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SURFACE WATER SUPPLY OF THE PHILIPPINE ISLANDS, 1908–1922

SCOPE AND IMPORTANCE OF WORK

This bulletin contains the results of measurements of the flow of certain streams and irrigation ditches in the Philippine Islands during the years 1908 to 1922, inclusive. The investigations leading to the report were made by the Irrigation Division of the Bureau of Public Works as a part of a general plan for ascertaining the water resources of the Philippine Islands and the extent to which lands could be made more productive by irrigation.

The Irrigation Division was created by Act 1854 of the Philippine Legislature which also authorized "the appropriation of seven hundred and fifty thousand pesos annually for the promotion, establishment, and maintenance of irrigation systems in the Philippine Islands." The hydrographic work was supported by appropriations by this Act until December 31, 1914, when the lack of funds necessitated the discontinuance of the work and the suspension of most of the activities of the Division.

The Irrigation Division was reorganized in June, 1918, and the hydrographic investigations have been extended since this time to include most of the important streams for irrigation and water power development on the Island of Luzon and in the Visayan Islands. A number of gaging stations are also being maintained on streams on the Island of Mindanao.

The investigations heretofore conducted by the Irrigation Division are not complete nor do they include all the representative streams that might have been advantageously studied. They include, however, as many of the important streams as the available appropriations and personnel would allow. Accurate data of the discharge of streams are of vital importance in the study of irrigation, domestic water supply, and water power projects, and in the adjudication of water rights. The maximum or highest flow must be known to make safe designs of dams, roads, bridges, and many other structures to be built in the Islands. The minimum or lowest flow is essential to decide whether or not water has to be stored, or to determine

the feasibility of domestic water supply and hydro-electric projects. It is therefore necessary that records of stream flow be kept over a period of years long enough to determine within reasonable limits the range of flow from the maximum to the minimum. Experience in other countries has shown that this period varies for different streams and that record should be kept from 10 to 30 years.

In the performance of this work an effort was made to secure accurate results consistent with a reasonable expenditure of time and money. It is to be regretted, however, that the lack of a sufficient number of trained hydrographers and the difficulty of securing reliable gagekeepers in many localities have contributed to some inaccuracies in the work.

FIELD METHODS OF MEASURING STREAM FLOW

BASE DATA

In making plans for power, irrigation, municipal water supply, and other projects involving the use of water from surface streams it is necessary to have data from which both the total flow of the stream and its distribution from day to day throughout the year can be obtained. The data necessary for obtaining such information are daily gage heights, which give the fluctuations of rise and fall of the stream, and measurements of discharge at various stages, from which a rating curve and table can be prepared giving the discharge for any stage. Such a rating is possible from the fact that so long as the conditions at the controlling section in the stream remain the same the discharge will be approximately the same for any given gage height.

Points at which discharge measurements are made and records of daily fluctuations of stage are kept for determining the daily flow, are termed gaging stations.

Gaging stations may be classified as weir stations and velocity-area stations. At weir stations the head of water on the crest of the weir is measured and the discharge computed by means of a formula. The discharge at velocity-area stations is obtained by measuring the velocity of the current and the area of cross section, the product of the two giving the discharge.

The data presented in this paper were collected at both weir and velocity-area stations.

WEIR MEASUREMENTS

A weir properly constructed and of a type for which accurate coefficients have been determined is one of the most convenient

and reliable means of measuring small quantities of water. In practice, however, weirs rarely conform to the requirements imposed by the experimenter who derived the coefficients. If the crest of the weir is sharp and clean and sufficiently high above the bottom of the leading channel, if the end contractions are complete and the velocity of approach is wanting or negligibly small, and if the head on the crest is measured at a distance back of the overfall at least as great as the length of the weir crest, the Francis formula will give good results. On the other hand, if these essential conditions are not complied with or if the weir is improperly constructed and there is leakage around or under it, and especially if the velocity of approach is considerable and the contractions are imperfect, the Francis formula will not give accurate results.

The type of weir most commonly used in the Philippines is the rectangular sharp-crested with end contractions which offers the most convenient and reliable means of measuring small quantities of water. It is constructed of planks and timbers in small streams, and leakage is prevented by means of sheathing. The crest is made up of planks with the edge chamfered on the downstream side about $\frac{1}{4}$ inch.

VELOCITY-AREA METHOD

The velocity-area method of measurement consists in determining the mean or average velocity of the water passing a given cross-section area. The area of the cross-section at right angles to the direction of flow is ascertained by soundings which are taken at such distances apart as will show the contour of the stream bed. The depths are recorded and also their distances from some arbitrarily chosen initial point on one side of the stream.

The method of making the soundings depends on the size and stage of the stream. On ditches and small streams, where the depths and velocities are not large, a graduated rod may be used; on large streams, which must be measured from bridges or cables, a lead weight and sounding line must be used. The size of weights—whether 10 or 15 pounds—depends on the swiftness of the current; and the weights are torpedo shaped, so as to offer as little resistance as possible to the moving water.

On streams the beds of which are permanent or nearly so a standard cross-section is usually constructed from careful soundings and referred to the zero of the gage, so that the depths for any stage can be found by adding the gage height at that stage to the depths below the zero of the gage. This

method is especially useful at high stages, when it is difficult to make accurate soundings.

After the cross-section area of the stream has been measured by soundings and horizontal distances, the velocity is determined at a number of points. These measurements of velocity should be made at frequent intervals across the stream and close enough to take account of any abrupt change in the velocity. For convenience, the velocities are usually observed in the same verticals at which soundings are made. On some streams fairly good measurements of velocities may be made by means of surface floats. This method is applicable, however, only to channels of uniform cross-section area over a considerable distance, and is not so extensively used on natural streams like those of the Philippines.

The velocity of flow is best determined by the current meter, which is a form of water wheel actuated by the current and of such size and shape that it can easily be placed at any point in the stream.

The penta-recording current meter consists of six cups attached to a vertical shaft which revolves on a conical hardened-steel point when immersed in moving water. The revolutions are indicated electrically or acoustically. The rating, or relation between the velocity of moving water and the revolutions of the wheel, is determined for each meter by drawing it through still water for a given distance at different speeds and noting the number of revolutions for each run. From these data a rating table is prepared which gives the velocity in meters per second of moving water for any number of revolutions in a given time.

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

The two principal multiple-point methods in general use are the vertical velocity curve and 0.2 and 0.8 depth.

In the vertical velocity-curve method a series of velocity determinations are made in each vertical at regular intervals, usually about 10 to 20 per cent of the depth apart. By plotting these velocities as abscissas and their depths as ordinates, and drawing a smooth curve among the resulting points, the vertical velocity curve developed. The curve shows graphically the magnitude and changes in velocity from the surface to the bottom of the stream. The mean velocity in the vertical is then obtained by dividing the area bounded by this velocity curve and its axis by the depth. This method of obtaining the mean

velocity in the vertical is probably the best known, but on account of the length of time required to make a complete measurement its use is largely limited to the determination of coefficients for purposes of comparison.

In the second multiple-point method the meter is held successively at 0.2 and 0.8 depth, and the mean of the velocities at these two points is taken as the mean velocity for that vertical. On the assumption that the vertical velocity curve is a common parabola with horizontal axis, the mean of velocities at 0.22 and 0.79 depth will give closely the mean velocity in the vertical. Actual observations under a wide range of conditions show that this multiple-point method gives very closely the mean velocity of water flowing in open channels and that in a completed measurement it seldom varies as much as 1 per cent from the result obtained by the vertical velocity curve method. It is very extensively used by the United States Geological Survey.

In the single-point method the meter is held either at the depth of the thread of mean velocity or at an arbitrary depth for which the coefficient for reducing to mean velocity has been determined or must be assumed.

Extensive experiments by means of vertical velocity curves show that the thread of mean velocity generally occurs between 0.5 and 0.7 total depth. In general practice the thread of mean velocity is considered to be at 0.6 depth, and at this point the meter is held in most of the measurements made by the single-point method. A large number of vertical velocity curve measurements, taken on many streams and under varying conditions, show that the average coefficient for reducing the velocity obtained at 0.6 depth to mean velocity is practically unity. The variation of the coefficient from unity in individual measurements is, however, greater than in the 0.2 and 0.8 method and the general results are not so satisfactory.

In the other principal single-point method the meter is held near the surface, usually about 0.30 meter below, or low enough to be out of the effect of the wind or other disturbing influences. This is known as the surface method. The coefficient for reducing the velocity taken at the surface to the mean has been found to be in general from about 0.85 to 0.95, depending on the stage, velocity, and channel conditions. The higher the stage the larger the coefficient. This method is especially adapted for flood measurements, or for measurements when the velocity is so great that the meter can not be kept in the correct position for the other methods.

The vertical integration method consists in moving the meter at a slow but uniform speed from the surface to the bottom and back again to the surface and noting the number of revolutions and the time taken in the operation. This method has the advantage that the velocity at each point of the vertical is measured twice. It is useful as check on the point methods. In using the Price meter great care should be taken that the vertical movement of the meter is not rapid enough to vitiate the accuracy of the resulting velocity determination.

In practical work on rough streams, such as many of those in the Philippines, the meter should be held at 0.6 depth if the depth is 0.3 meter or less. If the depth is greater the meter should be held at two points in the vertical, 0.2 and 0.8 from the surface.

When the mean velocities in the different verticals have been found, the average of two adjacent means is taken as the mean velocity for that individual section. The area of the section is computed by multiplying the width of the sections by the mean depth. The discharge of each section is then the product of the area multiplied by the mean velocity, and the total discharge of the stream results from summing up the discharge of the individual sections. In practice the work is tabulated in such a way as to render the computation very simple.

Current meter measurements are not practicable where there are eddies, cross currents, swirls, or passages for the water underneath stones. It is usually possible, however, to improve the channel by removing boulders and rocks, so that a satisfactory measuring section may be obtained, even on rough, steep streams such as exist in the Philippines.

Four kinds of velocity-area gaging stations are in general use in the Philippines, according to the means provided for making the observations of depth and velocity. They are wading, boat, bridge, and cable stations.

A wading station is one at which measurements are made only by wading—that is, no means exist for getting above the water at any stage except by wading. Such stations are usually on ditches or wide, shallow streams, which do not fluctuate greatly. On many streams, however, measurements are made at low stages by wading, even though other means exist for making measurements at higher stages.

A boat station is one at which the measurements are made on a boat (*banca*) or on a sufficiently strong bamboo raft. This kind of station is used on streams where the method by wading

is impracticable or in the absence of already existing highway or railroad bridge and the cost of a cable station would not warrant its establishment.

A bridge station is one at which the meter is used from a bridge. In some places highway or other bridges are available from which to make measurements, but generally they are not at the right place on the stream. Temporary bamboo bridges are then built.

A cable station is one at which measurements are made from a cable spanning the stream. Cable stations are used on large streams, such as Angat in Bulacan, Jalaur in Iloilo, Santa Cruz in Laguna, Pampanga in Nueva Ecija, Agno in Pangasinan, and Tarlac in Tarlac. The cable supports the car from which a man works above the water. Distances are marked off on the cable itself.

A suitable place for a gaging station having been selected, a staff gage is set in the edge of the stream, either vertical or inclined, but graduated into tenths, half-tenths, or hundredths of a meter vertically. The gage is securely fastened to rocks or trees to prevent displacement by floods and is so placed that the zero, or reference datum, is well below extreme low water. The datum is also referred to a permanent bench mark as an additional precaution. An observer is engaged to record the heights of water morning and evening, and the mean of the two readings is used as the mean gage height for the day. Owing to the rapid rise and fall of most of the streams in the Philippines, two gage height readings a day will not as a rule give a true mean for the 24 hours. For this reason, and also owing to the fact that many of the gaging stations are necessarily situated in the mountains at points remote from all habitations and difficult of access, it will be found necessary to use water-stage recorders.

DEFINITION OF TERMS

The volume of water flowing in a stream past a given section is usually expressed in various units among which the second-liter is the most commonly used in the Philippines. This term is an abbreviation for liter per second, which is defined as that volume of water flowing in a stream, 1 decimeter wide, 1 decimeter deep, at the rate of 1 decimeter per second. The term second-liter is generally used in connection with irrigation.

The unit of capacity is the hectare-meter, and is equivalent to 10,000 cubic meters. It is a quantity that would cover a

hectare to a depth of 1 meter. The term "hectare-meter" as an absolute quantity, is used in the measurement of storage capacities of reservoirs.

Other units are (1) those which represent a rate of flow, as "second-feet," "gallons per minute," and (2) those which represent the actual quantity of water, as "run-off in inches."

"Second-foot" is an abbreviation for cubic feet per second and is the unit for the rate of discharge of water flowing in a stream 1 square foot in cross-section at the rate of 1 foot per second.

"Gallons per minute" is generally used in connection with pumping and municipal water supply, the United States gallon of 231 cubic inches being the unit of quantity and 1 minute the unit of time.

"Run-off in millimeters" 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 millimeters.

CONVENIENT EQUIVALENTS

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

1 millimeters equals 0.0394 inch.
1 centimeter equals 0.394 inch.
1 meter equals 1.094 yards; equals 3.281 feet; equals 39.37 inches.
1 kilometer equals 0.621 mile; equals 1094 yards; equals 3281 feet.
1 square millimeter equals 0.00155 square inch.
1 square centimeter equals 0.155 square inch.
1 square meter equals 1.196 square yards; equals 10.764 square feet; equals 1,550 square inches.
1 square kilometer equals 247.1 acres.
1 hectare equals 2.471 acres; equals 11959.6 square yards; equals 107,636.8 square feet.
1 liter equals 0.2642 gallon; equals 1 cubic decimeter.
1 liter equals 0.0353 cubic foot; equals 61.022 cubic inches.
1 liter of water weights 2.2 pounds.
1 hectoliter equals 26.42 gallons.
1 hectoliter equals 0.131 cubic yard; equals 3.531 cubic feet.
1 cubic centimeter equals 0.06102 cubic inch.
1 cubic meter equals 264.2 gallons; equals 1,000 liters.
1 cubic meter equals 1.308 cubic yards; equals 35.315 cubic feet.
1 second liter equals 0.0353 second foot.
1 second liter equals 0.2642 gallon per second; equals 15.852 gallons per minute; equals 951.12 gallons per hour; equals 22,826.9 gallons per day.
1 second liter for one year (365 days) equals 31,536,000 liters.
1 cubic meter per second equals 35.315 second feet.

1 cubic meter per minute equals 35.321 cubic feet per minute; equals 0.5886 second foot.

1 cubic meter of water weighs 2,200 pounds.

1 meter per second equals 3.28 feet per second.

1 meter per second equals 2.2304 miles per hour; equals 3.60 kilometers per hour.

1 atmosphere equals 15 pounds per square inch.

1 watt equals 0.7373 foot-pounds per second.

1 watt equals 0.00134 horsepower.

1 kilo-watt equals 1-⅓ horsepower.

To calculate water power quickly:— $\frac{\text{Sec-lit} \times \text{fall in meters}}{100}$ equals net horsepower on water wheel, realizing 76 per cent of the theoretical power.

OFFICE METHODS OF COMPUTING DISCHARGE

At the end of each year the field or base data for current meter gaging stations consisting of daily gage heights, the results of occasional discharge measurements, notes from observers' books and descriptions of conditions of gaging stations, are assembled. The discharge measurements made at different stages of water level from the low to the high water stage are plotted on cross-section paper, with gage heights as ordinates and discharges as abscissas. Through or among the plotted points, a smooth curve is drawn and this defines the discharge rating curve which is generally more or less parabolic in form.

In preparing the rating curves, a careful study of the class of channels which they represent is made and it is here that notes in regard to the various conditions at the time measurements were made, are of great value. In choosing the scale for plotting the curve, the maximum and minimum gage heights and discharges are considered. The size of the curve is such that the discharge can be read from it with a required degree of accuracy. The inclination of the rating curve is approximately 45° with each axis, for when the curve becomes nearly horizontal accurate determination of the discharges from it is more difficult.

As a check on discharge measurements mean velocities and cross-section areas are plotted as abscissas and the gage-readings as ordinates and smooth curves drawn through the plotted points which become the area and velocity curves. These curves are especially valuable in extending discharge rating curves to gage heights for which no data by actual gaging are available. The discharges obtained from the extension of curves are estimated discharges. The fact that the velocity

curve usually approaches a straight line, when plotted on logarithmic cross-section paper, while the area curve may be determined for any gage reading from the standard cross-section of streams means that values derived from these curves may be used in extending discharge rating curves.

From the discharge rating curve, a table is prepared giving values for gage readings from the lowest to the highest known water level with their corresponding discharges. The table is smoothed out by adjusting the first and, sometimes, the second differences, if necessary. The differences between the discharges for successive tenths, half-tenths, or hundredths of gage height are in general either constant or gradually increasing, but never decreasing, and as far as possible should follow some general law.

For every rating table the following assumptions are made for the period of applicability: (*a*) that the discharge of the stream is the same for the same level of the water, that is, for the same gage reading: (*b*) that the discharge is a function of and increases gradually with the stage; (*c*) that the increased and decreased discharge due to change of slope on rising and falling stages is either negligible or compensating.

In the Philippines, the torrential nature of most streams with shifting banks and beds cause frequent changes in the cross-section. As a rule, a new cross-section is taken after each flood and a separate rating curve drawn for each period between floods.

The gage height readings are copied directly from the gage height cards as they are received from the hydrographers to standard forms of daily and monthly discharge table. These gage height readings are the arithmetical means of two readings made daily. The daily discharge corresponding to the daily gage height is taken from the rating table. It is assumed that this discharge is the mean discharge in second-liters for that day.

The mean for each month is the mean of the average daily discharge in second-liters. The maximum and minimum are the respective discharges for those days in the month during which the mean discharge is the greatest or the smallest.

The method of computing float measurements varies with the kind of floats used. For surface floats the following method has been found to give sufficiently accurate results. The cross-section area is taken from the mean of areas computed from one if the formulas described for current meter computations. The arithmetical mean of the time in seconds is taken as the

mean time. The velocity is then the length of the run divided by the mean time. The mean velocity is taken about 0.85 of the surface velocity. The mean velocity multiplied by the mean area gives the discharge.

Sub-surface and rod floats are very seldom used. These floats are intended to measure mean velocities directly. The velocity, however, obtained by means of rod floats is found to be greater than the mean and coefficients less than the unity are used to reduce the same to the mean.

EXPLANATION OF TABLES

For each current meter gaging station, the following data are given: Description of station, list of discharge measurements, and tables of daily and monthly discharge.

The description of stations gives information with regards to location referred to the nearest post office, railway station, building and tributary stream; installation of gages, whether vertical, horizontal, or inclined staff; how discharge measurements are made; the character of stream bed and banks, affecting the constancy of the relation of gage heights to discharges; maximum and minimum discharge recorded during period of observation; number of diversions above and below the measuring section affecting the total flow; how diversions are made; purpose of investigation or how water is or is to be utilized and the accuracy of data obtained.

The table of discharge measurements gives the results of actual gagings made during the period of observation, also the date, name of hydrographer, gage height, and discharge in liters per second.

The tables of daily and monthly discharges give the discharges per day corresponding to the observed gage heights as determined from the rating curve, and the maximum, minimum, and mean flow for the month corresponding to the observed highest, lowest, and mean gage heights, respectively.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of stream-flow data depends (1) on permanence of the relation between discharge and stage and (2) on the accuracy of observations of stage, measurements of discharge and interpretation of data.

The accuracy recorded in the station description is based on the accuracy of the rating curve, the reliability of the gage-height record, the range of the fluctuation in stage and knowledge of local conditions. The use of "good," "fair," "poor"

indicates that discharge points plotted are on the curve, close to the curve and widely scattered about the curve, respectively.

DIVISION OF WORK

The data pertaining to the years 1908 to 1913 were collected under the supervision of George K. Larrison, Assistant Irrigation Engineer, who was succeeded in the later part of the period by Claude O. Brown and John I. Quinn, office engineers. Field work was accomplished by S. G. Cutler, J. A. Steere, J. G. Beckjord, F. T. James, R. D. Klise, F. T. Ryan, C. E. Parish, W. Demers, J. B. Holt, R. W. Hazen, W. G. Frisbie, H. V. Hall, T. S. Lawrence, H. H. Outlaw, and E. L. Lundgren.

The data from the year 1918 to the first quarter of 1919 were collected under the supervision of Nicanor Cortes, acting chief hydrographer, and those for the remaining period, under Jacinto Gochoco, chief hydrographer, who with the assistance of Luis Novenario, hydroghapher, M. Trani, assistant hydrographer, A. de la Cruz, junior draftsman, E. Perez and P. Astilla, hydrographic computers prepared all the data for publication. Field work was accomplished by W. Demers, supervising hydrographer, F. T. Ryan and A. Baldonado, district hydrographers, F. Aquino and J. Roxas, assistant hydrographers, R. Pertierra and J. Alario, junior civil engineers, O. Buenaventura, assistant topographical draftsman, A. Fegarido, M. Yambao, P. del Castillo, N. Robles, and T. Mendoza, junior hydrographers, and V. Villanueva, B. Ramos, D. Belen, M. Canas, S. Pasion, C. Daquil, C. Flores, P. Feliciano, D. Abenes, B. Callang, hydrographic assistants.

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GAGING STATIONS MAINTAINED IN THE PHILIPPINES

The following list comprises the gaging stations that have been maintained in the Philippines by the Irrigation Division, Bureau of Public Works, Manila. The stations are arranged in the correlative alphabetical order of provinces and streams. The dates show the years or parts of years for which records are available. A dash following the date indicates that the station was being maintained to December 31, 1922.

ABRA PROVINCE, LUZON ISLAND

Abra River near San Quintin.—May 6, 1910, to March 31, 1912; January 31, 1919–

AGUSAN PROVINCE, MINDANAO ISLAND

Adgawan River near Sagunto.—February 15, 1921, to March 31, 1922.

Agusan River near Talacogon.—February 24, 1921, to March 31, 1922.

Agusan River near Santa Josefa.—February 1, 1921, to March 31, 1922.

Gibung River near Ebro.—Febraury 19, 1921, to January 20, 1922.

Simulao River near Libertad.—February 6, 1921, to March 31, 1922.

Ujot River near Remedios.—April 22, 1921, to March 31, 1922.

Umayan River near Loreto.—February 11, 1921, to March 31, 1922.

ALBAY PROVINCE, LUZON ISLAND

Calacran River near Oas.—January 5, 1921, to September 9, 1922.

Nacici River near Ligao.—January 4, 1921, to November 30, 1921.

Paulog River near Ligao.—November 27, 1910, to April 20, 1912; February 10, 1919, to July 15, 1922.

Polangui River near Polangui.—February 10, 1911, to April 20, 1912.

Quinali River near Guinobatan.—March 24, 1910, to April 20, 1912; February 15, 1919–

Quinali River near Malinao.—April 2, 1911, to April 20, 1912; April 1, 1919–

Quinali River near Polangui.—August 9, 1910, to April 20, 1912; February 12, 1919–

San Francisco River near Malinao.—March 29, 1910, to April 20, 1912; February 22, 1919–

Tobgon River near Ligao.—January 22, 1921, to March 31, 1922.

ANTIQUE PROVINCE, PANAY ISLAND

Sibalom River near Sibalom.—June 1, 1910, to November 8, 1913; August 22, 1918, to July 15, 1922.

Tipuluan River near Sibalom.—July 17, 1919–

BATAAN PROVINCE, LUZON ISLAND

Cabayo Canal near Limay.—May 15, 1922–

Calaguiman River near Samal.—December 3, 1917, to May 31, 1919.

Lamao River near Limay.—October 5, 1919–

Orani River near Orani.—December 12, 1917, to May 31, 1919; August 10, 1920–

Talisay River near Balanga.—April 26, 1909, to March 23, 1912; February 10, 1921–

Talisay River near Pilar.—June 10, 1917, to July 28, 1919.

BATANGAS PROVINCE, LUZON ISLAND

Pansipit River near Taal.—August 26, 1910, to August 31, 1911.

Tubig-ng-bayan Irrigation Canal No. 1 near Rosario.—November 14, 1922–

BOHOL PROVINCE, BOHOL ISLAND

Bago Seco River near Mabini.—January 19, 1922, to July 18, 1922.

Cabatang River near Mabini.—January 18, 1922, to July 22, 1922.

Dimiao River near Bilar.—January 28, 1922, to March 31, 1922.

Gabayan River near Candijay.—January 21, 1922, to July 24, 1922.

Loboc River near Carmen.—January 26, 1922, to July 15, 1922.

Loboc River near Loboc.—January 29, 1922–

BULACAN PROVINCE, LUZON ISLAND

Angat River near Norzagaray.—April 3, 1909, to November 8, 1913; August 9, 1918–

Angat River near Quingua.—July 24, 1909, to March 16, 1912.

Bulo River near San Miguel.—September 21, 1918, to April 30, 1922.

Maasim River near San Rafael.—January 29, 1919–

Pampanga River near Calumpit.—May 17, 1910, to March 16, 1912.

Santa Maria River near Santa Maria.—October 25, 1919–

CAGAYAN PROVINCE, LUZON ISLAND

Pañgul River near Solano.—December 17, 1921, to December 16, 1922.

CAMARINES NORTE PROVINCE, LUZON ISLAND

Alinao River near San Vicente.—January 1, 1921, to March 31, 1922.

Bical River near Labo.—January 1, 1921–

Daet River near Daet.—January 1, 1921–

Labo River near Labo.—January 1, 1921, to May 31, 1922.

Matogdon River near Labo.—January 29, 1921, to August 5, 1922.

San Vicente River near San Vicente.—January 1, 1921–

CAMARINES SUR PROVINCE, LUZON ISLAND

Anayan River near Pili.—January 1, 1911, to April 20, 1912; March 6, 1919–

Barit River near Iriga.—May 8, 1910, to March 30, 1912; February 27, 1919–

Bato Lake near Bato.—August 13, 1910, to April 20, 1912.

Bicol River near Nabua.—October 18, 1910, to February 17, 1912.

Buhi Lake near Buhi.—August 15, 1910, to April 20, 1912.

Colasi River near Goa.—December 10, 1910, to April 20, 1912; March 16, 1919–

Inarihan River near Calabanga.—August 21, 1920–

Lagonoy River near Lagonoy.—February 1, to April 20, 1912; March 11, 1919, to July 15, 1922.

Libmanan River near Sipocot.—January 11 to April 20, 1912; January 12, 1921, to June 18, 1922.

Pawili River near Pili.—March 20, 1910, to April 20, 1912; March 7, 1919–

Rangas River near Goa.—July 14, 1922–
Waras River near Bao.—March 20, 1910, to March 30, 1912; November 26, 1919, to May 31, 1922.

CAPIZ PROVINCE, PANAY ISLAND

Aclan River near Malinao.—September 8, 1919–
Mambusao River near Mambusao.—June 15, 1919–

CAVITE PROVINCE, LUZON ISLAND

Biñang River near Carmona.—September 13, 1919, to March 18, 1922.
Kay Alemang River near Naic.—September 29, 1918, to March 31, 1922.
Lantic Creek near Carmona.—June 20, 1921, to March 31, 1922.
Maragundong River near Cay-acle, Maragundong.—November 8, 1919–
Maragundong River near Mabacao, Maragundong.—April 4, 1919–
Patay-na-Ilat Canal near Carmona.—June 18, 1921, to March 31, 1922.
Tatlong Balon River near Naic.—November 11, 1919, to March 19, 1922.
Ulong Tubig River near Carmona.—June 17, 1921, to March 31, 1922.

CEBU PROVINCE, CEBU ISLAND

Mananga River near Talisay.—January 3, 1922–
Mantayupan River near Barili.—June 1, 1921–

COTABATO PROVINCE, MINDANAO ISLAND

Auang River near Auang.—August 1, 1919, to November 25, 1922.
Kabakan River near Kabakan.—August 29, 1919, to August 7, 1921.
Katingauan River near Bual.—August 19, 1919, to August 10, 1921.
Libungan River near Libungan.—September 28, 1919, to July 16, 1921.
Maganoy River near Maganoy.—August 17, 1919, to August 3, 1921.
Malitibug River near Bao.—August 25, 1919, to August 3, 1921.
Nitoan River near Parang.—August 8, 1919, to September 30, 1921.

Pulangui River near Kabakan.—August 30, 1919, to August 4, 1921.

Salimbao River near Salimbao.—August 6, 1919, to March 31, 1922.

DAVAO PROVINCE, MINDANAO ISLAND

Talomo River near Davao.—March 18, 1921–

ILOCOS NORTE PROVINCE, LUZON ISLAND

Abis River near Burgos.—August 8, 1918, to March 31, 1922.

Alabaan River near Dingras.—November 13, 1908, to October 21, 1909; April 7, 1911, to April 6, 1912; August 1, 1918–

Baruyen River near Bangui.—April 19, 1911, to March 30, 1912.

Bilatag River near Pasuquin.—September 22, 1922–

Bolo River near Bangui.—April 18, 1911, to March 31, 1912; August 7, 1918, to March 31, 1922.

Laoag River near San Miguel.—February 3, 1910 to April 6, 1912.

Laoag River near Sarrat.—January 1, 1921–

Paoay Canal near Paoay.—March 28, to December 23, 1920.

Paoay Lake near Paoay.—June 2, 1909, to April 11, 1912; May 14, 1919, to December 24, 1920.

Pinacua-an River near Batac.—June 4, 1911, to April 6, 1912.

Salsalomague Ditch near Vintar.—December 17, 1919–

Vintar River near Bacarra.—May 6, 1919, to July 15, 1922.

Vintar River near Salsalomague, Vintar.—December 17, 1919–

Vintar River near Visaya, Vintar.—March 16, 1910, to April 6, 1912; July 28, 1918–

Visaya Canal near Vintar.—April 22, 1919, to February 12, 1922.

ILOCOS SUR PROVINCE, LUZON ISLAND

Balaoeg Canal near Nagbuquel.—November 17, 1919, to February 25, 1919.

Bullalaya River near Santa Maria.—September 13, 1911, to March 30, 1912.

Casupitan River near Bauguen.—November 22, 1918–

Casupitan River near Sta. Lucia.—February 24, 1922–

Chico River near Suyo.—August 15, 1918–

Langlangca River near Galimuyod.—October 9, 1919–

Narvacan River near Nagbuquel.—November 20, 1918, to April 15, 1922.

Santa Maria River near Sta. Maria.—January 11, 1921–

Villavieja River near Sta. Maria.—July 11, 1921–

ILOILO PROVINCE, PANAY ISLAND

Aganao River near San Miguel.—January 1, 1910 to November 25, 1913; October 1, 1918–

Jalaur River near Dingle.—November 1, 1909, to November 20, 1913; October 24, 1918–

Jaro River near Jaro.—November 29, 1909, to March 16, 1912.

Magapa Creek near Janiuay.—April 1, 1910, to March 31, 1912.

Salog River near Maasin.—February 15 to May 31, 1910.

Sibalom River near Leon.—February 4, 1910, to March 18, 1912; September 29, 1918–

Suague River near Pototan.—October 21, 1908, to November 21, 1913; October 4, 1918–

Tigom River near Maasin.—February 15 to June 4, 1910; January 24, 1912, to November 26, 1913; February 3, 1921–

Tigom River near Santa Barbara.—December 10, 1909, to November 24, 1913; September 17, 1918–

Ulian River near Dueñas.—April 1, 1910, to March 16, 1912; September 18, 1918–

ISABELA PROVINCE, LUZON ISLAND

Cagayan River near Echagüe.—April 16, 1918, to April 30, 1922.

Ganano River near Angadanan Viejo.—April 19, 1918, to April 30, 1922.

Magat River near Santiago.—October 19, 1920, to April 30, 1922.

Pinacawan River near San Pablo.—May 1, 1918, to September 20, 1919.

Siffu River near Ilagan.—September 1, 1920–

LAGUNA PROVINCE, LUZON ISLAND

Botocan River near Mahayhay.—April 21, 1920, to March 31, 1922.

Caliraya River near Pagsanjan.—November 1, 1911, to November 22, 1913.

Dayap River near Calauan.—May 1, 1911, to March 16, 1912.

Dismo River near Calamba.—April 6, 1911, to March 19, 1912; January 15, to November 30, 1913.

Laguna Lake near Los Baños.—February 1 to March 16, 1912; June 17, 1920–

Lawa Canal near Calamba.—March 5, 1911, to March 16, 1912; December 26, 1912 to November 22, 1913; January 17, 1917, to November 2, 1919.

Lilio River near Lilio.—February 5, 1911, to March 16, 1912.

Mabitac River near Mabitac.—June 2, 1911, to March 16, 1912.

Mayor River near Siniloan.—June 1, 1911, to March 16, 1912.

Oples River near Lilio.—February 5, 1911, to March 9, 1912.

Prinsa Canal near Calamba.—March 5, 1911, to March 16, 1912; December 26, 1912, to November 15, 1913, January 17, 1917, to January 15, 1920.

Rio del Pueblo near Siniloan.—July 2, 1911, to March 16, 1912.

San Cristobal Canal near Calamba.—January 3 to November 26, 1913; January 18, 1917, to January 15, 1920.

San Cristobal River near Calamba.—May 23, 1911, to March 26, 1912; January 1 to November 26, 1913; January 25, 1917, to June 14, 1919.

San Juan Creek near Loñgos.—April 20 to June 28, 1918; January 4 to February 14, 1920; May 8 to August 31, 1921; January 17 to May 31, 1922.

San Juan River near Calamba.—February 15, 1911, to March 23, 1912; January 1 to November 22, 1913.

Santa Cruz Canal near Nagcarlan.—February 19, 1920–

Santa Cruz River near Nagcarlan.—February 19, 1920–

Santa Rosa River near Calamba.—March 24 to November 29, 1913.

Taliabing River near Nagcarlan.—April 1, 1911, to March 9, 1912.

LANAO PROVINCE, MINDANAO ISLAND

Agus River near Dansalan.—July 1, 1918, to June 30, 1920.

Agus River near Momuñgan.—June 18, 1918–

Gata River near Tamparan.—September 24, 1919, to July 8, 1922.

Iligan River near Iligan.—December 11, 1919, to August 31, 1921.

Kapay River near Kapay.—March 1, 1920, to June 30, 1922.

Malaig River near Tamparan.—November 20, 1919, to July 1, 1922.

Matling River near Malabang.—February 7, 1920, to August 31, 1921.

Ramain River near Ramain.—September 13, 1919, to July 1, 1922.

Rumayas River near Tamparan.—January 13, 1920, to July 1, 1922.

Taraca River near Tamparan.—September 12, 1919, to July 15, 1922.

LA UNION PROVINCE, LUZON ISLAND

Amburayan River near Sudipen.—January 16, 1910, to March 12, 1912; August 17, 1918–

Aringay River near Tubao.—May 20, 1911, to March 19, 1912; April 7, 1919–

Baroro River near San Gabriel.—June 23, 1920–

Casilagan Creek near Naguilian.—April 18, 1921–

Cava River near Cava.—November 23, 1911, to March 18, 1912; March 16 to June 21, 1919.

Malamec Creek near Naguilian.—June 21, 1911, to March 18, 1912.

Maluyo River near Balaoan.—September 1, 1908, to March 19, 1912; May 24, 1919–

Maragayap River near Bacnotan.—June 16, 1908, to December 31, 1909; January 6 to March 21, 1912; August 29, 1919–

Naguilian River near Naguilian.—May 22 to September 27, 1911; February 15, 1918, to July 15, 1922.

Ribsoan River near Naguilian.—June 18, 1911, to March 18, 1912; February 15, 1918, to June 15, 1919.

Sapang Creek near Bauang.—December 24, 1919, to December 31, 1920.

LEYTE PROVINCE, BILIRAN ISLAND

Anas River near Naval.—March 9, 1911, to March 30, 1912.

LEYTE PROVINCE, LEYTE ISLAND

Binahaan River near Dagami.—June 4, 1910, to April 11, 1912; November 18, 1918–

Daguitan River near Burauen.—November 1, 1911, to April 11, 1912; October 19, 1920–

Guinarona River near Dagami.—November 23, 1918–

Minusuang River near Calincaguing, Barugo.—October 6, 1908, to November 6, 1909; April 18, 1910, to April 6, 1912; December 29, 1918–

Minusuang River near Tunga, Barugo.—March 20, 1911, to March 23, 1912; October 25, 1920–

Palo River near Palo.—June 8, 1921–

Quilot River near Dagami.—June 4, 1910, to April 11, 1912; November 17, 1918–

Tagbanato River near Hilongos.—January 10, 1911, to April 14, 1912.

MINDORO PROVINCE, MINDORO ISLAND

Pulang Tubig River near Calapan.—February 10, 1918, to December 31, 1920.

MISAMIS PROVINCE, CAMIGUIN ISLAND

Tibucas River near Mambajao.—May 4, 1921–

MOUNTAIN PROVINCE, LUZON ISLAND

Agno River near Itogon.—March 4, 1919–

Balili River near Trinidad.—January 1 to May 23, 1921.

Bued River near Camp One.—May 1, 1910, to March 25, 1912; December 8, 1918–

Trinidad Canal No. 1 near Trinidad.—February 25, 1919, to July 10, 1920.

Trinidad Canal No. 2 near Trinidad.—February 25, 1919, to February 28, 1920.

Trinidad Creek near Trinidad.—January 13, 1919, to June 30, 1921.

Wangal Creek near Trinidad.—January 5, to June 14, 1921.

OCCIDENTAL NEGROS PROVINCE, NEGROS ISLAND

Bago River near Bago.—June 20, 1919–

Bungahin River near La Castellana.—June 25, 1919, to July 15, 1922.

Camansi River near Hinigaran.—April 15, 1920, to November 9, 1921.

Guintubhan River near Isabela.—December 16, 1919, to July 22, 1922.

Imbang River near Talisay.—July 4, 1919.

Maao River near Bago.—April 27, 1920–

Malugo River near Saravia.—May 11, 1920–

Maragandang River near Bago.—July 20, 1920, to November 4, 1922.

Pag-iplan River near Himamaylan.—June 28, 1919–

Sicaba River near Manapla.—November 10, 1919, to July 25, 1922.

ORIENTAL NEGROS PROVINCE, NEGROS ISLAND

Bayawan River near Tolong.—February 8, 1922–

Cahimaya-an River near Tolong.—February 7, 1922–

Mangoto River near Tanjay.—August 20, 1920–

Tabuyanan River near Tanjay.—November 27, 1921, to March 4, 1922.

NUEVA ECIJA PROVINCE, LUZON ISLAND

Baliuag River near Santo Domingo.—February 16 to July 28, 1913; September 13, 1918–

Chico River near Peñaranda.—May 9, 1919–

Dibabuyan Creek near Santo Domingo.—September 12, 1918, to December 31, 1920.

Minalungao or Sumacbao River near Peñaranda.—January 1, 1912, to November 8, 1913; September 17, 1918–

Pampanga River near Cabanatuan.—September 16, 1918, to August 19, 1919; November 29, 1920–

Pampanga River near Rizal.—November 18, 1911, to September 3, 1912; December 16, 1918–

Pampanga River near Santa Rosa.—September 24 to December 31, 1909; February 25, 1910, to November 8, 1913.

Peñaranda River near Peñaranda.—October 28, 1911, to November 8, 1913; May 11, 1919–

Rizal Canal near Rizal.—December 16, 1918–

Talavera River near San Jose.—May 17, 1911, to November 15, 1913; September 10, 1918–

Talavera River near Talavera.—May 16, 1911, to March 23, 1912; February 11 to November 12, 1913; September 12, 1918–

NUEVA VIZCAYA PROVINCE, LUZON ISLAND

Lamut River near Bagabag.—July 11, 1920, to April 30, 1922.

Lanog River near Bagabag.—July 11, 1920–

Magat River near Bayombong.—July 15, 1920, to April 30, 1922.

Morong Canal near Bagabag.—August 12, 1920–

PAMPANGA PROVINCE, LUZON ISLAND

Balsik River near Florida Blanca.—January 1, 1921–

Gumain River near Florida Blanca.—November 16, 1910, to November 7, 1913; October 4, 1921–

Pampanga River near Arayat.—July 1, 1909, to March 16, 1912.

Porac River near Florida Blanca.—November 27, 1910, to November 6, 1913; September 23, 1919–

PANGASINAN PROVINCE, LUZON ISLAND

Agno River near Alcala.—April 24, 1911, to March 27, 1912.

Agno River near Bayambang.—July 3, 1908, to March 27, 1912; October 19, 1919–

Agno River near San Manuel.—December 11, 1908, to November 29, 1913; September 1, 1918–

Agno Chico River near Asingan.—May 11, 1909, to March 20, 1912; March 1, 1920–

Banila River near Umingan.—August 4, 1920–

Binmatay Ditch near Asingan.—March 22, 1910, to March 20, 1912.

Bued River near San Fabian.—March 7, 1920–

Caruyungan River near Umingan.—September 20, 1920, to March 31, 1922.

Mangabol Swamp near Poponto.—May 7, 1911, to February 29, 1912.

Mitura River near Asingan.—June 19, 1910, to March 20, 1912.

Pao River near Manaoag.—October 29, 1920–

Pila River near Mangatarem.—July 10, 1919–

Sobel Ditch near Asingan.—June 5, 1909, to March 20, 1912.

Tagumusing River near Binalonan.—January 1, 1920–

Tarlac River near Bayambang.—May 5, 1911, to March 5, 1912.

Toboy River near Asingan.—August 21, 1908, to March 20, 1912; January 1, 1920–

Toboy River near San Manuel.—January 26, 1922–

RIZAL PROVINCE, LUZON ISLAND

Ampid River near San Mateo.—November 5, 1918, to April 15, 1922.

Banaba Creek near San Mateo.—October 17, 1918, to April 15, 1922.

Bulao River near Antipolo.—June 25, 1919, to March 31, 1922.

Laguna Lake near Binangonan.—October 13, 1919, to November 15, 1920.

Manga River near Montalban.—October 20, 1918, to January 19, 1922.

Morong River near Morong.—August 1, 1918, to March 31, 1922.

Nangca River near San Mateo.—October 19, 1918, to April 15, 1922.

Pililla River near Pililla.—July 24, 1918, to March 31, 1922.

Sala Bato River near Baras.—May 11, 1919, to March 12, 1922.

Tanay Canal near Tanay.—July 24, 1918, to June 21, 1919.

Tanay River near Tanay.—September 5, 1918, to June 21, 1919.

TARLAC PROVINCE, LUZON ISLAND

Camiling River near Camiling.—February 3, 1918–

Cutcut River near Capas.—January 1, 1911, to March 28, 1912; September 25, 1919–

O'Donnell River near San Miguel.—January 11, 1910, to December 28, 1911; January 5, 1921–

O'Donnell River near Capas.—September 13, 1911, to July 31, 1913.

Parua River near Bamban.—December 3, 1910, to March 16, 1912; September 16, 1919–

Sapang Maragul Creek near Capas.—January 9, 1919, to March 31, 1922.

Tarlac River near Tarlac.—November 11, 1917, to July 6, 1918; September 19, 1919–

TAYABAS PROVINCE, LUZON ISLAND

Agus River near Infanta.—August 19, 1920–

Taguan River near Candelaria.—April 9, 1917 to March 31, 1922.

ZAMBALES PROVINCE, LUZON ISLAND

Mabanban Creek near San Antonio.—March 9 to June 22, 1919.

Nagsabaran River near San Marcelino.—July 11, 1919–

Payetpet River near Botolan.—July 6, 1919, to November 6, 1920.

Santa Fe River near San Marcelino.—July 9, 1919, to March 31, 1922.

Toton Lanum River No. 1 and No. 2 near Botolan.—July 6, 1919, to March 31, 1922.

ZAMBOANGA PROVINCE, BASILAN ISLAND

Balobo River near Lamitan.—July 28, 1920, to April 1, 1922.

Gubauan River near Lamitan.—July 30, 1920–

Maloso River near Maloso.—July 24, 1920–

ZAMBOANGA PROVINCE, MINDANAO ISLAND

Ayala River near Ayala.—February 17 to September 28, 1918; June 4, 1920–

Bolong River near Zamboanga.—August 19, 1920–

Curuan River near Zamboanga.—July 10, 1920–

Layawan River near Dipolog.—November 30, 1920–

Manikahan River near Zamboanga.—February 17 to September 21, 1918; June 18, 1920–

Mercedes River near Zamboanga.—September 8, 1920–

Tumaga River near Zamboanga.—June 9, 1920–

ABRA PROVINCE

ABRA RIVER, SAN QUINTIN

LOCATION.—About 1 km. east of the barrio of Palang and just northeast of San Quintin, Abra.

RECORDS AVAILABLE.—From January 31, 1919, to December 31, 1922. Also there are records from May 6, 1910, to March 31, 1912 at about the same place as the present station.

GAGE.—Standard metric gage board of three sections fastened vertically to iron bars imbedded in limestone formation at right bank of river.

DISCHARGE MEASUREMENTS.—Made from raft.

CHANNEL AND BANKS.—Channel is straight for 500 m. above and for 600 m. below gaging section. Both banks are high, solid, and free from possible erosion. Stream bed of sand, gravel, and mud.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 11,555,000 second-liters on September 28, 1911. Minimum discharge, 10,400 second-liters on March 31, and April 13, 24, and 27, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from May, 1910, to March, 1912 determined from a poorly defined curve. Daily discharge from February 1, 1919, to December 31, 1922, determined from a fairly well-defined curve. Gage read twice daily.

Discharge measurements Abra River, near San Quintin, Abra

Date	Made by—	Gage height (meters)	Discharge (second liters)	Remarks
1909				
January 14	F. T. James	1 27	95,900	
January 22	do	1 20	82,000	
February 5	do	1 20	70,400	
February 13	do	1 10	65,500	
February 19	do	1 10	64,700	
March 6	do	1 03	56,500	
1910				
April 9	do	17 60	53,140	
April 28	do	17 75	79,895	
April 29	do	17 70	68,840	
May 18	do	17 79	89,910	
1911				
May 3	do	17 92	79,464	
November 11	do	18 11	178,782	
December 22	do	17.89	136,386	
1912				
March 12	do	17 46	513 549	

Discharge measurements Abra River, near San Quintin, Abra—Continued

Date	Made by—	Gage height (meters)	Discharge (second liters)	Remarks
1920				
December 17	R. Pertierra and S. Pasion.	1 25	126,330	
December 18	do	1 31	128,087	
December 19	do	1 27	125,955	
December 20	do	1.22	123,850	
December 21	do	1.19	102,787	
December 21	do	1 11	86,452	
December 22	do	1 15	94,225	
1921				
February 18	S. Pasion	98	50,615	
March 15	do	1 03	62,359	
April 20	do	77	34,248	
May 2	do	1 03	58,249	
December 31	do	2 04	99,752	
1922				
January 17	do	1 87	68,876	
January 28	do	1.79	53,190	
February 20	do	1 70	50,544	
March 18	do	1 56	38,675	
April 1	do	1.58	43,008	
April 15	do	1 50	16,476	

NOTE.—Gage height from December 17, 1920, referred to different data.

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Ilocos Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						365,730	219,600	157,500	376,860	195,900	105,900	126,900
2						353,010	173,400	173,400	316,440	195,900	109,200	125,000
3						314,260	241,800	147,900	305,310	227,400	105,900	122,100
4						211,800	279,870	175,200	322,800	215,400	112,200	125,000
5						228,900	232,200	198,900	348,700	227,400	105,900	131,700
6					63,600	165,300	257,700	205,500	1,310,020	224,400	109,200	131,700
7					63,600	191,100	239,000	200,700	863,400	259,200	105,900	125,000
8					128,400	195,900	251,000	202,200	558,120	249,600	105,900	122,100
9						219,600	215,100	195,900	459,540	443,640	115,500	117,300
10					112,200	183,000	197,400	183,000	481,800	298,360	122,100	117,300
11					94,800	203,700	189,900	179,800	376,860	275,100	102,600	122,100
12					94,800	189,900	205,500	178,900	391,170	230,700	99,600	128,400
13					94,800	179,800	197,400	183,000	348,700	186,300	....	134,100
14					99,600	150,900	187,800	178,200	294,180	179,800	...	130,200
15					115,500	205,500	213,300	178,200	270,300	173,400	.	147,900
16					101,100	213,300	221,700	198,900	262,200	186,300	. .	163,800
17					86,500	208,500	389,580	208,500	255,900	176,400	. .	165,300
18					80,400	211,800	350,290	227,400	384,660	186,300	.	162,000
19					72,600	207,000	300,540	221,000	411,840	171,900	.	149,100
20					63,600	205,500	273,600	215,400	394,350	157,500	237,000	134,100
21					78,900	165,300	228,800	202,200	246,600	160,500	224,400	125,100
22					93,300	210,300	215,400	198,900	246,600	154,200	208,500	. . .
23					72,600	222,900	211,800	221,000	233,700	144,600	259,200	. . . . .
24					308,490	179,800	203,700	210,300	322,800	138,300	249,600	. . . . .
25						195,900	197,400	198,900	411,380	133,500	230,400	. . . . .
26						257,700	198,900	240,000	306,900	115,500	202,200	. . . . .
27					308,490	275,500	186,300	332,800	257,700	107,900	181,200	. . . . .
28					195,900	219,600	186,300	586,740	224,400	96,300	159,000	. . . . .
29					267,000	175,200	157,500	574,020	216,600	59,100	149,100	. . . . .
30					283,050	194,000	155,700	459,540	189,900	88,500	141,300	. . . . .
31					210,300		159,000	430,920	96,300			. . . . .
Maximum					308,490	365,730	389,580	586,740	1,310,020	443,640	259,200	165,300
Minimum					63,600	150,900	155,700	147,900	96,300	59,100	99,600	117,300
Mean					134,327	216,690	223,799	240,801	370,517	188,643	153,991	133,629

NOTE.—No gage height records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Ilocos Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						565,000	380,000	8,305,000	4,350,000	4,450,000	360,000	178,200
2						200,600	530,000	8,475,000	3,005,000	4,040,000	330,000	174,000
3					200,600	135,100	645,000	5,475,000	1,875,000	2,960,000	305,000	169,000
4					174,000	117,600	475,000	3,455,000	1,200,000	3,330,000	290,000	165,800
5					161,700		475,000	3,635,000	1,225,000	1,900,000	280,000	161,700
6					157,900		655,000	1,910,000	1,190,000	1,535,000	280,000	157,900
7					275,000		500,000	1,810,000	895,000	1,060,000	275,000	157,900
8					1,305,000		455,000	2,060,000	850,000	835,000	260,000	165,800
9					142,700	114,200	445,000	3,740,000	1,005,000	785,000	285,000	670,000
10					1,360,000	142,700	540,000	5,320,000	850,000	1,150,000	265,000	675,000
11					2,120,000	187,000	425,000	8,390,000	1,105,000	685,000	305,000	605,000
12					1,475,000	270,000	415,000	4,280,000	915,000	880,000	300,000	460,000
13					2,410,000	285,000	390,000	5,100,000	1,100,000	890,000	290,000	395,000
14					2,245,000	320,000	685,000	4,445,500	1,015,000	905,000	280,000	355,000
15					1,355,000	305,000	1,540,000	3,815,000	910,000	1,050,000	270,000	340,000
16					470,000	715,000	7,340,000	2,880,000	900,000	955,000	260,000	285,000
17					850,000	375,000	4,555,000	1,925,000	5,385,000	945,000	260,000	260,000
18					905,000	405,000	3,575,000	1,705,000	3,755,000	1,025,000	250,000	240,000
19					865,000	435,000	1,560,000	1,435,000	2,040,000	1,015,000	240,000	230,000
20					775,000	435,000	1,180,000	1,700,000	1,585,000	965,000	230,000	220,100
21					700,000	405,000	1,205,000	1,365,000	1,425,000	900,000	225,000	210,300
22					680,000	420,000	1,235,000	1,380,000	1,310,000	850,000	220,100	200,600
23					785,000	410,000	2,005,000	1,210,000	1,065,000	765,000	215,200	191,400
24					730,000	385,000	2,265,000	1,150,000	955,000	635,000	210,300	182,600
25					805,000	375,000	3,485,000	1,825,000	890,000	590,000	205,400	178,200
26					750,000	515,000	3,355,000	7,175,000	850,000	600,000	200,600	174,000
27					685,000	370,000	2,550,000	3,375,000	1,700,000	535,000	195,800	169,900
28					675,000	320,000	1,770,000	1,500,000	11,555,000	490,000	191,400	165,800
29					685,000	350,000	1,920,000	2,305,000	9,425,000	460,000	187,000	161,700
30					645,000	400,000	1,620,000	2,095,000	5,255,000	410,000	182,000	157,900
31					640,000		1,655,000	2,435,000		390,000		157,900
Maximum					2,410,000	715,000	7,340,000	8,475,000	11,555,000	4,450,000	360,000	675,000
Minimum					142,700	114,200	380,000	1,150,000	850,000	390,000	182,000	157,900
Mean					862,997	344,508	1,607,419	3,408,871	2,319,500	1,225,323	254,927	258,571

NOTE.—See footnote, year 1911

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Ilocos Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	154,100	110,900	74,100									
2	150,300	107,600	71,300									
3	157,900	98,000	68,800									
4	178,200	94,800	66,300									
5	174,000	91,800	64,100									
6	174,000	98,000	61,900									
7	174,000	101,200	59,700									
8	174,000	94,800	57,700									
9	165,800	91,800	55,700									
10	161,700	88,800	53,700									
11	157,900	82,800	53,700									
12	154,100	79,800	49,900									
13	150,300	76,900	53,700									
14	150,300	74,100	51,700									
15	142,700	71,300	55,700									
16	135,100	68,800	59,700									
17	128,100		57,700									
18	114,200		51,700									
19	104,400		51,700									
20	101,200		49,900									
21	98,000		48,100									
22	94,800		46,300									
23	91,800		44,700									
24	94,800		43,100									
25	94,800	88,800	43,100									
26	88,800	85,800	43,100									
27	94,800	82,800	39,900									
28	91,800	79,800	39,900									
29	88,800	76,900	39,900									
30	98,000		38,500									
31	107,600		38,500									
Maximum	178,000	110,900	74,100									
Minimum	88,800	68,800	38,500									
Mean	129,881	87,881	52,703									

NOTE.—See footnote, year 1911.

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Abra, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		194,700	167,100	162,500	176,300	374,100	351,100	1,027,300	1,298,700	222,300	194,700	192,400
2		194,700	167,100	167,100	180,900	321,200	244,700	967,500	1,103,200	208,500	180,900	169,400
3		194,700	167,100	167,100	180,900	337,300		1,303,300	475,300	197,000	167,100	153,300
4		194,700	167,100	160,200	171,700	337,300		1,301,000	486,800	190,100	171,700	144,100
5		194,700	164,800	157,900	171,700	420,100		1,245,800	466,100	190,100	162,500	122,300
6		199,300	162,500	153,300	183,200	381,000		1,261,900	493,700	185,500	160,200	101,000
7		199,300	160,200	153,300	176,300	371,800		2,172,700	461,500	208,500	157,900	95,600
8		192,400	160,200	153,300	180,900	360,300		3,160,100	381,000	203,900	153,300	95,600
9		190,100	160,200	157,900	171,700	346,500		2,899,500	318,900	197,000	148,700	135,100
10		187,800	157,900	160,200	169,400	318,900		1,448,260	309,700	203,900	146,400	167,100
11		185,500	157,900	157,900	176,300	312,000		1,234,300	318,900	213,100	148,700	137,300
12		185,500	157,900	169,400	190,100	275,200		1,225,100	300,500	240,700	144,100	104,700
13		183,200	157,900	190,100	217,700	249,900		1,186,000	335,000	298,200	144,100	102,800
14		183,200	157,900	180,900	261,400	240,700		1,040,100	420,100	275,200	139,500	99,200
15		185,500	157,900	180,900	236,100	233,800		999,700	404,000	183,200	137,300	101,000
16		183,200	155,600	171,700	213,100	263,700		983,600	463,800	190,100	135,100	95,600
17		180,900	155,600	171,700	222,300	266,000		1,229,700	424,700	192,400	135,100	97,400
18		176,300	155,600	167,100	245,300	268,300		1,344,700	452,300	183,200	132,900	95,600
19		171,700	155,600	164,800	332,700	272,900		1,390,700	500,600	482,200	132,900	92,100
20		174,000	153,300	171,700	314,300	378,700		1,945,000	415,500	420,100	135,100	88,700
21		174,000	153,300	171,700	272,900	397,100		1,287,200	323,500	351,100	135,100	87,000
22		174,000	153,300	176,300	272,900	450,000		1,140,000	295,900	259,100	132,900	106,600
23		171,700	153,300	162,500	263,700	447,700		1,022,700	286,700	236,100	132,900	102,800
24		171,700	151,000	180,900	238,400	390,200		1,022,700	272,900	226,900	130,700	99,200
25		169,400	153,300	187,800	226,900	337,300		1,126,200	259,100	286,700	132,900	92,100
26		164,800	151,000	194,700	222,300	374,100		1,128,500	157,900	305,100	130,700	88,700
27		167,100	151,000	187,800	247,600	410,900		1,100,100	132,900	282,100	130,700	87,000
28		167,100	148,700	180,900	275,200	422,400		1,133,900	272,900	298,200	185,500	87,000
29			148,700	185,500	298,200	360,300		1,034,200	226,900	238,400	263,700	106,600
30			148,700	183,200	381,000	355,700		1,090,900	176,300	213,100	236,100	102,800
31	197,000		151,000		383,300		1,057,200	1,422,900		194,700		99,200
Maximum	197,000	199,300	167,100	194,700	383,300	450,000	1,057,200	3,160,100	1,298,700	482,200	263,700	192,400
Minimum	197,000	164,800	148,700	153,300	169,400	233,800	244,700	967,500	132,900	183,200	130,700	87,000
Mean	197,000	182,543	156,861	171,010	334,023	342,513	611,000	1,350,822	407,843	244,410	154,647	111,268

NOTE.—Daily discharge not very reliable. Data obtained from discharge measurements made only in December, 1920, and made applicable from January 31, 1919. See footnote, year 1911.

Daily and monthy discharges, in liters per second, of Abra River near Palang, San Quintin, Abra, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	102,800	72,700	31,000	. . . .	42,100	102,800	148,700	772,000	475,300	171,700	151,000	126,500
2	99,200	47,300	29,800	. . .	37,000	82,100	135,100	767,400	668,500	160,200	146,400	118,200
3	95,600	44,700	28,600	. . .	24,000	75,700	126,500	654,700	1,567,800	229,200	153,300	118,200
4	106,600	44,700	27,400	. . .	24,000	74,200	171,700	521,300	1,818,500	295,900	148,700	116,200
5	106,600	42,100	26,200	. .	26,200	85,300	174,000	489,100	999,700	378,700	171,700	114,200
6	114,200	40,800	25,100	14,300	26,200	217,700	162,500	519,000	778,900	259,100	162,500	110,400
7	110,400	39,600	25,100	27,400	29,800	208,500	167,100	484,500	548,900	268,300	157,900	106,600
8	106,600	39,600	25,100	32,200	32,200	137,300	222,300	470,700	475,300	240,700	162,500	194,700
9	104,700	37,000	24,000	20,700	33,400	132,900	174,000	466,100	429,300	222,300	153,300	102,800
10	99,200	37,000	22,900	20,700	38,200	174,000	231,500	431,600	397,100	213,100	155,600	99,200
11	99,200	34,600	21,800	18,500	39,600	167,100	238,400	404,000	385,600	236,100	153,300	106,600
12	93,800	33,400	20,700	12,300	43,400	157,900	157,900	424,700	378,700	231,500	153,300	118,200
13	92,100	33,400	20,700	10,400	47,300	141,800	171,700	420,100	371,800	226,900	160,200	114,200
14	88,700	32,200	20,700	.	47,300	122,300	206,200	406,300	367,200	220,000	146,400	114,200
15	87,000	32,200	18,500	. . .	55,600	114,200	298,200	447,700	332,700	256,800	144,100	110,400
16	87,000	31,000	18,500	. .	57,000	126,500	525,900	392,500	332,700	240,700	139,500	114,200
17	85,300	31,000	18,500	.	75,700	128,600	496,000	364,900	330,400	254,500	137,300	116,200
18	85,300	25,100	17,400	.	78,900	162,500	1,344,700	341,900	309,700	222,300	132,900	126,500
19	85,300	25,100	17,400		162,500	118,200	2,931,700	374,100	270,600	120,200	132,900	118,200
20	82,100	24,000	16,300		231,500	104,700	3,150,200	415,500	240,700	208,500	135,100	110,400
21	82,100	24,000	16,300		266,000	99,200	3,299,700	360,300	220,000	199,300	132,900	101,000
22	82,100	22,900	16,300		259,100	95,600	3,644,700	369,500	164,800	190,100	132,900	93,800
23	82,100	21,800	15,300	. .	245,300	97,400	2,623,500	530,500	139,500	176,300	132,900	95,600
24	88,700	20,700	15,300	10,400	164,800	95,600	2,393,500	512,100	114,200	171,700	130,700	93,800
25	83,700	20,700	14,300	12,300	137,300	144,100	2,043,900	538,900	126,500	171,700	126,500	95,600
26	80,500	20,700	14,300	16,300	112,300	148,700	1,381,500	530,500	263,700	167,100	126,500	92,100
27	80,500	20,700	14,300	10,400	75,700	139,500	1,211,300	505,200	286,700	164,800	126,500	87,000
28	78,900	33,400	14,300	37,000	69,700	167,100	1,183,700	452,300	279,800	157,900	124,400	78,900
29	77,300	33,400	13,300	72,700	66,800	162,500	1,209,000	447,700	176,300	153,300	122,300	75,700
30	75,700	. .	12,300	59,800	75,700	153,300	928,400	438,500	194,700	148,700	126,500	77,300
31	636,300	. .	10,400		108,500		875,500	431,600	.	148,700		75,700
Maximum	636,300	72,700	31,000	72,700	266,000	217,700	3,644,706	772,000	1,818,500	378,700	171,700	194,700
Minimum	75,700	20,700	10,400	10,400	24,000	74,200	126,500	341,900	114,200	148,700	122,300	75,700
Mean	109,019	33,303	19,745	25,027	88,165	131,243	1,033,193	473,716	448,181	209,881	142,667	107,181

NOTE.—Daily discharge not very reliable as data utilized are only derived from measur ements made in December.

19606—8

Daily and monthly discharges, in liters per second, of Abra River near Talaytay, San Quintin, Abra, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	77,300	55,550	54,550	46,850	33,900	135,950	421,800	221,800	415,000	156,700 448,600	130,100	158,800
2	80,500	56,550	56,550	44,950	33,000	234,400	255,400	209,200	394,000	478,000	126,400	154,600
3	78,900	54,550	54,550	43,000	33,900	408,700	272,200	230,200	368,800	463,300	122,850	154,600
4	61,550	54,550	53,550	42,100	35,700	276,400	154,600	205,000	373,000	415,000	119,350	160,900
5	61,550	50,650	52,550	39,300	33,900	312,100	150,400	188,200	381,400	391,900	122,850	167,200
6	58,550	52,550	52,550	39,300	33,900	217,600	171,400	196,600	494,800	377,200	122,850	163,000
7	57,550	54,550	54,550	39,300	35,700	190,300	200,800	184,000	494,800	377,200	121,100	142,000
8	56,550	53,550	54,550	39,300	41,150	213,400	181,900	253,300	587,200	310,000	115,950	139,900
9	56,550	54,550	56,550	41,150	53,550	255,400	175,600	297,400	385,600	251,200	150,400	137,900
10	56,550	55,550	56,550	44,950	64,550 134,000	263,800	169,300	303,700	352,000	209,200	156,700	135,950
11	56,550	54,550	58,550	45,900	99,650	234,400	158,800	299,500	326,800	196,600	179,800	126,400
12	56,550	54,550	57,550	41,150	109,200	221,800	169,300	291,100	394,000	196,600	289,000	126,400
13	56,550	54,550	56,550	40,200	82,550	221,800	152,500	465,400	580,900	198,700	272,200	128,250
14	56,550	50,650	55,550	39,300	95,100	223,900	150,400	553,600	524,200	200,800	268,000	130,100
15	57,550	52,550	56,550	37,500	101,150	213,400	146,200	536,800	471,700	190,300	251,200	126,400
16	58,550	53,550	54,550	35,700	119,350	192,400	142,000	656,500	452,800	175,600	205,000	122,850
17	60,550	50,650	53,550	35,700	124,600	196,600	150,400	452,800	417,100	173,500	165,100	115,950
18	60,550	52,550	52,550	35,700	144,100	188,200	163,000	759,400	358,300	171,400	163,000	110,850
19	62,550	53,550	52,550	33,900	188,200	179,800	188,200	1,654,000	272,200	158,800	163,000	105,900
20	56,550	53,550	52,550	33,000	289,000	190,300	240,700	1,040,800	221,800	158,800	171,400	98,100
21	56,550	54,550	51,600	32,100	276,400	196,600	274,300	1,259,200	163,000	156,700	165,100	85,250
22	55,550	54,550	50,650	32,100	242,800	160,900	1,070,200	1,635,100	154,600	154,600	163,000	79,950
23	56,550	54,550	50,650	32,100	177,700	175,600	1,162,600	1,141,600	142,000	150,400	158,800	77,450
24	55,500	54,550	49,700	33,900	167,200	238,600	366,700	1,015,600	134,000	150,400	158,800	72,450
25	55,550	54,550	48,750	36,600	134,000	196,600	198,700	541,000	122,850	148,300	167,200	73,900
26	54,550	53,550	48,750	38,400	196,600	291,100	431,800	513,700	115,950	134,000	175,600	73,900
27	54,550	53,550	48,750	43,000	150,400	238,600	322,600	459,100	130,100	134,000	207,100	82,500
28	53,550	50,650	47,800	38,400	134,000	165,100	377,200	444,400	122,850	142,000	179,800	78,700
29	54,550		48,750	35,700	134,000	228,100	263,800	402,400	115,950	137,900	200,800	90,700
30	54,550		46,850	34,800	130,100	228,100	255,400	408,700	114,250	135,950	171,400	89,350
31	54,550		46,850		144,100		247,000	385,600		134,000		92,200
Maximum	80,500	56,550	58,550	46,850	289,000	408,700	1,162,600	1,654,000	587,200	478,000	289,000	167,200
Minimum	53,550	50,650	46,850	32,100	33,000	135,950	142,000	184,000	114,250	134,000	115,950	72,450
Mean	59,165	53,707	52,777	38,512	118,525	222,995	276,942	555,023	319,398	225,000	172,128	116,210

NOTE.—Daily discharge determined from fairly well-defined rating curve applicable from December 31, 1921, to April 1, 1922. But this curve was arbitrarily applied for dates before December 31, 1921, and after April 1, 1922.

Daily and monthly discharges, in liters per second, of Abra River near Talaytay, San Quintin, Abra, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	85,250	56,500	45,200	40,250	34,200	52,500	119,350	415,000	192,400	507,400	163,000	126,400
2	83,900	56,500	45,200	39,450	33,500	47,850	92,200	{2,170,600 / 1,435,600}	194,500	545,200	158,800	130,100
3	82,550	55,500	44,350	38,650	32,800	47,850	158,800	805,600	198,700	452,800	154,600	134,000
4	82,550	55,500	44,350	37,900	32,100	78,700	102,700	543,100	213,400	436,000	154,600	146,200
5	77,450	54,500	43,500	37,150	31,400	67,650	92,200	442,300	240,700	419,200	150,400	139,900
6	77,450	55,500	43,500	37,900	32,800	71,250	179,800	396,100	280,600	377,200	148,300	148,300
7	76,200	55,500	42,650	37,150	34,900	198,700	167,200	349,900	257,500	335,200	150,400	150,400
8	74,950	54,500	41,850	36,400	37,900	87,950	188,200	326,800	244,900	343,600	148,300	137,900
9	73,700	54,500	41,050	36,400	41,850	65,250	333,100	301,600	234,400	331,000	146,200	134,000
10	72,450	53,500	41,850	35,650	46,050	59,600	177,700	368,800	261,700	305,800	144,100	139,900
11	72,450	53,500	41,050	34,900	64,100	57,500	148,300	337,300	375,100	284,800	169,300	137,900
12	73,700	52,500	40,250	34,200	60,700	54,500	134,000	318,400	356,200	272,200	154,600	142,000
13	72,450	51,500	40,250	34,200	54,500	82,550	132,050	301,600	457,000	255,400	146,200	134,000
14	70,050	51,500	39,450	33,500	56,500	186,100	121,100	314,200	381,400	242,800	137,900	130,100
15	68,850	50,550	38,650	33,500	52,500	93,650	117,650	293,200	490,600	276,400	144,100	126,400
16	67,650	50,550	38,650	32,800	54,500	110,850	109,200	305,800	900,100	304,200	152,500	124,600
17	66,450	50,550	38,650	32,800	58,550	90,750	105,900	326,800	{2,800,600 / 2,170,600}	293,200	175,600	122,850
18	66,450	49,650	38,650	32,800	81,250	115,950	196,600	389,800	1,855,600	268,000	160,900	121,100
19	67,650	49,650	38,650	33,500	61,800	128,250	192,400	389,800	1,120,600	242,800	150,400	119,350
20	67,650	49,650	40,250	34,900	60,700	247,000	190,300	381,400	585,100	221,800	154,600	112,550
21	65,250	48,750	41,850	35,650	52,500	135,950	297,400	368,800	515,800	213,400	146,200	109,200
22	62,950	48,750	43,500	38,650	49,650	255,400	184,000	343,600	486,400	280,600	137,900	105,900
23	61,800	48,750	41,850	38,650	46,950	261,700	375,100	310,000	431,800	234,400	134,000	102,700
24	60,700	48,750	41,050	35,650	42,650	247,000	343,600	289,000	394,000	213,400	132,050	101,150
25	60,700	47,850	40,250	34,200	46,050	230,200	387,700	265,900	368,800	205,000	137,900	99,650
26	60,700	46,950	44,350	33,500	43,590	175,600	354,100	249,100	368,800	196,600	135,950	101,150
27	59,600	46,050	44,350	33,500	46,050	115,950	364,600	234,400	345,700	188,200	137,900	126,400
28	58,550	45,200	43,500	32,800	49,650	122,850	333,100	223,900	751,000	184,000	130,100	119,350
29	58,550		42,650	32,800	52,500	121,100	242,800	215,500	564,100	179,800	126,400	128,250
30	57,500		41,850	36,400	56,500	119,350	213,400	207,100	616,600	175,600	122,850	126,400
31	57,500		41,050		58,550		263,800	198,700		167,200		119,350
Maximum	85,250	56,500	45,200	40,250	81,250	261,700	387,700	2,170,600	2,800,600	545,200	169,300	150,400
Minimum	57,500	45,200	38,650	32,800	31,400	47,850	92,200	198,700	192,400	167,200	122,850	99,650
Mean	69,148	51,523	41,750	35,527	48,618	124,317	207,044	445,797	621,823	292,039	146,868	125,782

NOTE.—See footnote to daily discharge for 1921.

AGUSAN PROVINCE

ADGAWAN RIVER, SIGUNTO

LOCATION.—South of Sigunto; about 2½ days trip by "baroto" from Talacogon.

RECORDS AVAILABLE.—From February 15, 1921, to March 31, 1922.

GAGE.—Standard metric gage board on right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low stage and from boat at medium and high stages.

CHANNEL AND BANKS.—One channel at all stages; straight for 150 m. above and 200 m. below station, banks low, grassy, and not subject to overflow. Stream bed sandy and gravelly.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation 687,200 second-liters on February 8, 1922; minimum discharge 16,230 second-liters on April 19, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Discharge determined from fairly well-defined rating curve below 312,000 second-liters. Gage reads twice daily.

Discharge measurements of Adgawan River, near Sigunto, Agusan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 15	P. B. A.	3 84	50,550	
February 16	do	6 33	168,013	
April 1	B. and A.	3 45	27,417	
May 27	Abejero	3 62	40,240	
May 28	do	3.46	31,884	
May 30	do	4 10	74,173	
May 31	do	4 20	83,542	
July 18	do	4 80	132,114	
July 18	do	4 35	94,034	
July 19	do	4 26	84,878	
July 19	do	4 13	75,317	
October 26	do	5 05	146,445	
October 26	do	5.54	198,319	
October 27	do	4 66	117,316	
1922				
January 7	do	4 47	113,578	
January 8	do	6 24	291,056	
January 10	do	5 13	170,508	
March 17	do	4 03	97,986	

Daily and monthly discharges, in liters per second, of Adgawan River near Sigunto, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				29,760	66,200	74,550	82,080	111,650	94,080	164,000	60,680	39,960
2				26,760	43,890	41,400	91,800	66,800	340,000	177,000	85,400	51,720
3				25,320	36,690	86,950	63,800	136,250	101,480	86,000	79,120	45,200
4				24,360	163,800	37,840	98,120	82,080	68,640	75,880	52,560	58,760
5				29,240	50,280	54,240	79,200	56,000	69,880	68,210	59,720	86,000
6				29,240	51,600	52,920	53,840	44,960	76,400	61,160	72,800	90,840
7				28,200	37,260	94,320	45,920	43,200	97,280	72,290	61,160	82,480
8				23,400	27,720	94,320	41,880	56,000	83,560	79,120	60,680	97,040
9				37,260	25,320	46,410	75,700	57,620	68,020	169,400	72,800	43,300
10				64,600	27,720	97,200	43,640	49,560	55,460	130,500	60,680	41,400
11				127,800	27,240	84,150	57,080	65,600	97,280	175,000	66,680	39,960
12				32,360	24,360	154,350	63,800	99,800	82,820	147,000	68,210	39,240
13				24,360	27,240	167,000	51,680	89,520	56,540	88,400	55,160	43,680
14				27,240	42,000	97,280	41,440	63,800	45,920	70,250	51,300	41,040
15				22,500	237,520	98,960	41,000	43,200	62,600	111,100	47,600	44,820
16				18,900	381,680	360,000	83,560	35,920	77,800	89,600	138,500	68,720
17				18,000	335,440	156,200	49,560	32,800	45,400	299,400	84,800	56,920
18				17,100	180,900	76,400	41,440	34,360	39,280	107,200	58,760	58,760
19				16,230	88,760	58,160	79,900	47,480	67,400	150,400	50,460	69,740
20				20,250	55,620	102,320	51,680	41,880	168,300	134,500	46,400	91,460
21				21,150	45,780	72,360	41,980	59,780	84,200	211,000	45,200	81,920
22				29,240	43,890	205,600	40,140	51,140	114,350	114,350	43,680	58,760
23				27,240	33,460	152,600	34,360	38,420	103,300	155,500	71,270	51,720
24				31,320	29,760	150,200	32,210	40,140	116,500	147,000	99,520	60,200
25				25,320	27,720	116,500	35,530	46,440	83,040	111,100	53,400	62,600
26				24,360	70,350	144,200	83,560	51,680	101,380	172,100	46,000	56,040
27				26,280	37,260	87,260	59,240	50,600	69,740	108,500	52,560	49,200
28				226,640	31,840	159,800	52,220	75,000	83,600	91,460	46,000	51,300
29				270,160	30,280	107,400	139,000	528,000	93,370	83,040	45,200	62,120
30				133,950	113,260	122,500	322,000	322,000	235,000	80,240	42,160	97,040
31					29,790		76,400	76,400		70,250		63,620
Maximum				270,160	381,680	360,000	322,000	528,000	340,000	299,400	138,500	97,040
Minimum				16,230	24,360	37,840	32,210	32,800	39,280	61,160	42,160	39,240
Mean				48,616	79,827	111,780	69,476	83,809	76,086	122,611	62,615	60,825

Daily and monthly discharges, in liters per second, of Adgawan River near Sigunto, Agusan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	82,280	209,000	58,760									
2	60,680	215,200	53,400									
3	51,720	199,000	47,600									
4	53,400	102,650	43,700									
5	57,800	133,700	41,400									
6	74,880	145,300	46,000									
7	89,600	405,800	43,300									
8	209,000	687,200	44,500									
9	538,800	440,800	44,500									
10	155,500	344,200	53,840									
11	87,200	195,000	49,200									
12	74,880	99,520	466,000									
13	90,840	90,840	256,600									
14	82,280	75,920	82,280									
15	86,600	70,250	65,660									
16	199,000	63,620	63,110									
17	132,100	64,640	77,480									
18	281,750	53,400	170,100									
19	158,050	51,300	82,280									
20	127,300	67,700	71,270									
21	97,660	97,660	65,150									
22	115,000	107,850	53,400									
23	126,500	182,000	47,600									
24	259,000	65,660	48,400									
25	103,300	51,720	87,200									
26	80,240	49,200	147,000									
27	103,950	49,620	97,040									
28	94,560	50,880	70,760									
29	112,400		47,600									
30	128,900		48,400									
31	213,000		44,300									
Maximum	538,800	687,200	466,000									
Minimum	51,720	49,200	41,400									
Mean	133,167	156,058	84,446									

AGUSAN PROVINCE

AGUSAN RIVER, TALACOGON

LOCATION.—About 15 m. upstream from Talacogon wharf.

RECORDS AVAILABLE.—From February 24, 1921, to March 31, 1922.

GAGE.—Standard metric gage board vertically fastened to a pier of the wharf on the left side of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages; straight for 300 m. above and below the station; both banks permanent, and high. Stream bed muddy.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 2,080,560 second-liters on March 17, 1921; minimum discharge 199,240 second-liters on April 22, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Records fair.

Discharge measurements of Agusan River, near Talacogon, Agusan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
March 20	B. and A	10 58	1,849,334	
May 12	Abejero	5 08	427,136	
May 13	do.	5 00	317,532	
August 17	do.	4 26	259,354	
September 24	do.	4 98	390,764	
September 26	do.	5.08	415,113	
November 26	do	4 78	360,066	

Daily and monthly discharges, in liters per second, of Agusan River near Talacogon, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			874,600	1,131,560	647,480	378,000	448,800	360,080	335,400	544,600	736,640	306,480
2			886,280	1,008,920	664,520	417,560	555,700	350,480	592,160	565,540	702,320	329,880
3			775,320	938,840	664,520	437,500	446,540	346,560	539,400	589,480	673,120	310,000
4			681,880	848,320	670,200	465,060	455,700	372,040	570,780	547,200	639,000	308,200
5			676,040	760,720	647,480	639,000	432,980	346,560	542,000	544,600	586,800	301,320
6			716,920	693,560	616,760	404,700	402,620	329,880	552,440	584,200	562,920	306,480
7			959,280	639,000	576,080	451,100	378,000	320,800	557,680	534,200	542,000	311,800
8			915,480	592,160	534,200	411,120	362,240	324,400	516,280	529,080	529,080	329,880
9			1,028,120	544,600	498,680	406,840	368,120	303,040	491,400	592,160	518,840	308,200
10			1,337,640	513,720	469,820	411,120	350,480	299,600	508,600	565,540	516,280	297,880
11			1,645,480	474,600	442,020	428,460	333,560	342,720	508,600	639,000	506,120	289,280
12			1,864,480	439,760	413,260	411,120	360,280	337,240	493,800	656,000	508,600	275,840
13			1,966,680	406,840	390,180	411,120	344,600	354,400	453,400	544,600	469,820	262,720
14			2,033,840	376,000	386,060	411,120	331,720	339,080	428,960	552,440	446,540	246,680
15			2,057,200	350,480	458,000	424,040	319,000	319,000	448,800	557,680	411,120	234,400
16			2,077,640	311,800	549,820	503,640	328,040	294,440	555,700	573,400	547,200	254,600
17			2,080,560	287,560	605,720	444,280	333,560	269,280	291,000	589,480	479,400	285,840
18			2,063,040	262,720	565,540	437,500	339,080	240,480	291,000	600,200	455,700	303,040
19			2,022,160	246,680	568,160	415,400	342,760	259,440	360,080	584,120	458,000	368,120
20			1,981,280	222,360	565,540	394,300	331,720	287,560	390,180	589,480	437,500	320,800
21			1,905,360	213,640	568,160	428,460	310,000	254,600	354,400	647,480	428,460	402,620
22			1,884,920	199,240	565,540	479,400	292,720	275,840	362,240	581,440	419,720	406,840
23			1,809,000	202,120	547,200	529,080	275,840	253,000	428,460	633,400	415,400	415,400
24		555,060	1,690,960	223,840	521,400	536,800	256,200	231,360	386,060	560,300	402,620	428,460
25		523,960	1,668,840	219,400	518,840	489,000	237,440	225,320	380,000	424,040	331,720	411,120
26		565,540	1,598,760	219,400	498,680	489,000	289,280	228,320	413,260	653,160	339,080	398,460
27		581,440	1,773,960	253,000	465,060	458,000	282,400	225,320	386,060	787,000	324,400	384,000
28		570,780	1,420,640	460,300	432,980	474,600	269,280	226,800	408,980	757,800	346,560	374,000
29			1,359,320	570,780	234,400	484,200	292,720	432,980	374,000	734,440	342,760	396,380
30			1,286,320	608,480	246,680	460,300	362,240	508,600	513,720	725,680	320,800	386,060
31			1,178,280		299,600		340,920	534,200		696,480		366,160
Maximum		581,440	2,080,560	1,131,560	670,200	639,000	555,700	534,200	592,160	787,000	736,640	428,460
Minimum		523,960	676,040	199,240	234,400	378,000	237,440	225,320	291,000	424,040	320,800	234,400
Mean		559,356	1,491,974	474,013	510,928	451,061	347,566	315,912	433,363	601,104	480,851	332,934

NOTE.—Discharge determined from fairly well-defined rating curve.

Daily and monthly discharges, in liters per second, of Agusan River near Talacogon, Agusan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	360,280	1,540,360	944,680									
2	366,160	1,546,200	860,000									
3	354,400	1,543,280	798,680									
4	333,560	1,534,520	740,280									
5	333,560	1,552,040	693,560									
6	331,720	1,546,200	653,160									
7	354,400	1,668,840	614,000									
8	647,480	1,800,240	565,540									
9	1,011,840	1,887,840	544,580									
10	997,240	1,969,600	518,840									
11	1,189,960	2,038,000	489,680									
12	1,446,920	2,013,400	769,480									
13	1,449,840	1,984,200	839,560									
14	1,455,680	1,946,240	822,040									
15	1,446,920	1,890,760	839,560									
16	1,499,480	1,835,280	897,960									
17	1,499,480	1,765,200	897,960									
18	1,581,240	1,686,360	1,017,680									
19	1,616,280	1,622,120	979,720									
20	1,651,320	1,546,200	897,960									
21	1,627,960	1,505,320	851,240									
22	1,610,440	1,444,000	822,040									
23	1,636,720	1,379,760	792,840									
24	1,680,520	1,306,760	740,280									
25	1,668,840	1,236,680	708,160									
26	1,657,160	1,175,360	699,400									
27	1,639,640	1,093,600	772,400									
28	1,604,600	1,008,920	743,200									
29	1,581,240		684,800									
30	1,552,040		647,480									
31	1,540,360		573,400									
Maximum	1,680,520	2,038,000	1,017,680									
Minimum	331,720	1,008,920	489,680									
Mean	1,217,009	1,609,546	755,489									

NOTE.—See footnote to daily discharge for 1921.

AGUSAN PROVINCE

AGUSAN RIVER, SANTA JOSEFA

LOCATION.—In front of "plaza" at Santa Josefa.

RECORDS AVAILABLE.—From February 1, 1921, to March 31, 1922.

GAGE.—Two standard metric gage boards vertically set on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages, straight for about 300 m. above and below station; both banks high and covered with vegetation; stream bed sandy and muddy and subject to frequent changes during flood.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 2,457,200 second-liters on January 9, 1922; minimum discharge, 11,774 second-liters on October 31, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Record good for all stages below 450,000 second-liters; fair for higher stages.

Discharge measurements of Agusan River, near Santa Josefa, Agusan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 1	B. and A.	4 34	86,058	
February 24	do	5 66	534,591	
April 9	do	3 98	55,428	
June 9	Abejero	4 38	83,763	
June 10	do	4 26	72,860	
June 10	do	4 87	114,558	
August 10	do	3 94	52,300	
August 11	do	3 88	46,866	
August 12	do	3 82	42,540	
October 10	do	4 30	87,397	
October 11	do	4 12	72,302	
December 13	do	3 79	42,841	
December 14	do	4 18	76,032	
December 15	do	3 98	58,521	
1922				
March 1	do	4 23	80,369	
March 2	do	4 37	100,611	

Daily and monthly discharges, in liters per second, of Agusan River near Santa Josefa, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		77,960	109,600	64,040	132,000	92,680	62,980	65,620	55,500	62,800	14,050	50,120
2		79,240	106,000	67,760	108,880	80,520	74,420	61,240	53,100	70,280	12,018	51,300
3		85,260	91,320	66,520	93,360	76,680	93,160	57,800	53,700	58,500	12,506	48,380
4		79,240	77,960	62,800	74,120	72,840	76,500	59,520	53,100	57,300	14,330	47,220
5		71,560	72,840	59,700	69,000	70,920	76,500	57,000	57,300	54,300	37,230	51,900
6		65,280	89,280	58,500	72,840	82,480	72,340	50,200	57,900	55,500	67,760	50,700
7		65,280	130,480	60,320	75,400	91,320	64,740	50,200	65,280	50,120	75,400	66,520
8		63,420	111,040	56,700	70,280	93,360	59,520	69,380	62,800	57,900	70,920	81,800
9		60,320	91,320	55,500	59,700	80,520	78,780	58,660	59,100	68,380	66,520	69,640
10		59,100	255,200	53,100	62,800	94,040	95,760	53,080	62,800	76,040	61,560	51,300
11		61,560	472,680	52,500	61,560	127,440	90,680	47,400	69,000	65,280	49,540	48,380
12		62,800	Flood	51,900	56,700	140,800	65,620	45,300	63,420	72,200	55,500	46,060
13		72,840	471,200	50,700	56,700	155,780	71,300	43,200	53,100	64,040	53,100	48,380
14		67,760	320,600	49,540	72,840	172,200	74,420	41,130	47,220	71,560	51,300	65,280
15		62,800	228,680	49,540	87,240	207,000	91,920	39,120	56,100	62,800	36,600	57,900
16		78,600	199,800	47,220	101,680	195,000	83,400	37,860	47,220	72,840	64,040	73,450
17		89,280	127,440	47,220	135,800	183,300	85,800	37,860	45,480	65,900	82,480	69,000
18		75,400	109,600	46,640	190,220	151,900	94,400	41,130	46,060	67,760	66,520	76,040
19		72,200	111,040	46,640	156,200	140,800	70,340	39,120	27,170	62,800	58,500	87,240
20		66,520	104,560	50,700	142,200	142,600	57,800	39,120	51,300	60,940	54,300	106,720
21		66,520	113,200	47,220	116,800	101,200	54,600	40,440	50,120	64,040	55,500	91,320
22		76,680	111,760	49,540	103,840	85,800	50,200	43,200	46,060	65,900	51,900	76,680
23		71,560	103,840	49,540	84,520	93,160	48,100	46,060	42,510	106,720	53,100	76,680
24		72,840	92,680	50,700	67,760	97,120	46,000	46,060	41,130	434,660	50,700	69,000
25		72,200	84,520	66,520	78,600	85,800	44,600	46,060	39,120	246,400	48,380	65,280
26		95,400	80,520	62,800	67,760	91,920	53,080	47,220	38,490	281,000	50,120	59,100
27		118,320	78,600	141,400	60,320	89,440	56,200	45,480	50,700	94,040	64,040	60,320
28		103,120	83,160	Flood	62,800	94,400	57,800	57,900	59,700	60,320	58,500	69,000
29			77,960	410,520	72,200	82,200	62,100	77,960	71,560	56,700	54,300	56,700
30			74,760	149,480	121,360	68,430	83,400	63,420	80,520	26,250	54,300	53,100
31			67,760		113,200		82,200	57,300		11,774		51,300
Maximum		118,320	472,680	410,520	190,220	207,000	95,760	77,960	80,520	434,660	82,480	106,720
Minimum		59,100	67,760	46,640	56,700	68,420	44,600	37,860	27,170	11,774	12,018	46,060
Mean		74,750	141,647	73,285	91,248	111,388	70,279	50,485	53,552	87,905	51,500	68,737

Daily and monthly discharges, in liters per second, of Agusan River near Santa Josefa, Agusan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	52,360	83,400	79,920									
2	50,920	534,900	105,580									
3	53,080	281,000	93,160									
4	66,500	155,780	83,400									
5	104,120	178,860	76,500									
6	98,480	691,500	72,340									
7	315,000	1,064,100	75,460									
8	2,003,700	1,733,700	83,400									
9	2,457,200	1,793,100	85,800									
10	1,658,100	1,323,300	87,000									
11	794,100	794,100	95,760									
12	420,240	255,640	966,900									
13	268,200	274,600	1,020,900									
14	83,400	95,760	345,100									
15	243,400	72,340	255,640									
16	402,440	85,800	194,320									
17	204,600	83,400	116,800									
18	277,800	118,480	105,580									
19	224,720	99,840	137,200									
20	172,200	93,160	144,460									
21	237,400	89,440	165,840									
22	454,580	104,120	174,420									
23	439,400	115,140	120,160									
24	1,334,100	121,840	104,120									
25	945,300	113,480	113,480									
26	475,500	104,120	155,780									
27	291,020	91,920	123,520									
28	195,000	83,400	108,500									
29	172,200		91,920									
30	234,400		77,640									
31	159,660		72,340									
Maximum	2,457,200	1,793,100	1,020,900									
Minimum	50,920	72,340	72,340									
Mean	480,294	379,865	178,482									

AGUSAN PROVINCE

GIBUNG RIVER, EBRO

LOCATION.—About 8 m. downstream from the wharf at Ebro.

RECORDS AVAILABLE.—From February 19, 1921, to January 20, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages; straight for 50 m. above and 100 m. below the station. Stream bed sandy and muddy. Both banks high and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 88,920 second-liters on September 2, 1921; minimum discharge, 3,280 second-liters on August 10, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily; rating curve well-defined below 80,000 second-liters; fair for higher stages.

Discharge measurements of Gibung River, near Ebro, Agusan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 20	B. and A	4 51	38,233	
February 21	do	4 68	36,068	
March 25	do	4 46	35,525	
March 26	do	4 21	32 540	
March 27	do	4 06	29,403	
March 27	do	3 97	28,703	
March 28	do	3 80	23,626	
May 19	Abejero	4 94	39,765	
May 19	do	3.12	46,214	
May 20	do	4 36	31,411	
May 21	do	3 88	25,674	
May 22	do	3 58	22,852	
May 23	do	3 25	18,712	
July 24	do	2 72	14,071	
July 25	do	2 86	16,396	
November 1	do	4 58	35,846	
November 1	do	4 44	31,210	
November 2	do	4 24	27,906	
1922				
January 19	do	6 89	88,499	
January 20	do	6 81	84,248	

Daily and monthly discharges, in liters per second, of Gibung River near Ebro, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			54,396	20,540	51,120	36,420	23,316	10,248	83,304	20,664	37,380	27,512
2			60,816	20,912	36,740	32,672	23,572	14,436	88,920	18,130	36,420	26,380
3			56,248	19,300	28,808	25,020	21,284	11,808	80,600	14,870	68,380	34,732
4			60,154	17,898	27,080	23,444	16,868	9,728	78,104	12,744	63,796	42,560
5			60,734	17,782	22,804	20,540	16,532	7,856	61,028	16,980	61,492	42,892
6			53,486	17,208	18,362	17,094	16,868	9,728	50,590	10,768	59,968	43,058
7			46,070	19,300	21,284	17,436	14,544	13,472	25,020	10,352	57,736	43,224
8			47,600	19,064	13,896	20,416	17,208	9,936	17,782	15,860	52,576	26,660
9			81,224	16,084	13,368	19,920	22,292	5,360	27,080	22,036	48,304	23,316
10			86,424	16,644	15,420	18,828	20,044	3,280	28,808	24,624	49,912	18,130
11			86,840	15,420	16,084	19,548	16,308	9,936	33,288	21,532	53,668	16,084
12			86,008	14,980	16,756	15,640	17,782	15,860	21,284	29,528	46,920	14,652
13			85,384	13,368	16,980	20,292	38,660	19,300	18,828	34,732	43,224	13,680
14			79,976	12,120	18,014	26,800	38,340	19,796	18,130	40,900	42,892	15,200
15			75,400	11,392	41,896	20,664	40,740	13,472	17,094	28,376	43,224	17,094
16			75,192	10,976	56,620	18,828	40,420	10,248	16,756	24,756	43,224	14,544
17			76,440	10,456	62,068	18,828	33,442	9,728	16,084	35,780	60,724	32,980
18			79,560	9,936	57,922	15,530	26,800	4,528	10,144	47,260	60,532	47,952
19		37,060	78,520	10,352	46,240	14,112	22,676	10,560	16,644	45,900	60,724	52,394
20		38,660	63,220	11,392	31,292	16,420	20,540	16,980	15,530	50,240	51,120	69,180
21		38,340	61,292	10,144	26,520	18,946	17,666	21,908	14,760	42,726	39,620	71,656
22		35,780	54,396	10,248	36,900	16,308	15,200	20,044	13,896	34,732	31,440	66,180
23		37,060	42,892	10,664	17,898	21,036	13,680	20,912	20,044	28,808	31,440	55,504
24		35,460	40,260	36,420	16,980	50,416	12,848	14,544	27,368	66,180	28,520	52,030
25		38,820	35,144	32,980	15,310	52,758	14,112	12,016	26,660	72,280	23,572	51,120
26		37,700	31,788	21,780	13,264	52,940	12,016	12,224	25,972	73,112	20,912	28,088
27		38,980	28,808	19,424	22,548	22,676	10,976	12,848	26,108	68,580	39,300	26,244
28		37,700	26,180	50,064	16,532	25,972	10,768	13,576	20,292	60,340	52,212	26,800
29			23,832	65,280	15,420	25,700	11,600	58,108	17,208	47,090	43,556	50,416
30			22,164	61,180	22,676	24,888	12,224	73,528	25,156	47,776	35,460	36,100
31			21,036	..	35,144		10,456	71,448	. .	62,604	..	29,096
Maximum		38,980	86,840	65,380	62,068	52,940	40,740	73,528	88,920	73,112	68,380	71,656
Minimum		35,460	21,036	9,936	13,264	14,112	10,456	3,280	10,144	10,352	20,912	13,680
Mean		37,556	57,467	20,780	27,482	24,336	20,316	17,981	31,416	36,460	46,268	35,983

AGUSAN PROVINCE

SIMULAO RIVER, LIBERTAD

LOCATION.—About the north end of Libertad.

RECORDS AVAILABLE.—From February 6, 1921, to March 31, 1922.

GAGE.—Two inclined standard metric gage boards set on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and 50 m. below the station, stream bed sandy and gravelly. Both banks low and subject to overflow at extreme high flood. Right bank is covered with vegetation and near left bank is the settlement of Libertad.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 589,200 second-liters on February 8, 1922; minimum discharge, 5,700 second-liters on July 25, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Records good below 100,000 second-liters, fair for higher stages; discharge below 12,000 second-liters may be in error.

Discharge measurements of Simulao River, near Libertad, Agusan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 6.	B. and A	3 70	42,182	
April 13	do.	3 36	26,030	
April 14.	do.	3 32	23,166	
April 15	do.	3 26	22,018	
June 14 .	Abejero	3 06	21,727	
June 15..	do.	4 49	71,983	
August 5 .	do.	3 34	22,849	
October 5	do.	3 44	31,914	
October 6	do	3 56	35,016	
December 7	do.	3 98	52,258	
December 7	do.	3 85	46,242	
December 8	do.	3 66	39,224	
1922				
February 25..	do	4 48	62,087	
February 26.	do	4 32	54,748	

Daily and monthly discharges, in liters per second, of Simulao River near Libertad, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			176,310	58,440	85,230	72,400	19,780	20,684	26,000	64,660	46,700	28,608
2			128,470	50,490	61,880	69,270	18,496	19,780	22,100	90,160	69,620	32,600
3			117,810	40,400	52,950	82,010	18,292	19,132	19,132	51,518	107,600	41,858
4			93,510	47,620	49,260	33,000	19,132	22,588	17,884	35,600	54,290	39,940
5			111,910	47,620	43,200	31,100	17,680	26,288	17,080	31,644	41,472	75,360
6		40,800	213,410	38,020	40,400	29,580	16,880	20,006	31,960	32,280	51,516	59,100
7		39,600	201,150	41,200	34,140	27,300	16,296	19,132	33,898	33,560	78,900	50,616
8		34,140	169,410	33,380	32,620	24,340	15,720	24,620	29,788	96,880	80,100	43,836
9		31,100	159,290	47,210	28,820	22,120	14,800	19,348	21,862	43,836	63,100	32,920
10		29,960	251,750	44,000	25,820	19,950	16,488	25,724	23,076	41,472	41,858	29,492
11		34,520	353,410	38,020	29,580	18,510	15,720	18,916	26,864	41,472	42,244	26,864
12		27,300	341,910	30,340	25,080	16,350	34,912	23,580	20,684	47,128	43,836	25,172
13		52,950	328,450	26,190	26,560	14,910	19,348	20,684	18,496	32,280	44,640	22,588
14		41,200	270,150	23,970	25,820	13,830	25,172	24,100	16,488	31,644	22,588	36,300
15		35,680	228,750	22,490	42,000	88,910	24,100	16,104	16,104	31,012	28,084	27,732
16		144,030	196,550	21,030	44,400	33,560	26,864	15,912	12,728	29,196	135,000	28,084
17		63,600	162,050	19,950	46,800	41,472	25,724	15,536	14,272	27,732	73,040	94,160
18		67,950	157,450	18,510	35,290	28,608	19,348	14,272	14,624	26,288	43,032	118,000
19		55,890	131,690	77,790	27,300	26,288	15,168	13,232	26,864	23,580	35,250	243,400
20		86,150	110,990	16,350	24,340	23,076	11,100	14,448	21,148	23,580	32,600	201,600
21		74,200	64,460	15,630	22,120	21,862	10,700	13,576	24,100	22,100	32,600	118,760
22		69,710	59,300	19,950	19,950	20,684	10,100	19,564	19,348	20,232	30,084	57,140
23		74,650	58,440	24,710	17,790	21,386	9,500	18,916	21,624	313,000	71,300	55,230
24		57,150	80,170	24,340	16,350	21,148	5,860	17,080	17,680	386,000	73,040	47,984
25		67,950	93,510	78,950	15,270	20,684	5,700	15,720	14,624	148,000	37,720	42,630
26		55,890	135,370	87,070	13,830	20,252	33,560	16,104	16,104	94,840	34,696	58,500
27		90,750	111,910	105,470	12,750	19,348	29,788	15,352	69,620	67,380	126,000	43,836
28		102,550	94,890	242,590	12,390	20,684	26,288	20,232	111,160	60,100	62,100	105,260
29			61,880	204,590	14,190	25,448	23,580	40,320	60,100	47,128	37,720	73,040
30			78,790	132,150	15,270	22,344	23,076	43,836	237,500	62,100	31,644	59,100
31			74,200		17,070		21,624	30,696		63,100		77,100
Maximum			144,030	353,410	242,590	85,230	88,910	34,912	43,836	237,500	386,000	135,000	243,400
Minimum			27,300	58,440	15,630	12,390	13,830	5,700	13,232	12,728	20,232	22,588	22,588
Mean			59,901	155,398	55,949	29,564	31,013	19,058	20,851	34,097	68,371	55,612	64,413

AGUSAN PROVINCE

UMAYAN RIVER, LORETO

LOCATION.—About 100 m. upstream from the wharf at Loreto.

RECORDS AVAILABLE.—From February 11, 1921, to March 31, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low water and from boat at high stage at 50 m. above gaging section.

CHANNEL AND BANKS.—One channel at all stages; straight for 150 m. above and 100 m. below gage. Stream bed sandy and gravelly. Both banks high, composed of alluvial soil and covered with cultivated plants.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 460,320 second-liters on January 9, 1922; minimum discharge, 11,280 second-liters on April 19, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Record good below 163,000 second-liters. For higher stages records may be in error due to drifts which sometimes dammed up the water.

Discharge measurements of Umayan River, near Loreto, Agusan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 12	P. B. A	2 71	26,845	
April 4	B. and A	2 62	21,486	
June 3	Abejero	3 48	70,233	
June 4	do.	3 90	92,460	
July 29	do.	3 76	97,636	
July 29	do	3 34	64,598	
July 30	do.	3.50	77,407	
October 21.	do.	4 48	138,763	
October 21	do.	4 03	100,629	
December 21	do.	2 88	31,886	
December 23	do.	2,69	25,174	
December 24	do	3 37	63,177	
December 25	do	2 94	33,722	
December 26	do.	2 74	28,304	
1922				
March 11	do.	2 66	22,157	
March 12	do	6 14	300,584	

Daily and monthly discharges, in liters per second, of Umayan River near Poblacion, Loreto, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			138,140	24,840	246,700	20,200	55,120	69,900	240,000	55,500	39,360	18,660
2			165,740	25,380	145,500	15,420	62,420	94,540	104,200	236,920	195,280	28,320
3			166,660	24,840	47,000	63,100	51,340	37,520	102,520	98,400	34,400	27,980
4			61,740	24,840	43,400	89,700	56,400	35,780	53,340	56,660	31,076	30,032
5			88,120	24,840	41,600	56,400	61,740	32,400	48,700	45,300	32,150	78,100
6			107,560	23,780	39,260	48,240	60,380	30,240	71,360	38,080	38,080	38,080
7			72,980	23,260	38,100	63,100	34,640	29,160	86,780	59,580	31,788	74,000
8			54,480	22,740	36,940	112,840	30,780	25,380	86,780	34,020	26,640	40,220
9			132,620	22,220	35,780	101,100	113,700	34,640	68,408	229,300	51,240	31,788
10			381,940	21,700	34,640	75,860	38,100	44,600	45,300	229,300	39,790	27,640
11		46,400	368,140	20,700	34,640	88,900	32,400	32,400	34,020	61,350	36,400	23,800
12		31,860	197,300	19,700	34,640	99,460	47,000	32,960	51,760	164,700	61,950	21,416
13		23,780	184,140	18,720	32,400	168,500	34,640	35,200	34,400	82,340	31,076	21,120
14		28,080	309,260	17,280	31,320	237,500	42,800	33,520	29,000	53,340	27,640	20,886
15		16,800	322,140	16,800	39,840	197,940	106,040	19,700	63,750	88,300	25,030	25,650
16		278,900	184,140	15,880	285,340	126,180	105,200	14,500	63,750	125,860	114,700	31,788
17		230,140	154,700	14,040	290,860	89,760	71,540	13,560	123,980	204,900	57,240	133,840
18		119,860	149,180	31,120	272,460	94,540	64,550	15,880	123,980	131,800	42,450	78,100
19		102,740	112,840	11,280	241,180	116,340	48,860	59,200	125,860	356,600	31,788	76,720
20		76,820	95,360	46,600	212,260	118,980	47,620	22,740	60,170	187,440	27,640	53,340
21		64,500	87,340	24,840	196,100	104,380	39,260	47,620	42,450	111,100	25,650	31,788
22		55,120	76,820	21,200	159,300	64,500	33,520	32,400	92,920	76,720	44,340	29,000
23		92,100	88,120	24,840	118,100	150,100	36,460	28,080	95,230	90,300	25,030	35,600
24		61,380	62,420	33,520	39,460	251,300	23,780	32,400	53,880	112,900	29,000	37,240
25		219,100	53,840	30,240	83,440	244,860	19,200	40,420	118,340	77,400	31,788	32,880
26		156,540	51,340	27,540	63,100	126,180	38,100	37,520	57,820	90,300	29,000	27,640
27		171,260	51,340	25,920	45,200	61,740	64,500	48,860	76,720	63,750	26,310	31,788
28		83,440	48,860	118,100	39,260	74,420	45,200	133,540	105,880	46,260	22,900	38,500
29			36,360	340,540	38,100	47,000	63,100	437,920	102,520	20,836	21,416	52,280
30			30,240	290,860	31,860	65,200	56,400	114,700	104,200	34,800	19,984	41,550
31			26,460		24,840		39,840	160,640		30,032		33,640
Maximum		278,900	381,940	340,540	290,860	251,300	113,700	437,920	240,000	356,600	195,280	133,840
Minimum		16,800	26,460	11,280	24,840	15,420	19,200	13,560	29,000	20,836	19,984	18,660
Mean		102,875	134,010	45,672	97,504	105,789	52,083	58,981	82,434	106,261	41,705	41,075

Daily and monthly discharges, in liters per second, of Umayan River near Poblacion, Loreto, Agusan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	42,450	190,000	31,788									
2	32,880	163,520	30,376									
3	29,000	112,900	27,640									
4	27,640	100,840	21,712									
5	35,600	72,680	23,800									
6	42,000	87,540	22,600									
7	23,500	146,420	29,688									
8	123,040	331,120	33,260									
9	460,320	368,880	22,600									
10	123,980	317,400	23,500									
11	58,980	94,460	30,376									
12	51,240	83,780	311,880									
13	67,470	75,360	368,880									
14	46,260	68,116	96,800									
15	44,340	65,598	64,974									
16	203,500	56,080	38,500									
17	195,280	53,880	91,380									
18	107,560	40,220	51,240									
19	130,800	38,500	42,450									
20	122,100	34,800	47,700									
21	64,350	45,300	38,080									
22	92,920	80,900	29,688									
23	178,560	52,800	23,200									
24	340,920	40,220	34,800									
25	116,500	33,260	29,688									
26	62,550	28,320	27,300									
27	109,300	28,320	25,650									
28	137,940	27,640	21,416									
29	195,280		19,700									
30	226,300		19,920									
31	122,100		18,920									
Maximum.	460,320	368,880	368,880									
Minimum	23,500	27,640	18,920									
Mean	116,602	101,388	54,791									

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ALBAY PROVINCE

CALACRAN RIVER, OAS

LOCATION.—About 2 km. in the easterly direction from the Oas–Manga trail.

RECORDS AVAILABLE.—From January 5, 1921, to September 9, 1922.

GAGE.—Standard metric gageboard vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for about 60 m. above and below the stations; stream bed sandy and muddy. Both banks high of earthy texture and covered with vegetation.

EXTREME OF DISCHARGE.—Maximum discharge recorded during period of observation, 77,230 second-liters on August 1, 1922; minimum discharge, 304 second-liters on June 13, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Records determined from poorly-defined curves.

Discharge measurements of Calacran River, near Sabang, Oas, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 5	S. Musa	.65	1,558	
May 19	do.	45	1,316	
August 5	Buchanan and Musa	95	4,387	
September 2	S. Musa	1 15	8,067	
December 10	O. Buenaventura	1 05	4,849	
December 24	do.	94	3,865	
1922				
January 2	S Musa	96	3,268	
January 24	do.	86	2,393	
January 25	do.	85	2,156	
March 6	do.	70	873	
March 7	O. Buenaventura	68	806	
March 23	S. Musa	42	801	
April 4	O. Buenaventura	40	671	
April 20	do.	40	697	
May 3	do.	42	848	
May 24	do.	50	1,391	
June 4	do.	39	490	
June 20	do.	42	669	

Daily and monthly discharges, in liters per second, of Calacran River near Sabang, Oas, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		2,720	1,970	2,370	640	1,615	2,210	3,880	17,810	6,025	8,100	8,980
2		2,050	1,895	2,050	820	1,485	2,370	3,110	6,145	17,560	15,140	7,440
3		1,750	1,365	1,615	1,365	1,020	4,000	2,910	7,140	3,835	42,420	7,220
4		2,050	2,210	1,365	730	920	51,810	3,315	17,250	3,570	42,200	6,800
5	1,365	2,540	8,850	1,820	550	920	40,210	4,000	15,330	6,025	41,100	14,040
6	1,750	38,810	25,650	1,750	820	820	10,810	3,760	17,250	3,970	39,780	12,500
7	1,615	17,810	65,410	1,485	1,365	1,615	8,065	4,260	18,370	7,440	42,640	7,220
8	2,540	4,000	33,210	1,750	505	2,210	4,825	3,420	16,970	9,860	34,500	6,025
9	1,245	3,530	22,850	1,550	1,485	2,455	4,825	17,810	18,930	8,760	34,060	5,335
10	1,750	2,910	5,450	1,485	1,425	2,540	12,210	18,370	18,930	17,560	65,960	4,700
11	1,750	2,050	3,880	1,130	1,485	2,910	4,975	18,930	31,250	16,020	66,180	3,835
12	1,245	1,750	2,050	1,020	1,425	2,050	4,260	13,610	43,960	13,380	66,840	3,335
13	1,750	1,365	1,615	820	820	3,110	4,530	18,370	41,760	12,940	66,180	3,570
14	2,720	2,050	2,370	1,365	505	2,370	2,810	16,410	45,500	14,480	63,100	7,660
15	2,290	1,365	3,110	820	385	3,520	2,370	4,825	30,760	13,380	34,500	8,980
16	4,390	1,750	3,315	920	820	4,000	2,370	4,130	26,360	12,940	13,820	8,540
17	3,010	2,050	3,210	820	1,365	2,370	3,110	4,260	13,160	10,300	7,440	7,880
18	1,895	2,720	3,110	1,365	1,365	2,540	3,110	4,530	3,970	3,835	8,100	7,000
19	1,550	1,750	4,260	820	820	2,810	4,260	2,910	3,075	3,835	6,400	5,670
20	1,750	3,760	2,720	820	1,365	2,210	8,850	3,315	2,960	2,615	5,335	5,670
21	1,615	47,210	2,810	1,020	730	2,370	20,610	2,720	3,885	2,185	5,335	4,395
22	2,050	52,810	2,210	820	1,750	2,050	5,790	2,910	16,020	2,615	6,800	5,170
23	2,720	17,810	2,630	640	1,365	1,615	6,720	2,810	16,900	2,185	10,300	4,700
24	1,895	38,810	2,540	775	820	2,455	5,130	2,370	11,620	1,500	14,700	4,110
25	1,365	35,730	2,370	920	820	2,910	4,825	2,720	31,420	1,980	27,460	4,700
26	1,750	17,810	3,110	1,365	1,615	2,455	6,520	3,420	13,820	2,615	45,060	6,025
27	2,630	4,130	2,810	550	1,360	1,365	6,145	2,910	16,020	2,395	26,580	8,100
28	2,210	2,910	2,210	820	820	970	4,975	3,420	12,500	1,980	22,180	6,400
29	4,130		1,820	1,365	1,365	550	4,390	3,110	9,420	2,845	14,700	5,010
30	3,110		2,210	820	1,615	1,485	4,000	3,530	8,320	3,320	12,500	5,010
31	3,420		2,540		820		3,315	4,825		3,970		4,700
Maximum	4,390	52,810	65,410	2,370	1,750	4,000	51,810	18,930	45,500	17,560	66,840	14,040
Minimum	1,245	1,365	1,365	550	385	550	2,210	2,370	2,960	1,500	5,335	3,570
Mean	2,204	11,286	7,283	1,208	1,069	2,054	8,206	6,157	17,894	6,965	29,647	6,491

NOTE.—Discharge determined from poorly defined rating curves.

Daily and monthly discharges, in liters per second, of Calacran River near Sabang, Oas, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,970	1,405	965	910	622	542	810	29,510 77,230	810			
2	3,320	1,785	715	564	682	446	810	46,606	1,164			
3	3,570	2,395	715	466	824	446	1,164	34,774	1,164			
4	2,845	2,080	555	564	682	446	1,164	31,990	3,460			
5	2,960	1,980	715	682	1,000	542	1,383	10,878	4,614			
6	2,395	1,785	715	564	1,000	669	1,066	8,094	7,630			
7	2,290	1,595	715	682	824	542	890	38,950	6,934			
8	2,185	1,405	555	564	824	542	890	21,550	6,704			
9	2,185	1,595	555	564	1,000	446	1,164	11,110	6,704			
10	1,980	1,405	555	564	1,164	446	9,950	9,950				
11	1,785	1,220	480	682	1,164	368	8,094	7,630				
12	1,980	1,050	715	824	970	368	2,638	6,704				
13	8,540	1,220	880	1,198	810	304	1,938	5,320				
14	6,800	965	1,135	748	669	542	1,383	4,846				
15	5,335	715	555	824	600	669	1,066	11,110				
16	6,025	715	715	824	669	542	669	18,070				
17	5,170	405	715	748	669	669	810	18,766				
18	4,700	880	880	682	542	738	3,632	12,270				
19	4,250	1,050	880	682	542	542	3,246	9,486				
20	3,570	1,405	715	682	669	600	4,382	7,862				
21	2,960	1,595	405	564	1,267	600	16,678	6,934				
22	2,615	1,405	555	564	1,383	810	13,662	5,078				
23	2,395	1,220	824	564	1,383	970	11,806	3,686				
24	2,505	965	682	564	1,164	1,164	12,038	2,454				
25	2,185	965	682	564	970	669	9,022	2,272				
26	1,880	880	682	564	600	490	7,166	1,938				
27	2,730	715	1,000	682	542	446	5,078	1,786				
28	2,395	715	824	564	542	446	4,382	1,164				
29	1,880		1,000	564	542	446	3,918	1,164				
30	1,595		1,000	682	446	542	3,032	970				
31	1,405		1,000		446		3,460	970				
Maximum	8,540	2,395	1,135	1,198	1,383	1,164	16,678	77,230	7,630			
Minimum	1,405	405	405	466	446	304	669	970	810			
Mean	3,239	1,268	745	663	813	566	4,413	14,521	4,354			

NOTE.—See footnote to daily discharge for 1921.

ALBAY PROVINCE

NACICI RIVER, LIGAO

LOCATION.—In the barrio of Nacici, about 10 m. north of the Ligao-Tabacco Provincial first-class road.

RECORDS AVAILABLE.—From January 4, 1921, to November 30, 1921.

GAGE.—Standard metric gage board vertically fastened to a tree on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 15 m. above and 25 m. below the station. Stream bed stony and sandy. Right bank high and of earthy texture; left bank low, of earthy texture and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge, recorded during period of observation, 44,850 second-liters on October 21, 1921; river frequently dry.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from a poorly-defined curve.

Discharge measurements of Nacici River, near Nacici, Ligao, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 4...	S. M. M	11	153	
January 22..	O. Buenaventura	08	204	
February 7 .	do	08	218	
February 24 .	S. M. M	14	77	
March 9	O. Buenaventura	14	374	
March 23	do	12	260	
June 6....	do.	10	242	
July 5	S. Musa .	25	854	
August 6 .	Buchanan and Musa	14	572	
September 1 .	S. Musa .	25	641	
September 2 .	O. Buenaventura	22	657	
September 17..	do.	18	924	
September 21	do	14	660	
October 10	S. Musa..	18	667	
October 12..	O. Buenaventura	20	977	

Daily and monthly discharges, in liters per second, of Nacici River near Nacici, Ligao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		47	148	107	892	2,827	5,450	1,265	4,255	1,760	272	
2		47	148	107	892	2,827	5,450	1,265	1,760	1,760	4,820	
3		47	148	107	892	2,827	24,940	1,265	1,265	2,412	(a)	
4		47	148	107	1,065	2,827	9,520	1,265	1,495	1,760	(a)	
5	107	47	148	107	1,265	2,827	3,265	592	1,265	1,760	(a)	
6	107	47	1,760	107	1,265	2,827	2,827	592	1,265	1,760	(a)	
7	107	47	9,520	107	1,265	2,827	2,827	592	892	2,060	(a)	
8	107	47	285	476	1,265	2,827	2,827	592	592	3,265	(a)	
9	107	47	372	210	1,265	2,827	2,827	892	892	1,760	(a)	
10	107	47	372	476	1,265	6,160	2,827	1,760	1,760	1,265	(a)	
11	107	47	372	476	1,265	2,827	2,827	1,265	2,060	1,495	(a)	
12	107	47	476	476	1,265	2,827	2,827	1,760	3,265	4,255	(a)	
13	107	47	476	476	1,265	4,255	2,827	1,265	[a] 47	2,412	(a)	
14	107	47	476	476	1,265	4,255	2,827	1,760	210	3,265	(a)	
15	107	47	1,760	476	1,265	5,450	2,827	592	3,265	3,736	(a)	
16	107	47	5,450	476	1,265	5,450	2,827	592	1,760	2,412	(a)	
17	107	47	2,412	476	1,265	4,255	3,265	372	1,265	1,206	(a)	
18	107	47	1,760	476	1,495	4,255	2,827	592	1,065	892	(a)	
19	107	372	1,760	476	1,265	4,255	2,827	372	1,760	1,760	(a)	
20	107	1,760	1,265	476	1,265	4,255	2,827	1,265	1,760	1,760	(a)	
21	72	107	1,265	476	1,265	4,255	2,827	730	5,450	44,850	592	
22	72	72	476	476	1,265	4,255	2,827	1,265	2,412	2,412	148	
23	47	47	107	476	1,265	4,255	2,827	2,412	1,760	372	372	
24	47	372	107	476	1,265	4,255	2,060	2,412	1,760	730	[a] 5	
25	47	372	107	476	1,265	4,255	2,060	1,265	1,760	1,760	[a] 1	
26	29	372	107	476	1,265	4,255	1,495	1,760	2,412	6,900	(a)	
27	47	107	107	476	1,265	8,600	1,495	1,495	4,255	4,820	(a)	
28	47	148	107	476	1,265	5,450	1,495	730	1,760	1,760	(a)	
29	47		107	476	1,265	5,450	1,495	372	2,412	592	(a)	
30	47		107	476	1,265	5,450	1,495	1,265	1,760	14,020	(a)	
31	47		107		1,265		1,495	1,495		3,265		
Maximum	107	1,760	9,520	476	1,495	8,600	24,940	2,412	5,450	44,850	4,820	
Minimum	29	47	107	107	892	2,827	1,495	372	[a] 47	372	(a)	
Mean	84	163	1,031	381	1,230	4,139	3,646	1,133	1,921	4,010	210	

[a] Channel closed.

ALBAY PROVINCE

PAULOG RIVER, LIGAO

LOCATION.—About 27.7 km. from Legaspi on downstream side of bridge on the Legaspi–Ligao Road.

RECORDS AVAILABLE.—From February 10, 1919, to July 15, 1922. Also from November 27, 1910, to April 20, 1912, at old location very near the present station.

GAGE.—Standard metric gage board fastened vertically to stone abutment of bridge.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge, at high water.

CHANNEL AND BANKS.—Channel is straight for 20 m. above and 25 m. below. At measuring section bed of stream is sandy and shifting. Both banks are high and not subject to overflow. Flow is fairly uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation 58,540 second-liters on December 23, 1910. Minimum discharge, 1,026 second-liters on June 14 to 18, 1920.

DIVERSIONS.—None above station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from November 27, 1910, to April 20, 1912, determined from a poorly-defined rating curve. From February 10, 1919, to December 25, 1921, determined from a fairly well-defined rating curve. From December 26, 1921, to July 15, 1922, determined from well-defined rating curve. Gage read twice daily.

Discharge measurements of Paulog River near Tuburan, Ligao, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
August 19	J. I. Quinn		1,560	
September 10	do		1,112	
October 17	do.		2,330	
November 27	do	82	2,360	
December 14	do.	85	2,620	
December 19	do.	87	2,770	
December 27	do.	91	3,470	
1911				
January 11	W. Demers	90	3,150	
January 19	do	86	2,800	
January 20	do	88	2,900	
January 30	do.	86	2,540	
Fberuary 1	do	88	2,550	
February 9	do	86	2,780	
February 20	do.	1 06	6,460	
February 27	do	92	3,389	
March 10	do.	87	2,303	
March 30	do.	90	2,200	
April 10	do	94	3,360	
April 24	do.	91	2,320	
May 4	do	93	2,570	
May 19	do	87	2,230	
May 29	do.	88	2,290	
June 5	do	86	2,080	
June 12	do	90	2,120	
June 21	do	86	1,980	
June 23	do	89	2,630	
June 26	do	86	2,070	
July 12	do	93	3,270	
July 29	do	92	2,770	
August 2	do	89	2,390	
August 11	do	87	1,990	

Discharge measurements of Paulog River near Tuburan, Ligao, Albay—Ctd.

