

DEPARTMENT OF THE INTERIOR  
UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, DIRECTOR

---

WATER-SUPPLY PAPER 336

---

WATER RESOURCES OF HAWAII

1912

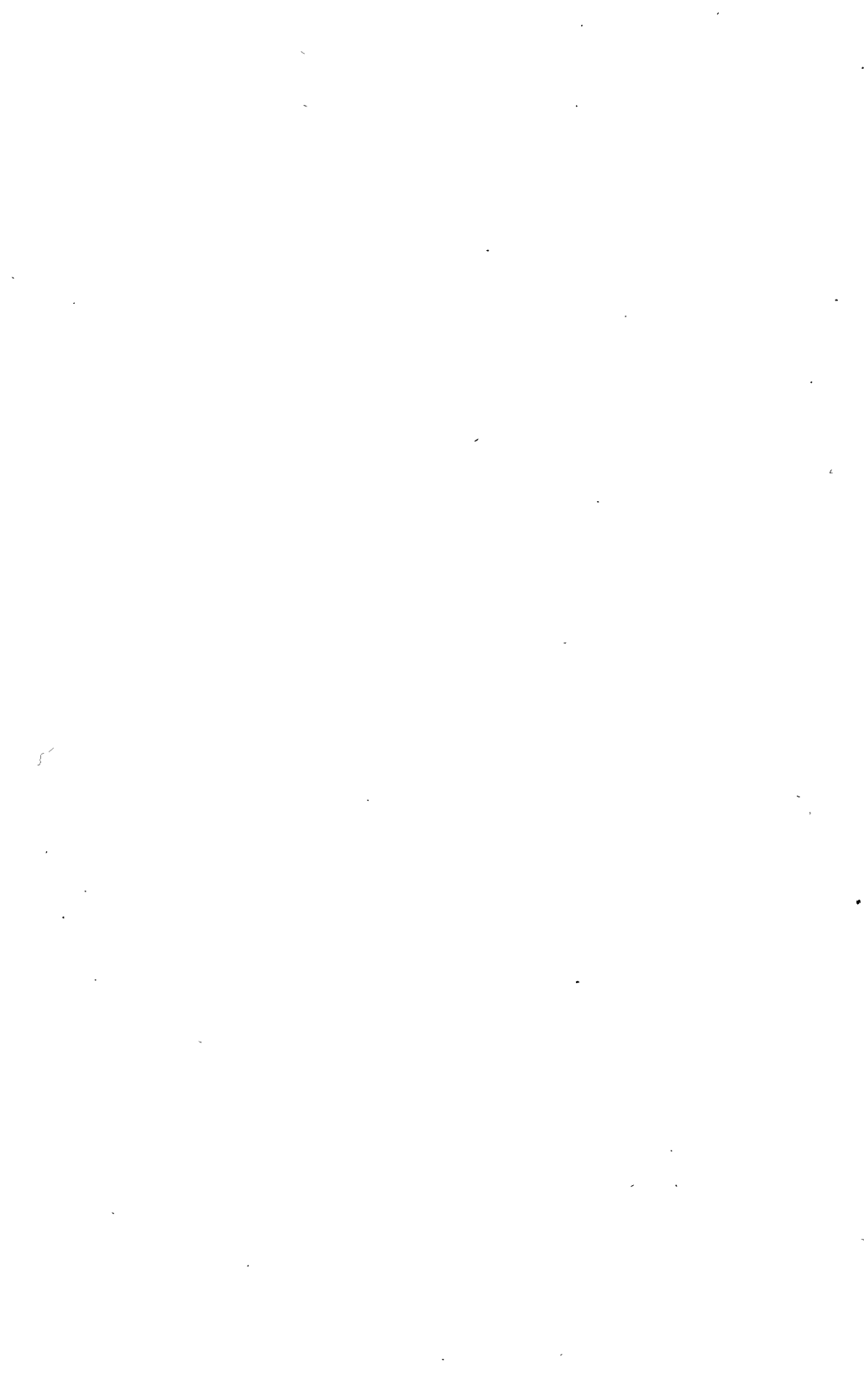
BY

C. H. PIERCE AND G. K. LARRISON



WASHINGTON  
GOVERNMENT PRINTING OFFICE

1914



# CONTENTS.

	Page.
Authority for investigations.....	9
Cooperation.....	10
Scope of work.....	10
Field methods of measuring stream flow.....	11
Base data.....	11
Weir measurements.....	11
Velocity-area method.....	12
Definition of terms.....	16
Convenient equivalents.....	18
Office methods of computing and studying discharge and run-off.....	19
Explanation of tables.....	22
Accuracy and reliability of field data and comparative results.....	24
Division of work.....	24
Gaging stations maintained in Hawaii.....	25
Geography of the Hawaiian Islands.....	29
Station records.....	34
Island of Kauai.....	34
Waimea River basin.....	34
Waimea River near Waimea, Kauai.....	34
Kawaikoi Stream near Waimea, Kauai.....	35
Waiakoali Stream near Waimea, Kauai.....	37
Mohihi Stream near Waimea, Kauai.....	38
Waialae Stream near Waimea, Kauai.....	39
Kekaha ditch at camp No. 1, near Waimea, Kauai.....	40
Kekaha ditch at flume No. 2, near Waimea, Kauai.....	42
Kekaha ditch at siphon near Waimea, Kauai.....	42
Kekaha ditch at tunnel No. 12, near Waimea, Kauai.....	43
Waimea ditch near Waimea, Kauai.....	45
Kamenehune ditch near Waimea, Kauai.....	47
Makaweli River basin.....	48
Makaweli River near Waimea, Kauai.....	48
Halekua Stream near Waimea, Kauai.....	50
Olokele ditch at tunnel No. 12, near Makaweli, Kauai.....	50
Olokele ditch at weir near Waimea, Kauai.....	52
Poowaiomahaihai ditch near Waimea, Kauai.....	53
Hanapepe River basin.....	55
East Branch of Hanapepe River at Hanapepe Falls, near Eleele, Kauai.....	55
Hanapepe River at Koula, near Eleele, Kauai.....	55
Hanapepe ditch at Hanapepe Falls, near Eleele, Kauai.....	57
Hanapepe ditch at Koula, near Eleele, Kauai.....	59
Hanapepe ditch at weir near Hanapepe, Kauai.....	60
Hanapepe River at Hanapepe Falls, near Eleele, Kauai.....	62
Hiloa ditch at Hanapepe Falls, near Eleele, Kauai.....	62

## Station records—Continued.

## Island of Kauai—Continued.

	Page.
Huleia River basin.....	63
Huleia River near Lihue, Kauai.....	63
Hanamaulu River basin.....	64
Hanamaulu River at Kapaia, near Lihue, Kauai.....	64
Wailua River basin.....	66
South Fork of Wailua River above Waiehu Falls, near Lihue, Kauai.....	66
Lihue ditch near Lihue, Kauai.....	68
Hanamaulu ditch at siphon near Lihue, Kauai.....	70
North Fork of Wailua River near Lihue, Kauai.....	71
Uhau Iole Stream at 750-foot elevation near Lihue, Kauai.....	73
East Branch of North Fork of Wailua River, near Lihue, Kauai.....	74
Keahua Stream at 750-foot elevation near Lihue, Kauai.....	75
Kawi Stream at 750-foot elevation near Lihue, Kauai.....	75
Kanaha ditch at intake, near Lihue, Kauai.....	76
Konohiki Stream basin.....	77
Konohiki Stream at Makakualele mauka weir, near Kapaa, Kauai.....	77
Konohiki Stream at Makakualele makai weir, near Kapaa, Kauai.....	78
Kaehulua Stream basin.....	79
North Fork of Kaehulua Stream at Kainahola weir, near Kapaa, Kauai.....	79
Kaehulua Stream at Kuhinoa weir, near Kapaa, Kauai.....	80
South Fork of Kaehulua Stream at Wainamuamu weir, near Kapaa, Kauai.....	81
Kapaa River basin.....	82
Kapaa River at Kapahi, near Kapaa, Kauai.....	82
Akulikuli Spring at weir near Kapaa, Kauai.....	84
Kapahi ditch at Kapahi, near Kapaa, Kauai.....	85
Kaneha ditch, at weir near Kealia, Kauai.....	86
Anahola River basin.....	87
Anahola River at 1,140-foot elevation near Kealia, Kauai.....	87
Anahola River above dam at Kiokala, near Kealia, Kauai.....	88
Anahola ditch at Kiokala, near Kealia, Kauai.....	89
Kalihiwai River basin.....	90
Kalihiwai River near Kilauea, Kauai.....	90
Hanalei River basin.....	91
Hanalei River near Hanalei, Kauai.....	91
China ditch near Hanalei, Kauai.....	92
Kuna ditch near Hanalei, Kauai.....	93
Lumahai River basin.....	95
Lumahai River near Wainiha, Kauai.....	95
Wainiha River basin.....	95
Wainiha River near Wainiha, Kauai.....	95
Wainiha canal at intake, near Wainiha, Kauai.....	97
Miscellaneous measurements on Kauai in 1912.....	98
Pumped water on Kauai.....	99
Ditch seepage and losses on Kauai.....	99
Island of Oahu.....	100
Palolo Stream basin.....	100
Waiomao Stream at 900-foot elevation near Honolulu, Oahu.....	100
Waiomao Stream above Pukele Stream, near Honolulu, Oahu....	102
Pukele Stream at Mahoe Springs, near Honolulu, Oahu.....	104



## Station records—Continued.

## Island of Oahu—Continued.

	Page.
Manoa Stream basin.....	106
Manoa Stream at upper end of valley near Honolulu, Oahu.....	106
Manoa Stream at College of Hawaii near Honolulu, Oahu.....	108
Manoa Stream at Waialae road, near Honolulu, Oahu.....	108
Pauoa Stream below Kahuawai Spring near Honolulu, Oahu.....	109
Kahuawai Spring near Honolulu, Oahu.....	110
Nuuanu Stream basin.....	111
Nuuanu Stream at Kuakini Street, Honolulu, Oahu.....	111
Lulumaho ditch in Nuuanu Valley, near Honolulu, Oahu.....	113
Luakaha weir in Nuuanu Valley, near Honolulu, Oahu.....	115
Waikane Stream basin.....	116
Waikane Stream near Waikane, Oahu.....	116
Waiahole Stream basin.....	117
Waiahole Stream at Manianaiaula, near Waikane, Oahu.....	117
Waiahole Stream at Waiahole, near Waikane, Oahu.....	119
Kahanaiki Stream near Waimanalo, Oahu.....	121
Kailua Stream near Waimanalo, Oahu.....	122
Pohakea Stream near Waimanalo, Oahu.....	122
Kamakalepo Stream near Waimanalo, Oahu.....	123
Kaimi Stream near Waimanalo, Oahu.....	124
Makawao Stream near Waimanalo, Oahu.....	124
Makawao ditch near Waimanalo, Oahu.....	125
Wong Leong ditch near Waimanalo, Oahu.....	125
Waimanalo ditch below reservoir near Waimanalo, Oahu.....	126
Pump ditch near Waimanalo, Oahu.....	127
Miscellaneous measurements on Oahu in 1912.....	128
Artesian wells.....	128

## Island of Maui.....

West Maui.....	129
Kahakuloa Stream basin.....	129
Kahakuloa Stream at Kahakuloa, near Waihee, Maui.....	129
Waihee Stream basin.....	130
Waihee Stream at dam near Waihee, Maui.....	130
Waihee canal near Waihee, Maui.....	132
Waihee canal at weir near Wailuku, Maui.....	133
Spreckels ditch near Waihee, Maui.....	134
Waiehu Stream basin.....	135
North Waiehu Stream near Wailuku, Maui.....	135
South Waiehu Stream near Wailuku, Maui.....	136
Iao Stream basin.....	137
Iao Stream near Wailuku, Maui.....	137
Maniania ditch near Wailuku, Maui.....	139
Waikapu Stream basin.....	141
Waikapu Stream near Waikapu, Maui.....	141
South Side Waikapu ditch near Waikapu, Maui.....	142
Palolo (Everett) ditch near Waikapu, Maui.....	144
Ukumehame Stream basin.....	146
Ukumehame Stream near Olowalu, Maui.....	146
Olowalu Stream basin.....	147
Olowalu ditch No. 1, near Olowalu, Maui.....	147
Launiupoko Stream basin.....	149
Launiupoko Stream near Lahaina, Maui.....	149

## Station records—Continued.

## Island of Maui—Continued.

## West Maui—Continued.

	Page.
Kauaula Stream basin.....	151
Kauaula Stream near Lahaina, Maui.....	151
Kauaula ditch near Lahaina, Maui.....	152
Lahainaluna Stream basin.....	154
Lahainaluna Stream near Lahaina, Maui.....	154
Kahoma Stream basin.....	155
Kahoma Stream near Lahaina, Maui.....	155
Kahoma ditch at weir near Lahaina, Maui.....	156
Honokawai Stream basin.....	157
Honokawai ditch near Lahaina, Maui.....	157
Honolua Stream basin.....	158
Honolua ditch near Honokahau, Maui.....	158
Honokahau Stream basin.....	159
Honokahau ditch at intake, near Honokahau, Maui.....	159
Honokahau ditch at Honokawai weir, near Honokahau, Maui..	160
Miscellaneous measurements.....	162

## East Maui—

Koolau ditch region.....	162
Koolau ditch near Keanae, Maui.....	162
Spreckels ditch region.....	164
Haipuaena Stream near Huelo, Maui.....	164
Puohakamoa Stream near Huelo, Maui.....	166
Alo Stream near Huelo, Maui.....	168
Waikamoi Stream near Huelo, Maui.....	169
Oopuola Stream near Huelo, Maui.....	171
Spreckels ditch at station No. 1, near Huelo, Maui.....	172
Spreckels ditch at station No. 2, near Huelo, Maui.....	174
Spreckels ditch at station No. 3, near Huelo, Maui.....	176
Spreckels ditch at station No. 4, near Huelo, Maui.....	178
Spreckels ditch at station No. 5, near Huelo, Maui.....	179
Spreckels ditch at station No. 6, near Huelo, Maui.....	181
Spreckels ditch at station No. 7, near Huelo, Maui.....	183
Spreckels ditch at station No. 8, near Huelo, Maui.....	185
Center ditch region.....	186
Center ditch near Huelo, Maui.....	186
Hamakua ditch region.....	188
Nailililihaele Stream near Huelo, Maui.....	188
Kailua Stream near Huelo, Maui.....	189
Hoolawaliilii Stream near Huelo, Maui.....	190
Hoolawanui Stream near Huelo, Maui.....	191
Honopou Stream near Huelo, Maui.....	193
Halehaku Stream weir near Huelo, Maui.....	194
Opana Stream near Huelo, Maui.....	196
Opana ditch near Huelo, Maui.....	196
New Hamakua ditch at Nailililihaele weir, near Huelo, Maui.	198
New Hamakua ditch at Halehaku weir, near Huelo, Maui....	199
New Hamakua ditch at station No. 1, near Huelo, Maui.....	200
New Hamakua ditch at station No. 2, near Huelo, Maui.....	200
New Hamakua ditch at station No. 3, near Huelo, Maui.....	201
New Hamakua ditch at station No. 4, near Huelo, Maui.....	202
New Hamakua ditch at station No. 5, near Huelo, Maui.....	203

Station records—Continued.

Island of Maui—Continued.

East Maui—Continued.

Hamakua ditch region—Continued.

Page.

Old Hamakua ditch at Opana weir, near Huelo, Maui ..... 204

Kaluanui ditch at Puuomalei, near Hamakuapoko, Maui ..... 205

Lowrie ditch at Opana weir, near Huelo, Maui ..... 207

Haiku ditch at Peahi weir, near Huelo, Maui ..... 208

Miscellaneous measurements ..... 209

Pumped water on Maui ..... 209

Island of Hawaii ..... 212

Hilo group of streams ..... 212

Wailuku River near Hilo, Hawaii ..... 212

Honolii River at Kaiwiki, near Hilo, Hawaii ..... 213

Kawainui River at Pepeekeo, near Hilo, Hawaii ..... 215

Stations Nos. 1, 2, 3, and 4, at Piihonua, near Hilo, Hawaii ..... 216

Stations at 2,700-foot level in the forest back of Hilo, Hawaii ..... 219

Station records ..... 219

Hamakua group of streams ..... 367

Kawainui River near Waipio, Hawaii ..... 367

Waipio River below Koiawe, near Waipio, Hawaii ..... 368

Waipio River below Waima Stream, near Waipio, Hawaii ..... 369

New Hamakua ditch at Waima Stream, near Waipio, Hawaii ..... 369

New Hamakua ditch at main weir, near Kukuihaele, Hawaii ..... 370

Kohala group of streams ..... 371

Kohala ditch near Kohala, Hawaii ..... 371

Miscellaneous measurements ..... 381

Rain gaging ..... 381

Index ..... 387



# WATER RESOURCES OF HAWAII, 1912.

---

By C. H. PIERCE and G. K. LARRISON.

