.97
Canaseraga Creek near Dansville, N. Y.	167	....	....	3.17	2.84	1.60	.56	1.09	.30	.50	.30	.44	.71	....
Keshequa Creek at Sonyea, N. Y.	67	....	....	3.06	3.34	.61	.11	.11	.07	.13	.16	.25	.56	....
Canadice Lake outlet near Hemlock, N. Y.	12.6	.78	.67	1.30	3.88	1.19	.75	.60	.42	.41	.45	.52	.57	.96
Oneida River at Caughdenoy, N. Y.	1,377	1.86	.98	1.56	5.60	3.36	1.87	.61	.42	.80	1.31	1.54	2.26	1.85
Salmon River at Stillwater Bridge near Redfield, N. Y.	191	1.31	1.05	1.69	15.4	5.92	1.53	.53	.65	1.74	3.03	3.08	4.47	3.36
Salmon River near Pulaski, N. Y.	260	1.31	1.04	1.69	16.0	5.81	1.73	.53	.59	1.71	3.01	3.32	4.04	3.38
Orwell Brook near Altmar, N. Y.	22.1	....	....	....	10.5	3.21	1.37	.54	.81	1.32	2.06	2.59	3.30	....
Black River near Boonville, N. Y.	303	1.55	1.14	3.11	9.90	4.75	1.27	.20	.17	.88	1.12	2.24	2.66	2.41
Black River near Felts Mills, N. Y.	1,851	1.22	1.17	1.75	8.45	3.83	1.99	.62	.58	.94	1.38	1.69	1.76	2.11
Moose River at Moose River, N. Y.	370	1.30	.72	1.45	7.30	5.24	1.54	.58	.65	1.05	2.00	2.76	2.14	2.23
Middle branch of Moose River at Old Forge, N. Y.	51.5	1.85	2.29	1.72	4.49	4.08	1.17	1.24	1.29	1.90	2.15	2.90	2.78	2.31
Oswegatchie River near Ogdensburg, N. Y.	1,580	1.19	.53	1.32	6.33	2.58	3.19	.43	.39	.84	1.27	3.11	3.53	2.05
East Branch of Oswegatchie River at Newton Falls, N. Y.	194	....	....	....	....	....	....	....	....	....	....	2.01	2.37	....
Raquette River at Raquette Falls, N. Y.	418	1.80	.74	.61	6.05	5.38	2.46	.39	.44	.84	1.27	....	....	....
Raquette River at Piercefield, N. Y.	723	1.67	.77	.58	3.15	4.61	2.41	.46	.44	.59	1.18	2.61	1.91	1.69
Raquette River at Massena Springs, N. Y.	1,170	1.28	.65	.83	5.32	4.22	2.62	.41	.44	.75	1.03	2.36	3.37	1.94
Bog River near Tupper Lake, N. Y.	132	....	....	....	5.75	3.75	2.20	....	....	....	....	....	....	....
St. Regis River at Brasher Center, N. Y.	621	1.26	.60	.74	8.00	3.24	2.09	.50	.82	1.82	1.41	2.30	3.53	2.19
Deer River at Ironton, N. Y.	206	....	....	....	....	....	....	....	.46	1.40	1.01	2.31	3.33	....
Ausable River at Ausable Forks, N. Y.	487	.82	.36	.84	5.11	3.47	1.00	.46	.56	1.33	1.60	1.92	1.39	1.57
Dog River at Northfield, Vt.	57	....	....	....	6.05	2.65	1.50	.22	.20	.44	1.21	1.81	1.33	....

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