Date	Made by—	Gage height (metere)	Discharge (second-liters)	Remarks
1911				
August 19	W. Demers.	95	3,520	
September 5	do	87	2,390	
September 7	do.	.85	1,940	
September 9	do	85	1,720	
September 20	do.	87	2,490	
September 22	do.	87	2,510	
September 23	do.	89	2,390	
October 4	do.	87	2,050	
October 9	do.	87	2,070	
October 30	do.	85	1,930	
December 5	do.	87	1,900	
December 7	do.		2,250	
December 16	do.	89	2,090	
December 19	do	87	2,220	
December 28	do	86	1,730	
1912				
January 4	do.	85	1,890	
January 16	do	87	2,070	
January 19	do.	86	1,780	
January 27	do.	84	1,910	
February 7	do.	85	1,750	
February 14	do.	85	1,910	
February 19	do.	84	1,870	
February 26	do.	86	1,680	
March 11	do	83	1,490	
March 21	do.	84	1,630	
April 3	do	84	1,620	
April 10	do	82	1,610	
1919				
February 8	W. Demers and A. Fegarido	48	2,130	
March 1	A. Fegarido	45	2,010	
March 21	do.	45	1,860	
April 15	do.	44	1,680	
April 24	A. Fegarido	40	1,490	
May 9	do	43	1,580	
May 16	do.	42	1,250	
June 5	do.	38	1,414	
June 30	do.	42	1,330	
July 7	do.	42	1,480	
July 19	do	43	1,570	
July 22	do	42	1,540	
August 18	do.	38	1,340	
September 4	A. Fegarido and M. B. Canas.	36	1,370	
September 16	do	38	1,560	
September 25	do	36	1,120	
October 8	do.	38	1,180	
October 22	do	40	1,480	
November 3	do	40	1,520	
November 4	do.	36	1,400	
November 13	do	40	1,520	
November 18	do	84	5,380	
December 1	A. Fegarido	50	2,290	
December 11	do.	46	1,980	
December 15	do	48	2,180	
1920				
January 9	M. B. Canas.	52	2,480	
January 14	do.	52	2,710	
February 6	do	48	2,030	
February 16	do.	50	2,110	
February 25	do.	48	2,080	
March 8	do.	48	2,290	
March 16	do.	46	1,960	
March 26	do.	46	1,860	
March 29	do	46	1,460	
April 10	do	42	1,140	
April 22	do.	44	1,460	
May 4	do.	40	1,560	
May 18	do.	44	1,900	
June 7	do	44	1,470	
June 18	do.	48	1,740	
July 8	do.	48	1,640	
July 21	do.	44	1,310	
July 29	M. B. Canas and O. Buenaventura.	46	1,440	
August 4	O. Buenaventura	45	1,378	

Discharge measurements of Paulog River near Tuburan, Ligao, Albay—Ctd.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
August 11	O. Buenaventura	43	1,244	
August 16	do.	40	1,058	
August 28	do.	42	1,245	
September 3	do.	47	1,642	
September 11	do.	46	1,534	
September 17	do.	49	1,837	
September 25	do.	59	3,199	
October 6	do.	51	2,070	
October 21	do	49	1,823	
October 29	do.	46	1,569	
November 4	do.	54	2,460	
November 12	do.	42	1,225	
November 19	do.	47	1,574	
November 27	do.	46	1,564	
December 3	do	48	1,739	
December 18	do.	46	1,639	
December 20	do.	46	1,627	
1921				
January 5	do.	44	1,391	
January 15	do.	43	1,270	
January 21	do.	45	1,479	
January 31	do	50	2,031	
February 5	do	48	1,760	
February 15	do	47	1,675	
February 21	do.	49	1,831	
February 28	do.	45	1,487	
March 8	do	57	2,861	
March 18	do	54	2,408	
March 21	do.	53	2,276	
March 31	do.	48	1,710	
April 5	do.	49	1,830	
April 21	do.	45	1,456	
March 30	do	41	1,119	
May 3	do.	40	1,091	
May 9	do.	44	1,362	
June 9	do	46	1,592	
June 30	do.	42	1,175	
July 9	do.	46	1,338	
July 27	do.	47	1,459	
August 4	do.	47	1,491	
August 23	do.	44	1,344	
September 1	do.	47	1,674	
September 17	do.	48	1,774	
September 20	do.	46	1,552	
October 4	do.	48	1,739	
October 12	do.	50	1,875	
November 3	do	68	4,806	
November 30	S. Musa	48	1,732	
December 5	do.	83	7,763	
December 21	O. Buenaventura	54	2,518	
December 29	do.	44	3,133	
1922				
January 3	do.	40	2,585	
January 11	do.	38	2,398	
January 16	do.	45	3,187	
January 26	do.	38	2,222	
February 2	do.	43	3,027	
February 23	do.	35	2,048	
March 3	do	34	1,903	
March 23	do.	34	1,907	
April 3	do.	33	1,661	
April 19	do.	32	1,581	
April 28	do.	28	1,441	
May 4	do.	29	1,579	
May 12	do.	27	1,305	
May 18	do.	28	1,539	
May 23	do.	34	1,777	
June 3	do.	26	1,477	
June 10	W. Demers and O. Buenaventura.	28	1,556	
June 19	S. Musa and O. Buenaventura.	28	1,499	
July 8	O. Buenaventura	29	1,553	

NOTE.—Gage-height readings from February 10, 1919 referred, to new datum.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Ambos Camarines, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												1,535
2												1,535
3												3,765
4												3,065
5												2,715
6												2,200
7												2,030
8												1,700
9												1,700
10												2,200
11												1,865
12												1,865
13												1,865
14												1,865
15												2,370
16												2,030
17												3,240
18												6,565
19												3,065
20												2,030
21												1,050
22												*18,115
23												*58,540
24												*18,815
25												*28,165
26												*10,765
27											1,700	7,440
28											1,700	*23,015
29											1,700	*12,165
30											1,700	7,265
31												5,515
Maximum											1,700	58,540
Minimum											1,700	1,050
Mean											1,700	7,744

NOTE.—Discharge determined from poorly defined rating curve applicable from November, 1910, to April, 1912.
* Discharges over 8,000 second-liters estimated from extension of curve.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,715	2,370	2,715	2,715	4,465	2,200	16,015	3,065	2,030	2,030	2,030	2,370
2	2,540	2,370	2,715	2,715	3,415	2,030	5,340	2,370	2,030	1,865	2,030	2,540
3	2,370	2,370	2,540	2,715	3,415	2,030	3,065	2,540	2,030	1,865	2,030	2,370
4	2,540	2,200	2,370	2,715	3,065	2,030	3,415	2,370	2,030	3,240	2,030	2,370
5	2,370	2,200	2,370	2,715	3,065	2,030	3,065	2,370	2,020	5,390	2,030	2,370
6	2,540	2,200	2,370	2,715	2,890	2,030	2,540	2,370	2,200	3,415	2,030	2,370
7	2,370	2,370	2,370	2,715	2,715	2,200	3,590	2,370	2,030	2,540	3,065	2,200
8	2,715	2,200	2,370	3,240	2,715	2,030	3,765	2,370	2,030	2,200	2,370	2,200
9	2,540	2,030	2,200	3,415	2,715	2,370	2,890	2,200	2,540	2,030	2,030	2,200
10	2,540	2,200	2,370	3,415	2,715	2,370	9,190	2,370	2,030	2,030	2,030	2,200
11	2,540	3,940	2,715	2,715	2,715	2,030	11,290	2,200	2,030	2,030	2,030	2,200
12	2,370	3,240	2,715	2,715	2,715	2,540	3,765	2,370	3,065	2,030	2,030	2,370
13	2,370	2,715	4,290	2,540	2,370	2,370	11,290	2,200	2,370	2,370	2,030	2,200
14	2,370	3,065	2,370	2,540	2,370	2,370	6,040	2,030	2,540	2,030	2,030	2,030
15	2,200	3,065	2,370	2,370	2,890	2,030	4,115	2,030	2,370	1,865	2,370	2,715
16	2,200	2,715	2,370	2,540	2,370	2,540	4,115	2,030	2,540	2,030	2,890	2,540
17	2,200	2,715	2,715	2,715	2,370	2,370	3,590	2,030	2,540	2,030	2,890	2,370
18	2,030	3,065	4,290	2,540	2,370	2,370	3,065	5,165	2,540	1,865	2,715	2,370
19	2,030	3,240	2,370	2,715	2,370	2,370	3,065	3,415	2,540	1,700	2,715	2,370
20	2,030	4,815	2,370	2,715	2,540	2,370	3,240	3,765	2,540	1,865	2,540	2,540
21	2,030	4,815	2,370	2,715	2,200	2,200	2,890	3,065	2,540	1,865	2,370	2,200
22	2,030	3,765	2,370	3,065	2,030	2,030	3,065	2,540	2,890	1,700	2,370	2,200
23	2,030	3,065	2,370	3,940	2,030	2,030	3,415	4,640	2,715	1,865	2,370	2,030
24	2,030	2,890	2,370	3,065	2,030	2,030	3,415	3,415	2,370	1,700	2,370	2,200
25	2,030	3,065	2,370	2,715	2,540	2,030	2,540	3,065	2,030	1,700	2,370	2,030
26	2,030	3,415	2,890	2,540	2,370	2,030	2,540	2,715	2,030	1,700	2,200	2,030
27	2,030	3,240	2,715	2,715	2,370	2,030	2,370	2,370	2,200	1,700	2,270	2,030
28	2,030	3,065	3,065	2,715	2,370	2,030	3,415	2,200	2,370	1,700	2,030	2,030
29	2,030	...	3,065	2,540	6,390	4,115	3,590	2,200	2,030	1,865	2,200	2,030
30	2,030	...	2,715	3,590	2,540	2,890	3,240	2,030	2,030	1,700	2,370	2,030
31	2,030		2,715		2,370	...	3,065	2,030		1,700	...	2,020
Maximum	2,715	4,815	4,290	3,940	6,390	4,115	16,015	5,165	3,065	5,390	3,065	2,715
Minimum	2,030	2,030	2,200	2,370	2,030	2,030	2,370	2,030	2,030	1,700	2,030	2,030
Mean	2,255	2,943	2,645	2,826	2,758	2,269	4,516	3,407	2,309	2,116	2,292	2,249

NOTE.—Discharge determined from poorly defined rating curve, applicable from November, 1910, to April, 1912.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,030	1,865	1,865	1,700								
2	2,030	1,700	1,700	1,700								
3	2,030	1,865	1,700	1,700								
4	2,030	1,700	1,700	1,700								
5	2,030	2,370	1,535	1,700								
6	2,030	2,030	1,700	1,700								
7	2,030	1,865	1,700	1,535								
8	2,030	2,030	1,700	1,535								
9	2,030	2,030	1,700	1,370								
10	2,030	1,865	1,700	1,370								
11	2,030	2,030	1,535	1,535								
12	4,290	2,030	1,535	1,700								
13	2,370	2,030	1,865	1,700								
14	2,370	1,865	1,700	1,700								
15	2,200	1,865	1,700	1,700								
16	2,030	1,865	1,535	1,700								
17	2,200	1,700	1,700	1,700								
18	2,030	1,700	1,700	1,700								
19	2,030	1,865	1,700	1,700								
20	2,030	3,765	1,700	1,700								
21	2,030	2,715	1,700									
22	2,030	2,370	1,700									
23	2,030	2,030	1,535									
24	2,030	2,030	1,535									
25	2,030	2,030	1,535									
26	1,865	2,030	1,535									
27	1,700	2,030	1,700									
28	1,700	2,030	1,535									
29	1,700	1,700	1,535									
30	1,700		1,535									
31	2,030		1,700									
Maximum	4,290	3,765	1,865	1,700								
Minimum	1,700	1,700	1,535	1,370								
Mean	2,088	2,104	1,597	1,642								

NOTE.—Discharge determined from poorly defined rating curve applicable from November, 1910, to April, 1912. Station maintenance discontinued after April 20, 1912.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			1,970	1,970	1,571	1,571	1,756	1,400	1,248	1,248	1,400	2,776
2			2,191	1,970	1,571	1,400	3,127	1,400	1,248	1,248	1,400	2,425
3			2,191	2,191	1,571	1,660	2,191	1,400	1,248	1,248	1,400	2,191
4			1,970	1,970	1,571	1,248	2,191	3,595	1,119	1,248	1,119	2,191
5			1,970	1,970	1,970	1,248	1,400	1,571	1,066	1,400	1,862	2,191
6			1,862	1,970	1,970	1,400	1,400	1,571	1,066	1,248	1,660	2,659
7			1,970	1,756	1,571	1,400	1,400	1,571	1,066	1,400	1,400	2,893
8			1,970	1,970	1,571	1,571	1,400	1,571	1,862	1,248	1,400	2,425
9			1,970	2,191	1,571	4,531	1,400	1,571	1,571	3,010	1,119	2,191
10		2,191	2,080	2,191	1,571	2,191	1,400	1,756	1,571	1,400	1,119	2,191
11		2,191	1,970	1,970	1,756	1,756	1,400	1,756	1,571	1,066	1,571	1,970
12		2,659	1,970	1,970	1,571	1,756	2,191	1,756	2,191	1,066	1,400	1,976
13		2,080	1,970	1,970	1,571	1,400	1,571	2,191	2,191	1,066	1,400	1,970
14		2,080	2,080	1,970	1,571	1,400	1,400	1,400	1,400	3,361	3,010	2,425
15		1,970	1,970	1,970	1,571	1,400	1,400	1,248	1,248	1,400	4,063	2,191
16		2,659	1,862	1,970	1,571	1,400	1,400	1,248	1,248	1,400	2,659	2,191
17		1,862	1,970	1,970	1,571	1,400	1,660	1,248	7,105	1,119	12,955	2,425
18		1,970	2,191	1,970	1,571	1,400	1,400	1,248	2,191	1,119	6,286	12,370
19		1,970	1,970	1,970	1,484	1,571	1,660	1,248	1,400	2,893	3,127	12,955
20		2,191	1,970	1,756	1,400	1,571	1,400	1,970	1,400	2,776	1,571	5,935
21		1,970	1,970	1,970	1,400	1,571	1,400	1,400	1,400	1,400	1,571	2,893
22		1,970	1,970	1,970	1,400	1,400	1,571	1,400	1,400	1,400	1,571	2,893
23		1,970	1,862	1,970	1,400	1,400	1,571	1,400	1,400	1,400	1,571	2,776
24		1,970	1,970	1,756	1,660	1,400	1,970	1,400	1,066	1,119	1,571	2,659
25		1,862	1,970	1,970	1,571	1,571	1,970	1,400	1,066	2,191	1,571	2,659
26		2,659	1,970	1,970	1,400	3,361	1,400	1,400	1,248	1,400	1,970	2,425
27		1,970	2,191	1,571	1,400	2,425	1,400	1,400	1,248	1,400	2,191	2,425
28		2,080	2,191	1,571	1,400	1,400	1,400	1,400	1,248	1,400	2,425	2,425
29			1,970	1,571	1,400	1,571	1,571	1,756	1,248	1,400	2,659	2,893
30			1,862	1,571	1,400	1,571	1,400	2,425	1,248	1,660	2,893	2,659
31			1,970		1,571		1,400	1,400		1,756		2,659
Maximum		2,659	2,191	2,191	1,970	4,531	3,127	3,595	7,105	3,361	12,955	12,955
Minimum		1,862	1,862	1,571	1,400	1,248	1,400	1,248	1,066	1,066	1,119	1,970
Mean		2,120	1,999	1,918	1,553	1,698	1,618	1,597	1,586	1,564	2,397	3,223

NOTE.—Discharge determined from a rating curve fairly well-defined between 1,000 and 2,200 second-liters. Discharge above and below these values are estimated from prolongation of curve.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,730	1,730	1,730	1,537	1,380	1,244	1,730	1,380	1,537	1,537	1,380	5,705
2	3,745	1,730	1,730	1,537	1,380	1,244	1,380	1,380	1,730	1,537	1,380	1,960
3	3,295	1,730	1,730	1,537	1,380	1,244	1,380	1,380	1,730	1,960	21,380	1,730
4	3,295	1,537	1,730	1,537	1,380	1,244	1,380	1,380	1,537	4,055	2,730	1,630
5	3,010	1,730	1,730	1,537	1,380	1,244	2,462	1,380	1,380	1,960	1,960	2,595
6	2,730	1,730	1,730	1,537	1,380	1,244	1,840	1,380	1,380	1,960	1,960	1,960
7	2,730	1,730	1,730	1,537	1,380	1,244	1,730	1,380	1,455	1,730	1,730	1,730
8	2,205	1,730	1,730	1,537	1,380	1,244	1,730	1,244	1,537	1,537	1,730	1,537
9	2,205	1,730	1,730	1,537	3,295	1,244	1,244	1,244	1,537	1,537	1,537	1,537
10	1,960	1,730	1,730	1,537	1,244	1,244	2,595	1,244	1,537	1,537	1,537	1,537
11	1,960	1,730	1,730	1,380	1,244	1,244	2,595	1,244	1,537	1,537	1,537	1,537
12	2,462	1,730	1,537	1,380	1,244	1,244	1,960	1,244	1,537	1,730	1,537	1,730
13	2,205	2,082	1,537	1,380	1,244	1,244	1,730	1,244	1,730	1,960	1,960	1,537
14	2,205	2,730	1,537	1,380	1,244	1,026	1,455	1,244	1,537	5,045	1,960	1,537
15	2,205	2,462	1,537	1,380	1,380	1,026	1,244	1,380	2,332	9,830	1,960	1,730
16	2,462	1,960	1,537	1,380	1,380	1,026	1,244	1,186	1,840	6,530	1,960	1,840
17	3,010	1,960	1,537	1,380	1,380	1,026	1,244	10,160	1,840	2,332	1,730	1,730
18	2,462	1,730	1,537	1,380	1,380	1,730	1,244	2,332	1,840	1,960	1,730	1,537
19	2,205	1,730	1,537	1,380	1,380	1,140	1,244	1,960	1,730	1,960	1,537	1,537
20	2,205	1,960	1,537	1,380	1,960	1,140	1,244	1,730	2,595	1,730	1,537	1,537
21	2,205	1,730	1,537	1,380	1,380	1,244	1,244	1,730	1,730	1,840	1,537	1,537
22	2,205	1,730	1,537	1,380	1,380	1,244	1,244	1,380	1,840	1,730	1,537	1,537
23	1,960	1,730	1,537	1,380	1,140	1,244	1,455	1,244	1,960	1,730	1,537	1,380
24	1,960	2,205	1,537	1,537	1,070	1,244	1,380	1,244	1,960	1,537	1,537	1,380
25	1,960	1,730	1,537	1,380	1,070	1,244	1,380	1,244	2,595	1,537	1,537	1,380
26	1,960	1,730	1,537	1,380	1,070	1,244	1,380	1,244	2,205	1,537	1,537	1,380
27	1,730	1,730	1,537	1,380	1,380	1,244	1,380	1,244	1,960	1,380	1,537	1,380
28	1,730	1,730	1,537	1,380	1,380	1,960	1,730	1,244	1,730	1,537	1,537	1,380
29	1,730	1,730	1,537	1,380	1,244	1,960	1,380	1,244	1,730	1,537	1,537	1,380
30	1,730		1,537	1,380	1,244	1,960	1,380	1,244	1,537	1,380	2,462	1,380
31	1,730		1,537		1,244		1,380	1,730		1,380		1,310
Maximum	3,745	2,730	1,730	1,537	3,295	1,960	2,595	10,160	2,595	9,830	21,380	5,705
Minimum	1,730	1,537	1,537	1,380	1,070	1,026	1,244	1,186	1,380	1,380	1,380	1,310
Mean	2,329	1,835	1,605	1,438	1,388	1,296	1,549	1,674	1,771	2,293	2,369	1,729

NOTE.—Daily discharge determined from a fairly defined curve, applicable throughout the year 1920 to December 25, 1921.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,310	2,205	1,960	1,730	1,244	1,244	1,380	1,960	3,462	1,730	2,595	1,730
2	1,960	1,960	1,840	1,730	1,244	1,244	1,730	1,840	1,730	1,730	12,965	1,630
3	1,380	1,840	1,730	1,730	1,244	1,244	5,540	1,730	1,380	1,730	4,715	2,082
4	1,380	1,730	1,730	1,630	1,244	1,380	7,520	2,332	1,730	1,730	3,150	1,730
5	1,380	1,730	1,730	1,730	1,244	1,537	4,550	1,537	1,630	1,730	3,295	7,355
6	1,380	1,537	2,595	1,730	1,244	1,730	2,205	1,380	1,537	1,537	3,010	2,870
7	1,380	1,537	4,880	1,730	1,380	1,537	1,730	1,380	2,332	1,537	3,010	2,205
8	1,380	1,537	2,462	1,730	1,380	1,537	1,730	1,630	1,730	1,730	1,730	1,960
9	1,780	1,537	2,462	1,730	1,380	2,082	1,630	1,537	1,730	,082	5,375	1,730
10	1,537	1,537	2,462	1,630	1,244	1,730	1,537	2,082	1,730	1,730	18,080	1,537
11	1,380	1,455	2,205	1,537	1,140	1,537	1,455	1,730	1,730	1,730	5,540	1,380
12	1,380	1,380	2,082	1,537	1,140	1,380	1,380	1,630	9,500	1,730	3,150	1,310
13	1,380	1,730	1,960	1,537	1,244	1,455	1,537	1,537	3,443	2,082	2,332	1,244
14	1,380	1,380	1,960	1,537	1,244	1,537	1,537	1,455	1,960	1,840	1,840	1,537
15	1,380	1,380	2,332	1,537	1,244	1,537	1,537	1,380	1,960	1,730	1,455	1,730
16	5,705	1,380	2,730	1,537	1,244	1,455	2,205	1,380	1,960	1,730	1,380	1,730
17	1,630	1,380	2,205	1,537	1,244	1,310	2,082	1,380	1,730	1,730	1,380	1,537
18	1,537	1,380	2,462	1,537	1,244	1,380	1,730	1,380	1,730	1,730	1,380	1,537
19	1,537	1,630	5,705	1,537	1,244	1,244	1,730	1,380	1,537	1,730	1,380	1,780
20	1,380	4,880	3,010	1,380	1,380	1,244	1,840	1,380	1,537	1,630	1,380	1,730
21	1,380	4,055	2,462	1,380	1,380	1,244	1,960	1,380	1,840	1,537	1,380	1,630
22	1,380	2,595	2,332	1,537	1,244	1,244	2,205	1,380	1,730	1,537	1,840	1,380
23	1,380	1,960	2,205	1,380	1,244	1,244	2,595	1,455	1,730	1,537	2,595	1,244
24	1,380	2,730	2,205	1,380	1,310	1,244	2,205	1,455	1,730	1,630	4,055	1,310
25	1,380	5,705	1,960	1,380	1,310	1,380	1,840	1,537	1,730	2,332	5,705	1,380
26	1,380	3,443	1,960	1,310	1,380	1,380	1,537	1,537	1,730	2,462	4,220	4,780
27	1,380	2,595	1,730	1,244	1,380	1,244	1,537	1,380	3,010	1,960	3,443	4,585
28	1,380	2,082	1,730	1,380	1,380	1,630	1,537	1,380	2,332	1,730	3,295	3,823
29	2,205	...	1,730	1,244	1,380	1,380	1,380	1,455	1,960	1,630	1,840	3,465
30	3,591		1,730	1,140	1,310	1,244	1,380	6,200	1,840	1,630	1,730	3,133
31	1,960	..	1,730	. .. .	1,310	.. ...	1,380	2,730	.....	1,462	.. ..	3,133
Maximum	5,705	5,705	5,705	1,730	1,380	2,082	7,520	6,200	9,500	2,462	18,080	7,355
Minimum	1,310	1,380	1,730	1,140	1,140	1,244	1,380	1,380	1,380	1,462	1,380	1,244
Mean	1,687	2,153	2,331	1,523	1,285	1,419	2,134	1,740	2,087	1,786	3,675	2,268

NOTE.—Discharge determined from well-defined rating curve, applicable from December 26, 1921, to July 15, 1922.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,133	2,354	2,145	1,866	1,623	2,145	1,954					
2	2,985	2,845	2,046	1,866	1,783	1,623	2,466					
3	2,845	2,354	1,954	1,783	1,550	1,346	2,145					
4	2,845	2,246	2,046	1,783	1,480	1,346	1,783					
5	2,712	2,585	2,046	1,783	1,480	3,295	1,623					
6	2,585	2,585	2,046	1,783	1,346	2,585	1,623					
7	2,585	2,354	1,954	1,783	1,346	1,954	1,623					
8	2,585	2,354	1,954	1,783	1,412	1,412	1,550					
9	2,585	2,354	1,954	1,783	1,480	1,346	1,550					
10	2,585	2,246	1,954	1,783	1,480	1,480	1,480					
11	2,585	2,246	1,954	1,783	1,480	1,480	3,133					
12	9,070	2,246	1,954	1,783	1,480	1,346	2,145					
13	3,644	2,145	1,954	1,783	1,550	1,346	1,550					
14	3,133	2,145	2,046	1,783	1,480	1,346	1,480					
15	3,465	2,145	2,046	1,783	1,480	1,346	1,480					
16	3,295	2,145	3,644	1,783	1,480	1,346						
17	2,985	2,145	2,145	1,783	1,480	1,550						
18	2,845	2,145	2,145	1,783	1,480	1,480						
19	2,585	2,145	2,046	1,783	1,480	1,480						
20	2,585	2,354	2,046	1,783	1,480	1,480						
21	2,585	2,246	1,954	1,623	2,246	1,480						
22	2,585	2,145	1,954	1,623	2,145	1,480						
23	2,585	2,145	1,954	1,623	1,954	1,480						
24	2,585	2,145	1,954	1,623	1,954	1,480						
25	2,354	2,145	1,954	1,623	1,954	1,480						
26	2,466	2,145	3,465	1,623	1,700	1,480						
27	3,644	2,145	3,295	1,623	1,623	1,412						
28	3,295	2,145	1,954	1,623	1,623	1,346						
29	2,985		1,954	1,623	1,550	1,346						
30	2,585		1,866	1,623	2,145	2,145						
31	2,585		1,866		2,145							
Maximum	9,070	2,845	3,644	1,866	2,246	3,295	3,133					
Minimum	2,354	2,145	1,866	1,623	1,346	1,346	1,480					
Mean	3,029	2,264	2,137	1,735	1,642	1,596	1,839					

NOTE.—See footnote to daily discharge for 1921.

ALBAY PROVINCE

POLANGUI RIVER, POLANGUI

LOCATION.—About 175 m. from Polangui and 40 Km. from Legaspi on the down stream side of bridge on the Legaspi–Libon Road.

RECORDS AVAILABLE.—February 10, 1911, to April 20, 1912.

GAGE.—No longer in existence. A standard metric gage board was fastened horizontally to a tree on right bank of river about 175 m. from the bridge. Chain 14.01 m. long used in measuring height.

DISCHARGE MEASUREMENTS.—Made by wading at low water, from concrete bridge at high water.

CHANNEL AND BANKS.—One channel at all times; straight for 400 m. above and 200 m. below the gaging section. Right and left bank only 1.5 m. high; subject to overflow, and covered with woods. Measuring section ideal but has rather shifting stream bed and flow rather swift.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 19,145 second-liters on July 1, 1911; minimum discharge, 400 second-liters on March 9, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge applicable from February to June, 1911, determined from a fairly well-defined curve from 550 to 3,300 second-liters; and from July, 1911, to April, 1912, from a fairly well-defined curve from 800 to 1,700 second-liters. Gage read twice daily.

Discharge measurements of Polangui River near Polangui, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
February 10	W. Demers	1 06	1,270	
February 11	do	1 10	1,750	
February 17	do	1 10	1,790	
February 18	do.	1 12	1,870	
February 22	do.	1 11	1,820	
March 9	do	1 08	1,617	
March 31	do.	1 00	1,030	
April 4	do	99	890	
April 17	do.	1 08	1,820	
May 5	do.	1 02	1,390	
May 6	do	1 03	1,670	
May 12	do	1 00	1,680	
May 26	do	95	1,140	
May 26	do	.95	1,200	
June 10	do.	.95	1,070	
June 22	do	96	1,110	
July 11	do.	1 47	6,810	
July 24	do	1 10	2,300	
August 7	do.	98	1,300	
August 18	do	94	1,510	
September 18	do	.91	760	
September 23	do.	90	680	
October 5	do	92	780	
October 10	do.	.88	560	
October 28	do.	91	720	
December 7	do.	90	860	
December 15	do.	.91	890	
December 20	do.	92	980	
December 27	do	92	1,050	

Discharge measurements of Polangui River near Polangui, Albay—Ctd.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1912				
January 3	W. Demers	1 00	1,760	
January 6	do.	95	1,280	
January 15	do	87	730	
January 18	do.	.92	1,030	
January 26	do.	.92	1,000	
February 8	do	.94	990	
February 13	do.	.92	990	
February 20	do.	90	840	
February 27	do	90	830	
March 4	do.	.91	780	
March 26	do.	1 00	900	
March 14	do.	94	810	
April 6	do.	91	880	
April 11	do.	1 01	720	

Daily and monthly discharges, in liters per second, of Polangui River near Polangui, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			2,370	1,500	1,650	1,050	19,145	1,710	1,370	795	875	1,115
2			2,450	1,500	1,650	1,125	7,405	1,540	1,200	955	1,115	1,035
3			2,290	1,500	1,810	1,050	3,855	1,540	1,200	875	795	955
4			2,290	1,500	1,650	1,125	3,095	1,455	1,035	955	1,370	955
5			2,290	1,500	1,650	1,200	2,905	1,285	1,115	1,710	795	955
6			2,130	1,350	1,730	690	2,715	1,370	1,035	1,115	955	955
7			2,130	1,500	2,130	1,200	2,525	2,070	1,285	1,115	1,200	1,035
8			2,130	1,500	1,650	1,050	2,160	1,200	1,115	875	1,115	1,115
9			2,130	3,090	1,575	1,050	2,620	1,370	1,035	955	725	955
10		1,970	2,130	3,570	1,500	1,275	4,555	955	725	875	955	875
11		2,610	2,290	2,610	2,370	900	8,760	955	955	955	1,115	955
12		2,930	2,130	2,450	1,350	1,200	3,655	1,115	725	875	1,035	875
13		2,530	1,970	2,130	1,500	1,350	11,760	1,200	955	795	795	955
14		2,450	2,050	1,970	1,350	1,500	7,760	1,115	955	795	875	875
15		2,290	1,810	1,970	1,200	1,275	4,970	1,035	955	875	955	795
16		2,290	1,810	3,010	1,275	1,500	3,955	1,285	955	955	1,115	795
17		2,290	1,650	2,050	1,125	1,650	3,655	1,115	795	875	1,370	875
18		2,370	1,650	1,970	1,275	1,730	3,190	1,800	955	875	1,200	795
19		2,450	1,810	2,210	1,275	1,200	4,255	2,525	725	795	1,455	725
20		2,610	1,650	2,130	3,490	1,275	3,190	2,715	590	795	1,370	875
21		2,770	1,650	1,890	1,425	1,200	3,095	3,570	875	795	1,285	955
22		2,610	1,650	1,650	1,350	1,500	3,000	2,525	795	795	1,285	1,035
23		2,290	1,650	2,690	1,350	1,050	2,715	6,485	875	795	1,370	955
24		2,210	1,730	1,425	1,050	1,200	2,525	3,380	655	795	955	875
25		2,370	1,650	1,810	1,050	760	2,070	2,430	1,035	725	1,285	725
26		2,770	1,890	1,890	1,200	900	1,890	2,160	725	725	1,115	875
27		2,690	1,890	1,650	1,350	1,425	1,980	1,625	1,035	590	1,200	1,115
28		2,530	1,650	1,730	690	1,650	1,540	1,800	1,115	590	1,115	955
29			1,575	1,730	1,200	1,650	1,890	1,625	795	795	725	955
30			1,050	1,730	1,050	1,425	1,890	1,455	955	875	1,035	955
31			1,425		690		1,540	1,370		955		955
Maximum		2,930	2,450	3,570	3,490	1,730	19,145	6,485	1,370	1,710	1,455	1,115
Minimum		1,970	1,050	1,350	690	690	1,540	955	590	590	725	725
Mean		2,478	2,225	1,974	1,471	1,239	4,203	1,864	951	843	1,087	912

NOTE.—Daily discharges from February to June, 1911, determined from a fairly well-defined curve from 550 to 2,300 second-liters.

Daily and monthly discharges, in liters per second, of Polangui River near Polangui, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	955	1,115	1,370	1,540								
2	1,115	1,115	1,540	1,370								
3	955	1,035	875	1,200								
4	955	1,115	795	725								
5	1,285	1,370	875	875								
6	1,455	1,115	1,370	955								
7	1,115	955	1,370	875								
8	795	1,115	1,115	955								
9	875	1,115	400	1,035								
10	955	955	795	1,370								
11	955	1,115	1,115	1,710								
12	1,285	875	1,285	1,625								
13	1,200	955	955	1,370								
14	1,115	875	1,115	1,200								
15	525	955	1,200	1,455								
16	875	955	1,200	1,455								
17	795	955	795	1,285								
18	875	955	875	1,455								
19	955	955	1,200	1,285								
20	955	1,035	1,035	1,455								
21	955	2,160	955									
22	1,035	1,370	795									
23	1,035	1,035	1,800									
24	955	955	795									
25	1,035	955	1,625									
26	955	655	1,285									
27	955	1,200	1,200									
28	955	1,115	1,625									
29	955	955	1,625									
30	1,035		1,625									
31	1,115		1,035									
Maximum	1,455	2,160	1,800	1,710								
Minimum	525	655	400	725								
Mean	999	1,070	1,149	1,259								

NOTE.—Discharges from July, 1911, to April, 1912, determined from a fairly well-defined curve from 800 to 1,700 second-liters.

ALBAY PROVINCE

QUINALI RIVER, GUINOBATAN

LOCATION.—About 25 Km. from Legaspi and about 60 m. above Reynold's Bridge on the Legaspi–Ligao Road.

RECORDS AVAILABLE.—From February 15, 1919, to December 31, 1922. Also from March 24, 1910, to April 20, 1912, inclusive, at a place 60 m. below present station.

GAGE.—Vertical and inclined sections for low and high water respectively set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low water, from bridge about 65 m. below the gage, at high water.

CHANNEL AND BANKS.—Channel straight for 25 m. above and 60 m. below regular section. Right bank is high, left bank low and subject to overflow. Stream bed at measuring section sandy and very shifting. Flow uniform.

EXTREMES OF DISCHARGES.—Maximum discharge recorded during period of observation, 61,310 second-liters on December 21, 1922, estimated from extension of rating curve. Minimum discharge, 208 second-liters on June 21, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from March, 1910, to June 20, 1911 and from June 21, 1911, to April, 1912, determined from fairly well-defined rating curves. From February to December, 1922, from fairly well-delned rating curves. Gage read twice daily.

Discharge measurements of Quinali River, near Banao, Guinobatan, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
March 24	J. I. Quinn	48	4,740	
April 11	do.	.49	3,510	
May 17	do.	.53	3,120	
May 26	do.	.58	3,180	
July 6	do.	.54	3,000	
July 23	do.	.54	3,060	
August 2	do.	.58	3,740	
August 12	do.	.53	2,340	
August 24	do.	.55	3,020	
August 24	do.	.55	2,270	
August 27	do.	.62	5,980	
August 27	do.	.62	4,170	
September 10	H. V. Hall	.58	3,560	
September 10	do.	.58	2,672	
October 17	do.	.62	6,720	
October 17	do.	.62	6,380	
November 22	J. I. Quinn	.74	12,970	
November 25	do.	.60	5,720	
November 25	do.	.60	5,180	
November 27	do.	.60	5,320	
December 14	do.	.58	6,390	
December 19	do.	.61	6,490	
December 27	W. Demers	.64	9,480	

Discharge measurements of Quinali River, near Banao, Guinobatan, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
January 11	W. Demers	.57	6,700	
January 19	do.	.50	5,220	
January 30	do.	.56	4,570	
February 2	do	.57	3,820	
February 9	do.	.56	4,190	
February 20	do.	.70	12,500	
February 28	do.	.62	6,783	
March 10	do.	.57	4,571	
March 30	do.	.58	3,960	
April 10	do.	.76	11,710	
April 22	do.	.57	3,320	
May 4	do	.56	4,220	
May 11	do	.55	3,140	
May 20	do.	.55	3,090	
May 29	do.	.55	3,130	
June 5	do.	.55	2,800	
June 12	do	.55	2,750	
June 21	do.	.55	3,070	
June 23	do.	.58	3,770	
June 26	do.	.54	2,190	
July 12	do.	.61	5,950	
August 2	do.	.58	5,040	
August 11	do.	.55	4,060	
August 19	do.	.74	7,730	
September 5	do	.55	3,920	
September 7	do.	.55	4,360	
September 9	do	.55	4,540	
September 20	do.	.58	4,270	
September 22	do.	.58	4,360	
September 23	do.	.63	6,410	
September 23	do.	.63	6,530	
October 4	do.	.57	3,720	
October 9	do.	.57	3,500	
October 27	do.	.54	2,570	
December 5	do	.58	3,070	
December 16	do.	.58	2,820	
December 19	do.	.57	2,210	
December 28	do.	.57	2,820	
1912				
January 2	do.	.63	3,380	
January 4	do.	.63	3,660	
January 16	do.	.59	3,180	
January 19	do.	.57	3,160	
January 27	do.	.57	3,060	
February 7	do.	.58	3,380	
February 14	do.	.58	2,580	
February 19	do.	.56	2,780	
February 26	do.	.58	2,900	
March 11	do.	.54	2,620	
March 21	do.	.58	2,500	
April 3	do.	.55	2,240	
April 10	do	.51	2,190	
1919				
February 14	A. Fegarido	.43	4,270	
March 1	do.	.41	3,060	
March 21	do.	.33	2,710	
April 16	do.	.36	2,580	
April 24	do.	.35	2,610	
May 9	do.	.31	2,100	
May 16	do.	.28	1,640	
June 5	do.	.28	1,660	
June 30	do.	.42	3,420	
July 19	do.	.42	3,490	
July 22	do.	.71	8,850	
July 7	do.	.43	3,520	
August 18	do.	.44	4,080	
September 4	A. Fegarido and M. Canas.	.41	3,210	
September 18	do.	.59	4,560	
September 26	do.	.40	2,720	
October 9	do.	.64	5,620	
November 3	do.	.40	2,720	

Discharge measurements of Quinali River, near Banao, Guinobatan, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
December 1	A. Fegarido	75	9,270	
December 11	do	.56	5,120	
December 15	do	.52	4,240	
1920				
January 9	M. B. Canas	.49	4,400	
January 14	do	47	4,300	
February 6	do	37	2,800	
February 17	do	.46	4,210	
February 25	do	.44	4,010	
March 8	do	38	2,110	
March 16	do	41	1,400	
March 26	do	.34	1,440	
March 30	do	.32	[a] 670	
April 9	do	26	[a] 960	
April 23	do	.20	[a] 210	
May 4	do	.30	[a] 880	
May 19	do	.26	[a] 710	
June 7	do	17	[a] 290	
June 18	do	18	[a] 320	
July 9	do	39	3,340	
July 20	M. Canas and O. Buenaventura	60	2,470	
July 29	do	61	2,500	
August 4	O. Buenaventura	22	1,966	
August 4	do	.22	2,423	
August 12	do	.20	2,216	
August 16	do	.19	2,166	
August 28	do	.50	5,676	
September 3	do	33	3,595	
September 11	do	26	2,805	
September 17	do	33	3,595	
September 25	do	.43	4,813	
October 5	do	.39	4,179	
October 21	do	.41	4,577	
October 29	do	.29	3,197	
November 4	do	.66	8,154	
November 12	do	.29	3,121	
November 19	do	32	3,524	
November 27	do	.29	3,126	
December 3	do	.48	5,421	
December 13	do	32	3,696	
December 20	do	29	3,140	
1921				
January 15	do	16	2,150	
January 21	do	23	2,593	
January 31	do	.55	6,801	
February 5	do	.21	2,503	
February 15	do	16	3,376	
February 21	do	.10	2,970	
February 28	do	14	3,187	
March 8	do	.45	8,203	
March 18	do	.18	3,836	
March 21	do	.24	4,878	
March 31	do	.14	3,336	
April 5	do	.10	2,898	
April 21	do	.08	2,022	
April 30	do	.04	1,829	
May 3	do	.06	1,671	
May 9	do	.08	1,550	
June 9	do	.20	2,294	
June 30	do	.13	2,970	
July 9	do	.22	3,984	
July 29	do	.15	3,281	
August 2	do	.13	2,962	
August 23	do	.01	1,726	
September 5	do	.08	3,347	
September 16	do	.18	4,734	
September 20	do	.15	4,207	
October 5	do	.14	4,009	
October 14	do	.10	3,857	
November 3	do	.66	12,543	
November 7	do	.39	7,462	
November 30	S. Musa	.41	7,945	

[a] Unreliable measurements.

Discharge measurements of Quinali River, near Banao, Guinobatan, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
Decembe 5.	S. Musa	45	9,240	
December 23	O. Buenaventura	25	5,276	
December 29	do.	19	4,392	
1922				
January 3	do.	.16	4,101	
January 11	do.	12	3,720	
January 16	do	19	4,522	
January 27	do	14	4,053	
February 2	do.	23	3,315	
February 23	do.	08	3,255	
March 3	do.	.05	3,087	
March 23	do.	005	2,495	
April 3	do.	— 02	3,249	
April 19	do	— 05	2,965	
April 28	do	— 06	2,379	
May 4	do	— 04	2,558	
May 12	do	— 12	2,264	
May 18	do	— 11	2,179	
May 23	do	— 06	2,956	
June 3	do.	— 15	2,002	
June 8	W. Demers and O. Buenaventura	—.11	2,145	
June 19	S. Musa and O. Buenaventura.	— 10	2,041	
July 8	do.	08	3,136	
August 3	O. Buenaventura	10	3,615	
August 11	do	12	3,087	
August 25	do	08	2,377	
August 28	do	065	2,287	
September 15	do	03	2,766	
September 19	do.	092	3,757	
September 20	do	.04	2,868	
October 6.	do.	14	4,283	
October 10	do.	.12	3,980	
October 21	do.	09	2,615	
October 24	do.	08	3,492	
November 13	do.	.09	4,136	
December 9	do.	.16	5,087	
December 12	do	.17	5,250	
December 19	do.	14	4,728	

NOTE.—Gage height readings from February 14, 1919, referred to different data.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				2,260	6,290	3,950	6,290	6,290	2,950		27,180	3,950
2				2,260	5,090	3,580	4,700	7,600	2,950	5,880	28,220	6,710
3				2,950	4,320	3,580	4,700	5,480	4,700	16,780	12,620	5,980
4				2,690	4,700	4,320	8,060	5,880	5,880	8,530	10,540	11,580
5				2,260	4,320	3,950	7,600	5,090	5,480	6,290	7,600	15,740
6				2,260	5,880	3,580	4,320	2,950	5,090	6,710	5,880	10,540
7				2,260	5,090	3,950	4,320	3,950	3,580	6,290	5,880	6,290
8				2,260	8,060	3,580	2,690	3,240	2,460	3,240	6,710	5,880
9				2,260	6,290	3,950	1,860	2,460	3,950	4,320	6,710	6,710
10				2,690	3,950	4,320	1,860	2,460	3,950	5,090	5,880	5,880
11				1,860	3,580	5,480	1,860	2,460	5,880	5,090	6,290	5,090
12				2,260	2,950	5,880	1,860	2,460	3,580	4,700	8,530	5,090
13				2,060	2,950	4,700	6,290	2,950	3,580	4,320	7,600	3,580
14				2,060	2,950	3,580	5,090	3,580	4,320	5,090	6,710	5,090
15				2,060	2,950	3,580	4,700	3,580	4,320	5,090	5,090	5,480
16				1,860	2,460	4,320	6,290	3,950	9,500	3,950	4,700	5,880
17				2,060	2,950	6,710	2,460	3,950	7,150	5,090	5,480	11,060
18				2,060	2,950	4,320	2,950	3,580	5,090	5,090	6,290	8,530
19				2,260	3,240	4,320	2,060	3,240	4,320	4,320	5,880	5,090
20				2,950	3,580	5,880	2,460	3,240	5,090	3,580	9,500	4,700
21				5,880	3,580	7,600	2,460	4,700	5,880	4,320	7,150	5,090
22				9,000	2,950	4,320	2,260	3,950	7,150	4,320	6,290	6,710
23				3,240	2,460	3,950	2,460	2,950	6,710	5,090	5,880	5,880
24			1,670	5,090	2,950	4,320	2,260	3,240	5,480	5,880	5,880	11,580
25			2,060	3,580	2,950	3,950	2,060	7,600	6,710	4,320	5,880	10,540
26			1,670	3,950	3,580	4,700	2,460	8,060	6,710	3,580	5,880	9,000
27			1,860	3,580	3,950	4,320	2,460	5,880	7,600	3,580	6,290	6,710
28			2,260	4,320	3,580	7,600	2,260	3,580	6,710	5,090	4,700	14,700
29			2,460	5,090	4,320	4,700	2,060	3,580	5,880	5,090	5,480	7,150
30			2,260	5,090	4,320	4,700	2,260	2,950	4,700	5,480	5,880	3,580
31			2,260		4,320		2,260	3,580		5,090		5,090
Maximum			2,460	9,000	8,060	7,600	8,060	8,060	9,500	16,780	28,220	15,740
Minimum			1,670	1,860	2,460	3,580	1,860	2,460	2,460	3,240	4,700	3,580
Mean			2,062	3,148	3,984	4,590	3,474	4,144	5,245	5,203	8,094	7,380

NOTE.—Daily discharge determined from a fairly well-defined rating curve, applicable from March 24, 1910, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5,880	3,580	3,950	3,240	3,240	2,460	24,300	4,550	2,900	3,820	3,350	3,580
2	5,090	3,580	3,950	3,240	3,580	2,690	8,660	4,300	2,900	3,580	3,350	4,060
3	3,950	2,950	3,580	3,240	3,580	2,460	4,800	3,820	2,900	3,350	3,350	3,820
4	5,090	3,580	4,320	3,240	3,580	2,460	8,360	3,580	2,900	3,580	3,350	3,820
5	5,480	2,950	3,950	3,950	3,580	2,460	4,060	3,120	3,120	3,820	3,350	3,820
6	5,090	2,950	3,580	3,580	3,580	2,460	4,060	3,820	2,900	3,820	3,350	3,820
7	3,950	2,460	3,580	3,580	3,580	2,690	4,300	3,350	3,120	3,820	3,350	3,820
8	3,580	3,580	3,240	3,580	3,240	2,460	3,350	3,350	3,120	3,820	4,060	3,820
9	5,880	3,580	2,950	8,530	3,240	2,690	3,350	2,900	3,350	3,820	3,580	3,350
10	5,090	2,460	3,580	8,530	3,580	2,460	6,110	2,900	3,820	3,350	3,820	3,350
11	3,950	4,320	4,700	3,950	3,240	3,240	8,960	3,120	3,580	3,350	3,820	3,350
12	3,950	5,090	5,480	3,580	2,950	3,240	5,840	3,120	3,580	3,350	3,820	3,350
13	4,320	4,320	4,320	3,580	2,950	3,950	11,500	3,120	3,350	3,350	3,820	3,350
14	4,320	3,950	3,950	3,240	2,950	3,240	13,740	3,350	3,580	3,350	3,820	3,580
15	4,320	3,950	3,950	3,580	2,950	3,240	8,660	2,900	3,580	3,350	3,820	3,820
16	3,580	3,950	3,580	3,580	2,950	2,690	5,840	2,900	3,580	3,350	4,060	3,820
17	2,690	4,320	3,580	3,950	2,950	5,090	5,320	2,900	3,580	3,350	3,820	3,820
18	3,580	3,580	3,950	3,580	2,950	4,700	4,550	3,820	3,820	3,350	3,820	3,580
19	4,320	6,710	3,580	2,950	2,690	4,320	4,300	4,300	3,580	3,350	3,820	3,820
20	3,580	5,880	3,580	3,580	2,460	4,320	4,300	4,800	3,580	3,120	3,820	4,060
21	2,950	7,600	3,580	3,240	2,690	3,350	4,550	3,820	3,820	3,120	3,820	3,820
22	3,580	5,480	3,950	3,580	2,460	2,900	4,060	3,580	5,320	3,350	3,580	3,820
23	2,950	4,700	3,580	5,880	2,460	3,120	4,800	3,820	4,060	3,350	3,350	3,820
24	3,240	3,580	3,580	4,700	2,460	3,120	4,550	4,300	4,550	2,900	3,350	3,820
25	3,580	4,700	2,950	3,580	2,460	3,120	3,580	3,580	3,820	2,900	3,350	3,820
26	2,950	6,710	3,580	2,950	2,460	2,900	3,580	4,060	3,350	3,350	3,350	3,820
27	2,690	4,700	3,580	2,950	2,690	2,680	4,550	3,820	3,350	3,350	3,350	3,820
28	3,580	4,320	3,580	3,240	2,690	3,580	5,060	3,820	3,820	3,350	3,350	3,820
29	3,580		3,950	3,580	2,690	7,490	5,320	3,820	3,820	3,350	3,350	3,580
30	3,580		3,580	3,580	2,460	8,960	4,800	3,820	3,820	3,350	3,350	3,580
31	2,950		3,580		2,460		4,550	2,900		3,350		3,580
Maximum	5,880	7,600	5,480	8,530	3,580	8,960	24,300	4,800	5,320	3,820	4,060	4,060
Minimum	2,690	2,460	2,950	2,950	2,460	2,460	3,350	2,900	2,900	2,900	3,350	3,350
Mean	3,978	4,269	3,769	3,918	2,962	3,484	6,251	3,593	3,553	3,412	3,585	3,714

NOTE.—Daily discharge determined from a fairly well-defined rating curve, applicable from March 24, 1910, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,580	3,350	3,580	3,120								
2	3,580	3,350	3,580	2,900								
3	3,820	3,350	3,350	3,120								
4	3,820	3,580	3,350	3,120								
5	4,550	4,300	3,120	3,120								
6	4,300	3,820	3,120	2,900								
7	4,300	3,820	2,900	2,900								
8	3,820	3,580	2,900	2,900								
9	3,820	3,580	3,120	3,120								
10	3,820	3,580	2,900	2,460								
11	3,820	3,580	2,900	2,260								
12	7,210	3,580	2,900	2,460								
13	4,550	3,580	3,120	2,060								
14	3,820	3,820	3,120	2,060								
15	3,820	3,580	2,900	2,260								
16	3,820	3,820	2,900	2,460								
17	3,580	3,580	2,900	2,260								
18	3,580	3,580	3,120	2,260								
19	3,350	5,060	3,580	2,260								
20	3,350	5,060	4,300	2,260								
21	3,350	3,820	3,820									
22	3,350	3,820	3,820									
23	3,820	3,820	3,820									
24	3,820	3,820	3,820									
25	3,820	3,820	3,820									
26	3,820	3,820	3,820									
27	3,820	3,820	3,820									
28	3,350	3,580	3,580									
29	3,350	3,580	3,580									
30	3,350		3,350									
31	3,120		3,350									
Maximum	7,210	5,060	4,300	3,120								
Minimum	3,120	3,350	2,900	2,060								
Mean	3,848	3,774	3,364	2,613								

NOTE.—Daily discharge determined from a fairly well-defined rating curve. Applicable fro m March 24, 1910, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			3,220	2,810	2,270	1,780	5,320	3,780	4,530	3,080	4,380	8,610
2			3,220	2,810	2,180	1,930	5,960	3,640	4,530	2,940	3,640	8,610
3			3,080	2,690	2,180	1,850	4,680	3,930	3,360	3,360	3,640	5,960
4			3,220	2,810	2,270	1,780	4,680	4,680	3,220	4,680	3,930	7,080
5			3,080	2,690	2,370	1,850	4,380	3,640	3,080	3,500	5,660	7,760
6			3,080	2,690	2,270	1,930	3,500	5,000	3,080	3,500	5,960	7,250
7			3,080	2,690	2,095	2,270	3,500	6,760	2,940	3,930	6,120	6,120
8			3,080	2,690	2,270	2,580	4,380	6,120	3,500	4,080	5,800	5,640
9			3,220	3,080	2,095	10,800	3,640	5,800	5,800	7,080	5,000	5,480
10			3,220	2,940	1,930	5,160	3,360	5,480	4,530	6,280	5,000	5,160
11			3,080	2,690	1,930	3,220	4,230	4,840	6,600	4,680	4,530	5,480
12			3,220	2,810	2,010	3,500	3,780	4,380	5,320	3,780	3,930	5,160
13			3,220	2,690	1,780	2,810	3,360	5,320	5,160	3,360	5,480	4,530
14			3,080	2,690	1,850	2,690	2,810	4,380	4,680	4,080	15,790	4,840
15		3,360	3,080	2,580	1,850	2,580	2,580	3,080	4,530	5,320	10,230	4,840
16		4,080	3,080	2,690	1,850	2,370	3,220	3,500	4,530	4,230	10,230	5,000
17		3,640	3,080	2,580	1,850	2,180	3,780	3,220	7,590	3,640	12,760	6,440
18		3,640	2,940	2,690	1,850	2,810	3,080	3,640	6,120	3,500	14,680	8,440
19		3,500	2,940	2,580	1,780	3,080	3,500	3,500	6,600	6,120	10,230	9,150
20		3,360	2,940	2,580	1,780	3,080	4,680	6,120	4,380	6,440	8,100	6,440
21		3,500	2,940	2,580	1,780	3,080	3,930	4,530	4,080	4,840	7,420	5,160
22		3,360	2,940	2,470	1,720	2,810	7,930	3,640	3,780	4,380	7,590	4,680
23		3,220	2,940	2,470	1,780	2,470	5,640	3,220	4,080	4,080	6,120	4,230
24		3,360	2,940	2,470	1,720	2,180	8,270	6,920	3,640	4,230	5,960	4,230
25		3,220	2,940	2,270	1,780	2,470	6,120	4,680	3,500	4,530	5,480	4,230
26		3,500	2,810	2,370	3,640	14,240	3,780	4,230	3,220	3,930	5,000	3,640
27		3,360	2,940	2,370	2,810	6,120	3,220	4,230	3,360	4,080	5,320	3,640
28		3,360	2,810	2,270	2,270	3,930	4,840	3,640	3,500	3,500	5,800	3,930
29			2,810	2,270	1,930	3,500	5,800	4,380	3,640	3,640	6,600	4,840
30			2,810	2,270	1,850	3,360	7,930	6,280	3,220	4,680	6,440	5,960
31			2,690		1,930		4,530	4,530		4,680		5,480
Maximum		4,080	3,220	3,080	3,640	14,240	8,270	6,920	7,590	7,080	15,790	9,150
Minimum		3,220	2,690	2,270	1,720	1,780	2,580	3,080	2,940	2,940	3,640	3,640
Mean		3,461	3,024	2,610	2,054	3,480	4,529	4,551	4,337	4,327	6,877	5,742

NOTE.—Daily discharge determined from well-defined curves between 1,750 and 4,500 second-liters.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,380	2,940	1,331	790	554	329	3,845	2,510	4,075	2,800	2,800	10,590
2	4,230	3,080	1,230	790	508	329	4,075	2,510	3,500	2,900	2,700	8,140
3	3,780	3,080	1,331	742	462	372	4,315	2,420	3,300	3,000	7,270	5,385
4	7,760	2,810	1,280	742	417	329	4,315	2,420	3,200	6,300	7,615	4,315
5	7,420	2,810	1,280	694	417	372	4,315	2,330	3,000	5,095	4,565	5,985
6	7,930	2,690	1,280	694	329	372	4,190	2,330	2,700	4,440	4,075	6,300
7	6,600	2,580	1,382	694	246	329	4,075	2,240	2,600	3,730	4,690	5,830
8	5,320	2,580	1,280	694	417	329	4,075	2,240	2,510	3,500	4,960	5,095
9	4,380	2,810	1,280	694	554	286	4,190	2,240	2,420	3,000	4,075	4,440
10	4,230	2,690	1,230	600	508	286	4,190	2,240	2,330	2,700	3,845	4,190
11	4,080	2,940	1,131	554	508	286	4,565	2,240	2,330	2,510	3,300	3,730
12	3,930	2,940	1,082	462	508	246	4,825	2,240	2,240	2,510	3,200	3,400
13	3,640	2,690	1,082	417	417	246	5,675	2,070	2,420	2,420	4,440	3,400
14	4,080	3,220	1,082	508	508	246	5,385	2,240	2,510	9,070	4,960	3,300
15	3,930	3,115	1,486	554	508	329	4,075	2,240	2,600	15,530	5,385	3,200
16	3,780	2,935	1,800	554	462	286	3,400	2,240	3,200	15,720	5,385	7,615
17	4,230	1,694	1,434	508	742	286	3,200	2,700	2,800	12,490	4,075	4,440
18	7,590	1,590	1,331	508	984	246	3,100	5,240	3,300	9,070	3,615	4,075
19	5,480	1,590	1,280	508	694	246	2,800	4,315	6,620	5,240	3,300	3,400
20	5,480	1,486	1,280	462	647	246	2,800	4,075	5,675	4,825	3,200	3,000
21	4,840	1,382	1,230	462	600	208	2,700	4,190	4,825	4,315	3,000	2,800
22	4,530	1,280	1,180	417	554	329	2,600	4,075	3,730	4,075	2,900	2,600
23	4,230	1,230	1,180	417	508	462	2,600	3,100	3,960	3,845	2,800	2,510
24	3,930	1,180	1,082	600	417	372	2,510	2,600	4,075	3,615	2,700	2,510
25	3,080	1,590	1,082	508	372	372	2,510	2,900	4,440	3,400	2,700	2,420
26	3,220	1,694	1,082	462	329	508	2,420	3,000	5,675	3,200	3,000	2,330
27	3,220	1,486	984	462	329	984	2,510	3,000	5,095	3,200	3,100	2,240
28	3,080	1,486	984	508	286	1,131	2,510	5,675	3,845	3,100	3,000	2,240
29	2,940	1,434	1,033	600	286	1,280	2,510	5,675	3,400	3,000	3,000	2,150
30	2,940	....	984	554	246	1,280	2,420	4,190	3,100	2,900	4,825	2,070
31	2,940	....	838	....	329	....	2,420	4,075	....	2,800	....	1,910
Maximum	7,930	3,220	1,800	790	984	1,280	5,675	5,675	6,620	15,720	7,615	10,590
Minimum	2,940	1,180	838	417	246	208	2,420	2,070	2,240	2,420	2,700	1,910
Mean	4,555	2,242	1,211	572	472	431	3,520	3,083	3,516	4,977	3,949	4,052

NOTE.—Daily discharge determined from fairly-defined curves. Daily discharges for April, May, and June are unreliable.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,910	5,675	4,270	3,000	1,735	1,555	2,910	3,000	5,850	4,190	8,560	8,145
2	2,420	3,200	3,940	2,910	1,675	1,555	2,820	3,000	4,080	4,190	12,380	6,460
3	2,240	2,700	3,695	2,820	1,675	1,555	9,920	3,000	3,680	4,190	11,880	6,460
4	2,070	2,510	3,480	2,735	1,615	1,735	33,700	4,270	3,500	4,190	9,000	6,000
5	1,910	2,330	4,150	2,655	1,615	1,735	16,970	3,805	3,410	4,080	9,000	8,560
6	1,510	2,240	16,490	2,575	1,615	2,125	8,200	3,000	4,650	3,980	6,300	6,000
7	1,590	2,240	27,530	2,575	1,675	7,390	4,930	2,820	5,420	3,880	7,340	5,560
8	1,590	2,240	7,920	2,575	1,615	6,470	4,270	2,735	4,650	3,780	7,740	5,290
9	1,510	5,230	6,270	2,495	1,555	7,920	4,030	21,290	3,880	3,680	13,880	5,160
10	1,440	4,030	5,230	2,495	1,555	4,790	3,585	6,910	3,590	3,680	30,380	4,770
11	1,440	3,480	4,650	2,415	1,675	3,585	3,380	3,695	7,740	3,980	20,380	4,770
12	1,370	3,380	4,520	2,415	1,735	3,090	3,280	3,380	24,130	3,880	13,880	4,650
13	1,370	3,380	4,390	2,340	1,735	2,820	3,585	3,090	10,880	3,780	10,880	4,770
14	1,440	3,695	4,030	2,340	1,675	3,805	3,695	2,910	5,850	3,680	9,000	9,440
15	1,910	3,380	3,920	2,265	1,675	4,790	3,280	2,655	4,650	3,680	7,740	8,145
16	7,440	3,180	3,920	2,195	1,675	3,480	3,090	2,575	4,530	3,590	6,980	5,420
17	2,800	2,820	3,805	2,195	1,675	2,820	3,180	2,495	4,190	3,590	6,630	5,290
18	2,240	2,820	3,695	2,195	1,855	2,575	3,090	2,495	3,980	3,500	6,300	5,160
19	2,150	2,735	13,130	2,265	1,855	2,495	3,805	2,415	3,880	3,410	5,850	4,900
20	1,880	8,520	7,920	2,195	2,340	2,820	4,030	2,265	4,080	3,410	5,850	7,740
21	1,750	21,770	5,080	2,195	2,195	2,820	4,270	2,195	4,080	3,325	6,000	5,700
22	2,330	17,450	3,805	2,195	2,125	2,655	7,150	2,125	3,980	3,325	13,380	5,030
23	2,070	5,230	3,585	2,195	1,985	2,576	9,190	2,125	4,190	3,410	18,130	4,770
24	1,990	4,270	3,380	2,125	1,855	2,575	6,270	1,920	4,410	3,410	16,130	4,770
25	1,750	5,390	3,280	2,055	1,795	2,495	5,890	2,910	6,460	3,590	24,880	5,420
26	1,590	6,690	3,180	1,920	1,795	2,495	4,650	3,000	5,420	4,530	14,880	6,000
27	1,440	5,550	3,090	1,855	1,795	2,415	3,695	2,820	6,460	3,980	10,630	4,900
28	2,240	4,790	3,000	1,855	1,735	3,585	3,380	2,655	5,560	3,780	9,440	4,650
29	3,730		3,000	1,795	1,675	3,280	3,180	3,090	4,650	3,590	8,560	4,530
30	8,320		3,000	1,795	1,615	3,090	3,090	3,695	4,410	4,080	7,740	4,530
31	5,675		3,180		1,555		3,000	6,300		4,650		4,530
Maximum	8,320	21,770	27,530	3,000	2,340	7,920	33,700	21,290	24,130	4,650	30,380	9,440
Minimum	1,370	2,240	3,000	1,795	1,555	1,555	2,820	1,920	3,410	3,325	5,850	4,530
Mean	2,421	5,033	5,630	2,321	1,753	3,236	5,791	3,698	5,541	3,807	11,324	5,726

NOTE.—Discharge determined from rating curves, applicable as follows: February 9, 1921, to August 30, 1921, well-defined below 19,000 second-liters; August 31, 1921, to November 5, 1922, fairly well-defined below 12,000 second-liters.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,410	3,590	3,410	2,940	2,670	2,135	2,940	9,440	2,550	3,410	2,940	7,540
2	4,410	5,030	3,325	2,940	2,550	2,050	3,085	5,700	2,670	3,245	2,800	6,580
3	4,300	4,410	3,245	2,735	2,670	2,050	3,085	3,880	3,590	3,410	3,980	5,600
4	4,190	4,080	3,165	2,670	2,550	1,970	3,010	3,325	3,410	3,880	13,630	11,920
5	3,980	3,980	2,940	2,610	2,550	2,610	2,940	6,460	3,085	3,880	12,980	8,060
6	3,980	3,980	2,870	2,610	2,440	2,230	3,325	6,000	2,800	3,780	7,290	8,060
7	4,190	3,780	2,870	2,550	2,330	2,180	3,590	6,000	2,800	3,980	5,600	6,160
8	4,080	3,780	2,940	2,550	2,330	2,135	3,500	5,420	2,670	4,190	5,100	5,160
9	3,980	3,780	2,870	2,670	3,500	2,135	3,085	4,300	4,650	4,300	4,950	5,100
10	3,780	3,780	3,085	2,670	2,550	2,050	12,380	3,680	3,980	4,300	4,660	4,800
11	3,680	3,680	2,870	2,550	2,280	1,970	3,500	3,780	3,325	4,190	4,260	4,520
12	11,630	3,590	2,940	2,670	2,180	2,010	3,085	3,590	3,780	4,650	4,020	4,800
13	6,800	3,410	2,870	2,670	2,135	1,970	3,590	3,325	3,590	6,150	4,660	4,260
14	4,900	3,590	2,940	2,670	2,230	1,970	3,680	3,590	3,165	4,530	4,800	3,910
15	6,150	3,590	2,940	2,610	2,135	1,930	3,780	4,900	2,940	4,900	4,660	3,800
16	6,300	3,590	3,325	2,610	2,050	1,970	3,410	5,700	2,940	5,160	6,160	4,020
17	4,770	3,500	3,010	2,670	2,230	2,090	3,085	5,420	4,530	3,980	4,260	7,800
18	4,410	3,500	3,085	2,550	2,230	2,090	3,085	4,650	4,410	3,590	4,020	6,160
19	4,190	3,590	2,940	2,495	2,090	2,135	4,410	3,780	3,680	3,980	3,800	6,160
20	4,190	3,880	2,940	2,440	2,280	2,010	4,650	3,245	3,010	3,590	3,910	24,950
21	4,080	3,780	2,870	2,550	4,530	1,970	5,160	3,010	2,800	3,410	22,930	61,310
22	4,530	3,590	2,735	2,670	3,590	1,970	6,300	2,870	7,740	3,165	9,570	11,040
23	4,190	3,410	2,800	2,550	3,245	2,440	9,220	2,800	5,700	2,940	7,040	7,800
24	4,080	3,410	2,870	2,550	2,385	2,230	6,000	2,800	5,700	3,410	5,780	9,570
25	3,980	3,410	2,735	2,610	2,330	1,970	4,410	2,800	4,530	3,085	4,950	8,930
26	3,780	3,410	2,940	2,870	2,230	2,050	3,780	2,670	4,410	3,245	4,520	7,040
27	4,650	3,410	4,300	2,670	2,180	2,050	3,410	2,670	5,030	3,590	38,080	15,080
28	3,980	3,325	3,085	2,550	2,180	1,970	3,880	2,550	4,410	3,590	17,980	7,540
29	3,780		2,940	2,670	2,135	1,970	3,245	2,440	3,680	3,590	23,940	5,960
30	3,680		2,940	2,610	2,050	3,780	2,940	2,440	3,590	3,245	11,450	6,580
31	3,590		2,870		2,090		13,630					
							19,880	2,550		3,085		12,870
Maximum	11,630	5,030	4,300	2,940	4,530	3,780	19,880	9,440	7,740	6,150	38,080	61,310
Minimum	3,590	3,325	2,735	2,440	2,050	1,930	2,940	2,440	2,550	2,940	2,800	3,800
Mean	4,601	3,709	3,021	2,639	2,481	2,136	4,591	4,058	3,839	3,853	8,489	9,454

NOTE.—Discharge determined from fairly well-defined rating curve below 30,000 second-liters which is applicable from November 6, 1922, to December 31, 1922. See also footnote to daily discharge for 1921.

ALBAY PROVINCE

QUINALI RIVER, MALINAO

LOCATION.—About 2 km. northwest of barrio Parapoto and about 600 m. upstream from barrio of Ogob.

RECORDS AVAILABLE.—From April 1, 1919, to December 31, 1922. Also from April 2, 1911, to April 20, 1912, inclusive, at old location a short distance below present station.

GAGE.—Standard metric gage board horizontally fastened to a tree and a chain with weight.

DISCHARGE MEASUREMENT.—Made by wading at 6.5 m. above gage.

CHANNEL AND BANKS.—Channel straight for 45 m. above and 40 m. below; banks high and not subject to overflow. At measuring section stream bed consists of gravel and small boulders. Rather shifting. Uniformity of flow slightly affected by few boulders.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 110,400 second-liters on July 31, 1922. Minimum discharge, 4,820 second-liters on July 21–24, July 30 to August 1, and August 12, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from April 22, 1919, to December 31, 1922, determined from fairly well-defined rating curves.

From April 1, 1911, to April 20, 1912, from a poorly defined curve. Gage read twice daily.

Discharge measurements of Quinali River, near Ogob, Malinao, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
April 1	Demers and Laurence.	.70	13,240	
April 18	do.	.70	11,200	
April 24	do.	.72	10,550	
May 1	do.	.71	8,670	
May 13	do.	.70	10,550	
May 31	do.	.68	9,370	
June 13	do.	.68	8,110	
June 15	do	.67	8,670	
June 24	do.	.66	7,750	
June 28	do.	.67	8,500	
July 17	do.	.77	16,370	
July 26	do.	.73	10,400	
August 8	do.	.68	9,930	
August 22	do.	.67	10,000	
September 9	do.	.67	9,660	
September 21	do	.71	8,710	
October 6	do.	.66	6,740	
October 20	do.	.66	6,520	
December 8	do.	.64	7,370	
December 18	do	.67	7,930	
December 29	do.	.63	7,720	
1912				
January 5	do.	.67	7,860	
January 17	do.	.66	7,700	
February 12	do.	.66	9,340	
February 28	do.	.70	10,310	
March 7	do.	.68	9,890	
March 12	do.	.66	7,210	
April 8	do.	.66	6,590	

Discharge measurements of Quinali River, near Ogob, Malinao, Albay—Ctd.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
March 25	Angel Fegarido	.37	6,700	
March 29	do	.36	8,050	
April 22	do	.35	6,300	
May 13	do	.33	5,880	
May 14	do	.33	5,850	
May 21	do	.31	5,620	
June 4	do	.32	5,670	
July 24	do	.38	8,220	
August 21	M. Canas and A. Fegarido.	.42	7,880	
September 2	A. Fegarido	.40	8,260	
October 7	do	.42	8,570	
October 14	do	.81	16,130	
October 27	do	.44	9,470	
November 7	A. Fegarido and M. Canas.	.60	14,130	
November 29	do	52	10,000	
December 13	do	.54	10,170	
1920				
January 8	M. B. Canas	.59	11,910	
January 13	do	.64	13,860	
February 20	do	.56	10,410	
March 4	do	.55	9,960	
March 22	do	.52	8,740	
March 22	do	.52	10,950	
March 23	do	.52	8,670	
April 26	do	.50	11,370	
May 22	do	.48	10,220	
June 3	do	47	8,880	
June 22	do	.46	9,240	
July 19	do	.58	7,150	
August 2	O. Buenaventura	.45	5,059	
August 14	do	.45	5,025	
September 2	do	46	5,233	
September 16	do	.45	5,039	
October 2	do	.49	5,919	
October 19	do	.56	7,186	
November 2	do	.52	6,654	
November 16	do	.64	9,608	
December 1	do	.80	14,832	
December 15	do	.62	8,815	
1921				
January 20	do	.60	8,165	
February 4	do	.70	13,435	
February 19	do	.69	12,305	
March 19	do	.82	18,487	
April 4	do	.65	10,188	
April 20	do	.56	7,355	
May 2	do	.58	7,841	
May 9	do	.59	8,196	
June 4	do	.57	7,667	
July 7	do	.64	8,238	
July 28	do	60	7,837	
August 26	do	.57	7,227	
September 3	do	.59	7,751	
September 19	do	.60	8,174	
October 3	do	.59	7,920	
October 18	do	.67	11,090	
November 5	do	.84	18,806	
December 3	S. Musa	.68	11,749	
December 22	O. Buenaventura	.82	17,371	
1922				
January 2	do	.75	15,065	
January 31	S. Musa	.72	10,783	
February 21	O. Buenaventura	.74	13,898	
March 6	do	.71	9,677	
March 22	do	.70	11,981	
April 1	do	.70	10,429	
April 18	do	.71	10,624	
May 2	do	.67	9,338	

Discharge measurements of Quinali River, near Ogob, Malinao, Albay—Ctd.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
May 11	O. Buenaventura	66	8,586	
May 22	do	69	11,690	
June 1	do	65	8,245	
June 9	W. Demers and O. Buenaventura	.65	8,371	
June 22	S. Musa and O Buenaventura	65	8,241	
July 3	do	66	10,355	
August 3	O. Buenaventura	75	9,281	
August 26	do	67	5,040	
September 16	do	64	4,857	
October 7	do	68	7,365	
October 23	do	66	6,885	
November 14	do	74	9,009	
December 11	do	79	9,481	
December 20	do	77	9,339	

NOTE.—Gage-height readings from March 25, 1919, referred to different data.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1					10,120	8,320	55,720	11,320	7,720	8,320	9,520	10,120
2				10,120	11,920	7,720	22,720	11,320	7,720	8,320	9,520	8,920
3				10,720	11,320	7,720	14,320	10,120	7,720	8,320	9,520	7,720
4				10,720	10,720	7,720	12,520	10,120	7,720	8,320	8,920	7,130
5				10,120	11,320	8,320	11,920	10,120	8,320	7,720	8,920	7,130
6				11,320	10,720	8,920	10,120	10,120	7,720	7,720	8,920	7,130
7				10,720	14,920	8,320	10,120	10,120	7,720	7,720	10,120	6,550
8				11,920	13,720	10,720	10,120	8,920	7,720	7,720	9,520	6,550
9				28,120	11,320	8,320	10,120	8,920	8,920	7,720	8,920	6,550
10				17,320	11,320	8,320	14,320	8,320	8,920	7,720	8,920	6,550
11				13,120	10,120	9,520	14,920	8,920	8,920	8,320	8,320	6,550
12				12,520	10,120	8,320	11,320	8,920	7,720	7,720	8,320	7,130
13				11,320	10,120	9,520	29,920	8,920	7,720	8,320	8,920	6,550
14				10,720	10,120	8,920	28,120	8,920	8,320	8,320	8,920	6,550
15				10,720	9,520	8,920	19,120	8,920	10,120	7,720	8,920	7,130
16				11,320	10,120	9,520	16,720	8,320	8,920	7,720	9,520	10,720
17				11,320	8,920	8,920	14,920	8,920	8,920	7,720	8,320	9,520
18				11,920	8,920	8,920	14,320	11,920	10,120	8,920	8,920	8,320
19				12,520	8,920	9,520	14,320	8,920	10,120	7,720	9,520	7,720
20				11,320	10,720	8,920	13,120	10,720	10,720	7,720	8,920	11,920
21				11,320	8,920	7,720	13,120	9,520	10,720	7,720	8,320	8,920
22				11,320	8,920	8,320	12,520	8,920	10,120	7,720	7,720	8,920
23				13,720	8,920	7,720	13,720	13,720	10,120	7,130	7,720	7,720
24				11,320	7,720	7,720	12,520	10,120	9,520	7,720	8,320	7,720
25				10,720	8,920	7,720	12,520	10,120	8,920	7,130	8,320	7,130
26				11,320	7,720	8,320	12,520	8,920	8,920	7,130	7,720	7,130
27				10,720	8,320	8,920	11,320	9,520	8,920	8,320	7,130	6,550
28				10,720	8,320	8,320	12,520	8,920	7,720	10,120	7,130	7,130
29				12,520	8,920	8,920	11,320	7,720	8,920	10,120	7,130	7,130
30				11,320	8,320	8,920	12,520	7,720	7,720	10,120	10,120	6,550
31					8,320		11,320	8,320		9,520		6,550
Maximum				28,120	14,920	10,720	55,720	13,720	10,720	10,120	10,120	11,920
Minimum				10,120	7,720	7,720	10,120	7,720	7,720	7,130	7,130	6,550
Mean				11,763	9,946	8,600	15,249	9,559	8,780	7,917	8,701	7,675

NOTE.—Discharge determined from a poorly defined rating curve, applicable from April 1, 1911, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5,980	7,720	8,920	10,720								
2	5,980	7,720	8,920	10,120								
3	6,550	8,920	8,920	9,520								
4	7,130	7,720	8,920	7,720								
5	10,120	15,520	8,920	7,130								
6	7,720	8,920	8,920	7,130								
7	7,720	7,720	8,920	7,720								
8	7,130	7,720	8,920	7,720								
9	7,130	6,550	8,920	7,720								
10	6,550	7,130	7,720	7,720								
11	6,550	7,720	7,720	7,720								
12	21,520	7,720	7,720	8,320								
13	14,320	7,720	7,720	8,920								
14	9,520	7,130	7,720	8,920								
15	8,920	7,130	7,720	8,920								
16	7,720	7,130	7,720	8,320								
17	7,720	8,920	7,720	8,320								
18	6,550	7,720	7,720	7,720								
19	6,550	7,720	8,320	7,720								
20	6,550	19,720	8,920	8,920								
21	7,720	39,520	8,320									
22	7,720	17,920	7,720									
23	7,720	13,120	8,320									
24	7,720	13,720	7,720									
25	7,720	11,320	8,320									
26	7,720	11,320	8,920									
27	7,720	15,520	8,320									
28	8,920	10,120	8,320									
29	8,920	9,520	9,520									
30	7,720		11,920									
31	7,720		11,320									
Maximum	21,520	39,520	11,920	10,720								
Minimum	5,980	6,550	7,720	7,130								
Mean	8,234	10,909	8,572	8,351								

NOTE.—Discharge determined from a poorly defined rating curve, applicable from April, 1911, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				6,910	5,780	5,945	8,430	6,500	7,625	7,625	22,150	14,120
2				7,140	5,780	5,945	8,430	6,500	7,380	7,625	13,670	12,830
3				7,140	5,780	5,945	7,625	6,500	7,380	7,380	12,830	12,425
4				7,140	5,780	5,945	6,700	9,000	7,140	7,380	12,040	23,890
5				7,140	6,300	5,945	6,120	6,700	7,140	8,150	18,130	18,130
6				7,140	6,300	5,945	5,945	7,880	6,910	7,880	16,030	16,050
7				7,140	6,300	5,945	6,700	8,710	6,910	7,880	25,050	13,250
8				7,140	6,300	5,945	6,500	6,910	6 910	8,710	15,050	12,830
9				7,140	5,945	7,140	6,500	6,700	7,140	8,430	12,425	12,425
10				7,140	5,945	6,910	6,910	7,380	7,380	6,910	12,040	12,040
11				6,700	5,945	6,910	6,910	7,140	9,000	6,910	11,660	12,040
12				7,140	5,945	6,700	6,500	7,880	9,620	8,150	10,250	11,660
13				7,140	5,945	6,700	6,560	7,880	18,130	7,880	11,660	12,040
14				7,140	5,945	6,500	6,700	7,625	8,710	10,940	13,250	12,040
15				7,140	5,945	5,945	6,700	6,910	8,150	10,940	14,120	12,040
16				6,700	5,945	5,945	6,500	6,910	8,430	9,620	14,120	11,660
17				7,140	5,945	5,945	6,500	6,910	32,590	8,430	48,250	13,250
18				7,140	5,945	5,945	6,500	6,910	11,290	8,430	28,530	15,050
19				7,140	5,945	5,945	6,910	7,380	9,930	8,430	18,670	23,890
20				6,700	5,945	5,945	7,140	9,620	9,310	8,430	14,120	15,050
21				7,140	5,945	5,945	6,700	7,880	8,430	7,880	14,120	13,250
22				6,300	5,945	5,954	6,910	7,380	8,430	7,880	13,670	12,830
23				6,300	5,945	5,945	6,700	7,880	8,150	7,880	12,830	12,425
24				6,300	5,945	5,945	6,910	7,380	7,880	8,710	12,830	12,040
25				6,300	5,945	6,120	6,500	7,380	7,380	16,550	11,660	11,660
26				6,300	5,945	5,945	6,500	6,910	7,380	9,930	11,660	11,660
27				6,300	5,945	7,880	6,700	6,910	7,380	8,710	16,550	11,660
28				6,300	5,945	6,910	6,910	6,910	7,140	8,710	16,030	11,290
29				6,300	5,945	6,300	7,625	7,625	7,140	8,710	15,050	11,660
30				6,300	5,945	5,945	6,910	9,620	7,140	24,470	12,830	19,250
31					5,945		6,700	8,150		12,040		15,540
Maximum				7,140	6,300	7,880	8,430	9,620	32,590	24,470	48,250	23,890
Minimum				6,300	5,780	5,945	5,945	6,500	6,910	6,910	10,250	11,290
Mean				6,836	5,970	6,232	6,832	7,483	9,118	9,277	16,042	13,838

NOTE.—Discharge determined from a rating curve fairly well-defined b etween 5,500 and 15,000 second-liters, applicable from April 1, 1919, to February 14, 1920.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	12,830	10,590	7,610	6,370	5,900	5,540	5,670	4,820	5,230	5,450	6,370	15,380
2	13,250	10,590	7,100	6,370	5,900	5,450	5,670	5,025	5,230	5,450	6,610	11,985
3	12,425	10,590	7,100	6,370	5,670	5,450	5,450	5,025	5,230	5,670	9,240	10,715
4	13,670	10,590	7,350	6,610	5,670	5,450	5,450	5,025	5,230	5,450	11,030	10,125
5	13,670	10,940	7,100	6,850	5,670	5,450	5,450	5,025	5,025	6,130	8,960	12,980
6	16,550	10,250	7,100	6,610	5,670	5,230	5,230	5,025	5,025	6,130	8,410	13,320
7	16,550	10,590	6,610	6,850	5,670	5,230	5,230	5,025	5,025	5,900	8,410	12,310
8	12,425	10,250	6,610	6,610	5,670	5,230	5,025	5,025	5,025	5,900	8,410	16,070
9	13,250	10,590	6,610	6,610	5,670	5,230	5,025	5,025	5,025	5,670	7,870	12,310
10	12,040	10,250	6,610	6,610	6,130	5,230	5,025	4,820	5,025	5,230	7,610	11,660
11	12,830	10,590	6,610	6,610	5,670	5,230	5,670	5,025	5,025	5,230	7,610	10,125
12	15,540	10,250	6,610	6,610	5,670	5,230	5,670	4,820	5,025	5,450	7,610	9,830
13	16,030	10,250	6,610	6,370	5,670	5,230	5,670	5,025	5,025	5,450	8,410	9,830
14	14,580	10,250	6,370	6,130	5,670	5,230	5,450	5,025	5,025	17,105	9,240	9,535
15	15,050	10,420	6,370	6,130	5,670	5,230	5,230	5,025	5,025	15,380	8,960	9,240
16	14,120	10,420	6,850	6,130	5,670	5,230	5,230	5,025	5,025	14,000	9,830	11,660
17	19,250	9,240	6,610	5,900	5,670	5,230	5,230	5,025	5,025	8,960	9,830	11,030
18	15,540	8,680	6,610	5,900	5,670	5,230	5,625	5,230	5,230	7,870	8,680	10,125
19	14,120	8,140	6,610	6,130	5,670	5,230	5,025	5,230	5,230	7,610	8,680	9,240
20	12,830	7,610	6,610	6,130	5,670	5,230	5,025	5,230	7,610	7,350	8,680	9,240
21	12,425	7,610	6,610	6,130	5,670	5,230	4,820	5,230	6,130	7,100	8,140	9,240
22	11,660	7,100	6,610	6,130	5,670	5,230	4,820	5,230	5,450	7,100	8,140	8,960
23	11,660	7,100	6,370	6,130	5,670	5,230	4,820	5,230	5,900	7,100	8,140	8,680
24	12,040	7,350	6,370	6,610	5,670	5,230	4,820	5,025	6,850	7,100	8,680	8,680
25	11,660	7,610	7,100	6,130	5,230	5,230	5,025	5,025	5,670	6,850	8,680	8,410
26	11,290	7,870	7,100	6,130	5,230	5,230	5,230	5,025	6,370	6,850	8,680	8,680
27	11,290	8,680	7,100	6,130	5,670	5,230	5,450	5,230	5,900	6,850	8,960	8,680
28	10,940	7,870	6,610	6,130	5,670	6,130	5,450	5,230	5,450	6,610	8,960	8,680
29	11,290	7,610	6,610	6,130	5,670	5,670	5,025	5,450	5,230	6,610	8,960	8,680
30	10,940	..	6,610	6,130	5,450	5,670	4,820	5,450	5,670	6,610	9,830	8,680
31	10,940	.....	6,610	....	5,450	...	4,820	5,450	.... ..	6,610	.. ..	8,960
Maximum	16,550	10,940	7,610	6,850	6,130	6,130	5,670	5,450	7,610	17,105	11,030	16,070
Minimum	10,940	7,100	6,370	5,900	5,230	5,230	4,820	4,820	5,025	5,230	6,370	8,410
Mean	13,312	9,306	6,754	6,325	5,657	5,326	5,211	5,099	5,431	7,318	8,587	10,380

NOTE.—Daily discharge determined from a fairly well-defined curve from 5,000 to 9,000 second-liters, applicable from February 15 to December 31, 1921.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	9,400	21,740	17,500	11,460	8,200	7,810	7,420	7,810	8,600	8,600	15,070	18,520
2	11,900	14,600	15,540	11,030	8,200	7,810	7,420	7,810	8,600	8,600	26,360	18,000
3	9,400	12,340	14,600	10,600	8,200	7,420	13,660	7,810	8,200	9,400	20,100	18,000
4	9,000	12,780	14,130	10,200	7,810	7,420	21,740	7,810	8,200	8,600	24,000	18,000
5	10,600	11,030	13,660	11,030	7,810	7,810	19,560	7,810	8,600	8,600	20,640	18,520
6	8,600	11,030	20,640	11,460	7,810	7,810	14,600	7,810	8,600	8,600	21,740	19,040
7	8,600	13,660	30,060	10,200	7,810	7,420	9,800	7,420	8,200	8,600	24,000	18,520
8	8,200	11,900	19,560	9,400	8,200	7,810	9,800	7,810	8,600	8,200	45,400	17,500
9	8,600	9,400	18,520	8,600	7,810	7,420	8,600	8,200	8,200	8,600	43,130	17,000
10	8,600	11,030	17,500	10,600	8,200	7,420	8,600	8,200	8,200	8,600	50,200	16,500
11	8,600	10,600	15,540	10,200	8,200	7,050	8,600	7,810	9,000	9,400	39,500	16,020
12	8,200	10,600	14,130	9,400	7,810	7,810	8,200	7,810	16,500	9,400	27,560	16,500
13	8,600	16,500	14,130	8,600	7,810	7,810	8,600	7,810	14,600	11,030	24,000	17,500
14	8,600	20,640	14,130	8,600	8,200	7,810	8,600	7,810	9,400	10,600	22,300	20,100
15	8,600	12,340	16,500	8,600	8,200	8,600	8,600	7,810	9,400	14,600	20,640	18,520
16	14,600	11,030	16,500	8,200	8,600	7,810	8,200	7,810	9,400	11,900	19,040	17,500
17	11,030	10,600	15,540	8,200	8,600	7,810	9,000	7,810	9,000	10,200	18,520	16,500
18	9,400	10,600	15,070	8,600	8,200	7,420	9,000	7,420	8,600	9,400	17,500	16,020
19	8,600	10,600	20,100	8,600	7,810	7,420	9,400	7,420	8,600	9,400	17,500	16,020
20	8,600	28,800	15,070	8,600	7,810	7,050	9,400	7,420	8,200	9,400	17,500	19,040
21	8,200	24,580	13,220	8,600	7,810	7,050	9,400	7,050	8,600	8,600	21,180	18,520
22	8,200	29,420	12,780	8,600	8,600	7,420	9,800	7,050	8,600	8,600	27,560	17,000
23	10,200	25,160	11,900	9,400	8,200	7,420	9,800	7,810	8,600	10,200	28,180	16,500
24	9,800	18,000	10,600	8,600	7,810	7,810	9,400	7,810	8,600	10,200	21,740	16,500
25	9,400	34,640	10,200	8,600	7,810	7,810	9,400	7,810	8,600	11,030	52,690	31,000
26	8,600	24,580	9,800	8,600	7,810	7,420	8,600	7,810	8,600	11,460	32,000	45,300
27	8,600	20,640	11,900	8,600	7,810	7,810	8,600	7,810	9,400	11,030	25,760	32,900
28	8,600	19,040	11,030	8,200	7,810	8,200	8,600	7,420	9,000	13,220	20,640	25,500
29	11,030		11,900	8,200	7,420	7,810	8,200	7,420	9,000	11,030	19,560	22,140
30	14,600		12,780	8,200	7,810	7,420	8,200	7,810	9,000	11,030	18,520	20,560
31	15,540		11,900		7,810		7,810	7,420		15,540		25,500
Maximum	15,540	34,640	30,060	11,460	8,600	8,600	21,740	8,200	16,500	15,540	52,690	45,300
Minimum	8,200	9,400	9,800	8,200	7,420	7,050	7,420	7,050	8,200	8,200	15,070	16,020
Mean	9,693	16,535	15,046	9,259	8,000	7,630	9,891	7,698	9,190	10,118	26,084	20,153

NOTE.—Discharge determined from fairly well-defined rating curve below 52,700 second-liters, applicable from January 1 to December 24, 1921.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1922.

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	19,060	17,640	11,650	9,660	7,050	5,550	4,850	45,300	5,550	8,720	9,660	32,900
2	19,060	39,000	11,650	9,660	6,300	6,300	4,850	25,500	6,300	7,850	9,660	31,000
3	17,640	29,150	11,650	9,660	6,360	5,550	4,850	13,840	7,850	7,850	19,060	25,500
4	17,640	23,800	11,650	8,720	6,300	5,550	4,850	10,620	8,720	7,850	70,500	29,150
5	17,640	25,500	10,620	8,720	5,550	6,300	4,850	9,660	7,850	7,850	120,900	36,900
6	19,060	22,140	10,620	9,660	5,550	6,300	4,850	9,660	6,300	8,720	62,100	32,900
7	19,060	22,140	10,620	9,660	7,050	6,300	4,850	9,660	6,300	8,720	25,500	31,000
8	19,060	19,060	9,660	9,660	7,050	6,300	4,850	9,660	8,720	16,280	16,280	25,500
9	16,280	19,060	9,660	9,660	7,050	6,300	4,850	9,660	7,050	12,710	15,010	25,500
10	16,280	16,280	9,660	9,660	7,050	5,550	7,850	7,850	11,650	9,660	16,280	23,800
11	16,280	16,280	9,660	10,620	6,300	5,550	6,300	8,720	11,650	8,720	16,280	20,560
12	29,150	16,280	9,660	9,660	6,300	5,550	4,850	7,850	11,650	8,720	16,280	19,060
13	45,300	16,280	9,660	11,650	6,300	5,550	4,850	7,850	11,650	7,850	16,280	19,060
14	34,850	16,280	10,620	13,840	6,300	5,550	4,850	8,720	7,850	7,850	13,840	19,060
15	49,500	15,010	11,650	10,620	6,300	5,550	4,850	17,640	4,850	7,850	12,710	17,640
16	70,500	15,010	41,100	9,660	6,300	4,850	4,850	17,640	4,850	10,620	12,710	16,280
17	32,900	13,840	22,140	9,660	6,300	4,850	4,850	13,840	4,850	9,660	11,650	29,150
18	29,150	13,840	29,150	8,720	6,300	4,850	4,850	11,650	5,550	9,660	11,650	32,900
19	25,500	13,840	16,280	9,660	6,300	4,850	5,550	9,660	6,300	11,650	11,650	81,000
20	23,800	13,840	11,650	9,660	7,850	4,850	6,300	9,660	6,300	9,660	11,650	133,500
21	22,140	13,840	11,650	9,660	13,840	5,550	7,050	9,660	7,050	8,720	99,900	146,100
22	22,140	13,840	10,620	7,850	7,850	6,300	6,300	7,850	15,010	7,850	23,800	41,100
23	22,140	12,710	9,660	7,850	7,850	6,300	9,660	7,850	17,640	7,850	15,010	19,060
24	20,560	12,710	9,660	7,850	7,050	5,550	13,840	7,850	17,640	7,850	13,840	29,150
25	19,060	12,710	9,660	7,850	6,300	4,850	13,840	7,050	19,060	7,850	13,840	62,100
26	19,060	11,650	9,660 259,500	9,660	6,300	4,850	11,650	7,050	17,640	7,850	13,840	29,150
27	20,560	11,650	53,700	7,850	6,300	4,850	9,660	7,050	13,840	7,850	41,100	41,100
28	22,140	11,650	19,060	7,850	6,300	4,850	6,300	6,300	11,650	11,650	91,500	19,060
29	19,060	..	16,280	7,050	6,300	4,850	6,300	6,300	10,620	13,840	116,700	12,710
30	19,060	..	11,650	7,050	6,300	5,550	16,280	6,300	9,660	13,840	45,300	31,000
31	16,280	..	9,660	..	6,300	..	99,900 110,400	6,300	.	11,650	..	72,600
Maximum	70,500	39,000	259,500	13,840	13,840	6,300	110,400	45,300	19,060	16,280	120,900	146,100
Minimum	16,280	11,650	9,660	7,050	5,550	4,850	4,850	6,300	4,850	7,850	9,660	12,710
Mean	20,153	17,322	22,896	9,300	6,790	5,517	13,380	11,103	9,720	9,524	32,483	38,242

NOTE.—Discharge determined from fairly well-defined rating curve below 41,000 second-liters, applicable from December 25, 1921, to December 31, 1922.

ALBAY PROVINCE

QUINALI RIVER, POLANGUI

LOCATION.—About 42 km. from Legaspi on the downstream side of bridge of the Legaspi–Libon Road.

RECORDS AVAILABLE.—From February 12, 1919, to December 31, 1922. Also from August 9, 1910, to April 20, 1912, inclusive, at a place very near present station.

GAGE.—Standard metric gage board fastened vertically on first pier of bridge at left bank.

DISCHARGE MEASUREMENTS.—Made by wading underneath bridge at low water; from bridge at high water.

CHANNEL AND BANKS.—Channel straight for over 50 m. above and below the station; both banks low but not subject to overflow. Covered with vegetation. At measuring section stream bed very shifting. Flow fairly uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 119,580 second-liters on July 4, 1921. Minimum, 1,700 second-liters, on August 13, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from August 9, 1910, to April 20, 1912 determined from a poorly defined rating curve.

Discharge from February 12, 1919, to December 31, 1922, determined from fairly well-defined rating curves, except records from February 25 to May 20, 1922, which were determined from poorly defined rating curve. Gage read twice daily.

Discharge measurements of Quinali River, near Quinali, Polangui, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
July 7			7,200	
August 25	J. I. Quinn	1.06	14,090	
August 25	do	1.04	9,550	
October 18	do	1.04	16,240	
November 21	do	1.10	18,850	
November 28	do	1.14	21,390	
December 13	do	1.14	23,780	
1911				
January 13	do	1.15	27,000	
January 17	do	1.12	22,760	
January 23	Wilfred Demers	1.10	15,910	
February 3	do	1.06	7,160	
February 7	do	1.05	14,300	
February 11	do	1.10	17,290	
February 18	do	1.21	18,250	
February 22	do	1.31	22,490	
March 9	do	1.08	16,506	
March 31	do	1.07	12,940	
April 17	do	1.10	16,460	
May 6	do	1.13	16,190	
May 25	do	.98	10,060	
June 10	do	.96	8,720	
June 22	do	.99	10,960	
July 10	do	2.00	111,060	
July 15	do	1.63	37,940	
July 24	do	1.22	17,640	
August 7	do	1.09	11,860	
August 18	do	1.02	10,150	
September 18	do	1.08	13,860	
September 23	do	1.12	14,890	
October 5	do	1.08	10,080	
October 10	do	1.08	9,820	
October 28	do	.99	7,600	

Discharge measurements of Quinali River, near Quinali, Polangui, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
December 7	Wilfred Demers	1.03	9,840	
December 9	do	1.04	10,040	
December 15	do	1.04	9,120	
December 20	do	1.05	9,640	
December 27	do	1.00	8,400	
1912				
January 3	do	1.06	10,450	
January 6	do	1.05	10,080	
January 15	do	1.09	11,530	
January 18	do	1.07	10,750	
January 26	do	1.05	9,440	
February 8	do	1.04	9,780	
February 13	do	1.05	10,880	
February 20	do	1.04	8,570	
February 27	do	1.06	10,700	
March 4	do	1.03	9,790	
March 14	do	.99	8,290	
March 26	do	.99	8,990	
April 6	do	.96	6,870	
April 11	do	.97	6,620	
1919				
February 11	W. Demers and A. Fegarido	.37	12,510	
March 1	do	.35	11,630	
March 21	Angel Fegarido	.30	10,180	
April 14	do	.29	7,630	
April 25	do	.23	6,880	
May 8	do	.19	5,200	
May 23	do	.20	5,310	
June 6	do	.14	3,620	
July 21	do	.28	8,980	
August 15	do	.46	13,610	
September 5	A. Fegarido and M. B. Canas	.17	5,260	
September 16	do	.50	15,290	
September 24	A. Fegarido and M. B. Canas.	.20	5,390	
October 8	do	.31	10,480	
October 21	do	.54	16,710	
November 4	do	.35	11,730	
November 18	do	.23	6,880	
December 2	do	.45	13,550	
December 16	do	.44	12,440	
1920				
January 10	M. B. Canas	.56	20,190	
January 15	do	.56	20,260	
February 7	do	.41	15,390	
March 9	do	.40	4,130	
March 16	do	.38	3,160	
March 27	do	.34	2,440	
March 29	do	.32	2,490	
April 12	do	.32	2,270	
April 13	do	.32	2,270	
April 22	do	.16	1,230	
May 5	do	.50	5,230	
May 18	do	.20	3,050	
June 8	do	.22	2,840	
June 17	do	.20	4,370	
July 8	do	.32	4,900	
July 21	M. B. Canas and O. Buenaventura.	.28	4,890	
July 21	do	.29	4,580	
July 29	do	.29	4,580	
August 4	O. Buenaventura	.20	4,253	
August 11	do	.21	4,699	
August 11	do	.11	2,190	
August 17	do	.09	2,141	
August 27	do	.35	8,764	
September 4	do	.32	8,147	
September 11	do	.30	7,498	
September 17	do	.28	6,650	
September 24	do	.57	21,298	
October 7	do	.39	11,594	
October 22	do	.56	19,377	
November 5	do	.60	23,031	

Discharge measurements of Quinali River, near Quinali, Polangui, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
November 11	O. Buenaventura	.39	10,462	
November 20	do	.40	11,745	
November 26	do	.42	12,386	
December 3	do	.60	23,098	
December 11	do	.48	15,518	
December 22	do	.50	17,155	
1921				
January 7	do	.40	9,167	
January 14	do	.39	8,068	
January 24	do	.40	8,644	
January 31	do	.59	16,065	
February 7	do	.53	17,705	
February 7	do	.53	12,705	
February 15	do	.48	11,854	
February 21	do	.40	9,230	
February 28	do	.42	10,302	
March 10	do	1.01	32,930	
March 18	do	.68	19,566	
March 23	do	.70	21,405	
March 30	do	.65	19,996	
April 6	do	.52	14,764	
April 22	do	.34	7,458	
April 29	do	.29	6,344	
May 4	do	.27	5,839	
May 8	do	.26	5,840	
June 8	O. Buenaventura	.30	6,873	
June 29	do	.28	6,653	
July 11	do	.44	10,438	
July 26	do	.39	8,866	
August 5	do	.40	9,113	
August 22	do	.29	6,718	
September 6	do	.49	12,863	
September 16	do	.59	17,750	
September 21	do	.46	11,869	
October 5	do	.48	11,671	
October 11	do	.50	12,944	
November 3	do	1.00	34,219	
November 29	S. Musa	.98	33,106	
December 6	do	.88	29,235	
December 21	O. Buenaventura	.79	27,417	
December 29	do	.75	25,183	
1922				
January 4	do	.65	19,871	
January 11	do	.62	17,948	
January 16	do	.88	28,798	
January 26	do	.62	18,617	
February 2	do	.80	25,068	
February 20	do	.54	13,789	
March 4	do	.48	16,377	
March 29	do	.50	16,653	
April 4	do	.38	10,645	
April 20	do	.36	9,901	
April 27	do	.33	8,969	
May 4	do	.36	8,419	
May 13	do	.41	11,220	
May 20	do	.35	6,562	
June 4	do	.21	3,553	
June 23	S. Musa and O. Buenaventura	.46	9,137	
July 5	do	.43	9,801	
July 15	do	.33	7,423	
August 10	do	.60	14,360	
August 25	do	.38	9,302	
August 28	do	.36	6,974	
September 15	do	.36	7,108	
September 19	do	.52	12,893	
October 5	do	.50	11,227	
October 10	do	.47	10,863	
October 21	do	.52	12,397	
October 24	do	.48	10,813	
November 13	do	.65	17,491	
November 27	do	1.46	53,227	
December 9	do	.78	26,625	
December 12	do	.75	25,208	
December 19	do	.72	21,877	

NOTE.—Gage height readings from February 11, 1919, to April 11, 1922, referred to new data.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									7,500	18,400	23,900	14,700
2									7,050	16,050	87,400	18,800
3									12,900	61,400	41,400	26,900
4									30,400	48,400	28,400	36,400
5									16,500	24,400	22,900	34,400
6									17,400	18,400	18,400	23,400
7									9,300	16,950	15,600	19,400
8									13,800	16,050	14,700	18,400
9								2,900	26,400	15,600	12,900	16,500
10								2,200	14,700	15,600	12,000	19,400
11								2,200	12,900	13,800	12,000	17,400
12								2,550	11,550	14,700	11,550	15,150
13								2,900	10,200	13,350	25,400	16,500
14								2,900	8,400	12,900	23,400	12,900
15								3,600	12,000	14,700	19,400	17,400
16								2,550	22,400	14,250	15,600	16,050
17								2,900	21,400	12,900	14,250	32,400
18								3,600	17,400	12,900	12,900	17,400
19								2,900	15,600	12,000	16,500	15,150
20								2,900	13,800	10,200	16,500	16,500
21								16,050	12,900	9,300	15,600	12,900
22								17,400	29,400	11,100	52,400	17,400
23								16,500	16,050	11,550	29,400	16,050
24								15,600	32,400	12,000	20,400	32,400
25								12,000	18,400	11,100	16,500	48,900
26								14,700	33,900	9,300	14,250	33,400
27								13,800	25,400	7,500	19,400	25,900
28								12,900	34,400	14,700	16,500	58,400
29								8,850	34,900	14,700	16,050	47,400
30								2,900	26,400	15,600	15,600	32,400
31								2,900		17,400		24,400
Maximum								17,400	34,900	61,400	87,400	58,400
Minimum								2,200	7,050	7,500	11,550	12,900
Mean								7,292	18,859	16,684	22,040	24,184

NOTE.—Daily discharge determined from a poorly defined rating curve. Station first established August 9, 1910.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	23,400	12,900	18,400	12,900	13,800	9,300	90,400	17,400	12,000	11,550	9,300	12,000
2	21,400	12,900	17,400	12,900	14,700	8,850	68,900	16,050	11,100	10,200	9,300	12,450
3	19,900	12,450	16,950	12,900	16,050	8,400	33,400	15,600	10,650	10,200	9,300	13,350
4	20,400	12,400	16,500	12,000	14,250	8,400	23,900	15,150	10,200	10,200	9,300	12,000
5	21,400	11,100	15,600	12,000	15,150	8,850	22,900	18,400	10,200	12,000	9,300	12,000
6	20,400	11,550	15,150	12,000	15,600	8,400	18,400	13,800	9,300	19,900	7,950	11,100
7	19,400	12,450	13,350	12,000	13,800	8,400	16,500	12,900	10,650	10,200	12,900	11,100
8	18,400	11,550	13,800	13,350	12,900	8,850	17,400	12,000	12,000	12,000	14,250	12,450
9	20,400	11,550	13,800	16,500	12,900	8,400	16,050	12,900	11,100	11,550	12,000	12,000
10	20,400	11,550	14,700	43,900	12,450	8,400	47,400	12,000	11,550	12,000	10,200	12,900
11	19,400	17,900	13,800	21,400	12,000	8,850	63,000	12,000	11,550	12,000	9,750	11,550
12	17,400	20,400	17,900	16,950	12,000	9,300	43,400	13,350	12,900	11,100	9,750	11,100
13	16,500	18,400	15,600	14,700	12,450	9,300	63,900	13,350	13,350	11,100	10,200	12,000
14	15,600	15,600	15,150	13,350	12,000	12,000	78,400	13,350	13,800	11,550	11,100	12,000
15	15,600	15,600	14,250	12,900	13,800	10,200	43,400	12,000	16,050	10,650	10,200	12,000
16	14,700	16,500	13,800	14,700	12,900	9,750	32,400	10,200	13,800	11,100	16,050	12,000
17	15,600	17,400	12,900	15,150	12,000	12,900	25,900	10,200	13,800	11,100	21,400	11,100
18	15,150	18,900	13,800	13,800	12,000	11,550	21,900	11,550	14,700	12,000	16,050	10,650
19	14,700	20,400	13,350	14,700	11,550	13,350	22,400	37,900	13,350	12,450	14,700	10,200
20	14,700	25,900	12,900	13,800	10,200	12,000	20,400	32,400	12,900	11,100	14,700	10,200
21	14,250	31,900	12,450	12,900	12,900	10,200	19,400	101,900	13,800	10,200	13,800	11,100
22	16,500	25,400	12,900	13,800	11,100	9,300	18,400	24,400	23,400	9,750	12,900	10,650
23	14,700	19,400	12,900	23,400	11,100	9,300	20,400	17,900	15,600	10,200	12,000	10,200
24	14,250	17,900	12,000	12,450	8,850	9,750	20,400	22,900	16,500	10,650	11,550	.....
25	13,800	18,400	12,450	15,150	8,850	9,300	18,900	16,500	17,900	10,650	11,100	.....
26	13,800	25,400	14,700	13,800	9,300	8,850	15,600	16,050	13,800	9,750	11,100	.....
27	13,800	24,400	14,700	12,900	8,850	7,950	15,600	14,700	12,900	10,200	10,650	.....
28	13,350	21,900	16,500	12,900	8,400	8,400	17,400	14,700	12,000	9,300	11,550	.....
29	13,800	.....	14,700	12,900	8,400	12,000	21,900	12,900	12,900	9,300	11,100	.....
30	13,350	.....	13,800	12,900	9,300	14,250	20,400	12,900	12,450	9,300	10,200	.....
31	12,900	.....	13,350	.....	8,400	.....	20,400	12,000	.....	9,300	.....	.....
Maximum	23,400	31,900	18,400	43,900	16,050	13,350	90,400	101,900	23,400	19,900	21,400	13,350
Minimum	12,900	11,100	12,000	12,000	8,400	7,950	15,600	10,200	9,300	9,300	7,950	10,200
Mean	16,754	17,575	14,502	15,166	11,898	9,825	31,614	18,689	13,207	11,050	11,788	11,513

NOTE.—Daily discharge determined from a poorly defined rating curve.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10,200	11,550	12,000	9,750								
2	11,100	11,100	12,000	9,300								
3	10,200	11,100	12,000	8,850								
4	11,100	11,100	12,000	9,300								
5	12,900	15,150	11,100	8,400								
6	13,350	13,350	11,100	8,400								
7	12,450	12,000	11,100	8,850								
8	12,000	12,000	11,100	8,850								
9	11,100	12,000	10,650	8,850								
10	11,100	12,000	11,100	8,850								
11	11,100	12,000	10,200	8,850								
12	11,100	12,450	11,100	9,750								
13	20,400	12,900	11,100	9,300								
14	19,400	12,450	9,750	8,400								
15	15,150	12,000	10,200	9,750								
16	13,800	11,100	10,200	9,300								
17	12,900	11,550	10,200	8,400								
18	12,900	11,100	9,750	9,300								
19	12,900	11,100	9,750	8,400								
20	12,900	12,450	10,200	9,300								
21	12,450	19,400	10,200									
22	12,000	17,400	10,200									
23	11,550	13,350	10,200									
24	11,550	12,900	11,100									
25	12,000	12,450	9,750									
26	12,000	12,000	9,750									
27	12,000	12,450	10,200									
28	12,000	12,900	9,750									
29	12,000	12,900	9,750									
30	11,550		9,750									
31	12,000		9,750									
Maximum	20,400	19,400	12,000	9,750								
Minimum	10,200	11,100	9,750	8,400								
Mean	12,554	13,010	10,560	9,008								

NOTE.—Daily discharge determined from a poorly defined rating curve. Station maintenance abandoned after April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			10,740	8,420	5,740	4,950	8,420	11,100	15,280	8,420	17,320	30,040
2			10,740	8,740	5,740	4,950	37,460	8,740	11,820	7,500	14,880	25,320
3			10,400	8,420	5,740	4,450	21,440	8,740	6,900	7,800	8,420	24,320
4			10,060	8,420	5,470	4,700	21,920	33,380	6,040	10,060	7,500	35,100
5			9,720	8,420	5,740	4,450	8,420	18,280	4,950	9,380	12,560	33,380
6			9,720	8,420	5,740	4,200	11,460	11,100	4,700	9,060	14,080	27,900
7			9,380	8,420	5,740	4,450	10,060	18,280	4,950	8,740	14,880	22,400
8			9,380	8,100	5,470	4,700	9,380	11,820	5,740	9,380	17,380	26,340
9			9,720	8,740	5,200	22,880	8,740	14,880	18,280	16,960	12,560	23,360
10			10,740	8,740	4,950	18,280	8,740	10,740	10,400	26,340	16,540	20,520
11			10,400	8,420	4,700	11,820	8,740	8,100	15,280	18,280	14,480	17,820
12		11,820	9,720	8,420	4,700	11,100	10,740	6,600	12,180	12,940	15,280	15,280
13		11,820	9,720	8,100	4,700	8,420	9,060	12,560	24,320	12,180	12,560	13,700
14		11,460	9,060	8,420	4,450	7,800	8,740	11,460	16,120	12,560	33,380	11,460
15		11,460	9,380	8,420	4,450	5,740	8,100	14,480	15,280	20,980	45,460	9,380
16		12,180	9,060	8,100	3,950	5,740	7,500	8,740	16,540	12,560	39,260	13,700
17		13,700	9,380	7,800	4,200	5,200	6,900	8,420	66,540	11,460	48,620	15,280
18		12,180	9,060	7,500	4,700	5,200	6,600	7,200	26,340	7,500	83,820	36,260
19		11,460	9,380	6,900	5,200	12,180	7,800	11,820	20,520	14,480	47,340	75,500
20		11,100	8,740	6,900	5,200	10,740	9,060	19,160	15,280	24,320	37,460	39,260
21		11,460	8,740	6,900	4,950	10,740	8,100	14,880	11,820	19,160	32,820	27,900
22		11,100	8,420	7,200	4,700	6,320	7,200	11,820	7,800	16,120	30,580	22,400
23		10,740	8,420	6,900	4,200	5,740	7,500	10,740	7,500	14,880	27,380	18,720
24		11,100	8,740	6,900	4,200	5,740	12,560	10,740	6,040	12,180	26,340	20,060
25		10,740	8,740	6,600	4,200	5,200	11,460	10,400	5,200	7,800	20,520	19,600
26		11,100	8,740	6,320	6,040	41,120	10,400	8,420	6,900	14,880	18,720	18,720
27		11,100	8,420	6,600	6,600	37,460	9,380	7,200	6,900	12,940	22,400	17,820
28		10,740	8,420	6,600	5,470	14,480	11,100	8,100	6,900	10,740	23,360	19,600
29			8,740	6,320	5,200	11,820	10,740	10,400	5,740	12,180	24,820	22,400
30			8,740	5,740	4,700	6,900	17,820	36,260	5,200	20,060	26,340	22,380
31			8,420		4,700		12,940	20,060		23,840		19,160
Maximum		13,700	10,740	8,740	6,600	41,120	37,460	36,260	66,540	26,340	83,820	75,500
Minimum		10,740	8,420	5,740	3,950	4,200	6,600	6,600	4,700	7,500	7,500	9,380
Mean		11,486	9,324	7,663	5,056	10,249	11,241	13,052	12,915	13,732	25,571	24,051

NOTE.—Daily discharge determined from a fairly well-defined curve from 4,000 to 19,000 second-liters, applicable from February 12 to December 31.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	19,540	12,420	15,320	8,160	4,390	5,520	11,950	4,940	10,170	6,420	7,800	37,030
2	21,660	11,950	14,320	7,440	5,220	4,940	6,760	4,940	8,160	8,940	7,440	26,960
3	18,480	11,950	13,360	8,160	4,660	5,520	5,220	4,940	8,160	15,830	13,360	23,780
4	25,900	12,890	12,890	7,440	4,390	4,940	10,610	4,390	7,440	13,830	37,560	18,480
5	24,310	11,950	13,360	6,760	4,390	4,390	8,940	4,940	7,440	17,950	19,010	19,540
6	20,070	11,500	12,420	6,110	5,520	4,120	8,160	3,400	6,760	13,360	13,830	31,730
7	21,660	11,950	11,050	5,520	4,120	4,940	7,440	3,400	6,760	11,050	13,360	24,840
8	23,780	11,500	11,500	8,940	4,940	4,940	8,160	3,400	5,520	9,330	14,810	21,660
9	21,130	10,610	11,500	7,100	5,520	5,520	7,800	2,960	4,660	7,800	11,950	20,600
10	19,540	11,050	12,420	6,420	4,390	10,610	13,830	3,400	4,940	6,760	11,500	17,420
11	16,360	10,610	11,500	7,440	5,820	8,940	29,080	1,860	7,440	6,760	11,050	16,360
12	14,810	12,420	11,500	8,160	6,760	5,520	24,310	1,860	6,760	7,800	11,500	14,320
13	16,360	13,360	11,500	7,440	6,110	4,390	15,320	1,700	6,110	7,800	14,320	16,890
14	20,600	19,540	10,610	6,420	7,100	4,940	10,610	2,190	4,940	23,250	15,830	13,360
15	19,540	56,110	10,610	5,520	7,440	4,390	8,160	6,110	5,520	81,020	21,660	11,500
16	19,540	36,500	10,170	4,390	7,800	4,940	6,760	6,420	6,110	66,180	22,720	18,480
17	21,130	23,250	9,750	4,660	8,160	4,390	6,110	4,390	6,760	42,860	20,600	15,320
18	26,430	18,480	10,170	4,660	8,940	4,660	5,520	22,720	6,760	29,610	17,420	16,890
19	20,070	16,360	11,950	4,390	6,760	3,870	5,520	23,780	8,940	23,780	16,360	15,320
20	19,540	16,360	9,330	4,390	8,160	4,390	4,940	19,010	8,940	21,130	12,890	15,320
21	17,420	15,320	9,750	3,870	8,160	5,220	4,390	15,320	11,950	19,540	12,420	15,320
22	7,440	15,320	10,610	3,400	7,440	4,390	4,390	7,440	12,420	16,890	13,360	15,320
23	15,830	11,500	9,750	3,400	7,100	4,390	3,870	8,160	11,950	13,360	11,500	11,950
24	14,810	12,420	10,170	3,400	6,760	5,520	3,400	4,940	13,360	11,500	14,320	11,500
25	13,360	16,360	9,750	4,120	5,820	6,760	2,960	4,390	20,600	11,500	13,360	11,950
26	14,810	17,420	9,750	4,390	5,520	6,420	2,760	6,760	21,660	10,610	12,420	11,500
27	13,360	18,480	8,940	4,940	5,520	7,100	3,870	9,750	16,890	10,610	11,950	11,950
28	12,420	16,890	8,160	4,940	5,220	14,320	8,160	21,660	11,950	9,750	11,500	14,320
29	11,500	16,360	8,160	4,940	5,520	16,360	6,760	32,260	9,750	9,750	12,420	11,050
30	11,050	.....	8,160	4,390	5,220	16,360	4,660	14,320	7,800	8,940	13,830	11,500
31	13,360	.....	7,440	.....	4,390	.....	4,390	10,610	.....	7,800	.....	9,750
Maximum	26,430	56,110	15,320	8,940	8,940	16,360	29,080	32,260	21,660	81,020	37,560	37,030
Minimum	7,440	10,610	7,440	3,400	4,120	3,870	2,760	1,700	4,660	6,420	7,440	9,750
Mean	17,929	16,580	10,835	5,710	6,041	6,424	8,220	8,592	9,221	17,797	14,735	17,158

NOTE.—Daily discharge determined from a fairly well-defined curve. Applicable from January 1 to February 24, 1922.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	9,400	28,120	14,740	14,740	5,540	5,540	6,060	6,060	16,240	12,590	32,340	27,560
2	12,590	18,300	16,240	14,000	6,060	6,580	6,060	7,950	13,280	12,590	46,020	31,080
3	11,260	18,720	14,740	13,280	6,060	6,060	17,880	8,810	10,000	10,620	59,780	26,460
4	10,620	16,240	14,370	12,590	5,540	5,040	119,580	10,000	10,620	11,920	33,660	27,560
5	9,700	14,000	12,930	13,280	6,060	4,120	28,120	9,400	11,260	12,250	36,420	34,340
6	9,700	15,480	14,000	13,280	6,580	4,120	24,360	8,810	12,590	11,260	28,680	29,880
7	9,400	16,240	68,060	12,590	5,540	6,320	14,000	8,810	19,160	10,310	34,340	25,400
8	9,400	17,460	62,540	11,920	5,040	6,580	11,260	8,810	16,640	9,700	28,120	24,360
9	8,810	16,240	36,420	11,260	5,540	7,670	9,400	8,230	12,250	10,310	44,220	23,350
10	8,810	14,740	37,880	10,620	5,540	9,400	8,810	16,640	12,590	10,000	78,180	28,680
11	9,400	13,280	23,350	10,310	5,540	9,700	10,000	14,000	18,300	9,400	96,580	22,860
12	8,810	12,590	18,300	10,000	5,540	10,000	8,520	11,260	92,900	10,000	82,780	20,520
13	9,100	11,920	15,480	8,810	4,570	6,850	9,100	9,700	50,580	10,310	41,700	17,880
14	9,400	12,590	16,240	7,670	4,120	11,260	6,580	8,810	24,360	9,400	33,660	34,340
15	10,000	11,920	16,640	7,670	3,690	11,920	7,670	8,520	12,930	16,240	28,680	32,340
16	14,740	9,700	17,880	9,400	3,690	10,000	8,230	7,670	16,240	14,740	25,400	25,400
17	14,740	10,000	18,720	10,000	3,270	6,850	7,120	6,060	12,930	12,250	25,920	24,360
18	15,110	9,400	20,060	9,400	6,060	6,320	7,670	5,800	12,590	11,260	24,360	21,900
19	10,620	10,000	30,480	8,810	4,340	9,400	9,400	6,060	11,920	10,620	23,350	20,520
20	10,000	18,300	24,360	8,810	2,190	8,810	9,400	5,540	11,260	10,000	24,360	32,340
21	10,000	14,740	20,520	8,230	2,340	8,230	9,400	6,060	11,590	10,620	24,360	25,400
22	9,400	27,560	21,900	7,670	4,120	6,320	9,700	6,060	11,920	11,920	34,340	23,840
23	10,000	22,380	20,520	7,120	3,690	6,580	10,000	6,580	12,250	9,700	59,780	22,380
24	10,000	16,640	15,480	6,580	3,270	10,940	12,590	6,060	12,930	11,260	82,780	22,380
25	9,400	49,660	14,740	6,850	3,690	12,590	10,620	5,540	21,440	10,940	114,980	22,860
26	9,400	37,140	14,000	7,390	3,690	9,400	9,400	9,400	18,720	12,590	108,540	44,220
27	9,400	23,350	14,370	6,850	3,270	6,320	8,810	6,850	15,110	13,280	75,420	25,400
28	10,000	12,930	14,000	6,580	3,270	7,120	8,520	6,580	14,740	11,920	37,880	24,360
29	11,260	.....	14,740	6,060	4,120	6,320	8,230	7,950	14,000	11,590	37,140	22,380
30	14,740	.....	17,880	5,540	6,320	5,540	7,120	8,810	13,280	13,630	29,880	20,520
31	15,860	.....	14,740	.....	7,120	.....	6,320	12,930	.....	22,380	.....	20,980
Maximum	15,860	49,660	68,060	14,740	7,120	12,590	119,580	16,640	92,900	22,380	114,980	44,220
Minimum	8,810	9,400	12,930	5,540	2,190	4,120	6,060	5,540	10,000	9,400	23,350	17,880
Mean	10,680	17,844	21,817	9,577	4,691	7,730	13,869	8,379	18,154	11,794	47,688	25,995

NOTE.—See footnote to daily discharge table for 1920.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	19,600	21,440	19,980	13,200	6,660	6,560	7,960	72,960 68,520	7,680	14,420	11,640	36,700
2	20,060	25,920	19,980	12,500	7,960	6,040	7,960	35,960	13,200	11,640	12,400	31,060
3	17,040	19,600	18,100	11,210	9,460	4,600	12,400	19,580	15,280	11,640	13,600	26,700
4	17,880	19,600	16,340	9,460	9,460	3,740	10,200	14,840	18,080	11,260	35,220	25,520
5	18,300	19,600	15,520	9,460	11,840	5,520	8,880	15,720	24,940	11,640	72,960	41,140
6	17,040	19,600	16,340	8,920	9,460	8,260	8,560	22,720	16,180	11,640	38,180	29,780
7	18,720	18,720	16,340	9,460	8,420	6,560	7,400	24,940	14,840	10,900	26,100	23,820
8	18,300	16,240	16,340	7,520	8,420	5,520	6,560	22,720	14,000	10,900	22,720	26,100
9	18,720	15,480	16,340	8,420	7,520	5,040	7,120	17,600	14,420	10,900	21,660	24,940
10	17,040	14,740	16,340	9,460	14,720	5,040	22,720	15,720	21,660	10,900	21,140	22,720
11	17,040	15,110	17,200	8,920	13,200	4,600	16,640	13,200	14,840	11,640	19,580	23,260
12	32,340	14,000	16,340	8,920	11,210	4,160	10,200	11,640	13,600	13,600	19,580	23,820
13	35,020	15,480	15,520	8,420	10,580	3,740	7,400	13,200	13,200	18,080	20,100	22,720
14	25,400	15,480	14,720	11,840	9,460	3,740	6,040	15,720	9,520	21,660	23,820	21,140
15	25,400	15,860	16,340	10,580	8,420	3,340	6,040	31,060	6,560	19,580	16,180	19,580
16	25,400	15,480	18,100	9,460	6,660	3,740	5,520	38,180	6,560	39,660	23,260	17,600
17	28,680	14,740	18,100	8,420	5,900	4,380	5,520	27,300	8,560	20,100	19,080	27,300
18	20,520	15,480	19,980	7,520	9,460	6,040	5,780	21,660	9,520	16,640	16,640	30,420
19	18,720	14,740	19,980	6,660	9,460	4,600	10,900	14,840	12,020	14,420	18,580	29,780
20	17,880	14,000	18,100	6,660	8,420	2,950	20,620	12,400	10,900	13,200	29,160	83,320
21	17,040	13,280	16,340	7,520	10,900	5,040	23,820	10,900	9,200	12,020	47,060	82,580
22	17,880	14,000	13,200	6,660	12,400	5,040	24,940	8,260	35,220	10,900	43,360	68,520
23	18,720	13,280	10,580	7,960	10,900	9,200	22,720	7,680	31,060	10,900	27,300	61,860
24	19,600	12,590	10,000	7,960	11,640	7,680	20,620	8,260	22,720	11,260	19,580	47,060
25	19,600	19,980	8,920	7,520	9,520	6,040	21,660	7,680	19,580	12,400	20,620	50,760
26	18,720	22,040	10,000	7,520	10,900	5,520	17,120	8,260	16,640	12,400	18,580	38,180
27	19,600	19,980	37,240	7,520	9,520	5,520	14,840	8,260	23,260	12,020	72,960	41,140
28	19,600	19,980	19,980	6,660	7,680	4,600	13,600	7,680	20,100	11,640	55,940	38,180
29	17,880	.....	18,100	6,660	6,840	4,600	10,200	7,680	16,640	10,900	75,920	31,720
30	16,640	.....	16,340	6,660	5,520	5,520	8,880	7,680	15,280	11,260	50,760	28,540
31	16,240	.....	16,340	.....	5,040	.....	84,060 87,020	7,680	.....	10,900	.....	81,100
Maximum	35,020	25,920	37,240	13,200	14,720	9,200	87,020	72,960	35,220	39,660	75,920	83,320
Minimum	16,240	12,590	8,920	6,660	5,040	3,340	5,520	7,680	6,560	10,900	11,640	17,600
Mean	20,343	17,016	16,872	8,655	9,276	5,231	14,786	17,734	15,842	13,904	30,489	37,325

NOTE.—Discharge determined from rating curves applicable as follows: February 25 to May 20, 1922, poorly defined; May 21 to December 31, 1922, fairly well-defined below 36,000 second-liters.

ALBAY PROVINCE

SAN FRANCISCO RIVER, MALINAO

LOCATION.—About 32 km. from Legaspi on the bridge of the Legaspi–Tui Road.

RECORDS AVAILABLE.—From February 22, 1919, to December 31, 1922. Also from March 29, 1910, to April 20, 1912, inclusive, at place 1.5 km. above present station.

GAGE.—Standard metric gage board fastened, vertically on down-stream right abutment, by means of anchor bolts.

DISCHARGE MEASUREMENT.—Made from bridge.

CHANNEL AND BANKS.—Channel is straight for 18 m. above and 15 m. below gaging section; left bank high, right bank low and subject to overflow. At measuring section stream bed mostly sand and very shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 41,070 second-liters on December 21, 1922, estimated from extension of rating curve; minimum discharge, 205 second-liters on June 15 and 16, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge for March 29, 1910, to April 20, 1912 and from February 22, 1919, to December 31, 1922, are determined from a well-defined curve. Gage read twice daily.