---

## AUTHORITY FOR INVESTIGATIONS.

This volume contains results of measurements of the flow of certain streams and ditches in the Territory of Hawaii made during the calendar year 1912. The investigations leading to the report were made by the United States Geological Survey in cooperation with the Territory of Hawaii, under the general sanction of the organic law of the Survey (Stat. L., vol. 20, p. 394), which contains the following paragraph:

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

As water is the most abundant and most valuable of the minerals, the investigation of water resources is authorized under the provision for examining mineral resources. The work has been supported since the fiscal year ending June 30, 1895, by appropriations in successive sundry civil bills passed by Congress under the following item:

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

The legislature of the Territory of Hawaii approved on March 22, 1909, "An act to promote the conservation and development of the natural resources of the Territory," which provided in substance as follows: A special tax of 2 per cent shall be levied, assessed, and collected annually on all incomes in excess of \$4,000; and all amounts so collected shall constitute a special fund to be expended only for the encouragement of immigration and the conservation of natural resources in the proportion of three-fourths for immigration and one-fourth for conservation. The conservation fund shall be used for the development, conservation, improvement, and utilization of the natural resources and shall be available for expenditure at such times and in such manner as a board of three persons appointed in accordance with section 80 of the organic act shall, with the approval of the governor, determine.

An act of April 26, 1911, amended the original act so as to extend it until December 31, 1913.

### COOPERATION.

Under the authority conferred by the Federal and Territorial legislation, the Director of the United States Geological Survey and the Governor of the Territory of Hawaii entered into a cooperative agreement, dating from July 1, 1910, for "the gaging of streams and the determination of the water supply of the Territory of Hawaii."<sup>1</sup>

The principal features of this agreement are:

1. The United States Geological Survey assumes the responsibility of gathering, analyzing, and publishing the data.

2. During the progress of the work all notes, maps, and data gathered as a result of field studies are at all times open to inspection by the representative of the Territory, and if they are not entirely satisfactory the agreement can be terminated.

3. Accounts for payment of salaries, travel and subsistence, supplies, or other expenses necessary to the completion of the work shall be rendered in the manner required by the laws and regulations of the contracting parties, and vouchers shall be preferred to either party for payment according as it may be convenient or according to the balance remaining in the respective allotments.

4. The cost of publication is borne entirely by the Geological Survey.

The Territory of Hawaii has been represented in the cooperation by the board of allotment appointed by Gov. Walter F. Frear, and consists of J. P. Cooke (chairman), Marston Campbell, and E. V. Wilcox.

### SCOPE OF WORK.

The investigations of stream flow in the Territory are not complete, nor do they include all the streams that might advantageously be studied. They include, however, as many of the streams and ditches on the four larger islands as the available appropriations would allow. It is essential that records of stream flow should be kept during a period of years long enough to determine within reasonable limits the range of flow from the maximum to the minimum. The length of such a period manifestly varies for different streams. Experience has shown that the records should be kept from 5 to 20 years.

In the performance of this work an effort is made to reach the highest degree of precision possible with a rational expenditure of time and money. In all engineering work there is a point beyond which refinement is needless and wasteful, and this statement applies with especial force to stream-measurement work in Hawaii. It has been found, however, that it is possible to obtain data which are sufficiently accurate, although many of them presented in this report are for periods too short to admit of definite conclusions.

<sup>1</sup> The United States Geological Survey is also cooperating with the Territory of Hawaii in mapping the several islands. The whole of the island of Kauai and a part of the island of Hawaii have been mapped.

Records have been obtained at about 200 different points in the Territory, and in addition to the observations at the regular stations, miscellaneous measurements at many other places have been made. Records have also been collected regarding precipitation on areas drained by the principal streams and at a number of points in the mountains at high elevations. Evaporation losses have been studied and data obtained at various places where such losses are serious.

## **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 point in the stream remain the same there will be the same discharge for any given gage height.

The determination of a discharge is termed a discharge measurement and 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 divided into two classes, known 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 the 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.**

Unquestionably 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 and the end contractions are complete and the velocity of approach is wanting, or negligibly small, and if the head on crest is measured at a distance of 6 or 8 feet back of the

overfall, the Francis formula will give good results. On the other hand, if these essential conditions are not complied with, especially if the velocity of approach is considerable, and the contractions are imperfect, the Francis formula will not give accurate results. This is particularly true if the weir is improperly constructed and there is leakage around and under it, as is so frequently the case in practice.

Observations made on various types of weirs in Hawaii show that of the weirs in use in the Territory not all are giving accurate results. If the error is known so that corrections can be made the trouble is largely mitigated, but faulty weir records are too often accepted without investigation as to their accuracy.

#### VELOCITY-AREA METHOD.

The velocity-area method of measurement consists of determining the mean or average velocity of the water past a given cross-section area. The area of the cross section at right angles to the direction of flow is determined by soundings which are taken at such distances apart as will develop 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 to advantage; on large streams, which must be measured from bridges or cables, a lead weight and sounding line must be used. The weights are of different sizes— $6\frac{1}{2}$ , 10, or 15 pounds—according to the swiftness of the current, and are torpedo shaped, so as to offer as little resistance as possible to the moving water.

On streams with beds which are permanent or nearly so, like the South Fork of Wailua River on the island of Kauai and the Wailuku River on the island of Hawaii, 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, where 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 subsurface floats. This method is applicable, however, only to channels of uniform cross-section area



over a considerable distance and is very unsatisfactory for use on natural streams like those of Hawaii.<sup>1</sup>

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 new type of 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. 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 feet per second of moving water for any number of revolutions in a given time interval. The ratio of revolutions per second to velocity of flow in feet per second is very nearly a constant for all speeds and is approximately 0.45.

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

The two principle 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 is developed. This curve shows graphically the magnitude and changes in velocity from the surface to the bottom of the stream. The mean velocity in the vertical is then obtained by dividing the area bounded by this velocity curve and its axis by the depth. 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 the mean velocity very closely for open-water conditions and that in a completed measurement it seldom varies as much as 1 per cent

<sup>1</sup> Further information regarding the float method is given in Water-Supply Paper 95 and in textbooks on stream flow.

from the value given by the vertical velocity-curve method. It is very extensively used in the regular practice of the United States Geological Survey.

The single-point method consists in holding the meter either at the depth of the thread of mean velocity or at an arbitrary depth for which the coefficient for reducing to mean velocity has been determined 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 cases is, however, greater than in the 0.2 and 0.8 method and the general results are not as satisfactory.

In the other principal single-point method the meter is held near the surface, usually 1 foot below, or low enough to be out of the effect of the wind or other disturbing influences. This is known as the subsurface method. The coefficient for reducing the velocity taken at the subsurface to the mean has been found to be 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 a 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 exist in Hawaii, the meter should be held at 0.6 depth for depths of 0.8 or less. For greater depths 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 section 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.<sup>1</sup>

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 Hawaii.

Three kinds of velocity-area gaging stations are in general use in Hawaii, according to the means provided for making the observations of depth and velocity. They are wading, 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 in flow. Frequently, however, measurements are made at low stages by wading, even though other means exist for making measurements at higher stages.

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. Special 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 Hanapepe, Wailua, and Hanalei rivers on the island of Kauai, and Wailuku River on the island of Hawaii. The cable supports the car from which a man works above the water. Distances are marked off on the cable itself or on a small auxiliary cable stretched taut above it.

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 feet 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 then engaged to record the heights of water, morning and evening; the mean of the two readings being used as the mean gage height for the day.

---

<sup>1</sup> For a discussion of methods of computing the discharge of a stream see Engineering News, June 25, 1938.

Owing to the rapid rise and fall of most of the streams in Hawaii, 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, the use of automatic recording gages has been found to be generally necessary. The gages used are of various types, some requiring weekly visits and others operating for a month without attention.

The essential features of automatic gages consist of a float free to rise and fall with fluctuations of the water surface, a means of transferring this motion of the float to the record, either directly or through a reducing mechanism, the recording device, and the clock. In most gages used on natural streams the float is connected with a counterweight by means of a chain or perforated tape which passes over a sprocket wheel connected with gearing in such a way as to reduce the motion caused by the rise and fall of the water surface to a convenient scale. This vertical motion from the float may be transferred either to the pencil or other recording device or to the cylinder carrying the paper. The time interval is given by the clock, which may move either the paper or the pencil, according to the float connection. For all autographic records the motions controlled by the float and the clock are brought at right angles so that there results a continuous curve where one set of ordinates represents gage heights, and the other the time interval.

The gage may be designed to accommodate any range of stage. Those used by the United States Geological Survey in Hawaii are designed for variations of 5, 10, 20, 30, and 36 feet, but so far those having a 20-foot range have been found to be sufficient for any stage.

#### DEFINITION OF TERMS.

The volume of water flowing in a stream—the “run-off” or “discharge”—is expressed in various terms, each of which has become associated more or less definitely with a certain class of work. These terms may be divided into two groups: (1) Those which represent a rate of flow, as “second-foot,” “gallons per minute,” “gallons per 24 hours,” “miner’s inches,” and “run-off in second-foot per square mile,” and (2) those which represent the actual quantity of water, as “run-off in depth in inches,” “million gallons,” and “acre-feet.” They may be defined as follows:

“Second-foot” is an abbreviation for cubic foot per second and is the unit for the rate of discharge of water flowing in a stream 1 square foot in cross section at a rate of 1 foot per second. It is generally adopted as the fundamental unit in the measurement of flowing water and is the “natural” unit, as the foot and the second are the units

used in making the physical determinations. Other units may be computed from this by the use of factors given in the table of equivalents.

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

The "miner's inch" is the unit for the rate of discharge of water that passes through an orifice 1 inch square under a head which varies locally. It is commonly used by miners and irrigators throughout the West, and is defined by statute in each State in which it is used.

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off in inches" is the depth to which the drainage area would be covered if all the water flowing from it in a given period were conserved and uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in inches.

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

In the Territory of Hawaii a unit commonly used in connection with the measurement of water is the "million gallons." This is used with two meanings—(1) to indicate a rate of flow and (2) to express an actual quantity of water. In the former sense "million gallons per 24 hours" is inferred, 1,000,000 gallons being taken as the unit of quantity, and 24 hours as the unit of time. With this meaning the term is generally used in connection with pumping and irrigation. In the latter sense "million gallons" as an absolute quantity is used in the measurement of storage capacities of reservoirs.

The following convenient approximate relations exist between second-feet, million gallons per 24 hours, and acre-feet: 1 second-foot flowing 24 hours equals about 2 acre-feet; 1,000,000 gallons equals about 3 acre-feet; and 1 second-foot equals approximately two-thirds million gallons per 24 hours.

"Man's water" is an irrigator's term also in common use in Hawaii. It signifies the amount of water that one irrigator can properly handle in the field. It varies greatly, being dependent upon the condition of the furrows, the age of the crop, and the skill and individuality of the irrigator. Some measurements indicate that it is about 0.75 second-foot. It may be almost any quantity under 1 second-foot.

## CONVENIENT EQUIVALENTS.

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

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

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

NOTE.—For partial month multiply values for one day by the number of days.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,272 gallons for one day.

1 second-foot for one year covers 1 square mile 1.131 feet or 13.572 inches deep.

1 second-foot for one year equals 31,536,000 cubic feet.

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

1 second-foot for one day covers 1 square mile 0.03719 inch deep.

1 second-foot for one day equals 1.983 acre-feet.

1,000,000 United States gallons per day equals 1.55 second-foot.

1,000,000 United States gallons equals 3.07 acre-feet.

1,000,000 cubic feet equals 22.95 acre-feet.

1 acre-foot equals 325,850 gallons.

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

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

1 foot equals 0.3048 meter.

1 mile equals 1.60935 kilometers.

1 mile equals 5,280 feet.

1 acre equals 0.4047 hectare.

1 acre equals 43,560 square feet.

1 acre equals 209 feet square, nearly.

1 square mile equals 2.59 square kilometers.

1 cubic foot equals 0.0283 cubic meter.

1 cubic foot equals 7.48 gallons.

1 cubic foot of water weighs 62.5 pounds.

1 cubic meter per minute equals 0.5886 second-foot.

1 horsepower equals 550 foot-pounds per second.

1 horsepower equals 76.0 kilogram-meters per second.

1 horsepower equals 746 watts.

1 horsepower equals 1 second-foot falling 8.80 feet.

1½ horsepower equals about 1 kilowatt.

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

## OFFICE METHODS OF COMPUTING AND STUDYING DISCHARGE AND RUN-OFF.

At the end of each year the field or base data for current-meter gaging stations, consisting of daily gage heights, discharge measurements, and notes from observers' books are assembled. The measurements are plotted on cross-section paper and rating curves are drawn wherever feasible. The rating tables prepared from these curves are then applied to the tables of daily gage heights to obtain the daily discharge, and from these applications the tables of monthly discharge and run-off are computed.

Rating curves are drawn and studied with special reference to the class of channels which they represent. The discharge measurements for all classes of stations, when plotted with gage heights in feet as ordinates and discharges in second-feet as abscissas, define rating curves which are generally more or less parabolic in form. For many stations curves of area in square feet and mean velocity in feet per second are also constructed to the same scale of ordinates as the discharge curve. These are used mainly to extend the discharge curves beyond the limits of the plotted discharge measurements, to check the form of the discharge curve, and to determine and eliminate erroneous measurements.

For every rating table the following assumptions are made for the period of application of the table: (a) That the discharge is a function of and increases gradually with the stage; (b) that the discharge is the same whenever the stream is at a given stage, and hence such changes in conditions of flow as may have occurred during the period of application are either compensating or negligible, except that the rating, as stated in the footnote of each table, is not applicable for periods during which the channel was obstructed; (c) that the increased and decreased discharge due to change of slope on rising and falling stages is either negligible or compensating.

As already stated, the gaging stations may be divided into several classes, as indicated in the following paragraphs:

The stations of class 1 represent the most favorable conditions for an accurate rating and are also the most economical to maintain. The bed of the stream is usually composed of rock and is not subject to the deposit of sediment and loose material. This class includes also many stations located in a pool below which is a permanent rocky riffle that controls the flow like a weir. Provided the control is sufficiently high and close to the gage to prevent cut and fill at the gaging point from materially affecting the slope of the water surface, the gage height will for all practical purposes be a true index of the discharge. Discharge measurements made at such stations usually

plot within 2 or 3 per cent of the mean discharge curve, and the rating developed from that curve represents a very high degree of accuracy.

Class 2 comprises mainly stations on rough, mountainous streams with steep slopes. The beds of such streams are, as a rule, comparatively permanent during low and medium stages, and when the flow is sufficiently well defined by an adequate number of discharge measurements before and after each flood the stations of this class give nearly as good results as those of class 1. As it is seldom possible to make measurements covering the time of change at flood stage, the assumption is often made that the curves before and after the flood converged to a common point at the highest gage height recorded during the flood. Hence the only uncertain period occurs during the few days of highest gage heights covering the period of actual change in conditions of flow.

Class 3 includes those stations where the stream bed is of a shifting character, or the controlling section below the gage frequently changes owing to cutting out by the current and the filling in of sand, gravel, and drift. In some cases in Hawaii changes are caused by the growth of vegetation in the stream bed. No absolute rule can be laid down for stations of this class. Each rating curve must be constructed mainly on the basis of the measurements of the current year, the engineer being guided largely by the history of the station and the following general law: If all measurements ever made at a station of this class are plotted on cross-section paper, they will define a mean curve which may be called a standard curve. It has been found in practice that if after a change caused by high stage a relatively constant condition of flow occurs at medium and low stages, all measurements made after the change will plot on a smooth curve which is practically parallel to the standard curve with respect to ordinates or gage heights. This law of the parallelism of rating curves is the fundamental basis of all ratings and estimates at stations with semipermanent and shifting channels. It is not absolutely correct, but, with few exceptions, answers all the practical requirements of estimates made at low and medium stages after a change at a high stage. This law appears to hold equally true whether the change occurs at the measuring section or at some controlling point below. The change is, of course, fundamentally due to change in the channel caused by cut or fill, or both, at or near the measuring section. For all except small streams the changes in section usually occur at the bottom. The following simple but typical examples illustrate this law:

(a) If 0.5 foot of planking were to be nailed on the bottom of a well-rated wooden flume of rectangular section, there would result, other conditions of flow being equal, new curves of discharge, area, and



velocity, each plotting 0.5 foot above the original curves when referred to the original gage. In other words, this condition would be analogous to a uniform fill or cut in a river channel which either reduces or increases all three values of discharge, area, and velocity for any gage height. In practice, however, such ideal conditions rarely exist.

(b) In the case of a cut or fill at the measuring section, there is a marked tendency toward decrease or increase, respectively, of the velocity. In other words, the velocity has a compensating effect, and if the compensation is exact at all stages the discharge at a given stage will be the same under both the new and the old conditions.

(c) In the case of uniform change along the crest of a weir or rocky control, the area curve will remain the same as before the change, and it can be shown that here again the change in velocity curve is such that it will produce a new discharge curve essentially parallel to the original discharge curve with respect to their ordinates.

Of course, in actual practice such simple changes of section do not occur. The changes are complicated and lack uniformity, a cut at one place being largely offset by a fill at another, and vice versa. If these changes are very radical and involve large percentages of the total area—as, for example, on small streams—there may result a wide departure from the law of parallelism of rating curves. In complicated changes of section the corresponding changes in velocity which tend to produce a new parallel discharge curve may interfere with each other materially, causing eddies, boils, backwater, and radical changes in slope. In such extreme conditions, however, the measuring section would more properly fall under class 4 and would require very frequent measurements of discharge. Special stress is laid on the fact that in the lack of other data to the contrary the utilization of this law will yield the most probable results.

Slight changes at low or medium stages of an oscillating character are usually averaged by a mean curve drawn among them parallel to the standard curve, and if the individual measurements do not vary more than 5 per cent from the rating curve the results are considered good for stations of this class.