Discharge measurements of San Francisco River, near Población, Malinao, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
March 29	J. I. Quinn	1 00	3,500	
April 16	....do.	1 60	4,230	
May 17	... do.	1 07	1,910	
June 30	....do.	1.10	2,180	
August 4	...do.	1.10	1,150	
August 8	....do.	1 10	1,105	
October 13	.... do	1.03	1,470	
October 13	H. V. Hall	1.03	1,480	
October 15	... do.	1 16	2,690	
October 15	...do.	1 16	2,840	
November 23	J. I. Quinn	1.33	4,650	
December 15	Sawyer	1 64	8,920	
December 16	...do.	1 40	5,690	
December 17	... do.	2 03	18,670	
December 28	... do	1 79	18,430	
December 30	... do.	1 67	9,600	
1911				
January 10	... do.	1.34	4,260	
January 10	... do.	1 34	4,420	
February 1	.... do.	1 16	2,450	
February 13	W. Demers.	1 34	4,460	
February 14	....do.	1.39	5,370	
March 15	....do.	1.23	3,626	
April 1	....do.	1.16	2,900	
April 11	....do.	1 23	3,330	
April 24	....do.	1.19	3,120	
May 1	....do.	1.11	2,280	
May 12	....do.	1.14	2,280	
May 31	....do.	1.08	1,470	
June 13	....do.	1 08	1,710	
June 15	....do.	1 08	2,130	
June 24	....do.	1.01	1,230	
June 28	....do.	1.00	1,210	
July 17	....do.	1 23	3,120	
July 26	....do.	1.11	1,710	
August 8	.... do	1.02	1,360	

Discharge measurements of San Francisco River, near Población, Malinao, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
August 22	W. Demers.	1.08	1,660	
September 8	do	.97	1,230	
September 21	do	1.03	1,280	
October 7	do	.96	710	
October 20	do	.96	710	
December 8	do	1 00	1,100	
December 18	do	1 03	1,330	
December 29	do	1.00	1,090	
1912				
January 5	do	1 04	1,570	
January 17	do	1.03	1,400	
February 12	do	1 08	1,150	
February 21	do	1.64	9,570	
February 28	do	1.14	2,110	
March 6	do	1.06	1,590	
March 12	do	1.03	1,100	
March 23	do	1 06	1,600	
April 8	do	1.00	1,060	
1919				
March 3	do	.88	1,420	
March 24	A. Fegarido	.85	1,230	
March 29	do	.84	1,210	
April 21	do	.76	790	
May 12	do	.69	510	
May 15	do	.70	610	
May 20	do	.68	430	
June 14	do	.71	660	
July 3	do	.90	1,560	
July 23	do	.85	1,270	
July 25	do	76	750	
August 20	do	1.17	3,290	
September 1	A. Fegarido and M. Canas	.82	1,150	
September 19	do	.98	2,360	
October 6	do	.88	1,300	
October 13	do	87	1,370	
October 28	do	96	2,320	
November 6	do	1.25	3,870	
November 28	A. Fegarido	1 30	4,210	
December	do	1.18	3,490	
1920				
January 7	M. B. Canas.	1.16	3,160	
January 12	do	1 11	2,870	
February 19	do	1 12	2,930	
March 3	do	1.03	2,380	
March 22	do	.86	1,990	
March 31	do	.82	950	
April 5	do	.80	940	
April 26	do	.78	910	
April 28	do	.96	1,740	
May 21	do	.76	790	
June 2	do	.73	800	
June 4	do	.69	660	
June 21	do	.57	550	
June 23	do	.56	390	
July 19	do	.78	610	
August 3	O. Buenaventura	.68	500	
August 14	do	.63	240	
September 16	do	.64	440	
October 19	do	82	1,199	
November 2	do	71	727	
November 16	do	1 04	3,222	
December 1	do	1.96	10,565	
December 15	do	.94	2,123	
1921				
January 3	do	1.10	3,039	
January 20	do	.92	1,885	
February 4	do	1.28	4,284	
February 19	do	1.22	4,006	
March 5	do	.99	2,796	
March 19	do	2.02	11,501	
April 4	do	.90	1,774	
April 20	do	.79	1,051	

Discharge measurements of San Francisco River, near Población, Malinao, Albay—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
May 2	O. Buenaventura	.81	1,184	
May 10	do	.78	1,061	
June 3	do	.86	1,477	
July 8	do	.93	1,945	
July 27	do	.76	833	
July 28	do	.76	781	
August 25	do	.61	433	
September 3	do	.90	1,578	
September 5	do	.85	2,027	
September 19	do	.82	1,270	
October 3	do	.87	1,350	
October 14	do	1 13	2,285	
November 5	do	1 57	6,912	
December 2	S. Musa	1 16	4,168	
December 22	O. Buenaventura	1 22	4,097	
1922				
January 2	do	1 08	3,275	
January 31	S. Musa	1 12	3,751	
February 21	O. Buenaventura	1 01	2,530	
March 6	do	.95	2,057	
March 22	do	1 00	2,519	
April 1	do	1 05	2,511	
April 18	do	1 04	2,531	
May 2	O. Buenaventura	.90	1,421	
May 11	do	.81	1,103	
May 22	do	.99	1,818	
June 2	do	.73	477	
June 9	W. Demers and O. Buenaventura.	.72	408	
June 21	S. Musa and O. Buenaventura.	.83	695	
July 7	do	.77	513	
October 22	do		1,804	
November 15	O. Buenaventura	1 13	3,275	
December 11	do	1.16	4,163	
December 20	do	1 15	4,112	

NOTE.—Gage height readings from March 3, 1919, referred to different data.

Daily and monthly discharges, in liters per second, of San Francisco River near Población, Malinao, Albay, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				1,410	1,590	1,680	1,970	2,170	1,500	2,170	5,850	3,510
2				1,590	1,590	1,725	2,600	2,170	1,320	2,070	11,850	3,510
3				1,970	1,725	1,590	2,930	1,870	1,410	4,530	9,690	6,930
4				3,880	1,915	1,545	3,040	1,870	1,590	2,820	6,300	11,430
5				2,170	2,015	1,680	4,140	1,680	1,590	2,380	4,950	7,920
6				1,970	2,170	1,770	3,155	1,590	1,500	2,170	4,530	5,550
7				2,490	1,970	1,500	2,490	1,500	1,410	1,970	3,750	5,400
8				2,170	1,870	1,590	2,170	1,410	1,590	1,970	4,270	4,665
9				1,590	2,115	1,500	2,070	1,590	1,970	2,070	3,750	4,270
10				1,915	2,070	1,410	1,870	1,500	1,590	1,970	3,270	6,600
11				1,725	2,070	2,600	1,870	1,410	1,970	1,870	3,270	4,800
12				1,590	1,870	2,600	1,770	1,410	2,600	1,770	2,930	5,700
13				1,455	1,815	2,170	1,870	1,410	3,750	1,590	5,850	5,100
14				1,455	1,870	1,870	1,680	1,230	2,275	1,320	3,750	4,270
15				1,635	1,870	1,680	1,970	1,410	1,970	1,770	3,270	10,830
16				1,870	1,770	1,770	1,770	1,410	3,270	1,870	2,930	5,550
17				1,680	1,725	2,170	1,680	1,410	2,820	2,600	2,600	14,760
18				1,365	1,770	1,870	1,770	1,410	2,170	2,275	2,490	6,930
19				1,275	1,915	2,710	1,590	1,410	3,040	1,870	5,100	5,700
20				1,230	1,970	2,865	1,500	1,500	2,380	1,590	4,270	4,800
21				1,185	1,815	2,535	1,590	1,590	2,930	1,590	4,665	4,530
22				1,275	1,870	2,600	1,770	1,590	3,040	2,275	7,920	7,590
23				1,590	1,915	3,555	1,590	1,970	2,380	2,070	4,950	7,260
24				2,425	1,635	4,710	1,590	1,970	2,170	2,600	4,800	27,240
25				1,725	1,635	3,390	1,410	2,170	1,970	1,970	4,010	15,720
26				1,970	1,275	2,600	1,410	1,770	2,275	1,680	3,750	9,880
27				1,680	1,590	2,710	1,230	2,170	2,710	1,590	4,800	7,920
28				1,455	1,545	2,490	1,230	1,680	3,750	1,970	4,270	17,160
29			1,050	2,820	1,635	2,170	1,590	1,410	2,820	1,970	5,250	14,280
30			1,320	1,815	1,635	1,870	1,410	1,410	2,380	3,390	4,140	9,880
31			1,410		1,590		1,410	1,680		3,270		8,435
Maximum			1,410	3,880	2,170	4,710	4,140	2,170	3,750	4,530	11,850	27,240
Minimum			1,050	1,185	1,275	1,410	1,230	1,230	1,320	1,320	2,490	3,510
Mean			1,260	1,809	1,788	2,231	1,294	1,355	2,271	2,162	4,441	8,326

NOTE.—Daily discharges determined from a well-defined curve between 700 and 18,600 second-liters. Values above and below these limits are estimated from extension of curve. Applicable from March 22 to December 31, 1910.

Daily and monthly discharges, in liters per second, of San Francisco River near Población, Malinao, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	8,970	2,600	4,800	2,710	1,970	1,770	6,150	1,770	870	960	700	1,680
2	7,095	2,600	4,270	2,600	1,870	1,590	4,270	1,680	870	960	700	1,500
3	6,300	2,380	4,530	2,710	2,070	1,590	2,490	1,590	870	870	870	1,230
4	6,930	2,380	4,400	2,490	2,070	1,410	2,380	1,500	870	870	870	1,050
5	6,765	2,170	4,270	2,380	2,275	1,770	2,710	1,410	870	700	700	1,050
6	5,700	2,380	3,880	2,490	1,970	1,590	2,070	1,230	960	870	700	1,050
7	4,950	2,600	3,750	2,710	5,700	1,500	2,070	1,230	785	870	700	1,140
8	5,100	2,380	3,630	3,040	3,390	1,870	1,970	1,230	785	700	540	1,050
9	5,100	2,170	3,270	3,270	3,270	1,870	1,970	1,230	1,140	700	700	870
10	4,530	1,970	3,040	4,530	2,820	1,680	2,600	1,140	1,770	870	700	960
11	4,270	2,600	4,010	3,390	2,490	3,270	2,070	1,050	1,500	870	700	870
12	4,010	6,450	5,850	2,930	2,490	2,170	1,970	1,050	1,230	870	620	1,050
13	4,010	5,100	4,010	2,820	2,380	2,170	8,790	1,050	1,410	1,050	1,050	1,050
14	4,400	5,100	3,510	2,600	2,275	1,870	8,970	1,140	1,050	870	960	870
15	4,010	5,100	3,155	2,600	2,275	1,770	4,800	1,050	1,050	870	870	1,230
16	3,750	5,400	2,820	2,600	2,275	1,680	4,010	1,050	1,140	870	1,140	1,870
17	3,750	4,530	2,600	2,490	2,170	1,770	3,510	960	1,230	870	1,230	1,500
18	3,510	6,930	2,600	2,600	2,170	1,770	3,270	1,050	1,230	1,140	1,230	1,320
19	3,510	12,900	2,490	2,600	1,970	1,500	2,820	1,680	1,140	1,050	1,050	1,410
20	3,270	10,450	2,380	2,490	1,970	1,410	2,490	1,870	1,230	870	1,140	1,870
21	3,390	13,590	2,275	2,710	1,970	1,230	2,490	1,590	1,320	700	960	1,410
22	3,155	9,690	2,070	2,710	1,970	1,230	2,380	1,500	1,500	870	1,050	1,320
23	3,040	7,095	2,170	3,270	2,070	1,230	2,380	1,770	1,410	700	870	1,230
24	3,040	5,850	2,070	2,710	1,970	1,230	2,380	1,770	1,230	785	960	1,050
25	2,820	6,150	2,170	2,380	1,870	1,230	2,170	1,770	1,140	700	1,500	1,050
26	2,820	9,330	4,950	2,170	1,970	1,140	1,770	1,680	1,050	700	1,050	1,050
27	2,820	6,930	6,600	2,070	1,870	1,140	1,770	1,500	1,140	700	870	960
28	2,600	5,550	5,100	2,070	1,770	1,140	1,770	1,410	1,050	620	960	960
29	2,600	...	3,750	2,275	1,590	1,140	1,770	1,230	1,140	620	870	870
30	2,710	...	3,270	2,070	1,590	1,140	1,590	1,230	1,050	870	1,970	1,140
31	2,710	...	2,930	...	1,680	...	1,680	960	...	700	...	1,140
Maximum	8,970	13,590	6,600	4,530	5,700	3,270	8,970	1,870	1,770	1,140	1,970	1,870
Minimum	2,600	1,970	2,070	2,070	1,590	1,140	1,590	960	785	620	540	870
Mean	4,246	5,442	3,246	2,681	2,264	1,599	3,017	1,367	1,134	828	978	1,187

NOTE.—Daily discharges determined from a well-defined curve between 700 and 18,600 second-liters. Values above and below these are estimated from extension of curve. Applicable throughout the year.

Daily and monthly discharges, in liters per second, of San Francisco River near Población, Malinao, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,050	870	2,380	1,410								
2	1,050	870	2,170	1,410								
3	870	1,410	1,970	1,320								
4	1,050	1,230	1,770	1,320								
5	1,500	1,590	1,770	1,140								
6	1,230	1,410	1,680	1,140								
7	1,050	1,230	1,680	1,050								
8	960	1,230	1,770	1,050								
9	1,050	1,050	1,770	960								
10	1,050	1,140	1,590	870								
11	1,050	1,230	1,590	785								
12	3,040	1,230	1,500	960								
13	1,970	1,230	1,410	1,320								
14	1,500	1,230	1,410	1,230								
15	1,410	1,230	1,410	1,320								
16	1,320	1,320	1,590	1,140								
17	1,230	1,410	1,500	1,050								
18	1,230	1,230	1,410	1,050								
19	1,230	1,320	1,590	960								
20	1,230	1,410	1,870	960								
21	1,050	9,880	1,770									
22	1,050	4,800	1,680									
23	1,050	3,750	1,500									
24	1,050	3,880	1,410									
25	1,050	2,930	1,500									
26	1,050	2,600	1,590									
27	1,050	2,490	1,500									
28	1,050	2,380	1,500									
29	1,050	2,600	1,590									
30	960		1,590									
31	960		1,500									
Maximum	3,040	9,880	2,380	1,410								
Minimum	870	870	1,410	785								
Mean	1,210	2,075	1,644	1,122								

NOTE.—Daily discharges determined from a well-defined curve between 700 and 18,600 second-liters. Values above and below these limits are estimated from extension of curve. Applicable from January to April 20, 1912.

Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			1,646	1,154	476	597	1,206	825	1,104	1,154	4,846	3,958
2			1,646	1,154	462	914	3,252	740	914	1,055	4,662	3,400
3			1,425	1,104	476	740	1,535	740	825	1,104	4,126	3,878
4			1,425	1,104	740	629	1,206	1,260	740	1,007	3,958	8,434
5			1,425	1,055	740	567	1,104	1,055	663	1,104	3,790	6,226
6			1,315	1,055	869	567	869	1,702	663	1,425	4,754	4,302
7			1,206	1,104	914	597	825	1,646	700	1,206	5,306	3,958
8			1,104	960	663	914	825	1,260	740	1,315	6,042	3,178
9			1,206	1,104	540	2,238	782	1,535	1,590	1,646	3,958	2,900
10			1,535	1,315	597	1,480	663	1,425	1,315	1,760	4,126	2,900
11			1,315	1,206	663	960	663	1,055	2,432	1,998	3,878	3,178
12			1,315	1,206	567	1,007	597	2,058	1,702	1,938	3,104	3,326
13			1,206	1,206	516	629	782	1,154	4,126	1,878	3,326	3,036
14			1,206	1,206	597	476	629	1,104	1,998	3,178	6,502	2,900
15			1,104	1,104	597	540	597	869	1,646	2,628	8,526	2,496
16			1,154	1,104	540	540	597	825	3,036	1,998	6,134	2,900
17			1,206	1,154	540	462	567	825	6,134	1,760	6,686	3,874
18			1,206	1,104	567	462	426	825	3,878	1,760	6,226	4,214
19			1,206	1,055	540	495	663	825	2,628	2,118	5,030	9,262
20			1,315	1,055	540	740	1,104	3,252	1,998	2,696	4,478	4,662
21			1,154	914	540	567	914	2,496	1,818	2,058	3,958	3,634
22		1,760	1,154	629	540	516	3,178	1,315	1,646	1,760	9,078	3,178
23		1,646	1,104	540	516	495	1,260	1,206	1,480	1,590	4,302	2,900
24		1,646	1,206	540	516	495	1,104	1,055	1,206	1,998	3,878	2,696
25		1,646	1,260	663	495	495	825	914	1,206	2,560	3,252	2,560
26		1,760	1,154	597	495	5,122	740	914	1,206	3,104	3,178	2,368
27		1,818	1,154	540	597	2,432	663	869	1,154	3,326	7,422	2,238
28		1,760	1,260	516	869	1,104	914	914	1,480	2,178	4,570	2,304
29			1,206	495	825	914	1,055	1,154	1,260	2,628	4,126	5,674
30			1,206	495	740	825	1,425	1,315	1,315	4,846	3,326	4,126
31			1,260		597		914	1,206		4,214		3,036
Maximum		1,818	1,646	1,315	914	5,122	3,252	3,252	6,134	4,846	9,078	9,262
Minimum		1,646	1,104	495	462	462	426	740	663	1,007	3,104	2,238
Mean		1,719	1,267	948	609	951	1,029	1,237	1,753	2,096	4,885	3,797

NOTE.—Daily discharge determined from a fairly well-defined curve from 600 to 1,400 second-liters, applicable throughout the year.

Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,496	1,878	2,058	1,104	825	597	825	462	1,104	462	663	9,446
2	3,036	1,760	2,118	1,260	663	700	914	462	540	448	663	8,342
3	2,496	1,702	2,304	1,206	597	597	825	462	597	476	1,646	5,950
4	3,790	1,535	2,238	1,104	567	567	462	448	540	2,900	2,368	8,710
5	3,252	1,535	2,058	1,007	540	567	495	430	476	1,055	1,590	9,354
6	3,874	1,646	1,998	1,007	540	516	629	437	462	1,007	1,315	5,674
7	3,036	1,535	1,878	1,104	540	495	597	430	437	1,206	1,007	3,634
8	2,432	1,370	1,760	1,154	567	495	495	426	437	1,007	914	3,400
9	3,104	1,260	1,760	1,154	567	495	495	426	825	597	914	2,668
10	3,036	1,260	1,646	1,154	700	567	540	426	625	740	914	2,764
11	3,634	1,425	1,535	1,206	960	567	663	426	540	629	960	2,560
12	2,892	1,535	1,480	1,535	740	540	914	430	597	567	1,007	2,304
13	5,396	1,535	1,370	1,154	663	495	663	437	663	540	1,206	1,938
14	3,878	2,496	1,315	1,007	663	437	540	437	597	2,560	2,118	1,760
15	4,126	7,606	1,878	960	597	426	540	437	597	5,766	2,178	1,760
16	3,036	3,874	1,878	914	663	422	540	437	495	4,302	2,238	3,556
17	3,790	3,036	2,118	825	825	426	495	540	437	2,238	1,938	3,178
18	3,326	2,900	1,760	740	869	418	430	1,154	462	1,760	1,702	2,696
19	2,900	2,900	1,760	825	825	418	430	1,104	1,055	1,206	1,590	2,304
20	2,628	2,900	1,702	740	825	418	426	1,007	1,760	960	1,370	2,118
21	2,368	2,496	1,535	663	1,260	414	430	740	1,104	1,007	1,260	1,760
22	2,496	2,368	1,425	663	825	410	437	540	1,425	914	1,055	1,535
23	2,368	2,178	1,315	663	567	412	426	476	1,590	1,007	1,154	1,315
24	2,238	2,118	1,260	960	540	412	426	462	1,480	1,055	2,118	1,206
25	2,178	2,238	1,315	914	495	418	422	462	869	914	2,058	1,104
26	2,058	2,238	1,315	914	495	426	422	516	960	1,007	1,818	1,315
27	1,998	2,238	1,206	914	495	437	426	914	629	1,702	1,818	1,590
28	1,878	2,696	1,154	1,878	540	495	426	1,206	516	1,646	2,496	1,646
29	2,058	2,304	1,154	1,104	540	825	426	1,007	476	1,007	1,590	1,702
30	2,238	.....	1,104	825	540	1,315	426	782	462	740	2,432	1,646
31	1,938	.....	1,104	.....	567	.....	426	960	.....	629	.....	1,646
Maximum	5,396	7,606	2,304	1,878	1,260	1,315	914	1,206	1,760	5,766	2,496	9,446
Minimum	1,878	1,260	1,104	663	495	410	422	426	437	448	663	1,104
Mean	2,900	2,295	1,629	1,022	665	611	539	609	759	1,357	1,537	3,245

NOTE.—Daily discharge determined from a fairly well-defined curve from 600 to 1,400 second-liters, applicable throughout the year.

Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,980	9,855	8,340	3,730	700	550	900	1,000	3,045	1,510	5,130	3,450
2	5,690	5,130	8,340	3,520	700	600	850	1,000	2,110	1,690	5,690	3,520
3	3,110	3,110	9,080	2,590	600	1,570	1,330	900	1,870	1,570	8,240	3,800
4	2,410	3,590	9,080	2,350	2,350	1,510	8,840	800	1,630	3,520	5,050	3,590
5	2,290	2,980	8,860	2,290	2,290	1,450	3,730	900	1,510	1,690	6,540	4,430
6	2,110	2,720	10,780	2,410	3,240	1,330	2,470	950	1,390	1,510	4,970	4,010
7	1,990	2,980	16,100	2,170	3,045	1,330	2,350	1,000	1,270	1,450	7,080	3,520
8	1,690	3,110	16,350	2,110	2,915	1,270	2,170	1,105	1,450	1,450	11,340	3,110
9	1,690	2,980	13,350	2,170	2,785	1,215	1,570	1,690	1,570	1,330	12,640	3,045
10	1,570	3,240	11,140	2,050	2,590	1,215	1,215	1,330	1,570	1,450	17,840	2,590
11	1,270	3,110	7,350	2,050	2,350	1,105	1,215	1,160	2,110	1,750	10,640	2,655
12	1,510	2,850	5,050	1,930	2,290	1,000	1,215	1,000	4,080	8,540	7,740	2,655
13	1,270	3,110	4,430	1,750	2,170	1,000	2,290	1,000	2,850	3,590	6,540	3,800
14	1,450	3,110	3,870	1,570	2,170	1,000	1,690	1,000	1,990	3,240	4,550	7,350
15	2,170	2,915	4,080	1,450	1,990	900	1,215	1,000	1,930	4,655	3,940	4,550
16	3,310	2,720	5,050	1,330	1,810	1,270	1,215	900	2,655	3,240	3,800	3,660
17	2,470	3,380	4,360	1,160	2,230	1,450	1,215	700	1,750	2,530	3,590	3,450
18	2,110	4,080	4,360	1,000	1,450	1,690	1,690	700	2,050	2,110	3,380	3,450
19	1,930	6,720	4,290	900	1,390	1,690	1,215	700	1,570	2,290	3,240	3,800
20	2,110	7,170	4,150	850	2,410	1,690	2,410	550	1,215	2,050	3,175	5,050
21	2,290	11,140	4,010	800	2,980	1,390	2,110	600	1,215	1,990	3,590	4,655
22	2,655	9,300	4,010	800	2,170	1,510	1,690	500	1,390	2,290	8,140	4,150
23	2,785	9,856	3,940	800	1,690	1,570	1,810	500	1,450	2,655	9,840	3,730
24	2,350	12,975	3,870	900	1,215	1,330	1,750	500	1,330	2,655	6,720	3,660
25	2,050	14,100	3,870	2,410	1,105	1,215	1,570	400	1,330	2,530	10,740	13,270
26	1,810	11,980	3,870	1,570	1,105	1,050	1,215	500	2,980	3,175	8,040	12,470
27	1,930	8,340	3,940	1,105	1,000	1,330	1,050	400	7,740	3,175	5,850	7,170
28	2,410	8,040	3,870	900	900	1,510	1,000	450	4,430	2,590	4,890	5,820
29	3,730	.....	3,730	900	800	1,215	1,000	550	2,110	2,230	4,360	4,735
30	6,020	.....	3,730	800	650	1,050	1,000	750	1,690	2,915	3,870	4,885
31	6,190	.....	4,010	.....	500	.....	950	3,730	.....	4,810	.....	4,300
Maximum	6,190	14,100	16,350	3,730	3,240	1,690	8,840	3,730	7,740	8,540	17,840	13,270
Minimum	1,270	2,720	3,730	800	500	550	850	400	1,215	1,330	3,175	2,590
Mean	2,560	5,914	6,492	1,678	1,793	1,267	1,805	912	2,176	2,651	6,706	4,657

NOTE.—Discharge determined from well-defined rating curve below 9,000 second-liters, applicable from December 25, 1921, to December 31, 1922.

Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,900	3,410	1,955	2,545	1,270	265	640					6,995
2	3,650	12,670	1,775	2,545	1,350	325	835					8,090
3	2,965	7,345	1,595	2,345	1,120	445	1,510					5,660
4	3,410	5,345	1,595	2,145	900	385	835					7,710
5	3,410	4,735	1,775	1,955	835	1,270	705					8,870
6	3,185	4,585	1,865	1,955	705	970	705					12,670
7	3,410	4,165	1,775	1,955	575	705	445					10,070
8	2,965	3,775	1,775	1,955	510	445	445					6,650
9	2,965	3,650	1,595	1,955	575	445	510					5,660
10	3,185	3,410	1,595	1,775	705	385	3,650					4,735
11	3,185	3,185	1,430	2,545	770	325	2,145					4,165
12	12,070	2,855	1,595	2,545	705	325	770					4,440
13	11,870	2,965	1,430	2,645	705	325	575					3,775
14	8,090	2,855	1,595	3,295	770	325	445					4,300
15	18,470	2,645	1,955	2,750	835	205	325				3,185	3,410
16	14,870	2,345	3,075	2,545	835	205					2,145	4,735
17	8,870	2,145	2,545	2,750	1,270	265					2,145	6,650
18	7,710	2,145	3,530	2,965	770	325					2,050	4,080
19	6,150	2,145	4,440	2,750	705	2,050					2,145	11,270
20	5,500	2,145	2,965	2,855	1,195	705					1,595	19,070
21	4,585	2,145	2,345	2,445	2,965	835					15,670	41,070
22	4,030	2,245	2,145	2,050	2,145	770					7,710	17,270
23	3,900	2,145	2,145	1,595	1,510	575					5,345	10,870
24	3,410	2,145	2,145	1,510	970	575					4,300	11,670
25	3,075	1,955	1,955	1,595	705	575					3,900	18,270
26	3,295	1,955	4,300	1,595	1,120	575					3,410	11,870
27	4,030	1,955	21,670	1,595	705	510					22,270	17,070
28	4,300	1,865	5,985	1,595	640	325					13,070	10,470
29	3,530		4,165	1,430	640	325					17,070	8,280
30	3,410		3,410	1,430	445	705					9,270	12,070
31	3,410		3,075		325							14,070
Maximum	18,470	12,670	21,670	3,295	2,965	2,050	3,650				22,270	41,070
Minimum	2,965	1,865	1,430	1,430	325	205	325				1,595	3,410
Mean	5,510	3,390	3,071	2,187	944	548	964				7,205	10,030

NOTE.—See footnote to daily discharge table for 1921. No record on days for which discharge is not given.

ALBAY PROVINCE

TOBGON RIVER, LIGAO

LOCATION.—About 11 km. northeast of the municipality of Ligao, between the barrios of Batang and Bubunsuran, and about 50 m. east of Tobgon Bridge on the Ligao–Tabaco Road.

RECORDS AVAILABLE.—From January 22, 1921, to March 31, 1922.

GAGE.—Standard metric board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for about 100 m. above and below the station. Bed of stream sandy and gravelly. Both banks low and covered with cogon grass.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 43,340 second-liters on November 10, 1923; minimum discharge, 916 second-liters on August 30, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from poorly defined rating curve.

Discharge measurements of Tobgon River, near Tobgon, Ligao, Albay

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 22	O. Buenaventura		1,564	
February 5	do		1,843	
February 29	do	.45	1,965	
March 9	do	.52	3,104	
March 22	do	.50	2,140	
May 18	S. Musa	.48	1,119	
June 7	O. Buenaventura	.48	1,869	
July 5	S. Musa	.52	2,188	
August 6	Buchanan and Musa	.40	1,176	
September 1	S. Musa	39	1,096	
September 2	O. Buenaventura	.38	1,874	
September 2	do	.38	2,631	
September 17	do	.50	2,926	
September 21	do	.54	2,514	
October 10	do	43	1,021	
October 12	do	.46	3,116	
November 4	do	.72	3,086	
December 23	do	.68	2,437	
1922				
January 3	O. Buenaventura and S. Musa	.46	2,437	
January 13	O. Buenaventura	.52	3,015	
January 25	S. Musa	.49	2,643	
January 26	O. Buenaventura	.50	2,707	
February 3	S. Musa	54	3,607	
February 22	O. Buenaventura	.48	2,643	
March 4	do	.46	2,241	
March 22	do	.45	2,235	

Daily and monthly discharges, in liters per second, of Tobgon River near Tobgon, Ligao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			1,595	2,105	1,785	1,885	1,995	1,505	1,345	1,345	4,245	
2			1,595	2,105	1,785	1,885	1,995	1,505	1,045	1,345	16,780	
3			1,595	2,105	1,785	1,885	6,555	1,425	1,265	1,345	7,430	
4			1,595	2,105	1,785	1,885	4,245	1,425	1,265	1,505	6,990	
5			1,595	2,105	1,785	1,885	2,565	1,425	1,190	1,685	7,890	
6			3,620	2,105	1,785	1,885	2,325	1,190	1,045	1,885	3,770	
7			7,430	2,105	1,785	1,885	2,325	1,115	1,190	1,685	4,590	
8			2,105	1,595	1,785	1,885	2,325	1,345	1,045	2,325	6,555	
9			2,325	1,595	1,785	1,885	2,105	1,885	1,045	1,685	7,430	
10			2,105	1,595	1,785	2,325	1,995	1,425	1,265	1,505	43,340	
11			2,105	1,595	1,785	1,885	1,995	1,505	1,345	1,505		
12			2,105	1,595	1,785	1,885	1,885	1,505	4,245	1,685	6,990	
13			2,105	1,595	1,785	2,215	1,855	1,190	2,565	1,505	7,890	
14			2,105	1,595	1,785	2,105	1,885	1,345	1,885	1,345	4,415	
15			3,620	1,595	1,785	2,105	1,885	1,045	2,325	1,505	6,990	
16			9,370	1,595	1,785	2,105	1,885	1,345	1,505	1,345		
17			2,810	1,595	1,785	2,105	2,215	1,190	2,105	1,345		
18			2,810	1,595	1,885	2,105	1,885	1,505	1,685	1,505		
19			4,085	1,595	1,785	2,105	1,885	1,345	1,685	1,345		
20			2,685	1,595	1,785	2,105	1,885	1,190	1,685	1,265		
21			2,685	1,595	1,785	2,195	1,885	1,265	2,565	1,595		
22			2,105	1,595	1,785	2,105	1,885	1,345	1,685	1,685		
23			2,105	1,595	1,595	2,105	1,885	1,685	1,425	1,885		
24			2,105	1,595	1,595	2,105	1,785	1,685	1,345	1,885		
25			2,105	1,595	1,595	2,105	1,685	1,190	1,505	1,345		
26			2,105	1,595	1,595	2,105	1,685	1,505	1,505	2,215		
27			2,105	1,595	1,595	2,810	1,685	1,425	1,785	1,685		
28			2,105	1,595	1,595	2,215	1,685	1,190	1,425	2,105		
29			2,105	1,595	1,595	2,105	1,685	1,345	1,505	1,505		
30			2,105	1,595	1,595	2,105	1,685	916	1,345	2,105		
31			2,105		1,595		1,635	1,190		2,810		
Maximum			9,370	2,105	1,885	2,810	6,555	1,885	4,245	2,810	43,340	
Minimum			1,595	1,595	1,595	1,885	1,685	916	1,045	1,265	4,245	
Mean			2,680	1,714	1,733	2,062	2,160	1,360	1,627	1,661	9,020	

NOTE.—No records on days for which discharge not given. River could not be measured on November 11, 1921 due to flood.

Daily and monthly discharges, in liters per second, of Tobgon River near Tobgon, Ligao, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		2,920	2,470									
2		3,970	2,470									
3	2,330	2,920	2,330									
4	2,330	2,920	2,330									
5	2,195	3,600	2,330									
6	2,060	3,245	2,195									
7	1,800	2,920	2,060									
8	1,800	2,920	2,195									
9	1,930	2,920	2,195									
10	2,330	2,615	2,195									
11	2,615	2,615	2,195									
12	11,270	2,615	2,060									
13	3,245	2,615	2,195									
14	3,785	2,615	2,330									
15	4,795	2,615	2,060									
16	3,970	2,615	2,920									
17	2,765	2,615	2,330									
18	2,920	2,615	2,330									
19	2,060	2,615	2,330									
20	2,920	2,765	2,195									
21	2,765	2,615	2,330									
22	3,080	2,470	2,060									
23	3,600	2,330	2,195									
24	2,920	2,470	2,330									
25	2,765	2,470	2,330									
26	2,920	2,330	2,330									
27	3,600	2,330	2,470									
28	2,765	2,470	2,330									
29	2,615		2,195									
30	2,920		2,330									
31	2,615		2,195									
Maximum	11,270	3,970	2,920									
Minimum	1,800	2,330	2,060									
Mean	2,893	2,741	2,284									

ANTIQUE PROVINCE

SIBALOM RIVER, SIBALOM

LOCATION.—About 4.5 km. northeast of Sibalom and about 1 km. north of Post Km. 14 of the Sibalom–San Remigio Road.

RECORDS AVAILABLE.—From August 22, 1918, to July 15, 1922, with breaks from February 1 to May 12, 1919, and from September 26 to November 7, 1920. Also there are records available from June 1, 1910, to July 26, 1913, inclusive, at old station about 200 m. below present station.

GAGE.—Of two sections; one is a vertical rod graduated in centimeters nailed on to a support driven into the river bed; the other is a non-recording vertical staff mounted on a triangular staff anchored into the ground.

DISCHARGE MEASUREMENTS.—Made from raft at section about 40 m. below gage.

CHANNEL AND BANKS.—Channel straight for about 40 m. above and about 100 m. below gaging section. Right bank well protected from scour by high hills; left bank low and subject to overflow. At measuring section stream bed mostly of gravel and very shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 1,162,570 second-liters on November 4, 1920; minimum discharge, 1,000 second-liters on May 13, 1912 and on January 20, 25, and 26, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge for the years 1910 to 1913, unreliable. Daily discharge from new records determined from a well-defined curve. Gage read twice daily. The true heights for both the maximum and minimum discharges are mere approximations.

Discharge measurements of Sibalom River, near Bubungan, Sibalom, Antique

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
May 6	R. D. Klise	25.32	6,479	
May 25	do	25.28	35,481	
June 2	do	25.48	15,516	
June 3	do	25.46	14,284	
June 4	do	25.49	15,489	
October 24	do	25.63	23,590	
October 25	do	25.62	19,990	
October 26	do	25.56	18,430	
November 22	do	25.49	27,450	
November 23	do	25.50	25,510	
December 15	do	25.31	17,570	
December 16	do	25.32	17,740	
December 17	do	25.27	18,980	
December 19	do	25.29	15,060	
December 20	do	25.26	11,780	

Discharge measurements of Sibalom River, near Bubungan, Sibalom, Antique—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
February 15	R. D. Kilse	25 32	6,190	
March 16	do	25.05	2,060	
March 17	do	25.05	1,980	
March 18	do	25 04	2,020	
March 19	do	25.05	2,190	
March 20	do	25 07	2,590	
March 21	do	25.11	4,660	
March 22	do	25.06	2,110	
April 20	do	25.16	5,010	
April 21	do	25.09	3,380	
April 22	do	25.06	2,490	
April 23	do	25 07	2,520	
April 24	do	25.06	2,760	
April 25	do	25.08	3,080	
April 26	do	25.21	6,810	
June 15	do	25 56	29,070	
July 7	do	26 38	82,500	
July 16	do	26 53	114,340	
October 12	do	25 97	26,340	
October 13	do	26 03	31,170	
October 14	do	26 11	34,190	
October 15	do	26 08	32,820	
October 16	do	26 02	29,640	
October 17	do	26.04	30,070	
October 18	do	25.98	25,300	
December 6	do	25.38	3,500	
December 7	do	25.44	3,680	
December 8	do	25.45	3,440	
December 9	do	25.45	3,360	
December 10	do	25.44	3,240	
December 11	do	25.43	3,210	
December 12	do	25.45	3,700	
December 13	do	25 44	3,350	
1912				
June 20	do	26 25	11,430	
September 25	do	26.38	105,000	
November 10	T. S. Lawrence	1.66	44,700	
November 11	do	1 63	43,950	
November 11	do	1.61	40,600	
1913				
January 15	do	1.12	5,600	
January 15	do	1.12	5,600	
January 16	do	1.12	5,600	
January 16	do	1.12	5,600	
February 5	do	1.15	7,500	
February 6	do	1.15	7,100	
February 6	do	1 13	6,300	
February 7	do	1.11	5,100	
February 7	do	1.12	5,100	
February 8	do	1.10	5,100	
February 8	do	1.10	4,600	
March 13	do	1.03	2,300	
March 13	do	1 03	2,300	
March 14	do	1.03	2,200	
March 14	do	1.03	2,300	
April 6	do	1.03	1,100	
April 6	do	1.03	1,200	
April 7	do	1.03	1,100	
April 7	do	1.03	1,200	
May 20	do	1.18	8,600	
May 20	do	1.18	9,700	
May 21	do	1.17	8,100	
May 21	do	1.17	7,700	
May 22	do	1.16	7,200	
June 18	do	1.50	36,400	
June 18	do	1.50	35,900	
September 21	do	1.38	29,700	

Discharge measurements of Sibalom River, near Bubungan, Sibalom, Antique—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
January 21	T. Mendoza	28.39	8,988	
February 19	do	28.23	8,164	
March 4	do	28.25	3,661	
April 7	do	28.31	3,536	
July 3	do	29.35	71,840	
September 8	do	28.86	46,854	
November 6	do	29 50	15,782	
December 19	do	28 28	9,220	
December 20	do	28.28	9,818	
December 22	do	28.10	8,354	
1921				
January 8	do	28.09	7,362	
January 13	do	28.08	6,756	
March 5	do	28 29	8,506	
March 7	do	28 22	7,259	
May 22	do	28 36	10,428	
May 24	do	28.28	7,326	
June 24	do	28 64	12,862	
August 26	do	28 64	21,501	
August 27	do	28.72	25,573	
October 27	do	28 70	24,251	
December 23	do	28 80	24,405	
1922				
January 19	do	28 78	10,613	
February 22	do	28 71	10,162	
March 22	do	28 54	2,563	
April 18	do	28 48	2,483	
June 21	do	28 84	37,212	

NOTE.—Elevation of zero from November 10, 1911, and from January 21, 1920, referred to different data.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						19,000	28,000	18,000	47,000			24,000
2						15,000	25,000	18,000	32,000	56,000		24,000
3						13,000	23,000	18,000	39,000	97,000		23,000
4						13,000	22,500	18,000	43,000	66,000	65,000	23,000
5						12,000	24,000	18,000	42,000	59,000	52,000	23,000
6						11,000	77,000	24,000	45,000	79,000	30,000	23,000
7						9,500	46,500	30,000	41,500	100,000	26,500	23,000
8						9,500	38,000	28,500	41,500	55,000	25,000	23,000
9						8,500	30,000	16,000	39,000		26,500	23,000
10						8,500	23,500	55,000	35,000		22,000	23,000
11						3,500	20,000	30,000	34,000		24,000	23,000
12						25,000	17,500	13,000	28,000		29,000	19,000
13						12,000	25,000	33,000	76,000		30,000	18,000
14						13,000	21,000	31,000	69,000		26,500	17,000
15						12,500	25,000	31,000	55,000		25,000	16,000
16						9,500	20,000	28,000	78,000	41,000	26,500	17,000
17						9,500	18,000	23,000	85,000	45,000	22,000	13,000
18						9,500	17,000	23,000	51,000	43,000	23,000	13,000
19						11,000	15,000	23,500	56,000	41,000	29,000	13,000
20						12,500	13,000	38,000	58,000	35,000	26,500	11,000
21						20,000	15,000	43,000	55,000	37,000	25,000	15,000
22						39,000	13,000	30,000	44,000	33,000	30,000	13,000
23						25,000	13,000	34,000	45,000	25,000	25,000	13,500
24						45,000	28,500	38,000	62,000	25,000	25,000	19,000
25						35,000	33,000	42,000	90,000	22,000	26,000	21,000
26						32,000	29,000	43,000	62,000	19,000	26,000	13,000
27						24,000	29,000	14,000	98,000	17,000	23,000	20,000
28						46,500	19,000	31,000	255,000	35,000	30,000	21,000
29						30,000	15,500	29,000	235,000	27,000	28,000	21,000
30						40,000	19,000	25,000		23,000	24,000	17,500
31							20,500	40,000		26,000		16,500
Maximum						46,500	77,000	55,000	255,000	100,000	65,000	24,000
Minimum						3,500	13,000	13,000	28,000	17,000	22,000	11,000
Mean						19,117	24,790	28,581	66,931	34,870	28,537	18,790

NOTE.—No records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	17,000	4,000	3,100	1,600	2,000	37,000	95,000	214,000	30,000	48,000	15,000	7,500
2	14,000	4,000	3,100	2,300	2,300	30,000	128,000	202,000	28,000	34,000	13,000	7,500
3	13,500	4,000	2,300	2,000	16,500	34,000	95,000	109,000	28,000	103,000	13,000	6,500
4	14,000	4,000	3,100	1,600	15,000	33,000	47,000	70,000	29,000	38,000	13,000	6,500
5	13,000	3,100	2,700	1,600	14,000	31,000	43,000	56,000	31,000	49,000	13,000	5,500
6	13,000	3,100	2,700	1,600	24,000	30,000	40,000	52,000	28,000	39,000	13,000	5,500
7	13,000	3,100	2,300	2,000	14,000	24,000	40,000	49,000	47,000	50,000	15,000	3,500
8	18,000	13,500	2,300	2,000	7,000	39,000	34,000	48,000	47,000	63,000	13,000	4,500
9	12,000	11,000	2,300	2,000	5,000	46,000	45,000	48,000	70,000	77,000	12,500	3,500
10	13,000	9,000	2,300	8,200	3,500	38,000	49,000	235,000	68,000	65,000	15,500	3,500
11	12,500	13,500	2,300	12,000	2,000	28,000	47,000	387,000	70,000	73,000	14,000	3,200
12	11,500	17,000	2,700	9,000	4,400	35,000	46,000	427,000	80,000	39,000	12,500	3,500
13	9,600	17,500	2,300	6,500	7,600	39,000	385,000	385,000	113,000	43,000	12,000	3,500
14	7,600	13,000	2,000	2,300	10,400	34,000	420,000	310,000	112,000	42,000	15,000	3,500
15	7,000	18,000	2,000	2,000	13,500	30,000	240,000	324,000	87,000	33,000	15,000	3,500
16	7,000	15,000	2,000	2,000	25,000	38,000	113,000	104,000	95,000	28,000	14,000	4,000
17	7,000	13,000	2,000	2,300	40,000	41,000	90,000	54,000	83,000	29,000	12,500	4,000
18	6,000	15,000	1,600	2,300	40,000	41,000	247,000	49,000	91,000	26,000	13,000	3,500
19	5,000	15,000	2,000	2,000	36,000	62,000	113,000	49,000	107,000	25,000	12,500	3,500
20	4,000	12,000	2,300	6,000	18,000	62,000	75,000	52,000	67,000	25,000	12,000	3,500
21	3,100	11,500	3,500	3,100	23,500	46,000	55,000	53,000	48,000	23,000	11,000	3,500
22	.....	10,000	2,300	2,700	25,500	40,000	54,000	48,000	34,000	20,000	15,000	3,500
23	.....	8,200	2,300	2,000	21,000	51,000	55,000	57,000	28,000	22,000	12,500	3,200
24	4,000	7,000	2,000	2,300	18,000	51,000	51,000	80,000	26,000	20,000	11,500	3,500
25	4,000	4,400	1,600	2,700	34,500	57,000	41,000	50,000	24,000	18,000	10,000	3,500
26	4,000	4,000	1,600	6,800	47,000	55,000	90,000	175,000	95,000	16,500	10,000	4,000
27	4,000	4,000	2,000	6,800	50,000	48,000	133,000	114,000	61,000	15,000	9,000	3,500
28	4,000	3,100	2,300	5,400	38,000	43,000	262,000	54,000	65,000	13,000	7,500	3,200
29	4,400	.....	2,000	2,700	37,000	35,000	430,000	48,000	80,000	21,000	6,500	3,200
30	3,500	.....	1,600	2,300	37,000	92,000	344,000	43,000	86,000	18,000	6,500	3,000
31	4,000	.....	1,600	.....	36,500	.....	243,000	34,000	.....	15,000	.....	3,000
Maximum	17,000	18,000	3,500	12,000	50,000	92,000	430,000	427,000	113,000	103,000	15,500	7,500
Minimum	3,100	3,100	1,600	1,600	2,000	24,000	34,000	34,000	24,000	13,000	6,500	3,000
Mean	8,542	9,286	2,265	3,603	21,555	42,100	133,871	128,387	61,933	36,468	12,267	4,090

NOTE.—No records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,500				8,000	11,000	32,000	96,000	100,000	72,000		39,000
2	2,500					11,000	31,000	98,000	100,000	69,000		37,000
3	2,500				2,700	12,000	30,000	96,000	100,000	67,000		34,000
4	2,500				1,100	14,000	47,000	93,000	105,000	76,000		33,000
5	3,000				1,100	14,000	48,000	78,000	77,000	62,000		31,000
6	3,000				1,100	17,000	47,000	66,000	76,000	58,000		29,000
7	3,000					17,500	47,600	63,000	65,000	96,000		30,000
8	3,000					17,500	40,000	61,000	150,000	74,000		44,000
9	2,500				6,500	24,000	44,000	58,000	113,000	94,000		40,000
10	2,500				7,000	24,000	55,000	59,000	105,000	94,000	45,000	36,000
11	2,500				3,500	20,000	47,000	58,000	93,000	91,000	42,000	33,000
12	2,500				1,500	19,000	46,000	59,000	89,000	94,000	39,000	30,000
13	3,500				1,000	24,000	41,000	140,000	88,000	83,000	37,000	26,000
14	3,000					21,000	40,000	130,000	106,000	71,000	37,000	25,000
15	2,500				5,000	22,000	45,000	104,000	130,000	68,000	32,000	23,000
16	2,500				4,000	24,000	45,000	87,000	175,000		27,000	22,600
17	2,500				4,000	25,000	45,000	80,000	160,000		29,000	22,000
18	2,500				3,000	22,000	44,600	86,000	134,000		27,000	22,000
19	2,700				4,300	23,000	102,000	83,000	109,000		25,000	21,000
20	2,500				3,000	23,000	150,000	64,000	126,000		23,000	20,000
21	2,500				3,000	25,000	110,000	86,000	140,000		23,000	19,000
22	2,700				3,500	26,000	88,000	95,000	100,000		26,000	19,000
23	2,500				3,000	27,000	84,000	80,000	98,000		28,000	19,000
24	2,500				6,500	25,000	81,000	92,000	90,000		26,400	17,000
25	2,500				7,300	23,000	75,000	100,000	100,000		200,000	17,000
26	2,700				7,700	29,000	54,000	94,000	110,000		113,000	16,000
27	2,800				6,500	26,000	49,000	113,000	100,000		59,000	16,000
28	2,000				6,500	24,000	73,000	104,000	134,000		115,000	20,000
29	1,500				7,000	25,000	91,000	100,000	108,000		66,000	19,000
30	1,500				8,000	26,000	82,000	100,000	92,000		51,000	17,000
31	1,100				14,000		80,000	100,000				16,000
Maximum	3,500				14,000	29,000	150,000	140,000	175,000	96,000	200,000	44,000
Minimum	2,100				1,000	11,000	30,000	58,000	65,000	58,000	23,000	16,000
Mean	1,500				4,622	21,300	61,500	88,000	109,100	77,933	42,500	25,600

NOTE.—No records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1913

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	15,000	5,700	2,500	1,400	3,200	7,600	48,000					
2	15,000	5,700	3,500	1,300	2,000	7,100	76,000					
3	13,500	5,500	3,500		7,500	8,200	68,000					
4	18,500	9,000	3,700		6,000	7,200	77,000					
5	15,500	7,300	3,500	1,100	2,500	9,500	55,000					
6	15,500	6,500	2,700		57,000	24,000	55,000					
7	15,500	5,700	2,500	1,100	62,000		80,000					
8	15,500	4,500	2,700	1,400	38,000		61,000					
9	15,000	4,500	2,250	1,250	19,500	9,500	51,500					
10	17,500	4,000	2,250	1,100	16,500	18,000	65,000					
11	17,500	3,700	2,000		13,500	26,800	43,500					
12	16,000	4,000	2,000	13,500	12,000	24,800	32,000					
13	15,500	7,300	2,250	8,500	11,000	44,000	20,500					
14	15,500	4,500	2,250	16,000	12,000	28,500						
15	14,500	14,500	2,250	33,000	9,500	38,500						
16	5,500	11,200	2,000	10,000	8,500	38,500						
17	5,500	6,500	2,000	13,500	8,500	51,500	50,000					
18	9,000	4,500	2,300	16,000	8,500	32,000	67,000					
19	13,500	3,700	2,100	15,500	10,500	44,500	65,000					
20	9,500	3,700	2,100	14,000	9,300	46,000	58,000					
21	9,000	4,500	2,100	3,700	7,500	42,500	72,500					
22	8,000	4,000	1,900	2,800	7,000	30,000	74,000					
23	7,500	3,700	2,000	2,600	6,500	20,500	131,000					
24	6,000	3,500	2,100	2,500	8,000	44,500	161,000					
25	6,000	4,000	2,000	2,500	8,000	33,000	151,000					
26	5,500	3,500	2,000	2,400	7,000	48,000	110,000					
27	5,500	3,500	1,700	2,300	6,500	46,500						
28	5,500	3,500	1,700	2,300	6,000	21,500						
29	5,700		1,700	2,000	8,000	61,000						
30	9,000		1,600	1,900	7,000	44,500						
31	6,500		1,300		5,500							
Maximum	18,500	14,500	3,700	33,000	62,000	61,000	161,000					
Minimum	5,500	3,500	1,300	1,100	2,000	7,100	20,500					
Mean	11,300	5,400	2,340	6,679	12,700	29,200	72,696					

NOTE.—Records unreliable from July 27 to August 28 and from September 20 to November 18, 1913. No records for other dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									95,400	165,600	13,975	3,100
2									68,550	150,000	9,875	3,100
3									52,575	142,200	9,125	3,100
4									44,675	276,100	8,000	2,500
5									36,225	90,388	25,550	2,500
6									107,100	53,400	6,950	3,700
7									74,575	40,350	6,950	3,700
8									64,775	33,550	5,950	3,100
9									72,500	27,300	5,625	3,100
10									133,100	22,725	5,625	2,800
11									129,200	22,725	5,625	2,500
12									78,875	34,875	9,125	2,500
13									51,750	29,100	10,250	2,500
14									40,350	19,600	8,000	2,500
15									29,700	29,100	6,275	2,500
16									27,300	53,400	6,275	2,500
17									21,675	241,000	5,625	2,500
18									19,600	60,250	5,625	2,200
19									17,625	40,350	5,625	1,900
20									14,850	40,350	5,625	1,900
21									38,250	62,000	4,975	1,900
22								52,575	36,225	146,100	4,975	1,600
23								62,000	27,300	57,650	4,975	1,600
24								95,400	27,300	148,700	4,975	1,600
25								46,237	59,375	35,550	4,650	1,900
26								64,775	27,900	28,500	4,325	54,250
27								100,600	40,350	21,675	4,325	16,675
28								127,900	19,100	18,100	3,700	6,275
29								103,200	23,300	16,675	3,700	8,000
30								72,500	59,375	14,850	3,700	8,375
31								61,125		90,388		5,625
Maximum								127,900	133,100	276,100	25,550	54,250
Minimum								46,237	14,850	14,850	3,700	1,600
Mean								78,631	51,296	71,373	6,999	5,226

NOTE.—As there were no measurements made during this year, the 1920 gagings were made applicable to the gage heights recorded.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5,300					7,650	34,875	38,950	150,000	17,625	36,900	17,150
2	4,975					4,975	195,500	36,225	70,500	17,625	24,975	16,675
3	4,650					7,650	134,400	86,625	41,775	15,750	16,675	16,200
4	4,325					10,250	53,400	299,500	33,550	13,350	17,625	27,900
5	4,325					13,975	28,500	147,400	27,300	11,850	16,200	66,650
6	4,000					22,725	50,925	155,200	28,500	13,975	15,750	83,275
7	3,700					38,950	49,320	111,000	27,300	18,600	13,125	26,125
8	3,700					19,600	28,500	134,400	49,320	13,975	9,125	27,300
9	3,100					21,150	22,725	103,200	81,025	147,400	27,300	22,750
10	3,100					146,100	19,600	95,400	39,650	152,600	27,300	21,675
11	3,100					267,000	32,250	163,000	35,550	104,500	18,100	18,700
12	3,100					159,100	22,250	118,800	75,650	50,925	23,300	16,675
13	2,500				4,325	47,775	66,650	163,000	194,200	137,000	28,500	18,700
14	2,200				1,900	27,900	59,375	122,700	137,000	261,800	22,750	15,300
15	1,900				13,125	19,100	33,550	76,725	120,100	267,000	17,625	14,950
16	1,900				7,300	14,850	38,950	54,250	68,550	111,000	16,675	12,275
17	1,900				13,550	13,125	61,125	36,225	48,550	98,000	24,975	10,650
18	1,900				7,300	9,875	44,675	34,875	37,575	45,475	26,125	10,650
19	1,900				7,650	12,250	49,320	155,200	52,575	34,875	29,725	16,200
20	1,000				4,325	14,850	27,900	163,000	39,650	34,875	24,975	18,700
21	1,600				3,700	14,850	50,925	98,000	32,250	26,125	28,500	14,400
22	1,600				3,100	11,450	53,400	62,925	37,575	24,975	20,100	9,875
23	1,600				4,975	13,125	98,000	43,950	33,550	22,750	24,975	16,200
24	1,600				8,375	8,375	91,625	40,350	26,125	27,300	27,300	16,200
25	1,000				8,375	8,375	66,650	27,300	22,200	26,125	20,625	12,275
26	1,000				9,125	41,775	144,800	34,200	19,600	24,975	12,700	9,500
27					10,650	30,975	126,600	40,350	17,625	29,725	24,975	9,875
28					11,450	17,625	170,800	36,225	24,975	34,200	32,250	9,125
29					8,000	13,975	90,388	32,250	17,625	24,975	21,675	8,000
30					6,950	12,275	66,650	178,600	18,100	24,975	27,900	7,300
31					5,950		60,250	150,000		26,125		5,625
Maximum	5,300				13,550	267,000	195,500	299,500	194,200	267,000	36,900	83,275
Minimum	1,000				1,900	4,975	19,600	27,300	17,625	11,850	9,125	5,625
Mean	2,706				7,375	35,065	66,899	98,059	53,598	60,021	22,624	19,254

NOTE.—The gagings made in 1920 were made applicable to the gage heights of this year. No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	11,050	6,275	10,650	5,300	10,650	17,625	146,100	30,975	182,500			13,540
2	11,450	4,975	4,650	5,300	9,875	20,625	36,225	45,475	202,000			19,355
3	12,275	4,975	4,975	7,300	7,650	28,500	52,575	35,550	150,000		242,070	30,150
4	12,700	4,325	4,650	7,650	7,300	36,900	108,400	40,350	98,000		1,162,570	21,580
5	13,975	4,650	4,325	7,650	6,275	34,200	202,000	30,975	75,650		505,070	17,690
6	13,125	4,975	3,100	5,950	17,150	30,975	124,000	26,700	30,350		16,000	37,100
7	11,450	10,650	3,700	5,625	10,650	27,900	28,500	25,550	32,250		6,060	20,300
8	11,450	4,325	3,400	6,275	10,650	27,900	61,125	30,975	30,975		17,330	19,905
9	10,250	4,325	3,100	5,625	7,650	25,550	63,850	49,325	26,125		13,835	20,300
10	10,650	4,000	3,100	5,625	8,000	25,550	204,600	47,000	26,700		18,770	15,060
11	8,000	3,700	3,100	6,600	7,300	25,550	120,100	33,550	23,850		16,000	8,420
12	8,000	3,700	3,400	7,300	23,850	26,700	112,300	26,125	21,675		11,870	11,870
13	13,125	4,000	3,100	6,950	13,125	26,700	100,600	19,100	24,975		10,565	11,340
14	9,125	3,700	3,100	7,650	21,150	32,900	27,900	24,975	75,650		14,130	10,310
15	7,650	3,700	3,400	7,650	23,850	29,725	19,600	27,300	55,950		14,130	8,870
16	7,650	3,100	3,700	6,600	20,625	26,700	18,600	20,100	26,125		13,260	6,780
17	7,650	3,400	3,100	5,625	17,625	22,200	32,250	34,200	34,875		10,820	8,870
18	10,650	3,700	2,800	6,275	24,975	22,200	33,550	36,225	56,800		10,310	8,000
19	9,125	3,700	3,100	5,950	21,150	19,600	34,875	113,600	111,000		10,565	22,390
20	10,650	3,700	3,700	5,950	20,625	19,100	33,550	87,975	46,237		12,420	9,320
21	10,650	3,700	4,000	5,625	18,600	20,100	28,500	40,350	39,650		12,980	6,975
22	8,375	3,100	3,100	6,275	14,850	20,625	30,350	68,550	37,575		12,700	6,780
23	9,125	3,100	5,950	6,275	18,600	19,100	30,975	75,650	278,700		11,080	6,780
24	7,650	2,500	6,600	7,650	17,150	23,300	27,300	36,225	770,100		13,540	6,780
25	7,300	3,100	6,275	5,300	18,600	24,975	26,125	37,575	853,300		11,870	7,580
26	7,650	3,700	6,950	8,375	22,200	37,575	24,975	30,975			12,980	8,000
27	8,000	3,100	6,950	7,300	16,200	30,975	126,600	34,875			17,330	6,780
28	6,275	3,700	6,275	6,950	17,150	273,500	55,950	32,250			18,770	8,870
29	5,950	3,700	6,600	7,300	19,600	139,600	57,650	34,200			16,660	6,780
30	6,275		6,275	8,375	16,675	140,900	54,250	65,700			16,330	6,420
31	4,650		5,950		16,200		30,975	147,400				6,420
Maximum	13,975	10,650	10,650	8,375	24,975	273,500	204,600	147,400	853,300		1,162,570	37,100
Minimum	4,650	2,500	2,800	5,300	6,275	17,625	18,600	19,100	21,675		6,060	6,420
Mean	9,416	4,123	4,615	6,609	15,676	41,925	66,269	44,831	132,440		80,358	12,896

NOTE.—Daily discharge determined from a fairly well-defined curve from 4,000 to 72,000 second-liters. Gage washed out during the dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10,310	10,565	12,145	10,310	6,240	21,960	12,700	20,300	37,300	30,680	27,080	25,103
2	7,990	8,210	14,750	8,420	6,060	13,260	12,135	17,330	25,130	36,460	23,720	27,080
3	6,975	7,375	13,835	10,820	6,240	8,000	13,540	23,720	30,680	31,220	23,270	28,080
4	6,600	9,560	11,340	9,560	8,000	8,420	25,600	36,460	62,920	32,860	25,600	26,580
5	7,580	11,080	10,310	9,560	13,260	7,990	30,680	36,460	36,460	33,440	30,150	25,600
6	6,420	10,055	8,645	8,870	10,565	8,210	19,510	84,270	34,020	34,630	25,600	23,720
7	7,375	9,095	8,210	8,000	10,820	11,080	12,420	37,100	34,020	29,620	28,080	24,660
8	6,420	7,375	8,870	6,975	12,980	14,440	16,660	30,680	32,310	29,100	22,390	24,190
9	6,420	8,000	7,375	6,420	15,685	11,605	19,905	23,720	29,620	28,580	27,580	22,820
10	6,780	7,580	6,975	6,210	10,820	14,130	20,300	18,050	43,340	22,820	128,980	24,660
11	9,095	7,170	6,600	6,780	8,000	22,820	12,700	20,300	115,830	30,680	148,705	20,300
12	9,560	7,170	9,320	7,170	8,210	24,660	11,870	19,510	277,475	31,220	57,500	22,390
13	7,990	6,600	7,580	9,560	8,870	29,620	22,390	17,330	184,210	26,580	57,500	18,410
14	7,375	7,580	6,600	8,000	14,130	37,100	14,130	13,835	97,420	32,860	34,020	19,905
15	6,600	7,990	7,580	8,645	20,300	41,900	20,300	14,130	53,550	21,960	34,020	26,090
16	6,600	7,170	23,720	7,990	24,660	58,530	16,660	17,330	35,850	27,080	31,760	26,580
17	6,975	7,170	20,700	7,375	19,905	32,860	22,820	14,750	29,620	24,190	31,760	24,660
18	6,780	7,170	19,510	8,210	18,770	24,660	28,080	12,980	27,580	27,580	26,580	20,700
19	6,780	6,600	14,440	7,990	22,390	19,510	90,845	12,420	28,580	33,440	28,080	20,300
20	7,580	8,420	11,340	6,975	17,330	20,300	168,430	12,700	38,410	29,620	29,620	21,100
21	6,240	11,340	14,130	7,170	12,135	29,620	131,610	19,140	32,310	28,080	28,580	20,300
22	6,600	10,565	12,135	7,990	7,990	29,620	53,550	15,060	35,850	32,310	28,580	18,770
23	6,240	12,420	8,645	10,310	6,975	27,580	64,000	26,080	32,310	31,220	27,080	30,680
24	6,420	12,420	9,095	7,580	11,870	29,620	44,090	21,530	23,720	30,680	30,150	31,760
25	7,580	13,540	9,095	8,420	9,800	31,760	29,100	18,770	21,960	25,600	52,575	28,580
26	7,375	20,300	7,990	10,055	9,560	12,700	26,090	20,700	24,660	23,720	109,255	35,240
27	7,375	19,140	7,580	9,560	9,830	16,660	22,820	29,620	22,390	21,530	30,680	34,630
28	7,990	18,410	7,375	8,420	8,870	11,870	20,300	35,240	23,270	21,100	32,310	31,760
29	10,565		10,820	7,375	10,820	10,565	34,630	37,740	28,580	21,960	30,680	29,620
30	12,700		10,310	6,600	8,870	11,080	29,620	37,740	30,680	21,960	30,150	26,580
31	9,560		8,000		14,440		26,090	36,460		20,300		25,600
Maximum	12,700	20,300	23,720	10,820	21,660	58,530	168,430	84,270	277,475	36,460	148,705	35,240
Minimum	6,240	6,600	6,600	6,240	6,060	7,990	11,870	12,420	21,960	20,300	22,390	18,410
Mean	7,964	10,002	10,333	8,251	12,076	21,404	34,631	25,208	51,002	28,164	41,401	25,370

NOTE.—Discharge determined from well-defined rating curve below 140,000 second-liters.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	15,715	12,750	8,250	7,500	6,800	40,500	18,470					
2	11,430	14,685	5,765	7,875	11,430	21,950	55,500					
3	7,500	8,250	6,450	6,800	12,750	32,600	387,200					
4	11,855	13,220	7,875	5,765	12,750	40,500	438,500					
5	7,875	10,600	6,450	4,160	18,470	18,470	400,700					
6	7,875	6,800	6,800	3,860	19,620	18,470	276,500					
7	5,765	6,800	5,430	4,470	17,915	19,045	182,000					
8	6,450	6,800	4,160	3,860	14,190	16,250	165,800					
9	10,185	7,500	4,470	4,470	19,620	15,180	168,500					
10	9,000	7,875	4,470	5,765	18,470	16,805	522,200					
11	6,100	3,560	3,280	5,430	19,045	7,500	441,200					
12	10,185	6,800	4,160	5,105	13,705	11,855	160,400					
13	8,250	11,855	5,430	6,100	15,180	11,855	53,200					
14	7,500	8,625	7,500	5,105	19,620	8,625	66,500					
15	8,250	5,430	7,150	3,280	13,705	8,250	53,300					
16	14,190	3,280	6,800	4,780	14,685	16,250						
17	14,190	7,875	8,625	2,725	13,220	15,715						
18	13,220	4,780	6,450	3,000	16,805	17,360						
19	11,430	5,765	5,430	6,450	16,250	21,950						
20	13,220	4,160	6,100	5,105	31,110	20,770						
21	11,430	4,160	4,470	5,105	670,700	19,620						
22	10,185	11,855	4,160	7,150	1,008,200	18,470						
23	15,715	7,150	3,280	7,875	400,700	16,250						
24	17,915	6,800	4,470	6,800	214,200	24,400						
25	15,180	6,450	5,105	6,100	75,700	35,580						
26	16,250	8,250	4,470	6,450	29,025	21,950						
27	11,855	8,625	5,765	8,250	19,045	18,470						
28	11,015	5,765	7,875	7,875	22,540	16,250						
29	9,385		6,800	7,150	21,950	15,180						
30	6,450		6,100	6,100	17,915	16,250						
31	6,100		5,105		17,915							
Maximum	17,915	14,685	8,625	8,250	1,008,200	40,500	522,200					
Minimum	5,765	3,280	3,280	2,725	6,800	7,500	18,470					
Mean	10,699	7,731	5,763	5,682	91,072	19,411	226,004					

NOTE.—See footnote to daily discharge for 1921.

ANTIQUE PROVINCE

TIPULUAN RIVER, SIBALOM

LOCATION.—About 800 m. east of the town of Sibalom and about 250 m. southeast of Sibalom–San Remigio Road.

RECORDS AVAILABLE.—From July 17, 1919, to December 31, 1922.

GAGE.—Inclined staff gage graduated with nails and an auxilliary vertical piece set at right bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel is straight for 40 m. above and for more than 300 m. below gaging section. Right bank low and subject to overflow; left bank high. At measuring section stream bed composed largely of gravel and shifting. Flow variable.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation 1,934,500 second-liters on July 10, 1922; minimum discharge, 130 second-liters on April 9–11, 1920.

DIVERSIONS.—There is one above, utilized for power and for irrigating rice fields.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curves. Gage read twice daily.

Discharge measurements of Tipuluan River, near Sermon, Sibalom, Antique

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 22	T. Mendoza	1 49	31,175	
September 5	do.	1 28	19,425	
October 2	do.	1 28	21,171	
October 23	do.	1 18	13,625	
1920				
January 4	do.	86	1,125	
January 23	do.	73	1,368	
February 19	do.	63	327	
March 5	do.	60	239	
April 8	do.	55	178	
June 7	do.	1 26	9,485	
July 6	do.		8,921	
September 7	do.	55	14,961	
September 9	do.	50	11,852	
October 30	do.	.60	9,380	
November 10	do.	1 29	28,628	
November 11	do.	1 15	13,653	
December 20	do.	1 05	4,826	
December 21	do.	1 04	4,164	
1921				
January 10	do.	97	1,246	
March 4	do.	.97	370	
March 8	do.	96	337	
March 9	do.	96	420	
May 21	do	1 10	616	
May 23	do.	1 02	509	
June 23	do.	1.27	2,523	
June 25	do.	1.25	2,298	
August 24	do.	1 33	7,458	
August 25	do.	1 38	7,829	
October 26	do	1.48	18,646	
December 22	do	1 58	8,562	
December 26	do	1 56	2,965	

Discharge measurements of Tipuluan River, near Sermon, Sibalom, Antique—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
January 18	T. Mendoza	1 41	1,677	
January 20	do.	1 45	1,889	
February 21	do.	1.31	1,381	
March 21	do.	1.28	268	
March 23	do.	1 27	255	
April 17	do.	1.25	216	
May 20	do.	1.66	56,551	
May 24	do.	1 76	61,055	
June 20	do.	1 80	42,564	
June 20	do	1 75	39,165	
August 20	do	1.72	58,896	
October 31	C. Q. Tumangday	1 56	9,698	
November 16	do.	1.70	24,081	

NOTE.—Measured at different sections.

Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibalom, Antique, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1								28,000	48,500	25,000	12,700	3,900
2								22,200	31,900	14,050	10,250	3,600
3								64,600	19,300	12,350	7,900	3,250
4								94,650	15,400	9,900	6,850	10,900
5								45,800	14,950	17,700	5,950	26,750
6								52,100	15,850	12,000	6,400	38,750
7								29,850	19,300	13,000	6,650	21,700
8								27,400	18,200	37,500	8,150	15,400
9								45,000	60,100	47,600	37,100	8,750
10								32,600	21,200	81,050	11,600	7,900
11								45,000	19,700	18,650	8,150	7,350
12								26,750	39,600	14,950	25,600	6,650
13								58,400	59,200	72,550	12,000	6,400
14								47,600	43,100	109,500	9,600	6,400
15								35,500	30,500	83,600	13,200	5,950
16								21,200	27,400	30,500	10,250	5,500
17							30,500	20,650	40,400	29,200	7,350	4,850
18							25,600	19,300	21,200	18,200	8,700	4,700
19							29,850	39,600	17,200	19,300	7,600	4,700
20							49,400	61,000	25,000	16,300	6,850	4,500
21							44,000	49,400	28,600	10,900	6,650	4,500
22							43,100	62,800	25,000	9,300	4,500	4,500
23							66,400	19,300	18,200	12,000	4,850	4,500
24							44,000	16,750	14,050	13,200	25,000	4,500
25							29,850	15,850	13,600	15,400	5,950	4,500
26							53,000	18,650	12,700	12,700	4,850	4,700
27							58,400	15,850	12,000	13,000	12,700	4,500
28							55,700	16,300	31,900	12,350	12,700	4,500
29							45,000	31,900	39,600	8,750	4,850	4,300
30							31,900	77,850	15,400	12,700	4,500	3,900
31							25,600	55,700				3,400
Maximum							66,400	94,650	60,100	109,500	37,100	38,750
Minimum							25,600	15,850	12,000	8,750	4,500	3,250
Mean							42,153	38,631	26,663	22,551	10,313	7,926

Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibalom, Antique, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,240	740	410	240	690	1,870				76,225	15,700	400
2	2,230	740	410	210	450	1,870				32,050	14,350	13,400
3	2,020	740	410	210	330	2,930				19,950	197,490	10,750
4	1,910	640	410	210	300	3,210				18,500	545,740	11,600
5	1,810	640	370	180	920	17,720				13,150	309,490	46,990
6	1,610	640	370	180	1,050	3,730				10,750	256,990	15,390
7	1,610	640	370	150	640	12,260			15,025	17,050	205,490	14,370
8	1,610	1,190	370	150	540	8,510			13,150	17,050	134,490	28,660
9	1,520	1,120	410	130	740	17,170			11,950	32,050	46,990	23,330
10	1,520	640	450	130	2,350	13,330			13,150	23,650	19,740	15,390
11	1,520	640	450	130	2,020	15,520			13,150	23,650	13,400	11,600
12	1,430	640	450	180	8,200	7,120			12,550	20,675	9,900	4,300
13	1,430	590	410	640	5,600	9,130			16,375	52,975	5,550	3,260
14	1,430	590	410	490	15,590	8,510			15,700	80,100	1,970	2,370
15	1,270	590	450	490	4,500	11,780			17,050	83,200	9,900	950
16	1,120	590	540	450	3,250	16,620			17,050	86,300	6,900	950
17	1,120	590	450	410	2,970	9,130			17,050	41,350	4,300	1,260
18	1,120	540	370	370	7,490	8,510			22,150	40,575	2,800	660
19	1,050	540	370	370	3,390	9,790			22,900	33,600	1,970	1,260
20	1,050	540	370	300	2,590	7,390			28,950	28,950	1,600	4,300
21	980	540	330	300	2,710	12,260			17,050	29,725	950	3,260
22	980	490	330	270	2,590	7,660			15,700	21,400	660	3,260
23	920	490	330	240	2,240	11,330			151,400	13,150	400	2,800
24	920	490	300	240	1,810	13,870			210,300	7,450	950	2,370
25	920	450	300	240	2,020	22,120			138,225	10,200	660	2,370
26	860	450	300	300	1,910	28,170			64,600	8,550	950	2,370
27	860	450	270	370	1,810	33,120			49,100	9,650	1,600	2,370
28	800	450	270	370	1,910	128,820			32,050	18,500	1,600	1,600
29	740	410	270	450	1,710				37,475	17,050	950	1,600
30	740		240	860	1,430				32,050	18,500	400	950
31	740		240		1,430					17,050		1,600
Maximum	2,240	1,190	540	860	15,590	128,820			210,300	86,300	545,740	46,990
Minimum	740	410	240	130	300	1,870			11,950	7,450	400	400
Mean	1,293	614	369	309	2,748	15,839			41,005	29,775	60,463	7,605

NOTE.—Gage destroyed during dates of no record.

Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibalom, Antique, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		410	380	300	280	640	1,490	1,780	9,250	5,085	6,200	17,450
2		410	380	300	280	790	1,320	2,000	8,380	6,520	6,200	16,700
3		380	380	300	350	595	1,320	2,365	8,380	13,350	6,520	16,000
4		445	380	380	410	445	7,570	5,345	10,150	10,150	7,570	15,300
5		445	350	380	350	380	2,110	18,950	12,200	11,150	7,200	14,650
6		380	350	325	350	325	2,110	19,750	10,150	20,600	6,860	14,650
7		380	325	325	410	300	6,860	12,750	16,700	14,650	6,200	14,650
8		380	325	325	300	515	3,520	7,570	9,250	12,200	6,200	14,000
9		350	325	325	300	595	2,650	6,860	17,450	14,650	6,860	14,000
10		325	325	300	300	515	2,365	5,085	36,300	13,350	74,200	13,350
11		325	325	300	280	1,030	2,110	4,120	39,300	14,650	213,200	13,350
12		325	325	300	280	1,490	2,110	3,155	40,900	16,000	53,450	13,350
13		325	325	380	280	1,490	2,980	2,815	32,300	12,750	29,850	13,350
14		325	325	325	325	8,380	2,365	2,650	31,050	10,150	18,950	13,350
15		325	325	325	1,100	10,150	2,235	2,365	17,450	11,150	16,000	13,350
16		325	380	325	1,890	7,570	2,110	2,365	15,300	13,350	14,000	12,750
17		325	350	325	2,365	5,085	2,500	2,110	13,350	11,150	13,350	12,200
18		325	350	325	2,500	3,155	2,650	2,110	12,200	10,150	13,350	12,200
19		325	380	325	18,950	2,365	9,700	2,000	11,150	10,150	13,350	12,200
20		325	325	325	965	2,365	286,600	1,890	10,150	11,150	22,400	12,200
21		410	325	325	900	2,365	206,600	1,890	9,250	16,000	17,450	12,200
22		445	325	325	740	2,110	132,300	16,000	8,380	12,200	17,450	12,200
23		380	325	325	515	2,500	226,400	5,605	9,250	10,150	16,700	12,200
24		380	325	325	445	2,365	132,300	3,910	9,250	9,250	16,700	13,350
25		445	325	325	445	3,710	61,900	4,580	7,970	9,250	16,700	12,200
26		555	325	325	845	4,120	33,550	4,580	6,200	8,380	407,500	11,150
27		445	325	325	1,240	3,710	9,250	10,650	5,605	7,970	88,500	11,150
28	690	410	325	325	900	2,235	6,200	8,890	5,085	7,200	26,450	10,150
29	965		325	280	515	1,405	4,580	10,650	5,085	6,200	18,950	10,150
30	555		300	280	790	1,320	3,330	8,380	4,825	6,200	17,450	9,250
31	445		300		740		2,235	13,350		6,200		9,250
Maximum	965	555	380	380	18,950	10,150	286,600	19,750	40,900	20,600	407,500	17,450
Minimum	445	325	300	280	280	300	1,320	1,780	4,825	5,085	6,200	9,250
Mean	664	375	337	322	1,301	2,467	37,591	6,336	14,409	11,011	39,525	12,977

NOTE.—Record from November 10, 1921, to May 11, 1922, fair below 8,230 second-liters.

Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibalom, Antique, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,720	825	520	520	1,370	52,050	159,500	37,350	13,300	44,150	26,650	1,290
2	2,595	825	520	450	2,115	61,050	78,100	56,300	10,750	56,300	31,600	1,053
3	2,470	670	520	450	2,595	61,050	447,000	31,600	78,100	93,700	9,700	1,053
4	2,470	670	520	380	2,720	172,000	672,000	14,750	111,900	61,050	11,950	1,023
5	2,230	670	520	380	2,985	71,700	259,500	10,750	24,300	85,400	10,750	1,023
6	2,230	670	380	380	2,115	31,600	56,300	9,700	7,050	44,150	10,750	904
7	2,230	595	380	380	2,230	29,050	147,000	71,700	26,650	22,100	66,100	904
8	2,000	520	450	380	3,125	22,100	347,000	122,000	16,300	14,750	122,000	904
9	2,000	520	380	380	3,875	18,100	147,000	259,500	18,100	31,600	24,300	846
10	1,780	520	380	315	3,265	51,050	{1,934,500 587,000}	184,500	447,000	29,050	7,800	792
11	1,780	520	380	315	2,230	31,600	172,000	159,500	147,000	44,150	7,800	792
12	1,675	520	380	255	5,750	48,000	56,300	159,500	56,300	71,700	8,700	739
13	1,570	825	380	255	8,700	85,400	134,500	78,100	44,150	44,150	5,250	686
14	1,470	995	380	255	11,950	48,000	93,700	134,500	52,050	297,000	259,500	686
15	1,470	825	380	200	22,100	472,000	44,150	222,000	52,050	322,000	134,500	636
16	1,570	825	380	200	37,350	122,000	78,100	222,000	722,000	61,050	34,400	588
17	1,570	670	380	200	111,900	48,000	93,700	347,000	422,000	37,350	44,150	588
18	1,470	670	380	200	26,650	31,600	56,300	222,000	697,000	22,100	66,100	545
19	1,780	670	380	745	52,050	122,000	44,150	172,000	472,000	40,650	2,682	588
20	1,570	670	380	520	44,150	61,050	61,050	40,650	111,900	71,700	2,182	588
21	1,370	825	380	380	{61,050 1,822,000}	85,400	122,000	34,400	52,050	102,100	1,865	545
22	1,370	670	380	670	1,634,500	85,400	61,050	22,100	52,050	78,100	1,774	636
23	1,275	670	315	1,780	200,750	85,400	172,000	14,750	61,050	52,050	1,686	503
24	1,180	595	315	2,000	52,050	322,000	197,000	9,700	34,400	56,300	1,440	503
25	995	595	315	1,780	34,400	322,000	297,000	7,800	24,300	40,650	1,290	1,088
26	995	595	255	825	71,700	147,000	359,500	16,300	61,050	44,150	1,364	1,053
27	825	595	380	995	71,700	222,000	134,500	85,400	147,000	52,050	1,290	2,430
28	745	595	1,370	1,370	37,350	134,500	197,000	26,650	102,100	71,700	1,053	1,219
29	745		825	1,180	52,050	93,700	71,700	9,700	71,700	147,000	3,312	1,290
30	670		670	1,370	159,500	372,000	56,300	14,750	44,150	37,350	1,440	1,290
31	595		595		44,150		56,300	13,300		11,950		1,053
Maximum	2,720	995	1,370	2,000	1,822,000	472,000	1,934,500	347,000	722,000	322,000	259,500	2,430
Minimum	595	520	255	200	1,370	18,100	44,150	7,800	7,050	11,950	7,800	503
Mean	1,594	672	457	650	117,706	117,293	197,982	90,653	139,325	70,565	30,113	898

NOTE.—See also footnote to discharge table for 1921. Record from May 12 to November 18, 1922, fair below 132,500 second-liters; also from November 19 to December 31, 1922 below 2,600 second-liters.

BATAAN PROVINCE

CABAYO CANAL, LIMAY

LOCATION.—About 300 m. above the Lamao River gaging station and within the territory of the Agricultural Experiment Station.

RECORDS AVAILABLE.—From May 15, 1922, to December 31, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the canal.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 20 m. above and below the station. Bed of the canal sandy and gravelly. Both banks low and lined with gravel.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 120 second-liters on August 27, 1922; minimum discharge, 16 second-liters on October 23, 1922.

DIVERSIONS.—This canal is a diversion of the Lamao River.

REGULATION.—Only by diversion.

ACCURACY.—Gage read twice daily. Rating curve well-defined. Records good for all stages.

Discharge measurements of Cabayo Irrigation Canal, near Lamao, Limay, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
March 5	Julian Roxas	62	38	
May 15	do	60	44	
June 26	do	57	31	
July 24	do	78	60	
November 13	P. del Castillo	75	84	

Daily and monthly discharges, in liters per second, of Cabayo Irrigation Canal, Lamao, Limay, Bataan, for the year 1922

Day	January	Febuary	March	April	May	June	July	August	September	October	November	December
1						29	33	114	38	40	18	80
2						29	31	105	38	38	18	80
3						29	33	100	38	38	19	80
4						31	33	114	38	38	27	80
5						33	33	114	38	31	25	80
6						38	46	110	38	25	25	76
7						42	38	105	38	25	23	76
8						42	33	100	38	21	25	84
9						46	38	114	38	21	38	80
10						48	29	114	38	19	38	84
11						33	40	114	38	19	35	72
12						29	35	110	38	18	35	70
13						27	38	105	38	18	60	66
14						31	29	105	38	19	84	66
15					40	33	38	96	40	19	84	66
16					40	27	66	105	48	18	84	70
17					42	29	80	105	52	19	88	70
18					42	29	80	110	48	19	88	66
19					42	31	80	96	42	18	84	66
20					42	35	80	92	42	19	84	66
21					40	33	80	100	38	18	84	70
22					40	35	72	100	40	18	84	64
23					46	35	80	96	38	16	80	66
24					58	33	88	88	38	18	80	66
25					42	33	96	96	38	18	80	66
26					42	29	96	96	40	18	84	66
27					42	29	105	120	38	21	88	66
28					42	25	100	100	48	33	84	66
29					35	27	100	76	54	33	80	64
30					35	29	100	48	48	33	80	52
31					31		105	40		29		58
Maximum					58	48	105	120	54	40	88	84
Minimum					31	25	29	40	38	16	18	52
Mean					44	33	62	100	41	24	60	73

NOTE.—Discharge determined from well-defined rating curve.

BATAAN PROVINCE

CALAGUIMAN RIVER, SAMAL

LOCATION.—About 1,225 m. S. 77° 30′ W. of Roman Catholic Chapel at Barrio Calaguiman.

RECORDS AVAILABLE.—From December 3, 1917, to May 31, 1919.

GAGE.—Standard metric gage board vertically fastened against a "bane" tree on left bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section 82.25 m. below gage.

CHANNEL AND BANKS.—Straight about 200 m. above and 550 m. below the gaging section. Banks planted to sugar cane. Stream bed sandy and gravelly. Only one channel at low and high water stage.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 20,860 second-liters on July 10, 1918; minimum discharge, 79 second-liters in June, 1918, and February and May, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For water right purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 50 to 1,900 second-liters. Above the higher value the discharges are estimated from extension of rating curve. Applicable from December 3, 1917, to May 31, 1919. Gage read twice daily.

Discharge measurements of Calaguiman River, near Calaguiman, Samal, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1917				
October 5	P. J.		560	
October 12	do.		680	
October 19	do		540	
October 27	do.		890	
November 3	do.		320	
November 10	do		250	
November 17	do		170	
November 26	do.		1,950	
December 1	do.		1,580	
December 8	do		400	
December 15	do		340	
December 22	do		200	
December 29	do		320	
1918				
January 5	D. B. and F. M.		330	
January 12	do.		185	
January 19	do		100	
January 26	do.		80	
February 2	do		97	
February 9	do.		148	
February 16	do.		144	
February 23	do		130	
March 6	do.		60	
March 9	D. B and P. S		54	
March 16	do.		91	
March 23	do		120	
March 30	do.		150	
April 9	do.		50	
April 13	do.		50	
April 23	do.		30	
May 14	do.		50	
May 21	do.		102	
May 28	do.		336	
June 4	do.		54	
June 15	do.		146	
June 22	do.		102	

Discharge measurements of Calaguiman River, near Calaguiman, Samal, Bataan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1918				
July 6	P. J. T.	32	1,181	
July 20	do	.49	1,933	
August 10	do	16	86	
August 17	do	46	1,021	
August 24	do	36	877	
September 7	do	76	4,697	
September 14	do	.54	2,257	
September 21	do	36	992	
September 28	do	.32	606	
October 5	do	.44	1,529	
October 12	do	58	2,577	
October 19	do	76	5,130	
October 26	do	46	1,448	
November 2	do	34	995	
November 9	do	.32	702	
November 16	do	26	339	
November 23	do	24	200	
November 30	do	24	171	
December 7	do	26	228	
December 14	do	.26	337	
December 21	do	26	337	
December 27	do	26	386	
1921				
February 19	I. Villo		14	

Discharge measurements of Calaguiman River, near Mabatan, Abucay, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 19	I. Villo		303	

Discharge measurements of Calaguiman River, near Santa Lucia, Samal, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 19	I. Villo		9,000	

Daily and monthly discharges, in liters per second, of Calaguiman River near Calaguiman, Samal, Bataan, for the year 1917

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												550
4												755
5												1,055
6												2,015
7												1,920
8												3,075
9												3,075
10												3,420
11												2,745
12												2,115
13												2,115
14												1,555
15												1,258
16												1,135
17												550
18												615
19												650
20												650
21												755
22												1,825
23												2,635
24												4,170
25												3,975
26												3,075
27												2,745
28												2,215
29												1,735
30												480
31												
Maximum												4,175
Minimum												480
Mean												1,763

NOTE.—No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Calaguiman River near Calaguiman, Samal, Bataan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	328	120	142	170	142	205	8,060	2,115	8,060	426	376	170
2	426	120	142	170	142	205	1,703	1,826	5,700	426	755	170
3	615	120	120	170	142	170	1,135	1,055	4,570	376	685	142
4	1,215	120	120	170	120	170	975	825	4,170	328	615	120
5	1,600	120	120	188	120	240	825	615	14,300	900	550	170
6	2,215	120	120	223	120	305	550	401	10,780	975	550	240
7	2,690	120	98	223	120	352	685	352	5,550	550	550	240
8	2,580	120	98	188	120	328	1,920	328	4,040	615	550	240
9	2,800	120	98	170	120	305	10,140	240	2,745	426	550	240
10	2,745	120	109	170	156	328	20,860	261	2,215	376	550	240
11	2,420	120	900	170	120	156	12,220	4,235	2,855	426	488	240
12	1,512	120	550	170	120	142	11,180	5,120	4,300	2,525	426	205
13	720	120	240	156	156	79	7,740	6,005	3,190	1,645	426	170
14	888	120	170	205	170	79	8,220	6,940	2,635	1,215	376	240
15	188	131	170	205	170	120	7,900	3,910	2,965	1,055	328	240
16	170	156	170	205	170	98	9,500	2,420	2,115	4,840	240	205
17	282	170	170	205	170	120	5,405	1,735	1,825	4,040	240	328
18	550	170	142	223	170	120	3,785	1,385	1,555	7,100	205	240
19	550	170	142	240	170	170	2,800	1,055	1,215	5,405	170	240
20	120	170	142	240	170	142	1,968	755	1,055	4,170	170	240
21	120	156	131	205	170	170	1,513	3,075	825	2,965	170	240
22	120	142	120	188	170	170	3,910	1,825	825	2,215	170	240
23	120	142	120	170	170	170	9,820	1,135	825	7,100	170	170
24	120	142	142	142	170	170	6,160	900	755	3,540	170	170
25	120	142	142	142	170	156	5,775	615	685	2,525	170	170
26	120	142	142	120	240	142	4,705	5,850	755	1,735	170	282
27	120	142	170	120	276	120	3,190	2,015	615	1,385	170	282
28	120	142	170	223	305	120	6,780	1,385	550	2,315	170	240
29	120	...	170	170	240	14,304	4,368	1,300	550	1,055	170	...
30	120	.	170	142	205	6,238	4,705	5,260	550	685	170	.
31	120		170	. .	205		3,075	9,340	. .	488	. ..	.... .
Maximum	2,800	170	900	240	376	14,304	20,860	9,340	14,300	7,100	755	328
Minimum	120	120	98	120	120	79	550	240	550	328	170	120
Mean	814	135	180	183	168	853	843	2,396	392	2,127	350	217

NOTE.—No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Calaguiman River near Calaguiman, Samal, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	170	120	120		426							
2	205	120	120		426							
3	170	120	120		426							
4	170	120	120		426							
5	170	120	120		426							
6	170	120	98		426							
7	170	98	98		426							
8	170	205	98		426							
9	170	120			426							
10	170	98			426							
11	142	79			426							
12	98	79			426							
13	60	79		488	426							
14	170	120		426	550							
15	170	170		426	426							
16	170	170		550	426							
17	170	98		488	426							
18	142	79		488	79							
19	142	120		426	79							
20	98	142		488	79							
21	120	142		488	79							
22	170	170		426	79							
23	240	170		426	79							
24	240	120		426	79							
25	120	120		488	79							
26	142	120		426	79							
27	120	120		426	79							
28	120	120		426	79							
29	120			426	98							
30	120			426	98							
31	120				79							
Maximum	240	205	120	550	550							
Minimum	60	79	98	426	79							
Mean	152	123	111	453	274							

NOTE.—No records of gage-heights for dates in which discharges are not given.

BATAAN PROVINCE

LAMAO RIVER, LIMAY

LOCATION.—About 400 m. inland from Lamao Experiment Station, and is opposite No. 39 "Hevi" Tree which is at the left side of the lane as one walks towards the experimental station.

RECORDS AVAILABLE.—From October 5, 1919, to December 31, 1922, with break from July 1, 1921 to December 31, 1921.

GAGE.—A four-meter gage board graduated in centimeters, fastened vertically to the big roots of Sahing (Gutta Percha) tree at right bank of stream.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 50 m. above and for 70 m. below the station. Banks thickly wooded; right bank high and steep, left bank low subject to overflow, and sloping. Stream bed full of boulders, hence accuracy of measurements greatly affected.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 18,344 second-liters on July 18, 1920; minimum discharge, 100 second-liters from April 20 to May 2, 1920.

DIVERSIONS.—One below station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a poorly defined curve. Table arbitrarily extended back for 1919 as no appreciable change of bed has been noted.

Gage read twice daily.

Discharge measurements of Lamao River, near Lamao, Limay, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
February 5	J. San Jose	.70	413	
February 25	do.	.69	456	
March 8	do.	.67	413	
March 29	do.	.66	403	
April 19	do	.63	313	
May 6	do	.64	301	
May 21	do.	.67	412	
June 2	A. Fegarido	66	257	
August 4	do.	.63	310	
September 14	J. S. Roxas	93	2,179	
October 21	do	84	1,049	
1921				
February 12	R. and C.	.67	384	
March 14	Castillo	.65	290	
April 14	do.	.62	226	
May 24	do.	.70	233	
June 9	do.	.82	753	
September 26	do.	69	1,658	
September 27	do.	1.12	2,811	
1922				
March 31	Julian Roxas	.76	228	
May 15	do.	.76	230	
June 26	do.	79	340	
July 24	do.	1.04	1,622	
July 24	do.	1 04	3,143	
November 13	Protacio del Castillo.	.86	883	

Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1											1,254	911
2											1,156	986
3											1,066	911
4											911	911
5										1,728	911	911
6										2,800	911	911
7										1,728	911	911
8										1,862	911	911
9										1,728	986	911
10										2,264	986	986
11										2,532	911	911
12										2,532	1,482	986
13										1,996	1,156	986
14										1,728	911	1,066
15										1,728	911	911
16										2,264	911	911
17										1,728	986	911
18										1,996	1,254	714
19										1,728	1,156	714
20										1,364	1,066	655
21										1,254	911	776
22										1,482	1,066	776
23										1,482	911	776
24										1,254	1,066	776
25										1,254	911	776
26										1,254	911	655
27										1,482	1,066	714
28										1,254	1,066	714
29										1,254	1,364	655
30										1,254	1,254	655
31										1,254		655
Maximum										2,800	1,482	1,066
Minimum										1,254	911	655
Mean										1,710	1,042	837

Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	655	400	234	198	100	162	4,140	4,006	2,666	1,728	841	714
2	600	400	234	198	100	198	1,728	3,604	6,016	1,600	546	714
3	600	448	234	198	129	448	1,728	3,062	7,088	1,482	357	714
4	546	448	234	198	129	496	1,254	2,934	6,686	1,482	357	714
5	546	357	234	198	129	911	911	2,800	6,284	1,482	357	714
6	546	357	234	162	129	1,066	911	2,264	6,016	1,364	274	714
7	546	448	234	198	129	655	600	1,996	5,614	1,254	776	714
8	546	448	234	162	198	448	496	1,728	4,408	1,254	776	714
9	546	400	274	162	198	448	448	1,600	3,470	1,254	776	714
10	546	400	198	198	234	496	448	1,364	3,336	1,254	776	714
11	496	448	198	162	234	357	448	1,364	5,748	1,156	776	714
12	496	448	274	162	496	841	841	1,364	4,140	1,156	714	714
13	496	448	198	162	448	274	2,264	1,254	2,532	1,254	776	714
14	496	448	198	162	655	274	5,346	1,254	2,398	1,254	776	714
15	496	448	198	162	1,254	234	6,686	1,254	2,398	1,482	776	714
16	448	448	234	129	1,066	234	6,284	1,254	2,264	1,364	655	714
17	448	400	198	129	600	198	6,016	1,156	2,264	1,600	546	714
18	496	448	198	129	448	198	18,344	1,066	1,996	1,482	655	714
19	496	448	234	129	274	198	11,094	1,066	1,996	1,482	655	655
20	496	448	274	100	234	198	10,036	1,996	1,996	1,600	714	655
21	448	448	234	100	234	198	4,006	1,996	1,728	1,254	714	600
22	448	448	198	100	234	198	5,212	1,996	1,728	1,254	655	600
23	448	448	198	100	234	198	3,604	1,862	1,600	1,156	655	600
24	448	448	198	100	234	198	3,202	1,862	1,482	1,156	655	600
25	496	234	198	100	234	198	3,336	1,728	1,600	1,156	655	600
26	496	357	198	100	274	198	8,026	1,482	1,600	1,156	655	546
27	496	162	198	100	274	1,156	6,016	1,482	4,944	1,156	600	546
28	448	198	198	100	198	4,140	7,356	1,482	3,470	1,254	655	546
29	448	162	198	100	162	3,604	8,026	1,364	2,398	1,156	714	546
30	448	.....	198	100	162	5,078	7,356	1,996	1,862	1,156	714	546
31	448	.....	198	.....	162	.....	6,016	2,532	.....	1,156	.....	546
Maximum	655	448	274	198	1,254	5,078	18,344	4,006	7,088	1,728	841	714
Minimum	448	162	198	100	100	162	448	1,066	1,482	1,156	274	546
Mean	504	395	218	143	309	783	4,586	1,876	3,391	1,322	652	659

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Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	501	390	316	340	222	233	2,010	397	1,578	1,718	912	1,185
2	501	365	316	340	222	194	753	397	1,130	1,718	912	1,126
3	501	365	292	316	222	233	1,074	397	858	1,648	858	1,014
4	473	365	292	316	222	233	2,811	397	660	1,578	858	1,014
5	473	365	292	268	222	233	.	614	568	1,648	858	959
6	445	365	292	244	222	233	.	966	397	2,010	858	906
7	417	365	292	244	222	273	.	3,733	355	1,578	858	906
8	417	365	292	244	222	397	.	2,473	314	1,442	804	853
9	417	365	292	244	222	660	.	1,578	273	1,718	1,578	800
10	390	340	292	244	222	397	1,074	1,377	233	1,578	1,377	800
11	390	340	292	244	316	439	233	1,578	233	1,510	2,058	750
12	390	340	292	244	365	314	481	2,160	118	1,442	2,058	750
13	365	340	292	244	365	233	314	4,395	568	1,578	2,924	750
14	365	340	292	244	365	397	753	3,533	1,442	1,442	3,506	750
15	365	316	292	244	417	753	912	6,637	858	1,442	3,118	750
16	340	316	292	244	365	481	804	8,643	397	1,377	2,378	750
17	390	316	292	244	365	439	481	4,631	314	1,312	1,907	700
18	417	316	292	244	706	397	439	3,837	233	1,188	1,557	700
19	417	316	292	244	660	273	753	2,983	273	1,188	1,306	700
20	417	316	292	222	397	524	439	4,867	233	1,188	1,245	700
21	390	316	292	222	233	397	156	5,575	397	1,130	1,245	700
22	390	316	292	222	660	355	524	4,985	753	1,074	1,431	700
23	390	316	316	222	341	273	1,188	7,109	706	1,074	1,368	650
24	390	316	340	222	233	481	2,010	6,283	397	1,074	1,368	650
25	390	316	340	222	439	614	2,639	4,395	314	1,074	1,557	650
26	390	316	340	222	481	1,578	2,010	3,249	233	966	2,378	603
27	390	316	340	222	273	660	1,312	1,935	2,725	912	1,832	603
28	390	316	340	222	233	118	858	1,510	2,160	912	1,622	603
29	390	.	340	222	273	1,510	614	1,312	1,935	912	1,431	603
30	390	.	340	222	233	1,510	481	1,442	1,790	912	1,245	603
31	390	.	340	.	233	.	439	1,578	.	912	.	603
Maximum	501	390	340	340	706	1,578	2,811	8,643	2,725	2,010	3,506	1,185
Minimum	340	316	292	222	222	118	156	397	118	912	804	603
Mean	409	337	306	245	327	494	983	3,063	748	1,331	1,580	769

NOTE.—Discharge determined from fairly well-defined rating curve applicable from May 18 to November 10, 1921. Record fair below 4,600 second-liters.

Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	603	431	288	230	258	230	288	10,587	1,014	2,134	750	511
2	603	431	288	230	230	230	288	9,132	1,014	1,907	750	511
3	556	431	288	230	320	230	320	8,647	1,014	1,760	700	511
4	556	431	288	230	258	258	288	4,185	1,014	1,690	700	650
5	556	431	288	230	230	288	1,126	3,797	1,014	1,494	700	603
6	556	393	288	230	207	288	2,058	2,112	1,014	1,760	700	556
7	556	393	288	230	207	511	3,118	1,760	1,014	1,907	700	556
8	556	393	288	230	207	800	2,547	1,306	1,014	1,494	650	511
9	556	355	288	230	207	1,907	2,058	1,245	1,014	1,245	700	511
10	511	355	288	207	184	2,378	1,622	1,245	959	1,557	700	511
11	511	355	288	207	184	1,494	9,908	1,126	959	1,306	650	556
12	511	355	258	207	184	906	2,730	1,069	1,014	1,306	650	556
13	511	355	258	207	184	800	1,760	1,014	1,494	1,245	603	556
14	511	320	288	207	230	700	1,245	906	1,622	1,245	603	556
15	511	320	230	207	258	603	1,014	1,014	1,306	1,245	603	556
16	511	320	230	207	230	511	959	1,126	2,924	1,306	603	556
17	511	320	230	207	230	393	853	1,126	3,312	1,368	603	556
18	511	320	230	207	288	320	1,126	3,700	9,229	1,306	556	556
19	511	320	230	207	288	320	906	1,622	9,617	1,245	556	556
20	470	320	230	207	288	320	800	1,126	3,700	1,245	556	556
21	470	320	230	207	230	288	750	1,014	3,409	1,245	511	556
22	470	320	230	207	258	230	603	1,014	3,312	1,245	511	556
23	470	320	230	603	288	230	800	1,014	3,118	1,245	511	556
24	470	320	258	603	906	258	1,622	1,014	2,730	1,245	511	556
25	470	320	258	603	603	258	3,700	1,368	2,112	1,126	511	556
26	470	320	...	603	511	288	6,610	1,245	2,058	906	511	556
27	470	320	..	556	511	320	6,901	1,245	1,760	853	470	556
28	470	320	...	511	393	288	4,670	1,126	2,058	853	511	556
29	511	...	...	393	288	320	2,037	1,069	3,312	800	556	556
30	470	...	...	288	288	320	7,774	1,069	2,378	800	511	556
31	431	...	...		230	...	10,684	1,014	...	750	...	556
Maximum	603	431	288	603	906	2,378	10,684	10,587	9,617	2,134	750	650
Minimum	431	320	230	207	184	230	288	906	959	750	470	511
Mean	511	354	262	297	296	543	2,618	2,259	2,384	1,317	605	552

NOTE.—Discharge determined from fairly well-defined rating curve applicable from November 11, 1921, to December 31, 1921. Records fair below 3,400 second-liters.

BATAAN PROVINCE

ORANI RIVER, ORANI

LOCATION.—About 120 m. west of the Hacienda Tionson, which is about 800 m. southwest of the municipality of Orani on a private road branching near Km. 13 of the Samal-Orani Road.

RECORDS AVAILABLE.—From August 10, 1920, to December 31, 1922. Also from December 12, 1917, to May 31, 1919, at about the same place as the present station.

GAGE.—Standard metric gage board vertically driven into hard clay near the right bank and made rigid by means of two supports.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for about 50 m. above and 80 m. below the station.

Right bank low, sloping, subject to overflow and grassy; left bank high and wooded. Stream bed stony.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation 12,710 second-liters on September 18, 1922; minimum discharge 10 second-liters on February 28 to March 1, 3, 4, and 6, 1919.

DIVERSIONS.—Many diversion canals above station.

REGULATION.—None.

UTILIZATION.—For adjudication of water rights.

ACCURACY.—Gage-heights not very reliable as the station is influenced largely by tides and diversion canals. Gage read twice daily.

Discharge measurements of Orani River, near Isaac Tongco, Orani, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1916				
November 2	G. C.		262	
November 9	do		89	
November 16	do.		200	
November 20	do		250	
December 7	do.		250	
1917				
January 11	P. J.		210	
January 18	do.		190	
January 25	do.		160	
February 1	do		100	
February 8	do.		240	
February 15	do		140	
February 21	do.		170	
March 1	do		190	
March 8	do.		90	
March 15	do		90	
March 22	do		30	
March 29	do		60	
April 4	do.		60	
April 12	do.		80	
April 19	do		140	
April 25	do.		570	
May 3	do.		670	
May 10	do		350	
May 17	do		190	
May 21	do.		60	
May 24	do		220	
May 31	do.		170	
June 7	do		70	
June 14	do.		80	
June 28	do.		1,100	
July 5	do.		600	
July 12	do.		1,940	

Discharge measurements of Orani River, near Isaac Tongco, Orani, Bataan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1917				
July 20	P. J.		5,140	
July 27	do		650	
October 6	do.		457	
October 13	do.		560	
October 20	do.		314	
October 26	do.		619	
November 2	do.	25	305	
November 9	do.	31	215	
November 16	do.	43	140	
November 23	do.	29	260	
November 30	do	08	1,015	
December 7	do.	.20	525	
December 14	do.	.24	360	
December 21	do.	22	490	
December 28	D. B.	28	350	
1918				
January 4	do.	30	190	
January 29	do	29	200	
January 18	do	33	70	
January 25	do.	32	80	
February 1	do.	32	72	
February 8	do.	.32	88	
February 15	do.	24	70	
February 22	do	22	48	
March 1	do.	.22	54	
March 8	do.	23	98	
March 15	do.	26	112	
March 26	do.	23	50	
April 3	do.	25	60	
April 5	do.	25	48	
April 19	do	.21	35	
April 26	do	20	37	
May 10	do	23	734	
May 17	do	23	50	
May 24	do	23	30	
May 31	do.	.19	62	
June 7	do	28	82	
June 14	do.	20	24	
June 21	do	40	40	
June 28	do	43	35	
July 5	do.	.35	556	
July 19	do	66	3,120	
August 7	P. P. and T. C.	46	556	
August 16	do	29	2,015	
August 23	do	.38	803	
August 30	do	73	2,966	
August 31	do.	23	378	
September 6	do.	95	7,579	
September 7	do	17	594	
September 13	do	59	2,714	
September 14	do.	.20	468	
September 20	do	37	980	
September 21	do	28	234	
September 27	do.	37	775	
September 28	do.	24	990	
October 4	do.	.48	418	
October 11	do.	.22	363	
October 18	do	.72	3,807	
October 25	do.	.28	1,617	
November 1	do.	.42	789	
November 8	do.	.52	498	
November 15	do	32	520	
November 22	do.	.60	173	
November 29	do.	.55	172	
December 6	do.	.53	250	
December 13	do.	.56	122	
December 21	do.	.52	282	
December 27	do.	.52	385	
1920				
June 25	A. Fegarido		45	
August 9	do	1.14	413	
August 10	do.	1.20	475	
August 11	do.	1.23	499	
October 20	J. Roxas	1.31	327	

Discharge measurements of Orani River, near Isaac Tongco, Orani, Bataan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
February 7	R. and C.	1.21	177	
February 8	do.	1.20	176	
March 15	Castillo	1.12	63	
April 13	do.	1.10	36	
May 26	do.	1.20	43	
June 11	do	.62	18	
July 28	Roxas	.80	888	
September 27	do.	.67	584	
December 29	do	.65	199	
1922				
March 30	do.	.58	87	
April 1	do	.58	84	
June 25	do.	.73	727	
July 21	do.	.36	1,124	
July 22	do	.38	1,263	
August 21	do.	.38	1,721	
November 5	Castillo	.19	409	
December 12	do.	.20	502	

NOTE.—Gage heights from August 9, 1920, referred to different data.

Daily and monthly discharges, in liters per second, of Orani River near Isaac Tongco, Orani, Bataan, for the year 1917

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												1,199
12												893
13												797
14												400
15												506
16												186
17												210
18												284
19												400
20												797
21												797
22												2,208
23												2,143
24												1,769
25												1,417
26												1,252
27												942
28												126
29												186
30												234
31												
Maximum												2,208
Minimum												126
Mean												837

Daily and monthly discharges, in liters per second, of Orani River near Isaac Tongco, Orani, Bataan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	210	108	234	284	234	166		1,199	3,187	470	542	146
2	234	186	234	312	234	166		844	2,677	370	470	146
3	400	622	234	312	234	166		750	2,273	400	435	146
4	706	1,306	234	312	234	166		542	2,471	435	370	108
5	622	1,769	234	312	234	312	1,093	340	6,071	506	284	186
6	1,306	2,017	234	312	258	340	991	258	4,589	470	234	186
7	1,648	1,708	234	312	258	435	942	166	3,187	435	234	146
8	1,474	1,360	234	312	258	370	893	108	2,819	400	234	146
1	1,306	797	234	312	258	370	7,319	146	1,954	340	186	146
19	1,306	400	234	312	284	340	10,049	146	1,954	284	186	146
10	1,093	78	435	312	258	258	2,017	370	1,830	258	186	186
12	706	14	400	312	258	284	4,511	4,511	3,187	844	186	146
13	340	340	370	312	284	312	3,111	7,631	1,954	750	146	108
14	166	312	340	284	312	210	5,369	3,887	2,080	622	146	108
15	78	284	340	284	284	186	5,135	2,273	2,607	506	234	284
16	52	284	340	258	284	258	4,745	1,648	1,708	3,035	186	284
17	146	284	312	258	258	258	3,419	1,360	1,360	11,531	186	186
18	542	340	284	234	258	312	2,891	582	1,252	7,553	146	186
19	1,306	284	284	210	258	234	2,273	542	797	2,677	146	186
20	1,708	284	284	210	284	234	1,954	400	797	2,208	146	186
21	1,531	258	284	210	284	234	2,963	1,708	706	1,830	108	186
22	1,531	234	258	210	284	234	3,341	1,040	706	1,360	108	186
23	1,417	234	258	210	258	234	3,809	797	435	4,043	108	186
24	991	234	258	186	258	234	3,653	893	582	1,954	108	146
25	662	234	258	186	258	186	3,887	706	582	1,360	108	146
26	284	234	258	186	234	258	2,963	1,417	844	1,040	108	108
27	146	234	234	186	210	210	2,273	844	706	844	78	186
28	78	234	234	312	186	234	4,745	942	582	706	78	146
29	42		234	234	186	750	3,419	844	582	706	78	108
30	42		234	234	186		3,341	2,891	435	622	78	108
31	64		284		166		2,071	4,589		622		108
Maximum	1,708	2,017	435	312	312	750	10,049	7,631	6,071	11,531	542	284
Minimum	42	14	234	186	166	166	893	108	435	258	78	108
Mean	714	524	275	264	258	274	3,451	1,431	1,830	1,567	195	160

Daily and monthly discharges, in liters per second, of Orani River near Isaac Tongco, Orani, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	108	108	10		33							
2	108	108	18		33							
3	78	108	10		33							
4	78	108	10		33							
5	78	64	18		33							
6	78	52	10		33							
7	78	52	33		33							
8	78	52	33		33							
9	78	52			33							
10	78	52			33							
11	78	78			33							
12	78	78			33							
13	78	78		186	33							
14	78	78		186	52							
15	78	78		186	33							
16	108	78		210	33							
17	78	78		210	33							
18	78	78		210	33							
19	78	78		186	33							
20	78	78		186	33							
21	108	18		186	33							
22	108	18		210	33							
23	78	33		42	33							
24	78	33		42	33							
25	78	18		42	33							
26	78	33		42	33							
27	78	18		33	33							
28	78	10		33	33							
29	78			33	78							
30	108			33	146							
31	52				33							
Maximum	108	108	33	210	146							
Minimum	52	10	10	33	33							
Mean	83	61	17	125	39							

NOTE.—No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Orani River near Cabiawan, Orani, Bataan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									1,423	513	557	605
2										470	535	617
3										643	524	605
4									1,358	630	535	630
5									1,436	630	535	630
6									1,462	605	513	708
7									1,293	593	513	682
8									1,163	557	502	656
9									1,020	535	513	786
10								431	734	513	502	760
11								682	480	480	502	747
12								617	890	470	546	682
13								581	890	450	747	656
14								470	812	431	773	617
15								413	760	413	838	605
16								369	708	413	773	643
17								361	708	605	747	630
18								361	682	581	747	617
19								361	669	581	695	617
20								377	656	581	669	605
21								395	630	581	643	605
22								450	656	581	630	581
23								450	656	569	617	581
24								535	656	569	617	581
25								557	617	593	630	569
26								557	630	581	605	569
27								605	708	569	581	557
28								502	656	569	557	557
29								480	605	569	605	557
30								460	557	569	593	546
31								825		581		546
Maximum								825	1,462	643	838	786
Minimum								361	480	413	502	546
Mean								493	840	549	611	624

NOTE.—See footnote to discharge table for 1919.

Daily and monthly discharges, in liters per second, of Orani River near Cabiawan, Orani, Bataan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	569	413	206	49	36		313	140	1,624	227	38	513
2	535	404	176	63	36		227	140	1,452	227	38	347
3	535	404	176	49	36		425	140	1,366	203	38	203
4	524	404	176	49	36		6,784	140	1,452	253	38	485
5	513	395	161	49	36		3,000	140	1,452	227	33	347
6	491	395	147	36	36		1,624	253	1,624	282	28	347
7	480	431	161	36	36		936	10,912	1,452	227	33	347
8	470	176	161	49	63		768	4,204	693	180	38	313
9	470	161	161	36	36		485	1,796	282	227	107	282
10	470	176	176	36	36		227	2,140	227	227	49	282
11	460	176	147	36	36		203	1,796	180	203	3,860	282
12	513	161	133	36	36	107	180	6,096	180	180	2,484	313
13	513	176	119	36	36	107	140	11,256	3,086	180	7,902	282
14	513	176	119	36	36	140	123	11,084	4,462	159	3,844	282
15	502	176	91	36	36	626	140	10,224	1,452	159	2,312	282
16	502	176	77	36	63	565	140	10,052	1,280	140	1,968	282
17	491	191	77	36	63	425	159	5,924	1,022	123	1,796	282
18	491	176	63	36	49	180	123	5,752	626	107	1,452	253
19	480	176	63	23	63	140	123	4,892	282	107	1,108	253
20	480	221	49	23	63	140	107	7,128	253	82	768	258
21	470	191	63	23	49	123	107	7,988	227	73	626	253
22	470	176	63	23	49	140	82	7,816	485	73	936	253
23	460	176	49	36	49	107	180	6,612	282	64	936	253
24	460	221	36	36	36	107	768	9,278	227	64	693	253
25	450	191	36	36	36	140	2,312	5,408	227	64	626	253
26	450	191	36	36	36	140	4,032	3,516	203	49	768	227
27	440	206	23	36	36	123	1,624	2,570	282	49	850	203
28	431	206	36	36	36	123	768	1,624	282	38	936	180
29	431		49	23		425	425	1,452	227	38	768	180
30	413		36	23		463	227	1,452	227	38	626	180
31	413		49				180	565		33		180
Maximum	569	431	206	63	63	626	6,784	11,256	4,462	282	7,902	513
Minimum	413	161	23	23	36	107	82	140	180	33	28	180
Mean	416	240	100	36	43	227	869	4,596	904	139	1,173	279

NOTE.—No record on days for which discharge is not given. Discharge determined from fairly well-defined rating curves. Records fair below 4,400 second-liters.

Daily and monthly discharges, in liters per second, of Orani River near Cabiawan, Orani, Bataan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	180	107	82					4,982	262	1,867	169	514
2	180	107	82					3,452	262	1,738	169	476
3	180	107	82					2,880	262	1,675	169	476
4	180	94	82					1,738	262	1,430	169	514
5	159	94	82					1,933	296	1,255	330	514
6	159	107	82					1,738	296	1,000	231	514
7	159	107	82					1,430	296	1,000	169	576
8	159	140	82					1,203	262	552	169	438
9	159	180	82				2,000	1,000	262	950	200	438
10	140	159	82				1,738	851	364	851	200	364
11	140	140	94				6,730	759	296	759	169	438
12	140	140	94				2,278	804	330	759	169	438
13	140	123	94				1,675	714	514	714	169	438
14	123	107	82				1,203	1,152	590	759	169	438
15	123	107	82				851	950	3,538	630	138	400
16	123	107	82				672	804	1,255	672	138	400
17	123	140	94				590	759	7,190	672	138	400
18	107	159	82				672	1,550	12,710	630	364	364
19	107	140	82				590	1,867	7,650	590	364	364
20	107	140	82				590	1,255	5,350	552	364	330
21	107	123	82				1,101	1,050	3,120	590	330	476
22	94	123	82				1,255	1,050	2,350	514	262	514
23	107	107	82				1,050	900	1,867	476	231	514
24	107	107	82				1,203	804	1,933	438	231	476
25	107	94	73				5,534	630	1,490	400	330	438
26	94	94	73				1,738	514	1,255	400	364	364
27	94	94	73				7,190	438	1,255	400	296	400
28	140	94	82				11,790	400	1,203	364	364	400
29	107		82				4,982	364	3,367	364	514	400
30	107		82				2,000	296	3,120	364	514	364
31	107		82				3,973	262		231		364
Maximum	180	180	94				11,790	4,982	12,710	1,867	514	514
Minimum	94	94	73				590	262	262	231	138	330
Mean	131	119	83				2,670	1,243	2,107	761	253	434

NOTE.—See footnote to discharge table for 1921.

BATAAN PROVINCE

TALISAY RIVER, BALANGA

LOCATION.—About 8 km. by trail west of Orion, and about the same distance from Pilar. It is near the intake of canal Valecos in the sitio Batugan.

RECORDS AVAILABLE.—From February 10, 1921, to December 31, 1922. Also from April 26, 1909, to March 23, 1912.

GAGE.—A standard metric gage board was securely fastened to a tree on the left bank of the river directly opposite the intake of Valecos ditch.

DISCHARGE MEASUREMENTS.—Made by wading at a short distance below the gage.

CHANNEL AND BANKS.—One channel at low water stage, two at high water stage, of uniformly curved course for 10 m. above and 150 m. below the gaging section. Right bank high and wooded. At measuring section stream bed composed of coarse gravel and sand. Not very shifting.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 95,860 second-liters on August 2, 1922; minimum discharge, 1,020 second-liters on April 6–8 and June 12–13, 1911.

DIVERSIONS.—One above the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve. Applicable from April 26, 1909, to March 23, 1912. Gage read twice daily.

Discharge measurements of Talisay River, near Batugan, Balanga, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1909				
February 8	C. T. Brady		2,000	
April 21	do.	.08	1,600	
April 27	do	.15	1,750	
May 4	do	.17	2,100	
December 27	S. G. Cutler	21	3,691	
1910				
January 11	do	.20	3,032	
January 28	do.	15	2,526	
February 24	do.	.12	2,362	
March 1	do	.10	1,478	
April 16	do	10	1,423	
May 4	do.	10	1,583	
May 31	do	.35	5,374	
June 22	do.	12	1,858	
July 6	do	.17	2,406	
1911				
December 12	do	22	2,872	
1921				
February 10	R. and C	1 00	2,144	
February 11	do	88	1,143	
March 16	Castillo	94	1,689	
April 13	do	.93	1,533	
May 25	do	90	1,167	
June 12	do	.90	1,050	
July 28	do	1.28	7,446	
September 27	do	1.37	10,456	
December 29	do	1.19	3,652	

Discharge measurements of Talisay River, near Batugan, Balanga, Bataan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
March 30	Julian Roxas	1.04	1,471	
April 1	do	1.04	1,477	
June 26	do	1.01	1,832	
July 23	do	1.67	16,931	
July 23	do	1.67	15,720	
August 22	do	1.70	16,485	
August 22	do	1.70	16,653	
November 6	do	1.22	6,840	
November 14	do	1.15	4,186	
December 13	do	1.16	3,857	

Day	January	February	March	April	May	June	July	August	September	October	November	December
1					2,600	1,880	1,740	18,200	3,860	7,140	6,600	4,355
2					2,300	1,610	1,740	15,960	3,540	6,780	6,065	4,190
3					2,300	1,610	1,740	15,600	3,540	9,120	5,715	4,190
4					2,450	1,610	1,740	14,340	3,220	11,640	5,370	4,025
5					2,300	1,480	1,740	24,680	3,380	7,680	5,200	3,700
6					2,300	1,360	4,355	15,960	3,060	7,140	5,030	3,540
7					2,750	1,360	5,030	22,700	3,220	13,620	9,300	3,700
8					2,750	1,360	4,190	18,740	8,940	13,980	20,540	3,700
9					2,450	1,360	4,190	13,260	13,260	13,980	13,440	3,700
10					4,690	1,360	6,240	10,920	17,580	8,220	12,360	3,700
11					3,540	1,360	4,690	7,680	12,720	8,040	9,120	3,860
12					2,750	1,360	4,190	8,760	18,740	7,140	7,860	4,860
13					2,450	1,360	10,560	7,860	21,620	6,780	6,780	4,355
14					2,300	1,360	13,260	7,320	12,000	5,540	6,065	6,420
15					2,450	1,360	8,220	6,600	9,120	6,065	13,980	5,030
16					1,880	1,360	5,540	6,420	8,220	5,715	11,280	4,690
17					2,300	1,240	5,715	6,065	15,600	5,890	10,200	4,860
18					3,380	3,060	5,715	6,065	15,960	6,065	7,680	4,025
19					1,880	8,940	6,065	6,065	31,160	6,065	7,140	3,700
20					1,740	7,320	5,715	5,715	28,100	6,420	6,780	3,700
21					1,610	6,960	4,190	5,370	31,700	5,715	6,420	3,700
22					1,740	8,760	4,355	5,200	21,260	5,715	5,715	3,700
23					1,740	5,715	4,025	4,520	15,600	5,030	5,540	3,700
24					1,740	5,030	4,690	4,355	13,620	30,440	5,370	3,700
25					1,360	3,380	3,060	4,025	12,180	14,520	5,030	3,700
26				2,020	1,360	2,600	5,370	4,025	10,740	11,100	4,690	3,540
27				2,020	1,360	2,600	25,760	4,025	10,740	8,940	4,355	3,060
28				2,020	6,780	2,600	28,640	4,025	9,660	7,860	5,715	3,060
29				2,160	3,380	2,450	31,880	4,025	8,940	7,860	5,030	3,060
30				2,300	2,600	1,880	23,780	4,025	8,400	7,500	4,355	3,060
31					2,600		23,780	4,190		6,600		3,060
Maximum				2,300	6,780	8,940	31,880	24,680	31,700	30,440	20,540	6,420
Minimum				2,020	1,360	1,240	1,740	4,025	3,060	5,030	4,355	3,060
Mean				2,104	2,478	2,856	8,449	9,248	12,656	8,848	7,398	3,924

NOTE.—Daily discharges determined from a fairly well-defined curve, applicable from April 26 to December 31, 1909.

Daily and monthly discharges, in liters per second, of Talisay River near Batugan, Balanga, Bataan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,750	1,880	1,740	2,600	1,610	4,520	4,520	7,680	10,200	18,200	4,190	3,380
2	2,750	1,880	1,610	2,600	1,360	3,700	4,690	6,960	13,800	15,060	4,190	3,540
3	2,750	1,880	1,610	2,600	1,480	2,900	4,025	9,660	14,700	10,200	4,355	3,700
4	2,750	1,880	1,480	2,750	1,480	2,750	3,700	10,740	27,200	16,860	4,190	3,700
5	2,750	1,880	1,480	2,900	1,480	2,300	2,750	6,780	25,040	14,340	3,860	3,700
6	2,750	1,880	1,480	2,750	1,610	2,160	2,450	5,540	19,640	12,180	4,025	3,220
7	2,750	1,880	1,480	2,600	1,480	2,020	2,300	5,200	21,080	11,100	3,700	3,220
8	2,750	1,880	1,480	2,450	1,480	2,020	2,300	4,860	15,780	10,560	3,700	3,220
9	2,450	1,880	1,480	2,450	1,480	1,880	2,020	4,690	11,100	9,660	3,700	3,220
10	2,450	1,880	1,480	2,160	1,360	2,600	1,880	7,320	12,180	13,980	3,700	3,220
11	1,880	1,880	1,480	2,160	1,480	1,880	1,740	9,480	12,180	12,000	3,700	3,060
12	2,160	1,880	1,480	2,020	1,480	1,740	1,740	12,360	9,480	9,480	3,700	2,900
13	2,160	1,880	1,610	1,880	1,480	1,740	1,880	17,940	7,860	8,520	3,700	2,900
14	2,160	1,880	1,610	1,480	1,480	1,740	3,860	12,900	6,420	9,660	5,540	3,220
15	2,160	1,880	1,610	1,480	1,740	1,740	3,380	12,720	7,140	8,220	5,890	2,900
16	2,160	1,880	1,610	1,480	1,740	1,610	5,370	10,560	7,680	7,500	4,690	2,600
17	2,160	1,880	1,610	2,900	1,610	1,480	17,940	8,580	7,680	7,500	4,690	2,600
18	2,160	1,880	1,610	2,900	1,610	1,480	12,180	7,140	6,780	6,780	5,715	2,600
19	2,160	1,880	1,480	2,300	1,610	1,480	6,960	5,890	6,420	6,420	4,355	2,600
20	2,160	1,880	1,480	2,020	1,740	1,480	5,200	5,370	7,320	5,890	4,025	2,600
21	2,160	1,880	1,480	2,020	2,020	1,480	5,200	5,540	6,780	5,715	3,860	2,450
22	2,160	1,880	1,610	2,020	1,880	1,880	4,520	4,860	9,300	5,540	5,030	2,300
23	2,160	1,880	1,610	2,020	1,610	1,480	3,380	4,355	7,500	5,370	8,940	2,300
24	2,160	1,880	1,610	2,600	2,300	1,480	2,750	12,180	7,140	5,030	5,715	2,300
25	2,160	1,880	5,370	7,320	6,780	1,480	2,600	9,480	9,660	5,030	4,690	2,300
26	1,880	1,880	5,200	4,025	10,380	1,480	2,450	6,960	7,320	4,860	4,190	2,300
27	1,880	1,880	2,900	2,900	6,245	2,450	2,300	5,890	6,780	4,690	4,025	2,300
28	1,880	1,880	2,750	2,450	13,260	3,220	2,160	5,030	21,080	4,520	3,860	3,700
29	1,880	.. ..	2,600	2,020	13,440	2,600	2,020	4,860	23,780	4,520	3,540	2,600
30	1,880	. . .	2,600	1,880	8,400	2,450	2,160	7,320	20,720	4,355	3,540	2,600
31	1,880	... .	2,600	...	5,715	....	5,370	6,420	.....	4,190	.. ..	2,600
Maximum	2,750	1,880	5,370	7,320	13,440	4,520	17,940	17,940	27,200	18,200	8,940	3,700
Minimum	1,880	1,880	1,480	1,480	1,360	1,480	1,740	4,355	6,420	4,190	3,540	2,300
Mean	2,268	1,880	1,975	2,524	3,317	2,107	4,058	7,912	12,325	8,645	4,433	2,898

NOTE.—Daily discharges determined from a fairly well-defined rating curve, applicable throughout the year.

Daily and monthly discharges, in liters per second, of Talisay River near Batugan, Balanga, Bataan, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,600	1,740	1,480	1,240	3,380	2,160	3,220	29,540	16,140	18,740	4,860	3,220
2	2,450	1,740	1,480	1,240	3,380	1,880	32,240	28,820	15,060	14,700	4,690	3,220
3	2,300	1,740	1,480	1,240	2,750	1,740	15,960	25,400	13,620	12,540	4,520	3,220
4	2,300	1,740	1,480	1,240	2,600	1,610	10,200	21,620	12,720	11,280	4,520	3,220
5	2,300	1,880	1,480	1,240	2,300	1,480	7,500	16,320	11,460	14,340	4,520	3,220
6	2,300	2,450	1,480	1,020	2,160	1,130	5,890	14,520	11,100	10,200	4,520	3,220
7	2,160	2,450	1,480	1,020	8,220	1,130	5,030	13,080	10,560	9,300	4,520	3,220
8	2,020	2,020	1,480	1,020	6,420	1,240	4,190	12,180	9,660	8,940	4,190	3,320
9	2,020	1,880	1,480	1,240	3,060	1,360	3,860	12,540	8,760	8,580	4,190	3,540
10	2,020	1,740	1,480	1,240	3,060	1,240	3,700	21,440	8,760	7,860	4,190	3,540
11	2,020	1,740	1,480	1,240	2,750	1,130	3,700	18,560	8,760	7,500	4,190	3,220
12	2,160	2,020	1,480	1,480	2,300	1,020	3,220	20,360	8,220	8,220	4,025	3,220
13	2,020	1,740	1,480	3,060	2,600	1,020	2,900	34,400	8,040	7,860	3,860	3,220
14	2,020	1,740	1,360	4,860	2,160	3,060	17,760	27,920	7,860	6,780	3,860	3,060
15	2,020	1,740	1,240	4,860	4,860	2,450	31,160	25,940	7,140	6,960	3,860	2,900
16	2,020	1,740	1,240	1,740	7,860	11,100	36,740	21,620	6,780	7,500	3,860	2,900
17	2,020	1,740	1,240	1,740	5,370	11,100	32,600	18,200	6,780	6,600	3,860	3,220
18	2,020	1,740	1,240	1,880	3,700	11,100	19,640	21,800	8,400	8,040	3,860	2,900
19	2,020	1,610	1,240	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,700	2,900
20	1,880	1,480	1,480	2,020	2,600	20,180	25,040	34,940	12,000	6,420	3,540	2,900
21	1,740	1,480	1,480	2,020	2,450	9,840	23,600	26,300	10,200	5,890	3,540	2,900
22	1,740	1,480	1,480	2,020	2,160	6,065	18,740	19,100	9,300	5,890	3,540	2,750
23	1,740	1,480	1,360	7,500	1,740	4,860	45,920	16,680	8,580	5,715	3,540	2,600
24	1,740	1,480	1,240	9,840	2,020	3,180	37,280	14,700	7,860	5,540	3,540	2,600
25	1,740	1,480	1,240	5,540	1,740	2,900	30,260	13,980	7,140	5,540	3,540	2,600
26	1,740	1,480	1,240	3,860	1,740	2,900	29,180	16,680	6,780	5,370	3,540	2,600
27	1,740	1,880	1,240	6,600	1,740	2,900	27,920	15,960	8,220	5,200	3,380	2,600
28	1,740	1,740	1,240	5,200	1,880	3,860	25,220	16,680	14,160	5,200	3,220	2,600
29	1,740	.....	1,240	4,355	2,020	3,220	20,000	19,460	23,520	4,860	3,220	2,600
30	1,740	.....	1,240	3,860	2,020	2,900	15,960	20,540	28,460	4,860	3,220	2,600
31	1,740	.....	1,240	.....	2,020	.....	23,600	28,380	.....	4,860	.....	2,600
Maximum	2,600	2,450	1,480	9,840	8,220	20,180	45,920	34,940	28,460	18,740	4,860	3,540
Minimum	1,740	1,480	1,240	1,020	1,740	1,020	2,900	12,180	6,780	4,860	3,220	2,600
Mean	1,996	1,756	1,412	2,911	3,379	4,059	28,828	20,692	10,887	8,008	3,927	2,978

NOTE.—Daily discharges determined from a fairly well-defined, applicable throughout the year.

Daily and monthly discharges, in liters per second, of Talisay River near Batugan, Balanga, Bataan, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,600	2,750	1,880									
2	2,600	2,750	1,880									
3	2,600	2,600	1,740									
4	2,600	2,750	1,880									
5	3,060	2,900	1,740									
6	2,600	3,060	1,880									
7	2,450	2,900	2,020									
8	2,450	2,750	2,020									
9	2,450	2,750	2,020									
10	2,450	2,750	2,020									
11	3,540	2,750	2,020									
12	3,220	2,600	2,020									
13	3,060	2,300	2,020									
14	2,900	2,300	2,020									
15	2,750	2,300	1,880									
16	2,750	2,300	1,880									
17	2,750	2,300	1,880									
18	2,750	2,300	1,880									
19	3,060	2,160	1,880									
20	3,060	2,020	1,880									
20	3,060	2,160	1,740									
22	3,060	2,020	1,740									
23	3,060	1,880	1,740									
24	2,750	1,880										
25	2,750	1,880										
26	2,750	1,740										
27	2,750	1,740										
28	2,750	1,740										
29	2,750	1,740										
30	2,750											
31	2,750											
Maximum	3,540	3,060	2,020									
Minimum	2,450	1,740	1,740									
Mean	2,803	2,347	1,899									

NOTE.—Daily discharges determined from a fairly well-defined curve, applicable to March 23, 1912.

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Balanga, Bataan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			1,670	2,070	1,410	1,670	7,450	2,650	19,560	9,650	5,490	8,280
2			1,670	1,930	1,670	1,410	5,870	1,930	15,640	8,740	5,130	7,840
3			1,670	1,930	1,670	1,410	4,770	1,170	13,280	8,300	5,130	7,620
4			1,670	1,930	1,410	1,410	3,120	2,210	11,660	8,740	5,310	6,990
5			1,930	2,210	1,410	1,410	33,180	2,210	14,420	7,870	5,680	6,570
6			2,210	1,930	1,800	1,410	11,400	5,130	12,190	8,080	4,950	6,570
7			1,930	2,210	1,670	1,410	6,250	69,810	11,140	7,870	4,770	6,570
8			2,210	2,070	1,416	1,410	5,490	28,370	11,660	7,870	4,950	6,360
9			1,670	1,930	1,800	1,410	4,080	13,000	15,640	7,660	5,870	6,160
10		2,210	1,670	2,070	1,800	1,410	3,760	10,630	13,280	7,450	5,870	6,160
11		1,930	1,410	2,070	1,670	1,410	2,500	10,630	12,730	7,450	7,030	5,960
12		2,800	1,410	1,930	1,800	1,290	2,500	23,190	11,920	7,450	43,210	5,760
13		1,670	1,540	1,670	1,800	1,170	2,500	28,860	16,580	7,240	56,570	5,760
14		1,930	1,670	1,930	1,930	1,670	2,210	42,430	21,710	7,030	29,950	5,760
15		1,800	2,210	2,070	1,670	2,350	2,500	94,600	22,450	6,630	18,390	5,760
16		2,210	2,210		1,670	2,500	2,500	113,100	16,900	6,250	16,030	5,560
17		1,670	2,210	1,930	1,670	2,500	2,500	74,250	14,420	5,870	16,650	5,360
18		1,670	2,210	1,930	1,670	2,650	2,500	53,160	12,730	5,870	12,620	5,560
19		2,500	2,210	1,930	1,800	2,210	2,500	98,300	12,460	5,870	11,330	5,360
20		1,670	2,210	2,210	1,930	2,210	2,210	44,650	11,660	5,870	9,880	5,360
21		2,210	2,350	1,930	1,930	1,670	2,500	40,950	12,730	5,870	9,170	5,360
22		1,930	1,670	1,800	1,930	1,670	2,500	49,830	13,280	5,870	9,640	5,360
23		1,410	1,800	1,930	1,930	1,930	2,500	76,100	11,920	5,870	9,640	5,160
24		1,670	1,930	1,800	2,070	1,930	16,900	73,140	11,140	5,490	12,100	4,970
25		1,670	2,070	2,070	1,540	2,070	34,290	41,690	10,630	5,130	10,360	4,780
26		2,070	2,210	1,800	1,410	1,930	40,950	28,370	9,650	5,130	17,280	4,590
27		2,070	2,070	1,930	1,410	1,930	8,740	22,450	9,410	5,490	13,160	4,780
28		1,670	2,070	1,800	1,540	1,800	4,420	25,040	10,130	5,130	10,600	4,590
29			2,210	1,800	1,540	7,870	5,310	28,370	9,180	5,870	9,880	4,400
30			2,210	1,930	1,410	12,730	4,420	26,520	8,740	5,680	8,720	4,220
31			1,930		1,410		3,440	21,710		5,490		4,220
Maximum		2,800	2,350	2,210	2,070	12,730	40,950	113,100	22,450	9,650	56,570	8,280
Minimum		1,410	1,410	1,670	1,410	1,170	2,210	1,170	8,740	5,130	4,770	4,220
Mean		1,935	1,939	1,957	1,670	2,328	7,605	37,240	13,295	6,735	12,862	5,734

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Balanga, Bataan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,400	2,500	1,890					88,620	5,760	23,710	4,970	3,860
2	4,400	2,340	2,040					56,080 95,860	6,360	25,270	4,040	3,680
3	4,220	2,820	2,190					49,060	7,620	16,030	3,500	4,970
4	3,330	2,820	2,190					28,780	6,780	13,430	4,400	6,160
5	3,500	2,190	1,890					25,270	5,760	11,580	5,160	6,160
6	3,500	2,820	2,190					17,920	5,560	11,080	4,220	5,760
7	3,160	2,500	1,890				27,610	16,650	5,360	9,880	3,860	4,590
8	3,160	2,190	1,890				31,510	13,710	5,360	9,170	3,860	4,590
9	3,160	2,500	1,890				19,560	11,080	4,970	10,600	3,860	4,220
10	2,990	2,340	1,890				11,080	13,430	5,360	9,640	3,500	4,220
11	2,820	2,500	1,890				74,410	10,600	9,640	8,940	3,860	3,860
12	3,160	1,740	1,890				26,440	9,640	6,570	8,720	3,860	3,860
13	3,160	2,040	1,890				12,100	9,640	13,990	7,840	3,500	3,860
14	2,660	2,190	2,190				8,720	41,260	20,270	7,410	3,680	3,500
15	2,660	2,040	1,890				7,410	16,030	42,430	7,410	3,860	3,500
16	2,990	2,040	1,890				6,570	12,620	29,950	10,120	3,680	3,500
17	3,500	2,190	1,600				5,560	24,490	65,050	8,280	3,860	3,500
18	2,990	2,500	1,600				4,780	31,510	92,350 64,660	7,200	3,860	3,500
19	2,820	1,600	1,600				4,400	31,510	71,290	6,570	3,860	3,500
20	2,990	1,740	1,600				5,560	26,050	55,300	6,570	3,680	3,500
21	2,990	1,890	1,600				5,160	19,910	38,530	6,570	3,860	3,860
22	2,820	1,740	1,600				12,620	15,720	25,660	6,780	3,680	3,860
23	2,500	2,040	1,600				15,560	14,850	18,560	7,620	3,500	4,220
24	2,500	2,190	1,600				18,560	13,990	22,930	4,970	3,500	3,500
25	2,500	2,040	1,890				18,560	10,360	17,280	4,400	3,500	3,860
26	2,820	2,190	1,740				36,190	9,640	13,990	4,400	3,860	3,500
27	2,500	2,040	2,040				47,110	8,500	12,360	4,590	3,860	3,500
28	2,500	2,190	1,740				60,760	7,840	13,710	4,970	3,500	3,500
29	2,660		1,740				27,610	6,990	40,090	5,160	3,860	3,500
30	2,500		1,740				21,000	6,160	31,900	4,590	3,860	3,160
31	2,190		1,740				68,560	6,160		5,760		3,160
Maximum	4,400	2,820	2,190				74,410	95,860	92,350	25,270	5,160	6,160
Minimum	2,190	1,600	1,600				4,400	6,160	4,970	4,400	3,500	3,160
Mean	3,028	2,211	1,839				23,096	21,773	22,896	9,008	3,868	3,997

BATAAN PROVINCE

TALISAY RIVER, PILAR

LOCATION.—About 708 m. S. 55° 45′ W. of km. Post No. 2 of the Balanga South Road.

RECORDS AVAILABLE.—From June 10, 1917, to July 28, 1919, with breaks from January 1–12, from February 16 to April 6, and from July 20 to 22, 1919. Breaks in records also on Sundays and legal holidays.

GAGE.—Standard metric gage board vertically attached to wooden post driven into river bed, at right bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 500 m. above and below station. Banks of sandy texture; stream bed of sand and gravel.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 85,950 second-liters on June 29, 1918; minimum discharge, 1,120 second-liters on June 6, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation and water right purposes.

ACCURACY.—Gage height readings from June, 1917, to March 23, 1918, seem to be affected by tide, hence discharges cannot be relied upon much. This gage was formerly established at Balanga but was transferred to Pilar due to former station being subject to tidal influences. Daily discharge determined from well-defined curves. Gage read twice daily.

Discharge measurements of Talisay River, near Aningay, Pilar, Bataan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1918				
March 7	D. Bascara	.24	1,275	
March 22	do	.30	1,730	
April 4	do	.12	1,360	
April 11	do	09	1,460	
April 25	do	.09	1,420	
May 9	do	.10	1,660	
May 16	do	.12	1,812	
May 23	do	.10	1,609	
May 30	do	.11	1,835	
June 6	do	.13	2,119	
June 13	do	.22	1,988	
June 20	do	12	2,807	
June 27	do	.18	2,434	
July 4	do	.44	8,472	
August 8	do	44	8,726	
August 29	do	.62	26,114	
September 19	do	.60	10,929	
September 26	do	.52	12,742	
October 3	do	.42	7,385	
October 10	do	.46	8,331	
October 24	do	.68	9,905	
October 31	do	.52	8,443	
November 7	do	.38	6,113	
November 17	do	.34	6,051	
November 21	do	.32	5,148	
November 28	do	.30	5,869	
December 5	P. J.	.30	4,934	
December 12	do	.30	5,252	
December 19	do	.30	3,975	
December 26	do	.28	4,450	
1921				
February 17	I. Villo		520	

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Pilar, Bataan, for the year 1917

Day	January	February	March	April	May	June	July	August	September	October	November	December
1							12,650	32,630	19,390	17,060	10,030	8,415
2							15,100	29,220	16,140	14,230	9,395	8,660
3							15,990	34,800	13,110	13,070	9,270	10,160
4							16,440	27,670	12,790	11,950	10,030	10,290
5							16,600	27,360	12,230	11,670	9,645	10,290
6							15,990	18,920	11,950	11,670	9,645	10,290
7							16,440	14,375	10,830	11,530	9,645	10,290
8							13,110	13,650	8,780	33,560	10,290	8,415
9							11,110	13,070	10,420	24,880	10,830	10,030
10						15,740	12,370	12,510	11,250	19,230	10,560	11,110
11						7,290	13,360	13,110	13,795	17,840	9,395	11,110
12						8,070	23,020	15,840	18,150	16,440	10,695	12,790
13						10,290	41,000	16,290	15,990	13,650	10,030	12,630
14						10,030	23,020	17,220	14,375	15,100	8,660	12,630
15						10,290	19,540	17,680	14,230	13,495	10,560	12,370
16						10,965	19,230	17,220	13,070	13,210	10,030	10,880
17						13,110	24,880	16,750	8,540	14,665	8,415	7,950
18						13,740	46,580	23,950	8,300	12,980	8,070	8,070
19						13,455	37,900	31,390	8,415	12,230	7,840	7,950
20						11,110	25,810	21,780	8,300	11,530	7,950	7,950
21						10,560	19,230	15,840	9,520	11,530	7,950	7,950
22						8,540	14,230	13,110	9,270	16,290	7,950	9,770
23						7,950	12,930	12,510	10,160	13,070	8,415	10,030
24						6,625	12,230		10,420	12,650	8,660	12,510
25						7,620	12,090	11,950	11,250	13,795	12,650	13,070
26						7,620	12,930	12,230	15,690	14,810	12,790	13,070
27						10,160	13,110	13,070	14,375	14,955	12,090	13,070
28						10,290	25,190	15,245	20,850	12,510	14,965	10,290
29						9,675	25,810	16,290	28,600	10,965	10,695	10,290
30						10,030		18,920	21,160	10,695	12,370	
13								31,700		10,160		
Maximum						15,740	46,580	34,800	28,600	33,560	14,965	13,070
Minimum						6,625	11,110	11,950	8,300	10,160	7,840	7,950
Mean						10,155	19,583	19,210	13,378	14,592	9,984	10,458

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Pilar, Bataan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	7,730	4,540	4,900	1,400	2,960	2,320	23,640	11,390		2,800	3,820	2,160
2	7,620	4,450	4,900	1,400	2,640		15,690	10,560	16,910	2,560	3,640	2,160
3	7,730	4,450	4,900	2,075	2,000	1,550	9,270	9,770	20,640	2,640		2,160
4	7,730	5,905	4,900	1,700	1,700	1,550	8,300		19,700	2,640	2,720	2,480
5	7,840	7,950	6,960	1,850		2,160	5,890	7,620	38,210	2,640	2,640	2,480
6	7,840	8,540	8,415	1,850	1,700	2,000	5,890	7,400	44,100		2,480	2,480
7	10,160	10,160	8,660		1,400	1,850		6,960	21,470	2,800	2,320	2,480
8	10,290	8,660	9,270	1,400	1,850	2,000	15,990	6,740		2,720	2,240	
9	10,695	8,660	7,840	1,550	1,700		29,220	6,520	15,390	2,800	2,240	2,480
10	8,300	8,660	6,625	1,550	2,000	1,700	30,460	6,100	11,950	2,800		2,480
11	8,185	4,450	5,580	1,400	1,850	2,160	44,410		13,070	2,800	2,160	2,480
12	5,680	4,450	5,680	1,850		3,470	30,150	36,970	16,290	3,040	2,160	2,400
13	5,480	4,450	5,480	2,000	2,160	2,640	22,400	61,150	16,600		2,075	2,320
14	4,360	4,450	4,900		2,160	2,160		23,020	11,670	2,720	2,000	2,320
15	4,360	4,450	4,720	1,700	2,480	2,480	23,330	18,770		2,640	2,000	
16	4,360	4,450	4,360	1,550	2,000		19,390	13,940	5,090	5,580	2,000	2,320
17	4,450	5,780	6,415	1,400	1,700	2,320	11,670	11,110	4,720	7,070		2,320
18	4,360	5,780	7,400	1,260	1,700	2,480	11,110		4,540	6,450	1,775	2,320
19	6,205	5,780	7,730	1,550		2,000	13,070	8,660	4,180	6,310	1,700	2,160
20	7,950	5,680	8,070	1,700	1,700	1,850	12,230	6,740	4,000		1,700	2,160
21	8,300	7,510	8,415		1,550	1,700		18,460	3,820	4,810	1,700	2,160
22	8,780	8,070	9,020	1,550	1,550	1,700	19,390	11,670	4,270	3,470	1,700	
23	8,540	7,180	9,895	1,400	1,700		18,460	10,030	4,270	9,645	1,700	2,160
24	8,660	4,360	1,625	1,550	1,550	2,320	13,070	9,270	4,360	5,185		2,160
25	8,185	4,360	1,700	1,550	1,550	2,000	13,070		4,450	4,540	1,850	
26	7,620	4,180	1,850	1,700		1,850	10,830	13,360	4,810	4,090	1,850	2,160
27	7,400	4,900	1,700	2,800	2,000	2,000	19,080	12,510	4,090		1,775	2,160
28	4,360	4,720	1,700		1,550	5,090		12,510	4,000	4,180	1,700	2,160
29	4,360		1,775	5,280	2,320	85,950	20,850	12,230		4,180	1,850	
30	4,360		1,700	3,130	2,000		17,840	12,230	2,960	4,000	1,775	
31	4,540				2,320		15,990	20,850		4,000		
Maximum	10,695	10,160	9,895	5,280	2,960	85,950	44,410	61,150	44,100	9,645	3,820	2,480
Minimum	4,360	4,180	1,625	1,260	1,400	1,550	5,890	6,100	2,960	2,560	1,700	2,160
Mean	6,982	5,963	5,564	1,852	1,918	5,572	17,795	14,316	12,554	4,041	2,137	2,738

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Pilar, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		2,160			1,550		2,640					
2		2,320			1,550	1,400	3,470					
3		2,320			1,550	1,260	5,280					
4		2,320				1,260	5,680					
5		2,320			1,550	1,260	4,000					
6		2,320			1,550	1,120						
7		2,320		1,700	1,550	1,260						
8		2,320		1,700	1,550		2,960					
9				1,550	1,400	5,680	2,960					
10		2,320		1,700	1,400	9,270	2,480					
11		2,320		1,550		4,540	2,480					
12		2,320		1,700	1,400	2,960	2,480					
13	2,640	2,320			1,400	2,480						
14	2,640	2,320		1,550	1,400	2,480	1,550					
15	2,640	2,320		1,550	1,400		1,550					
16	2,480			1,550	1,400	4,720	1,550					
17	2,480			1,550	1,400	4,900	1,550					
18	2,480			1,400		4,180	1,550					
19	2,480			1,550	1,400	3,820	1,550					
20	2,480				2,000	3,640						
21	2,480			1,550	1,550	3,470						
22	2,480			1,550	1,260							
23	2,480			1,550	1,260	2,800	2,800					
24	2,480			1,550	1,260	2,800	2,800					
25	2,480			1,700		2,800	2,800					
26				1,550	1,550	2,800	2,800					
27	2,480				1,400	2,800	2,800					
28	2,480			1,700	1,550	2,800	2,800					
29	2,480			1,550	1,400	2,640						
30	2,320			1,550	1,550	2,480						
31	2,320				1,400							
Maximum	2,640	2,320		1,700	2,000	9,270	5,680					
Minimum	2,320	2,160		1,400	1,260	1,120	1,550					
Mean	2,489	2,309		1,586	1,468	3,139	2,751					

BATANGAS PROVINCE

PANSIPIT RIVER, TAAL

LOCATION.—Just above bodega of Ignacio Ilagan and at the lower corner of the rice field abutting on the river.

RECORDS AVAILABLE.—Gage height records only from August 26, 1910, to August 31, 1911.

GAGE.—Standard metric gage vertically nailed to column of adobe wall at left bank of the river.

DISCHARGE MEASUREMENTS.—None taken during period of observation.

CHANNEL AND BANKS.—Channel straight for about 100 m. above and about 500 m. below the station. Right bank averages about one meter high above mean water level, and seldom overflows. Left bank high, rocky and well protected. Bed of stream of adobe, sand and hard clay and permanent.

EXTREMES OF STAGE.—Highest stage recorded during period of observation, 1.18 m. on August 21, 1911, lowest stage, 0.20 m. on August 28 and November 9, 1910.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—No daily discharge could be given as there was no gaging made on this river. Gage read twice daily.

Daily and monthly gage heights in meters, of Pansipit River near Taal, Batangas, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									61	58	28	.36
2									52	44	26	36
3									54	40	.28	.36
4									.42	38	.30	34
5									.37	.38	.28	.28
6									34	.36	.25	.30
7									.34	.34	24	.30
8									32	.34	22	.30
9									30	.35	.20	.32
10									32	37	38	.30
11									.30	.39	.34	.29
12									.37	.38	40	.36
13									.44	.44	.32	.43
14									.45	.49	.46	.40
15									48	.48	.35	.43
16									.51	.49	32	.42
17									51	.41	.44	.32
18									.44	.34	.33	.28
19									34	.28	.28	.26
20									.32	.33	.28	.24
21									.26	.26	.36	.23
22									24	.32	.38	.28
23									.27	.30	46	.31
24									.28	.30	.48	.29
25									.30	.38	.45	.33
26								.22	.38	.44	.42	.33
27								22	.56	.36	.38	.31
28								.20	56	.42	.40	.40
29								.40	.60	.40	.40	.40
30								44	.55	.36	.36	.38
31								.58		.25		.38
Maximum								.58	.61	.58	48	.43
Minimum								20	.24	25	.20	.23
Mean								34	.41	.38	.34	.33

Daily and monthly gage heights in meters, of Pansipit River near Taal, Batangas, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.32	26	30	26	.45	58	72	1 12				
2	.36	45	36	27	.48	59	.72	1 12				
3	.32	.50	.31	37	50	.59	.69	1 13				
4	.31	.48	.32	30	.51	.54	70	1 12				
5	30	.53	.33	.34	56	.50	.70	1 10				
6	.30	.52	.34	43	53	.46	.72	1.09				
7	.30	.52	38	44	.53	47	71	1 08				
8	33	59	44	43	45	48	73	1 06				
9	42	.63	50	.34	43	.48	.76	1 06				
10	34	.60	.52	30	.41	.48	.76	1 06				
11	.46	.60	44	23	42	.51	.74	1 06				
12	.46	46	30	22	42	.51	.73	1 07				
13	44	47	26	24	.44	.51	.76	1 12				
14	34	46	24	24	.44	.51	1 07	1 16				
15	35	45	26	24	.45	.57	1 08	1 16				
16	28	.42	26	.26	.47	62	1 04	1.16				
17	.26	42	.28	31	49	.65	1 07	1 16				
18	.24	.40	.30	31	49	.68	1 06	1 16				
19	24	32	28	.36	48	.65	1.07	1.16				
20	.26	37		36	.49	65	1 07	1.17				
21	.28	40	.40	.39	.52	.61	1 08	1 18				
22	.32	.40	31	39	.50	.61	1.08	1.17				
23	.36	.47	33	.54	46	.64	1.13	1 15				
24	.36	.44	.35	49	.43	.65	1 13	1.13				
25	.38	.38	37	42	.42	65	1.15	1.13				
26	43	31	.39	.39	44	.66	1.16	1 13				
27	.39	.32	23	.40	44	.70	1 16	1.13				
28	.23	.30	23	40	46	.66	1 13	1.11				
29			24	.42	50	.69	1.14	1.10				
30			24	45	.52	.71	1.11	1.10				
31			26		58		1.11	1 10				
Maximum	46	.63	.52	54	58	.71	1.16	1 18				
Minimum	23	26	23	22	41	.46	.69	1 06				
Mean	.34	.45	33	35	47	55	.94	1.12				

BATANGAS PROVINCE

TUBIG-NG-BAYAN IRRIGATION CANAL NO. 1, ROSARIO

LOCATION.—In the barrio of Old Rosario and about 97 km. from Ma nila.

RECORDS AVAILABLE.—From November 14 to December 31, 1922.

GAGE.—Metric gage board placed 1 m. above weir.

DISCHARGE MEASUREMENTS.—Made by sharp-crested weir with complet end contractions.

CHANNEL AND BANKS.—Channel straight for 10 m. above and belo weir. Both banks low, of steady earth and covered with vegetation. Be of canal of soft adobe stone.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observe tion 446.8 second-liters on November 18, 1922; minimum discharge, 86. second-liters on November 14–15, 1922.

DIVERSIONS.—Canal diverts water from the Tubig-Ng-Bayan River.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Record fair. Gage read twice daily.

Daily and monthly discharges, in liters per second, of Tubig-Ng-Bayan Canal near Sambat, Rosario, Batangas, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												166.1
2												161.9
3												166.1
4												166.1
5												166.1
6												168.1
7												170.2
8												166.1
9												159.8
10												166.1
11												164.0
12												166.1
13												153.6
14											86.1	141.5
15											86.1	151.6
16												161.9
17												147.5
18											446.8	147.5
19											196 2	149.5
20											202.9	161.9
21											181.0	147.5
22											168 1	151.6
23											160.2	147.5
24											170 2	147.5
25											170 2	141.5
26											170.2	133.5
27											170.2	129.5
28											168 1	129.5
29											174.5	125.4
30											170.2	123.6
31												121.8
Maximum											446.8	170.2
Minimum											86 1	121.8
Mean											182 1	151.6

NOTE.—Discharge determined by formula, $Q = 1838\ (L - .2H)\ H^{3/2}$.

BOHOL PROVINCE

BAGO SECO RIVER, MABINI

LOCATION.—About 1 km. northwest of Batuanan on the Batuanan-Ubay trail.

RECORDS AVAILABLE.—From January 19 to July 18, 1922.

GAGE.—Standard metric gage board vertically nailed to the "Bitan-ag" tree on the right bank of the river. It reads from 50 cm. to 4 m.

DISCHARGE MEASUREMENTS.—Made by wading at ordinary stage and by float at extreme high water.

CHANNEL AND BANKS.—Channel straight 20 m. above and 50 m. below the station. Both banks low, clayey, and subject to overflow. Stream bed sandy and considerably shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 27,541 second-liters on May 21, 1922; minimum discharge, 73 second-liters in April and May, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Rating curves are well defined for low and medium stages; records good. High-water extension of rating curve not based on measurements and determinations above 3,000 second-liters may be considerably in error. Gage read twice daily.

Discharge measurements of Bago Seco River, near Batuanan, Mabini, Bohol

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
December 6	W. Demers and A. Baldonado.	Investigation.	970	
1922				
January 19	A. Baldonado	1.90	1,680	
March 2	do	1.54	330	
April 6	do	1.48	156	
May 7	do	1 46	147	
June 30	do	1 54	429	
September 6	do	3 31		

Daily and monthly discharges, in liters per second, of Bago Seco River near Batuanan, Mabini, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		1,118	381	282	73	190	610					
2		3,261	330	190	73	147	460					
3		1,576	330	190	73	235	282					
4		2,027	282	190	73	235	235					
5		1,905	282	190	128	190	190					
6		1,788	282	190	109	147	147					
7		2,589	282	190	109	355	147					
8		1,526	282	190	109	190	212					
9		1,427	282	190	109	147	212					
10		1,118	282	190	90	109	9,553					
11		957	282	258	90	109	10,569					
12		774	381	190	73	90	1,905					
13		739	489	190	90	90	920					
14		739	355	190	73	90	489					
15		674	282	190	73	90	579					
16		642	1,035	190	73	90	548					
17		579	957	147	109	90	1,202					
18		579	610	147	73	90	1,289 23,360					
19	1,905	548	548	212	73	147						
20	7,461	548	460	147	489	235						
21	1,576	642	355	147	27,541	674 15,525						
22	25,353	774	330	128	9,225	674						
23	27,033	579	282	109	518	1,245						
24	7,965	489	282	109	381	518						
25	4,773	489	282	109	330	330						
26	2,223	433	282	109	258	330						
27	2,757	381	282	109	235	258						
28	1,576	381	282	109	235	235						
29	1,076		282	90	212	212						
30	706		282	73	190	2,156						
31	1,076		282		190							
Maximum	27,033	3,261	1,035	282	27,541	15,525	23,360					
Minimum	706	381	282	73	73	90	147					
Mean	6,575	1,046	375	165	1,338	571	2,939					

BOHOL PROVINCE

CABATANG RIVER, MABINI

LOCATION.—About 3 km. northwest of Batuanan-Sierra Bullones trail.

RECORDS AVAILABLE.—From January 18 to July 22, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank.

DISCHARGE MEASUREMENTS.—Made by wading at low and medium stages at about 10 m. below the gage.

CHANNELS AND BANKS.—One channel at all stages; straight about 30 m. above and 20 m. below station; both banks high and stony. Stream bed sandy, mixed with clay.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 42,100 second-liters on June 21 and July 10, 1922; minimum discharge, 5 second-liters on May 19, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curve. Discharge over 6,000 second-liters considerably in error. Gage read twice daily.

Discharge measurements of Cabatang River, near Batuanan, Mabini, Bohol

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
December 6	Demers and Baldonado	Investigation.	1,380	
1922				
January 18	A. Baldonado	3.16	4,430	
January 19	do	2.80	2,420	
March 2	do	2.32	281	
April 6	do	2.23	48	
May 7	do	2.18	51	
June 30	do	2.58	1,505	

Daily and monthly discharges, in liters per second, of Cabatang River near Batuanan, Mabini, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		13,000	330	122	8	360	11,250					
2		3,550	282	108	6	306	4,126					
3		1,168	238	108	8	238	2,198					
4		6,792	198	82	6	178	1,078					
5		7,803	198	70	52	198	779					
6		2,900	198	122	26	450	582					
7		6,307	178	94	218	3,410	330					
8		3,216	158	70	108	738	420					
9		3,410	178	420	23	390	12,030					
10		2,600	238	330	14	158	42,100 28,520					
11		1,868	238	238	14	40	12,515					
12		1,501	238	122	14	198	10,090					
13		1,307	306	94	10	52	5,172					
14		1,123	330	94	10	29	2,143					
15		990	198	178	6	20	1,402					
16		904	158	178	6	14	8,150					
17		779	2,198	122	6	658	4,910					
18	4,910	658	1,078	82	6	658	2,143					
19	2,720	510	820	32	5	5,082	28,421					
20	8,926	450	582	26	282	4,274	3,089					
21	2,198	779	420	20		390 42,100	1,307					
22	13,000	990	306	17	3,410	18,335	282					
23	13,000	450	282	14	2,088	14,940						
24	9,508	450	282	14	1,260	698						
25	6,792	390	260	17	658	198						
26	3,690	330	218	14	450	450						
27	4,126	282	198	14	306	320						
28	2,308	306	158	12	218	658						
29	2,143		158	10	158	198						
30			122	10	122	9,994						
31	3,830		122		94							
Maximum	13,000	13,000	2,198	420	3,410	42,100	42,100					
Minimum	2,143	282	122	10	5	14	282					
Mean	5,514	2,315	351	94	320	2,833	8,320					

NOTE.—No record on May 21, 1922.

BOHOL PROVINCE

DIMIAO RIVER, BILAR

LOCATION.—At Km. 42 on the Loay interior provincial road of Bohol and 500 m. from the poblacion of Bilar toward Carmen.

RECORDS AVAILABLE.—From January 28, 1922, to March 31, 1922.

GAGE.—Standard metric gage board vertically fastened to one of the piers of the bridge at Bilar.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; both banks low and subject to overflow, stream bed rough and of limestone rock.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 8,064 second-liters on February 7, 1922; minimum discharge, 758 second-liters on February 27 and March 4–8, and 24–31, 1922.

DIVERSIONS.—Part of flow diverted to rice land.

REGULATION.—By diversion.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Discharge determined from fairly well-defined rating curve. Records fair below 4,000 second-liters. Brush dams above station slightly affect measurements.

Discharge measurements of Dimiao River, near Poblacion, Bilar, Bohol

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
January 29	A. Baldonado	1 45	2,900	
March 6	do	1 30	770	
April 4	do	1 27	650	
May 4	do.	1 26	622	
June 27	do	1 32	1,206	

Daily and monthly discharges, in liters per second, of Dimiao River near Poblacion, Bilar, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		5,170	975									
2		4,250	975									
3		3,216	866									
4		2,610	758									
5		5,906	758									
6		5,170	758									
7		8,064	758									
8		7,010	758									
9		4,434	866									
10		4,066	975									
11		2,900	975									
12		2,470	975									
13		2,064	975									
14		1,804	1,201									
15		1,680	975									
16		2,198	1,085									
17		2,755	1,085									
18		2,064	1,201									
19		1,436	975									
20		1,318	975									
21		1,680	866									
22		1,556	975									
23		1,436	975									
24		1,201	758									
25		975	758									
26		1,436	758									
27		758	758									
28	3,216	866	758									
29	2,470		758									
30	3,055		758									
31	3,055		758									
Maximum	3,216	8,064	1,201									
Minimum	2,470	758	758									
Mean	2,949	2,875	895									

BOHOL PROVINCE

GABAYAN RIVER, CANDIJAY

LOCATION.—About 7 km. west of the old town of Candijay; a good trail leading to the station from Km. 47 at the Candijay-Batuanan provincial road.

RECORDS AVAILABLE.—From January 21, 1922, to July 24, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages: channel straight for 30 m. above and 20 m. below station; left bank high and of limestone; right bank low and clayey. Stream bed sandy and clayey.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 66,195 second-liters on January 22, 1922; minimum discharge, 430 second-liters on June 14–15, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Rating curves fairly well defined for low and medium stages. Records below 6,000 second-liters, fair; gage read twice daily. During flood time station is inaccessible.

Discharge measurements of Gabayan River, near Anuling, Candijay, Bohol

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
December 5	Demers and Baldonado	Investigation.	1,160	
1922				
January 23	A. Baldonado	1.78	13,100	
March 3	do.	1.20	1,110	
April 6	do.	1.15	703	
May 7	do.	1.14	580	
June 30	do.	1.22	1,542	
September 7	do	1.22	1,310	

Daily and monthly discharges, in liters per second, of Gabayan River near Anuling, Candijay, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		9,905	1,220	1,110	580	1,220	5,270					
2		4,710	1,220	1,110	580	580	4,005					
3		3,655	1,110	1,110	580	910	3,160					
4		7,635	1,110	1,110	580	1,220	1,695					
5		5,080	1,110	910	580	740	1,110					
6		3,655	1,110	740	500	740	1,110					
7		5,470	1,110	580	580	910	1,110					
8		3,830	1,110	1,110	580	580	5,470					
9		3,485	1,220	1,110	660	910	5,080					
10		3,005	1,330	1,110	580	660	4,005					
11		2,695	1,110	1,110	580	580	4,180					
12		2,395	1,330	910	580	580	1,695					
13		2,245	2,245	910	500	580	1,330					
14		2,100	1,825	910	500	430	2,100					
15		1,825	1,330	1,110	580	430	1,110					
16		1,825	2,695	1,010	500	910	2,100					
17		1,570	3,320	910	580	740	4,005					
18		1,570	1,695	910	580	1,330	5,270					
19		1,570	2,100	740	580	1,570	4,895					
20		1,570	1,450	740	820	2,850	4,335					
21	27,585	2,100	1,220	740	740	1,450	4,005					
22	66,195	2,395	1,110	660	660	1,330	1,695					
23	16,665	1,695	1,110	660	660	2,100	1,110					
24	8,120	1,695	1,110	660	580	1,330	1,110					
25	5,870	1,570	1,110	820	740	910						
26	4,710	1,330	1,110	740	1,110	910						
27	4,355	1,330	1,110	740	1,110	740						
28	3,655	1,330	1,110	740	1,110	660						
29	3,655		1,110	580	1,110	660						
30	3,320		1,110	580	1,330	1,825						
31	5,870		1,110		1,330							
Maximum	66,195	9,905	3,320	1,110	1,330	2,850	5,470					
Minimum	3,320	1,330	1,110	580	500	430	1,110					
Mean	13,636	2,973	1,389	873	712	1,013	2,957					

BOHOL PROVINCE

LOBOC RIVER, CARMEN

LOCATION.—About 2½ km. northeast of Carmen and about 300 m. upstream from the crossing of Carmen Colony road.

RECORDS AVAILABLE.—From January 26, 1922, to July 15, 1922.

GAGE.—Standard metric gage board vertically fastened to "dapdap" tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low and medium stages at 20 m. below the gage; by float during high water.

CHANNEL AND BANKS.—One channel at all stages; straight for about 30 m. above and 80 m. below the station. Both banks low, sloping gradually. Stream bed clayey and rocky; easily scoured.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 27,820 second-liters on May 21, 1922; minimum discharge, 20 second-liters on April 25–30, May 1 and 19, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Records fair below 6,960 second-liters. Gage read twice daily.

Discharge measurements of Loboc River, near Poblacion, Carmen, Bohol

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
January 26	A. Baldonado	1 56	4,100	
January 27	do	1 61	5,590	
March 5	do	1 12	310	
April 4	do	1 10	209	
May 4	do	1 11	254	
June 26	do	1 38	2,390	

Daily and monthly discharges, in liters per second, of Loboc River near Poblacion, Carmen, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		13,520	566	210	20	2,336	8,720					
2		4,900	310	210	636	1,228	2,610					
3		3,020	310	210	310	1,138	2,018					
4		5,445	310	210	310	2,018	1,914					
5		5,035	310	30	872	1,510	1,048					
6		10,480	310	30	872	1,228	872					
7		15,920	256	30	426	872	636					
8		5,735	256	30	256	426	426					
9		4,900	256	426	496	369	2,018					
10		3,610	364	426	1,048	310	20,080					
11		2,676	310	426	872	6,325	3,610					
12		1,914	960	364	364	3,610	2,904					
13		1,914	1,914	256	256	1,510	4,240					
14		1,810	1,138	256	210	1,228	2,018					
15		1,225	872	426	210	1,048	1,510					
16		1,048	5,035	264	210	1,048						
17		1,048	3,376	256	30	426						
18		1,048	2,448	210	30	1,228						
19		960	4,240	210	20	1,510						
20		872	1,810	210	1,810	1,138						
21		1,510	1,510	100	[a]27,820	7,920						
22		1,048	1,048	30	5,745	3,136						
23		960	872	30	3,136	1,048						
24		872	712	30	2,018	15,920						
25		426	636	20	1,228	2,018						
26	4,900	364	426	20	1,048	2,018						
27	5,035	310	310	20	960	1,510						
28	3,136	636	310	20	636	1,048						
29	3,136		310	20	364	872						
30	3,020		256	20	872	2,562						
31	12,880		256		1,112							
Maximum	12,880	15,920	5,035	426	[a]27,820	15,920	20,080					
Minimum	3,020	310	256	20	20	310	426					
Mean	5,351	3,329	1,032	170	2,071	2,285	3,708					

NOTE.—Discharge determined from fairly well-defined rating curve applicable throughout the period of observation.
[a] Unreliable.

BOHOL PROVINCE

LOBOC RIVER, LOBOC

LOCATION.—Below the junction of the Camayugan Creek and Loboc River; a trail leading to the station from Km. 28.5 on the Loay–Loboc provincial road.

RECORDS AVAILABLE.—From January 29, 1922, to December 31, 1922.

GAGE.—Standard metric gage board inclinely fastened to a limestone on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; both banks high vertical wall of limestone; pond formed 10 m. above; channel straight for 30 m. below station. Rapids are formed about 35 m. below station.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 182,870 second-liters on September 6, 1922; minimum discharge, 9,430 second-liters on April 22–25 and December 12, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For power and irrigation purposes.

ACCURACY.—Pond above and rapids below station affect measurements; rating curve fairly well defined; discharge greater than 38,500 second-liters considered inaccurate. Gage read twice daily.

Discharge measurements of Loboc River, near Bagumbayan, Loboc, Bohol

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
March 6	A. Baldonado	1.48	12,320	
April 3	do	1.45	10,900	
May 3	do	1.60	17,260	
September 11	do	1.61	21,060	
September 30	G. M. Borja	1.44	8,900	
October 23	do	1 64	21,902	
November 3	do	1 70	21,820	
November 13	do	1.74	26,660	
December 1	do	1.54	13,900	

Daily and monthly discharges, in liters per second, of Loboc River near Bagumbayan, Loboc, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		84,080	12,970	10,640	9,720	21,410	35,290	10,640	33,270	10,330	19,960	13,420
2		44,120	12,530	10,640	10,020	18,580	36,350	10,640	18,580	11,350	24,500	11,730
3		29,580	12,130	10,330	13,900	17,260	27,830	10,020	30,480	11,350	22,920	10,020
4		27,830	12,130	10,020	17,260	32,330	18,580	10,020	28,700	12,970	61,880	13,900
5		75,200	11,350	10,020	17,920	21,410	17,260	10,020	29,580	27,830	56,330	14,380
6		36,350	11,350	10,020	19,260	16,040	16,040	10,020	182,870 144,020	17,920	98,510	16,040
7		78,530	11,350	10,020	16,040	13,900	13,420	10,020	114,050	31,400	106,300	13,900
8		55,220	11,350	10,020	12,970	12,130	12,130	10,020	58,550	106,300	68,540	13,900
9		39,680	11,350	10,020	12,970	10,990	13,900	11,730	31,400	88,520	55,220	11,350
10		31,400	11,350	10,640	19,260	10,640	132,920	17,260	24,500	88,520	95,180	11,350
11		22,920	11,350	11,350	18,580	10,640	54,110	17,260	17,260	75,200	50,780	14,900
12		21,410	11,730	10,990	16,040	22,160	41,900	16,040	16,040	48,560	39,680	9,430
13		18,580	11,730	10,640	14,380	26,130	28,700	14,900	17,260	49,670	23,700	10,640
14		16,640	12,530	10,640	12,130	13,900	27,830	10,990	14,380	115,160	17,020	12,530
15		16,040	12,970	10,640	11,350	12,130	24,500	10,640	12,530	106,280	14,380	44,120
16		19,260	12,530	10,640	12,130	12,130	22,160	10,020	10,990	74,090	13,430	18,580
17		24,500	26,960	10,020	12,130	10,990	26,960	11,350	10,990	76,310	12,130	14,380
18		14,900	25,310	10,020	12,130	11,350	22,920	10,990	10,640	35,290	29,580	15,460
19		17,260	32,330	10,020	11,350	11,350	17,260	10,640	10,640	26,130	24,500	19,960
20		15,460	18,580	10,020	55,220	13,900	17,260	10,640	10,020	53,000	19,960	31,400
21		19,960	14,380	9,720	144,020	27,830	14,900	14,380	10,020	41,900	36,350	25,310
22		24,500	12,970	9,430	141,800	33,270	13,900	12,530	10,020	29,580	27,830	21,410
23		18,580	12,130	9,430	44,120	17,260	12,970	10,640	10,020	19,960	16,040	10,640
24		14,380	11,350	9,430	29,580	27,830	12,530	11,730	10,020	16,040	16,640	10,020
25		13,900	12,130	9,430	26,130	13,420	13,420	12,970	11,350	16,040	18,580	11,730
26		12,970	11,350	9,720	18,580	33,270	12,970	14,380	11,350	20,680	17,260	13,900
27		12,130	10,990	10,020	16,040	24,500	12,130	12,970	10,990	23,700	15,460	66,320
28		12,970	10,640	10,020	14,900	17,260	11,350	13,900	11,350	32,330	14,900	39,680
29	27,830		10,640	9,720	13,900	19,260	11,350	28,700	10,990	59,660	16,640	27,830
30	29,580		10,640	9,720	14,900	17,920	11,350	27,830	10,020	28,700	20,680	17,260
31	29,580		10,640		13,900		10,990	25,310		21,410		19,260
Maximum	29,580	84,080	32,330	11,350	144,020	33,270	132,920	28,700	182,870	115,160	106,300	66,320
Minimum	27,830	12,130	10,640	9,430	9,720	10,640	10,990	10,020	10,020	10,330	12,130	9,430
Mean	28,997	29,227	13,605	10,133	25,891	18,373	24,038	13,523	31,096	44,393	35,193	18,863

BULACAN PROVINCE

ANGAT RIVER, NORZAGARAY

LOCATION.—About 2 km. east of Barrio Matictic and very near north of the barrio, Santo.

RECORDS AVAILABLE.—From August 9, 1918, to December 31, 1922. Also from April 3, 1909, to November 8, 1913, inclusive, at place very near the present station.

GAGE.—Inclined staff of two sections at left bank of river. First section reading from 0 to 2 m., and second section from 2 to 4.8 m.

DISCHARGE MEASUREMENTS.—Made from raft at low water; from cable at high water.

CHANNEL AND BANKS.—Channel is straight above, over 150 m. and below for 100 m.; right bank covered with gravel and fine sand, subject to scour; left bank high and rocky. Bed of measuring section permanent, regular in shape and fairly smooth. Flow undisturbed at low water stage, but at high water stage flow of tremendous velocity.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 2,203,000 second-liters on August 16, 1921, estimated from extension of discharge curve. Minimum discharge, 2,500 second-liters on May 19, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from April, 1909, to December, 1911, determined from a well-defined rating curve, between 12,500 and 33,400 second-liters; from January, 1912, to November, 1913, from a very well-defined curve between 5,000 and 246,000 second-liters; and from August, 1918, to December, 1922, from a poorly-defined curve from 5,000 to 930,000 second-liters. Above and below these limiting values, discharges are estimated from extension of rating curve. Gage read twice daily.

Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1909				
April 3	L. W. Abrons	.40	36,150	
April 6	do	.36	29,362	
April 8	do	.35	24,603	
April 10	do	.35	19,890	
April 10	do	.30	22,180	
April 15	do	.28	19,080	
April 24	do	.20	11,926	
April 26	do	.19	11,870	
May 8	do	.21	12,590	
May 15	do	.27	16,360	
May 22	do	.12	9,560	
May 29	do	19	12,370	
June 5	do	.20	13,270	
June 12	do	.14	9,285	
June 19	do	.39	21,102	
June 6	do	33	16,688	
July 3	do	.44	23,180	
July 10	do	.69	38,975	
July 17	do	1.41	132,550	
July 24	do	.85	81,673	

Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1909				
July 27	F. T. Ryan	2.37	435,997	
July 29	do	5.22	1,172,280	
August 9	do	1 78	59,735	
August 18	do	1.59	38,098	
August 27	do	1.11	26,335	
September 4	do	1.40	47,946	
September 7	do	1.14	30,984	
September 9	do	1.40	53,136	
September 10	do	1.54	67,812	
September 20	do	3 37	426,407	
September 27	do	1 64	81,422	
October 4	do	1.35	49,867	
October 11	do	1.28	42,958	
October 30	do	2.58	199,644	
November 2	do	2 23	129,399	
November 7	do	6 27	1,816,332	
November 8	do	4.89	897,788	
November 14	do	1.94	84,447	
November 22	do	1.44	59,543	
November 29	do	2 40	210,311	
December 7	do	1.61	85,804	
December 13	do	2.05	168,786	
December 20	do	2.02	161,388	
December 27	do	1.65	106,631	
1910				
January 4	do	2 35	231,601	
February 24	do	1.35	38,690	
March 8	do	1 03	15,842	
March 15	do	1 15	25,567	
March 28	do	1.19	25,212	
April 5	do	1 22	28,641	
April 11	do	1.06	15,046	
April 21	do	1.00	12,960	
May 10	do	1.08	13,542	
May 18	do	1.06	14,709	
June 16	do	1 28	27,765	
June 29	do	1 79	78,516	
July 18	do	1.60	60,904	
July 28	do	1.20	22,674	
August 5	do	1.55	58,467	
October 10	do	1.86	85,670	
October 15	do	1.90	121,460	
October 21	do	1.77	76,454	
October 25	do	1 73	75,529	
November 19	do	3 28	334,549	
November 25	do	2 70	208,590	
December 16	do	3.12	290,066	
December 16	do	1 90	89,563	
December 29	do	2 70	208,590	
1911				
January 9	J. A. Steere	1.64	53,429	
January 16	do	1.75	60,210	
January 23	do	1.38	26,724	
February 8	do	1.86	81,910	
February 16	do	1.55	43,531	
February 23	do	1 29	23,655	
March 8	do	1.22	19,156	
March 17	do	1.17	17,853	
March 25	do	1.26	22,836	
April 18	do	1.34	26,121	
May 6	do	1.56	47,237	
June 12	do	1.58	48,636	
August 6	do	2.84	306,127	
August 18	do	2.21	127,281	
August 22	do	1.84	75,680	
September 6	do	1.43	46,674	
September 18	do	1.32	26,450	
September 30	do	3.11	431,754	
October 17	do	1.61	47,407	
November 14	do	1.22	22,230	
December 9	do	1.14	14,369	
December 20	do	1.30	23,903	

Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1912				
January 3	W. G. Frisbie	1.21	20,456	
February 2	do	1.22	20,131	
February 2	do	1.21	19,854	
February 5	do	1.83	79,147	
February 17	do	1.17	19,291	
February 22	do	1.68	60,002	
February 23	do	1 46	35,938	
February 29	do	1.17	15,414	
March 7	do	1 11	13,084	
March 8	do	1.10	11,340	
March 8	do	1.10	10,918	
March 20	do	1 42	29,515	
March 25	do	1 10	11,027	
March 25	do	1.10	13,060	
April 1	do	1 21	19,105	
April 1	do	1.19	14,645	
April 2	do	1 14	13,114	
April 15	do	1.28	20,039	
April 15	do	1 29	20,081	
April 16	do	1 26	19,502	
April 25	do	1 07	10,837	
April 25	do	1 06	9,242	
April 26	do	1.06	9,230	
April 26	do	1.08	10,892	
April 26	do	1 05	8,901	
May 7	do	1 01	6,994	
May 7	do	1.01	7,389	
May 14	do	.99	6,090	
May 14	do	.99	5,650	
May 18	do	.96	5,220	
May 18	do	.96	5,080	
May 19	do	97	5,510	
May 19	do	97	5,680	
May 20	do	.96	5,600	
May 20	do	98	6,460	
May 21	do	99	6,310	
May 21	do	99	5,690	
May 29	do	1.44	26,450	
May 30	do	1 36	27,360	
May 30	do	1.31	23,390	
June 6	do	1.44	30,700	
June 6	do	1 46	31,640	
June 7	do	1.48	33,420	
June 7	do	1.37	21,690	
June 18	do	1 05	8,720	
June 19	do	1 19	14,540	
June 19	do	1.28	20,070	
June 20	do	1.15	13,590	
June 27	do	1.00	6,840	
June 27	do	1.01	7,110	
June 28	do	1.02	7,950	
July 11	do	1.25	19,040	
July 12	do	1.26	19,540	
July 12	do	1.25	19,100	
July 25	do	1 64	43,550	
July 26	do	1.63	46,920	
July 26	do	1.59	42,410	
August 3	do	3.06	246,750	
August 3	do	3 01	238,280	
August 9	do	2.03	83,090	
August 9	do	2.40	173,980	
August 10	do	2.04	88,850	
August 10	do	2.01	81,190	
August 16	do	1.87	63,700	
August 17	do	2.09	92,520	
August 17	do	2.02	87,830	
August 23	do	1.69	47,068	
August 23	do	1.68	45,970	
August 24	do	1.90	56,950	
August 24	do	1.88	68,820	
September 3	do	2.21	97,800	
September 3	do	2.20	109,600	
September 4	do	2.14	101,900	
September 4	do	2.15	93,200	
September 16	do	1.82	62,800	

Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1912				
September 16	W. G. Frisbie	1 83	64,100	
September 17	do	1.78	60,000	
September 17	do	1.78	60,700	
September 27	do	1 73	54,600	
September 27	do	1.71	53,150	
September 28	do	2 48	162,850	
October 3	do	1 96	76,100	
October 3	do	1.97	79,300	
October 10	do	2 34	131,400	
October 10	do	2 27	129,500	
October 11	do	2 07	95,000	
October 22	do	2 53	158,200	
October 22	do	2 55	165,500	
October 23	do	2 61	175,300	
October 29	do	1 82	59,000	
October 29	do	1.82	57,400	
October 30	do	1.76	52,950	
November 6	do	1 80	56,700	
November 8	do	4 09	367,000	
November 21	do	1.98	70,000	
November 21	do	1 96	70,400	
November 22	do	1.83	59,300	
November 22	do	1 84	60,400	
December 3	do	2 03	83,800	
December 3	do	2 02	82,300	
December 4	do	1 95	77,400	
December 4	do	1 95	74,900	
December 9	do	1 68	39,100	
December 9	do	1 68	39,400	
December 10	do	1 84	54,200	
December 10	do	1 90	61,100	
December 18	do	1.75	44,800	
December 18	do	1.76	45,800	
1913				
January 16	do	1 70	45,400	
January 16	do	1.69	45,700	
January 17	do	1 66	40,100	
January 17	do	1 65	40,300	
January 27	do	1 75	18,900	
January 27	do	1 76	48,800	
January 28	do	1.73	48,100	
January 28	do	1.74	50,800	
February 6	do	1 62	38,800	
February 6	do	1 62	38,900	
February 19	do	1 44	24,800	
February 19	do	1 44	27,700	
February 19	do	1 43	28,300	
March 5	do	1.78	54,400	
March 5	do	1.77	50,500	
March 6	do	1.61	38,200	
March 6	do	1 62	37,100	
March 18	do	1 23	14,200	
March 18	do	1 22	13,400	
March 25	do	1 17	11,300	
March 25	do	1.17	11,700	
March 26	do	1 16	11,000	
April 3	do	1.15	10,400	
April 3	do	1.15	10,000	
April 16	do	1.70	48,300	
April 17	do	1.68	47,000	
July 28	do	1.92	68,200	
July 28	do	1 93	67,400	
August 11	do	2.11	91,600	
August 11	do	2 15	93,400	
August 12	do	2.46	148,500	
August 25	do	2.61	170,100	
August 26	do	2.41	143,500	
September 15	do	2.20	113,300	
September 15	do	2.20	112,500	
September 16	do	2.06	91,000	
October 24	do	1.49	31,000	
October 25	do	1.45	30,000	

Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1918				
April 22	N. Cortes		10,000	
April 22	do		8,700	
August 8	W. Demers	1.15	54,210	
October 10	A. Diaz	1 19	40,912	
November 21	do.	1.08	41,508	
December 19	do.	1.06	28,927	
1919				
January 17	do	.86	25,755	
January 28	do	.66	13,060	
January 28	do.	.66	13,487	
February 12	do	.62	10,506	
March 6	J. S. Roxas	.58	10,573	
March 27	do	.48	7,642	
April 27	do	.39	4,651	
April 28	do	.38	4,837	
June 9	do.	.51	25,784	
August 21	W. Demers	3 52	588,333	
August 22	do.	2 61	311,175	
August 22	do.	2 36	248,565	
August 23	do.	2.10	200,206	
August 23	do.	2 04	186,858	
September 24	J. S. Roxas	1.11	32,674	
September 25	do	1.10	32,838	
October 24	do	1 23	46,788	
November 16	do	1 08	35,305	
November 17	do	1.06	34,228	
November 17	do	1 06	34,059	
December 27	J. Gochoco and J. Roxas	1.34	60,490	
1920				
January 21	J. S. Roxas	1 42	75,581	
January 21	do.	1 42	75,474	
February 7	do.	85	16,244	
February 26	do	1 27	59,935	
March 30	do.	.82	14,642	
April 17	do	78	11,378	
June 9	do.	1.00	27,876	
June 9	do	1.45	75,034	
June 9	do.	1 26	61,918	
June 10	do.	1.14	39,813	
July 8	do.	2 08	219,640	
July 15	do	2.04	217,910	
July 16	do.	2.09	232,802	
August 7	do	2.24	220,832	
September 3	do	1 56	92,646	
September 3	do.	1 71	127,670	
September 17	do.	1.08	30,798	
September 17	do.	1 10	35,551	
September 18	do.	1 08	32,042	
November 30	do	1.44	75,805	
November 30	do.	1 44	76,347	
December 8	do.	2.12	191,167	
1921				
February 5	do.	1.32	57,934	
March 9	do.	2 48	315,165	
May 20	do.	.70	10,465	
June 25	do.	1.14	27,293	
July 22	do.	2 00	155,062	
August 23	do.	75	12,191	
September 8	do	1 40	51,332	
September 9	do.	1.95	129,513	
October 17	do.	1.03	25,382	
October 17	do.	1.03	26,053	
November 17	do.	1 78	124,009	
November 17	do.	1.91	151,987	
November 18	do.	1 60	92,079	
November 19	do	1.47	74,440	

Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan—Continued

Date	Made by—	Gage height (meters)	Discharge (second liters)	Remarks
1922				
January 20	J. S. Roxas	1 04	27,639	
January 20	do	1.04	27,003	
February 17	W. Demers	91	18,497	
March 22	Julian Roxas	.81	11,859	
March 22	do	.81	11,092	
April 6	do	.81	10,637	
April 7	do	80	9,980	
May 31	do	.86	13,995	
May 31	do	.86	12,500	
June 4	do	.90	18,347	
June 4	do	.90	19,926	
July 15	do	1 44	71,863	
July 15	do	1 44	76,105	
August 17	do	1.19	42,137	
August 17	do	1 19	46,348	
September 14	do	1.50	79,266	
September 15	do	1.32	56,024	
September 16	do	1 45	72,114	
October 13	do	1.59	116,904	
October 14	do	1 41	89,371	
October 14	do	1 45	80,948	
December 15	do	1 45	90,018	
December 16	do	1 41	84,317	
December 17	do	1.49	99,847	

NOTE.—Gage heights from April 22, 1918, referred to different datum.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1909

Day	January	February	March	April	May	June	July	August	September	October	November	December
1					13,000	12,500	14,500	150,000	57,500	75,000	162,000	174,000
2					12,000	11,000	14,500	122,000	45,000	55,000	130,000	158,000
3				36,100	15,500	8,000	23,200	92,000	69,000	50,000	65,000	145,000
4					15,000	8,000	21,000	91,000	47,000	53,000	95,000	121,000
5					14,500	13,100	20,000	97,000	41,000	60,000	91,000	110,000
6				29,400	14,000	14,000	16,500	94,000	34,000	66,000	97,000	95,000
7					13,000	31,000	22,000	98,000	44,000	56,000	678,000	85,000
8				24,600	12,600	24,000	29,500	74,000	33,000	66,000	694,000	92,000
9					13,000	11,000	34,000	59,000	53,000	53,000	275,000	77,000
10				22,000	12,500	9,000	39,000	50,000	47,500	48,000	180,000	56,000
11					12,000	8,600	25,000	47,000	47,500	42,000	140,000	275,000
12					13,000	9,280	18,000	40,000	42,000	64,000	124,000	122,000
13					14,000	8,000	14,000	36,000	64,000	66,000	97,000	148,000
14					13,600	8,000	22,000	36,000	46,000	52,000	82,000	171,000
15				19,100	16,400	9,000	23,000	39,000	40,000	39,000	375,000	380,000
16				19,100	13,000	10,500	33,500	31,000	63,000	33,000	345,000	180,000
17				22,000	12,500	11,000	132,000	32,500	65,000	33,000	140,000	123,000
18				19,000	32,000	21,200	71,000	33,000	177,000	157,000	143,000	300,000
19				18,000	17,000	15,000	32,000	41,000	468,000	82,000	95,000	315,000
20				16,000	14,500	16,000	34,000	32,500	426,000	66,000	78,000	161,000
21				15,000	11,000	14,500	23,000	42,500	233,000	58,000	69,000	127,000
22				14,500	9,560	14,000	22,000	21,000	133,000	44,000	52,000	105,000
23				14,500	8,000	12,000	36,000	20,000	93,000	50,000	59,000	71,000
24				11,900	8,200	28,500	81,700	18,500	83,000	2,142,000	46,000	73,000
25				11,600	8,000	14,500	50,000	28,000	103,000	465,000	52,000	102,000
26				13,500	8,200	16,800	70,000	20,500	79,000	202,000	238,000	93,000
27				13,200	7,500	16,000	436,000	30,000	75,000	173,000	96,000	94,000
28				13,200	13,000	16,000	320,000	45,000	87,000	225,000	270,000	85,000
29				13,000	12,400	15,000	1,172,000	76,000	61,000	356,000	272,000	174,000
30				12,400	8,000	14,500	600,000	74,000	46,000	195,000	380,000	120,000
31					11,000		210,000	83,000		155,000		143,000
Maximum				36,100	32,000	31,000	1,172,000	150,000	468,000	2,142,000	694,000	380,000
Minimum				11,600	7,500	8,000	14,000	18,500	33,000	33,000	46,000	56,000
Mean				17,905	12,800	13,999	118,000	56,800	96,700	170,194	187,000	144,300

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	125,000	86,000	33,000	40,000	20,000	58,000	115,000	37,000	135,000	121,000	167,000	98,000
2	98,000	85,000	23,000	29,000	18,000	55,000	225,000	47,000	60,000	95,000	325,000	171,000
3	94,000	75,000	17,000	25,000	15,000	57,000	147,000	58,000	88,000	98,000	500,000	420,000
4	275,000	135,000	19,000	25,000	14,000	38,000	87,000	42,000	138,000	86,000	608,000	450,000
5	300,000	103,000	15,000	27,000	13,500	34,000	74,000	77,000	194,000	68,000	275,000	400,000
6	155,000	125,000	24,000	26,000	14,000	30,000	74,000	52,000	213,000	61,000	152,000	278,000
7	112,000	118,000	26,000	24,000	33,000	27,000	100,000	43,000	175,000	62,000	112,000	205,000
8	88,000	108,000	16,000	26,000	15,000	25,000	61,000	46,000	120,000	51,000	186,000	138,000
9	85,000	85,000	13,000	22,000	13,500	24,000	61,000	39,000	135,000	48,000	137,000	103,000
10	115,000	71,000	32,000	18,000	12,000	23,000	61,000	60,000	98,000	56,000	98,000	75,000
11	98,000	52,000	19,000	15,000	14,000	22,000	61,000	44,000	75,000	517,000	74,000	72,000
12	73,000	137,000	14,000	14,000	13,000	31,000	61,000	63,000	65,000	157,000	67,000	65,000
13	63,000	113,000	11,000	12,000	12,000	38,000	61,000	46,000	55,000	111,000	67,000	69,000
14	50,000	95,000	37,000	11,000	11,500	52,000	61,000	43,000	57,000	125,000	400,000	108,000
15	40,000	78,000	25,000	10,500	27,500	33,000	61,000	38,000	82,000	127,000	410,000	106,000
16	82,000	91,000	24,000	9,500	19,000	27,000	61,000	38,000	76,000	130,000	186,000	88,000
17	118,000	96,000	17,000	10,000	16,000	29,000	43,000	43,000	330,000	360,000	140,000	135,000
18	95,000	100,000	16,000	8,500	14,000	30,000	56,000	44,000	133,000	205,000	560,000	110,000
19	100,000	75,000	15,000	9,000	18,500	60,000	44,000	38,000	192,000	136,000	375,000	83,000
20	100,000	155,000	16,000	9,000	15,000	72,000	38,000	33,000	192,000	98,000	274,000	70,000
21	82,000	112,000	22,000	8,000	18,000	56,000	40,000	30,000	167,000	76,000	420,000	58,000
22	100,000	78,000	13,000	9,000	23,000	50,000	35,000	32,000	340,000	76,000	644,000	52,000
23	78,000	55,000	13,000	7,500	24,000	40,000	39,000	32,000	198,000	81,000	325,000	48,000
24	62,000	34,000	16,000	222,000	43,000	49,000	35,000	185,000	141,000	83,000	600,000	64,000
25	48,000	35,000	17,000	188,000	42,000	67,000	31,000	198,000	133,000	76,000	245,000	49,000
26	116,000	25,000	33,000	74,000	145,000	73,000	26,000	96,000	133,000	72,000	160,000	53,000
27	94,000	71,000	32,000	46,000	47,000	83,000	25,000	70,000	119,000	72,000	135,000	96,000
28	116,000	52,000	28,000	34,000	112,000	94,000	26,000	58,000	154,000	71,000	123,000	478,000
29	69,000	..	25,000	26,000	160,000	78,000	30,000	52,000	181,000	69,000	102,000	224,000
30	57,000	..	30,000	22,000	67,000	95,000	31,000	47,000	164,000	58,000	120,000	140,000
31	83,000	..	57,000	..	148,000	..	39,000	48,000	..	53,000	.....	104,000
Maximum	300,000	155,000	57,000	222,000	160,000	95,000	225,000	198,000	340,000	517,000	644,000	478,000
Minimum	40,000	25,000	11,000	7,500	11,500	22,000	25,000	30,000	55,000	48,000	67,000	48,000
Mean	102,500	87,400	22,500	33,600	37,000	48,400	61,500	57,400	144,800	112,800	266,000	149,000

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	76,000	26,000	18,000	31,000	26,000	36,000	46,000	280,000	108,000	268,000	26,000	20,000
2	59,000	26,000	18,000	28,000	26,000	53,000	636,000	514,000	85,000	152,000	26,000	19,000
3	50,000	24,000	26,000	24,000	26,000	33,000	105,000	452,000	68,000	116,000	27,000	18,000
4	45,000	22,000	31,000	38,000	27,000	28,000	37,000	300,000	56,000	88,000	30,000	17,000
5	46,000	34,000	35,000	42,000	130,000	25,000	76,000	204,000	48,000	81,000	25,000	18,000
6	46,000	103,000	24,000	28,000	45,000	31,000	57,000	174,000	43,000	64,000	22,000	18,000
7	52,000	117,000	21,000	27,000	35,000	35,000	49,000	144,000	40,000	68,000	20,000	18,000
8	75,000	91,000	20,000	25,000	30,000	37,000	44,000	154,000	38,000	64,000	20,000	17,000
9	53,000	68,000	18,000	22,000	30,000	28,000	40,000	170,000	36,000	64,000	20,000	20,000
10	43,000	52,000	16,000	30,000	56,000	51,000	44,000	120,000	38,000	64,000	19,000	18,000
11	37,000	41,000	15,000	26,000	42,000	37,000	49,000	116,000	35,000	64,000	20,000	16,000
12	36,000	325,000	23,000	25,000	29,000	53,000	44,000	250,000	40,000	64,000	19,000	19,000
13	41,000	124,000	29,000	19,000	29,000	37,000	67,000	315,000	32,000	64,000	19,000	17,000
14	40,000	80,000	22,000	18,000	26,000	36,000	376,000	400,000	31,000	64,000	22,000	20,000
15	38,000	62,000	19,000	21,000	25,000	32,000	746,000	220,000	28,000	46,000	20,000	16,000
16	40,000	45,000	17,000	19,000	24,000	31,000	1,090,000	190,000	27,000	62,000	112,000	17,000
17	34,000	39,000	16,000	17,000	28,000	28,000	898,000	150,000	35,000	50,000	77,000	52,000
18	29,000	34,000	16,000	24,000	27,000	27,000	793,000	110,000	28,000	58,000	76,000	41,000
19	27,000	33,000	15,000	20,000	23,000	28,000	430,000	100,000	30,000	208,000	64,000	30,000
20	25,000	30,000	33,000	22,000	22,000	27,000	235,000	82,000	92,000	92,000	49,000	25,000
21	24,000	27,000	46,000	18,000	40,000	28,000	225,000	85,000	98,000	66,000	34,000	27,000
22	21,000	28,000	31,000	24,000	40,000	26,000	371,000	75,000	102,000	52,000	38,000	46,000
23	27,000	24,000	25,000	46,000	27,000	24,000	395,000	64,000	126,000	39,000	32,000	34,000
24	25,000	23,000	22,000	108,000	23,000	22,000	1,418,000	60,000	100,000	34,000	30,000	30,000
25	36,000	21,000	23,000	55,000	21,000	29,000	1,198,000	61,000	56,000	39,000	25,000	28,000
26	73,000	21,000	116,000	43,000	45,000	22,000	1,268,000	63,000	55,000	37,000	25,000	30,000
27	48,000	20,000	43,000	36,000	45,000	20,000	888,000	66,000	60,000	34,000	23,000	29,000
28	35,000	18,000	90,000	40,000	49,000	34,000	235,000	70,000	160,000	32,000	22,000	28,000
29	31,000	.....	68,000	31,000	30,000	33,000	203,000	78,000	316,000	31,000	20,000	25,000
30	28,000	.....	47,000	28,000	30,000	35,000	176,000	146,000	380,000	29,000	21,000	26,000
31	26,000	.....	35,000	.....	42,000	.....	168,000	130,000	.....	26,000	.....	22,000
Maximum	76,000	325,000	116,000	108,000	130,000	53,000	1,418,000	514,000	380,000	268,000	112,000	52,000
Minimum	21,000	18,000	15,000	17,000	21,000	20,000	37,000	60,000	27,000	26,000	19,000	16,000
Mean	40,860	55,460	31,550	31,160	35,420	32,200	400,200	172,300	79,700	71,700	32,760	24,500

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	23,000	30,000	15,500	21,400	8,600	22,500	106,000	1,030,000	254,000	144,000	52,000	170,000
2	20,000	25,400	16,000	12,000	8,600	20,000	130,000	630,000	140,000	73,000	50,000	116,000
3	19,800	20,500	15,000	11,000	8,200	11,800	110,000	286,000	87,000	65,000	56,000	86,000
4	19,800	28,000	21,000	10,000	8,600	10,000	114,000	160,000	95,000	84,000	78,000	73,000
5	88,000	50,000	16,800	13,000	8,200	20,000	122,000	94,000	80,000	86,000	77,000	61,000
6	62,000	98,000	16,000	11,400	7,800	40,000	68,000	82,000	70,000	59,000	56,000	50,000
7	43,000	43,000	12,000	10,000	7,200	26,000	22,000	78,000	63,000	75,000	1,300,000	43,000
8	36,000	37,000	11,400	9,000	14,000	18,000	19,000	63,000	120,000	74,000	550,000	40,000
9	52,000	35,000	11,200	10,200	16,000	11,400	19,000	124,000	150,000	71,000	400,000	39,000
10	38,500	31,000	11,000	8,400	11,200	10,000	35,000	86,000	108,000	117,000	260,000	53,000
11	27,000	26,000	11,000	7,400	9,600	15,400	22,000	146,000	93,000	129,000	200,000	50,000
12	33,500	20,000	9,000	7,600	9,000	10,000	16,000	85,000	131,000	116,000	130,000	61,000
13	106,000	20,000	9,000	7,400	10,200	16,000	15,000	72,000	124,000	84,000	104,000	50,000
14	80,000	19,000	9,500	40,000	7,200	14,000	11,500	76,000	93,000	70,000	87,000	43,000
15	60,000	18,000	8,000	22,400	6,300	13,000	10,500	83,000	74,000	77,000	78,000	32,000
16	42,000	17,000	9,000	19,500	6,200	9,800	9,500	69,000	64,000	83,000	74,000	25,000
17	33,500	19,000	9,500	19,000	6,000	8,000	10,000	90,000	63,000	900,000	84,000	20,000
18	32,000	15,700	9,000	18,000	6,000	9,000	17,000	73,000	75,000	470,000	135,000	44,000
19	30,000	26,000	41,000	16,500	5,800	14,500	28,000	44,000	71,000	350,000	80,000	39,000
20	26,000	18,500	29,000	13,600	5,800	49,000	36,000	86,000	67,000	220,000	64,000	36,000
21	22,000	19,000	21,000	12,400	6,300	110,000	54,000	62,000	52,000	154,000	66,000	33,000
22	19,800	73,000	18,000	10,800	7,400	9,200	175,000	55,000	45,000	180,000	60,000	31,000
23	16,700	34,000	16,000	11,200	13,600	9,400	102,000	52,000	37,000	170,000	56,000	29,000
24	18,400	22,000	15,400	13,600	18,600	6,000	95,000	72,000	45,000	126,000	44,000	28,000
25	16,000	19,000	12,000	10,000	18,600	10,000	54,000	70,000	69,000	110,000	46,000	180,000
26	17,000	17,000	9,400	8,600	18,000	7,800	44,000	73,000	60,000	84,000	300,000	280,000
27	16,000	18,000	10,000	9,200	24,000	7,100	43,000	110,000	63,000	80,000	85,000	196,000
28	16,700	16,000	10,000	14,000	40,000	7,100	82,000	128,000	168,000	67,000	72,000	139,000
29	15,400	17,000	9,000	11,200	33,000	5,500	80,000	330,000	152,000	62,000	460,000	76,000
30	17,000	.....	10,500	9,000	24,000	6,400	150,000	318,000	135,000	54,000	520,000	68,000
31	27,000	.....	10,000	.....	26,000	.....	128,000	390,000	.....	52,000	.....	140,000
Maximum	106,000	98,000	41,000	40,000	40,000	110,000	175,000	1,030,000	254,000	900,000	1,300,000	280,000
Minimum	15,400	15,700	8,000	7,400	5,800	5,500	9,500	52,000	37,000	52,000	44,000	20,000
Mean	34,700	28,700	13,850	13,200	12,900	17,500	67,000	165,000	94,930	144,500	187,470	75,200

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	174,000	87,000	24,900	11,300	26,400	9,600	18,700	226,000	125,000	27,500	26,500	
2	178,400	70,800	23,000	11,500	22,900	9,800	13,700	223,000	114,000	31,800	60,000	
3	109,000	69,000	21,700	10,200	22,500	10,000	11,800	216,000	154,000	31,400	37,000	
4	84,800	56,000	37,000	10,200	25,900	10,000	11,400	174,000	231,000	28,000	72,000	
5	79,000	43,900	52,450	9,600	23,700	11,600	10,700	82,000	203,000	25,000	420,000	
6	153,800	38,850	37,650	9,600	27,800	44,200	11,500	71,000	196,000	36,000	235,000	
7	90,900	38,500	35,900	9,600	100,900	18,400	11,200	106,000	149,000	30,500	155,900	
8	70,900	47,700	30,500	9,500	87,800	15,800	12,500	133,000	120,000	26,000	100,000	
9	145,400	68,900	28,700	9,500	62,100	14,000	13,000	224,000	146,000	23,000		
10	55,600	39,500	23,100	9,300	58,900	25,400	43,500	164,000	190,000	28,000		
11	72,100	35,900	21,900	9,300	56,100	24,900	20,000	104,000	380,000	24,000		
12	81,800	70,400	18,900	10,000	43,800	20,200	40,000	142,000	304,000	23,500		
13	71,000	68,900	18,200	10,200	38,100	15,800	41,000	139,000	201,000	47,000		
14	69,600	49,100	17,000	19,900	24,800	14,500	31,000	110,000	156,000	125,000		
15	50,000	43,200	16,400	18,400	18,300	18,800	21,800	90,000	110,000	106,000		
16	45,550	38,700	15,500	18,400	15,300	17,000	111,000	102,000	61,000	77,000		
17	40,200	32,500	15,200	47,000	20,500	19,900	141,000	86,000	97,000	64,000		
18	38,500	29,700	13,800	47,200	19,400	40,400	77,000	74,000	71,000	56,000		
19	36,500	26,930	13,200	48,200	18,200	25,900	90,000	68,000	56,000	44,000		
20	30,400	28,400	12,700	32,500	14,500	27,100	232,000	87,000	53,000	44,000		
21	29,900	26,800	12,700	23,800	14,100	25,000	248,000	73,500	56,000	37,500		
22	29,200	26,200	12,300	24,700	13,500	15,100	78,000	77,000	50,000	33,000		
23	26,200	24,200	11,800	20,000	13,200	11,900	89,000	75,000	47,500	35,000		
24	29,000	23,700	11,500	17,700	13,900	12,800	98,000	81,000	36,500	31,000		
25	50,600	21,700	11,500	16,600	14,000	25,200	105,000	139,000	38,500	27,000		
26	46,100	21,100	11,000	36,100	11,700	10,400	103,000	132,000	38,500	26,500		
27	52,000	21,700	10,700	24,500	11,800	9,700	79,000	99,000	42,000	24,000		
28	46,300	19,700	14,600	22,900	14,000	12,300	60,000	308,000	33,500	22,500		
29	49,600		12,800	21,200	14,700	18,100	240,000	200,000	30,000	22,500		
30	51,400		10,700	24,200	13,500	16,700	600,000	112,000	27,500	22,000		
31	83,300		11,000		13,000		310,000	73,000		21,000		
Maximum	178,400	87,000	52,450	48,200	100,900	44,200	600,000	308,000	380,000	125,000	420,000	
Minimum	26,200	19,700	10,700	9,300	11,700	9,600	10,700	68,000	27,500	21,000	26,500	
Mean	70,300	41,700	19,600	19,400	28,400	18,400	96,000	129,000	117,000	38,800	138,188	

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									107,600	50,800	57,900	47,400
2									85,000	44,000	49,950	44,000
3									85,000	40,600	56,100	40,600
4									75,000	47,400	52,500	50,800
5									92,000	57,900	49,950	58,800
6									314,000	67,200	45,700	50,800
7									133,800	63,400	49,100	49,100
8									97,000	61,500	54,300	47,400
9								53,400	117,500	68,150	63,400	44,000
10								49,100	123,000	61,500	61,500	66,250
11								86,000	89,000	101,000	60,600	59,700
12								93,000	77,000	79,000	81,000	56,100
13									89,000	61,500	97,000	52,500
14								137,500	120,800	57,000	243,800	50,800
15								85,000	152,700	54,300	314,000	52,500
16								89,000	213,600	168,600	194,700	64,350
17								74,000	127,800	89,000	99,000	77,000
18								62,450	93,000	65,300	81,000	63,400
19								97,000	83,000	70,050	70,050	56,100
20								99,000	157,900	168,600	63,400	48,250
21								85,000	176,900	112,000	54,300	50,800
22								73,000	86,000	73,000	49,100	44,000
23								99,000	75,000	109,800	44,000	35,500
24								81,000	69,100	77,000	44,000	20,250
25								85,000	65,300	61,500	48,250	26,600
26								77,000	57,000	49,100	57,900	185,600
27								99,000	51,650	49,100	51,650	172,650
28								204,000	44,000	41,450	50,800	140,000
29								157,000	45,700	30,250	52,500	124,200
30								115,300	59,700	37,200	49,100	112,000
31								112,000		65,300		114,200
Maximum								204,000	314,000	168,600	314,000	185,600
Minimum								49,100	44,000	30,250	44,000	26,600
Mean								96,075	105,468	70,403	78,218	68,247

NOTE.—Daily discharge determined from a poorly-defined curve, applicable to December 31, 1920.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	167,250	13,900	17,400	9,100	4,600	9,500	13,350	210,400	291,000	42,300	140,000	395,000
2	125,400	11,700	16,200	9,100	4,600	12,250	12,250	194,700	182,700	40,600	247,200	254,000
3	105,400	10,600	15,000	9,100	4,300	16,200	45,700	161,850	127,800	38,900	168,600	182,700
4	91,000	19,800	18,600	8,700	4,600	10,050	22,400	117,500	120,800	47,400	145,000	155,300
5	103,200	17,400	17,400	8,300	5,500	10,600	15,600	132,600	113,100	52,500	127,800	415,000
6	351,000	65,300	14,450	7,900	18,000	9,500	13,900	182,700	103,200	47,400	105,400	355,400
7	220,000	87,000	12,800	17,400	10,050	7,900	12,800	248,900	91,000	45,700	87,000	179,800
8	220,000	83,000	10,600	16,200	7,900	5,900	15,000	328,000	86,000	127,800	93,000	157,900
9	146,250	76,000	10,600	13,350	4,900	7,500	18,600	550,800	79,000	161,850	93,000	140,000
10	114,200	59,700	9,500	10,600	3,700	52,500	29,500	498,100	73,000	185,600	83,000	120,800
11	81,000	52,500	9,500	9,100	3,400	71,000	15,600	1,171,200	69,100	130,200	83,000	112,000
12	62,450	35,500	9,100	8,700	3,100	31,750	12,250	917,100	69,100	117,500	70,050	103,200
13	52,500	28,750	15,000	9,100	4,600	19,800	10,050	795,000	81,000	107,600	65,300	95,000
14	45,700	25,200	12,800	8,700	4,900	18,600	9,100	466,600	61,500	101,000	57,900	93,000
15	41,450	20,400	11,150	8,300	6,700	16,200	7,100	366,400	61,500	101,000	54,300	86,000
16	37,200	31,000	11,150	7,500	4,600	13,350	8,300	405,000	70,050	130,200	50,800	80,000
17	34,000	25,000	10,600	7,500	3,400	12,250	10,600	272,000	61,500	114,200	49,100	87,000
18	29,500	19,800	10,600	7,500	3,100	13,900	19,800	176,900	77,000	93,000	47,400	81,000
19	25,900	16,200	9,500	7,100	2,500	23,100	13,900	137,500	76,000	81,000	172,650	77,000
20	23,800	13,900	9,500	7,100	14,450	28,000	13,350	132,600	64,350	95,000	140,000	74,000
21	59,700	28,000	12,800	7,100	7,900	16,800	25,900	469,300	65,300	93,000	107,600	69,100
22	65,300	17,400	12,250	6,700	23,800	12,800	26,600	215,200	65,300	77,000	89,000	66,250
23	42,300	22,400	11,150	6,300	12,800	10,050	40,600	157,900	57,000	73,000	77,000	63,400
24	29,500	19,800	10,600	6,300	7,900	9,500	70,050	133,800	53,400	63,400	73,000	66,250
25	25,900	18,600	10,600	5,500	11,700	13,350	70,050	242,100	50,800	64,350	66,250	68,150
26	23,800	17,400	10,600	5,200	8,300	12,250	42,300	722,400	49,100	63,400	92,000	72,000
27	21,000	21,000	9,100	5,200	5,500	8,700	31,750	283,400	49,100	127,800	112,000	75,000
28	19,800	19,800	8,300	4,900	26,600	7,900	86,000	261,200	47,400	107,600	133,800	73,000
29	17,400	...	8,300	4,900	69,100	12,250	583,800	199,350	45,700	114,200	199,350	69,100
30	16,200	.....	8,700	4,900	13,100	11,700	287,200	185,600	44,000	116,400	501,000	73,000
31	15,000	.....	9,500	...	15,600	.	226,800	233,600	. . . .	136,250	.....	69,100
Maximum	351,000	87,000	18,600	17,400	69,100	71,000	583,800	1,171,200	291,000	185,600	501,000	415,000
Minimum	15,000	10,600	8,300	4,900	2,500	5,900	7,100	117,500	44,000	38,900	47,400	63,400
Mean	77,842	31,330	11,721	8,245	10,684	16,838	58,716	340,861	82,860	93,456	114,383	129,305

NOTE.—Daily discharges determined from a poorly defined curve. Applicable to December 31, 1920.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	64,350	38,900	56,100	35,500	22,400	23,800	73,000	116,400	292,900	81,000	53,400	89,000
2	61,500	35,500	48,250	31,000	28,000	29,500	65,300	106,500	257,600	71,000	52,500	130,200
3	63,400	34,000	49,950	34,000	25,200	31,750	73,000	96,000	242,100	103,200	51,650	110,900
4	69,100	32,500	47,400	40,600	26,600	34,000	70,050	83,000	185,600	91,000	263,000	95,000
5	71,000	37,200	45,700	37,200	23,800	31,750	61,500	84,000	152,700	81,000	176,900	85,000
6	69,100	42,300	50,800	33,250	22,400	32,500	54,300	71,600	133,800	91,000	163,200	342,600
7	89,000	36,350	57,900	30,250	21,700	34,000	69,100	66,250	110,900	75,000	132,600	257,600
8	85,000	30,250	52,500	28,000	21,000	33,250	65,300	63,400	103,200	81,000	101,000	205,600
9	87,000	29,500	43,150	27,300	22,400	63,400	56,100	57,900	86,000	74,000	85,000	157,900
10	81,000	29,500	38,900	27,300	31,000	52,500	50,860	59,700	75,000	67,200	81,000	137,500
11	76,000	93,000	37,200	25,200	31,750	53,400	66,250	56,100	79,000	71,000	114,200	116,400
12	71,000	73,000	34,000	23,800	28,000	56,100	67,200	57,900	86,000	61,500	114,200	103,200
13	65,300	54,300	32,500	22,400	35,500	50,800	74,000	56,100	75,000	55,200	913,800	99,000
14	59,700	45,700	31,750	24,500	34,000	38,900	94,000	57,900	79,000	52,500	472,000	93,000
15	54,300	56,100	31,000	25,200	29,500	40,600	124,200	56,100	71,000	50,800	351,000	93,000
16	50,800	67,200	29,500	26,600	34,750	38,900	101,000	71,000	62,450	69,100	630,000	420,000
17	59,700	95,000	32,500	28,000	67,200	38,050	190,050	78,000	55,200	64,350	289,100	338,400
18	116,400	103,200	38,900	26,600	49,100	31,000	507,000	97,000	50,800	87,000	230,200	250,600
19	116,400	87,000	34,000	25,200	37,200	31,000	940,200	78,000	65,300	68,150	171,300	207,200
20	77,000	80,000	31,750	23,800	33,250	28,750	1,194,300	67,200	90,000	77,000	138,750	168,000
21	81,000	69,100	38,050	22,400	35,500	25,900	927,000	65,300	287,200	75,000	116,400	145,000
22	79,000	61,500	31,000	21,000	33,250	25,900	606,000	59,700	235,300	65,300	112,000	123,120
23	72,000	52,500	29,500	19,800	29,500	44,000	351,000	62,450	196,250	73,000	104,300	93,680
24	66,250	45,700	28,000	25,200	28,000	45,700	298,600	63,400	179,800	140,000	95,000	75,800
25	57,900	47,400	26,600	23,100	26,600	56,100	254,000	81,000	266,600	105,400	107,600	63,280
26	54,300	68,150	25,200	26,600	26,000	50,800	302,400	85,000	250,600	86,000	101,000	55,280
27	52,500	108,700	26,600	25,200	25,200	49,100	174,000	101,000	187,050	71,000	95,000	49,720
28	49,100	77,000	28,750	25,200	23,100	61,500	188,500	91,000	165,900	66,250	143,750	45,400
29	45,700	65,300	34,000	25,200	22,400	53,400	169,950	174,000	135,000	65,300	117,500	40,400
30	42,300		30,250	23,800	28,000	86,000	157,900	150,100	105,400	59,700	84,000	43,400
31	40,600		28,000		28,000		135,000	130,200		57,000		50,800
Maximum	116,400	108,700	57,900	40,600	67,200	86,000	1,194,300	174,000	292,900	140,000	913,800	420,600
Minimum	40,600	29,500	25,200	19,800	21,000	23,800	50,800	56,100	50,800	50,800	51,650	40,400
Mean	68,635	58,478	37,087	27,103	30,029	42,412	242,742	82,020	145,422	75,353	188,712	138,257

NOTE.—Daily discharges determined from a poorly defined curve. Applicable to December 31, 1920.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	48,720	40,600	36,600	11,000	8,800	7,100	10,200	67,600	132,500	56,600	136,600	87,800
2	43,400	56,900	29,800	10,200	8,100	5,900	9,500	57,800	124,300	50,900	91,000	72,900
3	41,400	34,800	25,200	9,500	7,400	7,100	15,600	56,600	120,300	46,600	215,500	74,300
4	39,480	49,800	26,600	8,800	7,400	14,600	572,000	50,900	112,600	41,600	158,700	188,000
5	43,400	50,900	18,250	11,400	11,000	8,800	583,000	62,600	105,000	48,700	78,600	149,700
6	39,480	44,600	39,600	15,100	8,800	7,400	424,500	84,600	96,100	48,700	78,600	108,800
7	38,560	45,600	128,400	23,800	11,000	23,800	356,500	424,500	86,200	42,600	62,600	70,200
8	35,800	39,600	136,600	18,800	10,200	29,800	257,500	283,500	74,300	37,600	70,200	49,800
9	34,880	34,800	254,250	14,100	8,450	33,100	163,400	175,500	60,200	36,600	583,000	34,800
10	48,720	28,200	120,300	12,700	9,500	29,800	91,000	128,400	63,800	37,600	364,500	28,200
11	62,600	25,200	72,900	16,600	8,450	25,700	61,400	193,500	60,200	31,400	1,963,000	21,200
12	50,900	21,850	55,400	12,700	7,100	21,200	46,600	280,000	74,300	91,000	819,000	20,000
13	47,650	36,600	149,700	12,700	6,200	23,800	40,600	283,500	84,600	43,600	201,750	15,600
14	44,600	50,900	126,350	11,800	6,200	25,700	36,600	283,500	75,700	38,600	140,900	21,200
15	42,600	46,600	108,800	11,000	6,800	28,200	31,400	777,500	87,800	33,950	154,200	65,000
16	63,800	34,800	91,000	10,200	6,200	25,200	28,200	2,203,000	75,700	29,800	215,500	168,100
17	105,000	26,600	78,600	10,200	6,200	19,400	33,950	1,446,000	97,800	26,600	154,200	183,000
18	72,900	28,200	60,200	9,500	6,200	13,150	41,600	936,000	70,200	25,200	80,100	158,700
19	83,100	42,600	46,600	8,800	6,200	11,000	65,000	398,000	87,800	23,800	94,400	120,300
20	77,150	44,600	34,800	18,800	8,100	10,200	45,600	221,000	86,200	23,150	68,900	163,400
21	65,000	34,800	29,800	15,100	10,200	10,200	39,600	165,750	70,200	21,200	56,600	126,350
22	60,200	40,600	26,600	13,600	21,200	9,500	33,100	132,500	110,700	20,000	89,400	94,400
23	55,400	40,600	22,500	12,700	11,800	8,800	33,950	180,500	84,600	18,800	389,500	70,200
24	67,600	42,600	20,600	21,200	9,500	11,000	60,200	158,700	72,900	17,700	847,500	52,000
25	46,600	38,600	18,800	13,150	10,600	14,500	300,500	149,700	120,300	15,600	337,250	75,700
26	36,600	44,600	17,700	14,600	8,100	16,600	193,500	145,200	91,000	18,800	1,824,000	128,400
27	28,200	42,600	15,600	13,600	7,400	11,000	149,700	130,450	106,900	18,800	1,162,000	149,700
28	25,900	38,600	14,600	11,400	6,500	11,000	124,300	136,600	105,000	16,600	389,500	84,600
29	23,150		13,600	10,200	8,100	10,200	138,750	175,500	84,600	17,700	201,750	60,200
30	21,200		12,700	9,500	8,800	10,200	112,600	136,600	62,600	18,800	105,000	46,600
31	28,200		11,800		8,100		86,200	149,700		62,600		41,600
Maximum	105,000	50,900	254,250	23,800	21,200	33,100	583,000	2,203,000	132,500	91,000	1,963,000	188,000
Minimum	21,200	21,850	11,800	8,800	6,200	5,900	9,500	50,900	60,200	15,600	56,600	15,600
Mean	49,100	39,312	59,492	13,092	8,642	16,465	135,050	323,006	89,480	34,232	371,125	88,089

NOTE.—Discharge determined from well-defined rating curve, between 23,000 and 700,000 second-liters. Above and below these values are estimated from extension of rating curve. Rating curve made applicable from January 11, 1921, to March 13, 1922.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	37,600	66,300	22,500	15,950	9,100	13,300	38,000	140,350	19,550	145,350	61,500	183,300
2	33,950	55,400	19,400	16,650	10,550	15,950	55,450	173,950	16,650	123,000	71,000	123,000
3	48,700	46,600	16,600	14,600	10,550	17,350	94,150	126,350	33,100	161,100	59,200	283,900
4	41,600	37,600	14,600	13,300	10,550	17,350	78,750	95,550	48,650	123,000	294,400	395,200
5	37,600	61,400	13,600	11,600	10,050	13,300	119,350	88,550	38,000	105,050	269,200	710,200
6	34,800	78,600	12,700	11,050	10,550	11,050	154,350	73,200	43,200	130,300	169,500	416,200
7	30,600	60,200	12,250	10,550	10,050	15,950	129,150	81,550	38,000	89,350	137,800	239,800
8	33,950	43,600	12,700	10,050	10,550	11,050	221,550	103,950	40,050	115,900	118,700	185,050
9	31,400	36,600	14,600	10,050	48,650	38,000	136,150	134,750	66,600	89,350	140,800	150,000
10	29,800	29,800	14,600	13,950	14,600	29,450	89,950	98,350	54,300	86,850	103,700	125,900
11	28,200	26,600	23,800	17,350	33,100	66,600	96,950	71,850	45,350	93,200	157,900	107,750
12	38,700	23,150	26,600	44,250	15,950	43,200	73,200	54,300	48,650	83,100	110,450	80,600
13	52,000	20,000	25,900	33,100	13,300	33,100	54,300	47,550	38,000	75,800	106,400	120,100
14	87,800	17,700	21,100	26,000	13,300	35,000	87,150	54,300	80,150	85,600	74,600	105,050
15	57,800	21,850	16,650	31,250	13,300	29,490	66,600	33,100	56,650	72,200	68,600	89,350
16	42,600	18,800	18,050	20,300	13,950	25,150	56,650	44,250	73,200	59,200	79,400	84,350
17	42,600	15,600	15,250	14,600	15,250	45,350	64,050	56,650	57,850	65,000	67,400	95,800
18	34,800	23,800	13,950	12,700	12,700	31,250	81,550	222,950	372,750	52,400	83,100	118,700
19	28,900	18,250	12,700	12,150	11,050	36,000	98,350	150,150	176,300	84,350	72,200	94,500
20	26,600	17,700	11,600	11,050	8,200	29,450	105,350	124,950	127,350	73,400	81,850	83,100
21	38,700	16,600	10,550	18,050	7,800	46,450	137,550	94,150	110,450	74,600	88,100	458,200
22	42,600	15,600	11,050	15,250	21,900	38,000	98,350	74,550	128,800	68,600	97,100	279,700
23	34,800	14,600	10,550	16,650	112,350	31,250	81,550	60,300	151,550	73,400	120,100	128,800
24	36,600	13,600	9,550	11,050	82,950	39,000	126,350	48,650	178,050	65,000	109,100	106,400
25	33,100	12,700	11,050	10,550	38,000	33,100	78,750	38,000	143,800	56,900	123,000	91,900
26	31,400	11,800	44,250	10,050	26,000	24,300	66,600	32,150	113,150	61,500	118,700	374,200
27	32,250	12,700	74,550	9,100	20,300	20,300	88,550	24,300	130,300	55,750	93,200	332,200
28	120,300	15,600	37,000	10,550	18,800	54,300	98,350	19,550	195,950	60,350	71,000	169,500
29	185,500		27,700	10,550	20,300	38,000	74,550	14,600	169,500	78,200	66,200	140,800
30	124,300		24,300	12,700	16,650	26,850	89,950	10,550	153,100	68,600	205,300	123,000
31	87,800		19,550		13,950		81,650	24,300		53,500		90,900
Maximum	185,500	78,600	74,550	44,250	112,350	66,600	221,550	222,950	372,750	161,100	294,400	710,200
Minimum	26,600	11,800	9,550	9,100	7,800	11,050	38,000	10,550	16,650	52,400	59,200	80,600
Mean	50,560	29,741	19,976	15,833	21,752	30,296	94,294	77,990	98,300	84,836	113,983	196,402

NOTE.—Discharge determined from rating curves applicable as follows: March 14, to September 18, 1922, well-defined below 87,000 second-liters; September 19 to December 31, 1922, fairly well-defined below 160,000 second-liters.

BULACAN PROVINCE

ANGAT RIVER, QUINGUA

LOCATION.—About 200 m. northwest from a bridge of the Manila Railroad Company, north of Quingua railroad station.

RECORDS AVAILABLE.—From July 24, 1909, to March 16, 1912.

GAGE.—No longer in existence. Formerly a horizontal gage board with chain and weight for measuring height.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel is straight for about 500 m. above and 200 m. below the gaging section. Banks are high and wooded but still subject to overflow; at measuring section stream bed is composed of clay, sand, and gravel. Flow rather sluggish.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 1,480,000 second-liters on July 24, 1911; minimum discharge, 7,500 second-liters on March 13, 14, 16, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge copied directly from records given, which according to remarks, were taken from a rating curve. Gage read twice daily.

Discharge measurements of Angat River, near Quingua, Bulacan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1909				
August 7	F. T. Ryan	1.91	149,556	
August 16	do	1.14	45,340	
August 21	do	1.32	62,320	
August 28	do	1.20	41,170	
September 1	do	1.16	47,160	
September 6	do	1.20	44,730	
September 11	do	1.44	80,430	
September 18	do	2.15	193,200	
September 23	do	1.87	132,030	
October 3	do	1.53	93,935	
October 8	do	1.29	98,818	
October 16	do	1.25	57,251	
October 23	do	1.25	84,282	
October 25	do	4.65	653,878	
November 5	do	1.92	110,450	
November 11	do	2.35	169,880	
November 20	do	1.86	106,380	
November 27	do	1.92	106,950	
December 6	do	1.74	92,003	
December 11	do	1.75	98,784	
December 18	do	2.38	202,229	
December 24	do	1.57	68,284	
1910				
January 3	do	1.54	64,830	
February 26	do	1.25	26,269	
March 3	do	1.06	14,570	
March 9	do	1.06	16,370	
March 16	do	1.20	28,425	
March 29	do	1.19	24,306	
April 4	do	1.22	32,298	
April 13	do	1.09	14,118	
April 20	do	1.10	14,118	
April 25	do	3.18	37,024	
May 6	do	1.24	18,643	
May 11	do	1.28	17,564	
May 19	do	1.20	16,420	
May 23	do	1.54	43,004	
June 21	do	1.28	58,986	
June 28	do	1.46	86,144	

Discharge measurements of Angat River, near Quingua, Bulacan—Cont.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Ramarks
1910				
July 12	F. T. Ryan	1.10	40,025	
July 19	do	1.20	53,298	
July 27	do	.92	31,604	
August 24	do	1 52	76,196	
August 25	do	3.45	409,000	
August 31	do	1.20	42,649	
September 3	do	1.75	95,455	
September 12	do	1.58	76,770	
June 28	do	2.18	138,920	
October 11	W. B. Frisbie	1.86	85,670	
October 14	do	1.88	109,685	
October 15	do	1 90	121,460	
October 19	do	2 12	139,000	
October 26	do	1.52	67,081	
November 8	do	1.89	117,144	
November 16	do	2 57	1,215,084	
November 24	do	4.50	735,000	
December 13	do	1.72	69,026	
December 23	do	1.55	49,387	
December 27	do	1.69	71,685	
1911				
January 13	do	1 41	44,517	
January 17	do	1.34	45,604	
January 24	do	1 14	35,303	
February 2	do	1.04	26,025	
February 8	do	1 60	75,603	
February 11	do	1 29	48,042	
March 4	do	1.10	29,321	
March 9	do	.94	18,488	
March 18	do	.89	17,012	
March 27	do	1 75	86,823	
April 19	do	.78	22,045	
April 25	do	1 33	47,932	
May 8	do	1 40	51,020	
May 24	do	1.09	24,450	
June 26	do	.97	16,841	
July 3	do	2 54	190,951	
July 19	do	4.19	637,578	
July 25	do	6 14	920,482	
August 2	do	3.80	445,524	
August 11	do	2.00	111,227	
August 21	do	2 15	118,423	
September 2	do	2 03	102,402	
September 25	do	1 45	65,012	
October 5	do	2 08	178,884	
October 16	do	1 54	50,621	
September 23	do	1.55	53,760	
November 2	do	1.23	42,075	
November 10	do	1 06	19,965	
November 22	do	1 40	42,534	
December 5	do	.96	16,258	
December 11	do	99	16,920	
December 19	do	1.22	29,402	
1912				
January 3	do	1.03	18,884	
January 8	do	1.31	41,974	
January 22	do	1.05	19,933	
January 31	do	1 00	18,555	
February 6	do	1.72	82,900	
February 19	do	.91	13,819	
February 23	do	1.31	35,449	
March 2	do	.89	11,837	
March 8	do	.85	10,734	

Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1909

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									50,000	96,000	168,000	180,000
2									52,000	89,000	180,000	132,000
3									48,000	90,000	172,000	116,000
4									46,000	90,000	116,000	114,000
5									50,000	96,000	118,000	98,000
6									47,000	103,000	118,000	86,000
7									53,000	110,000	888,000	83,000
8									42,000	104,000	1,040,000	76,000
9									60,000	90,000	800,000	75,000
10									82,000	89,000	218,000	76,000
11									82,000	93,000	185,000	120,000
12									82,000	79,000	164,000	114,000
13									84,000	80,000	143,000	118,000
14									107,000	73,000	138,000	123,000
15									98,000	64,000	158,000	424,000
16									96,000	64,000	910,000	226,000
17								44,000	90,000	60,000	644,000	122,000
18								86,000	148,000	53,000	466,000	210,000
19								59,000	240,000	120,000	130,000	30,000
20								50,000	285,000	73,000	115,000	174,000
21								63,000	266,000	62,000	104,000	114,000
22								114,000	230,000	57,000	90,000	85,000
23								65,000	148,000	53,000	89,000	72,000
24							80,000	50,000	128,000	1,100,000	80,000	68,000
25								46,000	128,000	985,000	70,000	107,000
26								41,000	116,000	280,000	77,000	56,000
27							79,000	41,000	102,000	200,000	112,000	65,000
28								41,000	92,000	317,000	228,000	65,000
29								42,000	94,000	162,000	372,000	70,000
30								44,000	102,000	340,000	450,000	106,000
31								53,000		194,000		91,000
Maximum							80,000	114,000	285,000	1,100,000	1,040,000	424,000
Minimum							79,000	41,000	42,000	53,000	70,000	56,000
Mean								55,930	108,000	176,160	284,770	124,740

NOTE.—Data for July 25 and 26 not given. Gage washed away by flood July 28 and had not been restored until August 17.

Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	95,000	38,000	24,000	50,000	37,000	147,000	90,000	54,000	75,000	154,000	72,000	124,000
2	75,000	54,000	21,000	38,000	35,000	158,000	80,000	41,000	63,000	120,000	608,000	104,000
3	67,000	58,000	14,000	32,000	26,000	124,000	162,000	72,000	90,000	122,000	500,000	276,000
4	162,000	60,000	16,000	33,000	19,000	96,000	186,000	54,000	90,000	99,000	320,000	522,000
5	270,000	79,000	13,000	32,000	18,000	370,000	120,000	65,000	220,000	88,000	365,000	406,000
6	134,000	107,000	18,000	32,000	33,000	160,000	80,000	58,000	252,000	80,000	300,000	250,000
7	88,000	105,000	19,000	27,000	31,000	136,000	73,000	49,000	210,000	82,000	134,000	194,000
8	72,000	100,000	17,000	28,000	30,000	174,000	62,000	66,000	134,000	73,000	164,000	144,000
9	63,000	64,000	16,000	30,000	21,000	184,000	54,000	47,000	184,000	71,000	144,000	120,000
10	65,000	52,000	18,000	25,000	20,000	144,000	68,000	49,000	124,000	72,000	124,000	94,000
11	72,000	46,000	18,000	22,000	17,000	112,000	50,000	47,000	89,000	440,000	96,000	84,000
12	62,000	64,000	15,000	20,000	14,000	92,000	42,000	49,000	78,000	200,000	85,000	76,000
13	58,000	76,000	12,000	16,000	30,000	72,000	56,000	49,000	68,000	120,000	85,000	69,000
14	53,000	66,000	24,000	12,500	24,000	68,000	50,000	44,000	64,000	116,000	418,000	112,000
15	48,000	56,000	26,000	11,000	18,000	70,000	50,000	39,000	82,000	109,000	420,000	95,000
16	47,000	62,000	23,000	13,000	29,000	64,000	56,000	42,000	77,000	108,000	164,000	89,000
17	51,000	52,000	22,000	11,500	24,000	64,000	60,000	43,000	180,000	276,000	132,000	100,000
18	56,000	43,000	19,000	12,000	19,000	64,000	76,000	72,000	160,000	216,000	600,000	102,000
19	50,000	47,000	18,000	12,000	16,000	64,000	54,000	46,000	242,000	144,000	414,000	78,000
20	58,000	52,000	15,000	13,000	16,000	64,000	47,000	43,000	158,000	111,000	333,000	74,000
21	54,000	56,000	16,000	16,000	18,000	56,000	45,000	43,000	140,000	90,000	540,000	60,000
22	56,000	50,000	17,000	13,000	39,000	45,000	38,000	49,000	440,000	83,000	320,000	55,000
23	53,000	43,000	17,000	13,000	40,000	38,000	40,000	45,000	218,000	82,000	708,000	50,000
24	54,000	35,000	20,000	80,000	48,000	44,000	41,000	65,000	178,000	78,000	560,000	65,000
25	47,000	30,000	30,000	350,000	64,000	44,000	36,000	262,000	155,000	70,000	300,000	54,000
26	39,000	26,000	40,000	140,000	83,000	50,000	32,000	100,000	140,000	67,000	212,000	54,000
27	40,000	24,000	31,000	80,000	94,000	55,000	29,000	70,000	150,000	64,000	170,000	67,000
28	45,000	26,000	27,000	58,000	120,000	68,000	27,000	54,000	178,000	64,000	152,000	120,000
29	44,000		25,000	44,000	314,000	78,000	32,000	47,000	176,000	66,000	135,000	260,000
30	40,000		30,000	37,000	124,000	72,000	31,000	43,000	192,000	60,000	138,000	153,000
31	36,000		72,000		280,000		32,000	42,000		52,000		114,000
Maximum	270,000	107,000	72,000	350,000	314,000	370,000	186,000	262,000	440,000	440,000	708,000	522,000
Minimum	36,000	24,000	12,000	11,000	14,000	38,000	27,000	39,000	63,000	52,000	72,000	50,000
Mean	69,450	56,110	22,350	43,370	54,871	99,230	61,260	59,650	153,570	115,387	290,370	134,030

Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	86,000	28,000	18,000	40,000	30,000	25,000	50,000	262,000	120,000	346,000	39,000	18,000
2	71,000	26,000	17,000	36,000	28,000	67,000	[a]502,000	470,000	104,000	130,000	42,000	18,000
3	63,000	24,000	22,000	30,000	31,000	34,000	190,000	500,000	92,000	110,000	40,000	17,000
4	58,000	24,000	32,000	28,000	24,000	26,000	103,000	400,000	78,000	100,000	41,000	17,000
5	55,000	24,000	44,000	72,000	64,000	21,000	126,000	260,000	71,000	102,000	39,000	17,000
6	54,000	46,000	30,000	42,000	70,000	27,000	72,000	185,000	72,000	96,000	33,000	17,500
7	70,000	118,000	23,000	34,000	50,000	25,000	58,000	158,000	70,000	96,000	30,000	18,000
8	68,000	78,000	20,000	29,000	57,000	28,000	54,000	136,000	63,000	45,000	26,000	17,000
9	60,000	73,000	18,000	27,000	36,000	25,000	46,000	124,000	56,000	39,000	22,000	17,500
10	37,000	55,000	17,000	28,000	35,500	25,000	64,000	114,000	58,000	37,000	20,000	17,000
11	47,000	46,000	15,000	27,500	46,000	47,000	66,000	113,000	53,000	34,000	19,000	16,000
12	42,000	170,000	15,000	25,000	40,000	48,000	62,000	134,000	51,000	53,000	17,000	13,000
13	50,000	148,000	40,000	23,000	29,000	40,000	88,000	190,000	47,000	58,000	17,000	19,000
14	46,000	90,000	27,000	21,000	23,000	29,000	360,000	175,000	44,000	70,000	19,000	16,000
15	48,000	70,000	20,000	21,500	21,000	30,000	648,000	320,000	43,000	63,000	20,000	16,000
16	44,000	54,000	18,000	25,000	20,500	28,000	1,180,000	202,000	39,000	54,000	37,000	25,000
17	35,000	46,000	17,500	22,000	20,500	25,000	1,080,000	138,000	41,000	61,000	68,000	52,000
18	43,000	40,000	17,000	21,000	22,000	24,000	1,240,000	178,000	40,000	51,000	61,000	34,000
19	40,000	36,000	16,000	23,000	21,000	28,000	600,000	135,000	43,000	175,000	60,000	30,000
20	34,000	33,000	73,000	17,000	18,000	41,000	380,000	118,000	42,000	112,000	45,000	30,000
21	31,000	30,000	92,000	21,000	33,000	28,000	386,000	120,000	82,000	77,000	39,000	28,000
22	30,000	28,000	45,000	25,000	27,000	22,000	424,000	103,000	120,000	63,000	44,000	31,000
23	30,000	26,000	34,000	34,000	29,000	19,000	580,000	88,000	102,000	54,000	33,000	28,000
24	36,000	23,000	28,000	236,000	22,000	18,000	1,480,000	84,000	94,000	51,000	30,000	29,000
25	36,000	22,000	26,000	76,000	15,000	20,000	1,130,000	90,000	50,000	50,000	26,000	28,000
26	65,000	21,000	100,000	50,000	25,000	18,500	824,000	85,000	33,000	50,000	24,000	23,000
27	63,000	20,000	96,000	42,000	34,000	17,000	600,000	82,000	48,000	50,000	24,000	22,000
28	46,000	19,000	125,000	46,000	35,000	34,000	416,000	81,000	68,000	46,000	20,000	26,000
29	39,000	.....	101,000	42,000	30,000	43,000	430,000	89,000	120,000	44,000	20,000	24,000
30	33,000	.....	69,000	36,000	23,000	50,000	370,000	108,000	588,000	42,000	19,000	20,000
31	32,000	.....	49,000	.....	36,000	.....	310,000	160,000	.....	40,000	.....	20,000
Maximum	86,000	170,000	125,000	236,000	70,000	67,000	1,480,000	500,000	588,000	346,000	68,000	52,000
Minimum	30,000	19,000	15,000	17,000	15,000	17,000	46,000	81,000	33,000	34,000	17,000	13,000
Mean	48,130	50,640	40,790	40,000	32,110	30,420	406,030	172,320	84,400	77,390	32,470	22,650

[a] Unreliable.

Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	20,000	26,000	13,000									
2	19,000	27,000	10,000									
3	18,000	19,000	10,000									
4	17,000	20,000	11,000									
5	142,000	18,000	13,000									
6	83,000	80,000	12,000									
7	52,000	75,000	9,600									
8	47,000	64,000	9,400									
9	42,000	46,000	9,500									
10	37,000	37,000	9,000									
11	30,000	30,000	8,000									
12	30,000	25,000	8,000									
13	90,000	23,000	7,500									
14	83,000	21,000	7,500									
15	56,000	19,000	8,000									
16	42,000	15,000	7,500									
17	34,000	14,000										
18	29,000	16,000										
19	26,000	14,000										
20	22,000	16,000										
21	20,000	14,000										
22	19,000	36,000										
23	17,000	34,000										
24	16,500	22,000										
25	16,000	18,000										
26	15,500	17,000										
27	16,000	15,000										
28	15,500	14,000										
29	14,000	13,000										
30	13,000											
31	15,500											
Maximum	142,000	80,000	13,000									
Minimum	13,000	13,000	7,500									
Mean	35,374	27,170	9,560									

NOTE.—Station maintenance abandoned after March 17.

BULACAN PROVINCE

BULO RIVER, SAN MIGUEL

LOCATION.—About 600 m. above the Public Schools or about 800 m. from the old dam site at the sitio Bardias, barrio of Kinamatayan Kabayo.

RECORDS AVAILABLE.—September 21, 1918, to April 30, 1922.

GAGE.—Horizontal gage board wired and nailed to a camachile tree and graduated with nails from .01 m. to 4 m. Chain and weight is used for reading heights.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—Channel is straight for about 20 m. above and 30 m. below. Right bank low, subject to overflow; left high, covered with bamboos. Stream bed at measuring section sandy and gravelly. Affords good measurement at low water stage.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 128,865 second-liters on August 16, 1921. River was dry on some of the days in 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined rating curves. Dry season flow cannot be accurately determined due to intermittent record obtained during that season. Gage read twice daily.

Discharge measurements of Bulo River, near Bardias, San Miguel, Bulacan

Date	Made by--	Gage height (meters)	Discharge (second-liters)	Remarks
1918				
September 21	F. Aquino and A. Baldonado.	1 43	11,900	
December 10	F. Aquino	61	240	
December 23	do	56	123	
1919				
January 21	do	54	49	
June 24	do	1 23	3,552	
September 19	J. S. Roxas	87	1,453	
October 29	do	91	1,304	
November 19	J. Roxas and B. B. Buchanan	1 27	4,501	
1920				
January 9	J. S. Roxas	.79	496	
February 10	do	74	66	
February 25	do	.71	28	
April 13	do	.70	22	
May 14	do	69	55	
June 11	do	87	355	
June 11	do	.87	278	
August 2	do	73	127	
September 10	do	2 04	11,840	
September 10	do	2 03	9,634	
September 11	do	1 48	4,053	
October 13	do	87	358	
1921				
January 13	do	1 03	218	
February 20	do	1 00	20	
March 11	do	1 05	111	
September 13	do	2.05	5,846	
September 13	do	2 07	6,436	
September 13	do	2 15	7,128	
September 13	do	2 10	6,798	
September 14	do	1 99	5,412	
November 21	do	1.58	1,409	
1922				
January 21	do	1.33	56	
February 2	do	1 31	34	
April 10	do			Dry.

Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1										2,180	850	250
2										1,155	735	227
3										1,060	735	204
4										1,585	698	204
5										1,255	628	204
6										1,155	595	204
7										970	595	183
8										1,902	498	204
9										4,110	498	227
10										890	530	204
11										890	595	183
12										890	465	204
13										1,155	405	204
14										970	970	204
15										1,710	1,648	204
16										10,850	930	204
17										5,682	970	183
18										1,585	890	183
19										13,325	498	183
20										3,490	465	183
21									5,375	2,922	405	183
22									5,580	2,320	405	183
23									3,325	3,490	405	162
24									2,922	2,110	352	123
25									1,648	2,845	352	123
26									2,845	1,585	300	106
27									1,465	1,648	250	106
28									890	1,355	250	227
29									970	1,015	227	106
30									1,970	890	275	106
31										890		106
Maximum									5,580	13,325	1,648	250
Minimum									890	890	227	106
Mean									2,699	2,512	581	180

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from September 21, 1918 to November 29, 1919. Record fair between 40 to 4,200 second-liters.

Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	162	90	51	51	37	75	275	11,510	3,665	595	5,995	.....
2	162	90	51	51	37	75	930	4,015	3,325	562	24,050	2,625
3	162	90	51	51	32	75	970	3,928	3,840	530	4,490	3,395
4	162	75	51	51	37	60	970	3,752	3,752	4,395	2,690	1,390
5	142	75	51	51	37	60	1,465	32,300	3,325	850	3,752	7,215
6	162	60	51	735	37	60	1,015	27,350	3,490	810	3,665	12,590
7	123	75	51	90	37	60	970	27,185	3,325	850	1,465	8,310
8	142	90	51	60	37	60	1,060	41,560	6,215	1,205	1,465	4,570
9	162	60	51	51	37	60	1,060	44,180	6,215	5,682	1,305	2,925
10	183	60	51	51	37	60	1,060	44,345	6,215	4,395	1,155	2,475
11	162	60	51	51	37	183	890	11,510	6,215	6,215	4,015	1,390
12	162	60	51	37	37	183	890	90,380	10,210	2,690	1,465	1,275
13	142	60	51	37	22	142	890	54,740	8,000	3,000	1,255	6,502
14	142	75	51	37	22	142	890	44,510	8,690	3,752	1,060	3,808
15	123	60	51	37	22	183	275	44,180	1,410	3,752	595	1,920
16	123	60	51	37	22	42	275	44,345	1,255	3,160	562	525
17	123	75	51	37	22	42	10,850	42,850	1,108	4,205	498	600
18	123	90	51	37	22	162	10,850	42,850	1,060	2,690	530	525
19	106	90	51	37	22	142	930	[a] 5,275	1,155	18,770	4,395	455
20	106	60	51	37	22	142	810	[a] 5,275	970	21,080	5,175	395
21	90	75	51	37	22	123	352		970	7,010	1,465	370
22	90	75	51	37	22	850	90	44,510	810	11,015	3,160	370
23	90	75	51	37	106	890	75	42,850	810	4,205	1,155	345
24	90	75	51	37	106	2,690	970	41,560	810	1,465	890	345
25	90	51	51	37	106	3,840	4,205	106,385	595	1,155	970	345
26	90	51	51	37	106	326	970	94,885	628	1,255	890	295
27	75	51	51	37	106	300	352	75,390	660	1,355	5,175	275
28	75	51	51	37	123	300	4,585	17,120	660	1,648	35,600	275
29	75	..	51	37	75	275	83,780	3,840	660	2,540	17,780	255
30	162	..	51	37	123	530	22,070	3,665	628	1,255	..	235
31	106	..	51	..	90	..	14,150	3,752	..	1,205	..	215
Maximum	183	90	51	735	123	3,840	83,780	106,385	10,210	21,080	35,600	12,590
Minimum	75	51	51	37	22	42	75	3,665	595	530	498	215
Mean	126	70	51	67	52	404	5,799	35,333	3,022	3,977	4,713	2,207

NOTE.—No record on August 21, 1919.
[a] Unreliable

Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	200	90	72	50	35	170	1,055	4,400	42,970	3,560	1,110	205
2	200	90	64	50	35	170	815	3,560	10,300	7,540	1,110	280
3	200	90	64	50	35	155	525	3,230	4,658	3,808	1,055	280
4	200	90	64	50	35	345	1,332	2,700	3,312	2,925	9,760	280
5	185	90	64	50	35	275	815	2,195	3,975	2,625	3,395	280
6	170	90	57	50	35	320	860	1,785	4,230	4,060	6,025	240
7	170	90	57	50	35	320	955	1,390	3,560	3,395	2,775	405
8	170	90	57	50	35	295	955	1,332	3,075	2,925	2,335	340
9	170	90	57	50	35	320	955	1,390	2,925	2,475	1,920	405
10	170	90	57	50	35	295	955	1,390	2,775	3,230	1,785	360
11	155	90	57	125	525	255	6,502	1,452	6,215	2,775	3,560	320
12	155	90	57	100	490	320	1,582	4,746	3,808	2,335	2,850	240
13	155	90	57	72	425	215	2,335	1,785	2,550	1,920	2,195	205
14	155	90	72	64	395	185	4,658	18,940	2,195	3,230	2,055	280
15	155	90	72	50	395	185	3,075	6,025	1,920	3,395	1,785	360
16	155	90	50	50	600	295	1,988	4,400	1,785	2,700	8,778	320
17	155	112	50	50	525	185	1,390	4,920	2,625	2,405	1,370	280
18	140	100	50	50	370	155	15,025	8,090	1,920	2,055	915	578
19	140	170	50	50	395	100	39,595	3,808	3,000	5,095	605	280
20	140	155	50	50	395	90	35,545	2,775	5,552	2,775	475	240
21	125	140	50	50	395	80	39,595	2,195	13,270	4,060	405	205
22	112	125	50	50	455	2,775	46,345	4,658	4,485	3,230	320	175
23	112	100	50	50	295	2,335	22,720	4,658	3,230	2,625	280	175
24	112	80	50	50	215	860	6,502	3,560	11,380	2,195	260	162
25	112	80	50	50	215	370	3,808	24,475	6,800	1,718	240	150
26	100	90	50	50	215	295	3,230	22,720	44,995	1,515	240	175
27	100	80	50	50	155	955	3,808	15,970	8,310	1,515	222	162
28	100	80	50	50	125	1,005	3,560	5,460	5,835	1,390	205	150
29	100	72	50	50	125	600	18,670	5,645	4,920	1,275	205	150
30	100		50	50	125	2,625	6,502	4,060	4,060	1,165	205	138
31	90		50		170		6,502	6,405		1,165		138
Maximum	200	170	72	125	600	2,775	46,345	24,475	44,995	7,540	9,760	578
Minimum	90	72	50	50	35	80	525	1,332	1,785	1,165	205	138
Mean	145	82	54	55	237	552	9,102	5,810	7,354	2,809	1,945	257

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from December 2, 1919, to November 15, 1920. Record fair between 20 to 10,000 second-liters.

Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	125	65	50	45	30	65	2,085	1,850	25,840	1,545	1,545	2,706
2	125	65	50	45	25	65	1,205	2,635	19,015	1,907	985	2,366
3	125	65	50	45	25	60	1,327	2,485	4,325	1,545	1,205	2,026
4	112	112	72	45	280	55	43,390	2,635	5,465	1,455	1,205	1,856
5	112	112	100	45	320	10,565	30,715	2,145	4,530	1,455	1,205	1,601
6	112	100	100	45	80	780	2,085	3,140	11,540	1,545	1,130	1,345
7	100	100	90	45	80	4,120	1,205	3,612	1,285	2,340	1,092	1,176
8	100	100	80	45	80	2,790	845	3,320	1,055	2,085	1,130	1,176
9	100	90	112	45	72	320	450	4,755	9,755	1,205	3,710	1,006
10	90	80	112	45	65	280	550	2,875	1,285	1,130	1,455	836
11	90	80	100	45	65	240	475	2,960	3,710	1,092	26,165	1,006
12	90	80	100	45	65	320	472	3,915	15,440	1,545	7,980	921
13	90	80	80	45	60	300	360	10,565	6,662	1,545	3,710	836
14	90	80	80	45	55	320	340	7,685	3,915	1,055	6,250	836
15	80	72	65	45	50	720	280	89,565	3,710	780	4,325	921
16	80	72	55	45	50	577	360	128,865	7,685	632	3,320	2,961
17	80	72	55	45	45	360	382	36,240	7,000	660	3,915	2,366
18	80	65	45	45	55	280	4,325	23,890	4,755	1,055	3,710	1,856
19	80	65	45	45	50	175	7,242	6,805	10,890	1,130	3,710	1,771
20	80	60	45	40	45	175	845	6,112	13,490	1,370	1,965	1,345
21	80	60	45	40	45	175	780	4,325	8,290	1,455	1,695	836
22	80	55	60	35	35	205	985	12,515	4,222	1,092	1,370	836
23	80	55	65	35	30	1,055	845	21,615	2,960	1,092	2,085	751
24	80	55	55	35	45	845	845	5,847	4,755	1,092	6,805	666
25	80	65	45	35	50	450	12,190	4,017	4,325	1,092	2,960	496
26	80	60	40	35	50	405	7,390	2,712	3,140	985	3,515	496
27	80	55	40	35	55	280	340	2,790	2,790	985	9,336	496
28	72	50	40	30	205	500	2,340	28,765	3,320	985	5,256	496
29	72	.....	40	30	240	605	5,465	30,390	2,485	985	3,556	411
30	72	.....	40	30	100	845	2,790	5,465	1,965	985	3,386	340
31	65	.....	45	.....	125	.....	2,085	5,465	.....	1,205	.....	340
Maximum	125	112	112	45	320	10,565	43,390	128,865	25,840	2,340	26,165	2,961
Minimum	65	50	40	30	25	55	280	1,850	1,055	632	985	340
Mean	90	74	65	41	83	931	4,385	15,160	6,653	1,259	3,860	1,196

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from November 16, 1920, to November 26, 1921. Record fair between 60 and 8,000 second-liters.

Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	275	20	(d)	2								
2	275	10	(d)	2								
3	275	10	(d)	2								
4	275	10	(d)	(d)								
5	219	10	(d)	(d)								
6	219	20	(d)	(d)								
7	172	20	34	(d)								
8	134	10	34	(d)								
9	134	10	78	2								
10	134	10	78	2								
11	134	10	34	2								
12	103	2	2	2								
13	134	10	(d)	2								
14	103	2	2	2								
15	103	2	2	2								
16	134	(d)	2	2								
17	134	(d)	2	2								
18	78	(d)	2	2								
19	56	20	2	2								
20	56	56	2	2								
21	34	56	2	2								
22	34	103	20	2								
23	34	103	10	2								
24	34	78	2	2								
25	34	56	2	2								
26	34	56	2	10								
27	34	(d)	10	56								
28	20	(d)	20	34								
29	20		2	34								
30	20		(d)	56								
31	20		2									
Maximum	275	103	78	56								
Minimum	20											
Mean	112	30	15	9								

[d] Channel dry.

BULACAN PROVINCE

MAASIM RIVER, SAN RAFAEL

LOCATION.—At the steel railroad bridge, about 500 m. north of the railroad station at Maasim and about 1.1 km. east of Km. Post No. 63 of the Manila North Road.

RECORDS AVAILABLE.—From January 29, 1919, to December 31, 1922.

GAGE.—Standard metric gage board nailed horizontally to guard rail at middle of bridge. Chain and weight used for determining gage heights and heads.

DISCHARGE MEASUREMENTS.—Made from bridge and by weirs.

CHANNEL AND BANKS.—Channel several at low water; straight for about 100 m. above and 70 m. below the station. Banks are high, not subject to overflow and covered with trees. Stream bed rocky, gravel, and sandy and is shifting.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 110,720 second-liters on August 16, 1921; minimum discharge, 18 second-liters on April 12, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge for 1919 and 1920 determined from a poorly defined curve. The station is a poor one. Gage heights read twice daily. Conditions of weirs fair. Record for 1921 and 1922 fairly good.

Discharge measurements of Maasim River, near Maasim, San Rafael, Bulacan

Year	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
February 11	A. Diaz	1 01	327	
March 3	A. Diaz and J. Roxas	1 00	100	
March 7	J. Roxas	1 00	142	
March 21	do	.98	75	
March 24	do	.98	79	
May 3	do	1 02	60	
June 12	do	1.21	919	
September 20	do	1.54	4,044	
October 31	do	1 87	10,486	
November 18	do	1 46	1,757	
1920				
January 7	do	1 45	1,174	
February 5	do	1.14	540	
February 10	do	1.14	561	
February 24	do	1 14	527	
April 14	do	1.00	113	

Daily and monthly discharges, in liters per second, of Maasim River near Maasim, San Rafael, Bulacan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	120	80	80	80	260	1,190	13,140	3,530	1,220	2,730	8,300
2	.....	120	100	80	80	260	1,340	4,890	3,430	1,190	3,480	3,600
3	.....	120	100	100	120	260	1,830	3,130	2,980	1,190	2,430	3,030
4	.....	120	100	120	130	380	1,160	2,220	2,630	1,690	2,300	2,780
5	.....	120	100	116	145	320	890	4,260	2,300	1,655	1,830	3,330
6	.....	120	100	90	145	380	740	8,630	3,530	1,340	1,725	3,380
7	.....	120	100	90	130	260	740	12,490	3,230	1,280	1,760	5,160
8	.....	120	90	90	120	220	710	10,000	2,980	2,220	1,725	5,960
9	.....	120	90	90	120	320	650	47,440	2,480	3,030	1,620	3,910
10	.....	120	90	90	130	450	890	36,240	3,180	8,740	1,830	3,330
11	.....	120	90	90	130	1,010	680	39,840	3,230	5,360	1,760	2,830
12	.....	110	90	145	130	540	590	35,240	2,630	3,395	1,655	2,530
13	.....	110	90	145	130	470	590	37,440	2,980	2,830	1,480	2,340
14	.....	100	90	145	145	440	560	28,040	2,300	2,380	1,410	2,220
15	.....	100	90	130	145	440	560	15,120	1,900	2,380	1,410	2,060
16	.....	100	90	120	145	980	530	25,840	2,060	2,260	1,340	2,020
17	.....	100	90	120	145	680	2,780	8,300	1,865	2,220	1,340	1,760
18	.....	100	90	120	120	680	2,240	8,080	1,830	1,980	1,340	1,725
19	.....	100	90	120	120	680	800	5,070	1,795	1,900	1,480	1,690
20	.....	100	90	120	130	1,100	860	4,710	1,655	3,675	1,410	1,655
21	.....	100	80	120	160	3,180	860	.....	1,585	2,580	1,550	1,620
22	.....	100	80	100	180	950	800	11,030	1,515	1,900	1,830	1,585
23	.....	100	80	100	180	740	800	4,620	1,410	1,760	1,550	1,550
24	.....	100	80	90	220	710	980	3,395	1,160	1,655	1,445	1,550
25	.....	100	80	90	350	1,340	920	3,995	1,340	1,655	1,410	1,515
26	.....	100	80	80	290	1,070	980	18,300	1,340	1,760	1,310	1,480
27	.....	80	80	80	220	710	2,980	25,840	1,310	1,980	1,690	1,480
28	.....	80	80	100	180	740	8,190	10,250	1,310	2,100	16,340	1,480
29	120	...	80	100	220	620	.....	5,960	1,310	1,760	4,710	1,410
30	120	.....	80	90	380	620	.....	4,080	1,250	1,760	48,240	1,375
31	120	.....	80	.....	410	.....	.....	4,800	.....	2,180	.....	1,375
Maximum	120	120	100	145	410	3,180	8,190	47,440	3,530	8,740	48,240	8,300
Minimum	120	80	80	80	80	220	530	2,220	1,160	1,190	1,310	1,375
Mean	120	107	88	105	172	694	1,694	14,446	2,202	2,356	3,871	2,581

NOTE.—Discharges determined from poorly defined curve. No record for days on which discharge is not given.

Daily and monthly discharges, in liters per second, of Maasim River near Maasim, San Rafael, Bulacan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,340	1,040	380	590	770	1,795	800	1,040	1,040	4,680	2,580	2,730
2	1,340	1,040	380	590	920	1,620	740	980	1,040	4,100	2,580	2,780
3	1,310	1,040	350	590	950	1,795	950	980	1,040	4,035	2,480	2,730
4	1,310	1,010	350	590	920	1,865	1,010	680	1,040	3,905	2,480	2,680
5	1,310	1,010	320	590	980	1,445	680	740	980	3,970	2,830	2,680
6	1,310	980	320	590	980	1,480	860	740	890	5,700	2,780	3,180
7	1,310	980	290	590	1,070	1,480	980	770	950	4,370	.....	4,445
8	1,310	680	260	560	1,040	1,480	860	830	1,250	3,720	2,830	3,600
9	1,280	650	260	560	1,040	1,620	980	860	1,160	3,480	2,580	3,080
10	1,280	650	240	560	1,310	1,865	920	860	3,720	3,380	2,530	2,830
11	1,280	650	220	560	1,010	2,220	860	950	4,765	3,330	2,780	2,780
12	1,280	650	220	560	1,070	1,445	1,040	950	8,270	3,720	2,480	2,630
13	1,280	620	200	830	1,100	1,690	920	950	6,500	3,230	4,300	2,530
14	1,280	620	200	920	1,160	1,900	890	1,040	3,970	3,280	.....	2,480
15	1,280	590	200	650	1,340	1,220	980	950	14,900	3,330	3,600	2,380
16	1,280	590	180	620	1,280	1,310	1,040	950	6,400	3,180	14,250	2,680
17	1,280	590	680	680	1,220	1,310	1,040	1,010	7,540	.....	4,850	2,980
18	1,280	560	680	680	1,310	1,190	1,040	500	5,700	3,970	3,720	2,880
19	1,220	560	680	620	1,310	1,280	980	560	4,520	3,130	3,380	2,780
20	1,160	530	680	590	1,410	1,190	1,040	560	5,530	3,480	3,280	2,580
21	1,160	530	680	620	1,375	1,160	950	620	4,850	3,280	.....	2,530
22	1,160	530	650	740	1,410	1,220	.....	680	3,720	3,080	3,080	2,480
23	1,160	500	620	680	1,375	1,190	1,040	770	4,300	2,980	2,880	2,480
24	1,160	500	620	710	1,310	1,160	1,040	740	5,020	2,930	2,880	2,430
25	1,160	470	620	680	1,220	1,160	980	680	15,030	2,880	2,880	2,430
26	1,160	470	620	860	1,190	1,190	.....	770	.....	2,880	2,830	2,380
27	1,160	440	590	740	1,190	1,190	.....	830	19,320	2,780	2,780	2,380
28	1,160	440	590	740	1,220	1,190	.....	1,040	10,610	2,730	2,780	2,380
29	1,040	410	590	740	1,190	1,190	1,040	1,040	6,300	2,680	2,730	2,300
30	1,040	.....	590	740	1,375	1,010	1,040	1,010	4,935	2,680	2,680	2,300
31	1,040	.....	590	.....	1,280	.....	980	1,040	.....	.....	.....	2,300
Maximum	1,340	1,040	680	860	1,410	2,220	1,040	1,040	19,320	5,700	14,250	4,445
Minimum	1,040	410	180	560	770	1,010	740	500	890	2,680	2,480	2,300
Mean	1,228	644	447	659	1,171	1,428	951	842	5,355	3,361	3,401	2,704

NOTE.—Discharges determined from poorly defined curve. No record for days on which discharge is not given.

Daily and monthly discharges, in liters per second, of Maasim River near Maasim, San Rafael, Bulacan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,200	482	263	200	50	27	394	2,750	5,860	3,131	606	4,440
2	1,200	482	263	143	50	75	394	2,384	5,760	3,131	606	3,750
3	1,200	482	263	143	93	75	3,131	2,039	5,760	2,750	606	3,460
4	1,140	651	331	143	143	140	12,620	2,565	8,190	2,750	846	3,330
5	1,080	651	404	143	93	215	31,240	2,039	4,710	2,565	496	3,131
6	1,080	564	404	143	93	215	4,620	6,360	4,620	2,750	394	2,384
7	1,080	564	482	143	93	215	3,180	17,040	4,800	2,750	394	2,039
8	1,020	564	564	143	93	1,113	3,131	7,640	4,350	3,131	394	1,872
9	1,020	482	564	143	93	1,872	2,565	9,070	3,750	2,209	1,553	1,710
10	1,020	482	564	143	50	2,039	2,565	5,960	3,750	2,039	2,039	1,553
11	960	482	482	143	50	1,113	2,900	5,760	24,640	1,872	1,553	1,401
12	960	482	482	143	50	2,039	2,039	7,310	18,020	2,039	5,760	1,710
13	960	482	404	143	50	3,990	1,710	7,420	11,840	1,553	3,530	1,710
14	960	404	404	143	50	1,113	1,401	13,920	8,300	1,401	2,750	1,710
15	960	404	404	93	50	1,113	1,113	58,800	10,120	1,249	3,750	1,710
16	960	404	404	93	50	977	1,249	110,720	9,760	1,113	5,760	1,710
17	920	331	331	93	93	846	3,600	61,440	10,380	1,113	14,570	1,553
18	920	331	331	93	143	606	2,600	12,100	8,740	977	4,800	1,553
19	920	331	331	93	143	496	22,640	10,120	6,060	846	3,750	1,401
20	263	331	263	93	93	496	12,620	7,310	5,160	846	3,131	1,401
21	404	331	263	93	93	1,113	29,840	6,260	4,620	846	2,750	1,401
22	482	263	263	50	93	1,872	3,080	8,300	5,760	723	2,565	1,249
23	564	263	263	50	50	2,600	2,600	7,310	5,160	723	5,160	1,401
24	564	263	263	50	50	1,249	14,840	6,660	5,460	606	8,740	1,113
25	564	263	263	50	50	1,113	6,980	5,860	5,860	606	4,800	1,113
26	564	263	200	50	143	215	5,760	5,560	5,160	606	12,620	1,113
27	564	263	200	50	143	606	4,170	5,560	4,530	606	10,120	977
28	564	263	200	50	93	606	3,830	5,860	4,350	496	5,560	977
29	564	.....	200	50	143	496	3,330	5,460	3,600	496	4,260	846
30	482	.....	200	50	50	394	2,600	6,360	3,131	496	9,180	846
31	482	.....	200	.....	50	....	3,131	6,060	.....	496	.....	846
Maximum	1,200	651	564	200	143	3,990	31,240	110,720	24,640	3,131	14,570	4,440
Minimum	263	263	200	50	50	27	394	2,039	3,131	496	394	846
Mean	826	413	337	106	84	890	6,318	17,096	7,073	1,564	4,520	1,787

NOTE.—Discharges over 3,131 second-liters computed by $A\sqrt{D}$ method based on weir measurements.

Daily and monthly discharges, in liters per second, of Maasim River near Maasim, San Rafael, Bulacan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	846	394	140	27	50	394	1,710	7,420	1,249	8,740	606	394
2	846	394	140	27	143	2,209	2,039	18,860	1,113	8,410	496	301
3	846	394	140	27	1,035	846	6,360	15,540	4,620	7,420	496	723
4	846	301	140	27	846	846	4,980	6,760	1,401	6,360	846	2,039
5	723	301	140	27	606	846	9,070	6,360	1,113	5,560	4,530	3,131
6	723	301	75	27	846	496	7,420	6,870	3,600	5,160	1,872	3,460
7	723	301	75	27	846	496	12,620	4,440	14,570	4,260	1,249	2,039
8	723	301	75	27	2,209	394	11,840	4,890	4,440	4,260	846	1,249
9	606	301	75	27	1,113	5,760	7,860	4,980	6,560	3,750	846	846
10	606	301	75	27	1,553	8,080	4,620	10,120	5,160	3,830	846	606
11	606	301	75	27	1,710	6,760	4,530	6,560	5,160	3,670	606	496
12	606	301	75	18	1,248	3,131	3,675	4,620	5,360	3,330	606	394
13	606	215	75	50	2,209	2,384	2,938	3,910	4,620	3,131	394	301
14	723	215	75	50	846	2,938	2,750	3,460	6,560	2,938	394	215
15	606	215	75	50	606	2,039	1,553	3,395	10,120	2,384	394	215
16	606	215	75	50	846	2,938	1,553	3,600	6,160	2,384	394	215
17	606	215	75	50	496	1,249	1,401	4,260	8,080	3,131	496	140
18	606	215	75	50	723	6,760	4,980	13,660	41,840	2,384	496	140
19	496	215	75	50	394	2,384	5,360	7,530	63,700	2,039	394	75
20	496	215	75	50	394	1,553	5,260	5,560	20,460	1,710	215	75
21	496	215	75	50	394	1,710	5,960	4,620	10,380	1,710	215	7,860
22	394	215	75	50	394	1,401	8,080	3,910	8,300	2,209	215	8,080
23	394	215	75	263	394	2,384	9,640	3,460	6,360	1,401	215	2,039
24	394	140	75	263	2,384	1,710	11,160	2,750	24,840	1,248	215	1,113
25	394	140	75	93	1,249	1,401	6,260	2,384	12,880	1,113	215	846
26	394	140	75	93	846	1,113	4,440	3,600	10,380	1,113	394	2,209
27	394	140	75	50	846	846	6,160	3,395	8,520	846	394	2,384
28	394		75	50	723	846	6,760	2,209	6,160	846	301	1,553
29	394		75	50	496	846	4,620	1,872	8,960	846	301	1,113
30	394		27	50	394	846	6,160	1,553	11,160	846	440	846
31	394		27		394		6,060	1,401		606		606
Maximum	846	394	140	263	2,384	8,080	12,620	18,860	63,700	8,740	4,530	8,080
Minimum	394	140	27	18	50	394	1,401	1,401	1,113	606	215	75
Mean	577	248	83	57	882	2,187	5,736	5,611	10,794	3,150	664	1,434

NOTE.—Discharges over 3,330 second-liters were computed by A√D method based on weir measurements. No record for days on which discharge is not given.

BULACAN PROVINCE

PAMPANGA RIVER, CALUMPIT

LOCATION.—At railroad bridge about 300 m. north of Calumpit Railroad Station.

RECORDS AVAILABLE.—From May 17, 1910, to March 16, 1912.

GAGE.—Standard metric gage board nailed horizontally at downstream railing of bridge near left bank of river.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel only one at all stages; curved for 100 m. above and straight for 150 m. below the station. Banks high and clean. Stream bed sandy and clean but shifting

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 1,560,400 second-liters on July 27, 1911; minimum discharge, 34,400 second-liters on December 4, 1911.

DIVERSIONS.—None.

REGULATION—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined rating curve from 60,000 to 480,000 second-liters. The station is a fair one. Gage read twice daily.

Discharge measurements of Pampanga River, near Calumpit, Bulacan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
June 28	J. A. Steere	.82	69,901	
July 12	do	.84	83,184	
July 27	do	.75	89,285	
August 24	do	.90	97,923	
September 3	do	1.57	253,165	
September 14	do	1.47	371,560	
September 29	do	2.41	585,600	
October 13	do	1.88	452,630	
October 27	do	1.01	217,059	
October 31	do	.91	59,163	
November 12	do	1.23	237,679	
November 22	do	1.79	476,703	
November 26	do	1.94	572,486	
December 2	do	1.09	269,033	
December 6	do	1.99	694,371	
December 14	do	.76	158,624	
December 23	do	.97	184,245	
1911				
January 7	do	.62	182,419	
January 13	do	.54	165,072	
January 20	do	.49	83,927	
January 26	do	.42	104,381	
February 2	do	.52	65,950	
February 14	do	1.10	240,712	
March 11	do	.36	92,165	
July 5	do	1.29	215,244	
July 27	do	4.62	1,560,400	
August 11	do	3.10	790,252	
September 2	do	2.45	636,070	
September 26	do	1.39	315,175	
October 5	do	4.31	1,304,521	
October 16	do	2.36	640,785	
October 23	do	1.27	320,819	
November 1	do	.70	198,300	

Daily and monthly discharges, in liters per second, of Pampanga River near Calumpit, Bulacan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						418,400	196,000	191,200	330,600	720,800	115,000	261,600
2						368,000	189,600	220,000	330,600	699,200	239,200	239,200
3						323,800	242,400	252,000	334,000	710,000	548,000	648,800
4						261,600	351,000	261,600	327,200	699,200	627,200	465,200
5						200,800	351,000	255,200	414,800	663,200	594,800	627,200
6						197,600	268,000	242,400	483,200	616,400	447,200	526,400
7						166,000	252,000	226,400	540,800	590,400	327,200	418,400
8						197,600	232,800	232,800	555,200	579,600	268,000	347,600
9						216,800	242,400	229,600	562,400	558,800	280,800	245,600
10						220,000	242,400	239,200	519,200	497,600	268,000	197,600
11						197,600	210,400	274,400	472,400	681,200	274,400	166,000
12						184,800	188,000	248,800	425,600	627,200	239,200	142,000
13						175,200	204,000	280,800	389,600	512,000	223,200	145,000
14						172,000	232,800	280,800	361,200	440,800	261,600	172,000
15						160,000	204,000	274,400	368,000	396,800	609,200	178,400
16						133,000	229,600	264,800	425,600	382,400	486,800	178,400
17					207,200	115,000	216,800	284,000	443,600	396,800	447,200	204,000
18					106,200	118,000	236,000	284,000	540,800	483,200	526,400	197,600
19					80,150	118,000	216,800	271,200	558,800	396,800	605,600	210,400
20					59,800	169,000	223,200	252,000	586,800	347,600	512,000	207,200
21					51,200	191,200	220,000	232,800	548,000	306,800	526,400	184,800
22					71,400	191,200	232,800	220,000	638,000	280,800	490,400	172,000
23					88,000	213,600	242,400	210,400	666,300	274,400	695,600	184,800
24					106,200	200,800	223,200	226,400	786,200	264,800	692,000	112,000
25					210,400	255,200	216,800	375,200	627,200	255,200	627,200	109,400
26					220,000	252,000	207,200	436,400	641,600	242,400	497,600	77,200
27					320,400	196,000	197,600	533,600	641,600	213,600	399,400	112,000
28					354,400	205,600	184,800	300,000	648,800	204,000	334,000	264,800
29					411,200	210,400	175,200	287,200	692,000	172,000	293,600	172,000
30					429,200	212,000	172,000	293,600	753,200	163,000	261,600	166,000
31					443,600	.....	178,400	310,200	.....	136,000	.....	.....
Maximum					443,600	418,400	351,000	533,600	786,200	720,800	695,000	648,800
Minimum					51,200	115,000	172,000	191,200	327,200	136,000	115,000	77,200
Mean					210,623	208,040	221,193	273,916	520,460	435,903	410,627	230,820

Daily and monthly discharges, in liters per second, of Pampanga River near Calumpit, Bulacan, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	148,000	106,200	71,400	118,000	172,000	210,400	210,400	1,450,000	677,600	1,051,800	163,000	85,900
2	136,000	112,000	59,800	133,000	166,000	191,200	323,800	1,438,000	706,400	1,048,000	157,000	80,100
3	157,000	118,000	62,700	145,000	175,200	181,600	530,000	1,418,000	706,400	1,141,100	154,000	67,500
4	148,000	130,000	77,200	148,000	172,000	154,000	494,000	1,382,000	310,200	1,318,000	130,000	34,400
5	148,000	106,200	136,000	157,000	160,000	118,000	368,000	1,334,000	623,600	1,430,000	103,300	45,600
6	133,000	118,000	130,000	160,000	172,000	97,500	303,400	1,282,000	591,200	1,430,000	85,900	65,600
7	154,000	118,000	127,000	145,000	160,000	90,900	271,200	1,219,100	566,000	1,402,000	103,300	83,000
8	142,000	136,000	124,000	115,000	109,100	109,100	255,200	1,141,100	530,000	1,354,000	103,300	127,000
9	136,000	124,000	112,000	106,200	85,900	130,000	242,400	1,067,000	494,000	1,294,000	90,900	163,000
10	121,000	112,000	106,200	90,900	80,100	139,000	258,400	991,000	454,400	1,215,200	118,000	175,200
11	109,100	100,400	88,000	67,500	106,200	175,200	313,600	945,400	404,000	1,121,600	127,000	172,000
12	100,400	118,000	71,400	85,900	103,300	172,000	287,200	915,000	364,600	1,006,200	133,000	157,000
13	109,100	210,400	65,600	77,200	109,100	194,400	271,200	922,600	327,200	934,000	133,000	136,000
14	112,000	207,200	65,600	83,000	124,000	191,200	337,400	892,200	293,600	846,600	142,000	103,300
15	124,000	166,000	83,000	109,100	166,000	188,000	586,800	968,200	280,800	738,200	124,000	83,000
16	133,000	154,000	83,000	115,000	163,000	178,400	1,133,300	922,600	280,800	692,000	115,000	62,700
17	145,000	145,000	103,300	136,000	154,000	175,200	1,191,800	850,400	293,600	620,000	106,200	40,000
18	151,000	130,000	97,500	136,000	154,000	175,200	1,302,000	839,000	310,200	540,800	77,200	77,200
19	136,000	103,300	112,000	136,000	160,000	169,000	1,350,000	812,400	323,800	579,600	83,000	74,300
20	127,000	90,900	106,200	136,000	163,000	184,800	1,410,000	789,900	371,400	530,000	71,400	77,200
21	127,000	83,000	136,000	127,000	148,000	130,000	1,466,000	775,100	432,800	422,000	74,300	77,200
22	124,000	83,000	118,600	118,000	139,000	115,000	1,470,200	767,600	425,600	334,000	88,000	80,100
23	100,400	88,000	115,000	112,000	127,000	106,200	1,470,200	749,600	501,200	280,800	94,600	97,500
24	88,000	77,200	106,200	142,000	115,000	136,000	1,523,500	713,600	458,000	258,400	94,600	88,000
25	88,000	71,400	94,600	157,000	85,900	178,400	1,544,000	677,600	375,200	245,600	100,400	97,500
26	94,600		74,300	106,200	97,500	213,600	1,552,200	656,000	347,600	229,600	106,200	85,900
27	112,000		106,200	97,500	136,000	216,800	1,560,400	648,800	337,400	226,400	112,000	83,000
28	100,400		94,600	106,200	181,600	210,400	1,552,200	623,600	368,000	210,400	109,100	83,000
29	100,400		100,400	130,000	197,600	210,400	1,544,000	602,000	728,000	200,800	106,200	83,000
30	97,500		88,000	166,000	210,400	207,200	1,515,000	602,000	1,044,200	178,400	88,000	83,000
31	100,400		103,300		220,000		1,482,500	677,600		175,200		56,900
Maximum	157,000	210,400	136,000	166,000	220,000	216,800	1,560,400	1,450,000	1,044,200	1,430,000	163,000	175,200
Minimum	88,000	71,400	59,800	67,500	80,100	90,900	210,400	602,000	280,800	175,200	71,400	34,400
Mean	122,332	120,328	97,390	122,057	148,158	164,970	907,106	915,597	466,260	743,674	109,797	91,035

NOTE.—No gage height records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Pampanga River near Calumpit, Bulacan, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	54,000	67,500	80,100									
2	54,000	59,800	71,400									
3	67,500	59,800	56,900									
4	62,700	71,400	59,800									
5	145,000	83,000	74,300									
6	223,200	115,000	85,900									
7	178,400	118,000	77,200									
8	166,000	112,000	90,900									
9	151,000	103,300	94,600									
10	139,000	77,200	97,500									
11	109,100	83,000	83,000									
12	94,600	65,600	80,100									
13	103,300	56,900	74,300									
14	118,000	62,700	74,300									
15	127,000	59,800	62,700									
16	100,400	71,400	54,000									
17	85,900	65,600										
18	67,500	59,800										
19	85,900	45,600										
20	62,700	37,200										
21	56,900	48,400										
22	80,100	67,500										
23	90,900	109,100										
24	103,300	106,200										
25	90,900	106,200										
26	90,900	106,200										
27	85,900	97,500										
28	71,400	88,000										
29	56,900	90,900										
30	56,900											
31	56,900											
Maximum	223,200	118,000	97,500									
Minimum	54,000	37,200	54,000									
Mean	94,716	79,124	76,061									

BULACAN PROVINCE

SANTA MARIA RIVER, SANTA MARIA

LOCATION.—About 31.76 km. from Manila and under the concrete bridge on the Bocaue–Santa Maria Road.

RECORDS AVAILABLE.—From October 25, 1919, to December 31, 1922.

GAGE.—Standard metric gage horizontally clamped to railing, 36 m. from left abutment on downstream side of bridge. Chain and weight used in measuring gage height.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel is straight for 300 m. above and below the station. Both banks low and wooded; subject to overflow and scour. At measuring section, stream bed of clay, earth, gravel and sand and shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 221,180 second-liters on July 18, 1920; minimum discharge, 20 second-liters on January 7, 1920. Gage heights from January to June, 1919, practically uniform at 0.05 meter.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For water right purposes.

ACCURACY.—Gage read twice daily. Records in 1919 and 1920 poor; in 1921 and 1922 fair.

Discharge measurements of Santa Maria River, near Poblacion, San Miguel, Bulacan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
October 22.	J. S. Roxas	2 82	7,087	
November 20	J. S. Roxas and B. Buchanan.	2 58	3,808	
December 1.	J. S. Roxas	2 92	23,302	
1920				
January 12	do	2 44	895	
February 9	do	2 36	482	
February 20	do	2 44	778	
April 15	do	2 32	534	
June 4	do.	2 37	386	
June 20	do.	2 39	316	
July 6	do	2.39	405	
July 21	do.	3 64	117,561	
July 22	do.	3 86	172,104	
August 4	do.	3.56	109,165	
August 30	do.	3.69	119,713	
August 31	do	3.86	175,439	
September 1	do.	3.80	146,893	
November 29	do	2.39	403	
December 6.	do	3 14	64,970	
1921				
January 12	do	2 24	1,113	
February 4	do	2.31	1,530	
February 25	do	2.08	209	
March 8	do	2.21	690	
March 19	Castillo	2 14	409	
April 7	do	2.08	154	
May 29	Castillo and Roxas	2 13	236	
May 31	do	2.09	166	
June 2	do	2 08	132	
July 8	Roxas	2.08	3,387	
July 23	do.	2.48	3,466	
August 11	do.	2.67	10,400	

Discharge measurements of Santa Maria River, near Poblacion, San Miguel, Bulacan—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
September 7	Roxas	2.50	7,491	
September 22	do.	2.60	12,349	
October 15	do.	2 25	2,382	
November 6	do.	2 02	1,397	
December 28	do.	2 16	1,132	
1922				
February 2	do.	2.00	343	
February 8	do	2 08	511	
March 20	do	2 00	308	
April 4	do.	2.00	83	
April 5	do.	2 01	48	
May 30	do.	2 61	9,519	
June 5	do.	2 18	1,518	
June 28	do.	2 30	3,941	
July 19	do	2.64	15,190	
August 4	do.	2 60	11,871	
August 5	do.	2.59	11,541	
September 1	do	2.33	6,541	
September 4	do.	2.46	7,584	
October 17	do	2 31	6,494	
November 8	Castillo	2 27	3,051	
November 26	Roxas	2 10	2,661	
November 27	do	2 09	1,935	
December 9	Castillo	2.31	4,643	
December 11	Roxas	2 28	2,463	
December 26	do.	2 37	5,824	

Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1											20,900	28,600
2											30,500	21,720
3											13,180	23,360
4											6,240	23,360
5											3,520	20,900
6											7,560	8,540
7											5,400	10,700
8											4,200	8,000
9											3,520	2,400
10											4,600	2,400
11											2,400	820
12											2,960	820
13											2,400	1,960
14											1,960	4,200
15											500	380
16											980	980
17											1,520	460
18											10,700	100
19											21,720	380
20											3,800	260
21											5,400	500
22											3,520	340
23											1,520	340
24											2,960	300
25										20,160	1,520	260
26										14,480	820	820
27										15,160	74,740	340
28										13,180	46,320	460
29										8,540	31,500	980
30										7,560	32,500	820
31										13,180		420
Maximum										20,160	74,740	28,600
Minimum										7,560	500	100
Mean										13,180	11,645	5,352

NOTE.—Discharge determined from poorly defined rating curve.

Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	820	500	260	140	100	380	5,800	13,180	34,500	8,540	420	2,400
2	180	500	260	100	100	420	3,520	6,240	36,580	8,540	300	2,400
3	100	500	180	100	140	380	4,600	2,400	26,800	16,520	420	2,960
4	60	460	100	80	100	340	4,200	2,680	30,500	20,160	660	2,960
5	60	.....	100	100	100	340	2,400	1,740	34,500	13,180	380	2,960
6	40	660	100	100	60	420	2,400	1,140	21,720	17,200	550	51,980
7	20	500	100	80	80	420	123,820	500	17,940	24,180	820	47,440
8	60	420	180	100	100	340	92,520	420	10,160	26,800	500	44,100
9	180	340	180	100	80	340	47,440	420	4,200	22,540	420	32,500
10	180	340	180	80	100	340	23,360	420	4,200	6,240	220	28,600
11	180	340	260	80	180	340	34,500	460	5,800	1,520	180	24,180
12	500	340	260	100	260	340	31,500	500	2,400	1,520	*60	13,180
13	820	420	220	100	260	340	30,500	380	3,240	980	69,300	8,000
14	820	340	180	140	260	380	34,500	420	1,520	500	62,800	4,200
15	660	340	260	340	340	340	32,500	460	2,680	500	45,200	4,200
16	820	420	180	340	220	380	38,660	820	1,960	460	45,200	25,000
17	820	340	220	340	420	340	27,700	500	2,180	500	36,580	6,680
18	1,140	420	260	340	380	340	221,180	420	1,300	500	18,680	5,800
19	1,140	340	220	260	420	380	110,220	460	1,960	500	5,800	5,800
20	820	420	220	340	500	420	148,280	500	4,200	420	2,680	2,453
21	820	340	220	260	500	380	143,900	660	5,800	980	1,140	2,536
22	820	340	260	260	500	340	178,220	500	3,520	500	660	2,792
23	980	340	180	100	500	380	36,580	820	7,560	500	500	2,453
24	820	340	180	100	500	420	23,360	500	15,840	420	500	2,299
25	820	340	220	100	500	420	18,680	500	20,900	420	420	2,077
26	820	340	180	100	500	420	21,720	1,140	27,700	460	340	2,005
27	820	260	180	100	500	500	19,420	11,940	59,140	660	420	2,005
28	820	260	220	80	500	500	20,160	5,800	26,800	340	500	1,803
29	820	260	220	100	500	820	29,500	15,160	17,200	420	460	1,869
30	820	.....	180	100	820	1,960	34,500	22,540	17,200	420	820	1,737
31	500	.....	140	.....	500	.....	20,160	32,500	.....	380	.....	1,489
Maximum	1,140	660	260	340	820	1,960	221,180	32,500	59,140	26,800	69,300	51,980
Minimum	20	260	100	80	60	340	2,400	380	1,300	340	*60	1,489
Mean	590	384	197	155	363	449	50,510	4,068	15,000	5,703	9,877	10,995

NOTE.—Discharge determined from poorly defined rating curve.
* Unreliable.

Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,489	566	44	276	98	214	1,144	6,670	8,310	5,460	170	5,460
2	1,550	566	44	276	44	184	1,144	5,160	7,210	4,810	170	5,690
3	1,489	607	44	342	44	214	1,674	6,670	6,670	5,020	390	5,460
4	1,489	1,370	98	276	126	276	6,060	6,670	6,670	5,240	390	4,810
5	1,611	1,088	44	214	154	214	8,264	6,670	5,160	4,810	275	5,240
6	1,611	648	566	276	126	308	7,536	7,750	6,670	4,410	170	4,810
7	1,611	566	781	214	308	410	5,872	76,470	7,750	4,810	75	5,020
8	1,550	689	735	214	342	449	6,670	35,970	6,670	4,810	170	5,240
9	1,611	648	648	214	276	342	5,690	23,970	6,670	5,920	275	5,240
10	1,550	648	566	214	214	410	5,160	15,730	6,670	4,220	170	4,810
11	1,256	566	449	214	214	527	5,460	12,760	7,210	4,030	1,590	4,810
12	781	607	488	154	154	566	5,690	13,460	6,930	4,410	7,210	4,410
13	929	566	410	214	154	566	5,460	34,470	7,750	4,410	5,920	4,810
14	827	566	376	154	184	566	5,690	32,220	8,310	4,030	4,220	4,810
15	929	527	342	154	98	735	5,240	181,470	7,480	3,330	5,020	4,410
16	878	566	410	154	154	929	5,690	128,970	7,210	2,250	4,810	4,410
17	827	566	449	98	154	1,144	6,410	100,470	7,750	1,850	10,120	4,030
18	735	607	488	154	154	1,088	6,670	56,970	7,750	1,590	5,160	4,410
19	827	488	410	98	154	1,034	8,600	37,470	9,500	1,160	5,240	4,030
20	735	566	376	154	244	1,144	9,500	24,720	10,120	975	5,020	4,030
21	827	488	342	154	449	929	8,030	55,470	10,120	725	5,240	4,030
22	689	488	410	154	276	929	7,750	14,560	10,120	510	10,760	3,500
23	735	488	410	126	276	929	7,210	18,000	9,500	390	11,080	2,840
24	648	276	410	214	342	1,370	7,750	17,500	9,500	275	7,210	2,390
25	735	214	410	154	308	1,256	37,470	17,500	8,890	170	5,240	2,250
26	781	276	410	154	276	1,034	31,470	14,190	8,890	75	8,310	1,720
27	735	184	342	98	342	980	28,470	13,460	8,310	170	5,690	1,360
28	607	98	410	98	410	1,034	9,190	10,760	6,930	170	5,020	1,160
29	566		342	98	342	929	7,750	8,890	5,160	170	5,240	1,160
30	607		376	98	214	1,034	7,210	8,030	5,160	220	4,810	975
31	566		276		214		7,210	7,210		170		725
Maximum	1,611	1,370	781	342	449	1,370	37,470	181,470	10,120	5,920	11,080	5,690
Minimum	566	98	44	98	44	184	1,144	5,160	5,160	75	75	725
Mean	1,025	555	384	180	221	724	8,811	32,267	7,701	2,600	4,172	3,808

NOTE.—Discharge determined from rating curves applicable as follows: July 8, 1921, to May 6, 1922, fairly well-defined below 10,000 second-liters; May 7, to December 31, 1922, fairly well-defined below 13,000 second-liters and above 1,000 second-liters.

Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	805	75	170	170	75	10,180	4,760	31,880	4,760	22,080	2,890	1,200
2	645	75	75	75	170	8,670	3,230	32,370	4,550	24,530	3,230	1,460
3	510	170	170	170	170	8,390	3,570	21,100	4,970	26,980	3,230	7,060
4	390	275	170	75	220	6,820	4,130	11,890	7,320	26,980	4,340	7,060
5	275	275	75	170	390	3,570	15,220	13,440	6,340	21,100	4,340	6,100
6	390	275	170	120	390	2,000	30,900	12,640	5,640	18,160	3,940	4,970
7	390	275	170	75	11,890	2,000	30,900	11,190	6,340	20,120	3,570	4,340
8	275	450	75	75	7,060	4,970	28,940	11,190	6,100	23,060	3,230	3,940
9	170	510	170	75	4,340	21,100	19,140	10,840	5,640	24,040	3,230	4,340
10	170	510	75	75	4,340	12,910	9,860	8,670	6,820	14,740	2,890	3,940
11	275	510	170	120	4,760	19,140	6,340	7,580	7,060	9,250	2,890	3,060
12	170	510	75	75	5,190	13,860	5,640	7,060	7,580	6,100	2,890	2,420
13	170	390	170	75	5,190	10,500	4,760	8,120	7,580	5,190	2,570	2,570
14	75	510	75	75	13,860	8,120	4,760	7,800	8,120	5,190	2,570	2,280
15	170	510	170	75	6,100	5,640	4,760	6,820	9,250	4,760	2,280	2,000
16	170	510	170	75	6,340	3,400	4,760	5,870	10,500	5,190	2,000	1,720
17	75	390	75	75	7,580	2,890	15,220	6,100	21,590	5,190	1,720	1,460
18	75	510	75	120	6,100	2,730	14,740	6,340	32,860	5,640	2,000	1,200
19	170	390	170	75	6,820	2,000	12,640	6,580	32,860	4,550	1,720	1,200
20	120	275	75	75	6,100	2,420	9,250	6,100	28,940	4,340	1,720	1,200
21	75	170	170	75	6,100	2,420	28,940	5,640	20,610	3,940	1,590	2,000
22	120	275	75	75	6,340	3,230	21,590	4,760	19,140	5,640	1,720	3,400
23	75	170	120	75	24,040	2,000	15,220	5,190	19,140	4,970	1,590	2,890
24	170	170	75	75	26,980	2,280	12,260	4,970	26,980	4,340	1,080	2,420
25	75	120	120	75	12,640	1,720	11,890	4,760	26,000	3,940	1,200	2,000
26	170	170	170	75	10,500	1,720	12,640	4,550	19,630	3,940	1,080	3,940
27	75	170	120	75	10,180	3,230	26,490	3,940	14,740	3,750	960	4,760
28	170	170	170	120	12,260	3,940	31,390	4,130	13,440	3,940	740	5,190
29	75		75	75	11,890	3,060	19,630	4,340	17,180	4,340	1,080	5,190
30	75		170	120	12,260	3,230	23,060	4,760	16,690	3,940	1,200	4,760
31	25		75		11,890		29,920	4,760		3,570		3,940
Maximum	805	510	170	170	26,980	21,100	31,390	32,370	32,860	26,980	4,340	7,060
Minimum	25	75	75	75	75	1,720	3,230	3,940	4,550	3,570	740	1,200
Mean	213	315	125	92	7,812	6,211	15,050	9,207	13,946	10,435	2,316	3,355

NOTE.—See footnote to daily discharge table for 1921.

CAGAYAN PROVINCE

PANGUL RIVER, SOLANA

LOCATION.—On the steel truss bridge over the Pangul on the Solana–Piat Road, 7 km. from Solana and 13 km. from Tuguegarao.

RECORDS AVAILABLE.—From December 17, 1921, to December 16, 1922. Station established April 10, 1920. Only few current meter measurements made.

GAGE.—Standard metric gage board attached horizontally on the downstream side of the bridge. Chain and weight used for measuring gage heights.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel only one at low water stage but three would be formed at high water stage; straight for about 20 m. above and 30 m. below the station. Banks about 6 m. high, subject to overflow at extreme high water. Stream bed very soft and muddy. Flow rather sluggish.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 3,351 second-liters on September 29, 1922; minimum discharge, 44 second-liters on July 13, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Record unreliable. Daily discharge roughly estimated.

Discharge measurements of Pangul River, near Pangul, Solana, Cagayan

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
March 10	W. Demers	35	343	
1922				
March 10	District Engineer	...	768	
April 20	M. Cruz and P. Libon.	50	168	
September 28	District Engineer.		2,000	
November 6	Tomas Lorenzo and P. Libon.	2.51	2,332	

Daily and monthly discharges, in liters per second, of Pangul River near Pangul, Solana, Cagayan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												818
19												
20												237
21												288
22												302
23												282
24												275
25												262
26												
27												
28												
29												
30												
31												
Maximum												818
Minimum												262
Mean												352

Daily and monthly discharges, in liters per second, of Pangul River near Pangul, Solana, Cagayan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			118	100	275	704	109	2,284	162		179	1,915
2			118	127	174	1,235	72	3,001	224	1,930	168	1,223
3	157		100	127	118	1,735	84	3,051		2,162	168	
4	157		76	136	76		114	2,208	196	2,777	202	1,791
5	157		92	146	72		179	1,818	2,669	2,685		2,074
6	168		92	131	68		118	1,685	2,454	2,623		838
7	157		76	146	68		100	1,295	1,415	2,361		1,006
8			100	131	68		157	2,623	329			1,542
9	157		100	118	68		888	1,973	275	496		1,151
10	157		105	136	72		275	487		454		
11	196		100	109	109		179	269	2,016	438		2,162
12	196		105	127	92	202	127	422	2,777	1,987		3,267
13	196	114	92	122	344	174	100		2,808	2,777	168	3,201
14	157	105	84	118	382	2,423	68		2,700	2,423	478	2,638
15		109	100	114	250	2,935			2,423		2,515	1,973
16		109	76		779	2,654	88		2,469	1,006	3,101	941
17		109	76	114	1,804	2,839	56	190		1,542	2,952	
18		88	76	100	1,858	2,531	44	202	1,428	1,295	2,870	
19			76	84	1,973	2,104	64	190	974	603		
20		118	84	80	2,016	2,823	56		478	557	2,669	
21		127	256	92	1,872	2,654	80	2,315	288	478	2,469	
22			190	237	146	1,698	92	2,685	262		2,208	
23		109	114	168	118	667	157	2,315	230	1,071	1,355	
24		92	96	100	100	302	76	2,423		438	612	
25		92	109	157	100	185	68	898	230	329	513	
26			105	168	96	146	566	406	224	269		
27		100	105	162	96	157	470		398	224	1,804	
28		118	100	174	88	118	190	1,542	2,623	196	2,608	
29			96	168	84	92	157	1,071	3,351		2,002	
30			157	146	100	84	1,199	344	3,035	196		
31			127		336		750	207		196		
Maximum	196	127	256	237	2,016	2,935	1,199	3,051	3,351	2,777	3,101	3,267
Minimum	157	88	76	80	68	84	44	190	162	196	168	838
Mean	169	107	106	135	445	1,294	223	1,436	1,401	1,212	1,528	1,908

NOTE.—No record on days for which discharge is not given. Discharge determined from poorly defined rating curve.

CAMARINES NORTE PROVINCE

ALINAO RIVER, SAN VICENTE

LOCATION.—About 50 m. northeast of the San Vicente–Labo trail.

RECORDS AVAILABLE.—From January 1, 1921, to March 31, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—Channel splits into two at extremely high water stage; straight for about 20 m. above and 30 m. below the station. Bed of stream sandy and gravelly. Left bank, high and covered with brushes; right banks low, sandy, and gravelly and covered with grass.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 15,106 second-liters on November 10, 1921; minimum discharge, 198 second-liters on June 30, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from well-defined curve. Records good below 4,600 second-liters.

Discharge measurements of Alinao River, near Alinao, San Vicente, Camarines Norte

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 24	Buch. and Musa	58	627	
March 10	Musa.	.80	1,937	
April 14	O. B. and Buch	.48		
June 6	Musa	40	175	
July 27	do	.44	433	
August 16	do	.41	146	
September 9	do	39	181	
October 25	O. B. and S. Musa	95	2,948	
November 27	O. Buenaventura	.95	2,966	
December 2	do.	90	2,706	
December 21	do	.90	2,599	
December 22	S. Musa	85	1,852	
1922				
January 13	do	80	1,681	
January 14	do.	.70	1,335	
January 16	do.	.62	1,090	
January 17	do	.60	865	
February 21	do	.60	1,075	
February 24	do.	.53	975	
March 17	O. B. and S. Musa	.60	1,216	
March 18	do	.54	803	

Daily and monthly discharges, in liters per second, of Alinao River near Alinao, San Vicente, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,546	9,506	2,609	1,017	356	298	222	272	326	1,203	3,486	3,071
2	2,483	2,237	2,177	974	326	272	222	326	298	1,017	5,160	1,939
3	2,298	2,177	1,824	888	272	272	1,497	272	326	1,203	8,246	2,359
4	1,768	11,606	1,603	888	298	298	8,106	298	246	1,299	8,946	10,206
5	1,824	3,071	1,348	974	272	272	2,673	272	272	1,299	5,586	4,466
6	1,348	2,867	2,237	1,251	272	272	1,062	272	272	1,107	4,466	2,673
7	1,880	1,336	5,656	931	272	246	1,107	246	272	1,107	6,356	1,768
8	1,497	7,546	3,556	724	272	326	1,348	222	272	1,203	9,646	1,939
9	1,497	3,139	2,546	804	272	272	530	272	298	1,299	10,906	2,117
10	1,447	2,737	1,598	644	272	272	356	272	272	1,299	15,106	1,656
11	974	2,298	1,998	974	246	272	530	272	1,348	5,586	4,746	1,497
12	974	1,880	1,397	568	272	272	880	222	7,406	5,306	4,676	2,177
13	1,017	1,998	1,497	568	272	272	386	222	2,935	2,421	4,466	2,298
14	1,155	1,603	1,348	530	272	272	568	246	846	2,673	4,326	3,976
15	2,237	1,603	2,421	492	272	272	606	246	606	1,497	4,186	3,626
16	4,046	1,155	4,256	492	298	246	568	222	530	1,203	4,816	3,139
17	2,177	1,107	4,186	454	272	246	530	222	272	1,062	4,746	2,802
18	1,550	2,298	5,586	454	246	246	530	246	272	1,155	4,606	2,421
19	1,768	2,359	3,906	492	272	272	568	222	272	974	4,466	2,546
20	1,397	3,207	2,609	454	246	272	356	246	272	846	2,673	2,737
21	1,497	4,606	2,298	454	272	272	454	246	272	684	1,768	2,177
22	1,447	4,396	1,939	492	272	222	356	222	272	1,017	14,456	2,483
23	1,203	2,935	1,824	420	246	222	386	222	272	5,656	14,406	2,935
24	888	2,867	1,656	454	272	272	356	222	386	7,056	13,146	3,976
25	804	16,906	1,447	386	272	420	298	222	454	3,486	12,236	6,006
26	804	3,836	1,447	356	272	222	326	222	386	6,426	8,606	8,106
27	931	3,139	1,348	326	272	222	326	272	530	3,346	4,536	3,906
28	724	2,609	1,299	492	298	222	326	272	1,299	3,416	3,139	3,003
29	5,656	. .	1,107	386	246	222	326	272	764	3,207	3,207	2,298
30	3,486	. .	974	326	272	198	272	272	3,766	3,207	3,207	2,177
31	6,356	. .	931	.	272		272			3,346	. . . . .	2,673
Maximum	6,356	11,606	5,656	1,251	356	420	8,106	326	7,406	7,056	15,106	10,206
Minimum	724	1,107	931	326	246	198	222	222	246	684	1,768	1,497
Mean	1,925	3,697	2,291	622	275	231	850	251	867	2,439	6,664	3,198

Daily and monthly discharges, in liters per second, of Alinao River near Alinao, San Vicente, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,712	684	1,299									
2	1,497	3,556	974									
3	1,397	1,824	684									
4	1,397	974	606									
5	1,107	1,824	846									
6	1,017	1,397	568									
7	1,107	1,062	606									
8	888	1,017	492									
9	931	764	684									
10	1,017	931	804									
11	1,017	846	804									
12	2,935	724	1,062									
13	2,673	606	1,107									
14	1,348	606	1,824									
15	1,397	606	1,348									
16	1,107	606	1,824									
17	1,017	606	888									
18	1,017	606	888									
19	1,299	1,017	1,017									
20	1,603	1,824	1,017									
21	1,107	1,107	1,062									
22	974	1,017	1,017									
23	1,203	804	931									
24	1,203	606	846									
25	1,017	606	684									
26	1,017	764	1,299									
27	1,107	684	1,203									
28	1,497	764	931									
29	1,299	.....	931									
30	974	.....	888									
31	724	.....	931									
Maximum	2,935	3,556	1,824									
Minimum	724	606	492									
Mean	1,278	1,015	970									

CAMARINES NORTE PROVINCE

BICAL RIVER, LABO

LOCATION.—In the northerly direction from San Vicente and about 200 m. below the San Vicente–Labo trail.

RECORDS AVAILABLE.—From January 1, 1921, to December 31, 1922.

GAGE.—Standard metric gageboard vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and below the station. Bed of stream gravelly. Left bank high and of earthy texture; right bank low and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 589,000 second-liters on October 23, 1921; minimum discharge, 245 second-liters from August 30 to September 8, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Roughness of bed due to gravels and boulders affect the discharge measurements and trees and brush on the right bank cause cessation of flow sometimes. Record from January 1, 1921, to March 31, 1921, may be in error due to poor observations made during this period. Records good below 16,500 second-liters. Gage read twice daily.

Discharge measurements of Bical River, near Bical, Labo, Camarines Norte

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 24	Buch and Musa	.87	796	
March 10	S. Musa	.95	2,160	
April 14	O. B. and Buch	.90	582	
April 25	S. Musa	.80	586	
June 7	do	.81	469	
July 26	do	.82	495	
August 10	do	.70	464	
September 9	do	.68	303	
October 25	do	.99	2,592	
November 28	O. B.	1.04	3,367	
December 3	do	.95	2,165	
December 21	do	1.02	4,075	
December 22	do	.97	2,720	
1922				
January 13	S. Musa	.97	2,870	
January 14	do	.94	2,498	
January 16	do	.92	1,476	
January 17	do	.91	1,502	
February 21	do	.91	1,001	
February 22	do	.90	984	
February 23	do	.88	811	
March 17	do	.94	1,646	
March 18	O. B. and Musa	.92	1,385	
April 20	do	.87	530	
April 21	do	.85	484	
May 9	do	.82	408	
May 11	do	.83	419	
May 12	do	.83	416	
May 13	do	.82	424	
June 30	do	.85	650	
July 3	O. Buenaventura	.88	824	
July 26	do	.83	475	
August 15	do	.83	352	
August 18	do	.80	268	
September 5	do	.75	317	
September 8	do	.78	378	
October 17	do	.95	1,551	
November 7	do	.93	1,462	
December 25	do	1.24	3,866	

Daily and monthly discharges, in liters per second, of Bical River near Labo, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,814	19,040	2,000			556	446	396	500	446	4,060	1,290
2	9,680	20,400	934			1,030	500	396	446	446	8,270	6,810
3	20,400	4,378	844		353	1,136	5,610	396	446	1,136	10,070	39,340
4	1,814	249,000	844		353	500	8,950	396	446	934	122,420	70,160
5	2,856	5,610	844		312	500	9,680	396	446	763	39,340	8,270
6	1,136	4,024	1,136		312	500	1,250	353	446	763	6,160	4,060
7	1,136	25,100	5,610		312	446	1,136	312	446	763	4,060	2,950
8	1,136	16,480	2,856		312	446	1,136	312	446	618	33,980	2,630
9	1,136	3,393	2,620		276	396	1,136	396	312	446	87,580	2,950
10	1,250	2,856	2,000		276	396	934	396	1,503	446	82,220	1,645
11	396	1,503	1,814		396	396	763	396	3,393	1,370	63,460	1,460
12	1,136	844	1,814		396	446	1,136	618	1,250	2,400	2,950	1,460
13	1,136	1,250	1,650		396	446	934	1,030	1,136	1,370	2,630	1,290
14	1,250	1,370	1,503		396	500	763	396	844	1,250	2,630	60,780
15	1,136	1,136	2,856		396	500	763	353	763	1,650	1,850	20,580
16	2,000	1,136	6,603		446	446	618	353	618	844	2,335	3,640
17	1,250	1,136	6,603		396	396	556	396	556	618	2,630	3,290
18	1,250	1,650	21,900		396	446	618	396	446	618	1,645	2,630
19	1,136	5,610	4,024		396	353	763	396	396	500	1,460	2,070
20	1,136	941,200	2,856		396	353	686	353	396	556	1,290	1,645
21	1,136	48,800	2,400		446	396	686	353	396	556	21,920	4,490
22	1,136	3,700	1,136		446	353	618	353	396	2,856	60,780	2,630
23	1,136	3,112	934		446	396	556	353	353	589,000	23,260	2,950
24	618	8,950	844		396	4,024	556	312	312	5,172	151,900	3,290
25	844	223,000	763		500	763	618	312	686	2,856	137,600	6,160
26	934	40,200	763		446	618	556	312	3,700	2,856	20,580	23,260
27	763	2,856	844		500	500	500	312	2,196	763	6,810	10,070
28	844	2,620	686		446	446	500	312	1,503	2,196	4,490	3,650
29	1,136		2,196		446	446	446	312	3,112	1,650	1,290	2,630
30	6,085		618		446	446	446	312	556	2,856	1,020	2,335
31	45,800		618		446		396	446		90,360		1,850
Maximum	45,800	941,200	21,900		500	4,024	9,680	1,030	3,700	589,000	151,900	70,160
Minimum	396	844	618		276	353	396	312	312	446	1,020	1,290
Mean	3,697	58,584	2,681		396	619	1,428	391	948	23,195	30,356	9,750

NOTE.—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Bical River near Bical, Labo, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,645	900	1,645	700	980	420	620	700	245	550	1,460	2,950
2	1,290	1,850	1,460	700	480	420	1,020	550	245	420	2,335	2,950
3	1,290	1,645	1,290	700	420	370	900	420	245	420	1,460	2,950
4	1,290	1,145	1,145	620	420	550	900	550	245	420	2,950	2,335
5	1,290	1,850	1,145	620	420	480	700	1,020	245	420	24,600	52,740
6	1,145	1,645	900	550	420	420	620	1,850	245	420	2,950	32,640
7	1,145	1,460	795	550	420	370	620	795	245	420	2,335	4,490
8	1,145	1,290	900	550	420	325	550	620	245	420	2,335	4,490
9	1,020	1,145	1,020	550	420	325	550	550	280	700	1,645	3,650
10	1,020	1,145	900	620	480	325	420	420	325	1,850	2,630	3,650
11	1,145	1,020	795	700	480	325	420	420	325	1,850	1,850	3,290
12	2,070	900	700	620	550	325	420	420	325	1,460	1,460	3,650
13	3,290	1,020	620	1,145	550	325	420	370	325	2,335	1,850	4,970
14	1,850	900	1,460	900	700	325	420	370	325	2,335	1,460	3,650
15	1,460	795	1,850	620	480	1,020	420	325	325	1,850	1,290	2,950
16	1,460	700	1,460	550	480	700	325	325	325	2,335	1,145	8,270
17	1,145	700	2,335	550	480	1,460	325	325	325	2,335	1,145	12,540
18	1,020	620	1,460	620	420	1,645	325	325	325	2,335	900	3,650
19	900	700	1,290	700	420	1,460	420	280	325	2,950	700	24,600
20	1,460	1,850	1,145	700	420	1,460	420	280	325	2,335	620	110,360
21	1,290	1,460	1,645	550	550	1,145	550	325	370	1,645	1,145	12,540
22	1,290	1,145	1,145	550	620	1,145	420	325	4,490	1,290	1,145	5,540
23	1,145	900	1,020	550	550	900	550	280	2,950	1,460	1,460	3,650
24	1,020	795	1,290	700	550	700	550	245	1,145	900	1,850	12,540
25	900	620	1,145	550	550	700	550	245	1,290	1,020	1,460	25,940
26	1,145	550	2,950	480	480	420	550	245	700	700	17,900	19,240
27	1,290	480	2,335	550	480	325	620	325	900	1,145	9,120	8,270
28	1,020	550	1,645	550	480	325	700	245	700	1,460	20,580	4,490
29	900		1,290	480	420	1,460	620	325	550	25,940	16,560	4,490
30	795		1,145	480	420	1,145	900	245	620	2,950	4,490	9,120
31	795		1,020		420		900	245		2,070		33,980
Maximum	3,290	1,850	2,950	1,145	700	1,645	1,020	1,850	4,490	25,940	24,600	110,360
Minimum	795	480	620	480	420	325	325	245	245	420	620	2,335
Mean	1,280	1,069	1,321	624	480	710	572	450	651	2,217	4,428	13,890

CAMARINES NORTE PROVINCE

DAET RIVER, DAET

LOCATION.—About 100 m. below the junction of Mananap, Maisog, and Daet Rivers and 1 km. above location of old Spanish dam.

RECORDS AVAILABLE.—From January 1, 1921, to December 31, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 50 m. above and below station. Right bank high covered with abaca and coconut trees; left bank low and subject to overflow. Bed of stream gravelly and sandy.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 258,100 second-liters on December 31, 1922; minimum discharge, 800 second-liters on August 29–30, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Record fair. Roughness of bed and poor location of station may greatly affect gaging. Gage read twice daily.

Discharge measurements of Daet River, near Mancalpe, Daet, Camarines Norte

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 15	S. M. Musa	.62	6,055	
January 27	do.	.62	7,678	
January 31	do.	2 73	107,586	
February 1	do.	2 86	128,443	
February 12	do.	80	12,131	
April 15	do.	.63	3,776	
May 9	do.	.59	3,279	
June 9	do.	.54	3,045	
July 28	do.	54	3,221	
August 17	do.	52	2,341	
September 10	do.	.55	3,302	
October 23	do.	.97	15,505	
November 23	do.	1 77	85,076	
1922				
January 11	do.	1.15	10,740	
January 18	do	1 16	9,493	
January 19	do.	1 14	8,747	
January 20	do.	1 15	9,014	
January 21	do.	1 14	8,372	
February 21	do.	1.05	6,347	
February 24	do.	1.05	5,688	
February 25	do.	1 05	6,026	
February 27	do.	1 07	7,006	
March 20	do	1 16	7,773	
April 22	do.	.97	4,673	
April 24	do.	.93	3,827	
May 9	do.	.88	2,901	
May 11	do.	.92	3,590	
May 12	do.	.96	4,582	
May 15	do.	94	4,267	
June 12	Demers, Musa, and O. B	.84	2,406	
June 29	O. Buenaventura	89	4,788	
July 1	do.	.91	5,498	
July 25	do.	.82	4,966	
August 14	do.	74	2,495	
August 17	do.	.74	2,432	
September 4	do.	.68	2,080	
September 7	do.	.74	2,289	
October 16	do.	88	7,257	
November 6	do.	1.00	8,935	

Daily and monthly discharges, in liters per second, of Daet River near Daet, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10,400	96,120	16,320	10,120	3,500	3,500	3,500	1,605	3,165	7,020	19,840	
2	13,580	33,640	14,240	9,450	3,330	3,870	4,055	1,605	2,295	6,235	14,880	
3	11,020	24,980	17,760	9,120	2,045	3,685	5,065	1,405	3,870	4,645	13,570	
4	12,940		12,300	8,800	3,500	4,245	34,270	1,405	4,245	14,000	12,350	
5	12,620		13,260	8,180	3,330	3,870	7,300	1,225	3,330	10,120	10,830	
6	9,800		18,840	7,580	3,165	3,500	5,515	1,605	6,490	7,020	22,640	
7	10,700		17,760	7,300	3,165	3,500	5,065	1,605	5,745	4,645	20,940	
8	10,400		14,240	6,490	3,165	3,330	4,645	1,405	5,515	5,985	17,750	
9	10,400		12,620	5,985	3,330	3,165	4,055	2,560	9,780	2,045	73,020	
10	12,940		11,980	6,490	3,165	2,850	3,870	2,295	10,470	11,570	32,740	
11	9,800		16,320	5,065	3,165	2,705	3,500	1,815	10,120	12,350	14,000	
12	8,360		27,060	4,245	3,165	2,560	3,165	1,605	13,140	15,800	14,880	
13	8,080		27,060	3,870	3,165	3,165	2,150	1,405	5,985	7,580	10,120	
14	7,280	15,600	39,980	3,685	3,165	3,685	3,005	1,815	10,120	7,580	7,020	
15	13,900	12,940	78,300	3,500	3,870	3,685	3,165	1,605	10,830	3,330	7,020	
16	34,760	11,660	15,800	3,500	3,500	3,870	2,850	1,405	8,800	2,560	11,200	
17	17,040	11,660	20,940	3,500	3,165	3,500		1,930	6,490	1,930	10,830	
18	12,300	11,980	22,640	3,500	3,005	3,165	2,705	1,815	9,450	3,500	10,120	
19	10,700	17,040	12,350	3,500	3,005	3,165	3,165	1,605	6,490	4,645	12,350	
20	9,200	34,300	13,140	3,500	3,005	5,290	2,850	1,405	2,425	3,870	14,880	
21	9,200	36,600	12,350	3,500	3,005	2,660	2,560	1,605	1,815	10,120	14,000	
22	8,080	46,500	11,570	3,500	3,005	2,560	2,850	1,405	5,290	15,800	19,300	
23	7,540	18,480	9,450	3,500	3,005	2,560	2,045	1,605	4,245	64,360	70,480	
24	7,020	14,920	10,470	3,500	3,005	2,560	2,295	1,225	4,850	18,770	117,420	
25	6,500	60,160	10,120	3,500	3,005	2,560	2,560	3,330	5,985	13,140	237,820	
26	7,280	41,500	9,450	3,500	3,005	2,560	2,560	3,330	27,720	15,800		
27	6,500	19,600	9,450	3,500	3,005	2,560	2,705	5,065	9,450	14,000		
28	6,260	17,040	10,470	4,645	3,005	2,560	2,560	4,645	17,750	13,140		
29	21,200		10,120	3,870	3,005	2,560	2,425	5,065	19,300	8,800		
30	28,040		9,450	3,500	3,870	2,045	1,815	5,065	14,880	7,580		
31	73,000		8,800		3,685		1,605	7,020		18,770		
Maximum	73,000	96,120	78,300	10,120	3,870	5,290	34,270	7,020	27,720	64,360	237,820	
Minimum	6,260	11,660	8,800	3,500	2,045	2,045	1,605	1,225	1,815	1,930	7,020	
Mean	13,769	29,162	17,215	5,130	3,178	3,180	4,352	2,338	8,335	10,862	32,400	

NOTE.—No record on days for which no discharge is given. Discharge determined from fairly well-defined curve.

Daily and monthly discharges, in liters per second, of Daet River near Daet, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		8,060	25,960	7,230	3,120	3,270	3,270	3,910	1,700	7,930	12,030	18,400
2		22,160	9,660	6,730	2,700	2,980	2,700	8,370	1,500	4,790	10,680	15,520
3		13,440	9,000	6,260	2,560	2,420	2,700	4,260	1,900	4,790	15,010	17,200
4		11,040	9,000	5,810	2,560	2,420	2,700	1,790	2,300	4,230	19,640	12,990
5		49,520	8,370	5,400	2,700	6,030	2,980	2,980	2,520	4,790	12,030	78,700
6		12,560	8,060	5,400	2,700	4,080	2,980	7,230	3,710	4,230	12,030	68,950
7		9,660	7,770	4,620	2,560	3,910	2,980	4,260	3,710	4,230	9,450	23,980
8		9,660	7,230	4,620	2,700	4,620	2,840	3,580	7,930	4,230	12,030	23,980
9		9,000	7,230	4,440	2,980	4,260	2,560	2,980	7,240	12,990	12,030	21,650
10		8,370	6,730	4,260	3,420	3,910	2,700	2,700	3,710	13,990	12,500	12,990
11	9,000	9,000	6,260	4,620	3,580	3,420	2,700	2,560	3,210	21,650	12,030	11,560
12	44,560	8,370	6,260	4,810	3,910	2,420	2,700	2,560	3,210	12,990	12,030	20,940
13	21,000	8,060	5,810	4,620	3,270	2,420	2,560	4,230	3,460	25,590	12,030	12,030
14	18,580	7,500	6,260	9,000	3,270	2,290	2,700	3,710	3,710	12,030	11,110	12,030
15	14,370	6,730	9,660	7,230	3,910	2,290	2,980	3,960	3,210	8,670	9,840	11,110
16	2,990	6,730	9,000	5,200	3,580	2,290	2,840	3,710	3,210	7,240	8,670	32,780
17	12,160	6,260	8,680	4,260	3,120	2,980	2,700	3,710	3,210	6,600	6,670	20,940
18	9,000	5,810	8,680	4,620	2,980	4,260	3,270	3,710	3,710	7,930	6,970	23,980
19	8,370	5,000	8,680	4,260	2,840	2,980	3,270	3,460	4,230	12,030	10,680	121,600
20	9,000	23,480	8,680	3,910	2,980	2,700	2,980	3,460	4,790	11,110	7,240	182,050
21	8,370	6,260	8,370	3,580	3,580	3,910	2,700	3,210	12,990	11,560	5,990	221,050
22	9,000	6,730	8,370	4,260	4,440	3,270	2,980	2,750	7,930	10,250	17,200	15,520
23	8,370	6,260	8,060	4,260	11,780	3,120	3,270	2,300	10,250	8,670	12,200	13,990
24	8,370	6,260	7,770	3,910	9,660	2,840	4,260	2,100	29,960 176,200	7,240	12,030	48,720
25	9,320	6,030	7,770	3,580	6,730	2,420	2,560	1,900	11,110	6,600	10,250	32,780
26	8,370	11,040	8,370	3,580	5,810	2,560	2,560	1,500	7,930	6,290	17,200	20,940
27	9,000	6,260	10,000	3,580	5,200	2,420	5,000	1,140	15,520	10,250	36,850	19,640
28	8,370	6,260	9,000	2,420	4,620	2,420	4,260	960	12,030	12,990	32,780	48,720
29	8,370		8,680	2,160	4,260	3,580	3,120	800	12,030	9,450	176,200	23,980
30	8,370		8,370	1,910	3,910	3,580	2,980	800	9,450	11,110	17,200	30,890
31	8,370		7,770		3,420		3,580	1,500		11,110		258,100
Maximum	44,560	49,520	25,960	9,000	11,780	6,030	5,000	8,370	176,200	25,590	176,200	258,100
Minimum	2,990	5,000	5,810	1,910	2,560	2,290	2,560	800	1,500	4,230	5,990	11,110
Mean	12,062	10,911	8,694	4,685	4,027	3,202	3,045	3,100	9,150	9,599	18,916	47,668

NOTE.—See footnote to discharge table for 1921.

CAMARINES NORTE PROVINCE

LABO RIVER, LABO

LOCATION.—Northeast of the town of Labo and about 300 m. below the provincial road.

RECORDS AVAILABLE.—From January 1, 1921, to May 31, 1922.

GAGE.—Standard metric gage board on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low and from boat at high water stage.

CHANNEL AND BANKS.—Channel splits into two at high water stage. Rapids 50 m. below and straight for 1 km. above the station. Bed of stream gravelly and sandy. Right bank high and left bank low; both covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 611,500 second-liters on November 26, 1921; minimum discharge, 7,350 second-liters on January 28, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Roughness of river bed affect discharge measurements. At high water stage no place for good discharge measurements due to formation of rapids. Record good below 10,000 second-liters; for higher stages records may be considerably in error.

Discharge measurements of Labo River, near Malasugue, Labo, Camarines Norte

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
April 13	O. B. and Buchanan	.02	25,668	
June 8	S. Musa.	.12	19,134	
July 25	do.	.32	18,882	
August 15	do.	25	17,088	
1922				
March 22	do.	.34	22,050	
April 21	do	.30	30,070	
May 10	do	27	27,122	

Daily and monthly discharges, in liters per second, of Labo River near Malasugue, Labo, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	19,825	101,500	38,050			17,075	12,450	17,625	29,525	61,500	46,050	63,500
2	20,925	56,650	30,875			19,825	11,475	16,550	25,700	46,050	54,800	64,500
3	30,875	39,600	20,925			17,075	15,500	26,950	28,225	41,150	186,500	60,500
4	30,875	91,500	17,075			19,825	591,500	18,175	26,950	49,500	166,500	124,500
5	30,875	47,750	20,925			17,075	156,500	16,550	27,575	49,500	244,500	131,500
6	32,250	32,250	22,675			14,450	61,500	15,500	30,875	22,675	112,500	88,500
7	26,950	91,500	191,500			10,525	43,550	14,450	29,525	30,875	68,500	68,500
8	19,825	61,500	61,500			10,525	38,050	15,500	35,050	24,475	54,800	58,550
9	20,925	66,500	43,550			11,475	39,600	14,450	28,225	22,075	556,500	54,800
10	25,700	35,775	28,850			11,475	35,775	30,875	27,575	26,950	361,500	58,550
11	19,825	32,250	32,250			12,450	20,925	18,725	271,500	106,500	196,500	47,750
12	22,075	26,950	28,850			10,525	33,650	16,550	136,500	96,500	151,500	47,750
13	23,275	35,775	24,475			15,500	28,850	14,975	31,550	65,500	136,500	46,050
14	21,500	25,700	22,675			23,275	25,700	14,450	26,325	61,500	128,500	336,500
15	22,075	19,825	58,550			18,725	25,075	17,625	25,700	54,800	98,500	142,500
16	101,500	22,675	106,500			35,775	24,475	15,500	24,475	64,500	60,500	106,500
17	54,800	20,975	116,500			26,950	29,525	20,375	22,075	64,500	64,500	86,500
18	38,050	17,075	86,500			20,925	26,950	15,500	23,275	44,375	74,500	70,500
19	30,875	35,775	106,500			19,825	32,250	14,975	28,225	45,200	128,500	70,500
20	24,475	151,500	61,500			20,925	25,075	13,450	28,225	47,750	35,775	62,500
21	19,825	126,500	61,500			23,875	24,475	12,450	28,225	35,050	46,050	114,500
22	19,825	136,500	43,550			20,920	22,075	11,950	30,875	47,750	356,500	87,500
23	24,475	58,550	32,250			9,600	23,875	11,950	28,225	261,500	366,500	72,500
24	20,925	32,250	28,850			18,725	23,275	11,475	30,875	248,500	198,500	74,500
25	8,700	171,500	22,675			47,750	22,075	11,475	32,250	116,500	214,500	141,500
26	11,950	266,500				22,075	20,375	11,475	36,525	126,500	611,500	336,500
27	9,600	78,500				18,725	19,825	11,475	135,500	141,500	321,500	118,500
28	7,350	43,550				19,825	18,725	17,625	124,500	131,500	144,500	92,500
29	19,825					16,550	18,175	17,625	56,650	128,500	116,500	74,500
30	33,650					13,950	17,075	30,200	92,500	161,500	74,500	66,500
31	47,750						17,625	32,250		61,500		66,500
Maximum	101,500	266,500	191,500			47,750	591,500	32,250	271,500	261,500	611,500	336,500
Minimum	7,350	17,075	17,075			9,600	11,475	11,475	22,075	22,075	35,775	46,050
Mean	27,140	68,815	52,362			18,873	48,579	17,055	50,107	80,199	179,266	97,902

NOTE.—Records from March 26, 1921, to May 31, 1921, unreliable.

Daily and monthly discharges, in liters per second, of Labo River near Malasugue, Labo, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	60,500	29,525	42,750	20,925	23,275							
2	53,900	58,550	25,700	19,825	32,250							
3	53,900	41,150	22,075	18,175	33,650							
4	58,550	32,250	20,925	16,550	20,925							
5	54,800	60,500	19,825	16,550	18,725							
6	42,750	48,625	18,725	15,500	18,725							
7	40,375	42,750	17,625	15,500	18,175							
8	38,825	36,525	16,550	16,550	15,500							
9	36,525	30,875	16,550	16,550	24,475							
10	36,525	28,225	19,275	22,075	46,050							
11	41,150	28,225	22,075	28,850	25,700							
12	155,500	26,950	20,375	22,675	20,925							
13	131,500	25,700	24,475	20,925	18,725							
14	64,500	24,475	58,550	19,825	18,175							
15	62,500	23,275	52,125	21,500	17,625							
16	59,525	23,275	38,050	18,175	24,475							
17	39,600	22,075	56,650	16,550	23,275							
18	36,525	20,925	43,550	16,550	19,825							
19	36,525	19,825	33,650	16,025	19,825							
20	42,750	32,250	29,525	18,725	16,550							
21	35,050	23,875	26,325	16,550	17,625							
22	33,650	22,075	30,875	23,875	30,200							
23	32,950	23,275	25,700	18,725	32,950							
24	35,775	22,075	24,475	15,500	29,525							
25	32,250	18,725	23,275	16,550	20,925							
26	29,525	19,825	26,950	18,725	20,925							
27	35,050	18,725	38,050	17,625	29,525							
28	46,900	17,625	30,875	17,625	25,700							
29	39,600		25,075	18,725	19,825							
30	35,050		23,275	18,725	19,825							
31	26,950		22,075		16,550							
Maximum	155,500	60,500	58,550	28,850	46,050							
Minimum	26,950	17,625	16,550	15,500	15,500							
Mean	49,338	29,362	28,902	18,669	23,240							

CAMARINES NORTE PROVINCE

MATOGDON RIVER, LABO

LOCATION.—About 30 m. above the Matogdon-Labo trail.

RECORDS AVAILABLE.—From January 29, 1921, to August 5, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 40 m. above and 30 m. below station. Bed of stream gravelly at the station and below plenty of boulders. Both banks low and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 69,630 second-liters on November 9, 1921; minimum discharge, 220 second-liters on June 20–22, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from fairly well-defined rating curves. Record fair below 15,000 second-liters and those below 1,000 second-liters may probably be in error due to no discharge measurement made during low water. Fish dams sometimes put up near station and the approximity of the station to the junction of the two branches affect measurements.

Discharge measurements of Matogdon River, near Matogdon, Labo, Camarines Norte

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 24	Buchanan and Musa.	67	2,880	
March 10	Musa.	78	6,788	
April 14	O. B. and Buchanan	68	3,082	
April 25	S. Musa	67	2,371	
June 7	do.	55	1,601	
July 26	do	54	2,452	
August 16	do	55	1,546	
September 9	do	55	1,544	
October 26	do	.88	10,338	
November 28	do.	83	9,929	
December 3	do	79	8,199	
December 21	O. B	76	5,467	
December 22	do.	79	6,280	
1922				
January 16	S. Musa	68	4,340	
January 17	do	66	4,217	
February 22	do.	66	2,717	
February 23	do	63	2,397	
March 18	do.	.66	2,484	
April 20	do.	.65	1,474	
April 21	do.	.64	1,326	
May 9	do.	.60	1,273	
May 11	do.	.60	1,245	
May 12	do.	60	1,305	
May 13	do.	.62	1,360	
June 30	do.	.60	1,320	
July 3	O. B.	.64	1,804	

Daily and monthly discharges, in liters per second, Matogdon River near Matogdon, Labo, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		7,160	1,910	1,280	2,370	2,020	1,480	1,280	1,580	1,690	1,450	4,790
2		3,410	1,910	2,370	1,910	2,370	1,480	1,480	1,580	1,690	8,545	4,140
3		6,760	3,130	1,280	2,250	1,800	1,580	1,580	1,480	2,130	2,730	3,530
4		7,160	1,280	920	1,480	1,910	14,830	1,480	1,480	1,800	21,570	25,350
5		1,910	660	1,910	2,130	1,910	15,860	1,580	1,480	1,480	8,545	12,390
6		1,280	4,610	2,130	1,280	1,910	2,370	1,580	1,480	1,480	2,985	9,420
7		6,760	4,610	1,010	1,010	1,690	2,020	1,580	1,480	1,480	5,825	7,725
8		12,030	1,280	920	1,480	2,130	2,130	1,480	1,690	1,580	5,825	3,830
9		4,610	450	1,280	1,280	1,910	2,370	1,910	1,580	1,480	69,630	2,985
10		3,410	4,610	3,410	1,480	2,130	1,910	1,580	1,690	1,690	63,150	2,985
11		2,610	3,690	2,370	1,280	2,130	1,910	1,480	8,440	2,870	9,420	2,485
12		1,280	3,130	4,610	1,480	2,130	1,910	1,480	3,130	2,870	5,825	2,255
13		1,010	3,980	3,130	1,280	2,250	1,910	1,480	2,870	1,690	4,790	6,940
14		1,910	3,130	2,610	1,190	2,370	1,910	1,480	2,250	1,690	3,245	13,470
15		590	4,610	2,370	1,010	[a]920	1,910	1,480	1,690	1,690	2,485	8,545
16		2,370	3,980	1,690	2,130	[a]740	2,020	1,480	1,580	1,580	2,485	8,980
17		1,910	6,760	1,910	1,690	[a]450	1,910	1,480	1,580	1,480	2,485	7,320
18		4,610	5,810	2,610	2,370	[a]590	2,020	1,480	1,480	1,480	2,730	5,470
19		3,130	4,610	2,020	1,690	[a]450	4,290	1,480	1,580	1,690	2,985	5,470
20		6,760	4,610	2,370	1,910	[a]220	1,910	1,480	1,580	1,690	2,985	5,470
21		5,280	3,690	2,370	1,690	[a]220	1,910	1,480	1,480	1,690	2,985	5,825
22		3,690	2,020	2,740	1,280	[a]220	1,800	1,480	1,480	5,280	68,550	6,135
23		3,410	1,690	2,370	1,690	[a]330	1,690	1,480	1,480	36,150	22,110	5,470
24		5,280	1,010	3,130	2,020	[a]390	1,690	1,380	1,480	36,150	14,550	5,470
25		11,460	450	2,740	1,690	[a]390	1,690	1,380	1,480	2,985	48,570	24,270
26		4,610	1,280	2,020	2,130	920	1,580	1,280	1,910	8,545	41,550	19,410
27		3,130	1,100	2,610	1,690	1,100	1,480	1,280	5,280	4,140	8,545	14,010
28		2,610	920	2,490	2,020	920	1,480	1,480	2,130	2,985	8,545	6,940
29	4,770		1,280	1,690	2,020	920	1,480	1,480	2,020	2,485	6,135	7,725
30	4,940		2,740	1,910	2,370	1,190	1,480	1,580	2,130	8,545	4,790	8,545
31	11,460		2,130		2,370		1,480	1,580		9,420		6,135
Maximum	11,460	12,030	6,760	4,610	2,370	2,370	15,860	1,910	8,440	36,150	69,630	25,350
Minimum	4,770	590	450	920	1,010	[a]220	1,480	1,280	1,480	1,480	1,450	2,255
Mean	7,056	4,281	2,809	2,209	1,750	1,288	2.758	1,491	2,086	4,955	15,167	8,177

[a] Unreliable.

Daily and monthly discharges, in liters per second, Matogdon River near Matogdon, Labo, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,140	2,035	4,140	1,825	2,485	1,275	1,275	4,140				
2	4,140	11,330	2,485	1,825	2,035	1,630	1,630	2,035				
3	4,790	2,730	1,825	1,825	2,035	1,450	1,825	1,630				
4	5,470	2,485	950	2,035	2,035	3,530	1,275	1,275				
5	5,470	10,340	660	2,035	1,620	2,485	1,275	1,825				
6	5,470	3,830	660	2,035	1,630	1,825	1,275					
7	5,470	2,730	950	1,825	1,630	1,450	1,275					
8	4,140	2,035	950	1,825	1,450	1,275	1,275					
9	3,530	2,035	2,035	1,825	1,630	1,275	1,275					
10	4,140	2,485	4,140	2,035	1,630	1,275	2,255					
11	4,140	2,035	3,245	2,485	1,275	1,275	2,485					
12	13,470	1,630	2,485	2,255	1,275	950	1,825					
13	8,545	1,825	3,830	2,485	1,630	1,105	1,275					
14	6,940	2,035	10,340	2,485	1,275	950	1,275					
15	6,185	1,825	6,940	2,485	1,630	1,105	1,275					
16	2,985	1,630	11,330	2,485	1,450	6,940	1,275					
17	2,485	1,630	4,140	2,485	1,275	1,275	1,275					
18	2,485	1,630	2,730	2,485	1,275	1,275	1,275					
19	2,035	5,470	2,485	3,245	950	1,275	1,630					
20	2,985	3,530	2,485	2,485	1,105	1,105	1,630					
21	2,485	2,035	3,530	2,485	1,630	5,825	1,630					
22	2,985	2,485	2,985	2,485	3,530	2,985	2,985					
23	2,985	2,035	2,035	2,035	2,485	1,630	2,485					
24	2,035	1,630	2,035	2,255	2,035	1,275	2,730					
25	2,485	1,630	2,035	2,485	1,630	1,275	2,985					
26	2,485	2,035	6,560	2,035	1,630	950	2,035					
27	8,130	1,275	2,485	2,035	1,275	950	2,035					
28	4,140	1,275	2,035	2,035	1,275	950	1,825					
29	4,790		2,035	2,485	1,825	950	1,630					
30	3,245		2,035	2,035	1,630	1,630	1,450					
31	2,035		2,035		1,275		1,275					
Maximum	13,470	11,330	11,330	3,245	3,530	6,940	2,985	4,140				
Minimum	2,035	1,275	660	1,825	950	950	1,275	1,275				
Mean	4,413	2,846	3,181	2,228	1,663	1,772	1,707	2,181				

CAMARINES NORTE PROVINCE

SAN VICENTE RIVER, SAN VICENTE

LOCATION.—About 600 m. northeast of San Vicente.

RECORDS AVAILABLE.—From January 1, 1921, to December 31, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading about 25 m. below the gage.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and 90 m. below. Bed of stream sandy and gravelly. Both banks low and covered with vegetation; subject to overflow.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 39,880 second-liters on November 25, 1921; minimum discharge, 123 second-liters on June 28–29, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from fairly well-defined curves. For low water stages, record may probably be in error due to formation of rapids below station.

Discharge measurements of San Vicente River, near Calabagas, San Vicente, Camarines Norte

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
March 9	O. B. and Buchanan	.62	2,687	
April 14	do	48	444	
April 25	Buchanan and S. Musa	50	689	
June 6	S. Musa	44	228	
July 27	do	48	427	
August 17	do	47	365	
September 10	do	52	804	
October 25	O. B. and Musa	.74	3,775	
November 27	O. Buenaventura	.76	4,243	
December 2	do	.72	3,613	
December 21	S. Musa	73	4,779	
December 22	do	66	3,200	
1922				
January 13	do	72	3,784	
January 14	do	62	2,416	
January 16	do	.55	1,519	
January 17	do	.53	1,348	
February 21	do	.54	1,496	
February 24	do	.50	920	
March 17	O. B. and S. Musa	.63	1,942	
March 18	do	54	899	
April 20	do	.47	494	
April 22	do	.46	440	
May 9	do	42	322	
May 11	do	.42	402	
May 12	do	.42	398	
May 13	do	.42	392	
June 30	O. Buenaventura	.46	515	
July 3	do	.50	674	
July 26	do	.46	657	
August 15	do	.42	287	
August 18	do	.41	238	
September 5	do	.42	840	
September 8	do	.38	282	
October 17	do	.60	895	
November 7	do	.65	1,291	
December 25	do	1.39	8,951	

Daily and monthly discharges, in liters per second, of San Vicente River near Calabagas, San Vicente, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,727	20,080	2,910	878	597	512	227	432	686	686	4,170	2,540
2	2,540	4,405	2,200	686	512	512	512	432	512	686	6,280	1,886
3	2,200	3,727	3,103	686	512	512	2,910	360	512	1,092	10,840	2,200
4	2,200	10,840	1,886	686	512	597	26,680	432	512	1,336	13,480	11,170
5	2,042	3,727	1,596	686	432	512	2,540	512	512	1,596	10,180	6,880
6	1,596	2,910	3,302	982	432	512	1,092	512	597	878	6,280	4,905
7	1,466	14,140	17,440	686	432	432	878	360	512	597	5,170	4,905
8	1,596	22,720	4,170	686	512	686	878	432	597	597	6,280	4,646
9	1,466	4,905	2,910	512	512	512	686	432	878	686	25,360	5,170
10	1,336	2,910	2,540	512	512	432	597	432	3,103	597	25,360	4,905
11	1,212	2,200	2,042	512	512	512	512	360	10,180	3,727	7,540	4,405
12	1,092	1,886	1,736	512	512	512	597	432	4,170	4,170	5,170	3,944
13	982	2,540	1,596	512	432	360	512	432	2,200	1,736	4,640	4,170
14	878	1,886	1,336	432	432	512	360	360	982	2,366	3,727	8,860
15	1,336	1,466	2,910	512	512	686	432	360	878	982	2,540	6,880
16	4,646	1,336	4,646	512	360	512	360	432	597	597	2,200	6,280
17	2,722	1,092	8,860	512	512	432	360	432	432	597	2,200	5,170
18	1,596	1,886	14,140	512	360	360	360	512	360	878	3,727	5,170
19	1,336	2,200	5,170	512	360	360	512	432	360	432	5,710	5,170
20	1,092	12,490	3,944	512	360	512	432	512	360	512	5,170	5,170
21	1,092	12,160	3,302	512	432	512	360	432	878	512	5,990	6,880
22	878	8,200	2,200	686	360	512	292	512	597	1,336	28,660	4,170
23	878	4,170	1,886	512	360	360	432	512	597	14,470	35,260	2,540
24	781	2,910	1,596	512	686	982	432	360	512	26,020	11,500	3,302
25	686	34,600	1,336	686	512	597	432	360	597	4,170	39,880	12,160
26	686	22,060	1,336	686	512	512	512	512	878	11,170	17,770	14,140
27	686	5,710	1,092	597	512	27	512	432	781	4,646	5,710	6,880
28	686	3,944	1,092	512	512	123	432	597	686	3,737	4,905	5,170
29	4,905		982	686	512	123	432	512	878	1,886	4,170	3,302
30	5,435		878	686	512	171	360	432	2,540	2,910	3,510	2,200
31	19,090		878		512		432	512		8,860		1,596
Maximum	19,090	34,600	17,440	982	686	982	26,680	597	10,180	26,020	39,880	14,140
Minimum	686	1,092	878	432	360	123	227	360	360	432	2,200	1,596
Mean	2,350	7,611	3,388	604	475	470	1,486	444	1,263	3,370	10,446	5,376

Daily and monthly discharges, in liters per second, of San Vicente River near Calabagas, San Vicente, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,394	1,272	2,416	675	385	338	385	385	304	690	1,310	2,470
2	1,152	5,306	1,272	605	385	338	338	450	338	610	1,210	2,340
3	1,394	1,892	920	545	385	338	675	385	338	540	1,410	2,220
4	1,640	1,394	698	492	360	304	545	338	304	540	2,100	2,470
5	1,640	4,506	698	450	338	545	450	320	338	475	1,860	3,985
6	1,394	3,869	600	415	360	450	385	1,589	320	475	1,740	12,000
7	1,152	2,416	508	492	385	338	338	545	304	540	1,620	3,370
8	805	1,152	508	450	360	304	338	450	280	575	1,620	3,200
9	920	920	698	450	338	338	320	385	385	1,860	1,620	4,650
10	1,152	920	698	450	338	338	385	338	338	1,310	1,565	3,050
11	1,152	698	600	545	338	338	385	338	320	1,460	1,510	2,900
12	6,100	698	698	450	338	338	338	338	304	1,565	1,410	3,200
13	4,186	698	508	751	338	320	304	338	304	1,310	1,310	2,340
14	2,690	600	1,394	998	320	320	492	320	304	1,030	1,210	1,980
15	1,892	508	1,640	545	338	304	415	320	304	1,120	1,120	1,510
16	1,640	425	2,074	450	338	415	385	338	304	1,510	1,030	1,920
17	1,394	698	1,698	450	338	450	912	304	304	1,410	940	3,890
18	920	600	998	450	338	385	492	338	338	1,510	850	6,240
19	920	920	912	450	338	338	385	338	385	1,860	770	8,405
20	1,152	2,690	830	545	545	338	385	320	338	1,360	690	16,510
21	1,764	1,152	1,376	605	830	545	385	304	338	1,310	895	3,285
22	1,640	1,152	1,589	450	675	385	415	338	2,975	1,310	770	2,540
23	2,828	920	998	415	492	338	415	320	2,975	1,210	1,920	2,220
24	1,640	920	830	450	450	338	1,942	304	1,030	1,120	1,740	2,470
25	1,394	805	675	415	415	338	998	304	940	1,030	1,620	16,705
26	1,892	920	1,815	450	450	360	338	304	985	895	1,860	5,895
27	2,283	698	1,589	450	415	338	360	304	940	1,565	2,470	3,800
28	2,690	698	1,376	385	385	330	385	304	940	2,610	3,890	2,975
29	2,283		998	385	338	304	415	304	850	1,410	9,080	2,470
30	1,892		830	385	338	545	338	304	770	1,310	2,750	3,125
31	920		751		304		415	304		1,210		2,680
Maximum	6,100	5,306	2,416	998	830	545	1,942	1,589	2,975	2,610	9,080	16,705
Minimum	805	425	508	385	304	304	304	304	280	475	690	1,510
Mean	1,804	1,409	1,073	502	397	367	486	383	640	1,185	1,796	5,059

CAMARINES SUR PROVINCE

ANAYAN RIVER, PILI

LOCATION.—About 250 m. northeast of Km. Post No. 16 of the Naga–Iriga Road and about 150 m. east of the municipal agricultural inspector's residence.

RECORDS AVAILABLE.—From March 6, 1919, to December 31, 1922. Also from January 1, 1911, to April 20, 1912, inclusive, at the old location very near the present station.

GAGE.—Standard metric gage board vertically spiked to a tree at the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low and ordinary high water at section of gage.

CHANNEL AND BANKS.—Channel is straight above and below for 25 m.; banks are high and not subject to overflow. At measuring section stream bed is sandy and very shifting; flow uniform, and good results can be obtained at low water stage.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 22,000 second-liters on July 1, 1911; minimum discharge, 106 second-liters on June 17, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from January 1, 1911, to April 19, 1912, determined from poorly-defined rating curve; from March 6 to December 31, 1922, from fairly well-defined curves. Gage read twice daily.

Discharge measurements of Anayan River, near Anayan, Pili, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
December 24	J. I. Quinn	2.16	5,660	
1911				
January 4	do	1.53	990	
January 14	do	1.49	1,011	
January 25	do	1.45	710	
February 6	do	1.45	730	
February 9	do	1.45	922	
February 14	do	1.48	806	
February 17	do	1.62	1,335	
February 21	do	1.97	3,194	
March 2	do	1.51	823	
March 7	do	1.48	605	
March 18	do	1.50	793	
March 22	do	1.47	735	
March 24	do	1.46	620	
March 27	do	1.49	806	
April 4	do	1.61	580	
April 8	do	1.56	470	
April 20	do	1.57	610	

NOTE.—Gage heights from February 28, 1919 referred to a different datum.

Discharge measurements of Anayan River, near Anayan, Pili, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
April 27	J. I. Quinn.	1.55	660	
May 10	do.	1 55	690	
May 24	do.	1.53	680	
June 7	do.	1 52	650	
June 17	do.	1 52	560	
July 7	do.	1.50	870	
July 21	do.	1 55	950	
August 4	do	1 51	660	
August 16	do.	1.47	640	
August 30	do.	1 43	850	
September 15	do	1 44	780	
September 18	do.	1 48	630	
1919				
February 28	W. Demers and Fegarido	21	280	
April 11	do.	.19	200	
April 29	A. Fegarido	17	170	
May 5	do	17	160	
May 30	do.	17	170	
June 11	do	19	200	
June 17	do.	.12	80	
August 7	do.	.60	930	
August 12	do.	52	727	
September 8	do.	.20	230	
September 12	do.	29	410	
October 15	do	.28	460	
October 18	do.	19	210	
November 11	do	.24	350	
1920				
January 20	M. B. Canas	.20	270	
February 10	do.	18	110	
February 13	do.	18	110	
March 11	do.	.18	100	
March 13	do	.18	70	
April 14	do	.17	160	
April 19	do.	.15	110	
May 10	do.	19	160	
May 14	do.	.19	230	
June 10	do.	.31	420	
June 15	do.	.31	560	
July 3	do.	.44	590	
July 24	M. B. Canas and O. Buenaventura	.31	530	
July 27	do.	30	500	
August 5	O. Buenaventura	.20	248	
August 18	do.	.24	288	
August 20	do.	48	854	
September 6	do.	.25	323	
September 10	do	.20	241	
September 18	do.	.18	221	
September 23	do.	43	716	
October 8	do.	.18	220	
October 14	do.	.56	1,148	
October 23	do	.22	263	
October 27	do	.19	330	
November 6	do.	.20	251	
November 10	do.	.20	347	
November 22	do.	.18	296	
December 4	do.	.22	360	
December 10	do.	.23	376	
December 23	do.	.16	226	
1921				
January 8	do.	.17	237	
January 12	do.	.16	242	
January 25	do.	.14	212	
January 29	do.	.19	290	
February 9	do.	.30	519	
February 14	do	.20	331	
February 22	do.	.32	585	
February 26	do.	.26	437	
March 12	do.	.20	317	
March 16	do.	.20	354	
March 29	do.	.14	221	
March 25	do.	.17	238	

Discharge measurements of Anayan River, near Anayan, Pili, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
April 7	O. Buenaventura	.15	229	
April 23	do	.13	203	
April 28	do	.12	194	
May 5	do	.10	181	
May 7	do	.09	166	
June 16	do	.14	223	
June 27	do	.14	173	
July 14	do	.16	243	
July 23	do	.44	853	
August 9	do	.20	340	
September 7	do	.29	593	
September 15	do	.29	936	
September 23	do	.20	384	
October 7	do	.18	300	
October 10	do	.16	324	
November 8	do	.22	385	
November 26	S. Musa	.86	3,015	
December 7	do	.29	526	
December 20	O. Buenaventura	.28	645	
December 27	do	.33	1,062	
December 28	do	.28	905	
1922				
January 5	do	.20	513	
January 9	do	.21	538	
January 18	do	.20	516	
January 23	do	.20	510	
February 4	S. Musa	.23	662	
February 14	O. Buenaventura	.26	677	
February 25	do	.23	594	
February 27	do	.25	559	
March 8	S. Musa	.24	482	
March 25	O. Buenaventura	.15	388	
April 6	do	.16	377	
April 15	do	.18	269	
April 25	do	.18	463	
May 5	do	.16	403	
May 10	do	.15	257	
May 17	do	.12	223	
May 25	do	.13	231	
June 5	do	.13	226	
June 24	do	.16	373	
July 11	do	.20	572	
July 20	do	.42	1,409	
August 7	do	.43	1,469	
August 22	do	.15	374	
August 29	do	.12	288	
September 2	do	.13	327	
September 21	do	.22	597	
October 3	do	.18	615	
October 12	do	.23	867	
October 19	do	.15	557	
October 26	do	.25	1,017	
October 31	do	.16	495	
November 3	do	.13	362	
November 16	do	.39	1,450	
December 2	do	.24	865	
December 7	do	.19	635	
December 14	do	.17	514	

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	600	700	870	730	680	650	22,000	800	800	660	620	
2	890	740	800	660	780	650	4,700	700	800	660	680	
3	1,060	720	790	660	840	650	1,400	660	790	600	680	
4	890	700	740	555	840	650	1,140	720	780	600	520	
5	840	700	720	600	870	650	1,060	720	760	650	520	
6	780	740	660	600	840	650	1,000	720	760	650	520	
7	760	820	600	560	780	650	1,000	710	870	650	1,200	
8	770	840	600	550	740	700	860	800	700	640	680	
9	820	920	600	600	700	620	860	760	720	640	920	
10	830	880	620	600	700	630	940	780	700	730	1,540	
11	1,250	2,400	630	480	830	620	780	760	700	660	2,500	
12	1,000	1,230	660	500	660	620	910	720	670	860		
13	520	1,160	620	560	600	600	14,000	760	1,340	820		
14	1,000	820	620	560	630	860	8,200	800	780	680		
15	940	2,000	630	600	630	600	6,400	660	840	620		
16	940	1,720	640	560	660	580	2,200	620	760	570		
17	900	1,340	710	620	700	580	1,300	620	560	600		
18	840	2,500	720	600	700	900	1,080	1,760	630	700		
19	840	9,200	740	620	660	1,100	1,080	1,400	620	700		
20	820	5,000	740	560	700	1,000	1,160	1,000	840	620		
21	820	3,000	750	610	700	920	940	800	1,120	670		
22	760	1,700	760	600	700	860	1,000	1,450	1,500	700		
23	1,000	1,200	620	910	650	800	1,180	1,250	820	670		
24	700	1,050	600	700	650	800	860	1,060	760	620		
25	710	1,500	630	710	650	860	860	960	700	700		
26	800	2,140	760	640	650	860	800	1,220	640	700		
27	740	2,260	860	640	680	800	600	880	740	700		
28	650	1,170	920	680	650	800	4,200	880	670	620		
29	650		820	640	650	800	1,500	840	740	620		
30	650		740	700	650	900	1,100	800	670	670		
31	700		730		680		1,000	800		670		
Maximum	1,250	9,200	920	910	870	1,100	22,000	1,760	1,500	860	2,500	
Minimum	600	700	600	480	600	580	600	620	560	570	520	
Mean	834	1,755	706	620	683	745	2,778	884	793	663	944	

NOTE.—Daily discharges determined from a poorly defined curve. Data rather defective and accuracy not warranted. Gage heights not reliable on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	400	430	360	380								
2	400	430	340	420								
3	400	430	320	280								
4	400	430	300	280								
5	400	430	300	300								
6	420	430	300	330								
7	450	430	300	300								
8	430	430	290	300								
9	430	430	300	250								
10	510	470	310	250								
11	580	390	310	350								
12	440	430	480	350								
13	440	430	400	380								
14	440	430	450	280								
15	390	470	400	280								
16	390	470	380	280								
17	390	470	380	280								
18	390	470	380	280								
19	390	470	330	280								
20	440	620	350									
21	440	1,200	330									
22	440	720	300									
23	390	590	380									
24	390	540	330									
25	430	520	330									
26	430	500	300									
27	430	470	300									
28	430	470	330									
29	430	400	300									
30	430		330									
31	430		380									
Maximum	580	1,200	480	420								
Minimum	390	390	290	250								
Mean	426	489	342	293								

NOTE.—Daily discharges determined from a poorly defined curve.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				244	170	184	2,904	212	250	250	316	299
2				260	170	170	5,151	212	282	235	250	353
3				244	170	700	530	308	250	220	220	299
4				228	170	170	440	404	250	220	190	452
5				198	170	156	476	276	220	250	190	1,050
6			228	184	170	156	372	712	220	235	190	692
7			212	184	170	156	340	932	250	250	190	411
8			212	184	184	156	260	584	250	266	190	282
9			228	184	184	260	228	792	515	282	220	391
10			244	184	184	308	308	404	580	978	220	353
11			244	198	212	198	260	476	882	473	316	299
12			244	198	198	170	228	772	411	536	282	282
13			212	198	212	156	212	656	353	473	282	353
14			212	184	212	156	212	260	282	515	1,314	353
15			244	198	244	128	184	228	250	391	1,002	299
16			244	184	308	116	212	260	282	316	762	353
17			260	184	260	106	260	212	431	266	1,146	353
18			260	276	212	116	244	198	515	250	1,242	473
19			212	260	212	156	244	184	316	250	810	1,986
20			276	184	212	212	228	476	353	250	646	1,386
21			228	184	212	142	244	548	316	220	411	391
22			260	184	198	116	1,182	372	250	250	1,482	299
23			260	184	184	116	1,812	276	235	220	646	282
24			276	184	184	128	620	244	220	266	282	299
25			260	184	184	212	512	244	220	906	316	282
26			244	170	184	1,896	404	260	220	1,362	250	316
27			244	184	184	512	340	244	220	978	494	266
28			244	170	184	170	372	212	220	266	334	250
29			212	170	170	422	340	244	220	250	299	282
30			212	170	170	566	308	308	220	266	282	316
31			212	.....	170	.....	260	244	.....	282	.....	250
Maximum			276	276	308	1,896	5,151	932	882	1,362	1,482	1,986
Minimum			212	170	170	106	184	184	220	220	190	250
Mean			238	198	195	256	635	379	316	393	393	443

NOTE.—Daily discharge determined from a fairly well-defined curve from 150 to 930 second-liters, applicable from March 6 to August 31, and from a well-defined curve from 240 to 1,360 second-liters, applicable from September 1 to December 31.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	316	235	205	136	220	136	1,458	558	334	220	348	856
2	372	235	190	136	220	176	1,794	558	334	235	310	679
3	266	220	205	136	220	162	3,138	558	316	473	387	545
4	316	205	190	136	220	176	3,138	558	334	353	1,448	329
5	353	220	190	136	205	353	1,050	250	334	235	497	735
6	316	220	220	136	220	558	431	250	334	220	348	825
7	299	205	190	136	235	558	473	266	334	205	310	429
8	299	220	220	149	235	353	738	266	353	205	275	407
9	266	220	220	176	235	536	473	266	391	220	292	329
10	282	220	220	190	235	452	558	266	250	220	292	367
11	250	220	220	190	235	282	1,098	353	250	205	292	329
12	266	220	220	205	220	266	1,482	299	250	190	275	310
13	473	220	220	299	220	431	1,554	282	220	190	292	310
14	431	250	176	205	235	391	1,362	353	220	1,650	348	310
15	266	266	176	176	250	452	1,218	558	220	3,930	387	310
16	250	235	176	176	282	494	1,170	250	220	2,922	329	473
17	250	220	190	149	282	473	882	282	220	882	310	429
18	250	205	190	176	282	334	834	316	220	494	310	387
19	250	220	176	176	810	299	738	353	220	411	292	329
20	250	205	190	250	646	282	692	316	220	2,946	275	292
21	250	190	190	205	494	299	692	334	190	2,178	275	292
22	250	190	190	220	353	316	738	334	220	407	275	292
23	250	190	176	190	250	669	786	316	452	310	275	275
24	250	190	162	162	250	602	858	316	624	292	275	275
25	220	190	162	162	250	536	558	282	646	275	275	258
26	220	190	162	220	220	473	646	316	1,674	275	275	258
27	220	190	162	205	220	602	1,002	353	858	275	275	258
28	205	205	149	220	205	646	810	1,482	558	275	275	275
29	205	190	149	220	162	1,122	692	1,482	334	275	275	275
30	205	.....	136	220	190	1,986	580	1,122	220	275	275	258
31	205	.....	136	.....	176	.....	580	1,122	..	292	.....	242
Maximum	473	266	220	299	810	1,986	3,138	1,482	1,674	3,930	1,448	856
Minimum	205	190	136	136	162	136	431	250	190	190	275	242
Mean	274	213	186	183	273	479	1,039	472	378	905	346	385

NOTE.—Daily discharge determined from a well-defined curve from 220 to 1,360 second-liters, applicable from January 1 to December 31.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	242			180	180	210	180	210	762	343	449	696
2	258			180	180	242	210	210	449	249	970	696
3	242			180	152	210	242	210	318	395	1,691	696
4	242			180	180	210	1,362	242	507	507	567	630
5	242			180	152	210	735	210	507	343	567	2,630
6	242			195	152	210	473	226	507	294	449	829
7	242			195	180	210	310	521	395	294	343	630
8	242			210	180	210	310	395	294	271	294	567
9	242			210	210	180	275	369	294	294	696	507
10	242			180	152	210	242	970	318 2,830	271	21,550	507
11	210			180	152	210	242	395	2,880 10,690	294	2,880	449
12	226			180	180	275	242	318	9,280	294	1,433	395
13	210		275	180	180	242	242	294	1,194	294	898	395
14	258		275	180	180	242	242	249	898	449	630	2,432
15	292		275	180	210	310	226	318	567	507	249	1,226
16	275		310	180	180	180	210	249	478	449	121	878
17	310		292	210	180	180	242	227	395	395	121	723
18	292		310	275	210	180	242	205	395	294	161	723
19	310		310	242	180	180	367	183	294	249	121	573
20	292		275	180	180	310	275	205	294	249	161	723
21	275		310	180	180	242	275	294	271	249	121	685
22	275		275	210	180	195	521	249	271	249	3,032	919
23	242		275	210	210	180	707	227	343	249	1,869	799
24	210		258	210	180	210	473	249	478	249	1,352	723
25	210		258	242	180	210	387	249	449	249	2,930	2,560
26	180		275	210	310	210	310	249	369	271	2,930	2,150
27	195		258	210	258	210	275	205	696	294	1,272	1,003
28	180		242	180	210	210	226	249	422	249	898	838
29	275		210	210	210	210	210	449	395	249	829	761
30	310		210	152	210	180	195	898	507	249	762	573
31	310		210		210		180	1,116		422		647
Maximum	310		310	275	310	310	1,362	1,116	10,690	507	21,550	2,630
Minimum	180		210	152	152	180	180	183	271	249	121	395
Mean	251		269	196	190	216	343	343	1,013	313	1,677	921

NOTE.—Discharge determined from fairly well-defined rating curves, applicable as follows: October 21, 1920, to August 7, 1921, fair below 1,540 second-liters; August 8 to December 14, 1921, fair below 3,000 second-liters. No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	723	538	723	374	503	259	438	1,322	259	943	370	1,357
2	878	573	723	374	799	287	374	919	287	740	370	943
3	647	647	723	345	503	316	878	647	438	622	740	805
4	573	573	761	374	470	316	573	503	374	568	2,460	871
5	503	573	723	374	438	345	503	609	503	2,206	1,649	943
6	503	799	723	374	374	316	503	723	573	1,547	943	680
7	573	647	647	406	374	316	438	1,046	878	805	680	568
8	538	573	647	374	374	316	470	685	878	680	568	464
9	573	573	573	438	345	316	438	503	1,003	1,649	464	464
10	573	573	573	438	438	316	1,226	438	573	943	464	370
11	573	573	573	438	374	374	438	961	961	680	370	464
12	799	573	609	406	374	345	406	573	1,134	740	805	464
13	838	609	609	438	287	316	647	470	1,134	568	3,493	464
14	647	723	573	503	316	345	438	503	838	568	3,037	464
15	647	723	609	470	316	374	374	438	573	680	2,206	664
16	647	723	647	438	316	316	647	503	503	680	2,594	464
17	647	647	647	503	259	316	723	1,322	438	680	1,181	805
18	503	723	609	573	259	374	1,089	1,806	438	568	1,100	568
19	609	647	647	503	259	374	961	647	761	464	568	2,885
20	573	723	503	438	259	316	1,578	573	503	464	568	1,860
21	573	723	374	503	316	374	2,212	438	438	370	1,100	9,573
22	573	723	374	503	316	374	1,134	374	5,054	370	680	1,547
23	503	723	374	503	316	438	1,748	316	2,792	286	568	805
24	573	685	374	503	316	406	1,524	316	1,420	370	568	1,860
25	647	723	374	503	316	374	919	259	919	327	464	1,450
26	503	723	438	538	287	316	573	259	16,248 12,157	680	416	1,268
27	573	723	573	503	287	316	878	233	5,925	680	15,349	2,885
28	573	647	374	470	316	345	1,322	316	2,206	680	7,445	1,181
29	573	.....	374	438	316	374	723	259	1,450	568	12,765	805
30	573	.....	374	503	287	503	503	259	1,268	464	2,330	5,469
31	573	.....	438	.....	287	.. ....	1,980	259	.....	370	.....	14,437
Maximum	878	799	761	573	799	503	2,212	1,806	16,248	2,206	15,349	14,437
Minimum	503	538	374	345	259	259	374	233	259	286	370	370
Mean	607	657	558	452	355	346	860	596	1,624	708	2,210	1,860

NOTE.—Discharge determined from fairly well-defined rating curves, applicable as follows: December 15, 1921, to September 26 (a. m.) 1922, fair below 1,200 second-liters; September 26 (p. m.) to December 31, 1922. fair below 1,300 second-liters.

CAMARINES SUR PROVINCE

BARIT RIVER, IRIGA

LOCATION.—Forty-three km. from Naga on the upstream side of bridge on the Buhi-Naga Road.

RECORDS AVAILABLE.—From February 27, 1919, to December 31, 1922. Also from May 8, 1910, to March 30, 1912, inclusive, at the old station at exactly the same place as the present station.

GAGE.—Standard metric gage board divided into two sections of 1 m. and 2 m. and set vertically on to the right bank of river and to the abutment of the bridge, respectively.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge at high water.

CHANNEL AND BANKS.—Channel is straight for about 40 m. above and below; left bank high, right low. At measuring section the river bed is full of large boulders which more or less affect the measurements of flow. Shifting only at very high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 100,000 second-liters on December 29, 1910; minimum discharge, 750 second-liters on August 18, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from May 8, 1910, to March 30, 1912, and from February 27, 1919, to May 2, 1920, determined from poorly defined curve; from January 11, 1921, to December 31, 1922, from well-defined curves. Gage read twice daily.

Discharge measurements of Barit River, near Santiago, Iriga, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
March 16	J. I. Quinn	1.72	8,630	
March 17	do	1.92	11,670	
April 6	do	1.92	20,910	
May 11	do	1.86	10,105	
June 19	do	1.86	7,040	
June 25	do	1.89	5,860	
July 19	do	1.97	7,200	
July 19	do	1.97	7,251	
August 15	do	1.76	6,712	
October 19	do	1.95	11,020	
October 24	do	1.89	9,790	
October 25	do	1.90	10,370	
October 25	do	1.90	9,760	
October 30	do	1.88	9,260	
October 30	do	1.88	9,150	
November 2	do	2 27	23,810	
November 5	do	2.31	25,330	
November 9	do	2.16	22,010	
November 15	do	2.20	19,370	
November 15	do	2.20	20,210	
November 16	do	2.20	21,619	
November 29	do	2.22	22,180	
December 22	do	2.34	26,550	
1911				
January 6	W. Demers	2.46	41,260	
January 16	do	2.20	25,940	
January 24	do	2.04	17,790	
February 4	do	1.94	11,600	
February 8	do	1.93	11,470	
February 15	do	2.07	15,270	

NOTE.—Gage heights from February 26, 1919, referred to a different datum.