Class 4 comprises stations on streams that have soft, muddy, or sandy beds. Good results can be obtained from such sections only by frequent discharge measurements, the frequency ranging from a measurement every two or three weeks to a measurement every day, according to the rate of diurnal change in conditions of flow. These measurements are plotted and a mean or standard curve drawn among them. It is assumed that there is a different rating curve for every day of the year and that this rating is parallel to the standard curve with respect to their ordinates. On the day of a measurement the rating curve for that day passes through that measurement.

For days between successive measurements it is assumed that the rate of change is uniform, and hence the ratings for the intervening days are equally spaced between the ratings passing through the two measurements. This method must be modified or abandoned altogether under special conditions. Personal judgment and a knowledge of the conditions involved can alone dictate the course to pursue in such cases.

The computations have as a rule been carried to three significant figures. Computation machines and the 20-inch slide rule have been generally used. All computations are carefully checked.

After the computations have been completed they are entered in tables and carefully studied and intercompared to eliminate or account for all gross errors so far as possible. Missing periods are filled in, so far as feasible, by means of comparison with records for adjacent streams. The attempt is made to complete years or periods of discharge, thus eliminating fragmentary and disjointed records. Full notes accompanying such estimates follow the daily and monthly discharge tables.

#### EXPLANATION OF TABLES.

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

All rates of flow are expressed as second-feet, because distances and depths are measured in feet, and velocities in feet per second. The flow is thus obtained in cubic feet per second, or more briefly in "second-feet." The term "million gallons per 24 hours" is not used except in a few tables where data have been furnished in these units by private corporations. "Million gallons per 24 hours" is not a primary but a derived unit. To convert second-feet into million gallons per 24 hours multiply by 0.646.

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

The discharge-measurement table gives the results of the discharge measurements made during the year, including the date, name of hydrographer, gage height, and discharge in second-feet.

The table of daily gage height records the daily fluctuations of the surface of the river as found from the mean of the gage readings taken

each day. At most stations the gage is read in the morning and in the evening unless a continuous record is obtained by means of an automatic instrument. The gage height given in the table represents the elevation of the surface of the water above the zero of the gage. All gage heights affected by shifting conditions of flow or by backwater from obstructions are published as recorded, with suitable footnotes. The rating table is not applicable for such periods unless the proper corrections to the gage heights are known and applied. Attention is called to the fact that the zero of the gage is placed at an arbitrary datum and has no relation to zero flow or the bottom of the river. In general the zero is located somewhat below the lowest known flow, so that negative readings shall not occur.

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

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

First plot the discharge measurements on cross-section paper with gage height in feet as ordinates and discharge in second-feet as abscissas. Then tabulate a number of gage heights taken from the daily gage-height table for the complete range of stage given and the corresponding discharges for the days selected from the daily discharge table and plot the values on cross-section paper. The last points plotted will define the rating curve used and will lie among the plotted discharge measurements. After drawing the rating curve, a table can be prepared by scaling off the discharge in second-feet for each tenth foot of gage height. These values should be so adjusted that the first differences shall always be increasing or constant, except for known conditions of backwater.

The table of daily discharge gives the discharge in second-feet corresponding to the observed gage height as determined from the rating table, the number of significant figures used varying with the size of the discharge. For quantities below 0.5 second-foot the daily discharge is carried to hundredths; from 0.5 to 9.9 second-feet, to tenths only; from 10 to 99 second-feet all decimals are omitted, and above 100 second-feet only three significant figures are used.

In the table of monthly discharge the column headed "Maximum" gives the mean flow, as determined from the rating table, for the day when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height, and the corresponding discharge

was consequently larger than given in the maximum column. Likewise in the column of "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this the computations for the remaining columns, which are defined on page 17, are based.

### ACCURACY AND RELIABILITY OF FIELD DATA AND COMPARATIVE RESULTS.

Practically all discharge measurements made under fair conditions are well within 5 per cent of the true discharge at the time of observation. Inasmuch as the errors of meter measurements are largely compensating, the mean rating curve, when well defined, is much more accurate than the individual measurements. Numerous tests and experiments have been made to test the accuracy of current-meter work. These show that it compares very favorably with the results from standard weirs, and, owing to simplicity of methods, usually gives results that are much more reliable than those from the ordinary weir used under conditions widely different from those under which the weir formula was derived.

The work is, of course, dependent on the reliability of the observers. With relatively few exceptions, the observers perform their work honestly. Care is taken, however, to watch them closely and to inquire into any discrepancies. It is, of course, obvious that one gage reading a day does not always give the mean height for that day. As an almost invariable rule, however, errors from this source are compensating and virtually negligible in a period of one month, although a single day's reading may, when taken by itself, be considerably in error.

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

### DIVISION OF WORK.

On account of the isolation of the different islands of the Territory an engineer or employee was assigned to take charge of the field work on each one of the four larger islands with temporary headquarters on that island.

*Persons in charge of field work.*

Island.	In charge.	Temporary headquarters.
Oahu.....	W. F. Martin, district engineer (Jan. 1 to Mar. 27).... C. H. Pierce, acting district engineer (Mar. 28 to Aug. 13). G. K. Larrison, district engineer (Aug. 14 to Dec. 31).	Honolulu (permanent).
Kauai.....	W. V. Hardy, field assistant.....	Waimea.
Maua.....	J. B. Stewart, clerk acting field assistant (Jan. 1 to Nov. 30). C. T. Bailey, assistant engineer (Dec. 1-31).....	Wailuku.
Hawaii.....	C. H. Pierce, assistant engineer (Jan. 1 to Mar. 27).... E. O. Christiansen, assistant engineer (July 10 to Dec. 31).	Hilo.

Office Engineer J. C. Dort, junior engineer, at Honolulu, October 29 to December 31, assisted on Oahu field work.

Ratings, applications, computations, etc., were made by G. K. Larrison, J. C. Dort, E. O. Christiansen, C. T. Bailey, W. V. Hardy, E. E. Goo, G. R. White, S. W. Dort, R. M. S. Goo, H. L. Book, H. H. Kennedy, H. M. Kennedy, and E. J. Howard. The report was edited by Mrs. B. D. Wood.

**GAGING STATIONS MAINTAINED IN HAWAII.**

The following list comprises the gaging stations maintained in Hawaii by the United States Geological Survey and cooperative parties. The stations are arranged by stream basins and appear in systematic order for the several islands, tributaries of main streams being indicated by indention. The date refers to the years or parts of years for which records are available. A dash following the date indicates that the station was being maintained December 31, 1912.

**KAUAI ISLAND.**

Waimea River near Waimea, 1910-

Poomau River:

Kawaikoi Stream near Waimea, 1909-

Waiakoali Stream near Waimea, 1909-

Mohihi Stream near Waimea, 1909-

Waialae Stream near Waimea, 1910-

Kekaha ditch at camp No. 1, near Waimea, 1910-

Kekaha ditch at flume No. 2, near Waimea, 1910-

Kekaha ditch at siphon, near Waimea, 1910-

Kekaha ditch at tunnel No. 12 weir, near Waimea, 1910-

Waimea ditch near Waimea, 1911-

Kamenehune ditch near Waimea, 1911-

Makaweli River near Waimea, 1911-

Mokuone River:

Halekua Stream near Waimea, 1912-

Olokele River:

Olokele ditch at tunnel No. 12, near Makaweli, 1910-

Olokele ditch near Waimea, 1912-

Poowaiomahaihai ditch near Waimea, 1911-

- Hanapepe River at Hanapepe Falls, near Eleele, 1911-  
 Hanapepe River at Kaula, near Eleele, 1910-  
   Hanapepe ditch at Hanapepe Falls, near Eleele, 1911-  
   Hanapepe ditch at Koula, near Eleele, 1910-  
   Hanapepe ditch at weir, near Hanapepe, 1910-  
   East Branch of Hanapepe River at Hanapepe Falls, near Eleele, 1911-  
     Hiloa ditch at Hanapepe Falls, near Eleele, 1911-  
 Huleia River, near Lihue, 1912-  
 Hanamaula River at Kapaia near Lihue, 1911-  
 Wailua River:  
   South Fork of Wailua River at siphon, near Lihue, 1910-11.  
   South Fork of Wailua River above Waiehu Falls, near Lihue, 1911-  
     Lihue ditch near Lihue, 1910-  
     Hanamaulu ditch near Lihue, 1910-  
   North Fork of Wailua River near Lihue, 1910-  
     East Branch of North Fork of Wailua River near Lihue, 1912-  
     Uāhu Iole Stream at 750-foot elevation, near Lihue, 1912-  
     Keahua Stream at 750-foot elevation, near Lihue, 1912-  
     Kawi Stream at 750-foot elevation, near Lihue, 1912-  
     Kanaha ditch near Lihue, 1910-  
 Konohiki Stream at Makakualele (mauka) weir, near Kapaa, 1911-  
 Konohiki Stream at Makakualele (makai) weir, near Kapaa, 1912-  
 Kaehulua Stream at Kainahola (mule stable) weir, near Kapaa, 1911-  
   North Fork of Kaehulua Stream at Kuhinoa weir, near Kapaa, 1911-  
   South Fork of Kaehulua Stream at Wainamuamu weir, near Kapaa, 1911-  
 Kapaa River, at Kapahi, near Kapaa, 1910-  
   Akulikuli Springs near Kapaa, 1909-  
   Kapahi ditch at Kapahi, near Kapaa, 1909-  
     Tunnel ditch at Kapahi, near Kapaa, 1909-11.  
     Kapaa ditch at Kapahi, near Kapaa, 1909-11.  
     Pipe ditch at Kapahi, near Kapaa, 1909-11.  
 Kealia Stream:  
   Kaneha ditch at weir near Kealia, 1909-  
 Anahola River at 1,140-foot elevation, near Kealia, 1912-  
 Anahola River above dam at Kiokala, near Kealia, 1910-  
 Anahola River at Kiokala dam, near Kealia, 1910-11.  
   Anahola ditch at Kiokala, near Kealia, 1909-  
   Anahola ditch at makai weir, near Kealia, 1909-11.  
 Kalihiwai River near Kilauea, 1912-  
 Hanalei River near Hanalei, 1911-  
   China ditch near Hanalei, 1911-  
   Kuna ditch near Hanalei, 1912-  
 Lumahai River near Wainiha, 1912-  
 Wainiha River near Wainiha, 1911-  
   Wainiha canal at intake, near Wainiha, 1910-  
   Wainiha canal at tunnel No. 18, near Wainiha, 1911.  
   Wainiha canal at tailrace, near Wainiha, 1911.

## OAHU ISLAND.

## Palolo Stream:

- Waiomao Stream at 900-foot elevation, near Honolulu, 1911-  
 Waiomao Stream above Pukele Stream, near Honolulu, 1911-  
 Pukele Stream at Mahoe Springs, near Honolulu, 1912-  
 Manoa Stream at upper end of valley, near Honolulu, 1910-

Manoa Stream at College of Hawaii, near Honolulu, 1909-10; 1912-  
 Manoa Stream at Waialae Road, near Honolulu, 1910-12.  
 Pauoa Stream below Kahuawai Springs, near Honolulu, 1911-  
 Kahuawai Spring, near Honolulu, 1912-  
 Nuuanu Stream at Kuakini Street, Honolulu, 1911-12.  
     Lulumaho ditch in Nuuanu Valley, near Honolulu, 1911-  
     Luakaha weir in Nuuanu Valley, near Honolulu, 1910-  
 Kaukonahua Stream:  
     South Fork of Kaukonahua Stream, near Wahiawa, 1911.  
     North Fork of Kaukonahua Stream, near Wahiawa, 1911.  
     Wahiawa Reservoir ditch, near Wahiawa, 1910-11.  
 Kaipapau Stream, near Hauula, 1906-7.  
 Kaluanui Stream near Hauula, 1906-7.  
 Punaluu Stream, near Hauula, 1906-7.  
 Waikane Stream at lower Waikane Valley, near Waikane, 1912.  
 Waiahole Stream at Manianiaula, near Waikane, 1911-  
 Waiahole Stream at Waiahole, near Waikane, 1911-  
     Waihi Stream, near Waikane, 1911.  
     Halona Stream, near Waikane, 1911.  
     Waianu Stream, near Waikane, 1911.  
 Kahanaiki Stream near Waimanalo, 1912-  
 Kailua Stream near Waimanalo, 1912-  
 Pohakea Stream near Waimanalo, 1912-  
 Kamakalepo Stream near Waimanalo, 1912-  
 Kaimi Stream near Waimanalo, 1912-  
 Makawao Stream near Waimanalo, 1912-  
 Makawao ditch near Waimanalo, 1912-  
 Wong Leong ditch near Waimanalo, 1912-  
 Waimanalo ditch below reservoir, near Waimanalo, 1912-  
 Pump ditch near Waimanalo, 1912-

#### MAUI ISLAND.

##### West Maui.

Kahakuloa Stream at Kahakuloa, near Waihee, 1912-  
 Waihee Stream near Waihee, 1910-  
     Waihee canal near Waihee, 1910-  
     Waihee canal at weir near Wailuku, 1911-  
     Spreckels ditch near Waihee, 1910-  
     Spreckels ditch at Waiale weir, near Wailuku, 1910-11.  
 Waiehu Stream:  
     North Waiehu Stream near Wailuku, 1911-  
     North Waiehu ditch near Wailuku, 1910-11.  
     South Waiehu Stream near Wailuku, 1910-  
 Iao Stream near Wailuku, 1910-  
     Maniania ditch near Wailuku, 1910-  
 Waikapu Stream near Waikapu, 1910-  
     South Side Waikapu ditch near Waikapu, 1910-  
     Palolo (Everett) ditch near Waikapu, 1910-  
 Ukumehame Stream near Olowalu, 1911-  
 Olowalu Stream:  
     Olowalu ditch No. 1 near Olowalu, 1911-  
 Launiupoko Stream near Lahaina, 1911-

**Kauaula Stream near Lahaina, 1911-**

Kauaula ditch near Lahaina, 1911-

Kauaula weir No. 1 near Lahaina, 1901.

Kauaula weir No. 2 near Lahaina, 1901.

Kauaula weir No. 3 near Lahaina, 1901.

**Lahainaluna Stream near Lahaina, 1911-**

Lahainaluna weir No. 1 near Lahaina, 1901.

Lahainaluna weir No. 2 near Lahaina, 1901.

**Kahoma Stream near Lahaina, 1911-**

Kahoma Stream at weir No. 1, near Lahaina, 1901.

Kahoma Stream at weir No. 2, near Lahaina, 1901.

Kahoma ditch at weir near Lahaina, 1911-

**Honokawai Stream near Lahaina, 1911.**

Honokawai ditch near Lahaina, 1912-

Honokawai weir No. 1 near Lahaina, 1901.

**Honolua Stream near Honokahau, 1911.**

Honolua ditch near Honokahau, 1911-

**Honokahau Stream near Honokahau, 1911.**

Honokahau ditch at intake, near Honokahau, 1907-

Honokahau ditch above Honolua Stream, near Honokahau, 1910-11.

Honokahau ditch at Honokawai weir, near Lahaina, 1910-

**East Maui.****Koolau ditch region:**

Koolau ditch near Keanae, 1910-

Koolau ditch at Alo division weir, near Huelo, 1908-1911.

**Spreckels ditch region:**

Haipuaena Stream near Huelo, 1910-

Puohakamoa Stream near Huelo, 1910-

Alo Stream near Huelo, 1910-

Waikamoi Stream near Huelo, 1910-

Oopuola Stream near Huelo, 1910-

Spreckels ditch at station No. 1, near Huelo, 1910-

Spreckels ditch at station No. 2, near Huelo, 1911-

Spreckels ditch at station No. 3, near Huelo, 1910-

Spreckels ditch at station No. 4, near Huelo, 1910-

Spreckels ditch at station No. 5, near Huelo, 1911-

Spreckels ditch at station No. 6, near Huelo, 1911-

Spreckels ditch at station No. 7, near Huelo, 1911-

Spreckels ditch at station No. 8, near Huelo, 1911-

**Center ditch region:**

Center ditch near Huelo, 1910-

**Hamakua ditch region:**

Nailiilihaele Stream near Huelo, 1910-

Kailua Stream near Huelo, 1910-

Oanui Stream near Huelo, 1910-11.

Hoolawaliilii Stream near Huelo, 1910-

Hoolawanui Stream near Huelo, 1910-

Honopou Stream near Huelo, 1910-

Halehaku Stream at dam, near Huelo, 1910-11.

Halehaku Stream weir near Huelo, 1910-

Opana Stream near Huelo, 1910-

Opana ditch near Huelo, 1910-

New Hamakua ditch at Nailiilihaele weir, near Huelo, 1910-



**Hamakua ditch region—Continued.**

New Hamakua ditch at Halehaku weir, near Huelo, 1910—  
 New Hamakua ditch at station No. 1, near Huelo, 1912—  
 New Hamakua ditch at station No. 2, near Huelo, 1912—  
 New Hamakua ditch at station No. 3, near Huelo, 1912—  
 New Hamakua ditch at station No. 4, near Huelo, 1912—  
 New Hamakua ditch at station No. 5, near Huelo, 1912—  
 Old Hamakua ditch at Opana weir, near Huelo, 1910—  
 Kaluanui ditch at Puuomalei near Hamakuapoko, 1910—  
 Lowrie ditch at Opana weir, near Huelo, 1910—  
 Haiku ditch at Peahi weir, near Huelo, 1910—

**HAWAII ISLAND.****Hilo group:**

Wailuku River near Hilo, 1911—  
 Honolii River at Kaiwiki, near Hilo, 1911—  
 Honolii ditch at Kaiwiki, near Hilo, 1911.  
 Kawainui River at Kawainui, near Pepeekeo, 1911—  
 4 stations at Piihonua, near Hilo, 1912.  
 81 stations at 2,700 feet level, in forest back of Hilo, 1911—

**Hamakua group:**

Kawainui Branch of Waipio River, near Waipio, 1911—  
 Waipio River below Koiawe Stream, near Waipio, 1911—  
 Waipio River below Waima Stream, near Waipio, 1911—  
 Waipio River at 360 feet elevation, near Waipio, 1901-2.  
 New Hamakua ditch at Waima Stream, near Waipio, 1912—  
 New Hamakua ditch at main weir near Kukiuhale, 1911—  
 Kawainui Stream at 2,120 feet elevation, near Waipio, 1901-2.  
 Kawainui Stream at 1,435 feet elevation, near Waipio, 1901-2.  
 Kawainui Stream at 775 feet elevation, near Waipio, 1901-2.  
 Branch No. 3 of Kawainui Stream at 1,700 feet elevation, near Waipio, 1901-2.  
 Branch No. 2 of Kawainui Stream at 1,405 feet elevation, near Waipio, 1901-2.  
 Branch No. 1 of Kawainui Stream at 1,380 feet elevation, near Waipio, 1901-2.  
 Alakahi Stream at 1,200 feet elevation, near Waipio, 1901-2.  
 Alakahi Stream at 730 feet elevation, near Waipio, 1901-2.  
 Koiawe Stream at 1,120 feet elevation, near Waipio, 1901-2.  
 Koiawe Stream at 610 feet elevation, near Waipio, 1901-2.  
 Waima Stream at 790 feet elevation, near Waipio, 1901-2.  
 Waima Stream at 385 feet elevation, near Waipio, 1901-2.

**Kohala group:****Honokane Stream:**

East Branch of Honokane Stream at 1,300 feet elevation, near Honokane, 1901.  
 East Branch of Honokane Stream at 770 feet elevation, near Honokane, 1901.  
 West Branch of Honokane Stream at 1,370 feet elevation, near Honokane, 1901.  
 West Branch of Honokane Stream at 775 feet elevation, near Honokane, 1901.  
 Kohala ditch near Kohala, 1907—

**GEOGRAPHY OF THE HAWAIIAN ISLANDS.<sup>1</sup>**

The Hawaiian Islands are situated in the north Pacific Ocean due west of the central part of Mexico and about 2,100 miles southwest of San Francisco, from which Honolulu may be reached in about 6 days. Dutton<sup>2</sup> has described the group as consisting of 12 islands—

<sup>1</sup> Adapted from Dutton, C. E., Hawaiian volcanoes: U. S. Geol. Survey Fourth Ann. Rept., pp. 81-212, 1884.

<sup>2</sup> Op. cit., p. 81.

eight inhabited and four mere barren rocks—lying between meridians 154° 30' and 160° 30' west of Greenwich and between parallels 18° 40' and 22° 15' north; but northwest of this principal part of the group are a dozen smaller low islands and reefs which are shown on the charts and over which the Territorial government has authority. The westernmost of these, which are known as the Ocean Islands, lie about in longitude 178° 30' west—very nearly the antipodes of Greenwich—and 29° north. The archipelago, therefore, extends over nearly 25° of longitude, or about 1,800 miles,<sup>1</sup> its form being rudely crescentic and its general trend northwest-southeast. Hitchcock<sup>1</sup> gives the following list of the islands in order from west to east with areas and extreme altitudes.

*Islands of the Hawaiian Archipelago.*

**Low islands and reefs.<sup>2</sup>**

	Altitude (feet).
Ocean Islands.....	10
Midway Islands.....	57
Gambia Shoal.	
Pearl and Hermes reefs.	
Lisiansky Island.....	50
Laysan Island.....	25
Maro Reef.	
Dowsett's Reef.	

**The lowest of the high islands.**

Gardiner Island.....	170
French Frigate Shoal.....	120
Necker Island.....	300
Frost Shoal.	
Nihoa or Bird Island.....	903

**High inhabited islands, with area and highest point.**

Niihau (97 square miles).....	1, 300
Cinder cones adjoining, named Kaula and Lehua.	
Kauai (547 square miles; highest point, Waialeale).....	<sup>3</sup> 5, 170
Oahu (598 square miles; highest point, Kaala).....	4, 030
Molokai (261 square miles; highest point, Komokoa).....	4, 958
Lanai (139 square miles).....	3, 400
Maui (728 square miles; highest point, Haleakala).....	<sup>3</sup> 10, 350
Kahoolawe (69 square miles; highest point, Moaulu Hill).....	1, 472
Hawaii (4,015 square miles; highest point, Mauna Kea).....	13, 825

Of these, Hawaii, Maui, Oahu, Kauai, and Molokai are by far the most important in area and in number of inhabitants.

All these islands are volcanic. No rocks other than volcanic are found on any of them except a few remnants of raised sea beaches

<sup>1</sup> Hitchcock, C. H., *Hawaii and its volcanoes*, p. 1, Honolulu, 1909.

<sup>2</sup> May be swept by storm waves.

<sup>3</sup> Hitchcock's figures, 5,250 and 10,032, revised from more recent maps.

composed of consolidated coral sands. All the larger ones are very mountainous and lofty. The culminating points of the island of Hawaii are Mauna Kea, 13,825 feet, and Mauna Loa, 13,675 feet above sea level. The summit of Haleakala, on East Maui, is 10,350 feet, and the mountains of West Maui attain 5,900 feet. Oahu has a peak on the eastern side of the island 3,100 feet high, and another on the western side 4,030 feet high. The loftiest point of Kauai is about 5,170 feet above the sea. Deep-sea soundings in the vicinity have disclosed the fact that these volcanic piles are only the summits of gigantic mountain masses rising abruptly from the bottom of the Pacific, which for many hundreds of miles around them is only moderately diversified. The slopes of Mauna Loa east, west, and south descend beneath the surface of the ocean with a gradient fully equal to if not greater than the visible slope of its flanks. The submarine slopes of all the other islands in directions perpendicular to the principal axis of the group are equally great and possibly somewhat greater. The depths attained by these continuous slopes within 30 to 50 miles of the shores vary from 2,400 to 3,100 fathoms, or 14,000 to 19,000 feet. Mauna Loa and Mauna Kea, referred to their true bases at the bottom of the Pacific, are therefore mountains not far from 30,000 feet in height. In general the island group consists of the summits of a gigantic submarine mountain chain, projecting its loftier peaks and domes above the water.

On the island of Hawaii the volcanic forces are still in operation. On the eastern portion of Maui they have rested at a very recent epoch. In the other islands they have long been extinct, and the piles they built up have been greatly ravaged by erosion. On Hawaii the large volcano Hualalai, just west of Mauna Loa, gave forth three eruptions in the early part of the present century, but has been dormant since 1811. Mauna Kea gives evidence of having reposed for many centuries—or throughout a period that, historically considered, may have lasted some thousands of years; though, if we value time by the geologic scale, the date of its last activity would be regarded as very recent. Haleakala, on Maui, gives indications of considerably greater recency in its last eruptions than Mauna Kea, but the natives have no traditions of any outbreak from it, and we may infer that it has been quiet for several hundred years. With regard to the other volcanic centers, we have no means of judging the antiquity of their final action except the progress made by erosion in demolishing them, and this progress is, in every instance, considerable. It is most conspicuous on Kauai and Oahu, and almost equally so on Molokai and West Maui. From this it is inferred that the western islands of the group have longest enjoyed immunity from eruption. Kauai, especially, is frequently spoken of

as the oldest island of the group, and, judging from the amount of destruction wrought upon it by the eroding forces, the statement is in some measure apparently justified, but only to this extent, the period which has elapsed since the cessation of eruption has probably been longer there than in the other islands. It does not follow, however, that the eruptions began there any earlier than on Hawaii.

The one continuously active volcanic vent of the islands is Kilauea, far down on the eastern flank of Mauna Loa—"the great mountain." No other volcano in the world approaches Mauna Loa in the vastness of its mass or in the magnitude of its eruptive activity. There are many volcanic peaks higher in the air, but most of them are planted upon elevated platforms, where they appear as mere cones of greater or less size. We do not know at what level the base of Mauna Loa is situated. We only know that it is below sea level, and probably far below it. But on the other hand, it may not be so low as the adjoining depths of the Pacific.

Mauna Kea—"the white mountain"—is also a colossus among volcanoes. The summit of Mauna Kea is a trifle higher than that of Mauna Loa, but its slopes are steeper and its base is therefore much smaller. The magnitude of Mauna Loa is due chiefly to the great area of its base, which is nearly elliptical in shape, with a major diameter of 74 miles and a minor of 53 miles, measured at sea level.

In the aggregate of its eruptions Mauna Loa is also unrivalled. Some of the volcanoes of Iceland have been known to disgorge at a single outbreak masses of lava fully equal to them. But in that island such intravasations are infrequent, and a century has elapsed since any of such magnitude have been emitted, though several of minor extent have been outpoured. The eruptions of Mauna Loa are all of great volume, and occur irregularly, with an average interval of about eight years. Taking the total quantity of material disgorged during the past century, no other volcano is at all comparable to it.

Mauna Loa and Kilauea are in many important respects abnormal volcanoes. Most notable is the singularly quiet character of their eruptions. Rarely are these portentous events attended by any of that extremely explosive action which is characteristic of nearly all other volcanoes. Only once or twice within the historic period have they been accompanied by earthquakes or subterranean rumblings. The vast jets of steam blown miles high, hurling stones, cinders, and lapilli far and wide, filling the heavens with vapor and smoke, and hailing down ashes and fragments over the surrounding regions, have never been observed here. Some action of this sort is indeed represented, but only in a feeble way. The lava wells forth like water from a hot, bubbling spring, but so mild are the explosive forces that

the observer may stand to the windward of the grandest eruption, and so near the source that the heat will make the face tingle, yet without danger. Ordinarily the outbreak takes place without warning and without the knowledge of the inhabitants, who first become aware of it at nightfall, when the sky is aglow and the fiery fountains are seen playing. As the news spreads, hundreds of people flock to it to witness the sublime spectacle and display almost as much eagerness to approach the scene of an eruption as the people of other countries show to get away from one.

The great magnitude of the individual eruptions of Mauna Loa and Kilauea, and the absence of fragmental products, supply an explanation of their abnormally flat profiles. Fragmental ejecta pile up around the vents from which they are projected; but great streams of fluent lava run far away from their sources. The large pits or so-called craters which are sunken in the summits Kilauea and Mauna Loa, and the still more remarkable one on Haleakala, are not entirely unparalleled, though their analogues in other regions are very uncommon.

In all those portions of the islands where quiet has long prevailed the scenery has habitudes of extreme boldness and animation. Cliffs, crags, and canyons are carved in the mountains with as much sharpness and spirited detail as in the plateau country of North America. In West Maui and Kauai may be found walled valleys and amphitheaters which almost rival Yosemite. The windward fronts of Oahu and Molokai stand 3,000 to 4,000 feet high, and are carved in a manner which is rarely surpassed by the finest sculpture in the valley of the Colorado. On the weather sides of Hawaii and Maui the gentle slopes of the mountains terminate on the ocean in walls a few hundred feet high, and the platforms are gashed with canyon valleys that are marvels of beauty.

The climate of the islands presents considerations of very great interest. It is difficult to find anywhere any greater constancy of atmospheric conditions than those prevailing over the ocean within the heart of the trade-wind belt. The temperature varies but little from winter to summer, and the general drift of the atmosphere is rarely interfered with by storms and cyclones. And yet upon the islands themselves it may be said that there are almost as many climates as there are square leagues. And the differences of climatal condition exhibited by localities separated only half a dozen miles are extreme. As a general rule the windward sides are excessively rainy, the precipitation may exceed 400 inches in a year. The leeward sides are generally arid, but to this there are some striking exceptions, especially under the lee of Mauna Loa, where the rainfall is almost as great as on the weather side.

## STATION RECORDS.

## ISLAND OF KAUAI.

## WAIMEA RIVER BASIN.

## WAIMEA RIVER NEAR WAIMEA, KAUAI.

**Location.**—About 2 miles north of Waimea and 250 feet above ford.

**Records available.**—July 9, 1910, to December 31, 1912.

**Gage.**—Vertical and inclined staff read once daily; datum unchanged.

**Channel.**—Bottom covered with sand and bowlders; seems fairly permanent.

**Discharge measurements.**—Made from a wire suspension bridge.

**Accuracy.**—Records fair.

*Discharge measurements of Waimea River near Waimea, Kauai, in 1912.*

[Hydrographer, W. V. Hardy.]

Date.	Gage height.	Dis-charge.	Date	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 4.....	5.55	178	Dec. 1.....	6.05	350
July 13.....	3.77	5.45	Do.....	5.77	232
July 14.....	5.07	87.2	Dec. 2.....	7.60	1,320
Sept. 30.....	3.67	.78	Do.....	7.10	927
Nov. 30.....	4.80	53.7	Do.....	8.10	1,760
Dec. 1.....	6.25	441	Dec. 10.....	4.18	15.6

*Daily gage height, in feet, of Waimea River near Waimea, Kauai, for 1912.*

[T. Mokuahakea, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.03	3.90	6.01	5.30	3.64	3.80	3.70	3.80	4.00	3.80	4.00	6.10
2.....	4.34	3.90	6.08	5.07	3.75	3.70	3.70	3.80	5.30	3.80	3.97	7.73
3.....	4.01	4.01	6.52	4.81	3.80	3.65	3.70	3.69	4.20	3.80	3.90	7.60
4.....	3.85	4.75	5.25	4.01	3.80	3.70	3.70	3.60	3.90	3.79	3.83	5.50
5.....	3.82	4.01	4.24	6.03	4.00	3.70	3.70	3.60	3.80	3.75	3.81	4.90
6.....	3.80	3.93	5.70	6.00	3.80	3.65	3.70	3.69	7.40	3.81	3.80	4.80
7.....	3.91	3.70	6.10	6.20	3.80	3.62	3.70	3.69	4.90	3.80	3.80	4.50
8.....	3.89	3.70	4.00	6.00	3.75	3.60	3.70	3.71	4.00	3.70	3.70	4.40
9.....	3.90	3.70	5.80	7.50	3.72	3.65	3.75	4.10	3.96	3.67	6.30	4.30
10.....	3.90	3.90	6.50	7.00	3.70	3.65	5.35	4.00	3.93	3.60	4.20	4.18
11.....	3.90	3.81	6.10	6.98	3.70	3.60	4.01	4.00	3.85	3.60	3.80	4.00
12.....	3.85	3.80	6.00	5.70	3.70	3.60	3.89	3.90	3.81	3.60	3.80	3.95
13.....	3.80	3.80	4.90	5.50	3.70	3.70	3.85	5.50	3.72	3.80	3.70	3.85
14.....	4.08	3.80	5.00	4.91	3.70	3.69	6.40	6.20	3.70	3.89	3.70	3.80
15.....	3.88	3.82	4.50	4.13	5.70	3.67	4.30	6.04	3.70	3.90	3.98	3.75
16.....	3.85	3.89	4.30	5.90	4.20	3.60	3.90	4.40	3.75	4.40	4.00	3.70
17.....	3.80	3.90	4.10	7.00	3.90	3.60	3.90	3.90	3.68	4.37	3.99	3.70
18.....	3.81	3.80	4.00	5.00	3.84	3.60	3.89	3.90	3.65	4.30	3.93	3.79
19.....	3.80	3.80	3.90	4.30	3.75	3.60	3.80	3.90	3.60	5.21	3.90	3.85
20.....	3.80	3.81	4.50	4.15	3.73	3.65	3.80	3.90	3.60	5.02	3.81	4.10
21.....	3.80	4.80	4.30	4.00	3.70	3.68	3.90	3.70	3.70	4.00	3.80	6.90
22.....	3.89	6.03	4.10	3.80	3.70	3.72	3.88	3.80	3.70	6.00	3.71	4.70
23.....	3.81	4.90	4.00	3.80	3.80	3.65	3.80	3.80	3.70	5.80	3.70	4.87
24.....	5.30	5.80	3.90	3.80	4.30	3.63	3.75	4.30	3.70	3.90	3.70	4.90
25.....	4.00	4.22	7.30	3.80	5.40	3.90	3.70	3.70	3.70	4.81	3.70	5.00
26.....	3.80	4.01	4.50	3.95	3.80	3.81	3.70	3.65	3.70	7.00	3.70	4.30
27.....	3.90	5.09	4.08	3.90	3.75	3.80	3.60	5.80	3.70	5.60	3.70	4.10
28.....	3.80	3.91	3.90	3.80	7.50	3.71	3.69	4.80	3.70	3.95	3.70	3.99
29.....	3.80	6.20	3.85	3.75	5.30	3.90	3.67	3.90	3.81	3.90	3.70	3.90
30.....	3.93	.....	3.70	3.75	4.01	3.70	3.65	6.20	3.67	4.00	4.25	3.87
31.....	3.88	.....	5.50	.....	3.85	.....	4.10	5.60	.....	4.60	.....	3.85