Discharge measurements of Barit River, near Santiago, Iriga, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
February 18	W. Demers	2.17	18,040	
March 3	do	2 29	26,318	
March 8	do	2 16	19,829	
March 21	do	2 05	16,067	
March 25	do	2 00	11,979	
March 28	do	2 07	14,415	
April 8	do	1 97	12,420	
April 12	do	2.07	16,820	
April 18	do	2 01	13,140	
April 26	do	2 05	12,850	
May 8	do	1 97	10,520	
May 23	do	1 90	9,160	
June 6	do	1 85	7,100	
June 8	do	1 82	8,360	
June 30	do	1 82	7,470	
July 8	do	2 10	14,840	
July 20	do	2 26	22,670	
August 3	do	2 05	12,960	
August 15	do	1 90	8,220	
August 31	do	1 92	8,870	
September 14	do	1.83	7,010	
September 16	do	1 83	5,530	
September 19	do	1 83	6,370	
September 26	do	1 85	6,490	
October 13	do	1 78	5,080	
October 17	do	1 77	4,030	
December 11	do	1 74	4,600	
December 13	do	1.76	4,730	
December 22	do	1 80	6,230	
1912				
January 8	do	1.76	4,900	
January 12	do	1.77	3,580	
January 23	do	1.74	3,750	
February 9	do	1 72	3,940	
February 15	do	1 73	4,380	
February 24	do	2 06	13,350	
March 1	do	1.99	10,320	
March 9	do	1.89	5,630	
March 15	do	1.84	5,910	
1919				
February 26	W. Demers and A. Fegarido	42	7,710	
April 14	do	.44	3,550	
April 26	A. Fegarido	.43	3,346	
May 7	do	.40	3,200	
May 27	do	.45	3,760	
June 9	do	.46	3,750	
June 19	do	.46	4,040	
August 14	do	79	13,270	
September 6	do	.63	7,780	
September 15	do	.70	8,590	
October 10	do	.64	7,130	
November 10	do	.65	7,860	
November 15	do	.78	12,200	
November 19	do	.85	10,710	
December 2	do	.90	11,150	
December 9	do	1 08	16,800	
December 22	do	.96	13,530	
1920				
January 19	M. B. Canas	1.02	16,700	
February 9	do	.64	7,660	
February 14	do	.64	7,680	
February 26	do	.67	8,340	
March 9	do	.60	6,620	
March 16	do	.57	5,790	
April 12	do	.48	4,320	
April 20	do	.48	4,330	
May 7	do	.42	4,430	
May 17	do	.49	5,310	
June 9	do	.48	6,520	
June 16	M. B. Canas and O. Buenaventura	.47	4,850	

Discharge measurements of Barit River, near Santiago, Iriga, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
July 7	do	.52	6,720	
July 22	do	.41	6,460	
July 28	do	.50	7,560	
August 4	O. Buenaventura	.40	3,315	
August 11	do	.35	2,220	
August 17	do	.37	2,434	
August 27	do	.36	2,348	
September 4	do	.47	4,604	
September 10	do	44	3,999	
September 18	do	40	3,164	
September 24	do	51	5,658	
October 7	do	.54	6,450	
October 15	do	.66	9,144	
October 22	do	77	13,552	
October 28	do	.69	11,687	
November 5	do	72	11,586	
November 11	do	.64	9,257	
November 20	do	66	9,906	
November 26	do	.59	7,782	
December 4	do	68	10,716	
December 11	do	77	13,655	
December 22	do	72	12,177	
December 27	do	64	9,031	
1921				
January 7	do	64	9,022	
January 14	do	57	7,307	
January 24	do	.61	8,081	
January 29	do	62	8,562	
February 8	do	.80	17,312	
February 14	do	71	11,502	
February 22	do	.69	11,240	
February 26	do	70	11,429	
March 10	do	1.16	34,456	
March 17	do	1.04	27,476	
March 23	do	98	23,543	
March 30	do	1 02	25,804	
April 6	do	71	11,574	
April 22	do	58	7,485	
April 29	do	55	6,719	
May 4	do	54	6,333	
May 8	do	52	6,212	
June 13	do	56	7,643	
June 28	do	60	8,045	
July 16	do	.68	10,632	
July 25	do	61	8,580	
August 6	do	.56	7,290	
August 20	do	47	4,647	
September 6	do	58	7,629	
September 12	do	66	10,448	
September 22	do	67	10,465	
October 6	do	62	8,709	
October 11	do	59	8,042	
November 7	do	82	15,519	
November 28	S. Musa	1 48	60,308	
December 6	do	1 18	35,741	
December 21	O. Buenaventura	83	16,600	
December 28	do	1 10	30,931	
1922				
January 4	O. Buenaventura	.82	17,445	
January 10	do	77	15,185	
January 17	do	1 00	26,862	
January 25	do	.78	16,011	
February 3	S. Musa	70	13,945	
February 18	O. Buenaventura	62	9,377	
February 24	do	.60	8,652	
February 28	do	.57	8,226	
March 7	S. Musa	.56	7,247	
March 8	O. Buenaventura	55	6,781	
March 29	do	63	8,768	
April 5	do	.58	7,349	
April 21	do	.50	5,777	
April 27	do	.52	5,892	

Discharge measurements of Barit River, near Santiago, Iriga, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
May 5	O. Buenaventura	.50	5,490	
May 13	do	.50	5,565	
May 17	do	.51	5,862	
May 20	do	.49	4,748	
May 24	do	.52	6,389	
May 28	do	.48	6,051	
June 7	do	.48	5,896	
June 23	do	.43	5,405	
July 31	do	.70	9,757	
July 10	do	.74	10,437	
July 21	do	.59	7,427	
July 29	do	.56	6,614	
August 5	do	.70	7,758	
September 14	do	.59	7,375	
September 21	do	.64	7,675	
October 4	do	.66	10,463	
October 11	do	.62	9,058	
October 25	do	.57	7,272	
November 14	do	.74	11,896	
November 28	do	1.10	30,904	
December 7	do	1.11	33,107	
December 13	do	.95	22,834	
December 21	do	.88	21,484	

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						7,600	13,000	11,000	6,600	13,200	10,500	19,400
2						7,000	15,000	13,600	6,600	13,260	22,000	18,000
3						7,400	9,500	13,000		21,000	25,600	21,000
4						7,000	10,000	14,500	6,600	18,700	24,400	26,000
5						6,800	9,000	16,000	7,500	17,400	26,000	39,000
6						6,800	8,400	11,000	7,000	17,000	23,600	36,500
7						6,400	8,400	13,600	6,800	16,600	21,000	35,000
8					10,200	6,400	8,800	16,000	6,500	16,000	20,000	48,000
9					10,000	6,400	9,000	14,600	6,800	17,000	20,200	30,000
10					10,500	6,000	8,800	7,300	6,800	15,400	22,000	26,000
11					10,200	6,400	7,700	9,000	7,000	13,800	23,000	23,500
12					10,200	6,800	7,000	7,000	8,200	14,600	22,500	23,500
13					9,300	6,800	8,400	6,800	8,200	13,500		22,000
14					8,000	6,800	9,000	6,400	8,000	13,000		20,000
15					7,600	6,500	10,200	6,400	8,200	12,600	18,000	20,000
16					7,600	6,200	10,600	6,400	8,400	12,200	20,000	20,000
17					7,000	6,200	10,200	6,400	9,000	11,600	18,600	23,500
18					7,300	6,200	11,300	6,800	9,000	10,800	18,000	22,200
19					7,000	6,000	11,800	5,400	8,400	10,000	18,000	22,000
20					6,800	6,000	12,000	6,000	9,100	9,500	17,000	21,400
21					6,800	5,800	11,400	6,000	9,100	9,200	16,600	20,400
22					5,000	5,900	10,600	6,000	9,500	9,200	28,000	24,000
23					5,200	5,800	11,400	5,800	9,500	9,000	30,000	77,000
24					7,100	6,000	10,000	6,000	9,000	8,800	24,000	72,000
25					6,400	6,200	10,400	6,000	9,000	8,800	23,600	92,000
26					7,000	6,200	9,200	6,000	8,200	8,400	27,000	88,000
27					6,600	6,200	9,000	6,600	9,000	8,400	23,600	71,000
28					7,000	6,100	9,200	6,000	11,700	8,000	24,000	72,000
29					7,000	15,000	11,000	6,000	12,400	8,400	21,500	100,000
30					7,600	19,000	10,200	6,200	13,200	8,800	20,000	81,000
31					7,600		11,200	6,600		8,000		68,000
Maximum					10,500	19,000	15,000	16,000	13,200	21,000	30,000	100,000
Minimum					5,000	5,800	7,000	5,400	6,500	8,000	10,500	18,000
Mean					7,708	7,130	10,023	8,529	8,458	12,326	21,739	40,400

NOTE.—Daily discharges determined from a poorly defined curve. No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	68,000	12,700	29,000	13,500	11,400	7,600	15,500	13,800	8,200	5,700	3,800	4,000
2	62,000	11,400	27,000	12,200	10,600	7,600	24,000	13,800	8,000	5,400	3,800	4,500
3	53,000	11,200	25,000	12,400	10,600	7,000	20,000	13,000	8,000	5,000	3,500	4,500
4	44,400	11,200	22,400	12,200	10,600	7,000	22,000	13,000	8,000	5,400	4,000	4,000
5	42,000	10,500	21,600	12,000	10,600	7,000	20,000	12,000	8,000	6,000	3,800	4,100
6	39,000	10,500	20,600	12,200	10,500	6,600	18,500	11,600	7,500	5,400	3,800	4,500
7	35,000	11,000	20,000	11,200	10,500	7,500	17,400	11,000	7,000	5,400	3,800	4,500
8	34,000	10,500	18,400	11,200	10,500	8,300	15,500	11,000	7,000	5,400	3,800	4,000
9	34,000	10,500	17,200	12,000	10,000	8,000	15,000	10,000	7,000	5,000	3,800	4,000
10	36,000	10,500	17,400	13,000	10,000	8,000	15,600	9,400	7,000	4,800	3,500	4,000
11	33,800	13,500	17,000	17,000	10,500	8,000	16,600	9,400	7,200	4,500	3,500	4,000
12	31,400	14,000	18,000	16,400	10,000	8,000	14,500	9,000	7,400	4,800	3,500	4,100
13	31,400	14,000	18,000	15,000	10,500	8,000	17,000	8,600	7,200	4,800	3,500	4,100
14	26,000	14,600	16,800	14,000	10,500	8,000	29,000	9,400	6,600	5,700	3,500	4,100
15	26,000	15,000	16,800	14,000	10,000	8,000	32,000	8,200	6,000	5,800	3,500	4,100
16	25,500	16,200	16,600	13,000	9,400	7,500	32,000	8,000	4,600	5,000	4,000	5,000
17	24,000	16,600	16,600	14,000	9,400	8,000	24,000	7,400	5,400	5,000	4,000	5,000
18	23,000	18,500	16,000	14,000	9,400	8,000	30,000	8,000	6,000	5,400	4,000	4,000
19	23,000	20,000	15,800	14,000	9,600	8,000	26,000	9,800	6,000	5,000	4,000	5,000
20	20,800	25,500	15,400	13,200	9,600	7,500	21,000	10,400	6,000	4,800	4,000	5,000
21	19,000	31,500	15,400	12,000	9,600	6,800	23,000	10,400	6,000	5,000	4,000	6,000
22	18,500	37,000	14,500	12,000	9,400	6,800	22,500	11,200	7,000	4,800	4,000	6,000
23	19,000	35,000	13,000	14,400	9,000	7,800	21,500	12,000	6,400	4,000	4,000	6,000
24	18,000	32,000	12,700	14,000	9,000	7,400	20,000	11,600	7,000	4,800	4,000	6,000
25	17,000	32,000	12,000	14,000	8,800	8,000	18,000	11,000	7,000	4,400	4,000	6,000
26	16,000	32,000	12,500	13,000	8,700	7,000	17,400	10,000	7,000	4,000	4,000	5,400
27	15,600	32,000	13,000	12,600	8,700	7,000	15,600	10,000	6,000	3,500	4,000	5,600
28	15,500	27,400	13,400	12,000	8,700	7,000	17,000	9,800	5,000	3,200	4,100	6,000
29	14,000		14,000	12,000	8,800	7,400	11,400	9,400	5,000	4,600	4,000	5,400
30	14,000		13,400	11,400	8,000	7,400	11,800	8,600	5,400	4,400	4,000	6,000
31	13,000		12,500		7,500		14,600	8,600		3,500		5,400
Maximum	68,000	37,000	29,000	17,000	11,400	8,300	32,000	13,800	8,200	6,000	4,100	6,000
Minimum	13,000	10,500	12,000	11,200	7,500	6,600	11,400	7,400	4,600	3,200	3,500	4,000
Mean	28,739	19,171	17,161	13,123	9,690	7,540	19,729	10,303	6,663	4,855	3,840	4,848

NOTE.—Daily discharges determined from a poorly defined curve.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,900	3,900	10,000									
2	4,900	3,900	9,600									
3	4,900	4,200	9,200									
4	4,600	4,000	9,200									
5	4,900	3,800	8,600									
6	5,000	3,800	8,300									
7	5,000	4,000	8,000									
8	4,900	4,000	7,400									
9	4,400	3,800	7,000									
10	4,200	3,800	6,600									
11	3,800	3,800	6,300									
12	3,600	4,200	6,000									
13	4,000	4,400	6,000									
14	3,800	4,400	5,700									
15	4,000	4,300	5,400									
16	4,200	4,300	4,700									
17	3,800	4,000	4,600									
18	3,800	3,600	4,600									
19	4,000	3,600	4,800									
20	4,000	4,600	4,700									
21	4,000	10,800	5,400									
22	3,800	13,400	4,600									
23	3,800	13,600	4,400									
24	4,000	13,500	4,400									
25	4,000	12,000	4,000									
26	3,800	12,000	3,800									
27	4,000	11,400	3,800									
28	4,000	11,000	3,000									
29	4,000	10,800	3,000									
30	3,800		3,000									
31	3,800											
Maximum	5,000	13,600	10,000									
Minimum	3,600	3,600	3,000									
Mean	4,184	6,514	5,870									

NOTE.—Daily discharges determined from a poorly defined curve.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			3,532	3,324	3,116	3,116	8,108	8,524	8,940	7,692	7,276	17,260
2			3,532	3,532	2,700	3,324	10,188	8,316	8,524	7,692	7,276	17,052
3			3,740	3,948	2,700	3,116	10,604	8,108	8,316	7,276	7,276	16,844
4			3,532	3,532	2,700	3,116	10,188	9,356	8,108	6,860	7,276	17,260
5			3,532	3,740	2,700	2,700	9,772	9,980	7,692	6,860	7,692	18,716
6			3,740	3,532	2,700	2,700	8,940	9,564	7,484	6,860	7,900	18,716
7			3,948	3,532	2,700	2,700	8,524	9,772	7,692	6,860	7,692	18,300
8			3,740	3,740	2,700	3,116	8,108	10,604	7,692	7,276	7,900	17,468
9			3,948	3,948	2,700	3,948	7,900	10,604	6,860	7,692	7,900	16,844
10			3,948	3,948	2,492	4,780	7,276	11,020	7,484	7,692	7,900	16,012
11			4,364	3,532	2,700	4,780	7,276	11,020	7,692	7,484	8,108	15,596
12			3,948	3,948	2,908	4,572	7,276	11,020	8,108	7,276	8,108	15,180
13			3,532	3,532	2,700	4,780	6,860	10,604	8,940	7,276	7,692	14,764
14			3,948	3,740	3,740	4,364	6,860	10,812	9,356	7,692	8,732	14,764
15			3,532	3,532	2,284	4,364	6,444	10,604	8,940	8,108	10,604	14,348
16			4,151	3,324	2,700	3,948	6,236	10,604	9,564	7,900	13,932	13,724
17			4,364	3,740	2,284	3,948	6,028	10,396	10,604	7,900	16,220	11,020
18			3,532	3,532	2,284	3,948	6,028	10,188	11,020	8,108	21,212	11,436
19			3,948	3,532	2,492	3,948	7,900	9,356	11,020	8,108	21,836	13,100
20			3,948	3,532	3,116	4,364	5,404	9,356	10,812	8,316	21,212	15,100
21			3,948	3,532	3,948	4,364	5,196	8,940	10,604	8,108	20,380	15,180
22			3,948	3,948	3,948	4,156	5,196	8,732	10,604	8,108	20,588	14,348
23			3,948	3,948	4,156	3,948	5,820	8,524	9,980	7,692	20,380	14,764
24			3,740	3,532	3,948	3,948	6,860	8,732	9,356	7,692	19,132	14,348
25			3,532	3,532	3,948	4,364	6,860	8,524	8,940	7,484	18,092	14,140
26			3,532	3,324	3,948	6,444	7,276	8,524	8,940	7,276	17,468	12,892
27		3,532	3,532	3,532	3,740	8,940	6,860	8,108	8,524	7,276	17,260	12,684
28		3,740	3,532	3,324	3,740	8,940	7,900	8,108	8,524	7,068	17,260	11,020
29			3,532	3,116	3,740	8,524	8,940	8,732	8,108	6,860	17,052	10,812
30			3,324	3,116	2,908	8,108	9,356	8,940	8,108	7,068	17,260	10,812
31			3,324		3,116		8,940	8,940		7,276		11,436
Maximum		3,740	4,364	3,948	4,156	8,940	10,604	11,020	11,020	8,316	21,836	18,716
Minimum		3,532	3,324	3,116	2,284	2,700	5,196	8,108	6,860	6,860	7,276	10,812
Mean		3,636	3,753	3,587	3,082	4,575	7,587	9,504	8,884	7,511	13,287	14,710

NOTE.—Daily discharge determined from a poorly defined curve, applicable from February 27, 1919, to May 2, 1920.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	13,724	9,356	8,108	5,612	3,948	4,760	2,840	4,280	4,760	5,730	8,780	7,745
2	13,724	8,940	7,692	5,404	3,948	4,520	2,840	4,280	4,520	5,730	8,260	9,820
3	12,684	8,940	7,692	6,236	3,800	4,280	2,600	4,040	4,760	5,240	9,040	10,080
4	13,100	8,940	7,484	4,780	3,500	4,280	5,240	3,320	4,760	5,730	10,340	9,820
5	14,348	8,524	7,276	4,780	3,320	4,520	5,480	2,840	4,520	6,230	10,860	10,340
6	14,556	8,524	7,276	4,572	3,320	4,280	5,730	2,600	4,280	5,980	10,340	10,860
7	14,348	8,316	6,860	4,364	3,320	4,040	5,730	2,370	3,800	6,230	10,340	10,860
8	13,932	8,108	6,860	4,364	3,080	4,760	5,730	2,370	3,560	5,980	10,080	11,120
9	13,100	7,900	6,860	4,346	4,280	4,760	5,240	1,910	3,560	5,730	9,820	12,680
10	13,100	7,692	6,652	4,780	4,280	4,280	5,480	1,910	3,800	5,240	9,560	12,420
11	13,308	7,484	6,444	4,572	4,280	4,520	5,730	1,680	3,800	5,240	9,300	11,900
12	12,476	7,276	6,444	4,572	4,760	4,520	5,980	1,450	3,560	5,240	8,780	11,640
13	14,348	7,276	6,236	4,363	4,760	4,760	6,230	1,450	3,320	5,000	8,780	11,380
14	14,764	7,692	6,236	4,988	4,280	4,280	5,980	1,220	3,320	6,230	8,780	11,120
15	15,180	9,356	6,028	5,196	5,000	4,280	5,730	980	3,080	9,300	9,040	10,340
16	15,596	10,188	6,444	5,196	4,520	4,520	5,730	980	2,840	11,640	9,300	11,120
17	16,012	9,980	6,444	4,988	5,000	4,280	5,240	1,450	3,080	14,570	9,040	11,640
18	16,012	9,564	6,028	4,572	5,240	4,280	5,240	750	2,840	14,030	9,300	11,380
19	15,596	9,356	6,028	4,364	5,730	4,280	5,480	980	3,320	14,300	9,040	10,860
20	15,596	9,356	6,028	4,364	5,480	3,080	5,730	980	3,800	12,950	8,780	10,340
21	15,180	9,148	6,028	4,364	6,230	5,240	5,240	1,450	4,760	12,420	8,780	10,080
22	15,180	8,940	5,612	4,156	6,730	5,240	5,240	1,450	5,000	12,420	8,520	9,820
23	14,140	8,524	5,612	4,156	6,980	5,240	5,000	1,450	5,240	11,900	8,000	9,560
24	14,140	8,524	6,028	4,364	6,730	5,480	4,760	1,220	5,730	11,900	7,745	9,300
25	13,724	8,108	5,820	4,364	6,230	5,730	4,760	1,910	5,730	10,340	7,745	9,040
26	12,892	8,316	5,820	4,364	5,240	5,480	5,000	1,450	5,730	10,080	7,235	9,300
27	12,268	8,524	5,612	4,156	5,240	4,280	5,240	1,910	6,230	9,820	7,235	8,780
28	11,228	8,524	5,612	4,156	5,000	3,800	5,240	2,370	5,730	9,560	6,730	8,520
29	10,188	8,108	6,028	3,948	4,760	3,320	5,240	3,560	6,230	9,300	6,730	8,260
30	9,980	.....	5,612	3,948	5,240	3,320	4,760	5,000	5,730	9,040	6,730	8,000
31	9,980	.....	.....	.....	4,760	.....	4,760	4,760	.....	8,780	.....	7,745
Maximum	16,012	10,188	8,108	6,236	6,980	5,730	6,230	5,000	6,230	14,570	10,860	12,680
Minimum	9,980	7,276	5,612	3,948	3,080	3,080	2,600	750	2,840	5,000	6,730	7,745
Mean	13,690	8,604	6,402	4,613	4,806	4,520	5,136	2,205	4,380	8,762	8,767	10,188

NOTE.—Daily discharges determined from a fairly well-defined curve from 3,000 to 5,500 second-liters, applicable from May, 3 to December 31.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	7,745	14,150	34,210	18,630	6,650	4,410	8,330	6,980	6,330	10,440	12,270	43,860
2	8,260	16,550	27,530	17,370	6,330	4,730	8,330	6,330	6,980	10,440	14,540	41,220
3	8,260	17,370	26,020	15,730	6,330	5,690	8,330	6,330	6,980	10,080	24,060	39,240
4	7,745	16,550	25,530	15,730	6,010	5,690	22,690	6,980	7,310	9,730	24,550	36,650
5	8,260	16,140	23,580	11,900	5,690	5,050	27,020	6,980	7,650	9,030	25,530	36,040
6	8,260	15,730	24,060	11,900	5,370	5,050	24,550	6,980	7,650	8,330	24,550	34,820
7	8,520	15,730	30,180	11,900	5,690	4,730	21,710	6,980	7,650	8,330	23,110	32,420
8	8,260	15,730	34,210	11,160	5,370	4,410	19,930	6,330	7,650	7,990	23,580	30,730
9	8,000	14,930	32,990	11,160	5,050	4,730	19,060	6,980	6,980	7,650	24,550	29,630
10	7,745	14,930	32,990	10,800	5,050	5,690	17,370	7,650	6,980	7,650	38,580	27,530
11	7,650	14,150	30,730	10,440	5,050	6,010	14,930	6,980	7,650	8,330	52,440	25,530
12	7,650	13,770	26,520	10,440	5,050	5,690	14,150	6,330	10,440	8,330	53,760	23,580
13	7,310	13,010	26,020	10,080	5,050	6,980	12,640	5,370	12,270	8,680	51,120	22,170
14	7,650	12,270	25,040	9,730	4,730	10,440	11,900	5,050	12,640	9,380	48,480	24,550
15	7,650	11,900	24,550	9,030	5,050	11,530	11,160	5,050	11,900	11,530	42,540	24,550
16	7,650	12,640	25,530	9,030	5,370	11,900	11,160	5,690	12,640	12,640	38,580	23,580
17	5,050	11,900	26,020	8,680	5,050	11,160	12,640	6,650	11,900	12,640	36,040	22,640
18	9,030	11,900	25,040	8,330	4,730	10,440	12,640	5,690	11,160	12,270	32,990	21,710
19	9,030	11,530	25,530	7,990	4,410	9,730	9,730	4,730	11,160	11,900	30,730	20,370
20	9,030	12,640	24,550	7,650	4,730	10,440	9,030	4,410	11,160	11,530	28,570	19,060
21	9,380	13,770	24,550	7,650	5,690	10,440	8,330	3,770	10,800	11,160	25,530	16,960
22	9,380	12,640	23,580	7,650	5,690	9,730	8,330	3,770	10,440	11,160	26,520	17,370
23	9,030	27,530	23,580	7,650	5,370	9,730	8,330	3,150	10,800	11,160	34,210	15,730
24	9,030	28,040	23,580	7,650	5,050	9,030	8,330	4,090	11,160	11,800	37,920	16,550
25	9,030	33,600	22,640	7,310	5,050	9,730	8,330	4,410	11,160	11,160	47,160	17,790
26	8,680	37,260	21,710	6,980	4,730	9,030	9,030	4,410	10,800	11,530	68,940	28,570
27	8,330	20,370	20,810	7,650	5,050	8,330	9,030	3,770	11,530	11,160	66,960	29,630
28	8,330	14,930	20,810	7,310	4,410	8,330	8,330	4,090	11,900	10,800	59,040	29,630
29	9,030	.....	22,640	6,980	4,410	7,990	7,650	5,050	11,160	10,440	54,420	28,570
30	10,800	.....	22,640	6,980	5,050	7,650	7,310	5,690	10,800	10,800	49,800	26,520
31	12,270	.....	20,810	.....	4,730	.....	6,980	6,010	.....	11,900	.....	25,530
Maximum	12,270	37,260	34,210	18,630	6,650	11,900	27,020	7,650	12,640	12,640	68,940	43,860
Minimum	5,050	11,530	20,810	6,980	4,410	4,410	6,980	3,150	6,330	7,650	12,270	15,730
Mean	8,453	16,845	25,748	10,050	5,225	7,816	12,491	5,570	9,854	10,289	37,369	26,862

NOTE.—Discharge determined from well-defined rating curve below 41,000 second-liters, applicable from January 11, 1921, to January 7, 1922.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	24,550	12,040	7,350	8,280	5,550	5,100	4,320	12,870	5,550	13,720	8,280	48,400
2	22,640	12,040	7,650	7,650	5,550	5,320	3,960	15,530	6,020	13,720	7,960	46,800
3	21,260	12,040	7,350	7,650	5,780	5,100	4,320	14,600	6,020	13,290	8,280	42,800
4	20,810	12,040	7,060	7,060	5,550	4,900	4,700	13,720	6,020	11,230	9,300	43,600
5	20,810	11,230	7,060	7,350	5,100	5,100	4,320	13,720	5,780	10,440	11,630	37,200
6	19,060	12,870	7,060	6,790	5,100	5,100	4,500	14,600	6,020	10,440	16,480	37,200
7	18,630	12,040	7,060	6,020	5,100	5,100	4,500	14,600	6,520	10,440	17,460	36,400
8	20,620	12,040	6,520	5,780	5,100	4,700	4,700	13,720	6,270	10,050	16,480	34,000
9	19,000	11,230	6,270	5,550	4,900	4,700	4,700	12,040	6,520	9,670	16,000	31,720
10	16,970	11,230	6,020	6,270	6,020	4,500	4,700	12,040	7,060	8,950	15,530	29,560
11	16,480	10,440	6,520	6,520	6,020	4,700	5,550	11,630	7,650	8,950	15,060	28,150
12	18,480	10,440	6,520	6,270	5,780	4,320	5,320	11,230	8,280	8,610	14,600	25,420
13	28,150	10,440	6,520	6,020	5,550	4,320	5,100	10,440	8,950	8,280	14,150	24,130
14	28,150	10,050	6,270	6,020	5,550	4,140	5,100	10,440	8,280	8,280	13,720	22,330
15	29,560	9,670	6,520	6,270	5,100	4,320	5,100	10,440	8,950	7,960	13,720	20,620
16	30,280	9,670	6,790	6,520	5,100	4,320	5,100	11,230	8,610	8,280	12,870	20,620
17	28,150	8,950	7,060	6,270	5,550	4,500	4,700	11,230	8,280	7,650	12,040	18,480
18	26,760	8,950	7,060	6,020	5,550	4,320	5,100	11,230	8,280	7,650	12,040	17,960
19	24,760	8,950	7,060	5,780	5,320	4,500	5,100	10,830	8,950	7,350	11,630	18,480
20	22,930	8,610	7,060	5,550	5,550	4,320	5,100	10,440	10,050	7,650	11,230	26,080
21	20,620	8,950	6,520	5,550	5,550	4,320	5,320	9,670	9,300	7,350	12,450	26,080
22	19,540	8,610	6,270	5,780	6,020	4,140	5,550	8,950	11,230	7,060	13,290	47,600
23	18,480	8,280	6,020	6,270	5,550	4,140	7,350	8,280	13,720	7,060	13,720	57,200
24	17,460	8,280	6,020	6,020	6,020	4,320	8,280	7,960	15,530	7,060	12,870	54,800
25	16,000	7,960	6,270	6,020	5,550	4,320	9,670	7,650	14,600	7,350	12,040	51,600
26	15,060	7,650	6,020	6,020	5,550	4,140	8,950	7,060	14,600	7,060	12,040	50,000
27	13,720	7,650	8,950	6,020	5,320	3,960	8,610	7,060	15,060	7,650	14,600	50,000
28	13,290	7,650	9,670	5,780	5,100	3,960	8,610	6,790	15,060	7,350	33,230	52,400
29	13,720	.....	9,300	5,550	5,320	3,960	8,610	6,270	14,600	7,960	46,000	50,000
30	12,870	.....	8,950	5,550	5,100	4,320	9,670	6,020	14,150	8,280	50,800	46,000
31	12,040	.....	8,280	.....	5,100	.....	11,630	5,550	.....	8,280	.....	47,600
Maximum	30,280	12,870	9,670	8,280	6,020	5,320	11,630	15,530	15,530	13,720	50,800	57,200
Minimum	12,040	7,650	6,020	5,550	4,900	3,960	3,960	5,550	5,550	7,060	7,960	17,960
Mean	20,350	10,000	7,066	6,273	5,452	4,499	6,072	10,479	9,530	8,873	15,983	36,878

NOTE.—Discharge determined from well-defined rating curve below 24,000 second-liters, applicable from January 8 to December 31, 1922.

CAMARINES SUR PROVINCE

BATO LAKE, BATO

LOCATION.—About 500 m. west from the end of the street leading to the church from the lake, of the town of Bato and at a place between the town of Bato and the outlet of the Bicol River.

RECORDS AVAILABLE.—From August 13, 1910, to April 20, 1912.

GAGE.—Standard metric gage board vertically nailed to the inside of a box filled with rock, set into the bed of lake near shore line.

DISCHARGE MEASUREMENTS.—None made being a lake station.

CHARACTER OF SHORES.—Low shores, generally swampy and shallow.

EXTREMES OF STAGE.—Maximum stage during period of observation, 3.48 m. on December 30, 1910; minimum stage, 0.68 m. on April 20, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—To study the fluctuations of water level.

ACCURACY.—The datum utilized from September 13, 1911, does not seem to be in accord with the datum of the previous records. However, there are no data on hand whereby the seeming errors might be adjusted.

Daily and monthly gage heights, in meters, of Bato Lake near Bato, Bato, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									1.22	2.46	2.08	2.88
2									1.19	2.50	2.53	2.76
3									1.16	2.80	2.92	2.76
4									1.16	3.22	2.96	2.85
5									1.16	3.35	2.92	2.91
6									1.22	3.33	2.86	2.92
7									1.24	3.29	2.80	2.89
8									1.24	3.25	2.76	2.84
9									1.30	3.26	2.68	2.78
10									1.36	3.26	2.62	2.74
11									1.40	3.24	2.56	2.70
12									1.40	3.18	2.50	2.65
13								1.08	1.40	3.15	2.51	2.60
14								1.08	1.40	3.10	2.61	2.54
15								1.07	1.42	3.06	2.62	2.50
16								1.06	1.50	3.02	2.60	2.46
17								1.06	1.58	2.98	2.58	2.46
18								1.04	1.64	2.91	2.56	2.48
19								1.03	1.66	2.88	2.55	2.46
20								1.02	1.70	2.81	2.54	2.42
21								1.08	1.72	2.68	2.56	2.38
22								1.11	1.78	2.66	2.86	2.44
23								1.14	1.85	2.58	3.22	2.53
24								1.18	2.02	2.49	3.26	2.72
25								1.20	2.06	2.43	3.24	2.81
26								1.21	2.06	2.36	3.18	2.97
27								1.22	2.08	2.28	3.12	3.02
48								1.22	2.14	2.21	3.07	3.12
29								1.22	2.22	2.18	3.00	3.42
30								1.22	2.41	2.14	2.94	3.48
31								1.23		2.09		3.46
Maximum								1.23	2.41	3.35	3.26	3.48
Minimum								1.02	1.16	2.09	2.08	2.38
Mean								1.13	1.59	2.81	2.77	2.77

Daily and monthly gage heights, in meters, of Bato Lake near Bato, Bato, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3.43	1 80	1.94	1 46	1 62	1 33	1 71			1 56	1.08	1 00
2	3.38	1.76	1 93	1 44	1 62	1 30	2 61			1 54	1.06	1 00
3	3 31	1.72	1 92	1 43	1 64	1 28	2 97			1 52	1.05	1.00
4	3 25	1 68	1.90	1 42	1 64	1 26	2 99			1.50	1.04	1.00
5	3.20	1.64	1.87	1.40	1 66	1 23	2 98			1 48	1.02	1.00
6	3.14	1.59	1 84	1 38	1 68	1 19	2.98			1.46	1.00	1.00
7	3 08	1 58	1.81	1 36	1 72	1 16	2 98			1 45	1.00	.99
8	3 00	1.55	1.78	1 36	1 74	1 14	2.98			1 44	1.00	.99
9	2.94	1.51	1 75	1 36	1 72	1.12	2 98			1.42	1.00	.99
10	2 90	1.48	1.72	1 63	1 70	1 10	2 99			1 40	.99	.99
11	2 93	1.46	1.69	1.78	1 70	1 08	3 00			1 38	.99	.99
12	2 82	1 45	1 70	1 85	1 68	1 06	8 14			1.36	.98	.98
13	2 76	1.46	1 71	1 84	1 66	1 04	3 34		1 52	1 34	.96	.98
14	2.70	1.45	1.70	1 82	1 64	1 02			1.50	1.34	.96	.97
15	2.64	1.48	1.68	1 80	1.62	1.00			1.50	1.34	.95	.97
16	2 58	1 49	1.66	1.77	1 60	98			1 49	1 33	.96	.98
17	2.52	1 50	1.65	1 74	1 58	98			1 49	1 34	.98	.99
18	2 46	1 52	1.64	1.72	1 56	1.00			1 48	1 32	.99	99
19	2.40	1.56	1 62	1 72	1 52	1 01			1 48	1 30	1.00	99
20	2 34	1 62	1.60	1.70	1 50	1 01			1.48	1 28	1 00	.99
21	2.28	1.69	1 61	1.68	1 52	1 00			1 48	1 26	1.01	1.00
22	2.24	1 76	1.60	1.68	1 50	1 00			1 53	1 24	1 01	1.00
23	2 18	1.80	1 57	1 70	1.50	99			1 56	1 22	1.01	.99
24	2.14	1 78	1 54	1 70	1.48	99			1 58	1.20	1.01	.99
25	2 08	1 81	1 52	1.70	1 46	98			1 62	1.18	1.00	.98
26	2 04	1 84	1 50	1.68	1.44	98			1 60	1 16	1.00	.98
27	2 00	1 90	1.51	1 66	1 42	97			1 60	1 14	.99	.97
28	1 96	1 94	1 51	1 64	1 40	96			1 62	1 12	.99	.97
29	1 90		1 50	1 63	1 38	96			1 60	1 12	.98	96
30	1.87		1 50	1 63	1 36	1 00			1 58	1 12	98	.96
31	1 84		1.48		1 34					1 10		.96
Maximum	3 43	1 94	1 94	1 85	1 74	1 33	3 34		1 62	1 56	1.08	1 00
Minimum	1 84	1 45	1 48	1 36	1 34	96	1 71		1 48	1 10	95	.96
Mean	2 59	1 64	1 68	1 62	1 57	1 07	2 89		1 54	1 32	1 00	99

Daily and monthly gage heights, in meters, of Bato Lake near Bato, Bato, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.96	.98	1.00	.79								
2	.95	.98	.98	.78								
3	.95	.98	.98	.77								
4	.95	.97	.97	.76								
5	.96	.97	.96	.76								
6	.96	.97	.96	.75								
7	.96	.97	.94	.75								
8	.97	.97	.94	.74								
9	.94	.97	.94	.74								
10	.97	.96	.93	.73								
11	.97	.96	.92	.72								
12	.99	.96	.91	.72								
13	1.01	.95	.90	.71								
14	1.02	.95	.90	.70								
15	1.04	.95	.90	.70								
16	1.04	.95	.90	.70								
17	1.04	.94	.88	.70								
18	1.04	.94	.88	.69								
19	1.04	.93	.86	.69								
20	1.03	.94	.86	.68								
21	1.03	.99	.86									
22	1.02	1.03	.86									
23	1.02	1.04	.84									
24	1.01	1.04	.85									
25	1.01	1.04	.84									
26	1.00	1.03	.83									
27	1.00	1.02	.82									
28	1.00	1.02	.81									
29	1.00	1.01	.81									
30	1.00		.80									
31	.99		.79									
Maximum	1.04	1.04	1.00	.79								
Minimum	.94	.93	.79	.68								
Mean	1.00	.98	.89	.73								

CAMARINES SUR PROVINCE

BICOL RIVER, NABUA

LOCATION.—About 500 m. downstream from an old bamboo bridge on the road to Santo Domingo about 6 km. from Nabua.

RECORDS AVAILABLE.—From October 18, 1910, to February 17, 1912.

GAGE.—Standard metric gage horizontally set at left bank of river. Chain and weight used for measuring the water surface fluctuations.

DISCHARGE MEASUREMENTS.—Made from boat at 200 m. above gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for about 200 m. above and several hundred meters below gaging section. Both banks wooded, high, yet subject to overflow. Stream bed sandy. Flow sluggish.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 200,000 second-liters on July 15, 1911; minimum discharge, 10,200 second-liters on January 7–8, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Records beginning only from October 18, 1910 and ending February 17, 1912, utilized. The rest of data can not be warranted to be very reliable.

Discharge measurements of Bicol River, near Santo Domingo, Nabua, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
October 20.	J I. Quinn	3 31	84,710	
October 26.	do	2 81	71,710	
October 26.	do	2 81	72,070	
October 31.	do.	2 45	59,740	
October 31	do.	2 45	57,130	
November 4	do.	3 39	104,403	
November 7	do.	3 29	93,680	
November 18.	do	3 09	71,500	
December 2	do	3 39	77,800	
December 2	do	3 39	75,400	
1911				
January 7	do	3.76	95,920	
January 16	do.	3 16	72,550	
January 28	do.	2.33	54,220	
February 4	C. O. Brown	2 00	39,160	
February 7	do.	1 84	39,580	
February 13	do	1 70	31,286	
February 16	do	1.76	34,846	
February 20	do	2 00	36,250	
March 1	do.	2 48	44,606	
March 6	do	2 30	43,800	
March 20.	do.	1.82	37,243	
March 23	do	1.77	33,452	
April 3	do.	1.51	30,480	
April 11	do.	2.00	40,330	
April 19	do.	1.90	41,540	
April 25.	do.	1 88	33,350	
May 9	do.	2.01	43,810	
May 22	do.	1 87	47,330	
June 7	do.	1 32	24,750	
June 16	do.	1.18	19,330	
July 6	do.	3.73	90,650	
August 5	do	3 42	89,020	
August 17.	do.	2.34	41,240	
August 29.	do.	2 69	56,130	

Discharge measurements of Bicol River, near Santo Domingo, Nabua, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
September 13	C. O. Brown	1.72	32,720	
September 28	do	1.79	36,470	
October 14	do	1 26	21,150	
October 18	do	1 27	22,000	
December 13	do	.77	14,450	
December 21	do	74	15,190	
1912				
January 8	do	63	10,090	
January 13	do	66	12,420	
January 23	do	.75	12,690	
February 9	do	.66	14,600	
February 17	do	.69	13,220	
February 24	do	89	10,810	
March 1	do	.83	4,210	
March 9	do	.72	3,430	
March 15	do	.68	2,840	

Daily and monthly discharges, in liters per second, of Bicol River near Santo Domingo, Nabua, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1											58,300	82,600
2											71,100	74,800
3											95,000	77,200
4											106,300	79,700
5											101,550	83,100
6											103,000	84,400
7											99,600	82,700
8											95,000	81,000
9											86,000	78,000
10											82,000	76,600
11											77,700	74,200
12											73,800	72,200
13											80,100	69,200
14											81,200	67,400
15											79,200	65,600
16											77,200	63,000
17											74,500	62,700
18										79,000	72,000	62,300
19										77,200	70,000	62,700
20										84,200	69,000	61,300
21										83,300	67,400	59,600
22										80,600	100,400	65,600
23										78,600	104,000	69,300
24										76,500	109,000	76,200
25										74,700	106,600	83,900
26										73,000	102,700	91,600
27										68,000	97,700	84,500
28										66,600	93,600	86,500
29										64,300	90,800	112,400
30										62,600	86,000	120,000
31										60,500		118,000
Maximum										84,200	109,000	120,000
Minimum										60,500	58,300	59,600
Mean										73,100	87,022	78,323

NOTE.—Records from September 1 to October 17 have not been included due to unreliability of discharges obtained.

Daily and monthly discharges, in liters per second, of Bicol River near Santo Domingo, Nabua, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	117,000	45,200	44,200	31,100	33,600	32,300	55,000	106,000	53,300	33,000	18,500	15,600
2	113,000	42,600	44,400	30,600	34,600	31,100	80,500	99,000	50,500	32,100	17,500	15,600
3	108,700	40,200	44,100	30,100	35,400	29,900	95,400	93,400	48,000	31,700	17,300	15,400
4	106,200	37,500	44,500	30,000	36,600	28,400	93,000	92,000	45,600	30,000	16,900	15,000
5	103,000	38,000	43,800	29,000	38,700	27,000	96,000	88,000	43,400	29,800	16,600	14,600
6	98,600	38,600	43,800	28,400	40,400	28,200	92,000	82,800	41,200	29,200	16,200	14,800
7	94,500	39,100	42,700	27,700	43,800	25,300	90,200	78,000	39,500	28,300	16,000	14,600
8	92,400	36,600	41,800	26,800	43,800	24,300	88,700	73,000	38,800	27,500	17,000	14,500
9	88,800	34,600	40,400	28,000	43,600	23,400	86,000	68,400	37,200	26,600	16,500	14,400
10	87,200	33,300	39,200	39,800	44,600	22,800	88,400	65,400	35,800	25,600	16,200	14,000
11	85,600	31,800	37,800	41,500	45,000	22,300	94,000	61,800	34,500	24,700	16,200	14,400
12	84,300	32,700	37,600	45,500	45,000	21,500	103,500	57,700	33,400	24,300	15,900	14,600
13	82,000	30,900	41,200	45,400	45,000	22,600	126,000	53,200	32,800	24,000	15,600	14,400
14	78,400	31,600	39,400	44,700	44,400	20,700	146,000	49,600	32,200	23,700	16,200	14,000
15	77,200	33,800	38,500	44,400	44,600	19,800	200,000	46,400	31,400	23,500	15,900	13,800
16	74,600	34,700	37,800	43,000	44,500	19,000	195,000	43,500	31,200	23,200	16,500	13,600
17	72,400	34,200	39,500	42,200	44,400	19,000	180,000	40,900	31,700	24,000	16,700	14,600
18	71,100	35,000	39,000	41,600	45,000	19,600	170,000	38,800	32,200	24,300	16,200	14,300
19	68,000	36,200	37,800	41,700	44,200	19,000	165,000	45,300	32,300	24,100	17,000	14,300
20	67,000	36,600	37,200	40,200	47,200	19,400	160,000	58,800	31,700	23,100	17,300	14,400
21	64,400	38,000	35,600	37,900	48,000	18,800	156,600	63,800	31,800	22,700	17,500	15,000
22	62,400	39,000	35,600	36,000	48,100	18,300	150,000	66,200	35,300	22,300	17,300	14,600
23	60,900	40,200	33,200	35,000	46,000	17,700	142,000	66,300	32,400	22,000	16,900	14,000
24	59,300	40,700	32,000	33,900	44,000	17,400	136,000	67,000	35,200	21,500	16,500	13,900
25	58,000	40,600	31,400	33,400	42,000	17,500	129,600	65,800	36,000	20,700	16,900	13,400
26	57,600	42,000	31,400	33,700	41,000	16,900	127,000	64,700	36,600	20,400	16,500	13,000
27	56,600	44,700	32,400	33,700	38,900	16,200	123,600	64,400	36,400	19,600	16,200	13,100
28	54,800	44,900	32,000	33,900	38,400	16,400	119,500	63,300	36,300	19,200	15,900	12,600
29	52,000	.....	32,200	33,400	36,500	16,000	115,400	61,400	35,300	19,000	15,600	12,000
30	49,100	.....	32,400	33,000	34,600	16,200	111,000	58,500	34,000	19,500	15,300	12,200
31	45,100	.....	31,800	.....	33,300	.....	109,800	55,600	.....	18,800	.....	11,600
Maximum	117,000	45,200	44,500	45,500	48,100	32,300	200,000	106,000	53,300	33,000	18,500	15,600
Minimum	45,100	30,900	31,400	26,800	33,300	16,000	55,000	38,800	31,200	18,800	15,300	11,600
Mean	77,103	37,618	37,894	35,853	41,781	21,597	123,536	65,774	36,867	24,474	16,560	14,074

Daily and monthly discharges, in liters per second, of Bicol River near Santo Domingo Nabua, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	11,200	13,400										
2	10,600	13,200										
3	10,800	13,500										
4	10,400	13,300										
5	11,000	14,000										
6	10,600	14,400										
7	10,200	14,100										
8	10,400	14,600										
9	10,200	14,400										
10	10,700	14,400										
11	11,200	14,000										
12	12,100	14,200										
13	12,900	13,600										
14	13,700	13,200										
15	14,100	13,300										
16	14,300	13,600										
17	14,000	13,200										
18	13,700											
19	13,300											
20	12,800											
21	13,200											
22	12,500											
23	12,000											
24	12,300											
25	12,200											
26	13,000											
27	12,900											
28	12,800											
29	12,700											
30	12,800											
31	13,500											
Maximum	14,300	14,600										
Minimum	10,200	13,200										
Mean	12,197	13,777										

NOTE.—Old records show gage heights up to March 31, but due to unreliability of discharges corresponding thereto, same have not been included.

CAMARINES SUR PROVINCE

BUHI LAKE, BUHI

LOCATION.—About 200 m. from right bank of the Barit River, the outlet of the lake.

RECORDS AVAILABLE.—From August 15, 1910, to April 20, 1912.

GAGE.—Standard metric gage fastened vertically to a tree.

DISCHARGE MEASUREMENTS.—None made being a lake station.

CHARACTER OF SHORES.—Very steep shores surrounded by mountains; covered with vegetation, trees, and hemp.

EXTREMES OF STAGE.—Maximum stage during period of observation, 2.00 m. on December 25, 1910; minimum stage, 0.36 m. on April 9–12, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—To study the fluctuations of water level.

ACCURACY.—There being no breaks in the record the heights shown seem reliable.

Daily and monthly gage heights, in meters, of Buhi Lake near Buhi, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									.47	.70		.88
2									.46	.68	1 22	.88
3									.45	.84	1 36	.95
4									.46	.88	1.30	1.27
5									.50	.86	1.26	1.44
6									.51	.84	1.20	1.43
7									.50	.80	1.12	1.39
8									.49	.76	1.06	1.34
9									.49	.78	1.02	1.29
10									48	.76	.99	1.24
11									.48	.74	.94	1.21
12									53	.76	.86	1.16
13									53	.72	.99	1 09
14									52	.70	1.00	1.06
15								47	.53	.64	1.00	1.08
16								48	54	.66	.96	1.06
17								47	55	64	.94	1.10
18								47	.54	.62	.90	1.08
19								46	.54	60	.88	1.05
20								45	.54	.58	.88	1.01
21								46	.56	60	.88	1.04
22								46	57	.60	1.19	1.18
23								45	.56	.58	1.25	1 60
24								45	.54	.56	1.22	1 83
25								.44	.53	54	1.19	2 00
26								43	.53	.52	1.16	1.96
27								43	.53	.50	1.12	1.87
28								.43	.66	.52	1.08	1.98
29								42	.68	.54	1 03	1.90
30								.43	.71	.56	.94	1.80
31								.46		.59		
Maximum								.48	.71	88	1.36	2.00
Minimum								.42	.45	.50	.86	.88
Mean								.45	53	.69	1 07	1.34

Daily and monthly gage heights, in meters, of Buhi Lake near Buhi, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1.70	.76	1.28	.81	72	.53	.75	.80	.73	.69	.56	.64
2	1.60	.72	1 24	.78	.72	.52	1 02	.78	.72	.69	.56	.64
3	1 52	.72	1.18	.75	.72	.51	1.01	.76	.71	.68	.56	.63
4	1.45	.70	1.14	.74	.70	.51	.97	.74	.70	.68	.54	.63
5	1.38	.68	1 11	.71	.70	50	.93	.72	.70	.67	.54	.63
6	1.32	.66	1.08	.68	.70	.50	.89	.72	.70	.66	.55	.62
7	1 29	.66	1.04	.67	.70	49	.85	.71	.69	.66	.59	.62
8	1 26	.66	1.02	.70	.70	.49	.82	.70	.68	.65	.61	.63
9	1 25	.64	.99	.75	.70	.48	.82	.68	.68	.65	.60	.63
10	1 23	.66	.96	.86	.70	47	.80	67	.68	.64	.59	.63
11	1 19	.76	.94	.86	69	.46	.80	.66	.69	.64	.58	.63
12	1 15	.84	1.00	84	.68	46	.79	.66	.69	.63	.57	.62
13	1 11	.86	.98	.82	.68	.47	.90	.66	.68	.64	.59	.62
14	1.08	.90	.96	.80	.66	.47	1 22	.66	.68	.64	58	.62
15	1.04	.94	.93	.78	.62	.46	1.30	66	.68	.64	.58	.65
16	1.02	.98	.90	.76	61	.46	1.29	.61	.68	.63	.64	.68
17	1.00	1.04	.80	.75	.62	.46	1 24	.64	.70	.63	.64	.68
18	.96	1.08	.86	.76	.61	.47	1 18	67	.70	.64	.63	.67
19	.94	1.20	.84	.75	60	48	1.16	.73	.69	.64	.62	.66
20	.92	1.30	.84	.74	58	.48	1.11	.76	.69	62	.61	.68
21	.88	1.40	.82	.74	60	.47	1.07	.78	.72	.58	.62	.68
22	.88	1.46	.82	.77	62	46	1 02	.81	.74	.62	.62	.68
23	.86	1.40	.80	.83	.62	46	1 00	.82	.74	.62	.61	.67
24	.84	1.36	.80	.83	.61	.47	.98	.82	.74	61	.60	.67
25	.82	1.36	.78	.82	.59	.46	.94	.80	.73	.61	.60	.66
26	.80	1.37	.80	.80	.68	46	.91	78	.72	.61	.59	.66
27	.80	1.36	.83	.78	.57	.45	.88	.77	.72	.60	58	.65
28	.78	1.32	.86	.76	.56	44	.87	76	.71	.60	.57	.65
29	.78		.88	.76	.56	43	.84	.76	70	58	.56	.64
30	.76		.86	.74	54	.45	83	.75	.70	58	.60	.64
31	.74		84		53		.82	.74		58		.63
Maximum	1 70	1.46	1 28	86	.72	53	1 30	.82	.74	.69	.64	.68
Minimum	.74	.64	.78	.67	.53	.43	75	.64	68	.58	.54	.62
Mean	1.08	1.00	.94	77	64	.47	97	.73	.70	63	59	.66

Daily and monthly gage heights, in meters, of Buhi Lake near Buhi, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.63	.59	.76	41								
2	.62	59	.74	41								
3	.62	.58	.72	.40								
4	62	.58	.70	39								
5	.62	.57	.68	.38								
6	.62	.57	.66	38								
7	61	56	.64	.37								
8	.64	56	.62	.37								
9	.64	.56	.60	.36								
10	.63	.55	.60	36								
11	.62	.55	58	.36								
12	.64	54	.58	36								
13	65	.54	56	37								
14	.64	.54	.54	41								
15	.64	.55	.54	41								
16	.64	55	.52	.41								
17	63	.55	.52	41								
18	.62	56	.50	41								
19	.62	.56	.50	41								
20	.62	.62	.51	41								
21	.62	.84	50									
22	.61	90	50									
23	.62	.90	48									
24	.62	90	47									
25	.61	.87	.46									
26	.61	.85	.45									
27	.61	83	.45									
28	.60	.80	45									
29	60	.74	.45									
30	.60		.43									
31	.59		42									
Maximum	.65	.90	.76	.41								
Minimum	.59	.54	.42	.36								
Mean	.62	65	.55	.39								

CAMARINES SUR PROVINCE

COLASI RIVER, GOA

LOCATION.—About 500 m. from main street of Goa at the first bridge from Goa on the Goa–San Jose Road.

RECORDS AVAILABLE.—From March 16, 1919, to December 31, 1922. Also from December 10, 1910, to April 20, 1912, inclusive, at the same location with breaks in the records from December 17, 1911, to January 31, 1912.

GAGE.—Made of two sections, the lower section is of an inclined type reading from 0 to 1.20 m. fastened to large stone in bored holes. The upper section is standard metric-gage board reading from 1.20 m. to 2.50 m. fastened to a left abutment of bridge.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge at high water.

CHANNEL AND BANKS.—Channel is straight for 10 m. above and below gaging section; banks high and covered with bushes. At measuring section stream bed is composed of gravel and sand and, therefore, shifting. Uniform flow can be obtained by cleaning bed of large boulders and placing low concrete control about 2 m. below gaging section.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 10,621 second-liters on December 23, 1910; minimum discharge, 6 second-liters on February 2, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Discharge for December 10, 1910, to April 20, 1912, and from March 16 to December 31, 1919, are determined from fairly well-defined curves. Discharge from January 1 to December 31, 1920, from poorly defined rating curve, from January 3, 1921, to December 31, 1922, from fairly well-defined rating curve. Gage readings for 1919–1920 rather doubtful; read twice daily.

Discharge measurements of Colasi River, near Colasi Bridge, Goa, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
May 5	J. I. Quinn	1 02	600	
December 9	W. Demers	1.02	870	
1911				
January 2	do	1 11	1,710	
January 2	do	1 15	1,620	
February 10	do	1 01	445	
March 13	do	1 07	720	
April 12	do	1 05	540	
April 13	do	76	1,170	
June 2	do	1 03	600	
June 26	do	1.00	430	
August 26	do	1 05	810	
1919				
April 8	A. Fegarido	.20	160	
April 10	do	.21	180	
April 30	do	.20	150	
May 3	do	.20	170	
June 12	do	.23	210	
June 14	do	.23	200	

NOTE.—Gage heights from April 8, 1919, referred to a different datum.

Discharge measurements of Colasi River, near Colasi Bridge, Goa, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 8	do	.24	240	
August 12	do	.48	500	
September 9	do	.23	200	
September 11	do	.25	220	
October 16	do	.25	260	
October 17	do	.23	200	
November 12	do	.25	290	
November 13	do	.25	320	
November 20	do	.44	380	
December 4	do	.43	430	
December 5	do	.50	570	
December 6	do	.38	380	
December 26	do	.32	490	
1920				
January 2	M. B. Canas	33	410	
January 23	do	.32	360	
February 11	do	28	340	
March 11	do	.26	370	
March 12	do	.26	280	
April 15	do	.22	150	
May 11	do	29	380	
May 12	do	.25	170	
June 11	do	.22	200	
July 21	M. B. Canas and O. Buenaventura.	.24	240	
July 26	do	.23	210	
August 9	do	21	150	
August 10	do	.19	107	
August 19	do	24	166	
August 25	do	19	118	
September 8	do	20	115	
September 9	do	19	107	
September 20	do	.24	169	
September 21	do	.27	220	
October 9	do	22	141	
October 26	do	29	248	
November 9	do	.26	200	
November 24	do	.27	223	
December 7	do	.30	323	
December 8	do	.34	421	
December 25	do	.25	211	
1921				
January 10	do	.16	792	
January 27	do	23	155	
February 11	do	.26	207	
February 24	do	.34	458	
March 15	do	30	322	
March 28	do	.25	205	
April 9	do	.26	209	
April 25	do	.24	186	
May 6	do	.22	171	
June 20	do	.31	332	
July 21	do	.28	255	
August 16	do	.30	322	
September 26	do	23	160	
October 31	do	.34	507	
November 18	do	.35	556	
December 13	do	.40	793	
December 14	do	.58	1,898	
December 26	do	.53	1,668	
1922				
January 7	O. Buenaventura and S Musa.	.38	747	
January 20	O. Buenaventura	.36	569	
February 17	do	.29	303	
March 9	do	.30	292	
March 27	do	.30	260	
April 7	do	.28	189	
April 22	do	.28	228	
May 9	do	.28	193	
May 18	do	.36	403	
May 27	do	.30	311	

Discharge measurements of Colasi River, near Colasi Bridge, Goa, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
June 26	do	.28	194	
July 12	do	.28	187	
August 9	do	.36	366	
August 23	do	.28	238	
August 23	do	.28	248	
August 30	do	.26	210	
September 13	do	.25	236	
September 22	do	.34	617	
September 23	do	.38	771	
October 2	do	.35	666	
October 14	do	.32	403	
October 20	do	.32	417	
October 28	do	.28	291	
November 2	do	.30	348	
November 18	do	.29	288	
December 5	do	.45	827	
December 16	do	.35	513	

Daily and monthly discharges, in liters per second, of Colasi River near Poblacion, Goa, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												672
11												546
12												546
13												546
14												546
15												672
16												546
17												546
18												742
19												814
20												672
21												1,508
22												2,431
23												10,621
24												4,771
25												5,551
26												5,291
27												2,691
28												4,251
29												2,691
30												2,431
31												1,939
Maximum												10,621
Minimum												546
Mean												2,294

NOTE.—Daily discharges determined from fairly well-defined rating curves, applicable only for discharges above 400 second-liters and below 1,600 second-liters. Above and below these limits, values are estimated from extension of curve.

Daily and monthly discharges, in liters per second, of Colasi River near Poblacion, Goa, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,822	436	1,717	.....	889	607	672	967	546	48	108	341
2	1,410	436	1,508	672	1,133	672	1,410	967	607	48	108	341
3	1,133	436	1,508	607	967	607	1,133	814	672	85	85	341
4	1,133	436	1,314	742	672	546	967	814	672	65	48	341
5	1,048	436	1,133	672	672	489	889	742	387	108	85	341
6	1,048	546	1,133	672	672	489	889	742	222	85	190	299
7	967	546	1,048	607	889	436	814	672	190	85	814	299
8	1,048	489	967	1,048	814	436	814	672	190	85	672	260
9	967	489	967	1,314	814	546	814	672	190	85	672	260
10	814	436	967	967	814	607	672	546	190	65	672	341
11	814	672	1,133	814	742	672	436	489	190	65	607	299
12	889	672	967	814	672	546	489	436	190	85	546	341
13	887	607	814	672	672	742	1,822	387	190	85	489	341
14	742	672	814	672	742	607	1,612	436	160	48	387	341
15	814	1,508	814	607	672	546	2,951	436	133	85	436	341
16	814	967	814	607	2,055	489	2,301	436	108	85	341	341
17	742	889	814	672	1,133	436	1,939	546	48	65	341	.....
18	672	1,612	814	672	889	546	1,717	436	48	85	341	.....
19	672	4,251	814	672	814	546	1,508	436	65	85	341	.....
20	546	2,431	742	672	742	489	1,314	436	48	85	341	.....
21	546	2,301	672	742	672	436	1,314	436	48	85	387	.....
22	646	2,175	672	742	672	436	1,133	546	48	85	341	.....
23	607	1,939	672	967	672	436	1,048	672	48	65	341	.....
24	672	1,508	607	967	607	436	1,048	814	48	65	341	.....
25	607	2,431	672	967	607	436	1,133	672	108	85	341	.....
26	546	3,341	4,511	814	814	436	967	672	.....	65	299	.....
27	546	2,431	.	814	672	436	814	672	546	85	299	.....
28	436	1,822		814	546	436	814	672	546	85	299	.....
29	436	. . .	.	814	546	436	967	607	133	85	260	.....
30	489		. . .	672	546	341	967	546	133	108	260	.....
31	489	4,251	. . .	. . . .	546	. .	889	546	108	108	299	.....
Maximum	1,822	4,251	4,511	1,314	2,055	742	2,951	967	672	108	814	341
Minimum	436	436	607	607	546	341	436	387	48	48	48	260
Mean	804	1,318	1,100	775	786	511	1,169	643	232	78	338	317

NOTE.—See footnote to daily discharge for 1910.

Daily and monthly discharges, in liters per second, of Colasi River near Poblacion, Goa, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		11	489	436								
2		6	546	436								
3		11	436	436								
4		24	489	436								
5		48	546	489								
6		24	546	436								
7		24	546	436								
8		48	546	436								
9		48	546	436								
10		65	436	436								
11		48	436	546								
12		48	436	607								
13		48	489	436								
14		299	489	489								
15		489	489	546								
16		546	546	489								
17		489	546	607								
18		546	489	607								
19		546	546	742								
20		672	607	607								
21		967	607									
22		672	546									
23		742	489									
24		546	607									
25		489	546									
26		436	546									
27		546	489									
28		607	489									
29		436	489									
30			546									
31			489									
Maximum		967	607	742								
Minimum		6	436	436								
Mean		327	517	504								

NOTE.—See footnote to daily discharge for 1910.

Daily and monthly discharges, in liters per second, of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				140	165	192	234	206	263	206	234	485
2				165	165	220	705	220	248	234	220	684
3				192	165	178	234	192	234	206	220	727
4				192	165	165	220	206	234	206	234	542
5				192	165	263	206	206	234	220	234	727
6				192	165	206	206	248	192	220	295	485
7				192	165	234	192	279	234	248	295	448
8				165	152	192	192	295	206	295	263	642
9				152	192	684	206	234	206	295	248	466
10				178	178	234	192	206	220	279	311	379
11				192	178	220	192	220	234	263	234	379
12				192	165	206	192	642	248	178	234	345
13				192	178	206	192	362	248	192	248	345
14				192	192	206	178	234	220	396	279	345
15				192	178	206	234	220	328	234	975	345
16			178	165	178	192	192	234	248	220	234	413
17			165	178	165	192	192	248	248	192	820	220
18			165	165	178	206	178	248	220	279	523	504
19			152	165	178	206	192	263	234	263	705	220
20			140	165	192	206	206	311	263	248	504	248
21			140	165	279	206	206	279	234	220	430	345
22			140	165	178	192	220	263	220	220	642	345
23			192	165	165	206	248	234	220	192	504	345
24			140	152	165	206	220	279	220	220	448	379
25			165	165	165	206	206	295	248	263	448	379
26			165	152	165	279	206	279	220	263	413	345
27			165	140	165	234	206	279	220	263	413	362
28			165	165	165	206	206	248	220	192	485	396
29			165	178	165	192	220	295	206	234	396	385
30			140	165	248	206	206	234	206	206	379	600
31			152		220		206	328		220		379
Maximum			192	192	279	684	705	642	328	396	975	727
Minimum			140	140	152	165	178	192	192	178	220	220
Mean			158	179	180	225	222	267	233	238	396	429

Daily and monthly discharges, in liters per second, of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	345	345	220	192	248	192	192	295	248	206	311	2,001
2	448	311	279	192	248	192	192	192	165	192	413	448
3	379	279	220	192	220	192	192	192	165	220	2,001	220
4	396	295	248	178	220	192	192	165	165	178	642	220
5	448	279	248	178	220	192	192	165	165	192	362	448
6	430	295	248	178	220	192	220	165	165	165	234	220
7	379	279	248	206	220	192	192	165	165	206	248	311
8	362	234	220	206	206	192	192	165	165	165	234	379
9	362	248	220	206	248	192	206	178	165	178	220	379
10	362	234	248	192	263	192	192	165	165	178	220	248
11	345	234	248	192	295	192	192	165	165	178	220	220
12	362	279	248	192	234	192	220	165	413	192	220	248
13	523	279	192	192	220	192	279	165	165	192	234	248
14	396	561	192	192	220	192	220	165	140	2,001	279	248
15	430	485	220	178	248	192	248	165	220	2,001	279	279
16	448	727	220	178	220	192	220	165	165	2,001	248	328
17	448	870	192	192	248	192	220	165	165	345	279	328
18	430	870	192	192	248	192	192	165	192	279	248	379
19	396	485	192	192	220	192	192	220	220	248	248	279
20	379	379	192	192	234	192	192	206	220	311	234	279
21	362	379	192	192	192	192	192	220	220	328	248	279
22	362	279	192	192	192	192	192	220	220	220	248	279
23	345	279	165	192	192	192	192	192	248	220	248	279
24	466	279	192	192	192	192	192	220	248	192	248	248
25	279	295	192	192	192	192	192	165	220	220	248	248
26	311	279	192	192	192	192	192	165	248	220	206	248
27	295	279	192	220	192	192	192	248	192	220	220	248
28	263	279	220	248	192	192	192	206	220	206	234	248
29	311	263	192	278	192	192	192	220	206	220	234	248
30	328	..	206	248	192	192	192	220	206	220	413	248
31	345	...	192	.	178	..	192	248	.	248	..	248
Maximum	523	870	279	278	295	192	279	295	413	2,001	2,001	2,001
Minimum	263	234	165	178	178	192	192	165	140	165	206	220
Mean	379	365	213	199	219	192	202	191	201	392	331	340

NOTE.—Discharge for June, unreliable.

Daily and monthly discharges, in liters per second of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	248	188	286	410	188	146	188	286	286	286	8,930	1,063
2	248	188	344	410	146	112	234	286	286	286	4,980	1,063
3	188	211	486	410	146	97	410	286	286	286	*572	936
4	188	234	486	410	146	146	666	286	286	286	8,410	936
5	188	234	528	410	146	146	314	286	286	286	3,550	1,130
6	188	234	572	260	146	146	234	314	286	286	4,310	1,063
7	211	286	572	234	146	146	234	286	286	286	1,778	1,063
8	188	286	572	188	146	146	234	286	286	234	3,000	936
9	211	286	486	234	146	146	211	286	286	234	4,470	822
10	234	234	410	211	146	188	188	286	286	286	10,280	716
11	234	234	410	188	146	234	188	286	410	286	8,670	716
12	146	234	572	188	146	234	234	286	410	286	5,340	716
13	146	286	486	188	146	234	234	286	618	286	3,710	666
14	188	286	572	188	146	286	234	344	572	286	1,518	2,170
15	234	234	572	188	410	286	234	344	260	344	572	1,436
16	211	286	572	188	260	286	188	344	260	286	618	1,278
17	211	286	286	188	188	286	234	286	286	286	572	1,203
18	146	286	286	188	166	286	286	234	286	286	528	998
19	146	286	286	188	188	344	260	234	286	286	528	998
20	188	286	286	146	188	344	286	234	286	286	528	998
21	146	234	234	146	188	286	260	286	286	286	528	998
22	188	234	234	146	166	234	286	286	286	344	3,000	936
23	188	234	234	146	146	234	286	286	286	286	5,340	1,518
24	188	377	377	146	146	234	286	286	286	344	3,690	1,130
25	188	666	716	144	146	234	286	286	286	344	3,840	3,710
26	188	572	572	144	146	234	234	286	188	344	3,990	2,390
27	166	572	572	144	146	234	286	286	286	344	1,602	1,356
28	234	260	260	188	188	234	286	286	286	314	877	1,278
29	344	.....	234	188	146	234	286	286	286	314	1,063	1,203
30	234	.....	234	188	146	188	286	286	286	572	998	1,130
31	234	.....	286	..	146	.....	260	286	.....	528	.....	998
Maximum	344	666	716	410	410	344	666	344	618	572	10,280	3,710
Minimum	146	188	234	144	146	97	188	234	188	234	528	666
Mean	201	294	420	213	168	213	269	287	310	313	3,260	1,211

NOTE.—Discharge determined from fairly well-defined rating curve, applicable as follows: January 3, 1921, to March 8, 1922, fair below 3,000 second-liters; March 9 to December 31, 1922, fair below 900 second-liters.

* Unreliable.

Daily and monthly discharges, in liters per second of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	877	410	447	403	228	228	403	1,293	122	507	228	2,076
2	877	377	314	269	228	228	356	696	155	507	155	1,865
3	768	410	286	269	191	311	564	453	93	403	311	1,554
4	716	344	286	269	228	356	453	403	93	356	311	1,380
5	716	486	286	269	228	403	403	403	155	403	228	1,119
6	666	410	344	311	228	269	228	564	228	403	311	1,293
7	716	377	314	228	228	269	191	564	155	403	311	945
8	666	377	314	228	228	269	191	507	155	507	311	1,032
9	666	377	356	311	228	269	228	627	155	453	311	945
10	666	377	403	228	228	269	403	507	122	453	311	1,032
11	572	377	403	228	403	228		403	93	403	269	945
12	822	410	311	228	228	311	228	311	93	403	269	1,119
13	666	410	403	228	228	311	228	311	93	403	403	945
14	618	410	311	228	311	228	228	311	93	403	311	945
15	877	344	311	228	311	228	228	311	191	403	311	945
16	666	344	311	228	311	403	228	311	155	453	311	1,119
17	666	314	311	269	627	403	228	311	771	564	311	1,119
18	666	286	507	228	627	269	228	228	507	403	228	945
19	618	286	311	228	311	311	228	228	269	356	311	2,250
20	618	286	356	228	311	356	228	269	311	356	228	2,511
21	618	286	356	228	311	228	311	269	269	311	696	1,641
22	618	344	356	191	403	228	507	228	627	311	771	1,641
23	618	344	356	191	311	228	696	228	696	311	507	1,380
24	572	344	311	311	311	269	403	228	1,032	311	403	1,641
25	572	286	356	311	311	228	771	228	771	228	453	1,467
26	528	286	311	269	311	228	696	228	1,554	403	453	1,728
27	572	286	356	228	311	311	696	228	1,293	228	1,293	4,860
28	486	314	311	228	311	228	627	228	696	269	3,838	1,728
29	447		269	228	228	228	627	228	453	228	5,643	1,467
30	410		269	228	228	311	453	191	564	191	2,163	2,511
31	410		269		228		771	155		155		3,120
Maximum	877	486	507	403	627	403	771	1,293	1,554	564	5,643	4,860
Minimum	410	286	269	191	191	228	191	155	93	155	155	945
Mean	644	354	336	251	296	280	401	369	399	371	732	1,589

NOTE.—See footnote to daily discharge for 1921.

CAMARINES SUR PROVINCE

INARIHAN RIVER, CALABANGA

LOCATION.—In the barrio Santa Cruz about 5 km. northeast of Calabanga and about 900 m. southeast of the Calabanga-Tinambac trail.

RECORDS AVAILABLE.—From August 21, 1920, to December 31, 1922.

GAGE.—Vertical staff made from a .05 × .076 × 1.5 m. guijo, fastened on to a big tree at the left bank. It is painted white and graduated to read from 0 to 1.5 m.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel straight for about 70 m. above and 30 m. below the station. Both banks high and steep and subject to overflow only at extreme high water stages. Stream bed full of gravel and small boulders and is rather shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 29,760 second-liters on November 25, 1921; minimum discharge, 666 second-liters on October 10, 1920.

DIVERSIONS.—One below the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge obtained from a fairly well-defined curve from 800 to 1,600 second-liters. Applicable up to October, 1921. Rating curves applicable throughout 1922, well-defined. Gage read twice daily.

Discharge measurements of Inarihan River, near Santa Cruz, Calabanga, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
July 2	M. Canas and B. B. Buchanan		1,670	
August 6	B. B. Buchanan and O Buenaventura		1,071	
August 21	O Buenaventura	19	857	
September 7	do.	19	817	
September 22	do.	27	1,313	
October 25	do.	.30	1,645	
November 8	do.	27	1,388	
November 23	do	27	1,388	
December 6	do.	43	3,565	
December 24	do.	27	1,378	
1921				
January 11	do.	28	1,434	
January 26	do.	29	1,528	
February 10	do	31	1,748	
February 23	do	41	3,185	
March 14	do.	30	1,638	
March 26	do.	28	1,466	
April 18	do.	25	1,262	
April 26	do	24	1,142	
May 7	do.	22	994	
June 16	do	26	1,295	
June 17	do	26	1,295	
June 25	do.	23	1,051	
July 19	do.	39	2,755	
August 10	do.	.25	1,236	
August 18	do.	34	2,103	
September 8	do.	.28	1,491	
September 9	do	.26	1,305	
September 9	do.	27	1,383	
September 24	do	.33	1,949	
October 8	do.	34	2,025	
November 9	do	64	8,482	
November 23	S. Musa	.80	13,176	
November 23	do.	92	17,764	
December 15	O. Buenaventura	.55	6,391	
December 27	do	.51	5,402	

Discharge measurements of Inarihan River, near Santa Cruz, Calabunga, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
January 6	S. Musa and O. Buenaventura	38	2,715	
January 6	do	40	3,070	
January 19	O. Buenaventura	.38	2,699	
January 24	do.	36	2,279	
February 7	O. Buenaventura and S. Musa	40	3,030	
February 16	O. Buenaventura	35	2,320	
February 27	do.	31	1,787	
March 10	S. Musa and O. Buenaventura	34	2,087	
March 11	O. Buenaventura and S. Musa	.33	1,898	
March 28	O. Buenaventura	29	1,745	
April 18	do.	27	1,392	
April 24	do	.24	1,203	
May 6	do	25	1,276	
May 16	do.	26	1,343	
May 16	do.	.25	1,253	
May 26	do.	25	1,338	
June 6	W. Demers and O Buenaventura	25	1,222	
June 27	O. Buenaventura	24	1,189	
July 17	do.	21	1,009	
July 30	do.	22	1,098	
August 8	do	26	1,506	
August 24	do.	21	1,344	
August 31	do	20	1,196	
September 12	do.	.22	1,241	
October 4	do.	28	1,639	
October 13	do	.26	1,497	
October 19	do	25	1,420	
October 27	do.	26	1,567	
November 4	do.	38	2,750	
November 17	do.	28	1,680	
December 4	do.	39	2,992	
December 8	do.	.36	3,027	
December 9	do.	38	3,211	
December 15	do	33	2,824	

Daily and monthly discharges, in liters per second, of Inarihan River near Santa Cruz, Calabanga, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									1,558	1,088	1,390	1,308
2									1,472	1,390	1,390	1,472
3									890	1,644	1,644	2,004
4									1,018	1,472	3,550	2,004
5									890	1,472	3,798	2,200
6									1,018	1,390	3,058	2,502
7									890	1,308	1,472	1,912
8									774	890	1,390	1,644
9									890	890	1,308	1,308
10									832	666	1,158	1,308
11									832	890	1,158	1,390
12									832	1,018	1,018	1,308
13									832	1,820	1,158	1,308
14									832	4,046	1,308	1,308
15									832	6,774	1,390	2,608
16									832	9,750	1,390	2,938
17									832	5,534	1,390	2,826
18									890	3,178	1,558	1,644
19									890	7,766	1,308	1,472
20									890	7,022	1,472	1,308
21								890	890	2,200	1,472	1,308
22								720	1,472	1,644	1,390	1,308
23								720	4,666	1,644	1,390	1,308
24								774	5,038	1,472	1,308	1,308
25								1,308	5,782	1,644	1,308	1,308
26								1,018	5,534	1,472	1,233	1,308
27								1,158	4,542	1,472	1,390	1,233
28								5,658	2,298	1,472	1,644	1,233
29								6,154	1,472	1,644	1,390	1,233
30								4,790	1,158	1,588	1,472	1,233
31								2,714		1,390		1,233
Maximum								6,154	5,782	9,750	3,798	2,938
Minimum								720	774	666	1,018	1,233
Mean								2,355	1,719	2,505	1,577	1,606

Daily and monthly discharges, in liters per second, of Inarihan River near Santa Cruz, Calabanga, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,233	4,294	1,820	1,390	1,158	1,308	1,308	1,308	1,472	2,102	2,450	5,020
2	1,308	1,820	1,820	1,472	1,233	2,004	1,233	1,308	1,308	1,912	7,550	4,440
3	1,308	1,472	1,732	1,390	1,233	1,472	1,308	1,233	1,308	3,058	5,650	5,020
4	1,233	1,390	1,732	1,308	1,233	1,644	7,394	1,158	1,644	3,058	3,890	4,630
5	1,308	1,472	1,644	1,308	1,233	1,233	2,714	1,158	1,308	2,502	3,720	15,540
6	1,233	1,390	2,298	1,308	1,233	1,158	2,200	1,158	1,472	2,200	3,380	7,550
7	1,233	1,644	4,666	1,472	1,233	1,644	1,820	1,308	1,472	2,004	3,060	5,650
8	1,390	2,608	2,608	1,390	1,233	1,308	1,644	1,233	1,390	1,912	2,750	4,820
9	1,308	2,200	2,200	1,308	1,233	1,233	1,820	1,158	1,308	1,912	9,710	4,440
10	1,558	1,644	2,004	1,308	1,233	1,308	1,644	1,308	2,102	2,200	27,230	4,070
11	1,472	1,472	2,004	1,308	1,233	1,308	1,558	1,233	8,262	1,820	13,100	3,720
12	1,308	1,558	1,308	1,308	1,233	1,308	1,472	1,233	10,122	2,200	5,650	3,720
13	1,158	1,732	1,644	1,308	1,233	1,308	1,390	1,308	4,046	2,200	5,020	5,870
14	1,158	2,004	1,644	1,308	1,233	1,472	1,390	1,308	2,826	3,302	4,070	12,120
15	1,158	1,644	1,558	1,308	1,308	1,472	1,390	1,644	2,200	3,178	3,720	6,090
16	3,550	1,390	1,472	1,308	1,308	1,308	1,390	1,820	2,298	6,090	3,380	4,820
17	1,308	1,308	1,644	1,308	1,308	1,233	1,558	1,390	2,004	3,060	3,220	4,630
18	1,233	1,390	2,400	1,308	1,233	1,233	1,472	1,308	1,912	2,600	3,060	4,440
19	1,233	1,308	2,200	1,208	1,233	1,233	2,200	1,208	2,004	2,450	2,900	4,440
20	1,158	1,912	2,004	1,208	1,233	1,308	1,644	1,233	1,820	2,310	2,900	5,020
21	1,158	6,030	1,641	1,308	1,233	1,233	1,644	1,233	1,820	2,310	2,900	4,250
22	1,158	4,418	1,558	1,308	1,233	1,233	1,820	1,233	1,820	2,450	13,440	3,890
23	1,233	2,714	1,472	1,233	1,233	1,233	2,004	1,158	2,004	3,060	15,540	8,880
24	1,088	2,400	1,472	1,088	1,308	1,308	2,400	1,158	2,004	2,600	11,480	5,220
25	1,088	4,542	1,472	1,088	1,308	1,308	1,732	1,088	2,004	3,060	29,760	17,000
26	1,088	4,170	1,472	1,088	1,308	1,233	1,390	1,088	1,820	3,220	15,800	12,440
27	1,088	2,400	1,390	1,088	1,390	1,233	1,308	1,088	2,004	2,750	8,340	7,290
28	1,088	2,004	1,390	1,088	1,308	1,158	1,308	1,088	1,912	2,450	6,310	5,966
29	4,294		1,390	1,088	1,308	1,158	1,308	1,208	1,912	2,310	5,430	4,676
30	2,004		1,390	1,088	1,308	1,158	1,308	1,732	3,058	2,450	4,820	4,418
31	2,004		1,390		1,308		1,233	1,472		2,450		4,418
Maximum	4,294	6,030	4,666	1,472	1,390	2,004	7,394	1,820	10,122	6,090	29,760	17,000
Minimum	1,088	1,308	1,308	1,088	1,158	1,158	1,233	1,088	1,308	1,820	2,450	3,720
Mean	1,456	2,298	1,821	1,273	1,302	1,325	1,806	1,283	2,421	2,619	7,676	6,273

NOTE.—Discharge determined from rating curves, applicable as follows: October 17, 1921, to December 27, 1922, fairly well-defined below 25,000 second-liters; December 28, 1921, to July 30, 1922, well-defined below 3,500 second-liters; July 31 to December 31, 1922, well-defined below 10,000 second-liters.

Daily and monthly discharges, in liters per second, of Inarihan River near Santa Cruz, Calabanga, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,902	2,535	1,894	1,512	1,347	1,274	1,203	3,210	1,020	2,280	1,350	4,860
2	3,902	3,442	1,894	1,512	1,347	1,512	1,203	2,160	1,020	2,160	1,460	4,090
3	3,902	2,690	1,894	1,512	1,426	1,347	1,347	1,570	1,020	2,660	5,350	3,490
4	3,664	2,535	1,787	1,512	1,426	1,274	1,274	1,460	1,020	1,920	3,070	3,350
5	3,442	2,386	1,787	1,512	1,347	1,274	1,690	1,240	1,020	1,920	2,790	3,210
6	3,050	3,236	1,787	1,426	1,347	1,274	1,274	1,920	1,020	1,680	2,160	3,070
7	5,450	2,535	1,690	1,512	1,274	1,347	1,070	1,460	1,460	1,800	2,040	3,070
8	3,442	2,250	1,690	1,426	1,274	1,274	1,070	1,680	1,020	1,680	1,920	2,930
9	3,050	2,126		1,426	1,347	1,347	1,008	1,460	1,570	2,930	1,920	2,930
10	4,160	2,126	2,126	1,426	1,347	1,347	1,347	1,240	1,130	2,400	1,800	2,660
11	3,050	2,006	1,690	1,512	1,347	1,274	1,598	1,570	1,020	2,400	2,040	2,400
12	9,578	2,006	1,690	1,426	1,347	1,347	1,008	1,240	1,130	1,920	1,920	2,660
13	4,418	2,006	1,598	1,426	1,347	1,347	1,203	1,240	1,240	1,920	1,460	2,930
14	3,236	2,006	1,598	1,512	1,347	1,274	1,135	1,460	1,020	1,680	2,660	2,530
15	3,442	2,006	1,598	1,426	1,426	1,274	1,070	1,460	1,240	1,920	2,400	2,530
16	3,050	2,006	1,598	1,426	1,347	1,203	1,008	1,460	1,460	1,800	2,040	3,350
17	2,864	2,006	1,690	1,426	1,347	1,203	1,070	1,240	1,240	1,680	1,920	5,860
18	2,690	2,006	1,690	1,512	1,347	1,347	1,070	1,570	1,920	1,680	1,800	4,090
19	2,690	1,894	1,690	1,598	1,347	1,274	1,070	1,240	1,240	1,800	1,680	7,540
20	3,236	1,894	1,598	1,426	1,347	1,347	1,203	1,240	1,240	1,800	1,680	4,700
21	2,690	1,894	1,598	1,426	1,274	1,347	2,386	1,130	1,020	1,920	3,210	6,760
22	2,535	1,894	1,598	1,426	1,690	1,347	1,690	1,020	10,120	1,680	2,160	4,090
23	2,535	1,894	1,598	1,347	1,690	1,274	2,535	1,020	2,530	1,570	1,920	3,350
24	2,386	1,894	1,598	1,347	1,347	1,274	2,006	1,130	2,660	1,680	1,920	7,140
25	2,386	1,894	1,598	1,426	1,274	1,274	1,203	1,020	2,160	1,570	1,680	6,220
26	2,386	1,894	1,690	1,426	1,347	1,274	1,135	1,020	9,430	1,460	1,570	5,520
27	3,050	1,787	2,250	1,347	1,426	1,274	1,426	1,020	5,020	1,680	15,390	7,540
28	2,864	1,894	1,598	1,347	1,690	1,274	3,442	1,020	3,350	1,240	23,800	4,240
29	2,535		1,598	1,347	1,347	1,274	1,070	1,020	2,400	1,800	22,350	4,390
30	2,386		1,598	1,347	1,274	1,347	1,070	1,020	2,280	1,240	12,870	19,450
31	2,386		1,512		1,274		3,490	1,020		1,240		
Maximum	9,578	3,442	2,250	1,598	1,690	1,512	3,490	3,210	10,120	2,930	23,800	19,450
Minimum	2,386	1,787	1,512	1,347	1,274	1,203	1,008	1,020	1,020	1,240	1,350	2,400
Mean	3,366	2,169	1,708	1,442	1,376	1,304	1,464	1,373	2,167	1,842	4,344	4,698

NOTE.—See footnote to daily discharge for 1921.

CAMARINES SUR PROVINCE

LAGONOY RIVER, LAGONOY

LOCATION.—About 1 km. northeast of town of Lagonoy, and about 50 m. east of barrio trail from Lagonoy. This trail commences from the first street parallel to main street and runs in northwesterly direction from the town of Lagonoy.

RECORDS AVAILABLE.—From March 11, 1919, to July 15, 1922. Gage-height records only from February 1 to April 20, 1912.

GAGE.—Standard metric gage board fastened vertically in two sections to a large tree on left bank of the river.

DISCHARGE MEASUREMENT.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel is straight for 35 m. above and below station. Right bank high and left bank low. Both covered with vegetation. At measuring section stream bed composed of large gravel and boulders. Somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 185,220 second-liters on November 25, 1921, estimated from extension of rating curve; minimum discharge, 2,420 second-liters scattered about in May and June, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from 1919 to October 16, 1920, determined from a poorly-defined curve; from October 17, 1920, to July 15, 1922, from well-defined rating curve. Gage read twice daily.

Discharge measurements of Lagonoy River, near Lagonoy, Camarines Sur

Day	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
April 9	A. Fegarido	.29	3,140	
April 10	do.	.32	3,450	
May 1	do.	.25	2,570	
May 2	do	.25	2,520	
June 12	do.	.30	3,320	
June 13	do	28	3,230	
August 9	do.	.61	6,000	
August 11	do	43	4,920	
September 10	do.	36	4,030	
September 11	A. Fegarido and M. B. Canas	60	6,320	
November 12	A. Fegarido	.65	6,730	
November 12	do.	70	7,290	
November 13	do	70	7,290	
November 21	do.	.72	7,780	
December 4	do	1.08	13,010	
December 26	do	68	6,620	
1920				
January 22	M. B. Canas.	.68	6,670	
January 22	do.	.64	6,020	
February 11	do	48	5,100	
February 12	do	.48	5,090	
March 12	do	.49	4,600	
April 15	do.	.36	2,310	
May 11	do.	36	1,570	
May 12	do.	.34	1,590	
June 12	do.	30	1,260	
July 26	M. B. Canas and O. Buenaventura.	.31	1,840	
August 9	O. Buenaventura	.29	2,414	
August 10	do.	.31	2,596	
August 19	do.	.33	2,847	

Discharge measurements of Lagonoy River, near Lagonoy, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
August 26	O. Buenaventura	31	2,446	
September 8	do	30	2,458	
September 9	do	31	2,570	
September 20	do	45	4,260	
September 21	do	44	4,097	
October 9.	do	.49	5,067	
October 26	do	.59	7,024	
November 9	do	.61	7,460	
November 24	do.	.57	6,545	
December 7	do	.82	15,340	
December 8	do	.82	15,589	
December 25	do	.65	7,804	
1921				
January 10	do	59	6,976	
January 28	do	54	5,402	
February 12	do	62	7,335	
February 25	do.	92	14,202	
March 15	do.	84	12,363	
March 28	do	68	8,955	
April 9	do	67	8,591	
April 25	do	.66	8,227	
May 6	do	54	5,400	
June 21	do	42	4,021	
July 22	do	.44	4,132	
August 17	do	42	4,001	
September 26	do	58	6,413	
October 31	do.	90	15,222	
November 19	do	74	11,607	
December 13	do	69	10,243	
December 26	do	1 90	71,368	
1922				
January 7	O. Buenaventura and S. Musa.	1 10	33,745	
January 21	O. Buenaventura	.70	10,783	
February 17	do	49	4,690	
March 9	do	44	4,895	
March 27.	do	56	6,624	
April 7	do	43	4,931	
April 22	do	39	4,493	
May 9	do	36	3,832	
May 18	do	42	4,030	
May 27	do	34	3,290	
June 5	O. Buenaventura and W. Demers.	.60	7,219	
June 26	O. Buenaventura	32	3,892	
July 12.	do.	36	4,314	

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				3,020	2,520	2,820	5,285	3,020	3,920	3,920	5,285	9,590
2				3,020	2,520	2,820	7,490	3,020	3,820	3,820	5,180	10,115
3				2,820	2,620	2,620	4,760	3,020	3,720	3,920	5,075	9,905
4				2,920	2,620	2,520	5,495	3,320	3,620	3,820	5,285	11,165
5				2,820	2,620	2,420	4,130	3,220	3,620	3,820	5,705	18,935
6				2,820	2,620	2,520	3,720	3,915	3,520	4,130	5,285	11,585
7				3,020	3,020	2,820	3,620	5,705	3,420	4,025	6,230	9,485
8				2,820	2,620	2,920	4,025	6,860	3,420	4,550	5,810	8,645
9				2,820	2,620	4,865	3,620	6,230	4,025	4,865	5,495	8,120
10				3,120	2,620	4,550	3,420	4,865	3,620	5,180	8,750	7,595
11			3,220	3,220	2,520	3,420	3,320	4,340	6,965	4,655	8,435	7,175
12			3,420	3,020	2,420	3,020	3,420	6,860	5,075	4,970	7,280	7,175
13			3,220	2,828	2,420	2,820	3,320	10,745	4,970	4,760	7,175	6,965
14			3,220	2,828	2,620	2,720	3,220	6,860	4,445	7,595	29,120	7,175
15			3,220	2,720	2,420	2,620	3,220	5,390	5,285	8,225	28,700	7,070
16			3,220	2,820	2,520	2,620	3,320	4,865	5,285	6,335	17,045	7,805
17			3,120	2,820	2,420	2,520	3,420	4,550	5,285	5,600	19,355	8,435
18			3,220	2,820	2,420	2,620	3,320	4,235	5,075	6,285	17,360	11,795
19			3,220	2,620	2,620	2,620	3,420	4,130	4,865	5,705	20,195	30,800
20			3,220	2,720	2,820	2,620	3,420	18,200	4,550	5,600	10,010	12,005
21			3,220	2,620	3,620	2,620	3,420	5,810	5,075	5,285	9,170	9,485
22			3,020	2,720	2,620	2,620	3,720	4,970	4,655	4,865	24,500	8,645
23			3,220	2,620	2,520	2,520	3,420	4,760	4,445	4,865	10,955	8,120
24			3,220	3,220	2,420	2,420	4,655	4,445	4,235	5,075	9,695	7,280
25			3,120	2,720	2,420	2,620	4,235	4,235	4,235	5,705	8,750	7,175
26			3,020	2,620	2,620	2,920	3,620	4,445	4,445	4,970	8,540	6,965
27			3,020	2,720	2,620	3,820	3,320	4,445	4,235	5,600	13,790	6,755
28			3,020	2,620	2,820	2,920	3,220	4,025	4,130	5,075	12,005	6,335
29			3,020	2,620	2,820	2,620	3,220	4,655	4,025	4,865	9,905	9,485
30			3,020	2,520	3,920	3,020	3,220	4,655	3,820	5,390	8,645	10,955
31			3,020		3,820		3,020	4,025		5,285		8,645
Maximum			3,420	3,220	3,920	4,865	7,490	18,200	6,965	8,225	29,120	30,800
Minimum			3,020	2,520	2,420	2,420	3,020	3,020	3,420	3,820	5,075	6,335
Mean			3,153	2,821	2,704	2,886	3,808	5,349	4,394	5,089	11,291	9,722

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	7,385	5,810	5,180	4,235	3,620	3,220	3,220	3,120	3,620	4,235	10,850	9,800
2	12,425	5,600	5,075	4,235	3,620	3,220	3,420	3,120	3,420	4,130	6,965	10,115
3	7,385	5,600	5,180	4,235	3,620	3,120	3,420	3,020	3,220	4,445	22,400	10,220
4	9,380	5,495	5,285	4,025	3,420	3,020	3,320	3,120	3,020	4,235	14,525	8,960
5	9,800	5,390	5,075	4,235	3,220	3,220	3,220	3,020	3,020	4,025	8,540	10,850
6	9,905	5,285	5,180	4,025	3,220	3,120	3,220	3,020	3,020	4,655	7,595	9,275
7	8,435	5,285	5,285	3,920	3,120	3,120	3,220	3,020	3,020	4,445	7,280	8,750
8	7,910	5,075	5,285	4,025	3,220	3,220	3,020	3,020	3,020	4,655	6,860	9,380
9	7,175	5,075	5,075	4,235	3,220	3,220	3,020	2,920	3,020	4,655	6,335	9,695
10	6,965	4,865	5,075	4,025	3,420	3,220	3,020	3,020	3,020	4,655	6,125	8,435
11	6,545	4,865	5,285	3,820	3,620	3,120	3,420	3,020	3,020	4,760	5,705	7,490
12	6,335	5,705	4,970	3,820	3,420	3,020	3,620	2,920	2,920	4,655	5,285	6,650
13	17,250	5,285	4,865	3,820	3,520	3,020	3,620	3,020	3,320	4,760	6,335	6,020
14	9,485	5,180	4,865	3,620	3,420	3,020	3,520	3,020	3,220	14,525	8,540	6,860
15	8,855	6,545	5,075	3,620	3,620	3,020	3,420	3,020	3,220	18,725	8,015	6,545
16	8,855	6,125	4,970	3,620	3,620	2,920	3,420	3,020	3,220	23,450	7,385	11,375
17	10,010	6,125	4,865	3,520	3,820	3,020	3,220	3,120	3,220	9,695	6,965	9,065
18	9,905	6,020	4,865	3,420	3,720	2,920	3,220	3,020	3,420	8,225	6,545	7,385
19	8,960	5,915	4,865	3,520	3,620	2,920	3,220	3,020	3,335	7,595	6,335	8,120
20	7,805	5,915	4,865	3,520	3,720	3,020	3,220	3,320	4,865	8,540	5,705	7,595
21	6,965	5,705	4,865	3,420	4,025	2,920	3,020	3,020	4,655	7,385	5,705	7,175
22	6,440	5,495	4,655	3,420	3,820	3,220	3,920	2,920	4,865	6,020	6,125	6,965
23	6,545	5,195	4,655	3,620	3,820	3,120	3,420	2,920	6,755	5,705	5,915	6,755
24	6,335	5,495	4,550	3,820	3,620	3,020	3,220	3,020	5,495	6,020	5,915	6,545
25	6,335	5,600	4,445	3,420	3,620	3,020	3,120	3,020	6,020	5,915	6,755	6,545
26	6,125	5,495	4,655	3,420	3,420	3,120	3,020	3,020	6,755	5,915	6,020	6,335
27	5,915	5,495	4,445	3,620	3,420	3,120	3,220	3,020	6,125	7,595	6,230	6,125
28	5,705	5,495	4,445	3,820	3,320	3,220	3,220	3,520	5,285	9,905	6,230	6,335
29	5,705		4,445	7,175	3,220	3,220	3,120	6,125	4,865	6,965	12,950	6,125
30	6,125		4,445	4,760	3,020	3,320	3,120	3,620	4,445	6,335	8,435	6,125
31	5,915		4,235		3,020		3,120	3,620		5,810		6,020
Maximum	17,250	6,545	5,285	7,175	4,025	3,320	3,920	6,125	6,755	23,450	22,400	11,375
Minimum	5,705	4,865	4,235	3,420	3,020	2,920	3,020	2,920	2,920	4,025	5,285	6,020
Mean	7,627	5,551	4,872	3,933	3,488	3,100	3,274	3,185	4,115	7,182	7,817	6,256

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	6,125	9,590	7,910	7,280	5,915	5,075	4,025	4,130	4,235	4,550	13,610	16,920
2	6,020	8,645	8,645	6,755	5,705	5,075	4,025	4,445	4,235	7,595	76,545	15,700
3	6,125	13,475	8,330	6,545	5,810	4,970	7,385	4,340	4,025	6,125	47,800	13,900
4	6,125	12,950	8,015	6,545	5,705	4,970	16,625	4,235	7,595	6,020	55,950	12,170
5	5,915	8,750	7,805	6,755	5,600	4,970	10,220	4,130	4,655	5,285	31,620	34,090
6	5,915	9,065	10,535	6,755	5,495	5,495	6,545	4,025	7,910	4,970	22,420	21,320
7	5,810	8,855	17,150	6,755	5,495	5,495	5,915	4,025	5,495	4,865	18,220	15,700
8	5,915	8,435	10,745	6,545	5,495	5,285	5,705	4,445	10,115	4,550	15,700	14,500
9	5,915	7,805	10,430	6,440	5,390	5,180	5,495	4,865	8,855	4,235	66,400	13,900
10	6,020	7,385	10,115	6,335	5,390	5,495	6,335	4,655	7,070	4,235	159,345	12,730
11	5,915	6,965	9,800	6,125	5,390	5,495	5,810	4,445	10,850	4,445	92,070	11,610
12	5,915	6,545	9,695	6,125	5,285	5,495	5,285	4,235	14,525	6,860	54,500	11,050
13	5,915	6,755	9,485	6,125	5,285	6,755	4,760	4,235	8,855	6,020	25,120	15,700
14	5,705	6,545	9,170	6,020	5,285	7,385	4,445	4,235	6,965	11,900	20,260	36,640
15	5,495	6,335	8,645	5,915	5,285	6,755	4,340	4,025	6,020	9,275	18,220	17,890
16	5,495	6,125	9,275	5,705	5,285	6,020	4,235	4,235	6,965	10,745	16,000	15,400
17	8,120	6,125	9,905	5,705	5,285	5,285	4,130	4,235	6,125	11,780	13,900	12,450
18	7,595	5,915	11,375	5,705	5,390	4,760	4,025	4,235	5,705	9,030	12,120	9,950
19	6,755	6,335	10,220	5,600	5,285	4,445	4,445	4,025	4,865	8,050	12,120	8,480
20	6,020	18,200	11,375	8,600	5,285	4,340	4,235	4,025	3,920	6,660	12,120	15,700
21	5,705	29,750	9,695	5,495	5,285	4,235	4,340	3,920	3,620	5,570	13,300	13,900
22	5,495	19,775	8,645	5,495	5,285	4,235	4,445	3,820	3,620	5,570	180,045	12,730
23	5,495	11,375	7,910	5,915	6,285	4,025	4,550	3,820	3,620	9,820	132,435	11,050
24	5,495	9,590	7,595	5,915	5,285	4,025	4,445	3,820	3,820	17,670	169,695	81,720
25	5,390	10,535	7,385	5,810	5,180	4,445	4,445	3,920	3,720	14,580	185,220	97,245
26	5,285	10,220	7,175	6,545	5,180	4,340	4,235	3,820	4,655	16,970	107,595	66,400
27	5,495	10,535	6,755	6,335	5,180	4,340	4,235	3,820	3,720	12,980	55,950	47,800
28	5,495	9,695	6,860	6,125	5,495	4,235	4,235	3,920	4,865	10,090	34,090	23,160
29	10,115	.....	6,755	5,915	5,390	4,655	4,235	4,025	4,970	7,350	23,920	17,240
30	8,015	.....	6,650	5,915	5,285	4,445	4,235	4,340	4,760	24,680	20,260	15,400
31	7,385	.....	6,545	.....	5,285	.....	4,130	4,235	.....	16,620	.....	14,800
Maximum	10,115	29,750	17,150	7,280	6,285	7,385	16,625	4,865	14,525	24,680	185,220	97,245
Minimum	5,285	5,915	6,545	5,495	5,180	4,025	4,025	3,820	3,620	4,235	12,120	8,480
Mean	6,200	10,081	9,051	6,160	5,394	5,058	5,339	4,151	6,012	9,003	56,885	23,460

NOTE.—Discharge determined from well-defined rating curves, applicable as follows: October 17, 1920, to November 2, 1921, good between 3,500 and 20,000 second-liters; November 2, 1921, to July 15, 1922, good between 2,500 to 16,000 second-liters.

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	17,560	7,120	6,720	4,860	4,860	4,520	3,290					
2	17,560	12,730	5,920	4,690	4,360	3,880	4,040					
3	13,900	11,330	5,550	4,520	4,040	3,580	4,520					
4	13,300	8,240	5,375	4,520	3,880	3,580	3,730					
5	12,450	7,550	5,375	4,360	3,880	7,550	6,120					
6	11,330	7,550	5,200	4,520	3,730	5,735	4,040					
7	18,220	7,120	5,200	4,860	3,580	4,520	3,580					
8	17,560	7,120	5,030	4,520	3,580	3,580	3,435					
9	14,200	6,920		4,520	3,580	3,580	3,290					
10	12,170	6,720	5,200	4,520	3,880	3,290	4,360					
11	10,490	6,520	5,200	4,520	3,580	3,290	3,880					
12	27,140	6,320	5,030	4,520	4,040	3,290	3,580					
13	22,790	6,320	5,920	5,200	3,880	3,000	3,580					
14	15,700	5,920	6,320	5,550	3,880	3,580	3,730					
15	14,200	5,920	5,920	4,690	3,880	3,145	3,580					
16	13,300	5,735	5,920	4,200	3,580	3,145						
17	11,890	5,735	5,550	4,200	5,375	3,000						
18	10,770	5,550	5,550	4,040	4,360	3,000						
19	9,950	5,550	5,550	4,200	4,200	3,000						
20	9,440	5,550	5,550	4,200	4,200	3,580						
21	9,440	5,375	5,735	4,200	3,880	3,290						
22	8,960	5,200	5,550	4,200	6,520	3,145						
23	8,960	5,200	5,030	4,040	5,550	3,290						
24	8,480	5,030	4,860	3,880	4,690	3,145						
25	8,480	5,200	5,550	5,375	3,880	3,000						
26	8,000	5,550	8,960	4,520	3,580	3,000						
27	8,480	5,200	8,480	4,200	3,290	3,580						
28	8,720	5,375	6,720	3,880	3,290	3,290						
29	8,000		5,550	3,730	3,730	3,000						
30	7,550		5,200	4,520	3,580	3,290						
31	7,120		4,860		4,520							
Maximum	27,140	12,730	8,960	5,550	6,520	7,550	6,120					
Minimum	7,120	5,030	4,860	3,730	3,290	3,000	3,290					
Mean	12,455	6,559	5,753	4,459	4,092	3,596	3,917					

NOTE.—No record on March 9, 1922. See footnote to discharge table for 1921.

CAMARINES SUR PROVINCE

LIBMANAN RIVER, SIPOCOT

LOCATION.—Just opposite Municipal Building of Sipocot.

RECORDS AVAILABLE.—From January 12, 1921, to June 18, 1922. Also from January 11, to April 20, 1912, inclusive.

GAGE.—Standard metric gage board horizontally fastened to a tree on the right bank of the river. Chain was used to measure the height.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 300 m. above and below the station. Both banks high, not subject to overflow, rocky and wooded. Stream bed shifting, composed of gravel and rock. Flow swift.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 936,100 second-liters, on November 26, 1921; minimum, 3,362 second-liters, on March 8, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharged determined from poorly defined rating curves. Gage read twice daily.

Discharge measurements of Libmanan River, near Poblacion, Sipocot, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1912				
January 10	W. Demers	.78	11,100	
March 28	do	70	7,150	
1921				
February 19	S. Musa	78	25,360	
April 3	do.	25	23,660	
May 13	do	15	6,051	
June 28	do.	.18	5,852	
August 2	do	12	7,416	
October 3	do	31	12,751	
October 3	do	.31	14,712	
November 16	do.	75	42,130	
December 17	do	1 48	86,645	
1922				
February 15	do	.30	16,783	
March 13	O. Buenaventura and S. Musa	.97	19,416	
April 11	O. Buenaventura	1.01	18,999	
April 12	do	.98	18,038	
May 3	do	.80	14,729	

Daily and monthly discharges, in liters per second, of Libmanan River near Poblacion, Sipocot, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		7,570	9,960	6,780								
2		7,570	9,960	9,960								
3		7,980	13,120	7,160								
4		8,400	9,960	7,160								
5		7,570	9,440	7,160								
6		24,320	13,120	6,780								
7		12,460	9,440	7,160								
8		8,400	9,960	6,780								
9		7,980	8,920	6,400								
10		7,160	7,160	7,160								
11	12,460	7,160	7,980	6,030								
12	12,460	6,780	7,160	9,440								
13	26,420	7,160	7,160	12,460								
14	16,620	7,160	7,160	9,440								
15	13,120	7,160	7,160	8,400								
16	11,140	7,570	7,160	8,400								
17	9,960	8,920	6,780	7,980								
18	9,440	9,440	6,780	7,980								
19	9,440	9,440	6,780	7,980								
20	9,960	22,220	19,420	7,980								
21	9,960	116,720	12,460									
22	8,920	99,920	8,400									
23	8,400	27,820	7,570									
24	7,980	29,220	7,980									
25	8,400	19,420	7,760									
26	8,920	14,520	6,780									
27	8,920	13,120	7,760									
28	7,570	11,800	7,760									
29	7,160	11,140	7,760									
30	7,160		6,400									
31	7,980		6,400									
Maximum	26,420	116,720	19,420	12,460								
Minimum	7,160	6,780	6,400	6,030								
Mean	10,590	18,486	8,762	7,930								

NOTE.—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Libmanan River near Poblacion, Sipocot, Camarines Sur, for the year 1921

Day	January	February	March	Apri	May	June	July	August	September	October	November	December
1		261,100	55,600	21,460			9,210	9,210	30,840	44,390	60,325	90,350
2		120,100	33,240	12,210			12,210	10,710	22,030	22,030	77,600	60,325
3		65,725	*241,600	12,210			18,650	9,210	13,760	16,450	279,950	41,840
4		63,700	49,000	11,710				9,210	10,210	22,600	159,850	172,600
5		90,350	45,700	10,210			171,100	10,210	19,210	24,910	222,850	313,600
6		105,100	39,350	15,900			56,950	9,210	18,100	14,710	80,400	106,600
7		86,725	*281,350	27,250			17,550	5,870	20,330	10,210	113,100	69,900
8		127,600	79,700	21,460			13,760	5,400	32,640	6,810	74,800	56,950
9		126,100	55,600	12,210			10,710	3,540	21,460	8,720	154,600	50,980
10		42,470	65,725	5,870			8,240	17,550	14,280	*4,930	456,100	65,725
11		29,040	67,800	5,400			7,280	12,210	46,360	22,030	311,350	45,040
12	29,040	33,240	45,700	6,340			7,280	8,240	398,350	83,200	138,100	36,870
13	20,890	142,600	42,470	5,400			9,210	12,210	223,175	26,660	85,300	38,730
14	18,100	49,000	271,600	5,400			10,210	13,240	307,600	25,490	58,975	262,600
15	15,350	33,240	108,850	4,460			7,760	8,240	145,600	70,600	45,700	201,850
16	*150,100	21,460	86,725	4,460			5,870	19,770	83,200	26,660	42,470	77,600
17	39,350	15,900	127,850	3,540			3,540	15,900	45,040	18,100	34,440	93,300
18	31,440	17,550	202,600	4,930			3,540	8,240	22,030	14,710	26,660	76,200
19	37,490	36,260	258,850	3,540			23,170	5,870	14,710	17,550	148,600	81,100
20	35,040	187,600	217,100	3,540			18,650	9,210	26,660	14,280	42,470	169,600
21	25,490	221,350	183,850	3,540			8,240	8,240	13,760	13,760	34,440	123,100
22	24,330	240,100	69,200	3,540			13,760	5,870	24,910	53,620	724,600	69,200
23	29,040	183,850	37,490	3,540			12,210	5,870	57,625	253,600		96,850
24	23,170	83,200	30,240				13,240	10,710	35,650	150,100		74,100
25	17,550	303,850	25,490				13,240	8,240	23,170	96,850	334,600	408,850
26	23,170	286,350	19,770				10,710	8,240	39,970	360,100	936,100	340,850
27	24,330	146,350	21,460				9,710	5,870	67,100	231,100	182,350	145,600
28	24,330	86,725	23,170				9,210	5,870	47,780	90,350	114,850	98,350
29	47,780		27,250				9,710	5,870	39,350	48,340	96,100	73,400
30	94,050		39,350				7,280	30,240	147,750	35,040	80,400	56,950
31	138,850		27,250				8,240	25,490				58,300
Maximum	150,100	303,850	281,350	27,250			171,100	30,240	398,350	360,100	936,100	408,850
Minimum	15,350	15,900	19,770	3,540			3,540	3,540	10,210	4,930	26,660	36,870
Mean	42,442	114,523	92,933	9,049			17,681	10,444	67,088	60,930	182,753	117,978

NOTE.—No record on days for which discharge is not given. * Unreliable.

Daily and monthly discharges, in liters per second, of Libmanan River near Poblacion, Sipocot, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	47,020	16,450	19,225	15,325	16,325	13,125						
2	41,840	67,100	16,525	14,725	15,525	13,325						
3	39,840	62,350	5,800	17,738	15,125	13,125						
4	47,020	41,840	4,488	17,525	14,325	13,925						
5	51,640	73,400	3,738	17,125	14,125	16,325						
6	35,650	92,550	3,550	14,725	13,925	14,925						
7	36,260	41,210	3,925	17,325	13,925	14,125						
8	29,640	27,840	3,362	16,725	14,725	13,325						
9	30,840	23,170	3,550	15,125	15,725	13,525						
10	43,110	20,890	16,325	15,325	14,525	13,525						
11	37,490	18,100	7,675	16,725	13,125	12,925						
12	146,350	16,450	5,238	16,925	12,125	12,325						
13	153,100	14,710	14,325	16,725	11,525	12,725						
14	70,600	14,280	6,550	27,950	11,725	12,725						
15	117,850	13,240	21,350	25,700	13,125	13,525						
16	86,000	11,710	21,350	19,862	13,725	12,325						
17	43,750	11,210	25,250	15,925	13,725	13,125						
18	36,260	10,210	18,800	15,525	13,125	12,325						
19	29,640	10,210	21,988	15,325	11,925							
20	36,260	50,320	15,325	15,325	11,925							
21	30,840	13,240	19,225	15,525	13,525							
22	27,250	12,720	20,712	16,125	14,525							
23	26,660	12,210	17,950	15,325	19,650							
24	25,490	11,210	16,925	14,725	18,588							
25	22,030	9,210	17,325	14,525	13,525							
26	20,890	9,210	35,150	14,325	12,125							
27	44,390	9,210	23,900	14,325	13,725							
28	48,340	8,240	21,988	14,325	13,525							
29	24,910		18,588	18,162	12,525							
30	20,890		17,325	15,325	11,325							
31	17,000		16,325		12,325							
Maximum	153,100	92,550	35,150	27,950	19,650	16,325						
Minimum	17,000	8,240	3,362	14,325	11,325	12,325						
Mean	47,092	25,803	14,960	16,678	13,860	13,402						

CAMARINES SUR PROVINCE

PAWILI RIVER, PILI

LOCATION.—About 18.5 km. from Naga. Right below the upstream side of steel bridge on the Naga–Iriga Road.

RECORDS AVAILABLE.—From March 7, 1919, to December 31, 1922. Also from March 20, 1910, to April 20, 1912, inclusive at exactly the same location as the present station.

GAGE.—Consists of two sections; the lower section is standard metric gage board, 1 m. long, fastened vertically on the right and at the lower part of abutment of bridge; the other section is an inclined staff fastened on upstream end of same abutment and reads from 1 m. to 3.87 m.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge at high water at section of gage.

CHANNEL AND BANKS.—Channel is straight for over 50 m. above gaging section. Channel below is also straight except that there is a large piece of debris of old bridge. Banks high, not subject to overflow and covered with "Santa Elena" trees. Measuring section will give good results at low water stage. Stream bed of solid hard adobe stone and rather rough. Flow fairly uniform.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 318,480 second-liters on November 22, 1910; minimum discharge, 640 second-liters on March 25 and 26 and April 1, 1912.

DIVERSION.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from March 20, 1910, to April 20, 1912, determined from fairly well-defined curve and holds good between 4,000 to 44,000 second-liters. Discharges from March 7, 1922, to December 31, 1922, are determined from a well-defined curve and holds good between 1,800 to 5,800 second-liters. Gage read twice daily.

Discharge measurements of Pawili River, near Santo Domingo, Pili, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
March 29	J. I. Quinn	1.05	11,210	
April 7	do	.60	2,890	
May 12	do	.61	4,024	
June 28	do	.64	3,600	
July 10	do	.74	6,893	
July 18	do	.74	6,890	
August 17	do	.62	2,480	
August 17	do	.62	2,550	
September 2	do	.76	7,774	
September 6	do	.77	7,312	
October 21	H. V. Hall	.72	5,542	
October 21	do	.72	5,880	
November 17	J. I. Quinn	.91	9,900	
November 30	W. Demers	.85	7,070	
December 5	do	1 65	53,550	
1911				
January 4	do	.83	8,100	
January 5	do	.94	8,867	
January 14	do	.77	6,457	
January 25	do	.71	4,160	
February 6	do	.60	1,860	

NOTE.—Gage heights from April 12, 1919, referred to a datum of different elevation.

Discharge measurements of Pawili River, near Santo Domingo, Pili, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
February 14	W. Demers	.87	9,080	
February 17	do	1 08	15,600	
March 2	do	93	9,072	
March 7	do	69	5,575	
March 18	do	.68	4,435	
March 22	do	.67	3,697	
March 24	do	67	3,364	
March 27	I. S. Lawrence	.78	5,433	
April 5	do	70	3,950	
April 20	do	.70	4,640	
April 27	do	.71	3,700	
May 10	do	.75	5,460	
May 24	do	59	3,840	
June 7	do	.58	4,420	
June 7	do	.61	2,610	
July 7	do	.85	5,870	
July 21	do	1 32	9,850	
August 4	do	.80	8,050	
August 16	do	74	4,300	
August 30	do	80	7,690	
September 15	do	.64	7,120	
September 18	do	88	8,090	
September 27	do	77	4,670	
October 12	do	.70	4,010	
October 16	do	71	4,060	
December 12	do	64	3,770	
December 22	do	.62	2,900	
1912				
January 9	do	59	2,550	
January 11	do	58	2,020	
January 24	do	55	2,320	
February 10	do	52	2,300	
February 16	do	55	2,620	
February 23	do	60	2,800	
March 2	do	52	2,280	
March 6	do	48	1,950	
March 8	do	53	2,300	
March 18	do	55	2,670	
March 30	W. Demers	50	2,200	
April 4	do	53	2,040	
1919				
April 12	A. Fegarido	.40	2,330	
April 28	do	38	2,120	
May 6	do	37	2,010	
May 29	do	39	3,060	
June 10	do	60	5,790	
June 18	do	35	1,830	
September 8	A. Fegarido and M. Canas	46	2,450	
September 13	do	80	8,190	
October 10	do	.82	6,530	
October 18	do	71	6,950	
November 11	do	.72	7,180	
November 14	do	.75	7,860	
November 19	do	80	7,240	
December 3	do	.73	8,110	
December 8	do	.76	8,840	
1920				
January 20	M. Canas	.57	5,220	
February 10	do	.55	4,720	
February 13	do	.59	5,770	
March 10	do	41	2,540	
March 13	do	42	2,960	
April 14	do	41	2,460	
April 19	do	.38	1,940	
May 10	do	.41	2,680	
May 14	do	.41	2,560	
June 10	do	.42	3,200	
June 15	do	.41	3,280	
July 5	do	.80	6,030	
July 27	M. Canas and O. Buenaventura.	.68	5,480	
July 27	do	.60	4,630	

Discharge measurements of Pawili River, near Santo Domingo, Pili, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1920				
August 5	O. Buenaventura	.40	2,481	
August 11	do	40	2,110	
August 18	do	.38	1,915	
August 20	do	.73	8,101	
September 6	do	58	6,100	
September 10	do	.45	3,021	
September 18	do	.43	2,730	
September 23	do	.75	11,069	
October 8	do	61	6,398	
October 14	do	1 50	27,858	
October 23	do	62	6,626	
October 27	do	56	5,456	
November 6	do	78	11,814	
November 10	do	56	5,432	
November 22	do	.50	4,159	
December 4	do	.68	8,442	
December 10	do	.67	7,702	
December 23	do	54	4,658	
1921				
January 8	do	46	3,012	
January 12	do	.44	2,739	
January 25	do	42	2,213	
January 29	do	.45	2,541	
February 9	do	.74	10,333	
February 14	do	.48	3,588	
February 22	do	81	12,309	
February 26	do	68	8,348	
March 12	do	63	6,424	
March 16	do	.68	8,330	
March 25	do	.48	2,862	
March 29	do	.46	2,426	
April 7	do	45	2,541	
April 23	do	40	1,920	
April 28	do	.39	1,772	
May 5	do	39	1,871	
May 8	do	.38	1,539	
June 15	do	42	2,213	
June 27	do	41	1,888	
July 14	do	.45	2,593	
July 23	do	1 22	25,654	
August 9	do	1 39	32,245	
September 7	do	78	11,416	
September 15	do	89	15,052	
September 23	do	.82	13,408	
October 7	do	56	5,004	
October 10	do	.60	6,205	
November 8	do	.72	9,704	
November 26	S. Musa	3 70	110,876	
December 7	do	1 12	22,805	
December 20	O. Buenaventura	73	9,863	
December 28	do	84	13,316	
1922				
January 5	do	.62	6,598	
January 9	do	58	5,683	
January 18	do	.62	6,790	
January 23	do	.56	5,263	
February 4	do	.53	4,748	
February 14	do	.44	3,172	
February 25	do	.44	2,914	
February 27	do	.46	3,124	
March 8	do	44	2,855	
March 25	do	.43	2,587	
April 6	do	.42	2,525	
April 15	do	.43	2,244	
April 25	do	.42	2,220	
May 5	do	.45	2,410	
May 10	do	.42	2,171	
May 17	do	.42	2,236	
May 25	do	.43	3,072	
June 24	do	.38	2,131	
July 11	do	63	5,984	
August 7	do	1.15	23,141	
August 22	do	.56	8,968	
August 29	do	.41	2,155	

Discharge measurements of Pawili River, near Santo Domingo, Pili, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
September 2	O. Buenaventura	.52	3,553	
September 21	do.	74	10,267	
October 3	do.	.56	4,175	
October 12	do	.71	9,514	
October 19	do.	53	3,865	
October 26	do	44	2,873	
October 30	do.	58	4,367	
November 3	do	47	3,626	
November 16	do	.72	9,377	
December 2	do.	.80	12,447	
December 7	do.	.73	9,926	
December 14	do	53	4,148	

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				1,240	1,600	6,120	3,880	2,720	14,440		43,380	8,280
2				1,760	1,920	5,180	4,660	2,520	7,320	22,560	42,400	7,620
3				1,760	1,240	3,880	4,920	1,760	6,420	16,000	30,720	43,870
4				2,720	1,760	4,400	4,400	2,720	5,520	62,000	13,680	67,880
5				1,600	1,600	4,010	3,360	3,880	9,280	49,260	10,720	51,710
6				2,720	1,760	3,360	4,400	3,880	7,320	23,400	8,600	18,800
7				1,240	2,720	3,120	2,920	3,360	4,140	18,400	6,420	14,440
8				2,120	3,360	1,680	3,880	5,180	36,520	13,680	4,920	10,000
9				1,440	2,920	2,920	2,520	6,120	16,400	10,720	4,920	9,620
10				880	2,390	2,920	2,120	3,880	16,000	34,560	6,120	15,600
11				1,600	1,000	1,600	2,120	2,720	13,680	38,480	5,820	12,160
12				1,240	3,360	3,120	6,720	5,820	11,080	31,680	5,520	8,600
13				880	2,120	4,140	12,160	4,660	7,320	24,240	166,600	7,960
14				1,000	2,920	2,000	15,600	2,720	6,720	17,600	37,500	7,620
15				1,240	1,840	3,580	15,200	2,920	8,600	16,800	18,000	10,720
16				1,600	1,920	1,760	38,480	2,920	13,680	14,440	13,680	8,920
17				1,120	1,600	2,300	13,300	2,720	16,000	12,920	10,000	39,460
18				1,000	1,840	4,140	6,120	2,720	8,920	11,440	9,280	
19				1,120	2,390	1,840	2,920	3,120	111,000	7,960	10,000	
20			12,520	1,000	2,520	2,300	3,880	1,440	15,200	7,960	10,720	
21			7,020	1,000	2,210	1,600	3,360	4,920	20,040	6,720	14,440	
22			4,920	1,000	2,520	1,840	1,760	5,820	26,000	5,520	318,480	
23			4,400	2,300	3,120	2,920	2,920	5,520	64,940	4,400	31,680	
24			4,400	3,120	6,720	2,300	1,440	3,880	16,800	3,360	19,200	
25			2,920	3,580	5,180	3,120	2,120	3,360	10,720	3,880	16,800	
26			2,720	3,120	4,400	2,920	1,760	4,660	8,280	2,920	13,680	
27			1,760	1,920	4,920	3,880	1,240	7,020	9,280	2,920	11,800	
28			2,720	1,600	2,300	4,400	1,440	3,880	75,720	4,400	9,280	
29			3,360	1,600	20,880	5,180	1,440	2,920	32,160	7,020	10,000	
30			2,300	1,920	7,320	2,120	1,760	27,840	62,000	7,020	10,000	
31			1,920		7,620		2,520	30,720		12,160		
Maximum			12,520	3,580	20,880	6,120	38,480	30,720	111,000	62,000	318,480	67,880
Minimum			1,760	880	1,000	1,600	1,240	1,440	4,140	2,920	4,920	7,620
Mean			4,246	1,681	3,547	3,155	5,665	5,429	22,055	16,481	30,475	20,192

NOTE.—Daily discharge determined from a fairly well-defined rating curve between 2,000 to 44,000 second-liters. Applicable from March 20, to December 31, 1920. No records of gage heights on dates for which discharges are not given.

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	14,440	6,920	14,440	3,580	3,880	2,720	300,140	15,600	5,520	4,660	2,520	4,400
2	12,920	6,920	12,520	2,920	4,920	2,520	143,340	10,720	4,140	4,660	2,300	2,520
3	10,000	2,520	10,720	3,360	6,720	2,120	25,540	9,620	3,880	4,400	1,760	2,920
4	8,600	2,300	9,280	4,920	8,920	2,120	15,200	7,960	4,140	3,880	2,520	3,360
5	12,920	2,120	8,600	3,880	7,620	2,300	11,440	7,320	4,140	4,140	2,520	2,720
6	9,280	2,920	7,320	2,920	7,020	2,520	10,360	6,420	3,580	8,600	2,300	2,520
7	8,600	7,020	6,420	3,880	7,020	1,920	7,320	6,420	5,820	5,180	17,200	2,720
8	8,280	4,400	7,020	3,360	7,020	1,920	12,160	11,440	6,420	4,400	14,060	7,320
9	12,160	3,360	4,920	13,300	6,720	2,120	6,720	7,320	4,140	3,880	7,320	4,920
10	12,920	3,360	6,120	16,800	6,720	2,720	13,300	6,120	4,140	3,360	5,520	3,360
11	13,300	28,300	6,420	6,420	6,420	1,760	7,020	18,920	3,360	3,360	4,400	3,360
12	8,600	22,140	6,420	4,660	3,880	2,120	23,820	7,020	3,580	3,880	3,880	6,720
13	7,320	13,680	5,820	4,920	3,880	1,920	226,640	6,420	4,400	4,400	3,360	6,120
14	6,720	10,720	4,920	4,660	3,580	3,360	313,660	6,120	3,880	5,180	2,920	3,580
15	6,720	23,820	4,920	4,400	2,520	3,120	122,760	6,420	4,140	4,400	3,120	3,360
16	7,320	21,500	4,400	6,120	2,720	2,520	67,920	4,660	7,620	3,880	3,120	7,320
17	6,720	19,200	5,520	4,140	3,360	2,920	49,750	4,660	4,400	3,360	3,360	7,320
18	4,920	47,300	4,400	3,880	2,920	6,420	42,890	11,440	9,620	4,920	3,360	4,660
19	4,920	51,220	5,180	4,660	2,920	8,280	47,790	30,720	9,620	4,920	2,920	3,880
20	4,400	37,940	4,920	5,820	2,520	6,420	37,990	19,600	13,680	3,880	2,720	3,360
21	4,140	29,760	4,400	3,580	4,660	3,360	26,920	12,920	14,060	3,360	2,920	2,720
22	3,880	22,140	3,880	4,660	2,520	3,360	21,720	27,840	25,120	3,360	2,520	2,120
23	3,580	16,000	3,580	22,980	2,920	2,920	19,200	26,440	15,020	3,360	2,920	2,120
24	4,400	12,920	4,140	9,280	2,720	1,920	16,400	25,540	9,620	2,720	2,520	2,520
25	3,880	17,600	2,520	5,820	2,920	1,760	13,300	18,000	7,320	1,760	2,300	2,720
26	3,880	37,500	4,660	4,140	3,360	1,920	8,920	19,600	7,020	2,720	2,300	2,520
27	3,360	27,840	7,320	4,140	3,360	1,760	9,280	11,440	6,720	2,520	2,520	2,120
28	3,360	20,040	5,520	4,400	3,120	1,600	19,200	12,160	6,120	1,760	2,120	2,120
29	3,360		3,880	4,920	2,520	2,520	19,600	9,280	6,720	2,520	2,520	2,120
30	3,360		3,580	3,360	2,920	6,120	15,600	7,960	4,660	2,720	2,520	2,300
31	2,920		3,360		2,720		17,200	4,660		2,520		2,120
Maximum	14,440	51,220	14,440	22,980	8,920	8,280	313,660	30,720	25,120	8,600	17,200	7,320
Minimum	2,920	2,120	2,520	2,920	2,520	1,600	6,720	4,660	3,360	1,760	1,760	2,120
Mean	7,135	17,909	6,036	5,863	4,356	2,969	53,971	12,283	7,087	3,821	3,878	3,643

NOTE.—Daily discharge determined from a fairly well-defined rating curve, and holds good between 4,000 and 44,000 second-liters. Applicable throughout the year.

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,760	1,120	1,600	640								
2	1,920	1,120	1,120	1,120								
3	2,120	1,920	1,440	1,240								
4	2,120	1,600	1,760	1,000								
5	2,520	1,760	1,000	1,240								
6	3,580	1,760	1,120	1,000								
7	2,920	1,600	1,000	1,240								
8	2,520	1,440	1,240	1,120								
9	2,120	1,240	1,120	1,000								
10	1,920	1,760	1,240	1,120								
11	2,120	1,760	1,000	1,000								
12	2,300	1,600	880	1,440								
13	2,720	1,760	1,440	1,440								
14	2,920	1,440	1,120	1,440								
15	2,520	1,240	1,120	1,440								
16	2,300	1,440	880	1,240								
17	2,120	1,920	1,240	1,120								
18	1,760	1,440	1,240	1,000								
19	1,760	1,240	1,240	1,120								
20	1,600	1,440	1,600	1,120								
21	1,240	7,320	1,240									
22	1,440	6,720	880									
23	1,600	2,720	1,000									
24	1,440	1,920	1,000									
25	1,440	1,600	640									
26	1,000	2,120	640									
27	1,120	1,920	720									
28	1,120	1,440	1,120									
29	1,440	1,600	1,120									
30	1,120		1,600									
31	1,120		1,000									
Maximum	3,580	7,320	1,760	1,440								
Minimum	1,000	1,120	640	640								
Mean	1,926	1,999	1,327	1,154								

NOTE.—Daily discharges determined from a fairly well-defined curve, and holds good between 4,000 and 44,000 second-liters. Applicable from January 1 to April 20, 1912.

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				2,220	2,120	2,220	15,860	5,075	5,780	2,690	4,270	14,060
2				2,440	2,120	2,220	82,160	4,090	6,580	2,690	4,270	11,660
3				2,220	2,020	1,930	20,960	8,060	5,780	2,560	3,575	19,760
4				2,220	1,930	1,840	40,160	35,960	4,660	2,690	3,255	32,660
5				2,330	2,020	1,930	10,760	15,260	4,090	2,960	3,105	59,360
6				2,220	2,020	1,930	4,865	22,160	3,740	3,910	3,105	21,260
7			2,440	2,330	2,020	2,020	4,660	52,760	3,410	3,910	3,740	12,860
8			2,330	2,120	1,930	2,120	3,410	31,760	3,105	4,865	5,300	11,660
9			2,330	2,330	1,930	3,410	2,560	36,260	3,105	14,360	4,660	8,660
10			2,330	2,220	2,020	5,780	3,105	22,760	3,910	31,160	9,860	7,460
11			2,330	2,440	2,020	4,660	2,690	15,560	23,060	20,060	12,260	6,860
12			2,330	2,220	2,220	2,820	2,960	27,260	12,560	12,260	7,160	6,030
13			2,440	2,220	2,440	2,220	3,410	32,660	12,860	8,060	4,270	5,780
14			2,560	2,330	2,440	2,020	2,820	19,160	22,460	9,260	21,260	5,300
15			2,440	2,120	2,330	2,020	3,410	13,160	13,160	23,060	31,460	5,075
16			2,560	2,120	2,120	2,120	7,460	7,760	10,460	11,660	36,260	7,160
17			2,330	2,120	2,220	2,020	4,460	7,460	28,460	8,660	58,460	7,160
18			2,330	1,840	2,220	1,840	4,460	6,300	15,260	4,270	61,460	6,860
19			2,440	2,020	1,930	1,930	3,575	5,780	13,460	13,160	23,360	27,260
20			2,330	1,930	2,220	2,560	3,740	24,860	8,960	8,960	18,860	14,360
21			2,330	1,930	2,330	2,330	3,575	15,860	6,860	6,860	36,860	
22			2,330	2,120	2,220	2,120	7,760	10,760	4,460	5,530	56,360	
23			2,330	2,120	1,930	1,930	15,560	7,160	4,270	5,075	18,860	
24			2,220	1,930	2,020	1,930	13,160	24,260	3,740	4,270	11,660	
25			2,440	2,020	2,440	2,120	7,460	11,660	3,255	13,460	9,560	
26			2,220	2,220	2,560	62,360	6,860	8,960	2,690	8,060	8,360	
27			2,330	2,220	2,960	18,260	9,560	12,560	2,560	6,360	21,860	
28			2,330	2,120	2,440	5,780	13,160	11,060	2,440	5,530	20,960	4,460
29			2,220	2,120	2,220	5,300	22,160	14,060	2,820	4,660	13,760	4,865
30			2,330	2,020	2,120	5,780	11,960	15,560	2,820	3,910	10,160	4,270
31			2,220		2,120		7,160	9,260		4,090		4,090
Maximum			2,560	2,440	2,960	62,360	82,160	52,760	28,460	31,160	61,460	59,360
Minimum			2,220	1,840	1,930	1,840	2,560	4,090	2,440	2,560	3,105	4,090
Mean			2,353	2,161	2,182	5,251	11,157	17,267	8,106	8,353	17,622	12,872

NOTE.—Daily discharge determined from a well-defined curve between 1,800 and 5,800 second-liters. Above and below these values discharges are estimated from extension of curve; applicable from April 12 to September 18, 1919, but can be arbitrarily extended to December 31, 1919. No gage-height data on dates for which discharges are not given.