*Daily discharge, in second-feet, of Waimea River near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	84	4.1	324	130	0.5	2.2	1.0	2.2	6.6	2.2	6.6	357
2.....	21	4.1	350	89	1.6	1.0	1.0	2.2	130	2.2	5.8	1,430
3.....	6.9	6.9	551	58	2.2	0.6	1.0	.9	14	2.2	4.1	1,310
4.....	3.2	52	120	6.9	2.2	1.0	1.0	.2	4.1	2.1	2.8	174
5.....	2.6	6.9	16	331	6.6	1.0	1.0	.2	2.2	1.6	2.4	68
6.....	2.2	4.8	226	320	2.2	.6	1.0	.9	1,150	2.4	2.2	57
7.....	4.4	1.0	357	397	2.2	.4	1.0	.9	68	2.2	2.2	30
8.....	3.9	1.0	6.6	320	1.6	.2	1.0	1.1	6.6	1.0	1.0	24
9.....	4.1	1.0	255	1,230	1.2	.6	1.6	10	5.6	.8	441	19
10.....	4.1	4.1	540	850	1.0	.6	140	6.6	4.8	.2	14	13
11.....	4.1	2.4	357	836	1.0	.2	6.9	6.6	3.2	.2	2.2	6.6
12.....	3.2	2.2	320	226	1.0	.2	3.9	4.1	2.4	.2	2.2	5.4
13.....	2.2	2.2	68	174	1.0	1.0	3.2	174	1.2	2.2	1.0	3.2
14.....	9.3	2.2	80	69.2	1.0	.9	489	397	1.0	3.9	1.0	2.2
15.....	3.7	2.6	30	11.2	226	.8	19	335	1.0	4.1	6.1	1.6
16.....	3.2	3.9	19	286	14	.2	4.1	24	1.6	24	6.6	1.0
17.....	2.2	4.1	10	850	4.1	.2	4.1	4.1	.8	22	6.4	1.0
18.....	2.4	2.2	6.6	80	3.0	.2	3.9	4.1	.6	19	4.8	2.1
19.....	2.2	2.2	4.1	19	1.6	.2	2.2	4.1	.2	113	4.1	3.2
20.....	2.2	2.4	30	12	1.4	.6	2.2	4.1	.2	82	2.4	10
21.....	2.2	57	19	6.6	1.0	.8	4.1	1.0	1.0	6.6	2.2	780
22.....	3.9	331	10	2.2	1.0	1.2	3.7	2.2	1.0	320	1.1	47
23.....	2.4	68	6.6	2.2	2.2	.6	2.2	2.2	1.0	255	1.0	64
24.....	130	255	4.1	2.2	19	.4	1.6	19	1.0	4.1	1.0	68
25.....	6.6	15	1,070	2.2	151	4.1	1.0	1.0	1.0	58.1	1.0	80
26.....	2.2	6.9	30	5.4	2.2	2.4	1.0	.6	1.0	850	1.0	19
27.....	4.1	92.6	9.3	4.1	1.6	2.2	.2	255	1.0	199	1.0	10
28.....	2.2	44	4.1	2.2	1,230	1.1	.9	57	1.0	5.4	1.0	6.4
29.....	2.2	397	3.2	1.6	130	4.1	.8	4.1	2.4	4.1	1.0	4.1
30.....	4.8	.....	1.0	1.6	6.9	1.0	.6	397	.8	6.6	16	3.5
31.....	3.7	.....	174	.....	3.2	.....	10	199	.....	38	.....	3.2

NOTE.—Daily discharge determined from a rating curve well defined between 10 and 2,000 second-feet but owing to the rapid fluctuation of the stream the monthly means have a low accuracy.

*Monthly discharge of Waimea River near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	130	2.2	10.8	664	C.
February.....	397	1.0	47.5	2,730	C.
March.....	1,070	1.0	161	9,900	B.
April.....	1,230	1.6	211	12,600	B.
May.....	1,230	.5	58.8	3,620	C.
June.....	4.1	.2	1.02	60.7	D.
July.....	489	.2	23	1,410	D.
August.....	397	.2	62	3,810	C.
September.....	1,150	.2	47.2	2,810	D.
October.....	850	.2	65.7	4,040	D.
November.....	441	1.0	18.2	1,080	D.
December.....	1,430	1.0	149	9,160	C.
The year.....	1,430	.2	71.4	51,900	

#### KAWAIKOI STREAM NEAR WAIMEA, KAUAI.

**Location.**—About 8 miles northeast of Knudsen's mountain house; reached from Waimea by horse trail.

**Records available.**—April 3, 1909, to December 31, 1912.

**Gage.**—A 34-day Barrett & Lawrence clock register; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made from a wire suspension bridge.

**Accuracy.**—Records good.

*Discharge measurements of Kawaikoi Stream near Waimea, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 2	W. V. Hardy.....	<i>Feet.</i> 1.54	<i>Sec.-ft.</i> 3.90
Aug. 7	.....do.....	1.67	6.30
Oct. 6	.....do.....	1.50	3.42

*Daily gage height, in feet, of Kawaikoi Stream near Waimea, Kauai, for 1912.*

[United States Geological Survey, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.75	2.49	2.90	3.00	1.80	1.80	1.55	2.00	2.30	1.70	.....	.....
2.....	1.70	3.32	2.58	2.45	1.80	1.80	1.58	2.00	2.30	1.70	.....	3.96
3.....	1.79	2.40	3.38	2.28	1.80	1.77	1.58	2.00	2.30	1.70	.....	.....
4.....	1.70	2.11	2.70	2.30	1.85	1.87	1.57	2.00	2.30	1.50	.....	3.10
5.....	1.69	2.11	2.70	2.60	1.85	1.84	1.55	2.20	2.30	1.52	.....	.....
6.....	1.69	2.11	2.90	3.07	1.78	1.75	1.52	2.20	2.30	1.54	.....	.....
7.....	1.69	2.05	3.08	3.50	1.80	1.70	1.55	2.20	2.25	1.52	.....	.....
8.....	1.73	1.90	2.42	2.77	2.10	1.70	1.80	2.20	2.02	1.51	.....	.....
9.....	1.74	1.95	2.95	3.57	1.90	1.72	2.88	2.25	1.92	1.81	.....	.....
10.....	1.71	2.35	3.38	2.45	1.77	1.92	1.98	2.28	1.97	1.80	.....	.....
11.....	1.65	2.04	3.60	2.35	1.70	1.78	1.80	2.25	1.80	1.70	.....	.....
12.....	1.62	2.00	2.95	2.50	1.70	1.70	1.90	2.95	1.70	1.70	.....	.....
13.....	1.61	2.00	2.45	2.70	1.70	1.70	1.75	5.30	1.70	.....	.....	.....
14.....	1.65	2.00	2.40	2.70	3.10	1.88	2.00	5.20	1.70	.....	.....	.....
15.....	1.60	2.05	2.20	2.22	2.63	1.88	2.00	4.65	1.70	.....	.....	.....
16.....	1.65	2.05	2.10	2.20	2.18	1.85	2.00	2.90	1.70	.....	.....	.....
17.....	1.63	2.42	2.04	2.70	2.30	1.80	2.00	2.50	1.70	.....	.....	.....
18.....	1.65	3.10	1.98	2.50	1.92	1.77	2.00	2.37	1.70	.....	.....	.....
19.....	1.67	2.80	1.97	2.17	1.80	1.75	2.00	2.30	1.70	.....	.....	.....
20.....	1.64	3.24	2.56	2.09	1.85	1.70	2.00	2.30	1.70	.....	.....	.....
21.....	1.64	3.59	2.27	2.00	1.80	1.75	2.00	2.30	1.70	.....	.....	.....
22.....	1.62	3.83	2.00	1.95	1.90	1.78	2.00	2.30	1.70	.....	.....	.....
23.....	1.82	2.70	1.95	1.90	2.80	1.75	2.00	2.30	1.70	.....	.....	.....
24.....	2.05	2.50	1.94	1.88	2.00	1.78	2.00	2.30	1.70	.....	.....	.....
25.....	2.00	2.90	5.05	1.92	2.00	1.85	2.00	2.30	1.70	.....	.....	.....
26.....	2.00	2.75	3.60	1.87	1.95	1.80	2.00	2.30	1.70	.....	.....	.....
27.....	2.00	2.30	3.15	1.80	1.95	1.80	2.00	2.30	1.70	.....	.....	.....
28.....	1.90	2.33	3.08	1.80	1.90	1.70	2.00	2.30	1.70	.....	.....	.....
29.....	2.04	3.40	3.10	1.80	1.90	1.62	2.00	2.30	1.70	.....	.....	.....
30.....	2.38	.....	3.05	1.80	1.85	1.55	2.00	2.30	1.70	.....	.....	.....
31.....	1.95	.....	3.13	.....	1.80	.....	2.00	2.30	.....	.....	.....	.....

NOTE.—Gage heights are means for 24 hours computed from Barrett & Lawrence record sheets. Clock stopped Sept. 12 to Oct. 3, but record showed that the water surface fluctuated not more than 0.35, the mean gage height for the period being estimated at 1.70.



*Daily discharge, in second-feet, of Kawaikoi Stream near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8.5	45.4	78.0	88.0	10.0	10.0	4.2	18.0	34.0	7.0	.....	.....
2.....	7.0	127.0	51.6	43.0	10.0	10.0	4.7	18.0	34.0	7.0	.....	223.0
3.....	9.7	40.0	135.0	32.8	10.0	9.1	4.7	18.0	34.0	7.0	.....	.....
4.....	7.0	23.5	61.0	34.0	12.0	12.8	4.6	18.0	34.0	3.5	.....	99.0
5.....	6.8	23.5	61.0	53.0	12.0	11.6	4.2	28.0	34.0	3.8	.....	.....
6.....	6.8	23.5	78.0	95.7	9.4	8.5	3.8	28.0	34.0	4.1	.....	.....
7.....	6.8	20.5	96.8	152.0	10.0	7.0	4.2	28.0	31.0	3.8	.....	.....
8.....	7.9	14.0	41.2	66.6	23.0	7.0	10.0	28.0	19.0	3.6	.....	.....
9.....	8.2	16.0	83.0	162.0	14.0	7.6	76.2	31.0	14.8	10.4	.....	.....
10.....	7.3	37.0	135.0	43.0	9.1	14.8	17.2	32.8	16.8	10.0	.....	.....
11.....	6.0	20.0	167.0	37.0	7.0	9.4	10.0	31.0	10.0	7.0	.....	.....
12.....	5.4	18.0	83.0	46.0	7.0	7.0	14.0	83.0	7.0	7.0	.....	.....
13.....	5.2	18.0	43.0	61.0	7.0	7.0	8.5	500.0	7.0	.....	.....	.....
14.....	6.0	18.0	40.0	61.0	99.0	13.2	18.0	475.0	7.0	.....	.....	.....
15.....	5.0	20.5	28.0	29.2	55.4	13.2	18.0	350.0	7.0	.....	.....	.....
16.....	6.0	20.5	23.0	29.2	27.0	12.0	18.0	78.0	7.0	.....	.....	.....
17.....	5.6	41.2	20.0	61.0	34.0	10.0	18.0	46.0	7.0	.....	.....	.....
18.....	6.0	99.0	17.2	46.0	14.8	9.1	18.0	38.2	7.0	.....	.....	.....
19.....	6.4	69.0	16.8	26.5	10.0	8.5	18.0	34.0	7.0	.....	.....	.....
20.....	5.8	116.0	50.2	22.5	12.0	7.0	18.0	34.0	7.0	.....	.....	.....
21.....	5.8	166.0	32.2	18.0	10.0	8.5	18.0	34.0	7.0	.....	.....	.....
22.....	5.4	202.0	18.0	16.0	14.0	9.4	18.0	34.0	7.0	.....	.....	.....
23.....	10.8	61.0	16.0	14.0	69.0	8.5	18.0	34.0	7.0	.....	.....	.....
24.....	20.5	46.0	15.6	13.2	18.0	9.4	18.0	34.0	7.0	.....	.....	.....
25.....	18.0	78.0	438.0	14.8	18.0	12.0	18.0	34.0	7.0	.....	.....	.....
26.....	18.0	65.0	167.0	12.8	16.0	10.0	18.0	34.0	7.0	.....	.....	.....
27.....	18.0	34.0	105.0	10.0	16.0	10.0	18.0	34.0	7.0	.....	.....	.....
28.....	14.0	35.8	96.8	10.0	14.0	7.0	18.0	34.0	7.0	.....	.....	.....
29.....	20.0	138.0	99.0	10.0	14.0	5.4	18.0	34.0	7.0	.....	.....	.....
30.....	38.8	.....	93.5	10.0	12.0	4.2	18.0	34.0	7.0	.....	.....	.....
31.....	16.0	.....	103.0	.....	10.0	.....	18.0	34.0	.....	.....	.....	.....

*Monthly discharge of Kawaikoi Stream near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet.)	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	38.8	5.0	10.30	633	A.
February.....	202.0	14.0	67.20	3,870	A.
March.....	438.0	15.6	80.40	4,940	A.
April.....	162.0	10.0	43.90	2,610	A.
May.....	99.0	7.0	19.50	1,200	A.
June.....	14.8	4.2	9.31	554	A.
July.....	76.2	3.8	15.80	972	A.
August.....	500.0	18.0	73.90	4,540	A.
September.....	34.0	7.0	14.30	851	B.
October 1-12.....	.....	.....	6.18	147	.....
November.....	.....	.....	.....	.....	.....
December 2 and 4.....	.....	.....	161.00	639	.....
The period.....	.....	.....	.....	21,000	.....

#### WAIKOALI STREAM NEAR WAIMEA, KAUAI.

**Location.**—About 10 miles northeast of Knudsen's mountain house; reached from Waimea.

**Records available.**—April 13, 1909, to December 31, 1912.

**Gage.**—Vertical staff read at irregular times; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from footbridge 75 feet below trail crossing; low-water measurements made by wading 50 feet above gage.

*Discharge measurements of Waiakoali Stream near Waimea, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 2	W. V. Hardy.....	<i>Fect.</i> 2.31	<i>Sec.-ft.</i> 0.94
Aug. 6	.....do.....	2.28	.98
Oct. 5	.....do.....	2.20	.84

*Daily gage height, in feet, of Waiakoali Stream near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....				3.00			2.31					
2.....				2.60			2.31				2.10	4.02
3.....												7.90
4.....												3.98
5.....								2.28		2.20		
6.....								2.28		2.20		
7.....								2.28	2.59			
8.....									2.48			
9.....												
10.....												
11.....												
12.....												
13.....												
14.....												
15.....												
16.....												
17.....												
18.....												
19.....												
20.....						2.35						
21.....						2.35						
22.....												
23.....												
24.....												
25.....												
26.....												
27.....		2.40										
28.....		2.50										
29.....												
30.....												
31.....												

NOTE.—Miscellaneous gage readings.

#### MOHIHI STREAM NEAR WAIMEA, KAUAI.

**Location.**—About 12 miles northeast of Knudsen's mountain house; reached by saddle horse from Waimea 1½ days' travel.

**Records available.**—April 13, 1909, to December 31, 1913.

**Drainage area.**—2.20 square miles.

**Gage.**—A vertical staff; datum unchanged.

**Channel.**—One at gage, two at low-water measurement section; practically permanent.

**Discharge measurements.**—Made from suspension bridge.

*Discharge measurements of Mohihi Stream near Waimea, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
July 2	W. V. Hardy.....	3.68	1.49
Aug. 6	.....do.....	3.64	1.12
Oct. 5	.....do.....	3.61	.71

The following gage readings were made: January 28, gage height, 4.0; April 2, gage height, 4.10; December 3, gage height, 7.10.

**WAIALAE STREAM NEAR WAIMEA, KAUAI.**

**Location.**—About 3 miles by trail northeast of F. Gay's mountain house; reached by saddle horse from Waimea in about one day's ride.

**Records available.**—August 1, 1910, to December 31, 1912.

**Gage.**—Barrett & Lawrence hydro-chronograph.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made from a cable and car.

**Accuracy.**—Records good.

*Discharge measurements of Waialae Stream near Waimea, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 8	W. V. Hardy.....	1.41	17.6
July 5	.....do.....	1.19	5.86

*Daily gage height, in feet, of Waialae Stream near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.18	1.40	1.40	1.37	1.20	1.21	1.18	1.40	1.59	1.20	1.50	2.12
2.....	1.18	1.39	1.51	1.31	1.21	1.20	1.20	1.40	.....	1.20	1.40	3.18
3.....	1.18	1.46	1.77	1.24	1.20	1.20	1.29	1.40	.....	1.22	1.36	3.28
4.....	1.26	1.45	1.81	1.24	1.20	1.20	1.35	1.40	1.19	1.29	1.32	2.02
5.....	1.60	1.30	1.52	1.28	1.20	1.20	1.38	1.40	1.11	1.24	1.35	1.70
6.....	1.50	1.24	2.05	1.57	1.27	1.20	1.34	1.36	2.10	1.24	1.45	1.58
7.....	1.40	1.20	1.61	1.78	1.25	1.20	1.58	1.32	1.58	1.25	1.40	1.50
8.....	1.40	1.20	1.41	1.63	1.25	1.20	1.61	1.31	1.45	1.25	1.42	1.55
9.....	1.40	1.20	1.76	1.85	1.23	1.20	1.74	1.30	1.41	1.29	2.40	1.45
10.....	1.40	1.24	1.63	1.42	1.21	1.20	1.73	1.30	1.38	1.29	1.71	1.40
11.....	1.39	1.39	2.01	1.39	1.20	1.20	2.15	1.21	1.40	1.30	1.49	1.34
12.....	1.33	1.29	1.82	1.34	1.20	1.19	1.69	1.23	1.38	1.29	1.40	1.30
13.....	1.40	1.20	1.65	1.35	1.20	1.24	2.00	1.22	1.31	1.28	1.39	1.21
14.....	1.42	1.20	1.63	1.33	1.28	1.36	1.89	1.73	1.24	1.25	1.39	1.20
15.....	1.39	1.19	1.40	1.32	1.78	1.29	1.73	1.63	1.22	1.21	1.34	1.21
16.....	1.32	1.13	1.33	1.30	1.41	1.25	1.60	1.30	1.20	1.20	1.33	1.20
17.....	1.30	1.10	1.31	1.42	1.28	1.21	1.54	1.22	1.20	1.68	1.28	1.20
18.....	1.26	1.05	1.30	1.58	1.20	1.20	1.50	1.20	1.20	1.66	1.35	1.20
19.....	1.22	1.03	1.24	1.32	1.19	1.20	1.49	1.21	1.20	1.82	1.57	1.20
20.....	1.21	1.01	1.20	1.24	1.16	1.20	1.42	1.18	1.20	1.61	1.58	1.50
21.....	1.30	1.03	1.20	1.22	1.14	1.20	1.40	1.10	1.20	2.04	2.01	1.46
22.....	1.25	1.65	1.20	1.21	1.31	1.23	1.41	1.19	1.20	1.81	1.78	1.82
23.....	1.26	1.64	1.19	1.20	1.33	1.20	1.47	1.20	1.20	1.59	1.64	1.88
24.....	1.64	1.57	1.15	1.20	1.30	1.35	1.50	1.26	1.20	1.40	1.45	1.58
25.....	1.40	1.31	1.77	1.29	1.31	1.38	1.49	1.22	1.20	1.33	1.34	1.72
26.....	1.34	1.29	1.36	1.40	1.20	1.26	1.44	1.21	1.20	1.99	1.30	1.59
27.....	1.35	1.20	1.24	1.32	1.26	1.24	1.43	2.06	1.20	1.81	1.26	1.42
28.....	1.30	1.21	1.35	1.29	1.88	1.22	1.43	1.46	1.20	1.42	1.22	1.30
29.....	1.30	1.20	1.32	1.22	1.79	1.20	1.40	1.17	1.20	1.53	1.52	1.27
30.....	1.28	.....	1.28	1.21	1.40	1.19	1.39	1.09	1.20	1.42	1.67	1.20
31.....	1.51	.....	1.40	.....	1.29	.....	1.40	1.07	.....	1.54	.....	1.20

*Daily discharge, in second-feet, of Waialae Stream near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.8	17.0	17.0	15.2	6.3	6.8	5.8	17.0	29.3	6.3	23.0	72.8
2.....	5.8	16.4	23.7	11.6	6.8	6.3	6.3	17.0	21.6	6.3	17.0	166.0
3.....	5.8	20.6	43.6	8.2	6.3	6.3	10.5	17.0	13.9	7.2	14.6	175.0
4.....	9.1	20.0	46.8	8.2	6.3	6.3	14.0	17.0	6.1	10.5	12.2	64.6
5.....	30.0	11.0	24.4	10.1	6.3	6.3	15.8	17.0	4.2	8.2	14.0	38.0
6.....	23.0	8.2	67.0	27.9	9.6	6.3	13.4	14.6	71.0	8.2	20.0	28.6
7.....	17.0	6.3	30.8	44.4	8.7	6.3	28.6	12.2	28.6	8.7	17.0	23.0
8.....	17.0	6.3	17.6	32.4	8.7	6.3	30.8	11.6	20.0	8.7	18.2	26.5
9.....	17.0	6.3	42.8	50.0	7.7	6.3	41.2	11.0	17.6	10.5	97.0	20.0
10.....	17.0	8.2	32.4	18.2	6.8	6.3	40.4	11.0	15.8	10.5	38.8	17.0
11.....	16.4	16.4	63.8	16.4	6.3	6.3	75.5	6.8	17.0	11.0	22.4	13.4
12.....	12.8	15.5	47.6	13.4	6.3	6.1	37.2	7.7	15.8	10.5	17.0	11.0
13.....	17.0	6.3	34.0	14.0	6.3	8.2	63.0	7.2	11.6	10.1	16.4	6.8
14.....	18.2	6.3	32.4	12.8	10.1	14.6	53.2	40.4	8.2	8.7	16.4	6.3
15.....	16.4	6.1	17.0	12.2	44.4	10.5	40.4	32.4	7.2	6.8	13.4	6.8
16.....	12.2	4.7	12.8	11.0	17.6	8.6	30.0	11.0	6.3	6.3	12.8	6.3
17.....	11.0	4.0	11.6	18.2	10.1	6.8	25.8	7.2	6.3	36.4	10.1	6.3
18.....	9.1	3.6	11.0	28.6	6.3	6.3	23.0	6.3	6.3	34.8	14.0	6.3
19.....	7.2	3.6	8.2	12.2	6.1	6.3	22.4	6.7	6.3	47.6	27.9	6.3
20.....	6.8	3.5	6.3	8.2	5.4	6.3	18.2	5.8	6.3	30.8	28.6	23.0
21.....	11.0	3.6	6.3	7.2	4.9	6.3	17.0	4.0	6.3	66.2	63.8	20.6
22.....	8.6	34.0	6.3	6.8	11.6	7.7	17.6	6.1	6.3	46.8	44.4	47.6
23.....	9.1	33.2	6.1	6.3	12.8	6.3	21.2	6.3	6.3	29.3	33.2	52.4
24.....	33.2	27.9	5.2	6.3	11.0	14.0	23.0	9.1	6.3	17.0	20.0	28.6
25.....	17.0	11.6	43.6	10.5	11.6	15.8	22.4	7.2	6.3	12.8	13.4	39.6
26.....	13.4	10.5	14.6	17.0	6.3	9.1	19.4	6.8	6.3	62.1	11.0	29.3
27.....	14.0	6.3	8.2	12.2	9.1	8.2	18.8	67.8	6.3	37.2	9.1	18.2
28.....	11.0	6.8	14.0	10.5	52.4	7.2	18.8	20.6	6.3	18.2	7.2	11.0
29.....	11.0	6.3	12.2	7.2	45.2	6.3	17.0	5.6	6.3	25.1	24.4	9.6
30.....	10.1	-----	10.1	6.8	17.0	6.1	16.4	3.9	6.3	18.2	35.6	6.3
31.....	23.7	-----	17.0	-----	10.5	-----	17.0	3.7	-----	25.8	-----	6.3

*Monthly discharge of Waialae Stream near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	33.2	5.8	14.1	867	B.
February.....	34.0	3.5	11.2	644	B.
March.....	67.0	5.2	23.7	1,460	B.
April.....	50.0	6.3	15.5	922	A.
May.....	52.4	4.9	12.4	762	A.
June.....	15.8	6.1	7.68	457	B.
July.....	75.5	5.8	25.9	1,590	A.
August.....	67.8	3.7	13.5	830	A.
September.....	71.0	4.2	12.7	756	B.
October.....	66.2	6.3	20.9	1,290	B.
November.....	97.0	7.2	23.8	1,420	B.
December.....	175.0	6.3	32.0	1,970	B.
The year.....	175.0	3.5	17.8	13,000	

#### KEKAHA DITCH AT CAMP NO. 1,<sup>1</sup> NEAR WAIMEA, KAUAI.

**Location.**—About 8 miles north of Waimea at camp No. 1 and a short distance below the diversion dam.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once a day; datum unchanged.

**Discharge measurements.**—Made with an 8-foot sharp-crested weir.

**Cooperation.**—Gage heights furnished by the Kekaha Sugar Co.

<sup>1</sup> Described in Water-Supply Paper 318 as Kekaha ditch at intake near Waimea.

The following discharge measurement was made by W. V. Hardy at the United States Geological Survey gage, about 200 feet above the Kekaha Sugar Co.'s weir:

March 8, 1912: Gage height, 3.64 feet; discharge, 85.3 second-feet.

*Daily discharge, in second-feet, of Kekaha ditch at camp No. 1, near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	62.0	80.0	90.0	91.2	57.0	53.0	37.0	47.0	90.0	45.0	92.5	92.5
2.....	57.0	75.0	90.0	91.2	54.0	49.0	37.0	37.0	90.0	37.0	57.0	92.5
3.....	55.0	90.0	90.0	91.2	55.0	47.0	35.5	35.5	90.0	35.5	43.0	85.0
4.....	57.0	90.0	90.0	85.0	53.0	59.5	35.5	34.0	82.5	47.0	37.0	85.0
5.....	85.0	90.0	90.0	(a)	87.5	57.0	35.5	34.0	57.0	35.5	41.0	90.0
6.....	87.5	73.0	90.0	(a)	80.0	49.0	35.5	62.0	53.0	32.0	57.0	90.0
7.....	62.0	62.0	90.0	(a)	57.0	43.0	41.0	41.0	90.0	30.0	41.0	90.0
8.....	53.0	66.0	90.0	(a)	53.0	43.0	53.0	37.0	80.0	30.0	37.0	90.0
9.....	71.0	59.5	90.0	(a)	77.5	41.0	41.0	75.0	62.0	37.0	90.0	90.0
10.....	80.0	55.0	90.0	(a)	57.0	43.0	90.0	75.0	53.0	45.0	92.5	80.0
11.....	57.0	90.0	90.0	(a)	51.0	45.0	90.0	47.0	49.0	45.0	66.0	80.0
12.....	53.0	75.0	91.2	(a)	49.0	41.0	90.0	75.0	49.0	37.0	53.0	66.0
13.....	71.0	59.5	91.2	(a)	49.0	41.0	57.0	53.0	49.0	37.0	45.0	62.0
14.....	90.0	53.0	91.2	85.0	47.0	80.0	90.0	71.0	45.0	34.0	41.0	53.0
15.....	64.0	49.0	91.2	90.0	85.0	57.0	90.0	90.0	39.0	30.0	37.0	53.0
16.....	53.0	47.0	91.2	90.0	85.0	51.0	71.0	82.5	37.0	30.0	82.5	57.0
17.....	49.0	47.0	90.0	90.0	85.0	49.0	53.0	49.0	35.5	30.0	55.0	59.5
18.....	45.0	45.0	82.5	82.5	66.0	45.0	64.0	41.0	34.0	90.0	45.0	53.0
19.....	43.0	53.0	77.5	82.5	53.0	53.0	47.0	37.0	41.0	90.0	85.0	53.0
20.....	43.0	58.2	77.5	82.5	49.0	66.0	43.0	34.0	35.5	90.0	80.0	92.5
21.....	75.0	90.0	91.2	85.0	49.0	49.0	37.0	34.0	34.0	90.0	90.0	85.0
22.....	53.0	90.0	91.2	80.0	53.0	66.0	37.0	57.0	34.0	90.0	90.0	92.5
23.....	47.0	90.0	80.0	75.0	80.0	49.0	35.5	85.0	34.0	90.0	92.5	92.5
24.....	90.0	90.0	66.0	71.0	75.0	53.0	35.5	90.0	32.0	71.0	100.0	92.5
25.....	90.0	90.0	90.0	67.2	90.0	85.0	53.0	66.0	32.0	49.0	73.0	92.5
26.....	62.0	90.0	91.2	87.5	100.0	57.0	41.0	53.0	32.0	90.0	57.0	92.5
27.....	53.0	90.0	91.2	90.0	53.0	85.0	60.8	90.0	30.0	90.0	49.0	92.5
28.....	55.0	90.0	91.2	75.0	90.0	57.0	41.0	90.0	30.0	71.0	45.0	75.0
29.....	57.0	80.0	91.2	71.0	87.5	43.0	35.5	62.0	30.0	90.0	47.0	62.0
30.....	53.0	.....	91.2	62.0	87.5	37.0	35.5	90.0	30.0	53.0	100.0	57.0
31.....	90.0	.....	91.2	.....	66.0	.....	75.0	90.0	.....	95.0	.....	53.0

<sup>a</sup> Ditch dry Apr. 5-13.

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 \text{ LH}^{\frac{3}{2}}$  where  $L=8 \text{ ft.}$

*Monthly discharge of Kekaha ditch at camp No. 1, near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	90.0	43.0	63.3	3,890
February.....	90.0	45.0	73.0	4,200
March.....	91.2	66.0	88.4	5,440
April.....	91.2	62.0	<sup>a</sup> 82.1	3,420
May.....	100.0	47.0	67.1	4,130
June.....	85.0	37.0	53.1	3,160
July.....	90.0	35.5	52.3	3,220
August.....	90.0	34.0	60.1	3,700
September.....	90.0	30.0	49.3	2,930
October.....	90.0	30.0	57.0	3,500
November.....	100.0	37.0	64.4	3,830
December.....	92.5	53.0	77.5	4,770
The year.....	100.0	30.0	<sup>b</sup> 65.2	46,200

<sup>a</sup> Ditch was dry Apr. 5-13; mean for the month is mean of 21 days.

<sup>b</sup> Mean for the year is mean of 357 days.

**KEKAHA DITCH AT FLUME NO. 2,<sup>1</sup> NEAR WAIMEA, KAUAI.**

**Location.**—About 6 miles north of Waimea and 2 miles below intake.

**Records available.**—December 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 7 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made from tie beam 2 feet above gage.

**Cooperation.**—Station maintained in cooperation with Kekaha Sugar Co.

The following discharge measurement was made by W. V. Hardy:

March 8, 1912: Gage height, 2.80 feet; discharge, 84.6 second-feet.

*Daily gage height, in feet, of Kekaha ditch at flume No. 2, near Waimea, Kauai, for 1912.*

[Manuel Arruda, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	2.08	2.42	2.86	2.85	1.93	1.88	1.38	1.55	2.60	1.50	2.52	2.80
2.	2.01	2.68	2.85	2.85	1.85	1.66	1.38	1.38	2.70	1.35	1.75	2.70
3.	2.01	2.82	2.85	2.85	1.85	1.60	1.35	1.35	2.72	1.30	1.48	2.60
4.	2.11	2.80	2.86	2.70	2.22	2.02	1.35	1.30	2.32	1.48	1.35	2.68
5.	2.78	2.69	2.86	(a)	2.60	1.95	1.35	1.58	1.92	1.28	1.35	2.75
6.	2.52	2.26	2.85	(a)	2.28	1.65	1.48	1.85	2.32	1.20	1.72	2.75
7.	2.08	2.12	2.85	(a)	1.95	1.55	1.50	1.45	2.75	1.15	1.45	2.75
8.	2.25	2.28	2.82	(a)	2.08	1.52	1.72	2.05	2.36	1.20	2.08	2.75
9.	2.30	2.04	2.85	(a)	2.25	1.50	1.50	2.40	2.04	1.40	2.80	2.75
10.	2.38	2.14	2.86	(a)	1.95	1.55	2.70	2.20	1.90	1.60	2.78	2.50
11.	2.00	2.80	2.86	(a)	1.82	1.55	2.70	1.90	1.84	1.55	2.04	2.35
12.	1.95	2.40	2.87	(a)	1.75	1.50	2.52	2.25	1.87	1.35	1.75	2.08
13.	2.52	2.12	2.86	(a)	1.70	1.50	1.92	2.22	1.84	1.32	1.45	1.98
14.	2.66	1.98	2.85	2.50	1.62	2.32	2.70	2.50	1.65	1.22	1.42	1.80
15.	2.06	1.85	2.85	2.60	2.65	1.90	2.70	2.70	1.42	1.18	2.15	1.82
16.	1.88	1.80	2.85	2.60	2.65	1.74	2.16	2.26	1.38	1.15	2.28	1.95
17.	1.78	1.80	2.75	2.00	2.46	1.68	1.88	1.71	1.32	1.95	1.78	1.95
18.	1.70	1.76	2.58	2.50	2.12	1.62	2.00	1.45	1.40	2.32	2.20	1.80
19.	1.65	2.12	2.53	2.50	1.80	2.06	1.65	1.38	1.45	2.75	2.85	1.75
20.	1.65	2.05	2.70	2.50	1.70	2.06	1.48	1.30	1.35	2.38	2.72	2.75
21.	2.34	2.85	2.85	2.52	1.70	1.78	1.42	1.35	1.30	2.75	2.75	2.68
22.	1.88	2.86	2.72	2.45	2.28	2.05	1.38	2.10	1.30	2.75	2.75	2.80
23.	2.28	2.85	2.48	2.38	2.36	1.67	1.33	2.65	1.28	2.75	2.82	2.80
24.	2.80	2.85	2.25	2.32	2.52	2.30	1.36	2.38	1.25	2.02	2.78	2.80
25.	2.64	2.80	2.85	2.36	2.52	2.46	1.72	2.15	1.25	2.16	2.15	2.80
26.	2.15	2.85	2.85	2.60	1.95	1.92	1.45	1.74	1.22	2.75	1.85	2.80
27.	2.00	2.88	2.85	2.46	2.26	2.30	1.86	2.70	1.20	2.75	1.70	2.65
28.	2.16	2.85	2.86	2.37	2.60	1.80	1.45	2.52	1.20	2.08	1.60	2.28
29.	2.02	2.52	2.85	2.25	2.60	1.53	1.33	1.98	1.20	2.42	2.95	1.98
30.	2.14	.....	2.85	1.98	2.60	1.50	1.44	2.70	1.25	2.28	2.92	1.88
31.	2.80	.....	2.85	.....	2.11	.....	2.17	2.70	.....	2.85	.....	1.80

<sup>a</sup> Ditch dry Apr. 5 to 13.