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,460	2,960	2,820	2,330	2,120	2,690	11,060	3,600	6,840	4,930	4,470	28,130
2	5,780	3,105	2,690	2,440	2,020	2,690	15,260	3,010	8,410	6,840	4,250	17,970
3	6,860	2,820	2,820	2,330	2,020	2,690	13,460	2,440	7,090	19,680	14,060	13,000
4	6,030	2,690	2,820	2,220	1,930	2,560	8,060	2,270	5,620	12,320	31,190	9,250
5	8,360	2,820	2,820	2,120	2,020	2,820	8,060	2,270	4,700	8,410	23,540	25,070
6	12,860	3,575	2,820	2,220	2,020	2,960	11,660	2,100	5,160	9,530	11,660	27,620
7	8,360	2,960	2,960	2,220	2,120	2,560	20,360	2,270	4,030	7,870	7,870	17,550
8	7,160	5,075	2,820	2,220	2,440	2,820	11,960	1,930	2,820	6,590	6,590	11,030
9	5,300	4,460	2,560	2,220	2,330	2,960	15,560	2,270	3,810	3,200	5,860	10,120
10	4,865	4,660	2,440	2,220	2,440	2,690	14,360	1,610	3,010	4,250	5,160	8,410
11	4,270	3,740	2,690	2,440	2,440	2,560	11,060	1,770	2,630	3,600	4,700	7,610
12	4,090	4,270	2,560	2,440	2,560	2,560	14,660	1,770	2,820	3,200	4,700	6,840
13	17,960	5,530	2,560	2,690	2,560	2,330	22,160	1,770	2,440	4,470	4,470	5,390
14	12,560	8,960	2,560	2,440	2,440	2,440	13,460	1,770	2,440	67,910	5,390	4,700
15	9,860	9,260	3,105	2,220	2,690	2,440	6,580	2,630	2,270	121,970	12,320	5,160
16	7,760	7,160	2,560	2,220	2,690	2,220	5,300	2,100	3,200	128,110	13,000	10,720
17	7,760	6,030	2,560	2,220	2,690	2,020	5,300	2,820	2,630	59,240	11,340	14,060
18	8,360	4,270	2,560	2,020	2,960	1,840	4,865	2,440	2,440	21,550	6,340	6,340
19	6,030	3,410	2,330	2,120	6,300	2,020	9,260	5,860	2,440	16,340	4,930	5,390
20	5,075	3,105	2,440	2,020	6,860	1,840	5,780	10,420	4,930	28,130	4,250	4,930
21	4,270	2,820	2,440	2,120	6,580	2,020	20,060	7,090	4,930	17,140	4,250	4,700
22	4,460	2,960	2,330	2,220	4,270	2,440	19,760	4,030	6,340	14,060	3,200	4,470
23	4,090	2,690	2,330	2,220	3,910	2,560	8,660	3,010	9,530	7,090	4,030	4,470
24	3,740	2,820	2,440	2,330	3,410	2,690	5,300	2,820	8,970	7,610	2,820	3,810
25	3,575	2,820	2,440	2,120	2,820	2,960	4,090	2,630	10,420	6,590	2,630	2,820
26	3,575	3,105	2,440	2,020	2,560	3,105	5,300	4,930	45,470	5,860	2,820	3,200
27	3,410	2,960	2,330	2,120	2,560	3,910	9,560	5,620	24,560	5,390	2,820	3,200
28	3,410	3,575	2,440	2,330	2,690	11,060	9,860	15,560	10,720	4,930	2,820	3,200
29	3,255	2,960	2,330	2,440	2,560	9,560	7,160	24,560	8,410	5,390	4,030	3,010
30	2,960	.....	2,330	2,330	2,820	10,460	6,300	9,250	5,620	4,030	3,600	3,010
31	3,105	..	2,330	.	2,440	.....	4,460	8,410	.....	4,470	.....	2,820
Maximum	17,960	9,260	3,105	2,690	6,860	11,060	22,160	24,560	45,470	128,110	31,190	28,130
Minimum	2,960	2,690	2,330	2,020	1,930	1,840	4,090	1,610	2,270	3,200	2,630	2,820
Mean	6,245	4,054	2,570	2,254	2,976	3,349	10,604	4,678	7,157	20,023	7,068	8,968

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,820	19,680	4,700	2,820	1,770	2,100	1,930	4,030	24,560	9,530	13,350	48,530
2	3,400	14,060	4,930	2,630	2,100	2,100	2,630	3,600	11,340	7,870	44,960	41,900
3	4,030	5,860	4,470	2,820	1,770	2,100	6,590	3,400	8,140	7,870	55,670	41,900
4	3,400	7,350	4,030	2,820	1,770	2,440	104,630	3,200	12,660	7,870	26,090	46,490
5	2,820	5,860	4,470	2,820	1,770	2,270	52,610	3,200	12,320	6,590	16,340	41,920
6	3,200	4,930	10,720	3,200	1,770	2,100	17,970	3,600	16,340	6,100	11,980	32,720
7	3,200	5,860	103,610	2,820	1,770	2,100	10,120	25,070	19,680	5,160	9,820	25,070
8	3,200	4,930	30,170	2,630	1,770	1,770	7,350	10,420	12,660	4,930	9,530	18,810
9	3,200	10,120	19,240	2,820	1,770	1,770	6,840	29,660	10,420	9,250	57,710	13,350
10	3,200	7,350	10,420	2,820	1,770	2,440	5,160	25,580	15,560	6,840	160,730	8,970
11	3,200	4,250	6,590	2,440	1,770	2,440	4,250	11,980	60,260	6,340	80,150	6,590
12	2,820	4,470	6,840	2,440	1,610	2,440	3,600	8,140	145,940	7,870	38,330	6,340
13	2,630	3,810	5,860	2,440	1,770	2,440	3,200	6,340	62,300	8,140	32,720	38,840
14	2,440	5,390	5,160	2,440	1,770	3,400	3,010	5,390	29,150	15,180	21,070	81,170
15	2,820	4,030	6,340	2,440	1,770	4,030	2,820	7,350	14,060	17,140	15,180	20,600
16	6,590	3,400	7,350	2,440	1,610	4,030	2,820	8,140	15,940	15,560	12,660	12,320
17	5,620	3,200	6,100	2,440	1,770	3,200	2,820	5,620	11,660	11,340	11,980	9,820
18	3,600	2,820	6,840	2,270	2,270	2,270	3,200	4,470	13,000	8,690	10,420	8,690
19	3,010	2,820	7,090	2,100	2,100	3,200	3,810	4,030	10,420	7,350	9,530	7,870
20	2,820	8,970	5,860	2,100	1,770	3,600	4,700	3,400	8,410	6,590	6,840	10,720
21	2,820	14,060	4,700	2,270	1,770	3,400	4,930	3,200	7,350	5,620	6,100	13,000
22	2,440	12,660	4,250	2,270	1,930	3,400	6,590	2,820	11,660	4,930	104,630	15,130
23	2,820	10,720	4,030	2,100	1,770	4,250	25,070	3,200	34,760	8,140	112,280	11,660
24	2,440	8,410	3,600	2,440	1,770	3,400	27,110	2,820	15,560	4,700	39,350	11,980
25	2,440	13,000	3,600	2,100	1,460	3,200	17,140	2,820	22,520	4,930	139,310	61,790
26	2,630	9,530	3,200	2,100	1,460	2,820	26,090	3,200	18,810	6,100	139,820	55,160
27	2,440	6,340	3,200	2,100	1,610	2,440	13,700	3,200	57,710	6,840	73,010	19,680
28	2,440	5,860	3,200	1,930	2,100	2,100	10,420	3,200	26,600	5,620	67,400	13,350
29	3,600	.....	3,200	2,100	1,770	2,100	6,340	9,250	13,350	4,930	58,730	10,720
30	6,590	.....	2,820	1,930	1,770	2,100	3,400	18,810	17,970	8,140	59,750	8,970
31	8,970	.....	3,200	.....	2,100	.....	3,200	19,680	.....	23,540	.....	8,410
Maximum	8,970	19,680	103,610	3,200	2,270	4,250	104,630	29,660	145,940	23,540	160,730	81,170
Minimum	2,440	2,820	2,820	1,930	1,460	1,770	1,930	2,820	7,350	4,700	6,100	6,340
Mean	3,473	7,455	9,671	2,436	1,798	2,715	12,711	8,066	24,704	8,377	48,180	24,275

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	8,140	3,600	3,200	2,820	3,200	1,770	1,310	39,860	3,010	9,250	4,030	15,940
2	7,350	5,390	3,600	2,820	3,010	1,930	1,460	25,580	4,030	8,410	3,400	11,660
3	6,590	6,100	3,200	2,820	2,630	1,770	3,400	12,660	3,400	5,860	15,940	9,530
4	5,860	4,700	3,200	2,820	2,820	1,610	4,930	8,970	4,250	6,100	30,280	17,140
5	6,590	4,030	2,820	2,630	2,630	2,270	3,600	7,870	10,120	8,410	38,330	21,550
6	5,860	6,340	2,820	2,440	2,820	2,100	4,030	30,680	8,410	7,870	11,660	17,140
7	6,340	4,930	2,820	2,440	2,630	2,270	3,200	31,700	20,600	8,410	8,970	10,720
8	6,590	4,030	2,820	2,440	2,440	2,100	4,250	15,560	15,560	11,340	7,350	7,870
9	5,620	4,030	2,820	2,440	2,440	1,770	4,250	9,820	16,340	38,840	5,860	7,350
10	5,620	3,600	3,200	2,440	2,820	1,930	7,610	7,870	11,340	14,800	5,860	6,340
11	6,100	3,400	3,200	2,630	3,400	2,100	6,590	8,970	12,320	10,420	5,860	5,390
12	15,940	3,400	2,820	2,440	2,440	2,100	4,470	7,350	13,350	12,320	5,860	4,930
13	18,810	3,200	3,010	2,820	2,630	2,100	3,200	4,700	14,800	10,420	10,720	5,160
14	9,250	3,200	3,200	2,630	2,440	1,770	2,820	4,700	8,140	8,690	15,560	4,470
15	8,140	3,200	3,010	2,820	2,820	1,770	2,100	4,930	11,340	7,350	18,810	4,030
16	10,720	3,200	2,820	2,440	2,440	1,770	2,100	8,140	15,560	7,870	24,560	3,600
17	8,690	3,600	3,010	2,100	2,440	2,100	3,200	30,680	8,970	6,340	11,030	9,250
18	6,840	3,200	3,010	2,270	2,440	2,100	4,030	32,720	7,350	5,160	7,870	6,590
19	5,860	2,820	3,200	2,820	2,440	1,770	8,690	14,800	14,420	4,700	6,340	29,660
20	5,860	3,290	3,200	2,440	2,270	1,770	18,390	9,250	11,340	4,470	5,390	37,310
21	5,390	3,200	2,820	2,100	2,440	1,770	15,560	7,610	9,530	4,030	15,940	135,230
22	4,930	3,200	2,820	2,440	2,630	1,770	27,110	5,390	39,350	3,600	13,700	28,130
23	5,390	3,200	2,440	2,100	2,820	1,770	35,780	4,250	35,170	3,400	10,120	17,140
24	5,160	3,010	2,820	2,100	2,820	1,610	33,280	3,600	43,940	3,600	8,140	26,600
25	4,470	3,200	2,440	2,440	2,440	1,460	14,060	3,200	52,100	3,200	6,340	28,120
26	4,030	3,200	2,820	2,100	2,820	1,160	13,350	2,820	137,780 116,360	2,820	6,840	21,550
27	4,470	3,200	7,870	2,440	2,440	880	29,660	2,630	59,240	4,470	114,830	29,150
28	5,160	3,200	4,470	2,440	2,100	1,160	29,660	2,270	24,050	12,600	86,780	24,560
29	4,470	..	3,810	2,440	2,440	880	11,030	2,100	14,800	9,250	108,200	16,340
30	4,030	..	3,200	2,630	2,100	1,160	10,720	2,100	11,660	5,860	33,740	41,020
31	4,030	..	3,010	..	1,930	..	26,600 133,700	2,100	..	3,600	..	64,340
Maximum	18,810	6,340	7,870	2,820	3,400	2,270	133,700	39,860	137,780	38,840	114,830	135,230
Minimum	4,030	2,820	2,440	2,100	1,930	880	1,310	2,100	3,010	2,820	3,400	3,600
Mean	6,848	3,735	3,210	2,492	2,586	1,750	15,295	11,448	25,288	8,176	21,610	21,543

CAMARINES SUR PROVINCE

RANGAS RIVER, GOA

LOCATION.—In the barrio of Matacla, about 900 m. northwest from monument of Km. 50 on the Tigaon–Goa road.

RECORDS AVAILABLE.—From July 14, 1922, to December 31, 1922.

GAGE.—Standard metric-gage board vertically fastened to a big boulder on the right bank of the river.

DISCHARGE MEASUREMENT.—Made by wading 1 m. below the gage.

CHANNEL AND BANKS.—One channel at all stages; straight for 30 m. above and 20 m. below the station. Bed of stream composed of large boulders and gravels. Right bank high and rocky; left bank low, containing boulders and covered with brushes.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 12,835 second-liters on December 27, 1922; minimum discharge, 250 second-liters on October 24–26, 1922.

DIVERSIONS.—Part of water diverted below the station to irrigate rice lands.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Records poor due to big boulders which affect discharge measurements.

Discharge measurements of Rangas River, near Matacla, Goa, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
July 14	O. Buenaventura	.28	885	
July 19	do.	28	745	
July 20	do.	28	852	
August 9	do	29	846	
August 23	do.	26	722	
August 30	do	23	564	
September 13	do.	26	726	
September 22	do.	32	1,189	
September 23	do.	27	747	
October 2	do.	.30	1,157	
October 14	do	.26	853	
October 20	do.	.24	877	
October 28	do.	.19	670	
November 2	do.	.20	743	
November 18	do	.24	807	
December 5	do.	38	1,691	
December 16	do	30	1,131	

Daily and monthly discharges, in liters per second, of Rangas River near Matacla, Goa, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1								948	500	700	948	2,188
2								1,136	948	858	948	2,188
3								3,986	776	630	1,365	1,895
4								3,986	858	564	1,136	2,188
5								1,620	776	564	948	2,502
6								948	948	564	948	1,895
7								948	776	630	948	1,486
8								776	630	630	776	1,136
9								948	700	776	858	948
10								776	776	948	948	948
11								700	776	948	948	858
12								776	948	776	1,620	1,038
13								858	776	776	3,005	948
14							948	776	776	776	948	948
15							948	776	948	858	776	948
16								948	1,136	776	858	1,895
17								2,830	1,620	776	630	1,620
18								1,895	948	776	630	2,041
19							858	948	776	776	630	3,188
20							948	948	776	630	630	2,342
21							1,365	858	776	630	948	3,005
22							2,041	948	1,136	564	2,188	3,376
23							3,188	776	1,365	292	1,136	3,376
24							2,342	776	2,041	250	948	3,570
25							948	776	1,895	250	948	3,570
26							1,620	776	2,342	250	1,244	4,460
27							1,620	500	2,502	292	3,188	12,835
28							1,136	630	1,754	390	3,986	3,188
29							948	630	1,754	948	4,460	3,188
30							2,502	500	948	858	1,620	6,120
31							3,005	500		776		3,570
Maximum							3,188	3,986	2,502	948	4,460	12,835
Minimum							858	500	500	250	630	858
Mean							1,628	1,135	1,123	653	1,372	2,692

NOTE.—Gage heights not recorded on days for which discharge is not given. Discharge determined from poorly defined rating curve.

CAMARINES SUR PROVINCE

WARAS RIVER, BAAO

LOCATION.—About 33.7 km. from Nueva Caceres and 4.3 km. from Iriga on Nueva Caceres–Iriga Road, below concrete bridge.

RECORDS AVAILABLE.—From November 26, 1919, to May 31, 1922. Also from March 20, 1910, to March 30, 1912, inclusive, at old station at exactly the same location as the present.

GAGE.—Standard metric-gage board of two sections attached vertically to abutment of bridge.

DISCHARGE MEASUREMENT.—Made from bridge at section of gage.

CHANNEL AND BANKS.—Channel is straight for 100 m. above and for 80 m. below gaging station; right bank high, left bank low, and subject to overflow. At measuring section stream bed of sandy and gravelly texture; shifting at high water stage.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 44,180 second-liters on November 25, 1921; minimum discharge, 66 second-liters on May 17, 1910.

DIVERSIONS.—Dam below the station affecting flow.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge estimated from a fairly well-defined curve between 500 to 2,500 second-liters, applicable from March 20, 1910, to March 30, 1912. Daily discharge from November 26 to December 31, 1920, determined from a well-defined curve from 760 to 1,410 second-liters. Discharges for 1921 and 1922 determined from fairly well-defined rating curves. Gage read twice daily.

Discharge measurements of Waras River, near San Juan, Baao, Camarines Sur

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1910				
March 18	J. I. Quinn	.65	2,320	
April 7	do	.39	2,000	
May 11	do	.34	2,080	
June 28	do	.33	2,360	
August 19	do	.46	2,980	
September 3	do	.80	597	
September 3	do	.80	577	
October 21	H. V. Hall	.68	862	
November 5	do	1 05	2,070	
November 5	do	1 05	2,010	
November 16	J. I. Quinn	.99	1,840	
November 16	do	1 00	2,660	
November 19	do	.87	1,240	
December 1	do	.74	1,560	
December 6	do	.88	3,810	
December 22	do	1 07	9,700	
1911				
January 6	W. Demers	.69	1,902	
January 14	do	.67	1,442	
January 26	do	.62	570	
February 6	do	.60	360	
February 14	do	.68	1,108	
February 17	do	.82	2,610	
March 2	do	.75	1,774	
March 7	do	.66	853	
March 18	do	.63	651	

NOTE.—Gage heights from July 31, 1919, referred to a datum of different elevation. Gage heights and measurement affected by dam since July 6, 1920.

Discharge measurements of Waras River, near San Juan, Baao, Camarines Sur—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1911				
March 22	W. Demers	63	612	
March 24	do.	61	463	
April 8	do	60	410	
April 10	do	84	2,880	
April 21	do.	.70	460	
April 26	do.	71	450	
May 9	do	73	650	
May 23	do	72	550	
June 7	do.	.67	350	
July 7	do.	.77	1,050	
July 20	do	84	2,340	
August 4	do.	.76	830	
1919				
July 31	A. Fegarido	32	1,820	
December 9	A. Fegarido and M. Canas	75	1,300	
December 23	do.	.73	1,580	
1920				
January 19	M. B. Canas	72	1,410	
February 9	do.	60	1,240	
March 10	do	56	970	
March 15	do.	54	890	
April 13	do.	53	950	
April 20	do.	.54	960	
May 8	do.	47	760	
May 15	do.	50	830	
June 9	do	58	1,270	
June 16	do	48	1,130	
December 26	O Buenaventura	1 29	393	
1921				
January 13	do	1 11	424	
January 13	do.	1.11	422	
January 24	do.	1 10	344	
February 8	do.	60	63	Unreliable measurement.
March 11	do	92	3,038	
March 17	do.	72	947	
March 24	do.	68	697	
March 29	do	.65	594	
April 23	do.		353	
July 12	do.	87	2,051	
July 25	do.	.78	442	
August 8	do.	.85	1,050	
August 19	do	66	193	
September 12	do.	1.07	6,336	
December 20	do.	1 49	10,358	
December 28	do.	1 44	8,625	
1922				
January 5	do.	1 28	6,283	
January 10	do.	1 34	7,007	
January 17	do.	1 38	6,033	
January 25	do.	1 22	5,039	
February 24	do.	.96	583	
April 5	do.	76	334	

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				375	92	164	112	1,222	2,972	3,563	9,920	1,142
2				206	99	164	99	1,061	1,886	1,997	13,150	1,585
3				182	105	140	206	853	1,774	15,570	9,529	1,396
4				206	99	121	130	1,061	1,585	6,539	6,539	8,193
5				194	85	112	79	901	1,997	3,711	5,128	7,637
6				170	85	105	99	853	1,585	2,588	4,455	2,716
7				149	105	105	85	805	1,061	1,774	3,860	1,886
8				149	92	105	78	626	2,460	1,396	3,415	1,396
9				130	88	105	78	626	1,142	8,006	2,972	1,302
10				130	85	121	72	558	805	2,972	2,716	1,585
11				130	105	130	72	490	805	1,774	2,332	1,396
12				130	99	121	72	592	1,774	1,585	1,997	1,061
13				121	85	140	218	558	1,061	1,061	19,530	901
14				112	78	121	194	444	901	805	8,193	853
15				112	78	130	398	398	1,396	660	5,296	1,222
16				112	72	92	375	421	1,491	592	4,157	981
17				130	66	85	206	467	1,774	558	3,268	4,791
18				105	72	85	158	756	805	524	2,844	1,997
19				99	72	89	121	230	853	467	2,460	1,302
20			299	112	66	89	105	255	2,716	558	2,332	1,061
21			267	105	105	105	105	2,716	1,774	708	2,220	1,222
22			217	112	99	99	92	2,460	3,415	805	20,410	7,637
23			194	158	99	92	660	1,997	1,396	708	5,296	17,110
24			217	194	289	140	1,142	1,396	805	805	4,157	11,403
25			170	170	194	144	1,222	1,141	626	660	3,415	10,130
26			158	149	121	121	1,585	3,268	558	558	2,844	4,960
27			170	130	99	121	1,396	3,563	626	444	2,332	3,268
28			182	121	88	130	1,222	2,716	7,268	467	1,997	9,725
29			217	112	432	356	1,396	1,997	4,455	524	1,680	5,648
30			217	99	182	140	2,109	2,716	10,341	467	1,396	3,268
31			182				1,222	6,358		981		2,460
Maximum			299	375	432	356	2,109	6,358	10,341	15,570	20,410	17,110
Minimum			158	99	66	85	72	230	558	444	1,396	853
Mean			208	147	117	126	488	1,349	1,737	2,059	6,995	3,905

NOTE.—Daily discharge determined from a fairly well-defined curve from 500 to 2,500 second-liters. Below and above these values, discharges are estimated from the extension of rating curve. Applicable from March 20, 1910 to December 31, 1910. Records from March 20 to July 22, 1910 are unreliable.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,997	558	1,585	592	805	708	15,570	1,222	8,943	10,762	13,810	12,050
2	1,585	524	1,222	592	901	708	8,006	1,061	12,050	9,920	13,370	10,762
3	1,222	490	1,061	558	1,061	708	3,415	805	11,619	9,725	13,050	10,341
4	853	490	901	708	901	708	2,332	708	12,050	10,341	12,930	10,130
5	1,222	558	805	558	1,061	708	1,997	626	12,930	9,920	12,710	9,334
6	901	490	756	524	1,585	853	1,774	626	13,370	14,690	12,270	8,756
7	901	708	708	490	1,680	756	1,680	558	14,030	11,834	12,910	8,193
8	1,061	558	660	524	1,142	708	1,491	626	15,350	10,130	14,030	8,568
9	1,585	444	660	660	1,491	708	1,396	526	23,490	10,130	12,050	8,006
10	1,302	490	626	2,844	1,774	756	6,721	490	17,330	12,710	12,050	7,268
11	981	1,222	708	1,585	1,396	708	2,220	467	15,790	15,130	11,619	6,902
12	853	1,491	981	1,396	1,061	708	1,997	2,588	15,790	16,670	11,188	6,902
13	805	1,396	708	1,141	901	708	18,650	10,130	14,470	16,890	11,188	7,637
14	756	1,222	592	901	901	853	18,650	10,551	13,590	17,110	10,972	7,084
15	708	5,824	558	901	901	708	34,050	10,972	14,470	16,450	11,188	6,721
16	901	2,460	626	901	901	708	7,637	10,551	15,790	15,570	11,403	9,725
17	708	1,997	558	901	901	756	4,791	9,920	13,810	16,010	11,403	9,725
18	626	8,756	592	1,061	901	856	3,711	11,188	14,910	17,110	11,403	8,568
19	626	2,844	558	901	805	901	3,268	14,250	14,910	16,890	10,972	8,006
20	558	5,824	558	805	901	805	2,220	13,370	13,810	15,350	10,180	7,637
21	626	6,176	708	853	1,222	756	2,220	10,551	17,330	14,030	9,920	7,453
22	558	4,009	524	1,061	1,491	708	1,886	9,920	17,550	13,590	10,130	6,902
23	626	2,332	490	2,588	901	708	1,774	10,341	15,130	13,590	9,725	6,358
24	626	1,585	490	1,396	901	708	1,558	10,341	13,810	13,150	9,334	5,824
25	558	2,332	490	1,142	805	708	1,302	9,138	12,270	12,270	8,756	5,472
26	626	2,972	1,302	981	901	660	1,222	8,943	10,762	12,050	8,193	5,296
27	558	3,415	1,997	901	1,061	708	1,302	8,193	10,551	12,050	7,822	5,296
28	558	2,220	1,396	1,061	901	660	1,680	8,006	10,972	12,050	7,822	5,128
29	558		901	981	805	756	1,396	7,453	12,270	12,050	8,006	5,824
30	558		660	901	805	660	1,222	7,264	11,619	12,050	10,551	6,902
31	558		626		805		1,585	6,539		12,930		7,208
Maximum	1,997	8,756	1,997	2,844	1,774	901	34,050	14,250	25,490	17,110	14,030	12,050
Minimum	558	444	490	490	805	660	1,222	467	8,943	9,725	7,822	5,128
Mean	857	2,264	807	1,014	1,051	735	5,120	6,385	14,026	13,328	11,031	7,738

NOTE.—Daily discharge determined from fairly well-defined curve from 500 to 2,000 second-liters, applicable throughout the year.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	7,084	4,458	2,844									
2	7,084	4,623	2,588									
3	7,268	4,458	2,109									
4	7,453	4,458	1,886									
5	8,006	4,458	1,886									
6	8,381	3,711	1,774									
7	8,568	3,860	1,680									
8	8,381	2,716	1,585									
9	8,006	3,268	1,396									
10	7,637	3,268	1,302									
11	7,268	3,563	1,302									
12	7,268	2,972	1,302									
13	7,822	3,268	1,396									
14	8,193	3,120	1,302									
15	7,637	2,844	1,222									
16	7,268	2,844	1,142									
17	7,268	2,972	1,142									
18	7,084	2,844	1,061									
19	6,902	2,844	901									
20	6,902	3,120	901									
21	6,539	13,370	853									
22	6,539	8,381	805									
23	6,358	5,824	805									
24	6,176	4,960	756									
25	5,824	4,455	756									
26	5,824	3,860	756									
27	5,648	3,711	756									
28	5,472	3,563	660									
29	5,648	3,268	708									
30	5,472		660									
31	4,623											
Maximum	8,568	13,370	2,844									
Minimum	4,623	2,716	660									
Mean	6,955	4,175	1,275									

NOTE.—Daily discharges determined from fairly well-defined curve between 500 to 2,000 second-liters, applicable from January 1 to March 30, 1912. Station abandoned after March 30, 1912. Reëstablished November 26, 1919.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												1,815
2												1,638
3												1,755
4												1,875
5												2,631
6												1,875
7												1,668
8												1,581
9												1,495
10												1,495
11												1,467
12												1,459
13												1,411
14												1,355
15												1,355
16												1,328
17												1,355
18												1,411
19												2,637
20												1,755
21												1,467
22												1,411
23												1,439
24												1,383
25												1,355
26											1,467	1,355
27											1,608	1,355
28											1,698	1,355
29											1,551	1,328
30											1,524	1,639
31												1,467
Maximum											1,698	2,637
Minimum											1,467	1,328
Mean											1,570	1,577

NOTE.—Daily discharge determined from a well-defined curve from 760 to 1,410 second-liters. No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,411	1,167	1,089	881	759	783	1,439	2,573	2,957	2,861	1,167	*1,581
2	1,411	1,167	1,089	881	759	783	1,247	2,573	2,925	2,637	1,274	2,509
3	1,467	1,141	1,089	855	759	1,037	1,301	2,573	2,893	3,213	1,523	2,413
4	1,411	1,115	1,089	855	759	1,247	1,141	2,413	2,893	3,213	2,413	*1,552
5	1,697	1,115	1,063	855	759	1,301	1,167	2,349	2,701	3,373	1,581	*1,581
6	1,668	1,115	1,037	855	759	1,411	2,253	2,317	2,381	3,437	1,581	*1,581
7	1,495	1,115	1,011	855	759	1,467	3,661	2,317	2,285	3,277	1,785	2,509
8	1,411	1,115	985	855	759	1,581	2,898	2,317	2,445	3,213	1,785	2,317
9	1,383	1,089	985	855	759	1,639	2,861	2,253	2,829	3,181	2,093	2,285
10	1,355	1,089	985	831	759	1,639	2,947	2,189	2,573	3,149	*1,936	*1,439
11	1,355	1,089	959	831	759	1,697	2,989	2,189	2,445	3,117	*1,815	*1,411
12	1,328	1,089	959	831	735	1,815	2,989	2,253	2,509	2,989	*1,697	*1,328
13	3,053	1,089	959	907	735	1,815	2,957	2,189	2,445	2,989	*1,639	2,701
14	1,639	1,089	959	831	783	2,381	2,861	2,125	2,477	3,853	1,639	2,573
15	1,581	1,552	933	831	831	2,829	2,733	2,125	2,381	5,197	1,785	2,637
16	1,552	1,411	933	959	783	2,573	2,733	2,125	2,413	5,453	1,936	*1,697
17	1,467	1,274	933	907	759	2,285	2,957	2,125	2,349	1,998	*1,936	*2,349
18	1,467	1,194	933	1,037	831	2,061	3,021	2,349	2,285	1,689	*1,845	*2,157
19	1,411	1,167	907	1,089	985	1,936	3,085	2,413	2,253	1,610	*1,785	*1,668
20	1,355	1,141	907	933	1,193	1,875	3,213	2,477	2,253	1,639	*1,726	2,125
21	1,328	1,115	881	985	907	1,815	3,213	2,573	2,797	1,581	*1,726	*1,610
22	1,301	1,115	881	807	831	1,998	3,213	2,253	2,541	1,495	*1,668	*1,581
23	1,274	1,089	959	807	933	2,605	3,149	2,221	2,637	1,328	*1,610	*1,610
24	1,247	1,089	959	807	855	2,413	3,085	2,189	3,053	1,193	*1,552	*1,610
25	1,247	1,089	907	783	881	2,925	3,021	2,125	3,053	1,247	*1,523	*1,581
26	1,220	1,089	907	783	783	2,253	2,957	2,125	3,213	1,247	*1,495	*1,581
27	1,193	1,141	907	783	783	881	2,957	2,285	3,245	1,220	*1,467	*1,467
28	1,167	1,193	881	759	783	1,355	2,957	2,445	3,213	1,220	*1,467	*1,328
29	1,167	1,089	881	783	881	1,355	2,925	3,309	3,149	1,220	*1,467	*1,328
30	1,167	.....	881	783	933	1,639	2,925	3,149	3,085	1,193	*1,439	*1,328
31	1,167	.....	881	.....	759	.....	2,893	2,957	.....	1,167	.....	*1,301
Maximum	3,053	1,552	1,089	1,089	1,193	2,925	3,661	3,309	3,245	5,453	2,413	2,701
Minimum	1,167	1,089	881	759	735	783	1,141	2,125	2,253	1,167	1,167	1,301
Mean	1,431	1,146	959	860	841	1,780	2,701	2,389	2,689	2,457	1,675	1,830

NOTE.—Daily discharges determined from a well-defined curve. Discharges marked with an asterisk (*) show that same were adjusted due to dam effect.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,328	2,285	668	406	406	120	193	320	10,160	10,160	12,100	11,440
2	1,328	2,765	717	406	275	161	176	320	8,520	9,955	12,780	10,580
3	1,875	1,467	541	376	176	321	211	320	5,680	9,750	17,045	10,370
4	1,610	1,355	376	541	161	176	39,380	355	5,360	10,160	14,700	10,370
5	1,439	1,220	406	4,070	146	120	3,035	320	5,520	9,340	14,450	12,320
6	1,383	1,141	541	6,150	133	120	2,005	390	6,340	8,130	12,780	11,660
7	1,328	1,115	26,510	6,720	133	120	1,580	760	8,725	7,020	11,880	10,160
8	1,467	1,089	3,200	5,630	146	120	1,270	1,065	11,880	6,160	12,100	9,750
9	2,509	1,141	1,878	4,280	176	1,116	1,000	1,270	10,580	6,000	12,550	9,340
10	2,477	1,668	2,350	3,880	176	3,880	870	1,740	17,870	6,680	44,180	8,725
11	2,573	2,477	1,417	3,700	161	2,895	815	1,420	19,910	8,130	21,780	8,130
12	2,541	1,167	878	3,527	161	1,682	760	1,130	24,980	10,580	16,770	7,740
13	2,605	1,089	717	3,362	146	1,776	705	870	18,725	9,750	15,200	7,740
14	2,541	1,089	581	3,200	133	2,476	605	605	14,200	11,880	13,720	15,980
15	2,509	1,141	623	2,612	133	3,880	515	560	12,780	12,780	12,100	10,160
16	1,755	1,141	934	2,350	161	5,630	430	760	12,100	16,240	11,000	9,340
17	1,905	1,089	934	2,224	211	3,200	470	515	11,440	12,550	10,790	8,520
18	1,610	1,037	934	2,104	176	1,986	430	250	10,370	10,580	10,580	8,130
19	1,355	1,011	822	1,986	211	13,300	430	200	9,955	9,750	10,160	8,325
20	1,247	1,089	822	1,878	211	11,080	470	175	9,545	8,930	10,160	9,955
21	1,193	1,905	768	1,776	211	8,660	515	175	8,725	8,130	10,580	11,000
22	2,573	2,253	717	1,682	253	7,010	515	175	7,935	7,380	16,240	9,340
23	2,573	1,785	668	1,589	211	3,362	650	175	7,740	6,680	17,320	7,935
24	2,573	1,523	717	1,417	231	1,337	760	150	8,725	6,340	17,045	7,740
25	2,573	2,861	623	1,338	253	1,682	650	130	11,440	7,020	44,180	11,880
26	2,573	2,350	541	1,262	253	1,589	650	110	11,880	8,130	20,220	17,320
27	2,573	768	470	1,187	297	1,500	760	110	26,580	7,740	15,200	10,580
28	2,573	541	406	1,116	321	993	560	130	14,200	7,020	13,240	7,740
29	2,669	.....	437	878	193	253	470	430	12,100	6,340	12,320	7,380
30	1,936	.....	437	541	146	211	390	2,290	11,000	6,160	11,880	6,680
31	1,668	.....	437	.....	146	.....	320	7,020	.....	11,000	.....	6,000
Maximum	2,669	2,861	26,510	6,720	406	13,300	39,380	7,020	26,580	16,240	44,180	17,320
Minimum	1,193	541	376	376	133	120	176	110	5,360	6,000	10,160	6,000
Mean	1,996	1,484	1,680	2,406	205	2,692	1,987	782	11,829	8,918	15,835	9,753

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from February 26 to July 3, 1921. Fair between 450 to 3,300 second-liters. Accuracy of discharges for March 7 and July 4, quite doubtful.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	6,170	4,040	1,345	355	175							
2	6,170	4,180	1,500	320	150							
3	6,340	4,460	1,355	355	175							
4	6,170	3,400	1,270	320	200							
5	6,000	4,460	1,130	320	150							
6	7,380	5,680	1,000	355	150							
7	7,740	4,320	870	355	150							
8	7,560	3,275	935	320	130							
9	6,850	2,920	1,000	285	130							
10	8,325	2,810	1,130	355	285							
11	4,750	2,700	1,130	320	200							
12	10,370	2,390	1,065	285	150							
13	9,135	2,290	1,000	250	150							
14	5,840	2,290	935	320	175							
15	5,360	2,290	870	320	175							
16	7,740	2,290	1,000	285	150							
17	5,040	1,270	1,065	250	130							
18	3,775	2,005	870	225	110							
19	3,525	2,100	935	225	110							
20	5,040	1,910	705	225	130							
21	4,180	1,910	560	225	110							
22	5,840	1,740	470	200	130							
23	5,200	1,925	390	225	130							
24	5,895	1,910	390	200	110							
25	4,750	1,580	390	175	110							
26	4,180	1,420	390	250	100							
27	4,460	1,580	1,910	250	110							
28	5,895	1,580	1,000	200	110							
29	4,320		760	175	175							
30	4,320		470	175	150							
31	4,180		390		130							
Maximum	10,370	5,680	1,910	355	285							
Minimum	3,525	1,270	390	175	100							
Mean	5,735	2,669	911	271	146							

NOTE.—Discharge determined from fairly well-defined rating curve. Applicable from July 4, 1921, to May 31, 1922. Fair below 10,000 second-liters. No record on days for which discharge is not given.

CAPIZ PROVINCE

ACLAN RIVER, MALINAO

LOCATION.—At 20 m. above the Aclan River Ferry of the Banga–Malinao Road.

RECORDS AVAILABLE.—From September 8, 1919, to December 31, 1922.

GAGE.—Inclined staff anchored to rocks at left bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat at 10 m. below the gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for over 300 m. above and below the station. Right bank low and subject to overflow; left bank over a meter high. Stream bed gravelly and shifting. Flow uniform at ordinary stage but at high, current swift.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 541,100 second-liters on May 22, 1922; minimum discharge, 11,700 second-liters on May 31, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 30,000 to 90,000 second-liters. Applicable throughout the period of observation. Gage read twice daily.

Discharge measurements of Aclan River, near Poblacion, Malinao, Capiz

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
October 3	C. Daquil	1 39	44,335	
October 26	do	3 22	418,290	
November 10	do	2 40	232,778	
December 15	do	1 54	90,147	
1920				
January 10	do	1 78	125,415	
March 12	do	1 16	38,942	
April 15	do	.90	29,283	
May 14	do	.78	21,466	
June 18	R. Ylagan and T. Mendoza	.94	33,161	
July 3	C. Daquil	1 06	47,559	
August 18	R. Ylagan	.96	33,251	
September 17	T. Mendoza	1.40	92,298	
September 19	do	1.79	173,845	
1921				
November 17	do	1.86	146,991	
November 18	do	1.72	69,800	
1922				
July 11	S. Malapit	2.40	20,400	
July 22	do	2 34	14,164	
August 21	do	1.64	6,820	
September 25	do	1.75	6,300	
September 30	do	1.80	7,784	
October 6	H. I. Fernandez	1.60	56,821	
October 9	do	1.62	67,544	
November 18	do	1 70	84,300	
November 20	do	1.76	103,200	
December 28	do	2.13	203,000	
December 29	do	1.88	126,300	

Daily and monthly discharges, in liters per second, of Aclan River near Santiago, Malinao, Capiz, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1										79,700	177,000	185,800
2										75,700	238,600	196,800
3										75,700	152,800	205,600
4										82,700	140,700	322,200
5										83,700	203,400	321,100
6										71,700	155,000	190,200
7										85,700	141,800	150,600
8									71,700	106,600	159,400	136,300
9									79,700	102,200	189,100	122,000
10									79,700	195,700	183,600	107,700
11									91,700	124,200	128,600	118,700
12									79,700	102,200	103,300	105,500
13									76,700	89,700	92,900	112,100
14									133,000	173,700	87,700	87,700
15									108,800	337,600	83,700	83,700
16									91,700	174,800	81,700	78,700
17									84,700	134,100	80,700	88,700
18									189,100	115,400	89,700	117,600
19									114,300	104,400	105,500	405,800
20									100,000	108,800	140,700	232,000
21									95,700	125,300	134,100	155,000
22									113,200	113,200	135,200	126,400
23									137,400	91,700	123,100	123,100
24									102,200	113,200	106,600	119,800
25									93,700	130,800	178,100	118,700
26									130,800	241,900	159,400	130,800
27									104,400	159,400	306,800	137,400
28									91,700	127,500	271,600	126,400
29									85,700	128,600	205,600	170,400
30									84,700	200,100	188,000	339,800
31										282,600		260,600
Maximum									189,100	337,600	306,800	405,800
Minimum									71,700	71,700	80,700	78,700
Mean									101,752	133,503	151,480	167,006

Daily and monthly discharges, in liters per second, of Aclan River near Santiago, Malinao, Capiz, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	212,260	58,000	123,100	39,100	35,500	45,400	54,400	56,200	375,000	137,400	84,700	137,400
2	260,600	56,200	115,400	37,300	28,300	27,400	45,400	51,700	260,600	119,800	83,700	130,800
3	218,800	53,500	101,100	77,700	23,000	18,100	36,400	48,100	227,800	136,300	123,100	156,100
4	194,600	50,800	87,700	79,700	19,800	22,200	51,700	43,600	174,800	127,500	447,600	139,600
5	201,200	49,000	80,700	67,700	17,300	18,100	63,700	39,100	145,100	126,400	436,600	146,200
6	194,600	49,000	75,700	54,400	42,700	19,800	75,700	36,400	134,100	137,400	128,600	227,600
7	161,600	48,100	85,700	47,200	26,500	17,300	56,200	31,000	90,700	150,600	125,600	174,800
8	150,600	45,400	73,700	44,500	19,800	27,400	50,800	30,100	92,700	118,700	120,900	160,500
9	137,400	47,200	71,700	39,100	33,700	23,800	58,000	23,800	91,700	116,500	114,300	182,500
10	117,600	43,600	61,700	36,400	40,900	45,400	51,700	28,300	84,700	124,200	122,000	144,000
11	106,600	40,000	56,200	37,300	42,700	47,200	146,200	26,500	77,700	104,400	116,500	126,400
12	93,700	33,700	51,700	33,700	35,500	47,200	236,400	27,400	123,100	89,700	117,600	124,200
13	85,700	52,600	48,100	30,100	23,000	39,100	255,100	40,000	91,700	82,700	133,000	130,800
14	172,600	55,300	50,800	29,200	20,600	36,400	195,700	36,400	83,700	106,600	236,400	201,200
15	199,000	134,100	155,000	30,100	18,900	49,000	211,100	27,400	81,700	238,600	200,100	134,100
16	194,600	189,100	95,700	27,400	28,300	49,900	193,500	37,300	84,700	304,600	134,100	159,400
17	238,600	115,400	74,700	28,300	23,800	40,000	127,500	31,000	75,700	227,600	227,600	150,600
18	247,400	101,100	68,700	31,000	15,700	31,000	196,800	38,200	77,700	161,600	156,100	151,700
19	216,600	112,100	107,700	25,600	21,400	25,600	189,100	39,100	130,800	108,800	126,400	148,400
20	174,800	86,700	84,700	21,400	17,300	25,600	172,600	77,700	126,400	107,700	126,400	130,800
21	98,900	87,700	70,700	21,400	20,600	18,900	236,400	60,700	126,400	125,300	118,700	126,400
22	227,600	79,700	58,000	19,800	25,600	49,000	223,200	73,700	137,400	120,900	122,000	115,400
23	227,600	74,700	49,900	23,000	29,200	45,400	207,800	76,700	146,200	126,400	135,200	102,200
24	218,800	72,700	46,300	23,800	18,900	59,800	185,800	55,300	387,100	125,300	187,400	95,700
25	197,900	117,600	56,200	63,700	22,200	49,000	188,000	49,000	453,100	130,800	141,800	89,700
26	78,700	89,700	61,700	43,600	25,600	39,100	174,800	39,100	392,600	113,200	167,100	83,700
27	67,700	73,700	52,600	32,800	16,500	39,100	163,800	50,800	232,000	125,300	260,600	172,600
28	67,700	128,600	45,400	28,300	27,400	42,700	148,400	45,400	133,000	134,100	222,100	200,100
29	66,700	111,000	49,900	30,100	25,600	56,200	94,700	64,700	130,800	131,900	170,400	145,100
30	63,700	.....	46,300	48,100	13,300	63,700	102,200	60,700	133,000	117,600	146,200	126,400
31	59,800	.....	42,700	.....	11,700	.....	83,700	79,700	.....	109,900	.....	115,400
Maximum	260,600	189,100	155,000	79,700	42,700	63,700	255,100	79,700	453,100	304,600	447,600	227,600
Minimum	59,800	33,700	42,700	19,800	11,700	17,300	36,400	23,800	75,700	82,700	83,700	83,700
Mean	159,805	77,803	72,565	38,393	24,881	37,293	137,961	45,971	163,400	135,090	166,193	142,897

Daily and monthly discharges, in liters per second, of Aclan River near Poblacion, Malinao, Capiz, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	119,800	257,300	192,400	73,700	52,600	34,600	63,700	85,700	65,700	58,000	189,100	232,000
2	211,100	227,600	117,600	74,700	50,800	95,700	83,700	90,700	74,700	69,700	277,100	208,900
3	189,100	174,800	84,700	75,700	43,600	80,700	115,400	84,700	64,700	69,700	284,800	212,200
4	148,400	136,300	76,700	74,700	39,100	46,300	156,100	84,700	61,700	95,700	298,000	227,600
5	137,400	104,400	73,700	77,700	36,400	112,100	189,100	81,700	67,700	82,700	262,800	266,100
6	126,400	137,400	58,900	75,700	40,000	75,700	150,600	126,400	81,700	67,700	273,800	292,500
7	135,200	117,600	51,700	65,700	39,100	46,300	125,300	130,800	111,000	58,900	291,400	271,600
8	134,100	104,400	79,700	63,700	40,900	64,700	117,600	105,500	76,700	68,700	305,700	258,400
9	167,100	87,700	179,200	62,700	38,200	85,700	85,700	90,700	84,700	77,700	298,000	248,500
10	227,600	73,700	185,800	58,000	40,900	49,000	68,700	84,700	115,400	73,700	313,400	252,900
11	332,100	66,700	109,900	61,700	44,500	31,000	89,700	77,700	150,600	93,700	486,100	252,900
12	183,600	54,400	105,500	61,700	36,400	88,700	138,500	86,700	442,100	102,200	376,100	260,600
13	141,800	44,500	115,400	57,100	35,500	80,700	163,800	80,700	371,700	102,200	306,800	279,300
14	166,000	51,700	117,600	64,700	47,200	101,100	133,000	80,700	262,800	102,200	205,600	336,500
15	152,800	92,700	135,200	55,200	42,700	117,600	111,000	80,700	179,200	87,700	167,100	364,000
16	260,600	87,700	185,800	29,200	58,000	75,700	134,100	76,700	163,800	113,200	144,000	290,300
17	196,800	95,700	182,500	38,200	58,900	51,700	156,100	67,700	153,900	115,400	123,100	256,200
18	101,100	75,700	251,800	21,400	68,700	34,600	163,800	61,700	159,400	108,800	104,400	279,300
19	126,400	111,000	287,000	31,900	101,100	60,700	218,800	57,100	134,100	120,900	102,200	320,000
20	104,400	127,500	255,100	28,300	138,500	74,700	315,600	54,400	106,600	126,400	105,500	416,800
21	93,700	172,600	239,700	68,700	115,400	92,700	331,000	52,600	87,700	119,800	112,100	339,800
22	83,700	272,700	129,700	85,700	73,700	119,800	348,600	49,900	78,700	115,400	229,800	293,600
23	139,600	288,100	96,800	83,700	68,700	147,300	320,000	37,300	58,000	107,700	358,500	280,400
24	127,500	336,500	75,700	75,700	70,700	172,600	260,600	33,700	40,000	108,800	293,600	267,200
25	112,100	328,800	60,700	64,700	100,100	207,800	205,600	34,600	36,400	116,500	458,600	254,000
26	104,400	300,200	80,700	60,700	86,700	200,100	147,300	31,000	41,800	156,100	387,100	269,400
27	108,800	288,100	94,700	74,700	51,700	152,800	116,500	42,700	58,900	119,800	405,800	312,300
28	126,400	260,600	84,700	78,700	37,300	100,000	100,000	44,500	63,700	136,300	339,800	378,300
29	156,100		74,700	58,000	32,800	63,700	84,700	45,400	66,700	140,700	310,100	362,900
30	238,600		71,700	58,000	39,100	53,500	94,700	62,700	69,700	142,900	300,200	342,000
31	238,600		68,700		36,400		83,700	68,700		130,800		337,600
Maximum	332,100	336,500	287,000	85,700	138,500	207,800	348,600	130,800	442,100	156,100	486,100	416,800
Minimum	83,700	44,500	51,700	21,400	32,800	31,000	63,700	31,000	36,400	58,000	102,200	208,900
Mean	157,784	159,871	123,384	62,013	56,958	90,587	157,194	70,735	117,660	102,903	270,353	289,165

Daily and monthly discharges, in liters per second, of Aclan River near Poblacion, Malinao, Capiz, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	283,700	241,900	147,300	129,700		105,500	134,100	156,100	84,700	125,300	130,800	134,100
2	287,000	250,700	145,100			102,200	124,200	141,800	85,700	120,900	116,500	141,800
3	257,300	243,000	140,700			105,500	134,100	137,400	90,700	114,300	147,300	120,900
4	260,600	250,700	136,300		73,700	108,800	130,300	118,700	82,700	120,900	{315,600 / 425,600}	131,900
5	269,400	251,800	134,100		74,700	113,200	196,800	115,400	79,700	115,400	334,300	332,100
6	252,900	258,400	126,400		79,700	105,500	145,100	126,400	80,700	104,400	260,600	277,100
7	260,600	248,500	111,000		79,700	102,200	120,900	119,800	79,700	97,800	189,100	337,600
8	254,000	241,900	104,400		77,700	94,700	119,800	109,900	86,700	97,800	194,600	280,400
9	268,300	246,300	117,600		78,700	94,700	133,000	111,000	87,700	104,400	150,600	225,400
10	258,400	250,700	128,600		79,700	90,700	{287,000 / 392,600}	108,800	81,700	108,800	147,300	213,300
11	263,900	245,200	140,700		75,700	91,700	227,600	103,300	86,700	119,800	152,800	194,600
12	273,800	245,200	174,800		73,700	91,700	145,100	108,800	88,700	114,300	147,300	150,600
13	284,800	204,500	201,200		77,700	95,700	136,300	105,500	83,700	119,800	136,300	190,200
14	271,600	174,800	197,900		73,700	95,700	119,800	109,900	89,700	107,700	122,000	217,700
15	260,600	155,000	195,700		73,700	86,700	130,800	113,200	104,400	109,900	205,600	215,500
16	251,800	139,600	204,500		71,700	81,700	150,600	122,000	156,100	144,000	145,100	188,000
17	243,000	131,900	200,100		76,700	79,700	180,300	117,600	288,100	178,100	108,800	145,100
18	208,900	125,300	195,700		74,700	77,700	159,400	112,100	{423,400 / 311,200}	150,600	109,900	167,100
19	208,900	134,100	183,600		73,700	76,700	182,500	122,000	206,700	182,500	102,200	172,600
20	207,800	142,900	175,900		75,700	80,700	196,800	116,500	196,800	172,600	116,500	222,100
21	221,000	149,500	162,700		205,600	82,700	181,400	101,100	186,900	133,000	123,100	277,100
22	232,000	174,800	155,000		541,100	87,700	184,700	105,500	194,600	130,800	122,000	238,600
23	281,500	213,300	151,700		271,600	96,800	158,300	107,700	192,400	119,800	124,200	277,100
24	290,300	188,000	148,400		227,600	107,700	150,600	104,400	166,000	118,700	118,700	304,600
25	267,200	169,300	150,600		178,100	108,800	184,700	102,200	115,400	112,100	127,500	398,100
26	259,500	159,400	144,000		151,700	108,800	203,400	108,800	124,200	116,500	136,300	326,600
27	252,900	161,600	146,200		139,600	130,800	191,300	81,700	117,600	116,500	161,600	218,800
28	256,200	155,000	153,900		123,100	134,100	150,600	82,700	120,900	161,600	189,100	131,900
29	254,000		149,500		112,100	118,700	128,600	84,700	120,900	150,600	180,300	128,600
30	250,700		139,600		108,800	142,900	120,900	90,700	120,900	180,300	150,600	137,400
31	239,700		131,900		105,500		148,400	83,700		178,100		115,400
Maximum	290,300	258,400	204,500		541,100	142,900	392,600	156,100	423,400	182,500	425,600	398,100
Minimum	207,800	125,300	104,400		71,700	76,700	119,800	81,700	79,700	97,800	102,200	115,400
Mean	255,881	198,332	154,681		157,077	100,000	163,232	110,621	131,367	129,913	160,720	213,300

NOTE.—No record on days for which discharge is not given.

CAPIZ PROVINCE

MAMBUSAO RIVER, MAMBUSAO

LOCATION.—About 4 km. southwest of the town of Mambusao and about 250 m. south of the Mambusao–Jagnaya Road under construction.

RECORDS AVAILABLE.—From June 15, 1919, to December 31, 1922.

GAGE.—Inclined staff of three sections anchored on left bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from boat at high water at section 50 m. above gage.

CHANNEL AND BANKS.—Channel straight for 300 m. above and 50 m. below the station. Right bank high and covered with vegetation; left bank lowout and slightly subject to overflow, also covered with vegetation. At measuring section, stream bed is composed of hard cemented sandstones and, therefore, not shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 425,220 second-liters on November 4, 1922. Minimum discharge, 450 second-liters on August 27, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curves. Gage read twice daily. Due to vegetal growth in channel, and occasional jamming of logs, some discharge measurements were considered in error.

Discharge measurements of Mambusao River, near Tumulalud, Mambusao, Capiz

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
July 18	C. Daquil	2 06	142,167	Unreliable measurement
July 24	do	1 88	8,722	
August 29	do	1.18	796	
September 19	do	2 44	20,309	
September 19	do	2.09	11,799	
October 6	do	1 34	1,657	
October 23	do	1 98	8,556	
November 6	do	2.52	23,988	
December 18	do	2 00	9,841	
1920				
January 9	do	2 55	28,355	
January 29	do	1 74	4,648	
February 9	do	1 54	2,719	
March 8	do	1.68	4,385	
April 19	do	1 35	902	
May 17	do	1.45	2,257	
June 19	T. Mendoza	1 48	2,796	
July 6	C. Daquil	1.70	4,979	
August 23	R. P. Ilagan	1 39	2,006	
September 20	T. Mendoza	2.25	14,630	
December 10	do	2 71	26,061	
December 10	do	2.52	17,000	
1921				
February 11	do	1.68	6,203	
March 23	do	1.49	5,178	
June 9	do	2.24	7,450	
July 1	do	1.86	6,439	
August 19	do	1.48	3,174	
September 27	do	1.62	4,116	
October 25	do	2.33	7,147	
November 23	do	4.50	42,122	

Discharge measurements of Mambusao River, near Tumulalud, Mambusao, Capiz—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
January 9	T. Mendoza	2 20	8,223	
February 15	do	1.56	3,400	
February 27	do	1.46	3,141	
March 14	do	1.69	5,018	
April 10	do	1.46	3,169	
May 9	do	1.86	8,127	
May 14	do	1 35	2,894	
June 14	do	1.80	6,675	
June 14	do	1.80	6,907	
June 28	do	2 82	48,781	
August 24	do	1.74	6,616	
September 29	do	1 60	4,881	
October 28	do	2.23	11,498	
November 15	do	2.78	37,834	
December 16	do	2.25	19,427	

Daily and monthly discharges, in liters per second, of Mambusao River near Tumulalud, Mambusao, Capiz, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1							870	1,330	1,840	3,280	37,260	39,240
2							820	1,140	1,540	2,500	63,540	42,480
3							1,760	1,140	1,260	2,000	25,560	47,520
4							2,160	1,200	1,140	1,540	33,840	57,960
5							4,160	4,900	1,085	1,540	32,040	65,160
6							2,500	2,780	920	1,680	20,520	38,880
7							18,180	2,000	2,500	7,300	20,520	23,220
8							9,160	975	3,810	34,560	33,480	48,240
9							3,700	3,080	1,920	49,320	21,240	21,420
10							2,780	2,880	15,660	21,600	28,440	14,940
11							5,680	2,000	8,520	23,040	16,200	15,120
12							22,320	1,540	3,700	10,295	23,400	11,880
13							10,120	1,330	4,160	6,200	14,940	16,740
14							6,740	1,140	5,940	30,780	10,470	13,320
15						4,640	2,880	1,140	14,760		8,840	9,800
16						3,080	4,400	1,030	13,680	44,280	7,600	7,900
17						1,680	19,440	920	23,400	24,120	6,740	7,900
18						2,000	13,500	820	36,180	16,920	7,900	9,480
19						1,610	4,900	720	17,280	10,820	10,820	
20						2,320	3,920	670	11,170	11,520	14,040	
21						1,680	11,170	1,030	10,470	21,600	58,680	33,840
22						2,240	3,280	1,680	20,160	15,480	14,400	18,720
23						1,140	8,050	1,085	11,520	9,480	11,700	15,480
24						820	9,160	670	5,940	8,840	12,240	13,860
25						1,030	7,450	575	3,590	27,720	17,280	11,880
26						1,140	6,600	530	9,160	50,400	27,360	14,580
27						1,330	3,920	450	6,200	39,960	15,480	16,560
28						1,260	3,280	720	3,480	21,600		12,600
29						1,610	3,080	720	3,700	18,360	39,060	14,220
30						1,140	2,500	920	4,900	21,420	22,680	35,640
31							1,840	2,320		41,580		35,280
Maximum						4,640	22,320	4,900	36,180	50,400	63,540	65,160
Minimum						820	820	450	920	1,540	6,740	7,900
Mean						1,795	6,462	1,401	8,320	19,324	22,680	24,616

Daily and monthly discharges, in liters per second, of Mambusao River near Tumulalud, Mambusao, Capiz, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	25,200	5,420	9,480	2,320	1,680	4,160	2,880	4,400	3,280	8,520	4,640	31,140
2	36,440	4,400	2,880	2,320	1,540	3,280	4,400	5,160	9,640	6,740	5,290	36,000
3	27,180	4,640	8,360	2,160	1,540	2,880	4,400	5,160	4,160	15,120	24,480	33,180
4	47,570	4,640	6,600	2,320	1,470	3,080	7,020	2,680	3,700	10,820	135,260	22,680
5	32,040	4,040	5,680	2,320	1,400	3,700	7,300	4,160	3,280	6,200	77,760	63,360
6	20,160	3,920	4,280	2,160	2,880	5,290	5,290	2,320	2,680	22,860	27,360	90,720
7	13,860	3,700	4,160	2,000	2,500	3,920	5,940	3,080	3,080	10,470	16,740	54,720
8	16,740	3,700	5,680	2,000	3,590	3,700	4,400	3,480	3,810	42,840	30,600	20,880
9	21,060	3,480	4,160	1,840	2,500	3,700	3,280	2,160	5,680	27,360	13,680	48,600
10	16,560	3,280	3,920	3,280	3,280	14,580	7,900	1,840	3,700	17,640	11,170	21,420
11	11,880	3,080	3,280	2,080	3,480	16,200	5,030	1,680	2,590	10,995	14,400	20,520
12	9,320	3,700	3,080	1,840	3,810	16,200	11,345	2,160	2,880	7,020	10,820	10,295
13	6,740	4,400	2,980	1,840	2,500	9,160	13,320	15,480	20,880	4,520	9,160	11,880
14	24,480	4,400	2,880	2,410	2,080	6,460	6,740	3,080	13,680	5,420	29,880	40,680
15	64,130	10,470	5,680	2,000	2,000	3,700	4,400	2,680	6,460	7,020	18,360	18,900
16	33,300	30,600	6,740	1,840	3,280	3,590	3,480	2,240	11,170	10,820	12,960	23,760
17	27,540	9,640	4,640	1,680	2,500	3,480	2,680	4,160	5,420	11,170	9,960	22,860
18	28,080	5,680	3,480	1,840	14,400	3,180	2,680	4,900	6,880	7,160	8,360	20,520
19	21,960	4,280	3,280	1,760	6,460	3,920	2,500	2,680	47,700	26,280	6,460	18,900
20	35,280	4,770	3,280	1,760	14,760	2,780	2,320	2,410	21,960	23,580	6,070	11,880
21	12,240	5,160	3,480	1,680	9,480	2,410	2,320	2,240	64,080	12,600	5,680	9,480
22	9,960	4,900	3,280	1,840	19,800	2,320	2,240	2,500	16,560	21,780	6,330	8,360
23	10,645	4,640	2,780	2,160	10,820	6,460	2,000	2,000	10,820	9,160	5,680	6,740
24	8,200	3,920	2,680	2,160	5,160	9,160	1,840	5,160	45,180	6,740	6,070	5,680
25	7,450	6,200	2,780	2,000	4,160	15,480	1,680	3,920	111,600	6,600	6,200	6,460
26	6,740	5,940	2,880	5,030	3,590	18,360	1,540	10,295	66,240	5,680	5,160	7,600
27	5,940	4,520	3,180	2,500	3,280	3,080	1,760	11,520	31,500	5,160	9,800	7,900
28	5,680	7,900	2,680	2,000	21,600	4,640	1,840	5,420	13,320	6,200	30,420	9,800
29	5,940	29,880	2,500	1,760	21,600	4,160	2,160	4,520	11,700	6,600	14,040	6,880
30	6,070		2,680	2,000	10,470	3,380	2,000	3,700	11,345	4,770	11,170	5,940
31	5,680		2,680		4,900		1,920	3,180		3,920		4,900
Maximum	64,130	30,600	9,480	5,030	21,600	18,360	13,320	15,480	111,600	42,840	135,260	90,720
Minimum	5,680	3,080	2,500	1,680	1,400	2,320	1,540	1,680	2,590	3,920	4,640	4,900
Mean	19,486	6,734	4,068	2,163	6,210	6,214	4,149	4,205	18,826	11,992	19,132	22,675

Daily and monthly discharges, in liters per second, of Mambusao River near Tumulalud, Mambusao, Capiz, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,900	39,600	10,820	3,520	2,480	11,830	13,150	38,420	11,730	4,330	12,064	9,160
2	47,160	18,000	8,680	4,020	2,480	7,900	6,550	11,045	18,410	24,440	30,132	8,160
3	34,260	34,920	6,740	3,450	2,370	26,560	6,760	7,440	27,375	9,600	31,848	27,000
4	15,840	17,100	5,940	3,120	2,260	9,325	4,905	10,145	22,950	6,870	12,736	12,736
5	13,500	11,520	4,900	4,020	2,370	6,130	4,905	5,540	11,200	5,540	64,472	33,496
6	10,820	8,360	4,640	5,350	2,370	26,830	4,170	3,945	20,810	4,250	100,936	23,900
7	10,470	8,050	5,680	3,180	2,260	21,040	4,820	6,340	15,630	3,660	57,052	15,512
8	12,960	8,520	5,160	2,880	2,260	57,950	4,820	4,650	12,325	4,905	28,036	11,300
9	13,680	6,880	27,000	2,760	2,260	14,530	4,490	4,410	7,440	4,250	30,896	9,560
10	18,000	6,600	10,120	2,590	2,260	16,590	4,490	6,760	6,550	20,120	110,900	8,560
11	63,360	5,290	6,330	2,700	2,210	25,500	18,620	6,235	8,150	16,590	157,116	7,960
12	22,500	3,380	4,900	4,490	2,425	18,410	27,100	6,250	238,100	33,380	70,640	7,576
13	14,220	4,400	44,250	3,520	2,315	6,980	31,820	3,590	104,100	9,720	25,300	7,392
14	16,200	4,160	18,410	2,110	2,315	11,510	12,855	3,380	13,660	8,150	16,700	12,288
15	15,120	10,120	25,500	2,370	2,315	18,200	7,745	3,180	8,150	7,095	11,952	21,216
16	26,640	5,680	45,750	2,060	2,760	8,525	5,730	3,060	10,000	96,060	10,160	29,372
17	18,360	4,520	32,750	2,260	2,820	5,730	4,410	2,940	7,210	125,316	9,860	14,016
18	11,880	3,920	60,875	2,260	5,540	18,200	7,095	2,700	5,260	31,364	10,160	8,960
19	9,160	6,460	53,100	2,260	10,435	18,410	17,990	3,180	6,340	11,952	9,360	19,412
20	7,600	29,160	26,030	2,210	18,830	6,130	7,745	3,180	5,080	9,160	8,160	18,652
21	7,300	29,880	12,820	2,160	25,500	10,290	5,730	4,820	6,030	22,404	10,160	17,180
22	7,450	40,320	8,400	2,260	9,460	31,820	4,570	4,990	7,785	15,628	17,540	11,624
23	8,050	54,000	6,550	12,820	10,000	12,985	4,820	4,650	6,340	13,076	39,436	16,940
24	9,160	62,640	5,445	4,410	4,820	28,500	4,990	6,250	6,340	9,260	38,340	19,796
25	6,740	50,040	4,650	3,310	5,830	54,450	4,170	3,310	17,790	10,364	23,620	21,216
26	6,880	38,520	4,410	2,820	3,730	15,630	4,820	3,310	11,200	18,404	146,728	32,832
27	6,320	26,280	4,820	2,820	4,020	9,325	11,200	3,120	10,290	22,272	53,236	102,632
28	7,020	15,480	4,170	2,700	4,735	16,590	13,150	4,095	8,525	22,140	22,140	32,668
29	33,480		3,870	2,645	3,450	8,920	13,490	7,670	7,670	66,592	13,656	15,280
30	83,880		4,020	2,480	3,660	6,130	15,630	20,580	5,350	25,300	10,780	11,300
31	42,120		3,450		3,060		137,000	62,350		10,676		9,760
Maximum	83,880	62,640	60,875	12,820	25,500	57,950	137,000	62,350	238,100	125,316	157,116	102,632
Minimum	4,900	3,380	3,450	2,060	2,210	5,730	4,170	2,700	5,080	3,660	8,160	7,392
Mean	19,515	19,779	15,167	3,318	4,955	17,697	13,534	8,437	21,593	21,705	37,471	19,308

NOTE.—Discharge determined from fairly well-defined rating curves, applicable as follows: March 13 to October 15, 1921, fair between 3,000 and 8,000 second-liters; October 16, 1921, to May 8, 1922, fair between 3,000 and 43,000 second-liters.

Daily and monthly discharges, in liters per second, of Mambusao River near Tumulalud, Mambusao, Capiz, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	8,660	7,576	3,970	2,442	1,952	40,170	30,660	10,430	22,900	5,376	39,540	24,360
2	7,484	25,580	3,810	2,442	1,816	18,200	18,860	9,180	9,180	6,620	30,060	23,140
3	6,840	11,408	4,130	2,300	1,884	22,660	12,250	9,350	15,260	5,004	53,090	12,650
4	7,024	24,880	3,650	2,300	1,816	19,780	12,250	10,530	11,690	4,350	285,060 425,220	12,650
5	7,484	11,196	3,490	2,300	2,020	29,500	38,920	7,220	11,330	4,456	261,380	15,470
6	7,208	12,176	3,334	2,230	2,370	49,550	17,570	6,760	6,760	5,250	51,650	25,940
7	7,392	9,260	3,324	2,300	2,160	17,150	12,250	6,480	8,020	11,150	68,390	36,130
8	8,760	7,208	3,178	2,442	2,160	11,510	14,050	7,060	24,100	11,510	42,110	31,740
9	10,884	7,208	3,490	2,586	5,376	9,350	32,300	19,780	65,250	26,110	41,450	16,730
10	8,560	6,664	3,178	2,952	8,340	8,180	258,820 422,660	10,530	20,260	22,900	135,940	11,510
11	11,624	6,136	3,490	2,730	10,070	6,760	269,700	20,260	21,700	28,100	38,920	9,710
12	13,888	4,130	4,936	3,026	3,670	9,010	61,970	20,020	33,140	23,860	31,180	11,510
13	12,848	4,050	6,932	3,650	2,760	8,020	25,140	14,450	19,540	37,680	28,660	132,100
14	9,860	4,290	4,772	6,136	2,520	8,020	22,660	11,880	12,250	23,140	25,670	42,770
15	9,160	3,970	5,100	3,730	2,360	5,640	17,150	9,890	9,010	21,220	40,810	37,680
16	8,360	3,890	4,210	2,878	2,360	6,760	32,020	8,180	8,020	29,500	16,520	18,860
17	7,484	3,810	4,610	2,586	24,620	9,010	57,590	19,300	7,540	33,700	21,940	153,220
18	7,024	3,970	3,810	2,442	14,650	7,700	91,180	40,810	16,730	21,940	38,300	32,860
19	6,488	3,810	4,450	2,300	6,060	7,860	133,380	17,360	10,070	32,300	15,470	69,880
20	6,840	3,970	3,810	2,300	3,850	8,020	175,620	11,150	7,380	24,100	11,330	58,760
21	6,312	3,890	3,570	2,300	78,710	10,430	47,470	10,790	6,060	21,220	11,150	56,820
22	8,560	10,364	3,490	2,300	404,100	45,230	50,250	22,420	8,020	21,220	10,070	83,790
23	12,512	7,960	3,334	2,160	228,900	47,810	34,600	8,340	8,670	42,110	11,330	21,700
24	15,628	6,576	3,256	1,884	41,450	24,100	62,380	6,480	13,650	17,150	23,140	25,400
25	15,048	5,100	3,178	1,884	17,360	28,100	95,500	5,640	10,430	13,050	77,330	390,660
26	14,700	4,530	2,730	1,884	13,050	22,900	71,600	5,500	7,380	15,470	27,830	257,540
27	8,760	4,050	2,730	1,884	33,140	94,420	34,600	5,004	6,340	11,880	60,750	48,500
28	8,160	4,050	3,178	1,816	20,020	27,830	21,700	12,850	5,004	55,300	68,610	28,940
29	6,488		2,878	1,748	14,650	75,950	15,890	15,890	4,562	99,820	151,300	18,860
30	6,664		2,730	2,952	15,890	21,220	12,650	8,340	6,760	30,060	93,340	23,140
31	6,664		2,658		25,670		15,470	23,140		93,880		49,900
Maximum	15,628	25,580	6,932	6,136	404,100	94,420	422,660	40,810	65,250	99,820	425,220	390,660
Minimum	6,312	3,810	2,658	1,748	1,816	5,640	12,250	5,004	4,562	4,350	10,070	9,710
Mean	9,141	7,561	3,723	2,563	32,121	30,159	60,573	12,742	13,900	25,756	62,747	57,514

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from May 9 to December 31, 1922. Records fair between 2,700 and 60,000 second-liters.

CAVITE PROVINCE

BIÑANG RIVER, CARMONA

LOCATION.—About 750 m. below junction of this river with Lantic creek at barrio Lantic and 2.22 km. south of Carmona.

RECORDS AVAILABLE.—September 13, 1919, to March 18, 1922.

GAGE.—Standard metric gage nailed in a vertical position to a post driven at right bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at 42.10 m. below gage. On April 30, 1921 a 3.048 m. sharp-crested weir with complete end contractions was constructed.

CHANNEL AND BANKS.—Channel is straight for about 300 m. above and below the station. Both banks rocky, high and wooded, not subject to overflow. At measuring section stream bed composed of gravel and fine sand and shifting during floods.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 5,992 second-liters on August 15, 1922; minimum discharge, 30 second-liters on May 10–13, 1920.

DIVERSIONS.—Two above the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 40 to 190 second-liters. Applicable from September 13 to December 31, 1920. Gage read twice daily. From April 30, 1921, to March, 1922, discharge determined by weir formula, $Q=1838\ (L-.2H)\ H^{3/2}$ except on days when weir was overtopped, in which case discharge current meter rating table was applied.

Discharge measurements of Biñang River, near Lantic, Carmona, Cavite

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
September 13	J. S. Roxas	62	405	
September 13	....do	.62	536	
1920				
February 21	...do	51	74	
April 27	J. Roxas and R. Pertierra	.43	41	
April 28	....do	.43	60	
April 28	...do	.43	52	
May 8	J. S. Roxas	43	40	
May 10	...do	.43	51	
June 30	....do	.51	194	
July 1	....do	.49	151	
July 1	....do	51	193	
July 2	J. S. Roxas and O. Buenaventura.	.46	104	
July 3	....do	.48	115	
August 28	J. S. Roxas and A. Fegarido	.55	301	
August 28	...do	.56	302	
September 9	A. Fegarido and B. Ramos.	.61	526	
September 24	B. Ramos	.76	950	
September 25	....do	.73	885	

Discharge measurements of Biñang River, near Lantic, Carmona, Cavite—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
January 26	Roxas and Castillo	.50	195	
February 23	Castillo	.45	69	
March 29	J. S. Roxas	.45	93	
April 12	do	.42	69	
1922				
May 9	do	.75	64	
June 16	do	.70	155	
July 4	do	.71	164	
October 21	do	.31	186	
November 23	do	.32	188	
November 24	do	.31	178	

Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1										132	286	340
2										132	262	286
3										132	215	238
4										151	238	262
5										132	238	288
6										132	238	215
7										151	238	215
8										151	238	238
9										151	238	238
10										151	215	238
11										132	262	215
12										172	313	193
13									490	193	340	172
14									523	193	313	193
15									,012	805	340	193
16									658	459	313	193
17									589	262	340	172
18									523	238	397	313
19									490	286	397	428
20									490	658	397	428
21									459	459	340	428
22									428	286	368	313
23									397	238	368	215
24									340	262	340	215
25									215	238	215	215
26									151	262	151	172
27									151	523	172	132
28									132	368	172	172
29									151	286	193	151
30									132	262	523	113
31										368		113
Maximum									1,012	805	523	428
Minimum									132	132	151	113
Mean									407	270	289	247

NOTE.—Discharge determined from fairly well-defined rating curve.

Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	113	95	95	95	45	78	340	340	397	490	151	95
2	113	95	95	95	61	61	313	368	4,012	556	78	132
3	113	61	95	95	61	61	95	340	1,292	589	78	132
4	95	61	95	78	61	78	151	368	1,504	730	95	132
5	95	61	95	78	61	132	132	340	1,527	428	113	262
6	95	61	95	78	61	132	113	313	589	397	132	1,198
7	95	61	95	78	61	132	1,198	313	368	556	95	428
8	95	61	95	78	61	95	428	262	1,292	490	61	368
9	95	61	95	78	45	95	215	238	490	556	61	428
10	113	61	95	78	30	95	172	238	556	428	45	428
11	132	61	95	78	30	132	313	215	397	368	45	340
12	132	45	95	78	30	215	313	215	313	313	61	286
13	132	61	95	78	30	132	490	215	313	262	95	262
14	151	45	95	78	313	172	286	215	340	313	193	262
15	151	45	95	78	61	172	589	262	340	368	368	313
16	151	95	95	78	45	151	623	215	313	490	397	428
17	172	95	95	78	428	132	1,198	215	340	623	286	428
18	172	61	95	45	368	132	1,433	215	313	556	262	368
19	151	95	95	45	61	132	1,433	238	368	490	262	313
20	151	78	95	45	61	95	1,762	313	1,198	459	215	172
21	132	193	95	45	95	95	968	238	428	490	132	172
22	151	193	95	45	61	61	428	238	368	490	95	172
23	132	193	95	45	61	95	313	215	844	428	95	151
24	151	172	95	45	61	523	262	215	1,574	262	95	151
25	113	172	95	45	61	132	368	215	1,480	262	95	172
26	113	172	95	45	61	113	1,386	215	968	215	61	368
27	113	172	95	45	61	132	1,668	397	885	215	95	556
28	113	172	95	45	61	95	968	340	523	215	172	428
29	95	132	95	45	61	132	623	313	556	215	151	523
30	95		95	61	61	215	523	313	490	215	132	556
31	95		95		95		313	313		215		556
Maximum	172	193	95	95	428	523	1,762	397	4,012	730	397	1,198
Minimum	95	45	95	45	30	61	95	215	313	215	45	95
Mean	123	101	95	66	88	134	626	273	813	409	141	341

NOTE.—Discharge determined from fairly well-defined rating curve. Daily discharge for March, very unreliable.

Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	459	172	132	78	83	166	89	118		138	92	668
2	151	151	61	78	83	101	116	118	195	147	92	647
3	132	193	132	78	83	101	116	118	179	147	92	412
4	151	238	151	61	83	101		118	178	145	92	422
5	132	262	151	78	83	110	105	118	164	147	92	450
6	151	215	61	78	94	118	259	123	166	147	94	592
7	132	172	95	78	83	118	157	126	164	140	96	458
8	113	172	95	78	83	164	140	126	152	140	96	368
9	113	95	78	95	83	161	133	126	152	145	96	225
10	132	45	95	95	83	142	138	176	152	142	98	152
11	113	61	78	61	83	140	128	152	157	140	109	128
12	113	61	78	45	87	140	128	152	157	140	221	140
13	113	95	95	30	87	157	121	152	157	140	221	162
14	113	95	95	30	83	138	118	154	152	133	229	114
15	113	45	95	30	83	116	118	[a]5,992	154	133	823	128
16	238	30	78	30	83	142	118	[a]5,428	164	133	832	133
17	215	30	78	30	83	147	118	176	161	133	461	135
18	172	30	95	30	83	116	123	2,279	152	133	371	116
19	172	30	95	30	83	368	118	2,138	149	130	405	114
20	151	30	78	30	83	234	116	2,185	147	128	354	110
21	172	30	61	30	159	354	116	152	138	128	368	107
22	172	61	61	30	159	401	114	157	130	126	672	105
23	172	78	61	30	159	110	164	164	133	116	1,680	107
24	172	61	61	30	128	112	152	164	130	107	819	107
25	172	61	61	30	128	110	123	157	128	101	727	107
26	151	78	61	95	114	110	116	152	128	92	1,714	103
27	172	61	61	45	98	110	116	152	130	90	[a]5,767	98
28	151	61	61	61	92	116	121	[a]4,018	128	90	1,718	100
29	151		61		176	101	118	157	128	90	756	94
30	172		78	83	214	89	118	[a]5,428	152	90	773	96
31	172		78		176		118	[a]3,078		90		98
Maximum	459	262	151	95	214	401	259	5,992	195	147	5,767	668
Minimum	113	30	61	30	83	89	89	118	128	90	92	94
Mean	162	97	85	54	106	153	128	1,092	146	126	666	219

NOTE.—Discharge from January 1 to April 28, and on July 4, August 15–16, 18–20, 28, 30–31, 1921, determined from fairly well defined rating curve. For other days by weir formula, $Q = 1{,}838\ (L - .2\ H)\ H^{3/2}$. [a] Unreliable.

Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	114	87	70									
2	116	79	70									
3	133	76	101									
4	109	79	94									
5	112	83	87									
6	107	74	83									
7	107	74	79									
8	107	79	74									
9	105	83	76									
10	181	85	74									
11	166	85	74									
12	181	79	72									
13	176	74	74									
14	179	72	74									
15	130	74	72									
16	128	74	72									
17	154	72	74									
18	138	63	72									
19	105	79										
20	101	79										
21	128	79										
22	157	81										
23	138	85										
24	142	83										
25	138	81										
26	118	79										
27	109	70										
28	147	70										
29	118											
30	109											
31	83											
Maximum	181	87	101									
Minimum	83	63	70									
Mean	130	78	77									

NOTE.—Discharge determined by weir formula, $Q = 1.838\ (L - .2\ H)\ H^{3/2}$.

CAVITE PROVINCE

KAY ALEMANG RIVER, NAIC

LOCATION.—At Sixto Velasco's dam, about 1.5 km. northeast of km. 5 of the Naic–Indang Road, and about 1.5 km. below the junction of this river with Sahing Creek.

RECORDS AVAILABLE.—From September 29, 1918, to March 31, 1922.

GAGE.—Standard gage board set vertically on wall at left abutment of dam.

DISCHARGE MEASUREMENTS.—Made by a sharp-crested weir with end contractions, is set at about 4 m. below the gage, and by wading when weir was overtopped and after said weir was abandoned.

CHANNEL AND BANKS.—Both the right and left banks are rocky, about 3 m. above ordinary water surface elevation. Stream bed at weir partly rocky and partly clayey.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 37,404 second-liters, on July 29, 1919; minimum discharge, 84 second-liters on December 20–22, 1918.

DIVERSIONS.—Water diverted for operation of Mr. Velasco's mill.

REGULATION.—By diversion above station.

UTILIZATION.—For power purposes.

ACCURACY.—From November, 1918, to March, 1919, discharge records largely estimated. During this period the mill is in operation and the greater part of the water is utilized. Gage read twice daily.

Discharge measurements of Kay Alemang River, near Halang, Naic, Cavite

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1918				
September 28	A. Diaz	.61	364	
October 28	do	.61	364	
November 13	do	.60	354	
1919				
March 29	J. Roxas	1.06	397	
March 30	do	.93	261	
April 16	do	.96	252	
1921				
July 13	do	1 49	389	
August 29	do	1.40	1,062	
August 30	do	1 45	1,214	
September 2	do	1.56	2,004	
October 29	do	1.18	238	
November 2	do	1 14	209	
December 18	do	1 27	298	
March 25	do	1 18	270	
May 23	do	1 44	1,060	
July 10	do	1.41	872	
August 8	do	1.34	760	
August 12	do	1.28	508	
October 8	do	1.37	1,686	
October 9	do	1.37	1,603	

NOTE.—Gage height from March 29, 1919, referred to a different datum.

Daily and monthly discharges, in liters per second, of Kay Alemang River near Sahing, Naic, Cavite, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1										185	255	185
2										185	255	185
3										185	255	185
4										185	255	185
5										185	255	185
6										185	255	185
7										185	255	185
8										185	255	185
9										600	255	185
10										1,380	255	185
11										185	185	185
12										185	185	185
13										185	185	185
14										185	185	185
15										600	185	125
16										1,380	185	125
17										2,660	185	125
18										2,580	185	125
19										1,380	185	125
20										1,380	185	84
21										2,660	185	84
22										2,660	185	84
23										1,380	185	185
24										1,380	185	185
25										600	185	295
26										600	185	375
27										600	185	375
28										185	185	375
29									185	415	185	355
30									185	415	185	295
31										415		295
Maximum									185	2,660	255	375
Minimum									185	185	185	84
Mean									185	822	208	200

Daily and monthly discharges, in liters per second, of Kay Alemang River near Sahing, Naic, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	295	415	1,080	255	255	503	347	4,124	9,484	470	429	429
2	295	415	1,260	295	295	503	5,244	3,964	7,004	516	429	429
3	295	575	1,510	375	295	503	22,764	928	3,884	516	429	347
4	295	575	1,575	375	295	375	2,834	3,324	1,934	516	516	347
5	295	457	1,575	335	295	255	2,524	11,324	1,796	516	429	387
6	355	457	1,575	295	295	255	516	10,684	2,224	1,526	429	387
7	355	457	1,575	295	295	255	516	18,604	2,151	1,338	470	470
8	355	457	1,710	295	295	255	470	10,844	1,338	516	429	429
9	355	745	1,710	295	295	295	347	8,124	2,681	516	429	429
10	355	745	1,710	295	375	12,020	347	7,644	1,468	2,524	470	429
11	355	745	1,710	375	375		347	16,444	1,526	1,038	429	387
12	355	457	850	375	375		387	32,684	1,869	617	387	347
13	295	457	850	295	375		429	20,924	1,526	565	429	347
14	215	850	850	295	375		429	7,804	1,526	617	470	387
15	170	850	850	295	457		387	6,204	1,401	3,154	429	429
16	170	850	850	295	457		387	10,844	1,338	1,338	429	387
17	170	850	850	295	375		387	6,124	1,871	808	516	347
18	215	1,080	1,080	295	375		347	4,764	1,526	617	2,151	387
19	295	1,080	1,380	295	375	1,869	347	3,154	1,218	516	808	307
20	295	1,195	375	295	375	516	429	6,524	1,038	516	617	307
21	295	1,195	375	295	375	470	387	5,884	1,038	516	516	347
22	295	1,080	375	295	375	470	5,404	3,884	928	516	516	347
23	295	1,080	375	255	375	470	1,796	3,564	868	516	429	307
24	295	1,080	375	255	375	516	1,401	3,154	710	516	516	347
25	295	850	375	255	375	516	868	13,164	660	516	429	347
26	375	850	295	255	375	516	470	17,884	516	516	429	307
27	375	850	457	255	375	565	5,084	10,764	516	565	516	307
28	375	970	457	255	375	516	14,204	4,204	470	516	429	347
29	415		375	255	375	516	37,404	3,324	516	516	429	347
30	415		255	255	375	516	9,724	9,724	516	516	429	347
31	415		255		503		5,564	5,164		516		347
Maximum	415	1,195	1,710	375	503	12,020	37,404	32,684	9,484	3,154	2,151	470
Minimum	170	415	255	255	255	255	347	928	470	470	387	307
Mean	311	774	929	298	360	1,030	3,942	8,895	1,851	789	525	369

NOTE.—Gage damaged on dates for which discharge is not given.

Daily and monthly discharges, in liters per second, of Kay Alemany River near Sahing, Naic, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	347	307	267	194	230	267	517	428	9,564	1,155	428	428
2	347	267	267	194	194	267	517	517	10,684	5,564	428	517
3	347	267	267	230	347	347	471	517	4,604	1,869	565	428
4	347	267	267	230	307	428	517	615	6,524	1,468	1,040	347
5	347	267	267	230	347	517	471	517	13,884	928	1,155	428
6	347	267	267	194	307	517	517	428	3,324	810	810	517
7	347	307	267	194	347	517	565	428	3,324	1,278	516	471
8	347	267	267	194	347	428	565	428	2,524	1,155	428	1,411
9	347	307	267	194	347	347	565	428	1,661	565	428	1,411
10	307	267	267	194	347	347	615	387	1,040	565	428	517
11	307	267	267	194	347	347	517	347	710	615	428	347
12	347	267	267	194	347	307	5,244	428	615	615	347	347
13	347	267	267	194	307	307	6,444	387	810	615	428	347
14	307	267	267	194	347	307	2,011	347	710	660	1,155	347
15	347	307	267	194	267	428	710	868	615	660	1,155	307
16	347	267	267	194	347	428	1,661	988	517	471	1,040	428
17	347	267	267	194	347	347	1,278	988	517	4,764	615	347
18	347	267	267	194	347	267	4,764	988	988	3,324	517	347
19	347	267	267	230	267	347	3,651	810	615	1,155	428	347
20	347	267	267	230	267	267	2,095	710	810	710	347	347
21	347	267	267	249	267	347	1,796	615	810	565	347	347
22	347	267	267	287	267	517	1,216	928	517	517	267	347
23	347	267	267	267	267	387	785	710	4,604	347	267	347
24	307	267	267	267	347	347	565	517	4,604	347	347	267
25	347	267	230	267	267	347	517	810	3,154	387	347	347
26	347	267	194	267	307	347	2,834	1,040	2,151	387	307	347
27	347	267	194	267	267	428	2,374	1,040	1,938	347	347	347
28	307	267	194	230	307	428	1,528	988	928	347	347	347
29	307	267	194	230	267	615	1,468	810	660	428	307	307
30	347		194	194	267	660	868	1,040	428	347	347	347
31	307		194		267		516	1,155		347		307
Maximum	347	307	267	287	347	660	6,444	1,155	13,884	5,564	1,155	1,411
Minimum	307	267	194	194	194	267	471	347	428	347	267	267
Mean	338	272	252	220	303	392	1,554	684	2,794	1,075	530	440

Daily and monthly discharges, in liters per second, of Kay Alemang River near Sahing, Naic, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	347	194		192	270	270	358	751	2,913	1,693	270	1,346
2	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
3	347	267	358	154	270	270	313	751	976	976	192	1,632
4	267	427	138	154	270	270	935	686	896	821	192	1,876
5	353	267	405	405	250	270	976	751	821	718	230	1,754
6	267	194	508	358	270	270	508	4,621	718	821	192	481
7	307	194	508	358	270	270	564	6,451	751	1,060	230	405
8	347	194	508	173	270	270	508	1,998	976	976	211	455
9	307	194	508	508	270	270	1,571	1,937	686	821	1,455	455
10	267	194	564	154	270	270	1,876	1,937	623	751	4,011	405
11	307	194	564	192	270	270	1,815	1,693	623	358	4,987	455
12	347	194	508	192	230	270	1,693	1,876	821	508	5,475	405
13	267	230	508	192	192	270	1,346	2,303	1,060	508	10,477 33,413	430
14	307	194	508	192	192	270	1,245	3,523	1,245	405	7,183	358
15	267	194	508	192	192	270	623	9,135	976	381	686	335
16	267	194	508	192	211	270	358	5,353	751	358	3,157	405
17	267	194	508	192	230	313	976	3,157	686	335	154	405
18	267	194	508	192	230	358	1,150	1,876	686	313	1,245	455
19	307	194	313	192	192	270	1,245	1,632	686	270	455	455
20	267	194	508	192	230	230	1,346	1,571	686	270	405	455
21	230	194	270	250	230	313	1,571	1,455	751	270	508	508
22	267	230	270	270	211	358	1,693	1,060	896	270	381	508
23	267	194		211	270	313	2,181	1,346	786	313	2,303	508
24	230	194		173	313	358	2,303	2,242	821	270	5,963	481
25	267	194		270	270	313	2,303	2,181	2,913	291	5,841	508
26	267	230		270	270	270	1,512	1,150	2,059	313	2,425	508
27	267	427		270	291	270	1,150	2,059	1,346	270	2,181	508
28	267	1,155		250	270	270	1,060	1,150	1,245	313	1,998	358
29	230			270	313	358	1,018	1,018	1,150	270	1,937	291
30	194			270	313	405	976	1,571	1,245	270		270
31	194				313		821	1,245		313		270
Maximum	353	1,155	564	508	313	405	2,303	9,135	2,913	1,693	33,413	1,876
Minimum	194	194	138	154	192	230	313	686	623	270	154	270
Mean	281	254	434	234	255	291	1,171	2,307	1,087	547	2,636	617

NOTE.—Discharge determined as follows: January 1 to August 29, 1921, by weir formula, 1,838 (L — .2 H) H3/2, August 30, 1921 to March 31, 1922, from current meter discharge rating curve. No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Kay Alemang River near Sahing, Naic, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	358	230	192									
2	381	230	192									
3	381	192	192									
4	405	230	192									
5	455	230	192									
6	455	192	211									
7	481	230	192									
8	481	192	192									
9	455	230	211									
10	455	270	192									
11	381	192	192									
12	335	211	230									
13	405	192	192									
14	358	211	192									
15	358	230	211									
16	358	192	230									
17	335	230	192									
18	335	192	192									
19	313	192	192									
20	313	230	192									
21	313	192	192									
22	335	230	192									
23	270	192	230									
24	270	192	211									
25	313	230	230									
26	358	192	230									
27	270	192	230									
28	230	192	230									
29	211		230									
30	230		230									
31	230		230									
Maximum	481	270	230									
Minimum	211	192	192									
Mean	349	211	207									

NOTE.—See footnote to discharge table for 1921.

CAVITE PROVINCE

LANTIC CREEK, CARMONA

LOCATION.—About 250 m. from the Gogo Dam and about 60 m. below the junction of Main Irrigation Canal with the Creek.

RECORDS AVAILABLE.—From June 20, 1921, to March 31, 1922.

GAGE.—Metric gage board vertically fastened to a tree on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by 3.048 m. sharp-crested weir with complete end contractions immediately below the gage.

CHANNEL AND BANKS.—Channel straight for 11 m. above the weir. Bed of river of adobe stone. Both banks high sloping gradually, of earthy texture and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 9,149 second-liters on August 6, 1921, which discharge is only roughly estimated; minimum discharge, 42 second-liters on August 18–21, 1921.

DIVERSIONS.—Part of the flow diverted above the station.

REGULATION.—Only by diversion.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read once daily. Records fair.

Daily and monthly discharges, in liters per second, of Lantic Creek near Lantic, Carmona, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1							80	83	248	154	87	44
2							80	83	186	146	87	44
3							83	83	170	132	87	44
4							1,328	83	161	130	87	44
5							176	83	277	100	87	44
6							128	9,149 710	228	98	87	44
7							105	203	170	98	87	89
8							89	176	166	98	87	89
9							91	152	152	96	109	89
10							87	173	170	107	111	89
11							83	146	259	105	197	89
12							83	161	152	100	183	89
13							83	189	146	91	168	94
14							87	200	142	89	168	98
15							87	405	152	89	166	98
16							87	450	122	89	166	96
17							85	109	107	89	130	96
18							85	42	98	100	111	96
19							85	42	100	100	111	96
20						78	85	42	91	100	109	94
21						87	85	42	89	100	111	94
22						94	85	116	96	100	128	94
23						83	128	203	113	91	146	91
24						83	164	189	111	91	146	91
25						83	128	170	100	91	142	91
26						80	152	116	96	91	3,712	91
27						78	118	122	170	91	44	91
28						80	87	236	118	89	44	89
29						80	122	225	122	87	44	89
30						80	113	265	132	87	44	89
31							113	250		87		89
Maximum						94	1,328	9,149	277	154	3,712	98
Minimum						78	80	42	89	87	44	44
Mean						82	142	315	148	101	233	83

NOTE.—Discharge determined by weir formula, $Q = 1{,}838\ (L - .2H)\ H^{3/2}$.

Daily and monthly discharges, in liters per second, of Lantic Creek near Lantic, Carmona, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	87	74	74									
2	87	74	74									
3	87	74	74									
4	87	74	74									
5	87	74	74									
6	87	74	74									
7	87	74	74									
8	83	74	76									
9	83	74	79									
10	83	74	79									
11	83	74	79									
12	83	74	79									
13	83	74	79									
14	83	74	79									
15	83	74	79									
16	83	74	79									
17	83	74	79									
18	83	74	79									
19	83	74	79									
20	83	74	79									
21	79	74	79									
22	79	74	79									
23	79	74	79									
24	74	74	79									
25	74	74	79									
26	74	74	79									
27	74	74	79									
28	74	74	79									
29	74		79									
30	74		79									
31	74		79									
Maximum	87	74	79									
Minimum	74	74	74									
Mean	81	74	78									

NOTE.—See footnote to daily discharge table for 1921. Discharge in February, unreliable.

CAVITE PROVINCE

MARAGONDON RIVER, CAY-ACLE, MARAGONDON

LOCATION.—At sitio Cay-acle about 1.75 km. southeast of the barrio of Mabaccao and about 2.5 km. above junction of Balaungan river with the Maragondon.

RECORDS AVAILABLE.—From November 8, 1919, to December 31, 1922.

GAGE.—Standard metric gage board set vertically to rock on right bank of river.

DISCHARGE MEASUREMENTS.—Made from temporary bridge 8 m. above gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 100 m. above and 130 m. below the gaging station. Banks rocky, steep and high, covered with trees, bamboos and vegetation and not subject to overflow. Stream bed slightly, shifting, watershed precipitous, and a little rainfall causes immediate rise of water which subsides immediately after.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 2,188,000 second-liters on August 16, 1921; minimum discharge, 820 second-liters on May 31–June 2, 1924.

DIVERSIONS.—One below the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from poorly defined curves. The station is a poor one. Gage read twice daily. Due to occasional jamming of logs and trees during rainy season and the irregularities of stream bed, good current meter measurements can hardly be made.

Discharge measurements of Maragondon River near Mabaccao, Maragondon, Cavite

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
November 7	J. S. Roxas	1.46	2,893	
November 8	do	1.46	3,159	
1920				
January 15	do	1.34	1,927	
February 29	do	2.40	1,599	
March 1	do	2.40	1,693	
April 30	do	1.28	1,495	
May 25	do	2.48	9,315	
June 18	do	1.33	1,524	
June 18	do	1.33	1,531	
August 25	do	1.57	3,068	
October 25	do	1.43	3,455	
October 26	do	1.44	3,433	
November 24	do	1.35	2,325	
1921				
January 6	do	1.27	1,811	
January 7	do	1.27	1,833	
February 23	do	2.25	1,915	
March 24	do	1.98	1,217	
April 14	do	2.28	1,240	
July 11	do	1.23	2,097	
August 31	do	1.96	9,632	
August 31	do	1.98	9,953	
August 31	do	1.94	9,485	
August 31	do	1.94	9,470	
September 1	do	2.35	17,182	
September 1	do	2.37	17,902	

NOTE.—Gage heights on February 29 and March 1, 1920, were influenced by the dam.

Discharge measurements of Maragondon River, near Mabaccao, Maragondon, Cavite—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
October 31	J. S. Roxas	1.28	2,072	
November 1	do	1.30	2,554	
December 21	do	1.36	2,486	
1922				
March 26	do	1.25	1,604	
May 25	do	1.39	3,116	
July 12	do	1.78	8,458	
August 11	do	1.78	8,546	
August 11	do	1.78	8,741	
October 7	do	1.60	5,947	
December 2	do	1.26	3,449	
December 2	do	1.26	2,643	

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												2,680
2												2,680
3												2,680
4												2,680
5												2,620
6												2,620
7												2,680
8											2,680	2,680
9											2,680	2,680
10											2,680	2,680
11											2,680	2,680
12											2,740	2,680
13											2,680	2,680
14											2,740	2,680
15											2,680	2,680
16											2,620	2,680
17											2,740	2,200
18											3,880	2,200
19											3,460	2,140
20											3,640	2,080
21											3,040	2,080
22											2,680	2,020
23											2,680	2,020
24											2,680	1,960
25											2,680	1,960
26											2,680	1,960
27											2,680	1,960
28											2,740	1,960
29											2,680	1,960
30											2,680	1,840
31												1,840
Maximum											3,880	2,680
Minimum											2,620	1,840
Mean											2,844	2,368

Daily and monthly discharges, in liters per second, of Maragondon River near Mabaccao, Maragondon, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,720	1,360	1,420	1,480	1,600	1,480	8,920	4,300	25,840	5,320	2,440	1,900
2	1,840	1,360	1,420	1,480	1,600	1,480	6,760	3,460	33,760	4,480	2,440	2,080
3	2,200	1,360	1,420	1,480	1,600	2,440	8,080	2,500	27,520	4,240	2,440	1,900
4	2,140	1,360	1,420	1,480	1,600	2,320	4,360	1,840	32,920	4,240	2,800	1,900
5	2,140	1,360	1,420	1,480	1,600	3,460	3,160	1,960	16,020	5,560	2,680	1,960
6	2,140	1,360	1,420	1,480	1,600	5,380	4,600	2,920	8,920	5,020	2,560	2,020
7	2,200	1,360	1,420	1,480	1,600	4,600	6,820	2,500	3,580	8,920	2,380	1,980
8	2,200	1,360	1,420	1,480	1,660	3,460	4,000	3,160	3,460	6,160	2,200	3,280
9	2,200	1,360	1,420	1,480	1,600	2,320	3,040	2,740	3,820	5,080	2,200	3,340
10	2,200	1,360	1,420	1,480	1,480	2,320	2,200	2,320	4,000	4,720	2,200	3,460
11	2,260	1,360	1,420	1,480	1,480	2,320	10,720	2,320	3,400	3,880	2,140	.....
12	2,260	1,360	1,420	1,540	1,540	2,440	10,480	2,200	3,460	4,300	2,140	2,320
13	2,260	1,360	1,420	1,540	1,600	2,320	11,380	2,200	3,520	4,000	2,140	2,200
14	2,020	1,360	1,420	1,540	1,600	2,920	12,640	10,480	4,000	3,520	2,380	1,960
15	1,960	1,360	1,420	1,540	1,720	5,500	6,280	12,400	3,520	3,520	2,380	2,080
16	1,900	1,360	1,420	1,540	1,960	6,340	9,820	2,560	4,120	3,040	2,440	2,200
17	1,900	1,360	1,420	1,540	2,320	2,200	10,960	3,940	4,360	4,060	2,440	2,080
18	1,840	1,360	1,420	1,540	2,200	1,840	28,120	4,840	3,460	5,320	2,380	1,960
19	1,840	1,360	1,420	1,540	2,200	1,720	15,520	8,320	2,920	4,600	2,320	1,840
20	1,840	1,360	1,480	1,540	2,200	1,720	77,420	3,830	3,340	4,960	2,260	1,780
21	1,840	1,360	1,480	1,540	2,200	1,720	6,400	12,220	3,160	4,120	2,260	1,780
22	1,840	1,360	1,480	1,540	2,260	1,840	5,920	9,340	4,120	3,640	2,200	1,720
23	1,840	1,360	1,480	1,540	2,200	1,780	4,600	4,240	11,620	4,060	2,080	1,720
24	1,840	1,360	1,480	1,540	2,140	1,780	3,520	2,560	9,640	3,520	2,020	1,720
25	1,840	1,420	1,480	1,540	5,440	5,920	3,880	3,280	7,600	2,980	1,960	1,720
26	1,780	1,420	1,480	1,540	2,740	5,080	25,120	2,680	5,920	2,380	1,960	1,660
27	1,600	1,420	1,480	1,540	1,540	9,640	14,020	2,680	4,720	2,440	1,900	1,660
28	1,600	1,420	1,480	1,540	1,480	11,020	13,120	4,480	4,240	2,440	1,960	1,660
29	1,360	1,420	1,480	1,600	1,360	4,120	11,320	2,920	3,700	2,440	1,960	1,660
30	1,420	. . .	1,480	. .	1,960	8,320	9,520	3,940	4,000	2,320	1,900	1,600
31	1,480	. . .	1,480		1,720	.	5,920	26,920	.	2,440	.....	1,600
Maximum	2,260	1,420	1,480	1,600	5,440	11,020	28,120	26,920	33,760	8,920	2,800	3,460
Minimum	1,360	1,360	1,420	1,480	1,360	1,480	2,200	1,840	2,920	2,320	1,900	1,600
Mean	1,919	1,370	1,443	1,519	1,929	3,660	11,246	5,035	8,389	4,120	1,579	2,024

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,600	2,800	2,560	1,780	1,300	820	2,598	2,598	13,370	5,472	2,412	5,690
2	1,540	2,800	2,920	1,600	1,240	820	2,237	2,352	11,800	3,937	2,352	4,660
3	1,420	3,220	3,160	2,500	1,240	880	1,660	2,012	9,310	3,446	2,598	3,852
4	1,420	3,640	3,280	2,380	2,920	880	30,650	2,012	10,100	3,070	2,862	3,767
5	1,420	3,370	3,220	2,200	2,800	880	167,000	2,012	6,270	2,730	2,352	3,767
6	1,420	3,100	2,860	3,100	1,240	940	5,054	15,550	7,020	4,379	2,352	3,767
7	1,420	3,280	2,920	3,040	1,000	1,300	3,604	96,000	5,910	2,862	2,352	3,525
8	1,420	2,800	2,740	3,220	1,000	1,000	2,598	30,650	11,450	4,660	2,412	3,292
9	1,540	2,920	2,680	3,100	1,000	3,280	2,412	14,640	7,150	3,832	4,660	3,142
10	1,480	3,040	3,100	2,560	1,480	3,400	2,796	10,430	5,690	6,150	5,366	2,998
11	1,420	2,800	3,220	3,100	1,060	8,080	2,123	9,460	7,710	4,565	30,650 779,700	2,998
12	1,420	2,800	3,280	3,040	1,060	1,910	1,910	10,770	5,580	3,767	27,300	2,998
13	1,420	3,040	2,860	3,040	1,000	1,810	1,710	435,000	7,430	3,292	22,650	2,930
14	1,420	3,040	3,160	2,920	1,000	1,810	1,660	82,700	11,450	2,998	17,500	2,998
15	1,420	3,280	2,800	2,860	1,000	1,910	1,610	633,000	8,410	2,862	12,770	2,930
16	1,420	3,100	3,040	3,040	880	1,810	1,610	2,188,000 520,000	5,690	2,730	10,600	2,862
17	1,420	2,800	3,040	2,860	1,000	1,710	1,515	32,475	4,660	2,598	11,620	2,862
18	1,540	2,800	2,920	2,680	1,000	1,710	1,610	19,020	3,369	2,532	9,460	2,862
19	1,780	2,680	2,560	2,920	1,000	1,660	3,767	42,400	6,630	2,472	7,150	2,796
20	2,020	2,740	2,560	3,040	1,060	1,710	1,810	18,760	3,937	2,472	6,030	2,862
21	2,680	2,560	2,680	3,040	1,060	1,810	6,150	7,990	4,290	2,472	5,472	2,862
22	2,680	3,280	2,560	2,800	1,000	1,760	5,910	5,690	9,620	2,532	6,390	2,796
23	2,680	3,040	1,840	2,800	1,120	12,370	75,500	35,150	6,270	2,472	6,150	2,730
24	2,680	2,980	1,240	1,600	1,000	1,810	230,000	34,350	7,710	2,472	6,760	2,730
25	2,680	3,040	1,240	1,480	880	1,760	14,200	65,150	6,150	2,412	5,690	2,730
26	2,620	2,920	1,240	2,860	1,000	1,710	11,620	24,150	6,630	2,412	530,000	2,730
27	2,680	2,680	1,240	2,680	1,000	1,710	6,510	7,430	7,430	2,412	24,450	2,664
28	2,740	2,800	1,240	2,080	1,000	4,856	5,054	9,780	5,472	2,472	9,460	2,598
29	2,740	.....	1,360	2,680	1,000	1,810	3,852	25,675	4,290	2,412	6,390	2,598
30	2,740	.....	1,480	2,680	880	2,998	2,730	17,500	9,780	2,412	6,630	2,598
31	2,800	.....	1,600	.....	820	.....	2,598	9,460	.....	2,352	.....	2,532
Maximum	2,800	3,640	3,280	3,220	2,920	12,370	230,000	2,188,000	13,370	6,150	779,700	5,690
Minimum	1,420	2,560	1,240	1,480	820	820	1,515	2,012	3,369	2,352	2,352	2,532
Mean	1,925	2,977	2,471	2,656	1,163	2,288	19,486	90,457	7,353	3,151	38,912	3,133

NOTE.—Daily discharge from June 12, 1921, to March 31, 1922 computed by formula $Q = .105\ H^{2.25}$

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,532	2,237	2,352				3,335	198,300	3,795	3,335	3,725	3,465
2	2,472	2,237	2,237				3,215	97,800	3,795	9,465	3,725	3,465
3	2,472	2,237	2,237				3,105	30,000	3,725	8,895	3,660	3,465
4	2,472	2,237	2,237				4,170	13,670	3,660	6,985	3,870	3,595
5	2,472	2,352	2,180				15,480	4,680	3,660	5,945	3,795	3,465
6	2,472	2,352	2,180				59,700 181,800	36,930	3,660	5,700	3,725	3,465
7	2,472	2,352	2,237				81,150	26,700	3,595	5,945	3,725	3,400
8	2,472	2,294	2,237				43,200	20,100	3,795	5,590	3,725	3,335
9	2,412	2,294	2,237				14,250	12,830	3,725	5,370	3,725	3,275
10	2,412	2,237	2,237				8,545	10,560	4,095	5'060	3,660	3,275
11	2,412	2,294	2,180				30,330	8,545	4,505	4,770	3,660	3,215
12	2,472	2,294	2,180				43,200	7,270	30,000	4,680	3,660	3,215
13	2,598	2,352	2,237				33,960	6,575	37,260	5,590	3,660	3,215
14	2,472	2,294	2,294				6,985	7,565	39,900	5,060	3,595	3,215
15	2,412	2,237	2,294				5,945	6,705	43,200	4,770	3,595	3,160
16	2,412	2,294	2,237				4,865	6,845	66,300	7,270	3,595	3,160
17	2,352	2,294	2,237				4,505	6,445	72,900	6,705	3,595	3,160
18	2,294	2,294	2,237				5,370	6,070	79,500	6,195	3,795	3,160
19	2,294	2,237	2,123				7,565	5,700	63,000	5,945	3,660	3,160
20	2,294	2,294	2,294				14,860	5,480	43,200	5,590	3,660	3,105
21	2,237	2,294	2,237				25,050	5,265	36,000	5,160	3,595	3,105
22	2,237	2,352	2,294				8,035	5,060	13,670	4,865	3,595	3,275
23	2,294	2,237	2,123				11,490	4,865	4,770	4,680	3,595	3,160
24	2,294	2,237	2,237				36,000	4,590	8,895	4,420	3,530	3,160
25	2,294	2,237	2,123				25,380	4,420	3,870	4,250	3,530	3,105
26	2,294	2,237	2,180				31,650	4,250	2,795	4,095	3,530	3,105
27	2,352	2,237	2,123				29,340	4,170	2,895	4,020	4,020	3,050
28	2,352	2,294	2,237				25,050	4,095	3,215	3,870	3,795	3,050
29	2,294		2,180				15,480	4,020	3,105	3,795	3,725	3,050
30	2,294		2,237				7,720	3,945	2,996	3,795	3,530	2,995
31	2,294		2,237				277,500	3,870		3,725		2,995
Maximum	2,598	2,352	2,352				277,500	198,300	79,500	9,465	4,020	3,595
Minimum	2,237	2,237	2,123				3,105	3,870	2,795	3,335	3,530	2,995
Mean	2,384	2,280	2,222				30,564	18,301	19,983	5,372	3,675	3,226

NOTE.—No record on days for which discharge is not given.

CAVITE PROVINCE

MARAGONDON RIVER, MABACCAO, MARAGONDON

LOCATION.—About 1 km. from junction of Maragondon-Magallanes Road with Paso Mabaccao trail which is about 15.8 km. southwest of Naic.

RECORDS AVAILABLE.—From April 4, 1919, to December 31, 1922.

GAGE.—Standard metric-gage board anchored vertically to adobe rocks at the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel straight for 51 m. above and 31 m. below the station. Right bank high, steep, and rocky; left bank also high but is overflooded during high water. Stream bed sandy, gravelly, and slightly shifting.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 318,500 second-liters on November 11, 1921; minimum discharge, 1,200 second-liters scattered about in May and June, 1921.

DIVERSIONS.—One above the station, used for power purposes in the mill of Mr. Enrique Punsalan's Hacienda.

REGULATION.—By diversion only.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 2,400 to 52,000 second-liters. Gage read twice daily. Low water measurements may be affected by the irregularities of stream bed.

Discharge measurements of Maragondon River, near Mabaccao, Maragondon, Cavite

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
April 4	J. S. Roxas	58	2,650	
April 15	do	.51	2,138	
June 21	do	65	3,961	
July 25	do	94	8,863	
November 9	do	49	5,398	
1920				
January 11	do	.32	3,321	
January 14	do	32	3,405	
February 29	do	26	2,875	
March 1	do	23	2,627	
April 30	do	21	2,385	
April 30	do	.21	2,217	
May 25	do	1 46	25,650	
June 17	do	21	2,045	
August 25	J. Roxas and A. Fegarido.	.65	6,883	
October 26	do	47	5,189	
November 24	J Roxas.	.38	4,049	
1921				
January 7	do	.27	2,636	
February 23	do	16	2,269	
March 24	do	.18	1,913	
April 14	do	.11	1,553	
July 12	do	.17	2,394	
August 31	do	1 12	21,500	
September 1	do	1.34	33,108	
September 1	do	1 62	34,881	
October 31	do	.29	3,412	
November 1	do	.30	3,485	
December 21	do	.37	4,373	
1922				
March 26	do	.14	2,094	
May 24	do	.79	12,264	
May 25	do	.59	7,114	
July 12	do	2.20	52,841	
August 10	do	.91	14,665	
October 7	do	.86	13,834	
December 21	do	.25	4,078	

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Covite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1					4,620	13,175	5,395		89,990	8,800	6,070	5,000
2					4,620	31,415	42,415		59,740	8,005	5,935	4,620
3					4,740	13,595	112,815	28,940	55,340	9,140	6,070	4,740
4				6,780	4,740	13,175	36,915	121,340	53,415	9,480	5,800	4,740
5				4,870	4,740	13,175	18,120	60,840	52,590	8,005	5,800	4,620
6				5,935	4,740	13,810	12,050	85,590	50,865	8,160	5,665	4,500
7				6,070	4,620	11,465	16,480	95,215	84,315	8,160	5,800	5,000
8				5,935	4,620	7,695	9,480	107,590	25,090	7,695	5,800	5,000
9				5,665	4,740	4,145	11,270	99,340	47,090	12,255	5,260	6,070
10				5,665	4,620	4,870	10,700	140,690	22,360	10,700	5,260	5,000
11				5,665	4,740	4,620	10,700	114,740	19,860	10,520	5,260	4,620
12				4,870	4,870	4,870	12,970	99,890	17,880	9,820	5,260	4,145
13				5,665	5,530	4,380	7,695	102,640	16,020	9,140	5,260	4,145
14				5,395	5,395	4,740	6,340	80,365	15,330	10,160	5,000	4,145
15				4,870	4,740	4,620	13,595	77,615	16,940	11,660	5,000	4,030
16				3,915	4,620	4,620	7,695	125,190	71,565	10,880	5,000	4,030
17				4,870	4,620	4,870	11,855	71,565	34,165	14,670	5,000	4,030
18				4,870	4,740	4,620	37,465	74,415	20,880	11,270	7,540	4,030
19				4,620	4,740	8,320	12,255	58,640	17,170	10,880	6,930	4,030
20				4,740	6,485	7,380	7,380	58,365	15,330	13,380	7,695	4,030
21				5,260	5,530	7,380	58,915	59,740	14,240	10,880	9,650	3,915
22				5,395	6,780	6,485	8,480	72,115	12,560	9,990	7,540	4,030
23				5,130	5,665	6,485	28,565	60,840	13,810	9,140	6,340	3,915
24				4,870	8,640	5,665	24,265	52,040	10,880	8,970	6,340	3,915
25				4,870	8,320	7,695	19,860	79,530	10,520	7,695	5,530	3,800
26				4,870	10,700	7,080	6,485	124,090	9,650	11,660	5,260	3,800
27				4,740	9,310	10,340		110,065	9,480	15,100	5,000	3,800
28				5,130	8,970	7,380		96,040	9,480	8,480	5,260	3,800
29				5,130	9,990	6,205		84,005	9,650	8,320	5,000	3,800
30				4,620	9,310	5,665		56,440	8,970	7,540	5,000	3,800
31					12,050			98,240		7,230		3,800
Maximum				6,780	12,050	31,415	112,815	140,690	89,990	15,100	9,650	6,070
Minimum				3,915	4,620	4,145	5,395	28,940	8,970	7,230	5,000	3,800
Mean				5,201	6,211	8,331	21,160	86,073	29,839	9,928	5,704	4,287

NOTE.—No record of gage heights on day for which discharge is not given.

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,800	3,800	2,750	2,750	2,010	2,190	28,940	10,520	177,440	35,815	4,500	3,465
2	3,800	3,800	2,750	3,050	2,100	2,100	12,560	8,645	114,740	27,840	4,500	3,800
3	3,800	3,800	2,750	3,050	2,010	2,370	9,140	7,230	192,840	9,210	4,385	3,685
4	3,800	3,685	2,750	3,050	2,100	2,370	8,640	4,030	113,915	8,800	4,740	3,570
5	3,685	3,800	2,750	3,050	2,190	7,540	6,340	5,260	97,690	15,100	4,620	3,685
6	3,800	3,800	2,750	3,050	2,100	8,640	9,480	4,260	26,740	13,380	4,500	4,740
7	3,570	3,685	2,750	3,050	2,100	6,630	14,455	4,500	6,930	39,940	4,500	3,685
8	3,570	3,800	2,750	3,050	2,370	4,130	6,930	4,500	8,005	13,380	4,500	23,990
9	3,465	4,030	2,750	3,050	2,190	2,190	4,500	4,500	9,140	12,560	4,385	9,820
10	3,570	4,145	2,750	3,050	1,760	2,190	6,485	4,260	7,540	11,270	4,260	9,820
11	3,570	4,030	2,750	3,050	1,760	2,190	33,890	4,260	7,230	10,160	4,260	6,340
12	3,570	3,800	2,750	3,050	1,925	2,370	53,690	4,030	6,930	8,645	4,145	4,740
13	3,570	3,800	2,750	3,050	1,840	2,370	46,540	4,500	6,930	7,080	4,145	4,385
14	3,360	3,915	2,750	3,050	1,760	3,150	56,715	4,385	8,160	9,140	5,000	4,260
15	3,360	4,260	2,750	3,050	1,840	9,140	26,190	72,390	7,850	6,930	4,870	4,260
16	3,360	3,800	2,750	3,050	1,840	11,465	50,390	5,260	9,480	5,935	5,000	4,740
17	3,360	3,800	2,750	3,050	2,560	2,850	41,590	27,010	9,310	36,090	4,620	4,030
18	3,685	3,800	2,750	3,050	2,010	2,370	87,790	20,360	8,005	26,740	4,385	3,800
19	4,145	2,370	2,750	3,050	1,760	2,370	76,240	16,480	8,800	12,970	4,260	3,800
20	4,030	2,750	2,750	3,050	1,760	2,370	30,865	18,670	7,850	10,520	4,260	3,685
21	4,030	2,750	2,750	3,050	1,760	1,680	21,300	68,815	9,140	10,520	4,145	3,570
22	4,145	2,750	2,750	3,050	1,925	4,030	13,160	26,740	25,090	10,160	4,145	3,570
23	4,030	2,750	2,750	3,050	2,010	1,925	9,480	9,140	35,265	7,540	4,030	3,465
24	4,145	2,750	2,750	3,050	2,010	2,190	7,540	4,260	32,790	7,230	4,030	3,465
25	4,030	2,750	2,750	3,050	11,660	33,615	6,930	6,630	22,900	6,070	3,800	3,465
26	4,030	2,655	2,750	3,050	5,800	33,615	118,865	4,385	11,270	5,000	3,685	3,360
27	3,800	2,750	2,750	3,050	2,190	34,440	59,740	26,740	10,880	4,740	3,570	3,360
28	3,800	2,655	2,750	3,050	2,190	35,540	39,940	8,160	10,880	4,500	3,465	3,360
29	3,800	2,750	2,750	3,050	2,010	10,160	54,790	8,480	12,560	4,740	3,572	3,150
30	3,800	.....	2,750	2,560	2,190	28,390	31,140	10,345	12,970	4,500	3,465	3,150
31	3,800	.....	2,750	.....	3,570	.....	15,560	171,390	.....	4,500	.....	3,150
Maximum	4,145	4,260	2,750	3,050	11,660	35,540	118,865	171,390	192,840	39,940	5,000	23,990
Minimum	3,360	2,370	2,750	2,560	1,760	1,680	4,500	4,030	6,930	4,500	3,465	3,150
Mean	3,751	3,422	2,750	3,024	2,493	8,886	31,930	18,714	33,976	12,613	4,258	4,883

NOTE.—Daily discharge in March and April, unreliable.

Daily and monthly discharges, in liters per second, of Maragondon River near Mabaccao, Maragondon, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,050	3,365	2,280	1,600	1,200	1,280	2,560	2,630	34,130	11,090	3,560	14,230
2	2,950	3,570	2,370	1,600	1,280	1,200	1,760	2,040	21,520	8,620	3,400	11,530
3	2,950	3,570	2,280	1,600	1,280	1,360	1,360	1,500	20,500	7,050	4,530	9,830
4	2,750	4,260	2,370	1,600	1,280	1,520	36,365	1,260	22,300	6,300	3,560	9,220
5	2,850	3,915	2,850	1,680	1,360	1,200	86,690	1,500	14,920	5,400	3,400	8,420
6	2,850	3,685	2,465	1,760	1,280	1,200	6,340	31,160	13,770	9,220	3,240	8,220
7	2,750	3,360	2,280	1,840	1,200	1,760	4,500	109,000	10,670	5,940	3,400	7,820
8	2,850	3,360	2,280	1,925	1,200	1,280	3,050	41,960	22,820	9,420	3,560	7,050
9	2,850	3,150	2,280	2,010	1,360	1,925	2,950	18,250	15,150	8,020	9,830	6,670
10	2,750	2,950	2,280	1,680	1,200	5,800	3,570	14,000	12,410	12,850	11,970	6,300
11	2,750	3,360	2,190	1,680	1,280	34,440	2,560	12,190	16,540	9,220	41,960 318,500	6,300
12	2,750	3,150	2,100	1,600	1,200	2,010	1,840	14,000	11,090	7,430	51,410	5,940
13	2,750	3,150	2,010	1,600	1,200	1,925	1,680	223,000	17,020	6,300	36,020	5,580
14	2,750	3,150	2,010	1,440	1,200	1,840	1,520	71,000	12,410	5,580	30,620	5,940
15	2,750	2,750	2,010	1,520	1,200	1,760	1,360	216,000	20,500	5,220	24,680	5,580
16	2,750	3,150	1,925	1,520	1,440	1,680	1,440	237,000	14,000	4,870	23,080	5,220
17	2,850	3,050	1,840	1,360	1,280	1,280	1,360	48,710	9,220	4,530	28,460	5,040
18	2,850	2,950	2,010	1,360	1,280	1,200	1,440	25,490	6,670	4,200	21,520	4,870
19	3,360	2,655	2,010	1,440	1,280	1,440	4,260	50,060	12,410	4,200	12,850	4,870
20	3,465	2,560	1,840	1,440	1,360	1,360	2,370	23,080	6,480	4,040	11,090	4,870
21	3,150	2,010	1,840	1,360	1,440	1,680	6,340	14,460	8,020	4,040	9,830	4,700
22	3,050	2,010	2,010	1,360	1,440	1,520	5,530	10,670	21,520	3,880	14,920	4,700
23	3,150	2,010	2,010	1,360	1,520	26,740	62,490	48,710	13,770	3,880	15,150	4,530
24	3,150	2,010	1,840	1,360	1,600	1,760	113,365	41,960	17,750	3,880	17,020	4,530
25	3,050	2,100	1,760	1,360	1,760	1,925	24,540	65,700	12,850	3,720	12,650	4,530
26	3,150	2,100	1,840	1,360	1,840	1,360	20,880	31,700	12,410	3,560	252,500	4,360
27	3,050	2,010	1,840	1,360	1,600	1,200	15,150	15,610	15,150	3,560	47,710	4,200
28	3,360	2,010	1,760	1,360	1,520	7,385	11,530	22,560	10,880	3,720	26,030	4,200
29	3,465		1,680	1,360	1,360	1,680	9,420	46,010	9,020	3,560	18,750	4,200
30	3,465		1,680	1,280	1,360	3,050	3,240	26,300	18,250	3,560	18,250	4,200
31	3,360		1,680		1,360		2,630	21,520		3,400		4,040
Maximum	3,465	4,260	2,850	2,010	1,840	34,440	113,365	237,000	34,130	12,850	318,500	14,230
Minimum	2,750	2,010	1,680	1,280	1,200	1,200	1,360	1,260	6,480	3,400	3,240	4,040
Mean	3,001	2,906	2,052	1,526	1,360	3,855	14,325	48,033	15,138	5,818	30,107	6,184

Daily and monthly discharges, in liters per second, of Maragondon River near Mabaccao, Maragondon, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,040	4,200	1,630				3,400	206,660	4,360	13,310	5,580	4,040
2	3,880	4,200	1,630				3,080	98,660	4,360	25,760	5,400	4,040
3	3,880	3,880	1,500				2,930	41,960	4,200	23,080	5,220	4,040
4	3,880	3,880	1,500				4,870	28,460	4,200	19,250	7,050	4,530
5	3,880	3,560	1,380				18,750	15,610	4,040	15,610	6,480	4,040
6	3,720	3,560	1,500				{32,780} {179,660}	39,260	4,040	13,540	5,940	5,400
7	3,720	3,560	1,500				95,960	31,160	4,040	11,970	5,580	5,400
8	3,720	3,560	1,630				51,410	28,460	4,360	11,090	5,220	5,220
9	3,560	3,560	1,500				23,600	25,220	4,200	10,670	4,870	5,040
10	3,560	3,560	1,500				10,670	18,000	5,040	10,040	4,700	5,040
11	3,560	3,560	1,380				52,220	14,690	7,430	9,620	4,530	4,870
12	3,720	3,400	1,380				50,060	12,410	32,240	9,020	4,530	4,870
13	4,200	3,560	1,630				41,960	11,090	39,260	11,090	4,360	4,870
14	4,700	3,560	1,630				18,000	12,850	44,660	10,040	4,360	4,870
15	5,220	3,240	1,500				9,020	11,090	50,060	9,020	4,360	4,700
16	5,220	3,400	1,630				7,240	11,750	71,660	21,780	4,360	4,700
17	4,870	3,400	1,500				7,050	11,090	85,160	19,250	4,360	2,780
18	4,700	3,240	1,500				8,420	10,670	98,660	17,020	5,220	2,780
19	4,700	2,930	1,260				12,850	10,250	82,460	15,610	4,700	2,780
20	4,700	2,330	1,630				20,500	10,040	50,060	14,460	4,530	2,780
21	4,530	2,930	1,500				30,620	9,830	39,260	11,090	4,360	2,630
22	4,530	2,630	1,500				13,310	6,120	28,460	9,830	4,360	3,560
23	4,530	2,930	1,500				18,000	5,940	31,160	9,020	4,200	4,530
24	4,530	2,040	1,630				39,260	5,760	32,510	8,220	4,200	2,780
25	4,530	1,630	1,500				31,160	5,580	21,780	7,430	4,040	2,780
26	4,360	1,500	1,260				29,270	5,400	15,610	7,050	4,040	2,630
27	4,700	1,500	1,500				19,250	5,220	16,300	6,670	6,300	2,630
28	4,870	1,760	1,500				32,780	5,040	19,750	6,300	5,220	2,480
29	4,530		1,380				24,140	4,870	19,250	5,940	4,700	2,480
30	4,360		1,260				15,610	4,700	14,690	5,760	4,200	2,480
31	4,200		1,380				287,660	4,530		5,580		2,480
Maximum	5,220	4,200	1,630				287,660	206,660	98,660	25,760	7,050	5,400
Minimum	3,560	1,500	1,260				2,930	4,530	4,040	5,580	4,040	2,480
Mean	4,294	3,109	1,491				35,138	22,980	28,109	12,068	4,899	3,815

NOTE.—No record on days for which discharge is not given.

CAVITE PROVINCE

PATAY-NA-ILAT CANAL, CARMONA

LOCATION.—In the southwestern part of the town of Carmona and about 1.4 km. from the municipal building.

RECORDS AVAILABLE.—From June 18, 1921, to March 31, 1922.

GAGE.—A metric gage board placed on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by .61 m. sharp-crested with complete end contractions at 2 m. below gage.

CHANNEL AND BANKS.—Channel straight for 10 m. above and 2 m. below the weir; channel immediately above the weir dug out to make velocity of approach practically nil; both banks low and of earthy texture.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 172 second-liters on November 29, 1921; water shut off occasionally.

DIVERSIONS.—Canal diverts part of flow of Carmona River.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Conditions at weir fairly good. Records fair for all stages.

Daily and monthly discharges, in liters per second, of Patay-Na-Ilat Canal near Bankal, Carmona, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1							45	34	87	81	34	(d)
2							45	39	81	(d)	34	(d)
3							45	45	56	45	35	(d)
4							129	45	62	45	45	(d)
5							62	39	62	45	25	(d)
6							16	34	50	45	45	(d)
7							25	143	68	45	34	(d)
8							39	114	62	45	39	(d)
9							45	50	56	25	45	(d)
10							45	108	50	45	68	(d)
11							45	56	50	39	151	39
12							45	45	45	39	6	34
13							45	74	50	45	1	34
14							50	81	50	45	1	29
15							45	122	50	45	6	45
16							34	50	50	45	6	(d)
17							25	45	50	45	3	(d)
18						45	45	29	50	45	1	(d)
19						50	45	45	45	45	(d)	29
20						45	39	56	45	45	(d)	(d)
21						39	45	56	45	45	(d)	(d)
22						39	45	50	45	45	165	25
23						39	45	50	45	29	9	(d)
24						39	34	62	45	25	3	16
25						50	34	56	45	45	1	(d)
26						45	34	56	45	45	172	(d)
27						45	34	62	45	(d)	9	(b)
28						45	39	68	45	(d)	3	(d)
29						45	62	81	45	45	1	(d)
30						45	34	87	87	45	.....	(d)
31							34	74	.....	45	.....	(d)
Maximum						50	129	143	87	81	172	45
Minimum						39	16	29	45	25	1	16
Mean						44	44	63	54	44	36	31

NOTE.—Discharge determined by formula, $Q = 1{,}838\ (L - .2H)\ H^{3/2}$.

[d] Channel dry.

Daily and monthly discharges, in liters per second, of Patay-Na-Ilat Canal near Bankal, Carmona, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	(d)	39	29									
2	(d)	34	34									
3	(d)	39	45									
4	(d)	45	34									
5	9	39	39									
6	25	34	39									
7	50	34	39									
8	34	34	45									
9	34	39	34									
10	50	45	34									
11	50	45	39									
12	50	45	34									
13	50	45	34									
14	50	45	34									
15	50	39	34									
16	50	39	34									
17	39	45	34									
18	39	45	39									
19	34	39	34									
20	29	45	34									
21	39	39	34									
22	50	34	34									
23	45	29	34									
24	45	29	34									
25	45	29	34									
26	45	29	34									
27	45	29	34									
28	39	29	34									
29	34		34									
30	39		34									
31	45		34									
Maximum	50	45	45									
Minimum	9	29	34									
Mean	41	38	35									

[d] Channel dry.

CAVITE PROVINCE

TATLONG BALON RIVER, NAIC

LOCATION.—Near Timalan Railroad Station and General Aguinaldo's Dam site, which is about 1.8 km. 542° 00′ E of General Aguinaldo's house.

RECORDS AVAILABLE.—From November 11, 1919, to March 19, 1922.

GAGE.—Standard metric-gage board nailed vertically to Bulong tree on left bank of river.

DISCHARGE MEASUREMENTS.—Made by a sharp-crested weir at 1.20 m. below gage.

CHANNEL AND BANKS.—Channel straight for 24 m. above the weir then forming a big pond which eliminates velocity of approach. Banks high and subject to overflow only during extreme floods. Above weir stream bed of adobe stone, clay and dirt; below weir, of gravel.

EXTREMES OF DISCHARGE.—The maximum discharge recorded during the period of observation, 123.1 second-liters on September 29, 1920, River was dry several times on the later part of March, 1922.

DIVERSIONS.—General Aguinaldo's Dam at 10.40 m. below.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Results fairly accurate, being measured and computed from mathematical formula. Gage read twice daily. Water higher than gage height .501 m. giving a discharge of 124.70 second-liters not recorded due to absence of gage for high water mark.

Discharge measurements of Tatlong Balon River, near Naic, Cavite

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
November 11	J. S. Roxas	.36	6	
1922				
May 23	do.	.39	69	
July 12	do.	.27	18	
August 12	do.	.14	31	

Daily and monthly discharges, in liters per second, of Tatlong Balon River near Timalan, Naic, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												16.9
2												8.0
3												10.7
4												10.7
5												13.7
6												16 9
7												16.9
8												10.7
9												10.7
10												8.0
11											5 5	8.0
12											5.5	8.0
13											5.5	8.0
14											5.5	10.7
15											5.5	8.0
16											8.0	8.0
17											10.7	8.0
18											13.7	8.0
19											10.7	8.0
20											8.0	8.0
21											8.0	8.0
22											8.0	5.5
23											8.0	5.5
24											10.7	5.5
25											8.0	5.5
26											8.0	5.5
27											10.7	5.5
28											10.7	5.5
29											13.7	8.0
30											16.9	8.0
31												8.0
Maximum											16.9	16.9
Minimum											5 5	5.5
Mean											9.1	8.9

NOTE.—Gaging station established on November 11, 1919. Weir constructed on December 24, 1919.

Daily and monthly discharges, in liters per second, of Tatlong Balon River near Timalan, Naic, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10.4	13 4	6.9	6 9	6.4	5.3	31 5	15.9	... ...	111 1	11 6	11 6
2	10.4	13.1	7.4	6.9	6.4	5 3	23 9	8.0	.....	.....	10 7	16.5
3	11.3	12.8	7.4	6.9	6 2	4 6	10 7	7 7	. . .	106 9	9 6	19.6
4	12.2	12 8	7.2	6.9	6 0	4.4	8.0	7 4	.....	81.8	103 6	18.6
5	14.3	13.1	7 4	6.9	6.0	101.5	... ...	6 9	117 0	53 8	101 2	23.1
6	16.9	13.1	6.9	6.9	5.7	3.7	108 0	6.4	33 9	44 8	103 6	... ...
7	18.2	13 1	7.4	6.9	5 5	4.1	107 4	3.9	33 1	43.1	45 7	.....
8	19.2	13.1	6.9	6.9	5.3	4.4	106 9	2 4	15 6	41.4	91.5	....
9	18.2	12.5	6.9	6 9	5 0	4.6	110 6	2 2	6 9	36 3	87 7	79 8
10	18.9	14.9	6.9	6.9	5.0	4 6	113 3	2.1	3.7	36 3	85 7	33.9
11	18.2	12.2	6.9	6 9	5.0	4.8	. . . .	1.9	4 1	63.6	82 8	24 6
12	12.5	11.9	6.9	6.9	5.0	4.8	.....	1 9	2 2	70 9	74.8	23.1
13	12.8	11.9	6.9	6.7	4.8	5.0	116 0	1.7	3 7	68.9	82.8	15 6
14	11.3	11.9	6.9	6.7	4.8	4.6	.....	1.6	14.9	67.0	92.6	11.9
15	11.9	11.9	6 9	6 7	4 6	3.2	118.7	67.9	9 0	64 1	.....	9.6
16	12.5	11.6	6.9	6.9	4.6	2 9	.....	118 7	6 4	66 0	119 8	11 7
17	12.5	10.4	6 9	6.4	4.6	2.9	.. .. .	97.3	6 0	.....	116 5	9.0
18	13.1	10.4	6.9	6.4	4.6	2.7	.....	96.2	5 0	.....	100.7	6 9
19	13.7	11.6	6 9	6 4	4.6	2 4	122 0	99.4	5.0	94.1	93 1	6.0
20	13.1	11.9	7.2	6 4	4.6	2.2	118 7	108.5	5.3	80.8	85.7	9.0
21	13.7	11.9	6.9	6.4	4.6	2.9	118 7	113.3	48 8	79.3	68.9	8 7
22	13.7	11.9	6 9	6 4	4.6	3.9	89.5	113 8	46 6	106.0	30.7	6.2
23	13.4	11.6	6.9	6.4	4.6	4 8	31.5	113 3	55 6	66.0	22.4	6.4
24	13.3	11.6	6.9	6.7	4.6	4.1	11 0	30.7	107 5	35 5	5.0	6.4
25	15.6	11.6	6.9	6.4	4.6	4.6	10 7	10 7	112 2	14.3	3.7	5 0
26	13.7	11.6	6.9	6 4	4 6	4.4	.....	114 3	97.9	12.5	1.3	3 7
27	13.1	11.9	6.9	6 4	4.6	92.1	122 5	113 3	123.1	13.1	1.7	4.1
28	12.8	11.9	6.9	6 4	4.8	110.6	122 0	113.8	119 2	15 0	2 2	4.1
29	13 1	6.9	6 9	6.4	4.8	110.0	116.0	110.0	122.0	14.6	2 4	3.7
30	13.1	.....	6 9	6 4	5.0	... .	18 6	114.3	116.0	13.7	2.5	4.6
31	13.1	... . .	6.9	. .....	5.0	... ...	15 6	.....	.....	12.8	.....	3.9
Maximum	19.2	14.9	7.4	6 9	6.4	110.6	122 5	118 7	123.1	111 1	119.8	79.8
Minimum	10 4	6 9	6 9	6.4	4.6	2.2	8.0	1.6	2.2	12.5	1.3	3.7
Mean	13.9	12.0	7.0	6.7	5.1	17.8	76.1	53 5	46 9	54.1	56.6	13.8

NOTE.—Water overtopped weir on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Tatlong Balon River near Timalan, Naic, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5.5	0.3	2 0	0 3	No flow	3 2	3 2	13 7	113 3	102 6	8.0	102.6
2	5.5	2.0	3 2	0.3	0.3	2.0	8 0	5 5	118 7	67.0	5.5	92.1
3	5.5	2 0	3 2	0.3	No flow.	2 0	5 5	2 0	118.7	52.9	13.7	81.8
4	8.0	3 2	2.0	0.3	...do	2 0	52 9	2 0	97 3	39.7	10.7	71.8
5	8 0	10.7	2 0	0 3	. do.	3 2	92 1	2 0	57 5	52.9	8.0	67.0
6	8 0	8.0	2 0	0 3	do.	5 5	35 5	2 0	27.6	48 3	10.7	62.2
7	8.0	5.5	10 7	0.3	...do. .	5.5	8.0	52 9	27 6	35 5	8.0	62.2
8	5 5	10.7	8 0	No flow	...do. .	10 7	0 3	118.7	43.9	62.2	23.8	62.2
9	3 2	16 9	5 5	..do. ..	. .do. .	8 0	5 5	118 7	43.9	48.3	27.6	52.9
10	3 2	13 7	5 5	..do....	. .do. .	5 5	13 7	108 0	57 5	35.5	35.5	48.3
11	3 2	8 0	3 2	..do....	0 3	3 2	13.7	92 1	118 7	57 5	71.8	43.9
12	3.2	5 5	3 2	...do...	No flow	3 2	10 7	. .....	118 7	48.3	..	39 7
13	3 2	3 2	3 2	...do .	. .do.	3 2	3.2	.. ....	113.3	31 5	...118.7	35.5
14	3 2	3 2	3 2	0.3	0.3	2.0	No flow	118 7	108 0	43.9	.....	31.5
15	3.2	2.0	3 2	No flow	No flow.	2 0	. do....	.... ..	97.3	43.9	.....	27.6
16	3.2	0 3	2.0	.do . .	do. .	2 0	..do....	.. ..	81 8	52 9	.. ..	20 3
17	3 2	2 0	2 0	...do....	. do. .	3 2	..do....	.. ..	62 2	43 9	124 2	20.3
18	5 5	0 3	2.0	...do.	. .do ..	2 0	76 8	118 7	39.7	35 5	118.7	16.9
19	3 2	2.0	0 3	.do..	. do.	2 0	97 3	118 7	27 6	31 5	113.3	13.7
20	3 2	2.0	2 0	.do.. .	0 3	2 0	102 6	108 0	23.8	23 8	118.7	20.3
21	3 2	2 0	2.0	...do..	0.3	2 0	67 0	52 9	20.3	16 9	... .	10.7
22	3 2	0.3	2 0	.do.	10 7	3 2	39 7	43 9	31 5	13 7	124.2	10.7
23	3.2	2.0	2 0	. do...	10 7	5 5	71.8	39 7	48.3	13 7	.....	8.0
24	3 2	2 0	0 3	..do. .	13 7	5.5	92.1	.. ..	87 0	10 7	124.2	5.5
25	3 2	3 2	2.0	...do. .	13 7	8 0	52 9	...	76 8	10.7	.....	3.2
26	2.0	2.0	0 3	.do....	10 7	5 5	62 2	118 7	62 2	10.7	.....	2.0
27	2 0	2 0	0 3	...do. .	10 7	5 5	57 5	113 3	52 9	10.7	118.7	2.0
28	2 0	2 0	0 3	...do. .	8 0	8 0	52 9	.. .	108 0	10.7	113.3	20 3
29	2 0	..... .	0 3	0 3	8 0	5 5	20 3	. .	113 2	10.7	108 0	16 9
30	2.0	....	2 0	0.3	5 5	8.0	13 7	....	118.7	13 7	108 0	13 7
31	0 3	....	2 0	.....	3 2	.. ..	13 7	118 7	....	10 7	....	8.0
Maximum	8.0	16 9	10 7	0 3	13.7	10 7	102 6	118 7	118 7	102 6	124 2	102.6
Minimum	0 3	0 3	0 3	0 0	0 0	2 0	0 0	2 0	20 3	10 7	5 5	2 0
Mean	3.9	4 2	2 6	0.1	3 1	4 3	33.7	69 9	73.9	35 2	68.8	34.6

NOTE.—No record on August 12, 13, 15 to 17, 24, 25, 28 to 30 and on November 12 to 16, 21, 23, 25, and 26 due to flood.

Daily and monthly discharges, in liters per second, of Tatlong Balon River near Timalan, Naic, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5.5	3.2	2.0									
2	3.2	3.2	2.0									
3	2.0	3.2	0.3									
4	3.2	5.5	0.3									
5	8.0	3.2	0.3									
6	5.5	3.2	2.0									
7	3.2	8.2	2.0									
8	2.0	3.2	2.0									
9	2.0	2.0	2.0									
10	5.5	2.0	0.3									
11	5.5	2.0	0.3									
12	5.5	2.0	0.3									
13	5.5	2.0	0.3									
14	3.2	0.3	0.3									
15	3.2	0.3	0.3									
16	5.5	2.0	0.3									
17	8.0	2.0	2.0									
18	5.5	3.2	2.0									
19	5.5	2.0	0.3									
20	3.2	2.0	No flow.									
21	13.7	2.0	do.									
22	13.7	2.0	do.									
23	10.7	0.3	do.									
24	10.7	2.0	do.									
25	10.7	2.0	do.									
26	10.7	2.0	do.									
27	10.7	2.0	do.									
28	10.7	2.0	do.									
29	8.0		do.									
30	8.0		do.									
31	5.5		do.									
Maximum	13.7	5.5	2.0									
Minimum	2.0	0.3	0.0									
Mean	6.6	2.3	0.6									

CAVITE PROVINCE

ULANG TUBIG RIVER, CARMONA

LOCATION.—In the southwestern part of the town of Carmona and about 1.3 km. from the municipal building.

RECORDS AVAILABLE.—From June 17, 1921, to March 31, 1922.

GAGE.—Metric gage board vertically set on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by .61 m. sharp-crested weir with complete end contractions, 2.75 m. below the gage and about ½ km. above the dam on the Ulang Tubig River.

CHANNEL AND BANKS.—Channel straight; natural pond formed above the weir. Bed of river of adobe stone. Both banks low and of adobe stone and steady earth.

EXTREMES OF DISCHARGES.—Maximum discharge recorded during period of observation, 263 second-liters on November 11 and 26, 1921; water shut off sometimes.

DIVERSIONS.—Water sometimes diverted to rice fields.

REGULATION.—None except by diversion.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Conditions at weir fairly good. Records fair for all stages.

Daily and monthly discharges, in liters per second, of Ulang Tubig River near Bankal, Carmona, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1							9	25	81	68	12	62
2							9	12	50	62	12	68
3							9	3	9	6	12	68
4							151	12	12	6	12	68
5							74	16	9	29	39	62
6							50	25	9	29	6	62
7							34	50	12	6	12	62
8							12	34	12	6	9	62
9							9	12	9	34	9	62
10							9	122	45	20	20	62
11							9	25	100	20	263	9
12							9	12	6	20	87	9
13							9	29	6	16	68	20
14							6	87	12	9	81	39
15							3	198	20	12	87	29
16							16	114	20	12	81	56
17						50	25	100	20	9	68	50
18						50	16	50	20	9	56	50
19						12	16	25	16	9	56	29
20						34	12	12	9	9	56	56
21						12	9	12	9	9	56	56
22						12	9	9	9	9	255	39
23						12	20	9	9	12	87	56
24						20	25	9	9	16	94	45
25						9	25	6	9	25	52	56
26						9	25	6	9	29	263	56
27						6	25	9	9	62	81	56
28						9	16	12	9	62	68	56
29						9	29	39	9	29	62	56
30						9	25	56	81	6	62	56
31							25	29		6		56
Maximum						50	151	198	100	68	263	68
Minimum						6	3	3	6	6	6	9
Mean						18	24	37	21	21	71	51

NOTE.—Discharge determined by weir formula, $Q = 1{,}838\ (L - .2\ H)\ H^{3/2}$.

Daily and monthly discharges, in liters per second, of Ulang Tubig River near Bankal, Carmona, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	54	8	13									
2	54	13	4									
3	54	10	6									
4	53	6	8									
5	36	8	5									
6	33	12	4									
7	(d)	14	3									
8	16	12	3									
9	10	10	8									
10	4	4	8									
11	(d)	1	7									
12	(d)	1	8									
13	(d)	3	8									
14	(d)	5	8									
15	(d)	5	8									
16	(d)	5	8									
17	11	5	8									
18	11	5	7									
19	15	5	7									
20	18	4	7									
21	18	4	7									
22	(d)	9	7									
23	2	14	7									
24	2	14	7									
25	3	14	7									
26	4	14	7									
27	4	14	7									
28	8	14	7									
29	12		7									
30	7		7									
31	3		7									
Maximum	54	14	13									
Minimum	2	1	3									
Mean	19	8	7									

[d] Channel dry. See footnote to discharge table for 1921.

CEBU PROVINCE

MANANGA RIVER, TALISAY

LOCATION.—About 4 km. northwest of Talisay and about 10 km. from Cebu City on the Cebu–Toledo Road.

RECORDS AVAILABLE.—From January 3, 1922, to December 31, 1922.

GAGE.—Standard metric board vertically fastened to a limestone rock on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and 200 m. below the station. Bed of stream sandy and very shifting. Right bank steep and of limestone; left bank low, sloping.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 91,695 second-liters on May 21, 1922; minimum discharge, 95 second-liters on May 3, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily gage-height corrections applied. Record good below 13,000 second-liters.

Discharge measurements of Mananga River, near Tabanok, Talisay, Cebu

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1922				
January 3	A. Baldonado and D. Mercado.	.56	1,030	
January 13	A. Baldonado	.68	2,180	
February 3	do	.60	990	
March 11	do	.60	820	
March 21	do	.58	660	
April 22	do	.55	336	
May 20	do	.59	785	
June 15	do	.65	1,131	
August 5	do	.55	1,600	
September 2	do	.58	840	
October 17	do	.72	3,014	
October 31	do	.68	3,030	
November 29	do	.55	860	
December 15	do	.60	1,090	

Daily and monthly discharges, in liters per second, of Mananga River near Tabonok, Talisay, Cebu, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		1,985	785	440	440	7,180	8,045	4,225	785	260	2,180	440
2		1,985	785	440	335	6,780	9,080	3,470	785	260	1,635	440
3	1,175	1,325	785	440	95	7,180	5,375	3,235	550	260	1,325	260
4	440	1,325	785	440	260	6,045	4,780	2,795	660	1,035	1,635	550
5	260	1,035	785	440	785	6,400	4,500	2,580	550	1,480	1,480	335
6	1,325	785	660	550	5,705	5,075	3,470	2,375	1,035	1,480	1,325	195
7	910	1,325	660	440	5,075	4,500	3,015	2,795	910	2,375	1,035	260
8	785	1,035	660	440	910	4,225	3,235	2,375	2,580	1,805	910	910
9	550	910	660	440	910	3,960	3,325	2,180	1,985	1,325	910	440
10	335	910	660	440	1,325	3,470	76,895	2,180	2,180	4,225	660	260
11	1,985	910	550	440	2,180	3,235	21,395	1,805	1,635	3,470	550	195
12	6,780	660	550	335	910	2,580	5,705	1,805	5,075	2,375	1,175	260
13	2,180	785	660	660	785	2,375	22,320	1,480	2,375	4,225	660	2,375
14	2,180	910	785	440	555	1,985	5,075	1,480	1,480	3,470	550	660
15	2,180	910	785	440	550	1,175	4,500	1,480	1,325	3,015	660	550
16	2,180	1,635	1,035	440	910	1,175	13,070	1,325	1,175	2,795	660	260
17	1,805	910	1,175	440	5,705	910	13,670	1,175	785	3,710	440	550
18	1,805	785	1,035	440	910	1,035	15,845	1,175	785	3,470	440	1,325
19	1,635	660	660	440	1,175	2,375	6,780	1,035	660	7,595	1,175	550
20	1,805	1,480	660	335	785	3,015	13,995	910	660	4,500	1,805	910
21	1,035	3,235	660	440	91,695	3,235	5,375	910	550	2,375	1,325	550
22	16,770	3,015	550	440	68,570	3,015	5,705	785	440	1,985	1,325	260
23	36,190	1,035	550	440	35,270	3,015	4,500	785	550	1,480	1,035	140
24	10,395	910	550	440	24,170	3,015	3,235	785	910	1,175	1,325	28,795
25	5,075	910	550	335	15,845	3,015	4,500	660	785	2,180	1,035	6,780
26	3,960	660	550	335	13,995	2,795	7,180	550	440	2,180	785	4,500
27	3,710	550	550	440	11,220	5,705	8,045	550	335	2,180	660	3,960
28	3,710	1,035	440	335	8,540	5,075	5,705	785	550	4,780	440	2,580
29	2,580		440	335	7,595	3,470	5,375	660	440	4,500	660	3,015
30	2,180		440	335	6,780	3,015	4,780	550	335	3,470	550	2,180
31	1,985		440		6,780		3,960	440		3,015		1,635
Maximum	36,190	3,235	1,175	660	91,695	7,180	76,895	4,225	5,075	7,595	2,180	28,795
Minimum	260	550	440	335	95	910	3,015	440	335	260	440	140
Mean	3,803	1,200	672	426	10,347	3,668	9,734	1,592	1,110	2,660	1,012	2,123

NOTE.—River bed very shifting; daily gage-height corrections made.

CEBU PROVINCE

MANTAYUPAN RIVER, BARILI

LOCATION.—About 3.5 km. southeast of Barili, and just above the Mantayupan falls. The station can be reached by following a trail from the Government sanitarium near Bolocboloc spring.

RECORDS AVAILABLE.—From May 11, 1921, to December 31, 1922.

GAGE.—Metric-gage board.

DISCHARGE MEASUREMENTS.—Made by 2.45 m. sharp-crested weir with complete end contractions 2 m. below gage; and also by current meter.

CHANNEL AND BANKS.—Channel forms a pond above the weir; both banks high and of limestone formation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 3,270 second-liters on January 27 and May 24, 1922; minimum discharge, 278 second-liters on May 11–16, 1921 and July 27–31, 1922. Maximum capacity of weir is 258 second-liters.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For power.

ACCURACY.—Conditions at weir fairly good.

Daily and monthly discharges, in liters per second, of Mantayupan River near Barili, Cebu, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						646	646	1,100	457	379	2,310	1,100
2						646	646	1,100	457	379	2,310	1,100
3						646	646	920	457	379	1,990	1,670
4						646	646	1,350	457	379	1,990	1,670
5						646	920	1,100	920	457	1,100	1,350
6						646	646	1,350	920	457	1,100	2,680
7						646	646	1,100	770	457	1,100	1,670
8						646	770	1,100	646	546	1,100	1,100
9						920	646	920	646	546	1,670	1,100
10						646	646	920	646	646	1,990	1,100
11					278	646	646	920	770	770	2,630	920
12					278	646	920	770	770	770	2,310	1,670
13					278	646	920	770	646	770	2,310	1,990
14					278	646	920	646	646	646	1,990	1,990
15					278	646	920	646	646	646	1,990	1,350
16					278	646	920	646	646	646	1,670	1,350
17					646	646	920	646	646	920	1,100	920
18					1,670	646	920	646	646	1,100	1,350	920
19					1,350	546	1,100	646	646	1,350	1,350	1,100
20					920	920	1,100	546	457	1,350	1,350	1,670
21					920	2,150	1,100	546	457	1,350	1,990	1,350
22					379	1,350	1,350	457	457	1,350	1,990	1,100
23					379	1,350	1,100	457	457	1,350	1,990	1,350
24					320	920	1,100	457	457	1,350	1,990	1,350
25					320	920	1,100	457	457	1,670	1,990	1,350
26					320	920	920	457	457	1,990	1,990	1,990
27					320	646	646	457	457	2,310	1,670	1,990
28					320	546	646	457	379	2,630	1,350	1,990
29					646	457	1,990	546	379	2,630	1,350	1,990
30					646	457	1,670	457	379	2,630	1,100	1,670
31					646	.....	1,350	457	.....	2,630	.....	1,670
Maximum					1,670	2,150	1,990	1,350	920	2,630	2,630	2,680
Minimum					278	457	646	457	379	379	1,100	920
Mean					546	769	939	743	574	1,145	1,737	1,489

Daily and monthly discharges, in liters per second, of Mantayupan River near Barili, Cebu, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,100	1,670	920	546	320	1,990	457		457	320	457	457
2	920	1,670	920	546	320	1,350	457		457	320	457	457
3	920	1,350	920	457	320	920	457		457	320	457	457
4	920	1,350	646	457	320	920	457		457	320	457	457
5	920	1,350	646	457	320	920	457		457	320	457	546
6	920	1,350	646	457	320	770	457		457	320	646	457
7	920	1,670	646	457	1,350	770	457		457	320	646	457
8	920	1,670	646	457	1,350	646	457	379	457	320	646	457
9	920	1,670	646	457	920	646	457	457	457	320	920	379
10	920	1,670	646	457	646	646	457	546	457	320	920	379
11	920	1,670	646	457	546	546		546	457	320	920	457
12	1,350	1,670	646	457	457	546	920	546	457	920	770	457
13	1,350	1,350	646	457	457	546	646	546	457	770	646	457
14	1,350	920	646	457	457	457	646	457	457	770	646	457
15	2,630	920	646	457	457	457	646	457	457	770	546	646
16	2,310	920	770	457	457	457	1,100	457	457	1,350	457	646
17	1,670	920	920	457	457	457	1,100	457	457	1,350	457	646
18	1,670	920	770	457	457	457	1,100	457	379	1,350	457	546
19	1,350	920	646	457	457	457	1,100	457	379	1,350	457	546
20	1,350	770	646	457	457	457	1,100	457	379	1,100	379	546
21	1,350	920	646	457		457	1,100	457	320	1,100	379	546
22		920	646	457		646	1,100	457	320	920	379	546
23		920	646	457		457	920	457	320	920	379	546
24		920	646	457	3,270	457	646	457	320	920	379	920
25		920	646	457	2,630	457	457	457	320	920	379	646
26		646	646	457	1,350	457	320	457	379	646	457	646
27	3,270	920	646	457	920	457	278	457	379	546	920	646
28	2,630	920	646	457	646	457	278	457	379		646	646
29	1,990		646	457	646	546	278	457	379	2,310	457	546
30	1,350		546	457	646	546	278	457	379	379	457	546
31	1,350		546		646		278	457		379		546
Maximum	3,270	1,670	920	546	3,270	1,990	1,100	546	457	2,310	920	920
Minimum	920	646	546	457	320	457	278	379	320	320	379	379
Mean	1,433	1,196	683	463	771	645	629	468	413	743	554	538

COTABATO PROVINCE

AWANG RIVER, AWANG

LOCATION.—About 100 m. south of Awang Farm School Dormitory, 8 km. southwest of Cotabato.

RECORDS AVAILABLE.—From August 1, 1919, to November 25, 1922.

GAGE.—Vertical gage board braced to "Alim" tree on right bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at 6.5 m. below gage.

CHANNEL AND BANKS.—Channel is straight for about 50 m. above and below the gaging station. Right bank loose and easily eroded; left bank low but of compact earth. At measuring section stream bed permanent but due to erosion of right bank the river channel is becoming wider.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during the period of observation, 73,264 second-liters on July 22, 1921; minimum discharge, 668 second-liters on September 3, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from poorly-defined curves. Applicable from August 1, 1919 to December 31, 1922. Gage read twice daily.

Discharge measurements of Awang River, near Awang Farm School, Awang, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 1	A. Baldonado and D. Abenes.	1.01	1,874	
August 12	do	.98	1,696	
September 6	do	.97	1,386	
October 5	do	1 12	3,712	
October 31	D. Abenes	.85	3,282	
November 1	do	81	2,597	
December 3	do	.82	1,585	
1920				
January 3	do	.83	1,817	
February 11	do	.80	1,407	
March 12	do	.81	1,383	
April 26	do	.81	1,508	
May 27	do	.82	1,467	
June 24	do	.93	2,094	
August 5	do	85	1,616	
September 4	do	.83	1,648	
October 4	do	.80	1,279	
October 6	do	.80	1,270	
November 7	do	.98	2,229	
1921				
January 26	do	1 03	1,258	
February 3	do	1.02	1,017	
March 3	do	1.05	1,917	
April 4	do	1.04	1,522	
May 10	do	1.00	1,259	
June 24	A. Baldonado	1.07	7,085	
August 13	P. Feliciano	1.04	1,977	
October 6	do	1.16	3,704	

Discharge measurements of Awang River, near Awang Farm School, Awang, Cotabato—Continued

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
October 7	P. Feliciano	1.20	4,560	
December 8	do	1.09	2,287	
December 9	do	1.08	2,359	
1922				
January 26	do	1.05	1,580	
January 27	do	1.07	1,747	
January 28	do	1.07	1,743	
February 3	do	1.04	1,473	
February 4	do	1.04	1,495	
February 5	do	1.04	1,468	
March 27	S. Gonzales	1.03	1,465	
March 28	do	1.04	1,474	
March 28	P. Feliciano	1.04	1,701	
March 29	S. Gonzales	1.03	1,434	
April 20	do	1.03	1,466	
April 21	do	1.04	1,412	
April 28	do	1.04	1,476	
April 29	do	1.03	1,485	
May 23	do	1.07	1,883	
May 24	do	1.04	1,423	
May 29	do	1.03	1,438	
May 30	do	1.03	1,462	
June 21	do	1.07	1,923	
June 23	do	1.04	1,440	
July 20	do	1.05	1,458	
July 21	do	1 07	1,995	
August 2	do	1.06	1,876	
August 3	do	1.04	1,511	
August 30	do	1.03+	1,495	
August 31	do	1.03	1,444	
September 19	do	1.03+	1,431	
September 20	do	1.04	1,463	
September 19	do	1 07	1,999	
September 30	do	1.06	1,897	
October 16	do	1.06	1,859	
October 17	do	1.05	1,490	
October 28	do	1.03	1,463	
October 29	do	1.07+	1,929	
November 17	do	1.09	1,909	
November 29	do	1.03	1,547	
November 30	do	1.03	1,310	
December 19	do	1.03+	1,403	
December 20	do	1.03—	1,407	
December 27	do	1.03+	1,424	
December 28	do	1.04	1,506	

Daily and monthly discharges, in liters per second, of Awang River near Awang Farm School, Awang, Cotobato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1								2,520	2,150	4,702	2,065	2,820
2								2,425	2,150	6,030	3,140	2,820
3								2,520	2,150	7,384	2,925	2,240
4								2,620	2,150	9,804	2,925	2,425
5								2,425	2,240	6,394	3,030	2,820
6								2,330	2,150	6,580	3,606	2,520
7								2,330	19,320	22,120	3,486	2,520
8								2,065	26,040	6,208	13,720	2,240
9								2,065	5,508	6,208	13,720	2,620
10								2,065	3,858	6,030	2,925	3,990
11								2,065	3,990	6,208	2,820	2,820
12								2,240	31,920	6,394	2,925	3,030
13								2,240	16,240	6,030	2,820	5,171
14								2,240	3,030	6,208	2,820	6,976
15								2,150	2,925	7,384	2,820	3,726
16								2,150	2,240	7,384	2,820	2,820
17								2,150	2,150	7,384	2,820	3,080
18								2,150	2,150	7,384	2,820	2,820
19								5,680	2,150	6,394	3,030	2,330
20								2,925	2,150	6,208	2,820	2,330
21								2,520	2,150	5,852	2,820	2,720
22								2,520	2,150	6,976	2,820	2,425
23								2,520	2,150	7,384	3,726	2,330
24								2,150	2,150	4,860	3,030	2,330
25								2,150	2,150	7,824	2,720	2,330
26								2,150	2,150	5,176	2,620	2,330
27								2,150	2,425	4,860	3,486	2,330
28								2,150	2,240	5,852	2,925	2,330
29								2,240	2,425	3,858	2,520	2,330
30								2,150	3,030	3,140	2,620	2,330
31								2,150	.....	2,620	.....	2,425
Maximum								5,680	31,920	22,120	13,720	6,976
Minimum								2,065	2,150	2,620	2,065	2,240
Mean								2,394	5,323	6,872	3,645	2,848

Daily and monthly discharges, in liters per second, of Awang River near Awang Farm School, Awang, Cotobato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,330	2,425	2,150	2,240	904	1,026	1,294	19,600	1,294	1,434	....	1,224
2	2,330	2,240	2,150	2,240	962	1,026	1,154	14,280	1,294	1,294	.... ..	1,224
3	2,330	2,240	2,150	2,240	962	1,294	1,740	7,604	1,294	1,224	.....	1,154
4	2,425	2,240	2,150	2,240	962	1,154	1,580	6,208	904	1,026	.....	1,154
5	2,720	2,240	2,150	2,240	962	1,224	1,740	1,224	904	904	.. ..	1,154
6	3,990	2,240	2,150	2,150	962	1,026	10,080	1,580	904	962	....	1,224
7	4,552	2,330	2,150	2,150	1,154	1,026	1,294	1,580	904	1,026	.. ....	1,224
8	4,860	2,330	2,150	2,150	1,154	1,026	10,080	1,364	864	1,026	1,294	1,294
9	3,606	2,330	2,150	2,150	1,026	962	23,800	1,364	846	1,580	1,294	1,294
10	2,330	2,240	2,150	2,150	1,026	962	9,280	1,740	904	1,580	1,294	1,294
11	2,330	2,240	2,150	2,150	1,026	904	3,858	1,900	904	2,425	1,294	1,154
12	2,330	2,150	2,150	2,150	962	904	4,860	1,434	904	4,860	1,294	1,154
13	2,330	2,150	2,150	2,240	1,026	904	9,804	1,294	1,026	19,880	1,294	1,154
14	2,330	2,240	2,150	2,150	1,026	2,065	20,160	1,294	1,026	25,480	1,294	1,294
15	2,330	2,425	2,150	2,150	1,090	3,486	8,290	1,294	1,294	25,480	1,224	1,294
16	2,330	2,425	2,925	2,150	1,026	1,294	1,154	1,090	1,294	25,480	1,224	1,224
17	2,330	3,990	2,520	2,240	962	1,154	962	1,090	1,154	28,280	1,364	1,224
18	2,240	2,820	2,425	2,240	962	1,090	1,026	1,154	1,154	28,280	1,364	1,294
19	2,240	2,425	2,720	2,240	962	1,026	1,294	1,154	1,090	28,280	1,294	1,294
20	2,620	2,240	2,240	2,240	962	962	1,224	1,294	1,224	.....	1,294	1,154
21	2,240	2,425	2,240	2,240	962	962	1,224	1,294	2,150	.....	1,294	1,154
22	2,240	2,240	2,240	2,240	1,026	1,026	1,154	1,294	2,150	.....	1,224	1,154
23	2,240	2,240	2,240	2,240	1,026	962	1,294	1,294	2,425	.....	1,224	1,154
24	2,240	2,150	2,150	2,240	962	1,434	1,294	1,434	2,425	.....	1,026	1,154
25	2,240	2,150	2,150	1,026	962	1,154	1,154	1,224	2,240	.....	1,026	1,154
26	2,425	2,150	2,150	1,026	962	1,154	1,294	1,224	2,240	.....	1,154	1,154
27	2,620	2,150	2,150	1,026	1,026	1,026	1,434	1,154	2,240	.....	1,154	1,154
28	2,820	2,150	2,150	962	962	1,090	1,364	1,294	2,150	.....	1,154	1,154
29	2,330	2,150	2,150	962	1,026	1,294	20,440	1,434	1,580	....	1,294	1,154
30	2,240	.....	2,150	962	1,026	1,224	19,600	1,294	1,504	.....	1,294	1,154
31	2,240	...	2,240	.. ..	1,026	.. ..	19,600	1,364	. ..	.. .	...	1,154
Maximum	4,860	3,990	2,925	2,240	1,154	3,486	23,800	19,600	2,425	28,280	1,364	1,294
Minimum	2,240	2,150	2,150	962	904	904	962	1,090	846	904	1,026	1,154
Mean	2,605	2,337	2,229	1,961	1,001	1,195	5,952	2,705	1,409	10,553	1,246	1,199

NOTE.—Gage damaged during period of no record.

Daily and monthly discharges, in liters per second, of Awang River near Poblacion, Awang, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,154	1,540	2,340	1,540		1,018	1,540	1,867	1,004	2,656	2,365	2,232
2	1,224	1,252	1,914	1,540		1,252	2,340	1,867	716	2,365	2,232	2,232
3	1,224	1,018	1,914	1,540		836	1,914	17,610	668	2,102	2,656	2,232
4	1,224	1,252	2,340	1,540		686	2,340	5,260	1,300	1,658	2,365	2,656
5	1,294	1,018	2,340	1,540		686	1,540	1,867	940	1,146	2,978	2,365
6	1,294	1,018	1,914	1,540		836	1,540	1,867	766	878	3,684	2,232
7	1,294	1,018	1,914	1,252		1,018	1,540	1,867	1,300	822	3,497	3,320
8	1,224	1,252	1,540	1,252		836	3,412	1,867	1,382	3,497	2,656	2,365
9	1,224	1,252	1,540	1,252		1,018	6,384	1,980		3,497	2,813	2,232
10	1,154	1,252	2,340	1,018		836	1,540	1,867	1,658	3,320	2,505	2,232
11	1,154	1,540	1,914	1,018		1,018	1,540	1,867	1,223	2,978	3,145	2,102
12	1,154	1,540	1,914	1,018		1,018	2,336	1,867	1,223	2,656	2,505	2,102
13	1,154	1,540	2,340	1,018		1,018	1,540		1,146	2,365	2,978	2,102
14	1,154	1,540	2,340	1,018		1,540	1,540	1,867	1,004	2,365	3,684	2,102
15	1,090	1,252	3,412	1,018		836	1,540	1,760	878	2,365	3,877	1,980
16	1,090	1,018	3,412	1,540		686	4,864	1,760	878	2,365	4,080	2,102
17	1,090	1,018	2,340	1,540		686	4,864	1,658	878	2,365	4,080	2,102
18	1,018	1,252	2,340	1,540		686	8,664	1,658	878	2,365	3,320	1,980
19	1,018	1,540	2,340	1,252		686	54,264	1,658	822	2,232	2,365	1,980
20	1,540	1,540	1,914	1,018		686	42,864	1,658	822	2,232	2,365	1,980
21	1,540	1,914	1,914	836		686	39,264	1,867	822	2,232	2,232	2,365
22	2,340	2,340	2,340	836	686	686	73,264	1,562	878	2,365	2,365	1,775
23	1,540	2,340	2,340	836	686	686	10,630	1,562	878	2,656	2,232	1,925
24	1,252	1,914	2,340	836	686	2,340	1,867	18,360	822	2,365	2,232	1,775
25	1,252	2,340	1,914	1,018	686	1,540	2,102	4,080	878	2,365	2,232	1,775
26	1,540	2,340	1,540	1,018	4,864	1,540	1,867	1,867	6,740	2,232	2,656	1,633
27	1,540	1,914	1,540	1,018	836	3,412	1,867	878	3,684	2,232	2,365	1,775
28	1,540	1,914	1,540	1,018	686	1,914	1,867	716	34,100	2,232	2,365	1,506
29	1,252		1,914	836	1,018	1,252	1,867	1,470	10,630	2,365	2,365	1,506
30	1,252		2,340	836	686	1,914	1,867	1,470	12,620	2,365	2,232	1,506
31	1,540		2,340		686		1,867	2,656		3,320		1,633
Maximum	2,340	2,340	3,412	1,540	4,864	3,412	73,264	18,360	34,100	3,497	4,080	3,320
Minimum	1,018	1,018	1,540	836	686	686	1,540	716	668	822	2,232	1,506
Mean	1,302	1,524	2,143	1,169	1,152	1,128	9,191	3,005	3,156	2,354	2,781	2,058

NOTE.—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Awang River near Poblacion, Awang, Cotabato, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,775	1,775	1,506	1,404	1,404	1,404	2,486	2,281	1,404	6,302	1,506	
2	1,506	1,775	1,506	1,404	1,320	1,404	1,775	1,775	1,404	2,486	1,404	
3	1,775	1,506	1,506	1,404	1,404	1,404	4,902	1,633	1,506	1,925	1,404	
4	1,506	1,506	1,404	1,404	1,404	1,404	2,281	1,633	1,404	1,633	1,404	
5	1,506	1,506	1,404	1,404	1,404	1,506	1,775	1,775	1,404	1,506	1,404	
6	1,506	1,506	1,506	1,404	1,404	1,506	1,775	1,775	1,775	1,506	1,404	
7	1,506	1,506	1,506	1,404	1,404	1,404	6,582	1,506	1,506	1,506	1,320	
8	1,775	1,633	1,506	1,320	1,404	1,506	1,775	1,506	10,782	2,095	1,320	
9	1,633	1,775	1,506	1,320	1,404	1,633	2,095	7,982	2,486	1,925	1,320	
10	1,775	1,506	1,506	1,404	1,404	1,775	7,982	2,962	1,775	3,782	1,775	
11	1,506	1,506	1,506	1,506	1,404	1,404	3,502	1,925	1,775	3,502	1,506	
12	1,506	1,506	1,404	1,506	1,404	1,404	2,281	1,775	1,925	2,095	1,320	
13	1,506	1,506	1,506	1,404	1,404	1,404	1,775	1,775	1,775	1,925	2,713	
14	1,775	1,404	1,404	1,404	1,404	1,404	1,775	2,281	1,633	1,633	15,822	
15	1,775	1,506	1,506	1,404	1,404	1,633	2,095	2,486	1,404	1,633	2,502	
16	1,775	1,506	1,404	1,506	1,404	1,633	1,775	3,782	1,404	1,775	3,222	
17	1,775	1,506	1,506	1,506	1,404	1,925	1,775	3,502	1,404	1,506	11,902	
18	1,506	1,404	1,506	1,320	1,404	1,775	2,095	2,281	1,404	1,775	6,582	
19	1,775	1,320	1,404	1,506	1,404	10,222	2,095	1,775	1,404	1,506	2,962	
20	1,775	1,320	1,506	1,506	1,404	6,302	1,775	1,633	1,404	1,506	2,095	
21	1,775	1,404	1,404	1,506	1,404	4,622	3,782	1,775	1,404	1,633	1,775	
22	1,633	1,320	1,404	1,506	4,902	2,486	2,486	1,506	1,404	1,404	1,633	
23	1,775	1,506	1,404	1,506	2,095	1,775	1,775	1,506	1,506	1,404	1,506	
24	1,775	1,404	1,404	1,925	1,506	1,775	2,095	1,506	1,404	1,404	1,506	
25	1,633	1,506	1,404	1,775	1,404	1,775	2,095	1,506	1,404	1,404	1,506	
26	1,775	1,775	1,404	1,506	1,404	2,962	9,102	1,506	2,095	1,404		
27	1,775	1,506	1,404	1,404	1,404	1,775	4,062	1,404	4,622	1,404		
28	1,775	1,506	1,506	1,506	1,404	2,962	2,962	1,404	6,582	6,582		
29	1,506		1,404	1,404	1,404	1,775	2,281	1,404	2,486	2,962		
30	1,775		1,404	1,320	1,404	1,775	2,095	1,404	6,302	1,775		
31	1,633		1,404		1,404		2,095	1,404		1,633		
Maximum	1,775	1,775	1,506	1,925	4,902	10,222	9,102	7,982	10,782	6,582	15,822	
Minimum	1,506	1,320	1,404	1,320	1,320	1,404	1,775	1,404	1,404	1,404	1,320	
Mean	1,670	1,514	1,453	1,460	1,540	2,258	2,877	2,076	2,340	2,146	2,913	

COTABATO PROVINCE

KABAKAN RIVER, KABAKAN

LOCATION.—On the Kabakan—Kidapauan trail, at about 70 m. south of the house of the manager of Rio Grande Rubber Estate, and about 200 m. above the confluence of this river with the Pulangui River.

RECORDS AVAILABLE.—From August 29, 1919, to August 7, 1921.

GAGE.—Inclined staff nailed and wired to wooden posts at left banks of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel straight for 100 m. above and 200 m. below the gaging section. Right bank bare, subject to overflow; left bank thickly covered with "talahib" seldom overflooded and not much eroded. Stream bed shifting, being of fine sand.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during the period of observation, 158,950 second-liters on October 1, 1919; minimum discharge, 9,300 second-liters scattered about in March, April, and May, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve. The station is a poor one due to the effect of Pulangui River. Gage read twice daily.

Discharge measurements of Kabacan River, near Rio Grande Rubber Estate, Kabacan, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 30..	A. Baldonado and D. Abenes.	1 20	28,611	
September 24 ..	..do	1 61	28,401	
October 17..	do	2 11	49,957	
November 26..	do.	1 89	38,198	
December 22	do	1 38	22,170	
1920				
January 31..	D. Abenes.	1 31	18,774	
March 1	.do	1 25	17,826	
April 4...	do	1 32	24,071	
May 8..	do.	1 47	24,000	
June 11 ..	.do.	1 68	21,227	
July 16	do.	1 37	22,533	
August 22	.do	1 82	23,540	
September 16 . .	do.	2 17	69,641	
October 12.....	do...	3 82	155,714	
November 26..	do	1 40	24,614	
1921				
January 19 .. .	do.	1 50	28,212	
February 21 . .	do.	1 40	23,966	
March 16 ..	.do.	2 33	50,237	
May 31 ...	do	2 10	43,793	

Daily and monthly discharges, in liters per second, of Kabakan River near Rio Grande Rubber Estate, Kabakan, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									12,400	158,950	58,800	27,600
2									12,400	129,025	47,725	24,600
3									11,100	109,075	38,300	32,850
4									12,075	90,550	35,100	26,850
5									10,500	118,575	34,350	35,900
6									23,900	111,450	43,500	30,225
7									31,725	150,400	66,900	25,725
8									42,300	133,300	106,700	63,300
9									46,450	112,400	113,350	71,550
10									37,100	91,025	110,500	62,400
11									35,100	70,125	68,250	39,100
12									49,000	57,900	58,800	32,850
13									50,700	49,850	72,500	35,100
14									33,225	61,050	69,175	34,350
15									26,100	120,950	47,725	30,600
16									22,150	82,000	42,300	26,850
17									26,850	57,000	37,500	24,600
18									52,500	42,700	35,100	22,500
19									90,550	37,500	35,900	21,100
20									86,750	37,100	68,700	23,200
21									91,025	39,100	71,550	21,100
22									80,100	51,125	66,450	21,800
23									47,300	41,500	53,400	23,900
24									32,850	52,500	45,175	23,900
25									30,600	61,050	51,650	22,500
26									28,350	86,750	42,300	19,350
27									29,850	93,400	35,100	19,000
28									30,600	104,800	35,100	17,950
29								32,100	48,150	63,300	32,850	16,950
30								20,400	112,400	65,100	30,600	16,300
31								15,000		88,650		16,300
Maximum								32,100	112,400	158,950	113,350	71,550
Minimum								15,000	10,500	37,100	30,600	16,300
Mean								22,500	41,470	82,845	55,178	29,365

Daily and monthly discharges, in liters per second, of Kabakan River near Rio Grande Rubber Estate, Kabakan, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	17,600	19,700	18,300	13,050	11,100	27,225	73,450	17,600	21,100	26,100	34,350	25,350
2	17,950	19,000	15,975	11,750	9,600	54,300	51,125	30,975	18,300	23,200	31,725	28,350
3	23,200	16,625	16,300	11,100	9,300	56,100	65,550	20,400	22,150	23,200	37,100	27,975
4	71,550	15,650	16,300	13,700	9,900	31,725	57,900	15,975	20,750	26,850	71,550	63,750
5	127,600	15,325	15,325	16,300	9,300	21,800	47,725	21,800	19,000	38,300	55,200	63,300
6	102,900	15,000	15,650	26,850	9,300	24,975	47,300	21,800	19,000	37,500	40,700	47,725
7	63,300	15,000	15,000	17,275	14,350	26,100	52,950	19,700	17,275	57,450	39,100	32,850
8	61,500	44,750	15,000	16,300	19,350	39,100	54,300	19,700	26,850	81,525	43,500	56,100
9	55,650	29,850	14,350	17,275	38,300	68,700	49,000	16,300	26,850	97,200	56,100	118,100
10	38,300	21,450	13,700	16,300	29,850	53,400	39,100	15,325	26,100	115,725	57,000	78,200
11	32,100	19,000	13,050	14,025	34,350	36,300	41,500	15,000	20,750	129,025	33,500	63,300
12	36,300	19,000	11,750	13,375	32,850	32,550	35,900	20,400	20,750	130,450	33,600	39,100
13	40,700	26,100	11,750	14,350	23,900	22,150	33,225	20,400	16,950	145,175	36,700	35,900
14	33,225	19,000	11,100	13,050	27,975	24,250	27,600	26,850	22,150	145,175	30,600	37,500
15	29,850	20,400	11,100	11,750	39,100	32,100	23,900	33,975	46,875	96,250	27,225	35,900
16	24,975	32,850	15,000	10,200	29,850	25,725	21,800	33,975	53,400	84,850	26,850	29,850
17	22,150	29,100	14,350	13,700	25,350	21,800	31,350	28,350	46,025	65,550	23,900	24,975
18	21,800	44,750	12,400	12,075	23,200	19,000	45,175	38,300	59,700	58,350	25,350	23,200
19	21,800	26,850	11,750	13,050	23,550	18,650	37,500	55,650	49,000	49,850	29,100	28,725
20	26,850	20,750	10,800	11,425	37,500	18,300	33,600	61,500	37,100	43,500	30,600	25,350
21	23,200	18,300	16,300	11,100	41,500	29,850	21,450	41,900	62,400	54,300	26,100	28,850
22	21,100	18,300	11,100	12,400	48,575	39,100	20,050	40,700	59,700	50,700	26,100	21,800
23	38,300	19,700	10,800	11,100	38,300	29,100	19,700	39,500	55,200	44,750	26,100	20,050
24	66,900	24,600	9,900	9,300	21,800	72,500	18,650	35,500	62,400	41,500	35,100	19,000
25	35,900	25,350	9,600	9,300	19,700	48,575	16,300	39,100	69,650	33,975	34,350	18,650
26	29,100	21,100	9,300	9,300	22,500	39,900	15,650	31,350	45,600	51,651	28,350	18,650
27	24,250	33,225	9,900	13,700	25,350	39,100	15,000	35,500	36,700	73,925	26,100	16,300
28	26,475	31,725	9,600	12,400	23,900	58,800	17,600	36,700	33,975	46,025	37,500	18,650
29	23,200	21,100	9,300	9,900	24,975	31,350	15,000	29,100	33,600	39,900	31,725	56,100
30	22,850		9,600	9,300	21,450	35,500	13,375	29,475	27,975	52,075	28,350	40,700
31	19,700				17,600		13,050	26,850		41,900		24,250
Maximum	127,600	44,750	18,300	26,850	48,575	72,500	73,450	61,500	69,650	145,175	71,550	118,100
Minimum	17,600	15,000	9,300	9,300	9,300	18,300	13,050	15,000	16,950	23,200	23,900	16,300
Mean	38,719	23,571	12,924	13,157	24,633	35,634	34,057	29,666	35,909	64,707	35,651	37,500

Daily and monthly discharges, in liters per second, of Kabakan River near Rio Grande Rubber Estate, Kabakan, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	21,800	17,950	38,300	20,750	94,350	45,600	45,600	64,200				
2	20,050	15,975	56,100	20,400	64,200	40,700	55,650	62,400				
3	23,550	15,650	33,225	20,400	61,500	60,600	73,450	68,700				
4	29,100	16,300	25,350	19,700	74,400	102,425	70,600	97,675				
5	32,850	17,600	22,150	18,300	78,675	101,000	64,200	95,300				
6	25,350	16,300	22,150	17,600	62,400	90,075	49,425	88,650				
7	20,750	15,975	27,600	24,975	69,650	114,300	41,500	79,625				
8	29,850	15,650	33,600	22,500	41,500	112,400	50,275					
9	28,725	15,000	29,475	16,625	26,850	103,850	60,600					
10	21,800	15,650	50,700	15,975	23,900	86,750	44,750					
11	24,600	41,500	124,750	19,350	25,350	66,450	62,850					
12	13,050	24,250	139,000	24,600	31,725	79,150	65,550					
13	30,600	15,650	133,300	29,850	39,500	106,700	70,125					
14	27,975	15,000	79,150	24,250	38,300	118,100	77,250					
15	39,500	14,350	62,950	19,350	71,550	116,200	75,350					
16	27,600	16,950	63,300	18,650	140,900	126,175	83,425					
17	26,850	27,600	60,600	15,975	156,100	137,100	77,250					
18	30,225	23,900	68,700	15,325	150,875	111,925	112,400					
19	23,900	20,050	90,550	15,000	129,500	78,150	118,100					
20	24,250	20,750	97,200	16,950	112,400	90,550	75,825					
21	24,975	25,725	64,200	19,000	76,300	123,325	75,825					
22	22,500	27,600	65,100	21,800	48,150	105,275	61,950					
23	23,550	29,850	24,325	20,400	49,425	118,575	49,000					
24	19,350	39,100	35,500	19,000	42,300	117,150	45,600					
25	19,000	52,500	29,850	15,650	65,100	111,450	45,175					
26	19,000	61,500	38,300	15,650	41,500	86,750	61,500					
27	19,000	58,350	29,475	15,000	40,700	85,325	72,975					
28	21,800	41,100	26,100	68,700	38,700	71,550	115,250					
29	19,700		24,975	106,700	47,300	82,000	69,650					
30	17,950		24,600	102,875	69,650	57,900	68,700					
31	16,300		21,800		49,850		67,350					
Maximum	39,500	61,500	139,000	106,700	156,100	137,100	118,100	97,675				
Minimum	13,050	14,350	21,800	15,000	23,900	40,700	41,500	62,400				
Mean	24,048	25,635	52,980	26,710	66,535	94,913	67,973	79,507				

COTABATO PROVINCE

KATINGAUAN RIVER, BUAL

LOCATION.—About 2 km. north of the Bual Farm School. On north side of trail leading from Bual to Libungan.

RECORDS AVAILABLE.—From August 19, 1919, to August 10, 1921.

GAGE.—Gage board of lauan graduated every 2 cm. with nails fastened vertically to "upak" tree at left bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 20 m. above and 50 m. below gaging station. Both banks of soft earth, heavily covered with cogon grass, and subject to overflow. Inaccessible during floods.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, over 2,593 second-liters on May 20, 1921; minimum discharge, 8 second-liters on February 9, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Exact flood height cannot be determined due to non-extension of gage. Daily discharge determined from a fairly well-defined curve from 45 to 220 second-liters. Gage read twice daily.

Discharge measurements of Katingawan River, near Bual Farm School, Bual, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 19	A. Baldonado and D. Abenes.	80	160	
September 30	do	1 08	404	
October 27	do	1 035	391	
November 17	do	92	282	
December 27	do	80	129	
1920				
January 21	D. Abenes	88	221	
February 23	do	.99	265	
March 25	do	.77	123	
April 17	do	.75	88	
May 17	do	67	36	
June 14	do	.71	67	
July 11	do	84	192	
August 9	do	69	54	
September 25	do	.92	355	
October 21	do	1.25	624	
November 22	do	.82	186	
December 9	do	85	217	
1921				
January 8	do	.79	108	
February 10	do	1 24	584	
March 24	do	1 05	421	
April 13	do	.78	114	

Daily and monthly discharges, in liters per second, of Katingawan River near Bual Farm School, Bual, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									84	368	1,189	409
2									84	288	1,072	378
3									68	388	1,176	308
4									68	453	564	228
5									68	348	348	208
6									68	368	431	189
7									84	1,852	453	171
8									208	2,086	624	153
9									171	1,527	660	153
10									238	1,098	624	378
11									799	1,956	588	409
12										541	541	388
13										464	486	968
14									1,579	1,137	431	660
15									388	812	358	486
16									348	431	288	409
17									388	308	268	308
18									431	308	248	258
19								171	175	238	218	228
20								497	378	218	228	218
21								588	308	198	338	258
22								338	268	189	308	288
23								278	248	208	278	208
24								208	189	208	248	171
25								153	171	208	228	162
26								135	238	208	153	153
27								117	298	388	198	144
28								117	600	228	171	153
29								108	497	1,917	162	153
30								100	175	1,267	453	144
31								100		1,774		135
Maximum								588	1,579	2,086	1,189	968
Minimum								100	68	189	153	135
Mean								224	308	709	444	281

NOTE.—Probable discharge on September 12 and 13 is 2,880 second-liters as adjusted from the curve for a gage height of 3.00 as was supposed by the Hydrographer in charge.

Daily and monthly discharges, in liters per second, of Katingawan River near Bual Farm School, Bual, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			308	308	92	68	60	278	238	144	248	278	135
2		135	171	189	92		60	238	238	144	218	248	135
3		135	144	268	84		92	684	228	162	162	218	135
4		153	189	171	76	258	60	672	218	180	903	162	135
5		348	171	171	76	208	60	576	198	162	358	903	162
6		734	108	171	497	126	44	431	198	162	298	358	144
7		684	84		198	76	36	338	180	162	258	298	135
8		175	1,826	153	189	60	92	378	144	162	198	258	126
9		442	2,008	153	180	60	68	358	52	153	338	198	100
10			1,267	153	126	60	44	358	60	162	258	338	162
11		636	368	135		198		348	60	238	238	258	162
12		497	328	135	258	92		318	60	218	464	238	144
13			268	126	298			298	60	218	612	464	144
14		564	218	117	180	60	60	238	52	198	398	612	420
15		422	228	117	144		258	238	44	218	278	389	576
16		348	2,060	298	108		162	238	36	218	278	278	358
17		368	737	153		29	52	368	36	278	348	298	208
18		388	696	144	92	29	60	318	29	278	358	248	218
19		378	431	144		29	60	298	29	278	378	228	180
20		238	368	144	76	29	68	278	22	278	600	228	144
21		238	368		76	60	76	708	60	278	612	198	144
22		238	378		76	29	92	278	68	268	278	162	162
23		208	328		84	22	144	248	52	278	825	162	180
24		162	303	117	76	44	135	238	60	268	612	162	144
25		189	278	117	60	60	126	198	92	258	486	218	144
26		431	268	117	60	44	108	180	117	248	497	180	144
27		328	368	108	162	29	162	180	100	258	431	153	144
28		258	268	92	76	52	144	144	117	248	378	144	153
29		453	328	84	76	29	144	144	100	258	318	144	162
30		453		100	76	29	162	238	144	258	180	135	162
31		348		100		60		238	144		180		162
Maximum		734	2,060	308	497	258	258	708	238	278	903	903	576
Minimum		135	84	84	60	22	36	144	22	144	162	135	100
Mean		518	513	151	133	71	97	324	104	221	387	272	181

NOTE.—No records of gage heights on days for which no discharges are given.

Daily and monthly discharges, in liters per second, of Katingawan River near Bual Farm School, Bual, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	144	298	126			218	278	208				
2	144	258	117			288	338	218				
3	144	258	108			278	258	208				
4	153	238	100			208	218	198				
5	153	228	162		208	2,476	218	180				
6	144	144	162		218	1,332	208	552				
7	135	92	144		198	1,163	198	398				
8	135	15	153		189	929	180	696				
9	126	8	180		189	672	162	508				
10	135	22	198		198	486	180	378				
11	135	60	180		189	420	180					
12	126	68	162		198	368	180					
13	126	153	144		198	318	208					
14	117	153	144		955	278	198					
15	117	144	144		171	278	180					
16	108	144	144		248	258	171					
17	198	171	135		298		218					
18	338	258	126		1,605	368	198					
19	258	258	108		2,242	409	198					
20	238	238	108		2,593	431	708					
21	541	198	108		1,085	398	1,046					
22	175	162	100		576	475	576					
23	318	144	298		576	1,449	564					
24	238	108	358		552	1,189	464					
25	238	92	358		453	486	318					
26	218	76	318		398	378	238					
27	318	60	298		420	328	877					
28	228	60	298		398	298	660					
29	278		278		890	258	721					
30	318		258		1,345	218	358					
31	278		258		1,241		308					
Maximum	541	298	358		2,593	2,476	1,046	696				
Minimum	108	8	100		171	208	162	180				
Mean	204	147	186		660	555	349	354				

NOTE.—No record on days for which discharge is not given.

COTABATO PROVINCE

LIBUNGAN RIVER, LIBUNGAN

LOCATION.—Directly on trail toward the river. Station is about 4 km. northeast of Katingawan River gaging station.

RECORDS AVAILABLE.—From September 28, 1919, to July 16, 1921.

GAGE.—Inclined staffs set at the left bank of the river.

DISCHARGE MEASUREMENTS.—Made from raft at ordinary water; by wading at low water.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 100 m. above and for 60 m. below the station. Right bank low subject to overflow, sandy and covered with "talahib;" left bank high and wooded. Stream bed sandy and very shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 219,910 second-liters on October 16, 1920; minimum discharge, 8,380 second-liters on June 2, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a well-defined curve from 11,000 to 28,000 second-liters. Applicable throughout the period of observation. Station is a good one. Gage read twice daily.

Discharge measurements of Libungan River, near Bual Farm School, Libungan, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
October 26	A. Baldonado and D. Abenes.	3 25	39,985	
October 27	do	3 075	34,527	
November 18	do	3.035	27,803	
December 28	D. Abenes	2 84	22,447	
1920				
January 22	D. Abenes	2.59	14,121	
February 23	do	2.59	14,601	
March 25	do	2 44	8,299	
May 16	do	2.43	8,187	
June 15	do	2.84	21,196	
July 10	do	2 62	15,120	
July 2	do	2.55	12,083	
August 10	do	2 42	9,108	
August 27	do	2.54	12,831	
September 25	do	2 87	25,483	
October 20	do	3.91	81,850	
November 22	do	2 88	24,705	
December 10	do	2 82	19,569	
December 19	do	2 92	25,525	
1921				
January 9	do	2.60	12,869	
February 9	do	2.57	11,907	
March 23	do	3.38	45,607	
April 14	do	2 80	18,636	
May 12	do	2.88	24,906	

Daily and monthly discharges, in liters per second, of Libungan River near Bual Farm School, Libungan, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1										38,690	28,170	22,980
2										33,590	32,570	22,360
3										45,490	32,910	21,740
4										28,500	31,550	21,740
5										72,690	26,190	22,360
6										77,790	25,210	19,890
7										46,510	27,510	19,890
8										53,990	24,890	19,290
9										30,190	22,980	19,590
10										58,750	21,740	27,510
11										54,670	19,290	27,510
12										49,230	17,790	37,670
13										45,490	17,190	32,910
14										35,290	16,290	29,850
15										29,510	31,550	32,910
16										42,090	30,190	29,850
17										42,090	28,170	23,610
18										30,870	26,850	22,360
19										57,310	27,510	21,740
20										45,150	27,510	22,670
21										47,870	30,870	20,190
22										39,370	24,890	18,690
23										30,870	24,250	18,090
24										31,210	23,290	17,490
25										34,270	26,190	17,190
26										34,610	26,190	18,090
27										33,930	24,890	21,740
28									59,090	34,950	23,610	20,500
29									33,250	30,190	25,860	18,890
30									69,630	48,890	24,250	17,490
31										32,910	.....	15,990
Maximum									69,630	77,790	32,910	37,670
Minimum									33,250	28,500	16,290	15,990
Mean									53,990	42,482	25,678	22,654

Daily and monthly discharges, in liters per second, of Libungan River near Bual Farm School, Bual, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	17,490	13,360	12,240	11,680	10,000	10,560	11,680	48,210	32,910	27,840	24,890	24,890
2	17,490	12,520	11,960	10,560	.....	8,380	75,070	48,550	28,500	26,190	24,890	26,850
3	16,290	11,680	11,680	10,280	.....	18,690	46,990	44,470	22,980	26,850	22,980	22,980
4	18,090	13,940	11,680	10,280	12,800	16,290	24,250	47,870	22,050	92,750	29,170	29,170
5	16,890	12,800	11,400	10,280	12,240	14,520	22,980	47,190	22,360	47,870	52,530	52,630
6	14,810	.....	11,400	15,690	11,680	12,520	20,500	46,510	22,670	20,190	45,830	45,830
7	.....	.....	.....	12,800	11,120	13,360	18,390	42,430	22,980	34,270	41,070	41,070
8	.....	25,530	11,120	11,400	11,680	15,690	17,490	41,750	22,980	33,250	32,910	32,910
9	19,290	22,360	11,680	12,240	10,560	13,360	16,890	34,270	22,670	37,670	29,510	29,510
10	20,810	21,430	10,840	12,240	11,680	14,810	15,100	24,890	31,210	29,510	15,690	21,120
11	19,890	21,120	10,840	.....	11,120	.....	18,090	26,190	34,950	28,830	14,810	20,500
12	20,500	.....	10,840	11,120	10,560	.....	16,890	25,860	32,230	29,850	26,190	20,500
13	.....	.....	10,840	13,360	.....	.....	29,510	24,250	33,250	29,510	36,990	36,990
14	20,190	14,810	10,560	13,360	11,680	24,250	17,190	41,750	36,310	26,520	26,190	26,190
15	.....	12,800	10,560	11,960	.....	21,430	16,890	43,110	32,910	24,250	31,550	30,870
16	16,890	22,980	11,680	11,680	.....	20,500	15,100	41,750	32,910	.....	25,530	25,530
17	16,290	.....	10,840	.....	9,730	23,610	14,520	26,850	28,170	22,360	24,890	24,890
18	15,100	19,990	.....	10,560	9,460	15,100	13,650	24,890	26,850	23,290	23,930	23,930
19	14,520	.....	10,840	.....	9,190	15,990	11,680	23,610	22,360	.....	27,180	27,180
20	14,520	.....	13,940	10,000	9,190	24,570	11,680	22,980	22,360	.....	22,360	22,360
21	14,230	36,310	.....	10,280	12,800	34,610	10,040	21,740	22,980	22,670	22,360	22,360
22	13,940	8,920	.....	10,000	11,400	22,980	9,460	20,500	22,980	24,890	22,980	24,250
23	15,390	17,490	.....	10,000	10,280	16,890	8,920	21,120	22,360	22,670	24,890	24,570
24	14,520	15,100	10,280	9,730	9,730	18,090	12,240	19,590	22,980	22,980	22,670	23,610
25	13,940	13,940	10,000	9,730	9,730	19,990	26,850	10,560	22,670	21,120	22,980	21,120
26	12,800	13,940	10,000	11,680	9,460	15,690	32,910	26,190	29,510	21,740	21,120	22,360
27	12,800	13,360	10,000	13,360	9,190	11,680	27,840	12,800	29,510	22,980	21,740	23,610
28	24,890	12,800	10,000	10,560	10,560	14,520	27,510	13,360	28,170	33,250	22,980	25,210
29	.....	12,240	10,000	9,730	10,000	14,520	24,250	28,170	28,170	28,170	33,250	21,120
30	15,390	.....	10,000	10,560	9,460	14,230	13,940	32,230	26,850	30,190	28,170	24,890
31	14,520	.....	13,650	.....	11,960	.....	11,960	32,230	.....	32,230	.....	28,830
Maximum	24,890	36,310	13,940	15,690	12,800	34,610	75,070	48,550	36,310	92,750	52,530	52,630
Minimum	12,800	8,920	10,000	9,730	9,190	8,380	8,920	10,560	22,050	20,190	14,810	20,500
Mean	16,595	16,792	11,110	11,300	10,663	17,291	20,336	31,157	26,993	30,141	27,408	27,349

NOTE.—No record on days for which discharge is not given. The probable discharge on October 16, 1924 is 219,910 second-liters.

Daily and monthly discharges, in liters per second, of Libungan River near Bual Farm School, Libungan, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	26,190	22,980	21,120			22,980	23,290					
2	32,230	20,810	23,290			25,860	30,870					
3	24,570	19,990	22,360			28,170	28,170					
4	22,050	18,690	22,360			27,180	26,850					
5	21,120	16,290	21,740		22,360	91,390	25,210					
6	17,490	14,520	20,500		22,980	89,690	22,980					
7	15,690	14,230	24,890		22,360	88,330	27,510					
8	14,810	13,940	23,610		22,980	85,950	28,170					
9	14,520	13,940	19,890		22,050	81,530	26,850					
10	14,520	21,430	21,120		21,740	75,750	29,510					
11	15,390	82,890	19,890		23,290	72,350	27,510					
12	18,390	45,630	24,890		22,980	64,870	28,170					
13	20,190	43,790	24,250		22,980	57,390	29,510					
14	21,740	46,510	19,590		72,350	47,870	28,830					
15	21,120	41,750	23,610		22,360	24,890	27,180					
16	20,500	40,390	25,210		58,070	31,890	26,190					
17	24,250	37,670	23,290		67,250							
18	27,510	36,990	28,830		87,650	31,210						
19	22,980	33,250	30,190		118,930	36,310						
20	22,670	29,510	32,570		74,050	32,230						
21	36,310	31,550	34,610		40,390	32,230						
22	41,070	31,550	36,463		33,590	34,950						
23	31,890	26,850	38,350		29,510	34,270						
24	28,830	23,610	33,590		36,990	45,830						
25	29,510	22,670	30,870		32,230	35,630						
26	39,110	20,810	26,520		31,550	31,550						
27	13,360	20,500	23,930		31,550	28,830						
28	50,590	19,890	23,610		30,870	27,840						
29	45,830		24,250		45,150	25,530						
30	52,630		22,980		56,710	25,210						
31	25,530		21,740		55,010							
Maximum	52,630	82,890	38,350		118,930	91,390	30,870					
Minimum	13,360	13,940	19,590		21,740	22,980	22,980					
Mean	26,213	29,022	25,488		41,775	46,120	27,300					

NOTE.—No record on days for which discharge is not given.

COTABATO PROVINCE

MAGANOY RIVER, MAGANOY

LOCATION.—About 50 m. northwest of Maganoy Farm School, and about 20 m. south of the Trading System of Maganoy, which is on the other side of river.

RECORDS AVAILABLE.—From August 17, 1919, to August 3, 1921.

GAGE.—Vertical gages of two sections both braced at the right bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat at section of gage B.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 50 m. above and below the station. Banks composed of alluvial soil and bare from vegetation. Stream bed subject to change at each flood. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 1,018,050 second-liters on October 14, 1920; minimum discharge, 18,760 second-liters on January 25–27 and 29, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 37,000 to 67,000 second-liters. Applicable throughout period of observation. Station fair. Gage read twice daily.

Discharge measurements of Maganoy River, near Maganoy Farm School, Maganoy, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 17	A. Baldonado and D. Abenes.	70	36,709	
September 14	.do	1 65	101,548	
October 29	.do	1 17	66,631	
November 17	D. Abenes	1.585	89,290	
1920				
January 19	do.	90	47,450	
March 21	.do.	.76	38,828	
May 4	.do.	.90	51,614	
July 9	.do.	84	46,090	
September 9	do	.65	34,915	
October 24	.do.	1.70	131,784	
November 20	.do	96	57,893	
December 22	.do.	.95	52,051	
1921				
January 23	.do	.37	27,015	
February 6	do	.39	30,529	
March 19	.do	.66	32,549	
May 27	do.	.70	13,609	

Daily and monthly discharges, in liters per second, of Maganoy River near Maganoy Farm School, Maganoy, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									34,900	162,450	133,300	53,000
2									34,400	107,050	127,700	50,875
3									33,400	155,550	91,300	48,200
4									32,900	248,700	76,400	53,725
5									31,000	165,900	68,500	51,550
6									32,900	142,400	89,150	50,875
7									40,300	167,625	97,850	45,000
8									46,250	267,675	196,950	177,975
9									61,275	221,100	130,500	297,000
10									62,050	169,350	190,050	162,450
11									51,550	139,300	129,100	95,600
12									215,925	97,850	111,850	78,250
13									259,050	88,075	148,800	207,300
14									122,100	68,500	124,900	186,600
15									79,200	75,500	108,225	207,300
16									63,600	74,600	107,050	139,300
17								35,950	57,450	66,850	93,450	95,600
18								34,900	70,200	60,500	85,000	72,800
19								43,800	71,900	55,950	83,000	65,200
20								169,350	73,700	54,450	89,150	72,800
21								77,300	85,000	54,450	83,000	64,400
22								58,950	63,600	67,675	75,500	57,450
23								49,525	64,400	77,300	77,300	55,200
24								43,800	131,900	93,450	85,000	53,000
25								40,875	81,100	136,300	74,600	50,875
26								40,300	75,500	116,900	64,400	49,525
27								47,550	193,500	111,850	69,350	50,200
28								43,800	324,600	79,200	70,200	47,550
29								41,450	231,450	66,850	60,500	46,250
30								38,100	219,375	203,850	57,450	45,000
31								36,475		228,000		43,800
Maximum								169,350	324,600	267,675	196,950	297,000
Minimum								34,900	31,000	54,450	57,450	43,800
Mean								53,475	98,149	123,394	100,018	89,505

Daily and monthly discharges, in liters per second, of Maganoy River near Maganoy Farm School, Maganoy, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	46,250	31,950	31,950	27,400	43,800	57,450	37,000	24,850	24,850	43,800	73,700	62,052
2	46,875	31,000	30,550	34,900	75,500	54,450	35,950	35,425	24,450	39,200	66,025	53,000
3	40,375	30,100	29,200	30,100	47,550	46,875	58,950	31,000	24,450	39,200	111,850	50,200
4	45,625	29,200	29,200	28,300	43,800	39,750	71,900	26,550	25,700	47,550	297,000	50,200
5	59,725	29,200	28,300	31,950	45,625	39,200	55,200	29,200	24,850	46,250	228,000	50,875
6	53,725	28,300	27,850	39,200	124,900	35,950	48,850	28,300	25,275	71,900	193,500	49,525
7	47,550	28,300	29,200	37,550	114,300	34,900	47,550	34,900	31,950	127,700	136,300	48,850
8	48,200	57,450	26,975	33,400	63,600	45,625	43,800	33,900	38,650	203,850	155,550	52,275
9	57,450	43,200	26,550	30,550	81,100	50,200	45,000	31,475	32,425	276,300	136,300	68,500
10	47,550	35,950	25,700	35,950	79,200	81,100	45,625	28,300	35,950	124,900	104,700	186,600
11	46,250	31,950	24,850	34,900	62,050	63,600	46,250	26,550	33,400	83,000	79,200	88,075
12	41,450	30,550	24,850	33,400	56,700	48,850	42,025	62,050	30,100	83,000	71,900	60,500
13	122,100	29,200	24,450	38,100	48,850	58,950	38,100	43,800	28,300	664,425	70,200	71,900
14	95,600	31,000	24,450	62,050	51,550	63,600	36,475	55,950	31,950	1,018,050	65,200	129,100
15	73,700	32,425	24,450	55,950	46,250	57,450	34,900	53,725	45,000	560,925	62,050	116,900
16	58,950	65,200	46,250	40,300	43,200	53,000	33,400	66,850	47,550	355,650	62,825	74,600
17	55,200	65,200	34,400	58,950	43,800	45,000	34,900	60,500	142,400	221,100	55,950	63,600
18	50,200	98,975	28,300	43,800	37,000	40,875	35,950	42,600	405,675	203,850	55,950	58,200
19	46,875	100,100	26,550	34,900	46,875	41,450	34,400	45,625	136,300	147,150	68,500	50,200
20	45,000	57,450	47,550	31,000	45,000	53,000	31,950	43,800	97,850	124,900	51,550	46,250
21	41,450	46,250	39,750	28,300	77,300	76,400	29,200	42,600	71,900	245,250	48,850	35,950
22	35,950	48,850	43,800	28,300	73,700	70,200	28,750	41,450	55,950	215,925	46,250	31,950
23	38,650	45,625	34,900	28,300	59,725	79,200	27,850	34,900	47,550	136,300	51,550	30,100
24	40,875	50,200	28,300	25,700	47,550	70,200	26,550	29,650	100,100	116,900	50,200	29,650
25	40,300	43,200	27,400	25,700	46,875	70,200	26,125	30,550	73,700	91,300	48,200	29,200
26	37,000	38,100	26,550	25,275	78,250	59,725	25,700	28,300	100,100	310,800	49,525	29,200
27	35,950	36,475	24,850	24,450	69,350	50,875	25,275	24,050	55,950	203,850	48,200	29,200
28	37,000	34,900	24,050	23,650	65,200	46,250	25,700	26,550	65,200	150,450	48,200	28,750
29	34,900	33,400	23,250	22,850	62,825	43,800	25,275	25,700	42,600	110,625	167,625	28,750
30	33,900		24,050	24,050	51,550	38,650	24,850	24,850	43,800	111,850	92,375	28,300
31	32,900		24,850		43,300		24,050	24,450		102,350		27,850
Maximum	122,100	100,100	47,550	62,050	124,900	81,100	71,900	66,850	405,675	1,018,050	297,000	186,600
Minimum	32,900	28,300	23,250	22,850	37,000	34,900	24,050	24,050	24,450	39,200	46,250	27,850
Mean	49,614	43,576	29,462	33,974	60,541	53,892	37,016	36,723	64,798	202,526	93,241	56,784

Daily and monthly discharges, in liters per second, of Maganoy River near Maganoy Farm School, Maganoy, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	27,850	30,100	80,150	39,200	207,300	105,875	86,000	90,225				
2	28,300	31,950	63,600	37,000	81,900	176,250	142,400	100,100				
3	28,300	22,450	58,950	34,900	68,500	155,550	104,700	124,900				
4	27,400	24,850	55,950	33,400	137,800	228,000	100,100					
5	26,550	26,550	48,850	33,400	212,475	165,900	101,225					
6	24,850	22,050	45,000	32,900	231,450	174,525	93,450					
7	24,450	21,650	63,600	45,000	210,750	155,550	78,100					
8	24,050	20,200	77,300	47,550	127,700	203,850	71,900					
9	26,125	19,120	58,200	43,800	92,375	200,400	123,500					
10	25,700	66,025	53,700	43,800	73,700	193,500	193,500					
11	25,275	35,425	61,275	87,000	63,600	203,850	155,550					
12	24,050	29,200	47,550	111,850	54,450	224,550	127,700					
13	23,250	28,300	45,625	89,150	58,950	255,600	136,300					
14	22,850	24,050	37,550	57,450	58,950	214,200	107,050					
15	22,850	24,050	75,500	48,850	62,825	165,900	124,900					
16	24,850	23,650	65,200	46,250	259,050	203,850	186,600					
17	24,450	23,250	78,250	43,800	246,975	143,950	162,450					
18	24,050	22,450	107,050	46,870	252,150	122,100	334,950					
19	23,250	20,920	186,600	68,500	159,000	352,200	343,575					
20	22,450	24,850	119,500	66,025	97,850	383,250	291,825					
21	21,650	34,900	101,225	89,150	93,450	262,500	262,500					
22	21,285	55,200	97,850	122,100	108,225	241,800	229,725					
23	21,285	94,525	85,000	148,800	133,300	203,850	165,900					
24	20,200	145,500	62,050	159,000	136,300	183,150	102,350					
25	18,760	102,350	55,200	130,500	130,500	159,000	88,075					
26	18,760	89,150	53,000	73,900	100,100	124,900	87,000					
27	18,760	70,200	60,500	65,200	179,600	91,300	86,000					
28	21,285	62,825	53,700	65,200	107,050	110,575	91,300					
29	18,760		43,800	102,350	119,500	107,050	109,400					
30	21,650		40,300	217,650	229,725	97,850	86,000					
31	32,900		35,425		205,575		88,075					
Maximum	32,900	145,500	186,600	217,650	259,050	383,250	343,575	124,900				
Minimum	18,760	19,120	35,425	32,900	54,450	91,300	71,900	90,225				
Mean	23,748	42,706	68,305	74,352	138,744	187,028	143,939	105,075				

COTABATO PROVINCE

MALITIBUG RIVER, BAO

LOCATION.—About 50 m. north of Bao Camp and about 150 m. east of school. It is exactly on the river crossing of the trail from Bao to Malagap.

RECORDS AVAILABLE.—From August 25, 1919, to August 3, 1921.

GAGE.—Vertical staff made out from log of "bagaclot" tree, planed on one side and tied with wires to "babonganin" tree on right bank of river.

DISCHARGE MEASUREMENT.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 150 m. above and below the station. Banks clayey and subject to overflow only at exceptional floods. Stream bed plenty of stones and boulders, and permanent in character.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 311,000 second-liters on April 27, 1921; minimum discharge, 4,750 second-liters on January 11, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from well-defined curves, applicable throughout period of observation. Station fair. Gage read twice daily.

Discharge measurements of Malitibug River, near Bao, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 25	Antonio Baldonado	0 38	10,343	
September 18	D. Abenes	0 64	29,628	
October 22	do	0 44	16,387	
November 23	do.	0 65	33,668	
December 19	do	0 47	17,924	
1920				
January 27	do	0 39	14,938	
February 27	do	0 34	9,239	
March 29	do	0 31	9,680	
May 14	do	0 46	16,425	
June 7	do	0 48	19,717	
July 19	do	0 44	15,922	
August 18	do	0.47	17,915	
September 22	do.	0 70	40,198	
October 17	do.	0 73	43,987	
December 14	do.	0 65	31,178	
1921				
January 12	do	0 40	7,200	
February 13	do.	0 42	11,300	
March 19	do	0 66	32,549	
May 27	do	0 70	33,464	

Daily and monthly discharges, in liters per second, of Malitibug River near Bao, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									13,030	128,150	66,150	17,670
2									13,030	131,150	45,150	15,180
3									13,030	71,150	27,240	15,780
4									13,030	35,150	19,080	20,470
5									13,030	21,990	15,780	17,670
6									15,780	27,240	18,340	16,400
7									19,030	45,150	70,150	16,400
8									19,030	20,470	61,150	37,150
9									20,470	15,180	37,150	56,150
10									19,030	14,060	49,150	43,150
11									17,670	13,030	145,150	33,150
12									43,150	13,030	71,150	19,030
13									41,150	13,030	67,150	16,400
14									63,150	13,030	39,150	60,150
15									57,150	13,530	33,150	39,150
16									20,470	13,030	37,150	31,150
17									17,670	13,030	41,150	27,240
18									37,150	12,080	32,150	19,030
19									49,150	12,080	29,150	19,030
20									37,150	12,080	25,410	19,030
21									25,410	14,060	41,150	16,400
22									32,150	17,020	53,150	15,180
23									39,150	28,180	43,150	15,180
24									35,150	21,220	38,150	15,180
25								13,030	33,150	37,150	39,150	13,530
26								13,530	29,150	39,150	25,410	13,030
27								14,060	115,150	33,150	44,150	13,080
28								13,530	63,150	41,150	37,150	14,060
29								13,030	57,150	49,150	30,150	14,610
30								13,030	75,150	55,150	21,990	14,060
31								14,060		119,150		13,530
Maximum								14,060	115,150	131,150	145,150	60,150
Minimum								13,030	13,030	12,080	15,780	13,030
Mean								13,467	34,904	35,231	43,455	22,489

Daily and monthly discharges, in liters per second, of Malitibug River near Bao, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	14,060	13,530	10,780	15,180	30,150	66,150	12,540	16,400	27,240	15,180	45,860	8,600
2	13,530	13,530	10,380	14,060	17,670	103,150	13,150	15,180	25,410	19,030	29,800	11,600
3	20,470	13,530	10,380	16,400	38,150	65,150	43,120	14,060	23,640	27,240	22,600	53,800
4	21,990	13,030	9,990	16,400	34,150	39,150	48,150	13,030	21,220	24,510	13,200	35,450
5	79,150	13,030	9,690	19,030	37,150	24,510	47,150	12,080	20,470	20,470	19,500	23,700
6	23,640	12,540	9,600	19,030	25,410	19,030	28,180	11,640	17,670	16,400	14,850	17,600
7	19,030	22,800	9,600	15,180	20,470	19,030	21,990	13,030	15,180	15,780	10,100	18,550
8	19,030	34,150	16,400	13,530	16,400	35,150	20,470	13,030	14,060	261,700	14,850	14,850
9	16,400	27,240	17,670	12,080	16,400	27,240	17,670	12,080	14,060	108,000	29,800	14,000
10	16,400	22,800	14,060	11,640	17,670	41,150	16,400	11,640	25,410	163,100	27,300	13,200
11	27,240	19,030	11,640	27,240	16,400	51,150	17,670	11,640	49,150	119,600	22,600	10,100
12	31,150	17,670	11,200	32,150	14,060	53,150	15,180	12,080	51,150	108,000	13,200	9,350
13	51,150	17,020	11,200	31,150	15,180	41,150	15,180	15,180	56,150	102,200	10,100	8,600
14	47,150	20,470	12,080	25,410	17,020	55,150	14,060	20,470	37,150	70,700	11,600	31,100
15	41,150	36,150	20,470	21,990	14,610	57,150	13,530	22,800	89,150	35,450	11,600	16,650
16	21,990	39,150	20,470	20,470	13,530	46,150	13,530	21,990	97,150	22,600	10,100	16,650
17	19,030	30,150	16,400	19,030	13,030	33,150	13,030	20,470	67,150	12,400	8,600	10,850
18	17,670	20,470	14,060	17,670	11,640	17,020	13,030	19,030	51,150	7,900	7,200	7,200
19	15,780	16,400	13,030	14,060	39,150	15,180	13,030	17,670	47,150	119,600	6,550	7,200
20	14,060	15,180	16,400	12,080	26,320	13,530	14,060	15,780	41,150	115,800	6,550	7,200
21	14,060	14,060	15,180	14,060	20,470	29,150	15,530	15,180	51,150	108,000	5,900	6,550
22	14,060	16,400	14,060	16,400	75,150	51,150	13,030	19,030	44,150	84,800	47,800	6,550
23	13,530	15,180	13,530	13,030	65,150	35,150	13,530	23,640	34,150	53,800	49,740	6,550
24	15,180	14,060	13,030	11,200	37,150	21,990	13,030	17,670	22,800	32,550	32,550	6,550
25	14,060	14,060	12,080	11,200	31,150	18,340	11,640	15,180	21,990	14,850	24,900	11,600
26	14,060	13,030	11,640	13,030	20,470	14,060	11,640	14,060	29,150	11,600	16,650	10,850
27	13,530	11,200	11,200	16,400	16,400	22,800	11,640	13,530	26,320	60,550	8,600	10,850
28	16,400	11,200	11,200	13,030	14,060	23,640	11,200	13,030	21,990	29,800	10,100	10,100
29	15,180	10,780	10,380	17,670	14,060	17,670	11,200	12,540	19,030	24,900	13,200	10,100
30	15,180	...	12,080	15,180	131,150	13,530	11,200	12,540	17,670	18,550	12,400	10,100
31	14,060	...	13,030	...	127,150	..	14,060	11,640	..	49,740	...	9,350
Maximum	79,150	39,150	20,470	32,150	131,150	103,150	48,150	23,640	97,150	261,700	49,740	53,800
Minimum	13,530	10,780	9,600	11,200	11,640	13,530	11,200	11,640	14,060	7,900	5,900	6,550
Mean	22,238	18,546	12,944	17,166	31,836	35,666	17,704	15,397	35,975	60,477	18,593	14,045

NOTE.—Discharge determined from well-defined rating curve, applicable as follows: August 25, 1919, to October 7, 1920, good between 16,000 to 30,000 second-liters; October 8, 1920, to August 3, 1921, good between 7,000 to 45,000 second-liters.

Daily and monthly discharges, in liters per second, of Malitibug River near Bao, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	9,350	10,850	60,550	8,600	27,300	14,000	7,200	6,550	...	.	..... .	....
2	8,600	8,600	32,550	7,200	19,550	13,200	6,550	6,550	. . .	. . .	. . . .	. . . .
3	8,600	7,900	22,600	7,200	14,850	10,100	20,500	5,900	..... .	.. ..	.....	.... .
4	7,900	7,200	16,650	6,550	11,600	7,900	16,650	.	.. ..	.. ..	.....	.... .
5	7,200	8,600	12,400	6,550	7,200	10,100	14,850	. ..	... ...	.... . .	....	.. .. .
6	7,200	8,600	10,100	8,600	6,550	13,200	13,200	..	.... .	... . .	....	.. ....
7	7,200	7,200	8,600	10,100	5,900	10,100	11,600	. .	.	.	.. ....	.. ....
8	11,600	6,550	7,900	8,600	5,900	8,600	11,600	.	.	.	. . ....	.. ....
9	10,100	51,700	7,200	14,850	5,900	7,200	11,600		.	..	.. . .	.. ....
10	7,900	34,000	10,100	24,900	13,200	6,550	7,900		.	.	.. . .	.. . ..
11	4,750	24,900	8,600	22,600	14,850	5,900	16,650		.	..	.. .. ..	....
12	7,200	17,600	7,200	18,550	11,600	34,000	24,900	. .	.	. ..	. . ..	.. . ..
13	7,200	14,850	7,200	14,850	10,100	84,800	38,650	.	. . .	.	.. . ..	.....
14	6,550	11,600	6,550	11,600	8,600	47,800	31,100		. .	. .	. ....	..... .
15	6,550	12,400	6,550	10,100	7,200	42,100	84,800			..	.....	..... .
16	6,550	10,100	35,450	7,900	6,550	35,450	53,800			.	....	..... .
17	6,550	13,200	116,700	7,200	6,550	45,860	28,500	.	.	.....	.....	..... .
18	6,550	10,100	110,900	6,550	6,550	90,600	17,600	. .	. .	....	.....	.. .. .
19	6,550	8,600	102,200	5,900	5,900	79,000	13,200		. .	....	.. ....	. ...
20	10,100	20,500	90,600	14,850	5,900	68,050	16,650		.	....	.. ....	. ...
21	8,600	18,550	81,900	38,650	5,900	137,000	70,700	..	.	. .	.. ....	. ...
22	7,200	22,600	68,050	27,300	16,650	108,000	60,550		..	. .	.. ....	. ....
23	13,200	22,600	56,000	20,500	14,850	68,050	43,980			. .	.. ..	. ....
24	11,600	60,550	43,980	16,650	13,200	49,740	26,100		.	. .	....	. ....
25	8,600	68,050	32,550	12,400	11,600	42,100	16,650		.		. ....	. .....
26	7,200	128,300	24,900	9,350	17,600	27,300	14,000		.		. .....	. .....
27	7,200	105,100	18,550	311,000	35,450	18,550	11,600		. .	.	.. ....	. ....
28	6,550	84,800	16,650	154,400	29,800	14,850	10,100		. .	. .	.. ....	. ....
29	6,550	. .	14,850	84,800	26,100	11,600	8,600		.	. .	. . ....	. ....
30	6,550	.	13,200	38,650	20,500	9,350	7,200		.	.	. . .	. . . .
31	13,200	. .	10,100	.. ..	16,650		6,550		.	.	. ....	.....
Maximum	13,200	128,300	116,700	311,000	35,450	137,000	84,800	6,550	... .		. . .	. . . . .
Minimum	4,750	6,550	6,550	5,900	5,900	5,900	6,550	5,900	..	... ..	....	.....
Mean	8,086	28,771	34,236	31,232	13,226	37,368	23,340	6,333		. . .	. ....	. ...

NOTE.—See footnote to discharge table for 1920.

COTABATO PROVINCE

NITOAN RIVER, PARANG

LOCATION.—About 1.5 km. southeast of Parang Camp and exactly on north side of bridge over Nitoan River of the Parang-Buldung trail.

RECORDS AVAILABLE.—From August 8, 1919, to September 30, 1921.

GAGE.—Board .02 × .04 × 2.3 m. graduated with nails, horizontally nailed to the floor beam of bridge. Water surface elevation measured with chain and weight.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel straight for 80 m. above and below the station. Only one at low water stage, two at high right bank of hard rock; left bank of loose earth, and easily eroded. At measuring section stream bed liable to change after each flood. Flow not uniform due to rapids in channel.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 254,250 second-liters on October 14, 1920; minimum discharge, 15,000 second-liters on April 4, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined rating curves. Applicable throughout the period of observation. Gage read twice daily.

Discharge measurements of Nitoan River, near Parang, Nitoan, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 9	A. Baaldonado and D. Abenes	1 29	41,581	
September 9	do.	1 37	55,447	
October 6	do	1 60	69,748	
November 7	do.	1 57	77,103	
December 5	do	1 24	36,451	
1920				
January 13	D. Abenes	1.38	40,432	
February 8	do	1 35	36,418	
March 8	do	1 25	27,808	
April 10	do	1 13	22,380	
April 28	do.	1 15	24,268	
May 23	do	1 15	22,043	
June 1	do	1.16	20,429	
July 3	do	1 43	60,225	
August 3	do.	1.18	23,409	
September 30	do	1 30	35,549	
October 31	do.	1.44	46,491	
November 1	do	1 42	41,517	
November 10	do.	1 46	68,192	
1921				
January 1	D. Abenes	1 44	62,464	
February 27	do	1 21	20,157	
March 2	do	1 38	50,880	
April 2	do.	1 20	23,488	

Daily and monthly discharges, in liters per second, of Nitoan River near Nitoan, Parang, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									34,050	56,740	39,550	34,810
2.									33,290	64,870	46,440	33,290
3.									34,810	59,720	41,250	39,550
4.									36,390	55,760	41,250	34,810
5									33,290	53,800	39,550	35,600
6.									36,390	59,720	48,240	34,050
7.									42,950	88,650	61,780	33,290
8.								37,180	41,250	72,390	62,810	34,810
9.								37,970	44,680	65,910	61,780	37,180
10.								39,550	39,550	68,020	49,160	34,810
11.								39,550	50,080	57,720	44,680	33,290
12.								37,180	76,900	53,800	44,680	33,290
13.								36,390	93,680	50,080	44,680	34,810
14.								34,810	75,750	50,080	43,800	34,810
15.								34,810	61,780	52,860	42,100	37,180
16.								34,810	51,000	50,080	41,250	34,050
17.								33,290	46,440	46,440	40,400	33,290
18.								33,290	48,240	43,800	38,760	31,770
19.								58,720	46,440	42,950	37,970	31,770
20.								53,800	46,440	42,100	37,970	34,810
21.								42,950	50,080	42,100	40,400	31,770
22.								35,600	45,560	40,400	36,390	34,050
23.								36,390	46,440	47,320	36,390	31,770
24.								46,440	61,780	53,800	35,600	31,770
25.								33,290	57,720	59,720	36,390	31,770
26.								37,970	55,760	58,720	41,250	31,040
27.								36,390	51,920	49,160	36,390	30,310
28.								35,600	59,720	50,080	34,810	34,810
29.								41,250	51,920	48,240	39,550	31,040
30.								36,390	59,720	53,800	36,390	30,310
31.								37,180		47,320		28,850
Maximum								58,720	93,680	88,650	62,810	39,550
Minimum								33,290	33,290	40,400	34,810	28,850
Mean								38,783	50,467	54,392	42,722	36,610

Daily and monthly discharges, in liters per second, of Nitoan River near Nitoan, Parang, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	28,160	33,290	31,770	30,310	39,550	59,720	34,050		35,950	45,250	58,550	47,150
2	29,580	31,770	27,470	34,810	34,810	53,800	33,290		30,550	43,350	58,550	45,250
3	33,290	31,770	27,470	28,160	36,390	42,950		31,040	34,750	50,950	54,750	47,150
4	30,310	28,850	27,470	35,600	41,250	39,550	32,530	30,310	69,950	47,150	126,950	50,950
5	31,040	28,160	27,470	30,310	37,970	34,050	39,500	36,390	54,750	56,650	90,850	50,950
6	31,770	28,160	28,850	34,810	42,100	32,530	34,810	33,290	50,950	66,150	85,150	43,350
7	31,770	27,470	28,160	30,310	43,800	32,530	33,290	33,290	56,650	62,350	77,550	43,350
8	37,970	36,390	26,090	33,290	41,250	37,180	31,040	31,770	69,950	87,050	69,950	43,350
9	38,760	36,390	26,090	29,580	42,950	36,390	30,310	31,770	47,150	81,350	77,550	58,550
10	37,970	28,850	26,090	26,090	36,390	39,550	72,390	31,770	47,150	66,150	69,950	56,650
11	32,530	27,470	26,090	26,090	40,400	40,400	66,950	29,580	47,150	73,750	66,150	54,750
12	31,040	27,470	26,090	30,310	34,810	39,550	57,720	30,310	43,350	94,650	66,150	47,150
13	40,400	27,470	26,780	34,810	32,530	51,920	57,720	34,810	41,450	163,050	62,350	47,150
14	36,390	36,390	26,090	36,390	38,760	46,440	55,760	36,390	50,950	254,250	58,550	54,750
15	41,250	24,710	28,850	34,050	32,530	48,240	52,860	34,050	77,550	242,850	62,350	58,550
16	34,810	61,780	26,780	28,850	31,770	46,440	52,860	33,290	54,750	172,550	58,550	54,750
17	34,050	48,240	26,090	36,390	33,290	40,400	53,800	37,970	50,905	145,950	58,550	54,750
18	37,970	39,550	26,090	31,040	30,310	42,950	52,860	42,950	77,550	126,950	58,550	54,750
19	33,290	36,390	32,530	27,470	33,290	44,680	51,920	42,950	62,350	107,950	58,550	50,950
20	34,810	36,390	28,850	26,090	34,810	44,680	61,780	50,080	54,750	92,750	62,350	47,150
21	33,290	33,290	26,780	29,580	30,310	70,190	59,720	42,100	62,350	100,350	58,550	47,150
22	33,290	37,970	24,710	28,850	28,850	45,560	53,800	45,560	56,650	85,150	58,550	43,350
23	33,290	34,050	26,090	26,780	28,160	42,950	53,800	46,440	50,950	75,650	54,750	39,550
24	33,290	33,290	26,780	26,090	26,090	40,400	48,240	46,440	47,150	68,050	50,950	35,950
25	37,970	31,770	25,400	28,850	34,050	33,290	48,240	38,760	47,150	62,350	50,950	32,350
26	48,240	31,770	24,710	30,310	30,310	36,390	48,240	38,760	45,250	71,850	52,850	25,250
27	41,250	31,040	24,710	30,310	28,850	34,810	65,910	36,390	47,150	58,550	62,350	25,250
28	41,250	31,770	24,710	28,160	26,090	33,290	59,720	34,810	41,450	54,750	60,450	23,500
29	35,600	29,580	24,710	33,290	26,280	34,810	55,760	31,770	35,950	58,550	52,850	28,750
30	34,810		24,710	36,390	28,160	33,290	52,860	34,050	35,950	66,150	50,950	
31	33,290		31,770		28,850		51,920	35,600		64,250		
Maximum	48,240	61,780	32,530	36,390	43,800	70,190	72,390	50,080	77,550	254,250	126,950	58,550
Minimum	28,160	24,710	24,710	26,090	26,090	32,530	30,310	29,580	30,550	43,350	50,950	23,500
Mean	35,249	33,844	26,955	30,779	34,021	41,964	50,123	36,644	51,620	91,840	64,503	43,380

Daily and monthly discharges, in liters per second, of Nitoan River near Nitoan, Parang, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	32,350	16,700	50,950	25,250	35,950	145,950	111,750	142,150	96,550			
2	32,350	25,250	49,050	21,800	35,950	145,950	113,650	130,750	92,750			
3	30,550	18,400	37,750	18,400	49,050	145,950	128,850	126,950	71,850			
4	30,550	20,100	43,350	15,000	32,350	145,950	126,950	134,550	71,850			
5	28,750	21,800		21,800	41,450	136,450	130,750	147,850	69,950			
6	25,250	21,800		28,750	18,400	145,950	126,950	119,350	62,350			
7	25,250	25,250	54,750	34,150	21,800	145,950	123,150	94,650	68,050			
8	21,800	21,800	56,650	32,350	32,350	140,250	130,750	90,850	54,750			
9	20,100	25,250	47,150	28,750	30,550	126,950	149,750	85,150	81,350			
10	21,800	30,550	43,350	28,750	32,350	145,950	128,850	79,450	79,450			
11	25,250	28,750	39,550	28,750	32,350	126,950	145,950	69,950	138,350			
12	27,000	47,150	34,150	25,250	32,350	119,350	140,250	66,150	140,250			
13	25,250	43,350	32,350	23,500	35,950	111,750	125,050	58,550	136,450			
14	25,250	47,150	28,750	21,800	35,950	109,850	121,250	58,550	134,550			
15	25,250	47,150	27,000	21,800	34,150	123,150	142,150	52,850	136,450			
16	25,250	47,150	25,250	18,400	32,350	100,350	145,950	50,950	130,750			
17	21,800	54,750	23,500	18,400	37,750	100,350	126,950	50,950	132,650			
18	21,800	54,750	25,250	18,400	35,950	96,550	132,650	64,250	134,550			
19	20,100		54,750	20,100	35,950	109,850	151,650	50,950	132,750			
20	25,250		49,050	18,400	50,950	126,950	166,850	50,950	130,750			
21	21,800		49,050	35,950	50,950	125,050	168,750	69,950	125,050			
22	21,800		47,150	39,550	50,950	130,750	161,150	54,750	121,250			
23	28,750	87,050	37,750	35,950	54,750	128,850	145,950	54,750	115,550			
24	25,250	85,150	32,350	30,550	62,350	126,950	119,350	56,650	128,850			
25	23,500	88,950	32,350	30,550	54,750	96,550	126,950	56,650	126,950			
26	21,800	58,550	32,350	28,750	106,050	104,150	126,950	62,350	125,050			
27	21,800	50,950	32,350	28,750	134,550	109,850	128,850	54,750	128,850			
28	21,800	62,350	28,750	39,550	145,950	113,650	126,950	69,950	126,950			
29	21,800		28,750	35,950	73,750	109,850	145,950	73,750	138,350			
30	21,800		32,350	32,350	69,950	104,150	126,950	87,050	132,650			
31	18,400		28,750		71,850		130,750	92,750				
Maximum	32,350	88,950	56,650	39,550	145,950	145,950	168,750	147,850	140,250			
Minimum	18,400	16,700	23,500	15,000	18,400	96,550	111,750	50,950	54,750			
Mean	24,498	42,921	33,088	26,923	50,637	123,350	134,795	79,327	112,177			

COTABATO PROVINCE

PULANGUI RIVER, KABAKAN

LOCATION.—About 60 m. south of the Kabakan School Dormitory and is about 100 m. below the confluence of the Dilapuan with the Pulangui River.

RECORDS AVAILABLE.—From August 30, 1919, to August 4, 1921.

GAGE.—Horizontal staff made out of "Tammag" log and set at the left bank of the river. The fluctuations of water level are being measured with the use of chain and weight.

DISCHARGE MEASUREMENTS.—Made from boat at about 30 m. below gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for about 200 or 300 m. above and for 100 m. below the station. Right bank low and subject to frequent overflow, covered with "talahib;" left bank of clayey material at top and limestone formation at bottom and is cultivated. Stream bed sandy and shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 795,450 second-litérs on June 17, 1921; minimum discharge, 109,750 second-liters on May 3, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curves. The station is a fair one. Gage read twice daily.

Discharge measurements of Pulangui River, near Kabakan, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
September 24	A. Baldonado and D. Abenes.	3 24	273,991	
October 17...	do	3 70	352,518	
November 27..	do.	3 13	251,492	
December 23	D. Abenas.	2 92	223,984	
1920				
January 31..	do.	2 62	192,500	
March 2	do	2.60	183,863	
April 4	do.	1 90	165,859	
May 8.	do	2 74	205,446	
June 11.	do.	3 46	329,722	
July 16	do	2.78	179,855	
August 22. ..	do	3 50	569,554	
September 15	do	3 67	290,738	
October 12..	do	5 70	573,768	
November 26	do	2 81	198,418	
1921				
January 18..	do	3 16	209,740	
February 20...	do.	3 80	374,583	
March 15... .	do	4 14	378,329	

NOTE.—Discharge measurement made on August 22, 1920, not very reliable as floats have been used to measure the velocity.

Daily and monthly discharges, in liters per second, of Pulangui River near New Kabakan Farm School, Kabakan, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									176,100	687,000	354,000	219,400
2									173,100	598,500	309,000	211,100
3									172,100	601,500	270,550	211,100
4									183,450	492,000	260,700	213,400
5									177,150	567,000	245,850	240,650
6									205,350	513,000	301,500	259,300
7									241,950	657,000	402,000	248,450
8									288,000	603,000	444,000	415,500
9									321,000	544,500	361,500	405,000
10									277,800	465,000	528,000	315,000
11									269,100	390,000	312,000	270,550
12									319,500	339,000	310,500	251,150
13									312,000	306,000	411,000	251,150
14									255,200	369,000	391,500	248,450
15									224,300	259,300	319,500	373,500
16									211,100	444,000	294,000	213,400
17									288,000	331,500	270,550	201,900
18									333,000	294,000	249,800	199,700
19									496,500	264,900	260,700	203,050
20									483,000	255,200	396,000	206,500
21									480,000	267,700	414,000	199,700
22									445,500	321,000	385,500	208,800
23									339,000	286,500	339,000	230,550
24									274,900	324,000	300,000	230,550
25									251,150	375,000	285,050	209,950
26									243,250	337,500	273,450	259,300
27									230,550	511,500	255,200	196,400
28									251,150	372,000	251,150	190,980
29									336,000	321,000	251,150	186,660
30								201,900	627,000	417,000	225,550	180,300
31								184,500		462,000		178,200
Maximum								201,900	627,000	687,000	528,000	415,500
Minimum								184,500	172,100	255,200	225,550	178,200
Mean								193,200	296,007	418,600	322,423	239,666

NOTE.—Daily discharge determined from a fairly well-defined curve from 192,500 to 245,200 second-liters. Applicable from September 1, 1919, to June 10, 1920.

Daily and monthly discharges, in liters per second, of Pulangui River near New Kabakan Farm School, Kabakan, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	178,200	190,980	209,950	204,200	114,500	211,100	365,400	177,750	212,000	259,500	217,000	213,000
2	200,800	182,400	195,300	204,200	112,100	150,720	306,700	165,400	210,000	199,000	230,650	261,700
3	279,250	177,150	190,980	196,400	109,750	139,800	328,500	164,450	203,000	193,000	227,500	270,500
4	379,500	176,100	189,900	123,480	117,700	198,600	322,300	183,450	190,100	217,000	231,700	337,250
5	525,000	172,100	186,650	124,310	112,900	215,800	295,900	207,000	182,500	269,400	229,600	307,900
6	496,500	170,100	185,580	120,990	117,700	228,050	293,500	207,000	181,550	270,500	240,100	252,900
7	384,000	167,100	185,580	119,330	132,750	220,600	315,100	206,000	183,450	294,700	285,450	244,300
8	372,000	243,250	182,400	124,310	197,500	193,140	312,700	205,000	205,000	370,700	295,900	252,900
9	346,500	263,500	180,300	125,970	168,100	120,990	298,300	197,000	224,350	425,800	310,300	263,900
10	292,500	206,500	178,200	127,650	154,480	162,160	268,300	191,050	217,000	473,000	317,500	267,200
11	267,700	185,580	172,100	130,200	158,270	266,100	261,700	199,000	205,000	519,550	259,500	270,500
12	285,050	178,200	170,100	131,050	162,160	173,000	211,000	195,000	193,000	538,150	236,950	277,370
13	303,000	179,250	168,100	138,900	186,200	173,000	213,000	180,600	183,450	365,400	240,100	259,500
14	270,550	177,150	165,100	138,900	147,900	179,650	205,000	198,000	197,000	370,700	225,400	263,900
15	255,200	172,100	168,100	173,100	180,300	137,400	197,000	212,000	268,300	143,700	217,000	270,500
16	235,550	279,250	203,050	155,420	180,300	223,300	193,000	243,250	276,250	378,800	208,000	263,900
17	215,800	429,000	208,800	155,420	156,360	209,000	213,000	240,100	279,700	334,750	210,000	249,600
18	208,800	346,500	190,980	145,200	157,300	190,100	208,000	315,100	311,500	294,700	207,000	244,300
19	207,650	262,100	183,450	139,800	206,500	179,650	199,000	337,250	291,200	269,400	205,000	240,100
20	220,600	223,050	170,100	151,660	234,300	181,550	227,500	283,150	261,700	258,400	215,000	235,900
21	229,300	205,350	178,200	151,600	184,500	217,000	265,000	282,000	333,500	299,500	238,000	205,000
22	208,800	207,650	176,100	144,300	325,500	250,700	233,800	275,100	329,750	291,200	251,800	261,000
23	201,900	219,400	176,100	148,840	291,000	225,400	224,350	266,100	319,900	265,000	243,250	193,000
24	286,500	223,050	174,100	156,360	225,550	261,700	207,000	272,800	324,750	259,500	245,350	187,250
25	285,050	220,600	172,100	150,720	214,600	270,500	199,000	255,100	339,750	242,200	270,500	181,550
26	267,700	213,400	175,100	124,310	220,600	267,200	225,400	263,900	275,100	235,900	206,000	183,450
27	245,850	303,000	180,300	149,780	207,650	277,400	241,150	268,300	246,400	226,450	150,000	179,650
28	243,250	273,450	182,400	145,200	228,050	316,300	268,300	239,050	238,000	224,350	148,200	213,000
29	219,400	230,550	172,100	125,140	223,050	244,300	233,800	240,100	235,900	223,300	140,300	221,200
30	201,900		174,100	116,100	208,800	259,500	211,000	219,100	217,000	220,150	172,050	284,300
31	195,300		185,580		188,820		219,100	218,050		230,650		259,560
Maximum	525,000	429,000	209,950	204,200	325,500	316,300	365,400	337,250	339,750	538,150	317,500	337,250
Minimum	178,200	167,100	165,100	116,100	109,750	120,990	193,000	164,450	181,550	143,700	140,300	179,650
Mean	274,487	223,373	181,642	144,761	180,167	211,457	312,106	229,263	244,535	295,624	229,170	243,743

NOTE.—Daily discharge determined from a fairly well-defined curve fro m 200,000 to 290,000 second-liters. Applicable from June 11, 1920, to December 31, 1920.

Daily and monthly discharges, in liters per second, of Pulangui River near New Kabakan Farm School, Kabakan, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	228,550	187,250	344,750	208,000	262,800	489,500	231,700	142,800				
2	233,800	205,000	315,100	208,000	197,000	491,000	185,350	150,000				
3	244,300	209,000	373,950	215,000	232,750	539,650	198,000	206,000				
4	248,500	201,000	266,100	200,000	219,100	714,850	207,000	219,100				
5	233,800	194,000	268,300	198,000	247,450	660,600	209,000					
6	246,400	191,050	261,700	197,000	209,000	634,250	200,000					
7	246,400	196,000	259,500	208,000	213,000	705,550	198,000					
8	212,000	200,000	261,700	163,500	153,600	702,450	197,000					
9	207,000	207,000	381,500	128,000	123,750	628,050	182,500					
10	213,000	213,000	538,160	133,950	113,550	620,300	157,200					
11	213,000	227,500	538,160	150,000	110,150	561,400	146,400					
12	328,500	205,000	498,500	192,000	120,350	580,000	169,200					
13	232,750	209,000	407,600	197,000	130,550	699,350	182,500					
14	227,500	207,000	396,400	128,000	142,800	767,550	200,000					
15	242,600	205,000	360,200	150,000	180,600	730,350	203,000					
16	246,400	203,000	441,200	182,500	416,000	725,700	193,000					
17	228,550	203,000	448,200	177,750	420,200	795,450	293,500					
18	250,700	224,350	439,800	150,000	435,600	719,500	294,700					
19	228,550	255,100	455,350	172,050	362,800	612,550	293,500					
20	232,750	246,400	468,500	163,500	225,400	461,150	250,700					
21	238,000	238,000	434,200	180,600	175,850	332,250	194,000					
22	202,000	275,100	409,000	163,500	166,350	317,500	173,950					
23	207,000	319,900	400,600	157,200	183,450	295,900	183,450					
24	199,000	724,750	382,850	159,900	144,600	288,900	187,250					
25	198,000	317,500	471,500	153,600	160,800	282,000	194,000					
26	192,000	317,500	341,150	150,000	153,600	263,900	195,000					
27	211,000	329,750	225,400	148,200	146,400	252,900	199,000					
28	211,000	339,750	215,000	174,900	519,550	270,500	179,650					
29	189,150		211,000	305,500	522,650	229,600	231,700					
30	184,400		208,000	303,100	595,500	231,700	221,200					
31	192,000		207,000		519,550		177,750					
Maximum	328,500	724,750	538,160	305,500	595,500	795,450	294,700	219,100				
Minimum	184,400	187,250	207,000	128,000	110,150	229,600	146,400	142,800				
Mean	224,794	251,818	353,828	180,625	251,734	520,145	204,168	179,475				

NOTE.—See footnote to discharge table for 1920.

COTABATO PROVINCE

SALIMBAO RIVER, SALIMBAO

LOCATION.—About 500 m. east of Cotabato–Parang trail and 4.5 km. northeast of Cotabato.

RECORDS AVAILABLE.—From August 6, 1919, to March 31, 1922.

GAGE.—Made of lauaan, set vertically and nailed to "tamunag" tree 60 cm. in diameter.

DISCHARGE MEASUREMENTS.—Made by wading at about 30 m. below gage.

CHANNEL AND BANKS.—Channel only one; straight for 10 m. above and 25 m. below gaging section. Both banks subject to overflow and may be easily disintegrated due to loose composition of earth's texture. At measuring section stream bed sandy and shifting during big floods.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 9,840 second-liters on November 14, 1921; minimum discharge, 12 second-liters, scattered in the months of May, June, and July, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a well-defined rating curve from 40 to 350 second-liters. Below and above these limits the discharges are estimated from extension of curve applicable throughout the period of observation. Gage read twice daily.

Discharge measurements of Salimbao River, near Salimbao, Cotabato

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1919				
August 6	A. Baldonado and D. Abenes.	.59	108	
August 11	do	.54	51	
September 5	do	.49	37	
October 10	do	.69	351	
October 11	do	.61	159	
November 3	do	.58	211	
December 4	D. Abenes.	.52	102	
1920				
January 5	do	.55	92	
January 6	do	.61	171	
February 7	do	.57	57	
February 15	do	.58	67	
March 7	do	.56	39	
April 13	do	.61	67	
April 27	do	.63	138	
May 22	do	.58	32	
June 21	do	.77	348	
June 29	do	.57	44	
July 5	do	.66	120	
August 7	do	.54	38	
September 3	do	.56	82	
October 1	do	.57	47	
October 2	do	.57	47	
November 3	do	.50	91	
November 8	do	.72	642	
December 8	do	.50	90	
1921				
January 4	do	.47	71	
February 2	do	.72	598	
March 3	do	.75	715	
April 5	do	.44	41	
June 25	A. Baldonado	.46	207	

Discharge measurements of Salimbao River, near Salimbao, Cotabato—Ctd.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
1921				
August 17	P. Feliciano	47	74	
August 20	do	.47	75	
September 21	do	.50	106	
October 10	do	.62	102	
December 6	do	.60	144	
December 12	do	.56	64	
December 12	do	.56	67	
1922				
January 24	do	.54	56	
January 29	do	54	64	
February 6	do	53	54	
February 7	do	53	55	
March 25	do	.51	40	
March 31	do	.51	36	

Daily and monthly discharges, in liters per second, of Salimbao River near Salimbao, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									160	109	84	55
2									118	118	84	49
3									128	212	69	
4									69	972	55	49
5									37		69	43
6								109	37		186	43
7								92	138		282	43
8								76	462		906	69
9								55	310		560	118
10								49	128	173	355	118
11								69		92	100	149
12								69	1,698	65	84	160
13								62	212	55	76	100
14								62	118	43	69	160
15								55	55	69	43	128
16								43	43	1,038	43	84
17								37	32	186	100	62
18								43	32	43	128	55
19								69	32	49	55	100
20								560	22	43	62	128
21								355	22	186	84	84
22								296	22	118	69	55
23								239	22	37	100	55
24								267	22	100	62	55
25								225	22	296	55	43
26								100	22	100	55	69
27								62	32	69	49	55
28								100	55	43	49	43
29								84	69	186	69	37
30								138	37	253	69	37
31								109		118		43
Maximum								560	1,698	1,038	906	160
Minimum								37	22	37	43	37
Mean								132	143	184	136	74

NOTE.—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Salimbao River near Salimbao, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	37	62	84	76	100	100			62	84	110	110
2	37	55	52	62	100	118			62	84	110	110
3	32	69	49	55	109	160			84	84	124	110
4	43	69	49	49	100	138			69	84	172	110
5	49	84	49	84	100	118			69	100	140	110
6	100	69	43	118	100	100			62	84	83	110
7	160	55	55	138	100	109		69	62	118	71	83
8	478	100	55	100	100	186		69	69	92	750	83
9	478	100	55	100	109	128		62	62	100	248	83
10	370	76	55	84	100	118		62	62	92	209	83
11	239	55	55	100	118	118		62	186	212	209	83
12	138	55	62	138	109	160		63		510	110	96
13	160	55	55	138	100	118			92		110	1,126
14	118	100	55	100	100	118		63	92		110	518
15	198	69	55	100	92	212		212	84		110	518
16	138	118	84	138	100	138		173	69		140	156
17	160	138	84	160	118	100		160	212		156	110
18	160	118	100	212	109	100		118	325		190	110
19	173	100	100	185	100	109		92	92		209	96
20	149	83	138	149	100	182		840	674		292	96
21	100	69	160	118	100	296		186	658		110	96
22	100	100	138	84	100			173	239		590	83
23	69	128	118	100	100			100	109		270	83
24	69	138	100	138	100			92	239		248	83
25	108	118	69	267	100			62	355		209	83
26	186	149	62	239	109			62	160		172	71
27	173	118	55	160	100			62	118		124	71
28	149	118	55	128	100			62	100		1,564	71
29	149	100	49	138	109			69	100		209	71
30	100		55	138	118			62	92		140	71
31	69		84		100			84				71
Maximum	478	149	160	267	118	296		840	674	510	1,564	1,126
Minimum	32	55	43	49	92	100		62	62	84	71	71
Mean	151	92	74	127	103	139		127	161	137	243	153

NOTE.—Gage damaged on June 22 and was not reinstalled till August 7.

Daily and monthly discharges, in liters per second, of Salimbao River near Poblacion, Salimbao, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	71	60	836	41	41		25	83	172	750	66	75
2	71	83	316	33	792		18	140	140	4,762	6,280	186
3	71	83	140	50	424		18	292	140	1,240	120	85
4	71	71	83	750	41		12	424	172	464	58	75
5	71	71	83	518	25		41	2,500	110	206	66	167
6	71	83	41	248	18		25	668	110	206	167	108
7	71	83	60	83	12		12	209	83	206	1,052	85
8	71	71	140	50	394		12	172	83	206	2,560	66
9	71	71	83	50	668		41	248	83	150	167	66
10	60	71	190	50	96		25	190	4,606	135	254	66
11	83	83	248	41	50		41	124	5,932	135	2,780	66
12	83	83	172	41	341		41	83	3,514	120	316	66
13	110	71	172	41	83		25	83	1,954	120	167	66
14	110		60	41	836		25	71	1,296	167	9,840	66
15	110		50	41	316		18	71	750	135	1,343	58
16	71	60	41	41	248		18	60	172	674	316	66
17	71	83	60	41	2,734		41	71	140	167	167	58
18	83	83	60	41	228		33	60	140	135	135	58
19	83		60	33	110		25	60	140	135	108	66
20	83		50	33	71		140	60	110	120	85	58
21	83		50	33	60		590	71	110	230	85	58
22	110		83	50	50		394	71	110	135	85	58
23	83	190	60	60	881		292	71	110	108	96	58
24	83	209	50	50	209		156	83	110	120	85	58
25	83	518	41	60	60		83	71	110	742	1,052	58
26	71	248	33	50	367	12	172	71	110	254	186	58
27	71	140	41	71	1,126	1,180	124	394	454	75	135	58
28	71	1,564	41	96	292	708	124	454	668	66	96	51
29	60		41	83	668	228	124	1,296	1,954	66	85	58
30	60		41	60	518	60	124	553	3,358	66	75	58
31	60		41		140		110	172		150		58
Maximum	110	1,564	836	750	2,734	1,180	590	2,500	5,932	4,762	9,840	186
Minimum	60	60	33	33	12	12	12	60	83	66	58	51
Mean	78	185	112	96	384	437	94	290	898	379	934	72

NOTE.—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Salimbao River near Poblacion, Salimbao, Cotabato, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	51	51	44									
2	51	44	39									
3	51	44	39									
4	51	44	39									
5	51	44	39									
6	51	44	39									
7	51	44	39									
8	51	44	39									
9	51	44	39									
10	51	44	39									
11	51	44	39									
12	51	44	39									
13	51	44	39									
14	51	44	51									
15	51	44	85									
16	51	44	66									
17	51	44	51									
18	51	44	39									
19	51	44	135									
20	51	44	51									
21	51	44	44									
22	51	66	39									
23	58	51	39									
24	51	51	39									
25	51	44	34									
26	51	44	34									
27	51	51	39									
28	51	44	39									
29	51		39									
30	51		39									
31	44		34									
Maximum	58	66	135									
Minimum	44	44	34									
Mean	51	46	47									