**KEKAHA DITCH AT SIPHON NEAR WAIMEA, KAUAI.**

**Location.**—About 4 miles north of Waimea, 50 feet above upper end of siphon where ditch crosses Waimea River.

**Records available.**—December 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 7 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made from a temporary foot bridge.

**Cooperation.**—Station maintained in cooperation with Kekaha Sugar Co.

The following discharge measurement was made by W. V. Hardy:

March 8, 1912: Gage height, 4.43 feet; discharge, 74.4 second-feet.

<sup>1</sup> Described in Water Supply Paper 318, p C2, as "Kekaha ditch at flume No. 3."

*Daily gage height, in feet, of Kekaha ditch at siphon near Waimea, Kauai, for 1912.*

[Mannel Arruda, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.82	2.05	4.45	4.65	1.72	1.68	1.25	1.40	5.05	1.42	3.20	5.50
2.....	1.75	3.52	4.60	4.65	1.68	1.55	1.25	1.25	5.50	1.50	1.52	5.50
3.....	1.70	4.30	4.90	4.40	1.68	1.50	1.25	1.25	5.50	1.22	1.30	3.75
4.....	1.75	4.65	4.88	3.00	3.02	1.82	1.25	1.20	4.08	1.45	1.25	3.60
5.....	3.40	4.25	4.45	.....	5.28	1.65	1.25	1.40	1.75	1.22	1.25	5.00
6.....	2.75	2.00	4.88	.....	2.35	1.55	1.40	1.65	3.58	1.18	1.52	5.00
7.....	1.85	1.80	4.80	.....	1.75	1.45	1.40	1.34	5.50	1.10	1.30	5.50
8.....	1.85	1.85	4.62	.....	1.88	1.42	1.60	3.29	2.92	1.12	1.30	5.50
9.....	1.88	1.72	4.80	.....	2.70	1.40	1.38	4.40	1.80	1.25	5.50	4.65
10.....	2.08	1.80	4.50	.....	1.75	1.48	5.30	3.10	1.70	1.52	5.50	3.55
11.....	1.70	4.70	4.55	.....	1.62	1.42	5.00	1.70	1.52	1.70	1.85	2.90
12.....	1.60	2.10	5.05	.....	1.60	1.40	3.60	3.12	1.52	1.30	1.55	1.92
13.....	3.05	1.75	5.10	.....	1.60	1.40	1.80	3.12	1.45	1.25	1.45	1.78
14.....	3.42	1.62	4.90	3.60	2.80	3.20	5.20	3.65	1.35	1.20	1.32	1.82
15.....	1.80	1.52	4.92	5.28	5.30	1.70	5.10	5.20	1.30	1.15	1.30	1.75
16.....	1.65	1.50	4.72	5.25	5.30	1.62	1.88	3.18	1.30	1.10	2.38	1.70
17.....	1.52	1.50	3.45	5.20	5.20	1.55	1.70	1.52	1.30	1.10	1.55	1.72
18.....	1.45	1.50	2.48	5.20	1.90	1.75	1.75	1.34	1.32	3.28	1.45	1.65
19.....	1.40	1.68	2.12	5.30	1.68	1.80	1.52	1.26	1.28	4.75	5.00	1.50
20.....	1.60	1.70	3.52	4.92	1.60	1.95	1.38	1.20	1.22	2.85	2.02	4.85
21.....	2.30	4.22	4.70	5.15	1.60	1.56	1.30	1.25	1.20	5.15	5.50	4.70
22.....	1.65	5.00	3.20	3.95	3.50	1.96	1.25	1.88	1.20	5.50	5.50	5.30
23.....	2.42	4.70	2.05	2.98	3.05	1.60	1.25	4.90	1.15	5.45	5.50	5.50
24.....	4.35	4.50	1.90	2.25	4.65	2.94	1.25	3.50	1.15	1.88	5.50	5.50
25.....	3.45	4.40	5.30	2.10	4.90	2.65	1.58	1.90	1.15	1.50	1.95	5.50
26.....	1.78	4.50	5.10	4.75	1.85	1.68	1.30	1.58	1.15	4.92	1.68	5.30
27.....	1.70	4.75	4.62	4.15	1.80	2.15	1.65	5.15	1.10	4.45	1.52	4.50
28.....	1.82	4.15	4.68	2.95	5.30	1.68	1.32	3.68	1.10	1.80	1.45	2.25
29.....	1.68	2.58	4.55	2.08	5.20	1.42	1.25	1.75	1.10	2.60	3.45	1.80
30.....	1.80	.....	4.35	1.82	4.90	1.80	1.38	5.30	1.15	2.50	5.50	1.68
31.....	4.28	.....	4.68	.....	1.90	.....	3.00	5.30	.....	4.25	.....	1.60

# **KEKAHA DITCH AT TUNNEL No. 12, NEAR WAIMEA, KAUAI.**

**Location.**—About 2 miles north of Waimea, and one-fourth mile below mouth of tunnel No. 12.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily; datum unchanged.

**Discharge measurements.**—Computed from flow over 6-foot weir with end contractions.

**Cooperation.**—Gage heights furnished by Kekaha Sugar Co.

*Daily gage height, in inches, of Kekaha ditch at tunnel No. 12, near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	25	28½	29	30½	23½	23	19	20	29	19	27	30
2.....	22½	24½	30	29½	22½	22	16½	17½	29	18½	20	30
3.....	21½	28½	29½	30	22½	21	16½	17	29½	16½	17	18
4.....	21	28½	30	30	22	21	16½	16½	28	20	16	26
5.....	27½	28½	29½	(a)	30½	23	16½	16	22½	16½	16	30
6.....	26	26	29½	(a)	29	21	22½	23	21	16	21½	31½
7.....	25	23½	30½	(a)	24	20½	19½	18	29½	16	16	31
8.....	24½	23½	29½	(a)	23	20½	23	17½	24	16½	16	29½
9.....	25	23	29½	(a)	26	21½	18	29	24	16½	31	30½
10.....	26	21½	29½	(a)	24	19½	30	28	21	19	29½	28½
11.....	22½	28	29½	(a)	22	19½	30	23	19	18½	26	28½
12.....	21	27	30	(a)	22	19½	31	26	19½	17½	21½	26½
13.....	23	23	30	(a)	21½	18½	25	22	18	18	19½	25½
14.....	27½	21½	29½	28½	20	30	30	27	18	17½	16	24
15.....	25½	30½	29½	29	30	24½	29	30	17	15½	16	23½

<sup>a</sup> Ditch dry Apr. 5-13.

Daily gage height, in inches, of Kekaha ditch at tunnel No. 12, near Waimea, Kauai, for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	21	19½	30	29	30	22	26	29	17	15	28	23½
17.....	20½	19	29½	29½	29	22½	22	22	17	15½	21½	23½
18.....	19½	19½	28	31	27	21½	24	18	18½	28½	18½	23
19.....	18½	21	27½	31	22½	22	21	17	17	25	29	21
20.....	18½	23	30	30½	21	26	20	16½	16½	28	27	26
21.....	27½	27	30	30½	21	23	18½	16	16	28½	31	30
22.....	22	30½	30	29½	22	25½	18	22	16	31	31	31
23.....	26½	28½	26½	28½	28	23½	17½	27½	16	30	30	31
24.....	29½	29	26	27½	28	24	18	28½	16	27	29½	31
25.....	29	29½	32	25½	27½	28½	22½	24½	15½	18	27	29½
26.....	23½	29½	31½	29½	24½	24	18	19½	15½	28	22½	29½
27.....	21½	28½	30½	30	22½	24	22	17½	15½	28	20	29½
28.....	21	29	29½	29	30	24	18	20½	15½	26	19	27
29.....	22½	28½	31	27	30	20	17	24	15½	24	17	27
30.....	20½	28½	28½	25	30	20	17	29	15½	20	29½	23
31.....	27	-----	31½	-----	27	-----	30	29½	-----	28	-----	23

Daily discharge, in second-feet, of Kekaha ditch at tunnel No. 12, near Waimea, Kauai, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	57.0	69.0	70.0	75.0	51.5	50.0	39.0	41.0	70.0	39.0	63.0	73.0
2.....	49.2	55.0	73.0	72.2	48.5	47.0	32.5	35.0	70.0	37.5	41.0	73.0
3.....	46.2	68.0	72.2	73.0	48.5	44.0	32.5	34.0	71.5	32.5	34.0	36.0
4.....	44.0	68.0	73.0	73.0	47.0	44.0	32.5	32.5	66.0	41.0	31.0	60.0
5.....	64.5	69.0	72.2	(a)	75.0	50.0	32.5	31.0	48.5	32.5	31.0	73.0
6.....	60.0	60.0	72.2	(a)	70.0	44.0	48.5	50.0	44.0	31.0	45.5	78.5
7.....	57.0	51.5	74.0	(a)	53.0	42.5	40.0	36.0	71.5	31.0	31.0	77.0
8.....	55.0	51.5	71.5	(a)	50.0	42.5	50.0	35.0	53.0	32.5	31.0	71.5
9.....	57.0	50.0	71.5	(a)	60.0	45.5	36.0	70.0	53.0	32.5	77.0	75.0
10.....	60.0	45.5	71.5	(a)	53.0	40.0	73.0	66.0	44.0	39.0	71.5	68.0
11.....	48.5	66.0	71.5	(a)	47.0	40.0	73.0	50.0	39.0	37.5	60.0	68.0
12.....	44.0	63.0	73.0	(a)	47.0	40.0	77.0	60.0	40.0	35.0	45.5	61.5
13.....	50.0	50.0	73.0	(a)	45.5	37.5	57.0	47.0	36.0	36.0	40.0	58.5
14.....	64.5	45.5	72.2	68.0	41.0	73.0	73.0	63.0	36.0	35.0	31.0	53.0
15.....	58.5	41.8	71.5	70.0	73.0	55.0	70.0	73.0	34.0	30.0	31.0	51.5
16.....	44.0	40.0	73.0	70.0	73.0	47.0	60.0	70.0	34.0	29.0	66.0	51.5
17.....	42.5	39.0	71.5	71.5	70.0	48.5	47.0	47.0	34.0	30.0	45.5	51.5
18.....	40.0	39.5	66.0	77.0	63.0	45.5	53.0	36.0	37.5	68.0	37.5	50.0
19.....	37.5	44.0	65.2	77.0	48.5	47.0	44.0	34.0	34.0	57.0	70.0	44.0
20.....	37.5	50.0	73.0	75.0	44.0	60.0	41.0	32.5	32.5	66.0	63.0	60.0
21.....	64.5	63.0	73.0	75.0	44.0	50.0	37.5	31.0	31.0	69.0	77.0	73.0
22.....	47.0	75.0	73.0	72.2	47.0	58.5	36.0	47.0	31.0	77.0	77.0	77.0
23.....	61.5	68.0	61.5	69.0	66.0	51.5	35.0	64.5	31.0	73.0	73.0	77.0
24.....	71.5	70.0	60.0	64.5	66.0	53.0	36.0	69.0	31.0	63.0	71.5	77.0
25.....	70.0	71.5	80.0	58.5	64.5	68.0	48.5	55.0	30.0	36.0	63.0	71.5
26.....	51.5	70.8	78.5	71.5	55.0	53.0	36.0	40.0	30.0	66.0	48.5	71.5
27.....	45.5	68.0	75.0	73.0	48.5	53.0	47.0	35.0	30.0	66.0	41.0	71.5
28.....	44.0	70.0	72.2	70.0	73.0	53.0	36.0	71.5	30.0	60.0	69.0	63.0
29.....	48.5	69.0	77.0	63.0	73.0	41.0	34.0	53.0	30.0	53.0	54.0	63.0
30.....	48.2	-----	67.0	57.0	73.0	41.0	34.0	70.0	30.0	41.0	71.5	50.0
31.....	63.0	-----	78.5	-----	63.0	-----	73.0	71.5	-----	66.0	-----	50.0

a Ditch dry Apr. 5-13.



Monthly discharge of Kekaha ditch at tunnel No. 12, near Waimea, Kauai, for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	71.5	37.5	52.5	3,230
February.....	75.0	39.0	58.3	3,350
March.....	80.0	60.0	71.8	4,410
April.....	77.0	57.0	a 70.3	2,930
May.....	75.0	41.0	57.5	3,540
June.....	73.0	37.5	48.8	2,900
July.....	77.0	32.5	47.2	2,900
August.....	73.0	31.0	50.0	3,070
September.....	71.5	30.0	41.8	2,490
October.....	77.0	29.0	46.5	2,860
November.....	77.0	31.0	51.4	3,060
December.....	78.5	36.0	63.8	3,920
The year.....	80.0	29.0	b 54.6	38,700

a Ditch dry Apr. 5-13. Mean for the month is the mean of 21 days.

b Mean for the year is the mean of 357 days.

#### WAIMEA DITCH NEAR WAIMEA, KAUAI.

**Location.**—About 4 miles north of Waimea and 300 feet below intake.

**Records available.**—November 4, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once each day, at 7 a. m.; datum unchanged.

**Channel.**—Fairly permanent.

**Discharge measurements.**—Made from a pole bridge 8 feet long, and graduated in 1-foot sections from 0 to 5.7 feet.

**Diversions.**—A lateral diverts water from the left bank of the ditch about 25 feet below the gage.

**Accuracy.**—Record fair.

*Discharge measurements of Waimea ditch near Waimea, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Mar. 8	W. V. Hardy.....	<i>Feet.</i> 2.29	<i>Sec.-ft.</i> 10.5
July 13	do.....	1.63	6.92
Sept. 30	do.....	1.66	3.61

*Daily gage height, in feet, of Waimea ditch near Waimea, Kauai, for 1912.*

[Honke, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.10	2.20	2.20	2.30	1.80	1.73	1.50	1.43	2.20	1.72	2.60	1.90
2.....	2.00	2.20	2.20	2.30	1.71	1.60	1.42	1.42	2.20	1.72	1.95	2.10
3.....	1.90	2.20	2.20	2.30	1.85	1.65	1.50	1.40	2.20	1.70	1.98	1.70
4.....	2.50	2.20	2.25	2.30	1.90	1.80	1.50	1.40	2.20	1.72	1.95	1.55
5.....	2.20	2.20	2.20	2.40	2.43	1.72	1.50	1.43	1.88	1.72	1.82	1.30
6.....	2.20	2.20	2.40	2.40	2.20	1.72	1.50	1.40	2.20	1.70	1.82	1.40
7.....	2.10	2.20	2.40	2.40	1.70	1.71	1.50	1.45	2.20	1.67	1.80	1.70
8.....	1.95	2.08	2.30	2.40	1.70	1.72	1.42	1.42	2.10	1.65	1.72	1.80
9.....	2.00	2.15	2.30	2.40	1.78	1.70	1.40	1.93	1.73	1.60	2.75	1.80
10.....	2.20	2.03	2.40	2.40	1.60	1.71	2.20	2.00	1.73	1.60	2.70	1.80
11.....	1.80	2.20	2.40	2.60	1.78	1.70	1.20	1.51	1.72	1.65	1.80	1.60
12.....	1.98	2.20	2.40	2.60	1.60	1.70	1.20	1.70	1.72	1.70	1.79	1.50
13.....	2.30	2.00	2.40	2.50	1.80	1.70	1.53	1.63	1.72	1.70	1.70	1.34
14.....	2.20	2.02	2.40	2.50	1.78	2.00	2.20	1.93	1.71	1.70	1.65	1.72
15.....	2.20	2.01	2.40	2.50	2.60	1.50	2.10	2.20	1.71	1.70	1.62	1.72

*Daily gage height, in feet, of Waimea ditch near Waimea, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	1.96	2.00	2.40	2.20	2.40	1.70	2.00	2.15	1.69	1.70	2.12	1.70
17.....	2.00	1.99	2.30	2.22	2.60	1.70	1.70	1.72	1.70	1.70	1.90	1.65
18.....	1.70	1.90	2.30	2.50	1.82	1.70	1.60	1.70	1.70	2.20	1.66	1.61
19.....	1.55	19.0	2.10	2.09	1.80	1.70	1.70	1.60	1.70	2.20	2.70	1.60
20.....	2.03	2.05	2.00	2.00	1.80	1.70	1.50	1.62	1.40	2.20	2.18	1.60
21.....	2.20	2.13	2.40	2.10	1.80	1.70	1.42	1.65	1.42	2.55	2.70	1.90
22.....	2.00	2.20	2.20	1.80	1.80	1.40	1.51	1.50	1.40	2.55	2.61	2.05
23.....	1.88	2.20	2.02	1.08	2.20	1.40	1.50	2.30	1.40	2.70	2.65	2.20
24.....	2.20	2.20	2.20	1.05	2.20	1.40	1.50	2.30	1.40	2.10	2.00	2.00
25.....	2.20	.....	2.30	1.01	2.51	1.90	1.48	1.70	1.39	1.90	1.91	1.92
26.....	2.05	2.20	2.30	2.60	1.90	1.80	1.48	1.70	1.25	2.90	1.79	1.50
27.....	1.98	2.20	2.30	2.20	1.80	1.53	1.40	2.30	1.25	2.60	1.75	1.32
28.....	.....	2.20	2.30	1.85	2.40	1.59	1.40	2.20	1.30	2.20	1.76	1.31
29.....	2.13	2.20	2.30	1.81	2.20	1.52	1.40	1.75	1.60	2.20	1.71	1.50
30.....	2.08	.....	2.30	1.71	2.10	1.51	1.40	2.20	1.67	2.20	1.70	1.50
31.....	2.40	.....	2.30	.....	1.70	.....	2.25	2.20	.....	2.75	.....	1.50

NOTE.—Gage was read without closing headgate for lateral whenever it might be in use, hence the discharge for some days will be too small.

*Daily discharge, in\*second-feet, of Waimea ditch near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.8	9.2	9.2	10.6	4.5	3.9	2.4	2.0	9.2	3.8	15.3	5.5
2.....	6.6	9.2	9.2	10.6	3.7	2.9	2.0	2.0	9.2	3.8	6.0	7.8
3.....	5.5	9.2	9.2	10.6	5.0	3.2	2.4	1.9	9.2	3.6	6.4	3.6
4.....	13.7	9.2	9.9	10.6	5.5	4.5	2.4	1.9	9.2	3.8	6.0	2.6
5.....	9.2	9.2	9.2	12.1	12.6	3.8	2.4	2.0	5.3	3.8	4.7	1.5
6.....	9.2	9.2	12.1	12.1	9.2	3.8	2.4	1.9	9.2	3.6	4.7	1.9
7.....	7.8	9.2	12.1	12.1	3.6	3.7	2.4	2.2	9.2	3.4	4.5	3.6
8.....	6.0	7.6	10.6	12.1	3.6	3.8	2.0	2.0	7.8	3.2	3.8	4.5
9.....	6.6	8.5	10.6	12.1	4.3	3.6	1.9	5.8	3.9	2.9	17.7	4.5
10.....	9.2	7.0	12.1	12.1	2.9	3.7	9.2	6.6	3.9	2.9	16.9	4.5
11.....	4.5	9.2	12.1	15.3	4.3	3.6	1.1	2.4	3.8	3.2	4.5	2.9
12.....	6.4	9.2	12.1	15.3	2.9	3.6	1.1	3.6	3.8	3.6	4.4	2.4
13.....	10.6	6.6	12.1	13.7	4.5	3.6	2.6	3.1	3.8	3.6	3.6	1.7
14.....	9.2	6.8	12.1	13.7	4.3	6.6	9.2	5.8	3.7	3.6	3.2	3.8
15.....	9.2	6.7	12.1	13.7	15.3	2.4	7.8	9.2	3.7	3.6	3.0	3.8
16.....	6.2	6.6	12.1	9.2	12.1	3.6	6.6	8.5	3.5	3.6	8.1	3.6
17.....	6.6	6.5	10.6	9.5	15.3	3.6	3.6	3.8	3.6	3.6	5.5	3.2
18.....	3.6	5.5	10.6	13.7	4.7	3.6	2.9	3.6	3.6	9.2	3.3	3.0
19.....	2.6	5.5	7.8	7.7	4.5	3.6	3.6	2.9	3.6	9.2	16.9	2.9
20.....	7.0	7.2	6.6	6.6	4.5	3.6	2.4	3.0	1.9	6.6	8.9	2.9
21.....	9.2	8.2	12.1	7.8	4.5	3.6	2.0	3.2	2.0	14.5	16.9	5.5
22.....	6.6	9.2	9.2	4.5	4.5	1.9	2.4	2.4	1.9	14.5	15.5	7.2
23.....	5.3	9.2	6.8	.8	9.2	1.9	2.4	10.6	1.9	16.9	16.1	9.2
24.....	9.2	9.2	9.2	.7	9.2	1.9	2.4	10.6	1.9	7.8	6.6	6.6
25.....	9.2	9.2	10.6	.6	13.9	5.5	2.3	3.6	1.9	5.5	5.6	5.7
26.....	7.2	9.2	10.6	15.3	5.5	4.5	2.3	3.6	1.3	20.3	4.4	2.4
27.....	6.4	9.2	10.6	9.2	4.5	2.6	1.9	10.6	1.3	15.3	4.0	1.6
28.....	7.3	9.2	10.6	5.0	12.1	2.8	1.9	9.2	1.5	9.2	4.1	1.5
29.....	8.2	9.2	10.6	4.5	9.2	2.5	1.9	4.0	2.9	9.2	3.7	2.4
30.....	7.6	.....	10.6	3.7	7.8	2.4	1.9	9.2	3.4	9.2	3.6	2.4
31.....	12.1	.....	10.6	.....	3.6	.....	9.9	9.2	.....	17.7	.....	2.4

NOTE.—A lateral diverts water from the left bank of ditch about 25 feet below gage. Daily discharge determined from a rating curve prepared from measurements made when lateral was dry. When lateral is carrying water the main ditch carries more water than is indicated by rating table.

*Monthly discharge of Waimea ditch near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	13.7	2.6	7.61	468	B.
February.....	9.2	5.5	8.24	474	A.
March.....	12.1	6.6	10.40	640	A.
April.....	15.3	.6	9.52	566	B.
May.....	15.3	2.9	6.82	419	B.
June.....	6.6	1.9	3.48	207	B.
July.....	9.9	1.1	3.28	202	B.
August.....	10.6	1.9	4.85	298	B.
September.....	9.2	1.3	4.37	260	C.
October.....	20.3	2.9	7.25	446	B.
November.....	17.7	3.0	7.60	452	B.
December.....	9.2	1.5	3.78	232	B.
The year.....	20.3	.6	6.43	4,660	

**KAMENEHUNE DITCH NEAR WAIMEA, KAUAI.**

**Location.**—About 3 miles above Waimea and 200 feet below wire suspension bridge across Waimea River; reached by wagon road up the right side of Waimea River.

**Records available.**—October 9, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at irregular hours; datum unchanged.

**Channel.**—Probably shifting.

**Discharge measurements.**—Made from plank across ditch.

**Accuracy.**—Data insufficient for estimate of discharge.

*Discharge measurements of Kamenehune ditch near Waimea, Kauai, in 1912.*

[Hydrographer, W. V. Hardy.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 4.....	1.23	3.04	Nov. 30.....	1.10	3.33
July 13.....	.92	2.65	30.....	1.02	3.04
14.....	1.38	5.01	Dec. 2.....	1.45	5.19
Sept. 30.....	.48	.27			

*Daily gage height, in feet, of Kamenehune ditch near Waimea, Kauai, for 1912.*

[P. Mokuahakea, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.30	1.00	1.09	1.38	0.40	0.99	0.50	0.40	1.10	0.44	1.20	1.51
2.....	1.10	.81	1.10	1.30	.45	.92	.50	.40	1.25	.57	1.00	1.48
3.....	.70	1.00	1.40	1.20	.40	.80	.50	.50	1.00	.54	.85	1.60
4.....	.50	1.20	1.23	1.87	.40	.60	.50	.40	.85	.51	.80	.39
5.....	.50	1.10	1.12	1.52	1.10	.90	.50	.50	.64	.65	.60	.39
6.....	.40	1.02	1.30	1.48	.80	.50	.50	.40	1.60	.64	.50	.40
7.....	.88	.90	1.30	1.40	.80	.50	.50	.41	1.55	.69	.50	.41
8.....	.82	.80	1.20	1.32	.80	.48	.50	.48	1.10	.70	.49	.52
9.....	.81	.80	1.25	1.50	.82	.45	.69	.70	.96	.70	1.50	.55
10.....	.81	1.00	1.31	1.40	.80	.55	1.45	.65	.72	.78	1.10	.49
11.....	.81	.72	1.30	1.30	.80	.57	1.28	.60	.50	.99	.70	.70
12.....	.75	.60	1.30	1.30	.80	.59	1.01	.70	.45	.98	.65	.75
13.....	.70	.60	1.15	1.24	.80	.59	.81	1.31	.41	.72	.61	.59
14.....	1.01	1.00	1.30	1.20	.80	.60	1.60	.40	.37	.70	.54	.70
15.....	.85	.94	1.10	1.01	1.50	.62	1.19	1.21	.34	.45	.52	.65

Daily gage height, in feet, of Kamenehune ditch near Waimea, Kauai, for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	0.71	0.80	1.10	1.40	1.30	0.50	1.13	1.00	0.31	0.48	1.60	0.95
17.....	.80	.80	1.10	1.00	1.20	.50	1.11	.90	.37	.90	1.40	.87
18.....	.81	.70	1.00	1.31	1.20	.50	.94	.40	.32	1.20	1.25	.80
19.....	.75	.70	.85	1.10	.58	.50	.58	.40	.30	1.00	.98	.98
20.....	.77	.73	1.30	.91	.51	.55	.47	.40	.30	.98	.80	1.00
21.....	.90	1.39	1.10	.65	.50	.60	.40	.35	.45	1.40	.70	1.30
22.....	.95	1.54	.90	.75	.50	.69	.40	.30	.45	1.50	.70	.79
23.....	.91	1.33	.75	.80	.90	.43	.35	.30	.45	1.60	.65	.70
24.....	1.23	1.35	.65	.80	1.42	.40	.35	1.25	.45	1.30	.50	.75
25.....	1.10	1.11	1.40	.80	1.58	1.00	.31	.60	.45	1.40	.40	.80
26.....	1.00	1.10	1.30	1.00	.90	1.10	.30	.45	.45	1.61	.40	.69
27.....	1.30	1.20	1.00	1.00	.75	1.09	.30	1.50	.45	1.20	.40	.50
28.....	.90	1.40	1.00	.40	1.50	.97	.40	1.25	.45	1.00	.40	.60
29.....	1.00	.93	.85	.60	1.40	.93	.40	.60	.57	.95	.84	.60
30.....	.95	.....	.80	.60	.93	.62	.39	1.50	.49	1.30	.40	.70
31.....	.80	.....	1.43	.....	.89	.....	1.20	1.30	.....	1.40	.....	.64

### MAKAWELI RIVER BASIN.

#### MAKAWELI RIVER NEAR WAIMEA, KAUAI.

**Location.**—About 2 miles northeast of Waimea; reached by wagon road up Makaweli River.

**Records available.**—October 6, 1911, to December 31, 1912.

**Gage.**—Vertical staff gage; read daily at noon; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made from a wire suspension bridge.

**Accuracy.**—Records good.

*Discharge measurements of Makaweli River near Waimea, Kauai, in 1912.*

[Hydrographer, W. V. Hardy.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 4.....	3.55	29.8	July 14.....	3.90	64.1
July 13.....	7.40	2,080	Sept. 30.....	3.18	10.2
13.....	6.80	1,360	Dec. 3.....	8.35	2,930
13.....	5.98	744	4.....	4.38	171
13.....	5.56	524	10.....	3.36	18.8
13.....	5.40	427			

Daily gage height, in feet, of Makaweli River near Waimea, Kauai, for 1912.

[Taguchi Umeichi, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.30	3.30	3.35	3.30	3.30	3.30	3.40	3.30	3.30	3.20	3.35	5.75
2.....	3.32	3.28	3.58	3.22	3.35	3.28	3.30	3.28	3.28	3.28	3.32	7.45
3.....	3.28	3.22	4.52	3.22	3.32	3.22	3.30	3.22	3.30	3.80	3.58	7.40
4.....	3.28	3.60	4.25	3.30	3.55	3.55	3.35	3.20	4.58	3.30	3.45	4.30
5.....	3.30	3.70	4.78	3.25	3.62	3.40	3.40	3.20	4.32	3.15	3.38	4.10
6.....	3.28	3.50	4.92	3.42	3.50	3.38	3.30	3.48	4.10	3.10	3.43	4.00
7.....	3.20	3.25	4.20	5.50	3.48	3.28	3.30	3.30	3.80	3.08	3.45	3.60
8.....	3.30	3.32	4.28	3.50	3.45	3.25	3.32	3.30	3.55	3.08	3.70	4.10
9.....	3.22	3.30	4.42	5.40	3.52	3.22	3.30	3.35	3.30	3.05	3.60	3.30
10.....	3.28	3.28	4.58	3.50	3.42	3.22	3.28	3.32	3.38	3.02	3.38	3.33
11.....	3.30	3.55	5.85	3.45	3.40	3.35	3.25	3.40	3.32	3.05	3.32	3.28
12.....	3.32	3.58	5.58	3.40	3.35	3.32	3.20	3.38	3.32	3.10	3.30	3.20
13.....	3.38	3.55	5.42	3.38	3.30	3.52	6.50	3.35	3.28	3.10	3.28	3.20
14.....	3.28	3.55	5.35	3.32	3.58	3.48	4.55	3.35	3.35	3.15	3.28	3.10
15.....	3.25	3.52	5.15	3.30	3.52	3.38	3.58	3.38	3.35	3.15	3.22	3.10
16.....	3.20	3.52	4.82	3.30	3.50	3.35	3.32	3.38	3.32	3.10	3.22	3.00
17.....	3.38	3.52	4.58	3.55	3.45	3.32	3.35	3.35	3.38	3.45	3.28	3.00
18.....	3.40	3.55	4.35	3.48	3.40	3.32	3.35	3.32	3.35	3.22	3.25	3.00
19.....	3.35	3.55	4.28	3.30	3.35	3.35	3.30	3.32	3.30	3.35	3.22	3.00
20.....	3.28	3.58	4.00	3.32	3.28	3.32	3.22	3.30	3.30	3.28	3.88	4.00
21.....	3.25	3.52	4.10	3.30	3.60	3.30	3.20	3.48	3.28	3.25	3.52	4.70
22.....	3.22	4.00	3.82	3.35	3.52	3.30	3.28	3.35	3.20	3.25	3.38	4.90
23.....	3.22	5.70	3.75	3.32	3.40	3.38	3.55	3.35	3.35	3.50	3.60	4.08
24.....	3.28	4.32	3.72	3.50	3.25	3.32	3.52	3.30	3.35	3.45	3.38	4.20
25.....	4.50	4.05	3.85	3.45	3.22	3.62	3.48	3.30	3.32	3.30	3.20	3.50
26.....	4.30	3.70	3.78	3.40	3.20	3.48	3.35	4.58	3.32	3.30	3.20	3.40
27.....	3.28	3.55	3.75	3.38	3.35	3.45	3.35	4.22	3.30	3.55	3.35	3.38
28.....	3.25	3.52	3.58	3.38	3.58	3.42	3.32	4.00	3.30	3.50	3.32	3.38
29.....	3.22	3.52	3.45	3.35	3.45	3.38	3.38	3.55	3.25	3.45	3.38	3.32
30.....	3.22	-----	3.38	3.32	3.42	3.35	3.35	3.40	3.12	3.40	3.35	3.32
31.....	3.28	-----	3.35	-----	3.38	-----	3.30	3.32	-----	3.40	-----	3.15

Daily discharge, in second-feet, of Makaweli River near Waimea, Kauai, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	14.0	14.0	17.0	14.0	14.0	14.0	20.0	14.0	14.0	10.0	17.0	621.0
2.....	15.2	13.2	32.4	10.8	17.0	13.2	14.0	13.2	13.2	13.2	15.2	2,020.0
3.....	13.2	10.8	195.0	10.8	15.2	10.8	14.0	10.8	14.0	55.0	32.4	1,970.0
4.....	13.2	34.0	132.0	14.0	30.0	30.0	17.0	10.0	209.0	14.0	23.0	143.0
5.....	14.0	44.0	260.0	12.0	36.0	20.0	20.0	10.0	148.0	8.0	18.8	102.0
6.....	13.2	26.0	298.0	21.2	26.0	18.8	14.0	24.8	102.0	6.0	21.8	84.0
7.....	10.0	12.0	122.0	500.0	24.8	13.2	14.0	14.0	55.0	5.4	23.0	34.0
8.....	14.0	15.2	139.0	26.0	23.0	12.0	15.2	14.0	30.0	5.4	44.0	102.0
9.....	10.8	14.0	171.0	458.0	27.6	10.8	14.0	17.0	14.0	4.5	34.0	14.0
10.....	13.2	13.2	209.0	26.0	21.2	10.8	13.2	15.2	18.8	3.6	18.8	15.8
11.....	14.0	30.0	674.0	23.0	20.0	17.0	12.0	20.0	15.2	4.5	15.2	13.2
12.....	15.2	32.4	537.0	20.0	17.0	15.2	10.0	18.8	15.2	6.0	14.0	10.0
13.....	18.8	30.0	466.0	18.8	14.0	27.6	1,110.0	17.0	13.2	6.0	13.2	10.0
14.....	13.2	30.0	438.0	15.2	32.4	24.8	202.0	17.0	17.0	8.0	13.2	6.0
15.....	12.0	27.6	366.0	14.0	27.6	18.8	32.4	18.8	17.0	8.0	10.8	6.0
16.....	10.0	27.6	270.0	14.0	26.0	17.0	15.2	18.8	15.2	6.0	10.8	3.0
17.....	18.8	27.6	209.0	30.0	23.0	15.2	17.0	17.0	18.8	23.0	13.2	3.0
18.....	20.0	30.0	154.0	24.8	20.0	15.2	17.0	15.2	17.0	10.8	12.0	3.0
19.....	17.0	30.0	139.0	14.0	17.0	17.0	14.0	15.2	14.0	17.0	10.8	3.0
20.....	13.2	32.4	84.0	15.2	13.2	15.2	10.8	14.0	14.0	13.2	66.2	84.0
21.....	12.0	27.6	102.0	14.0	34.0	14.0	10.0	24.8	13.2	12.0	27.6	239.0
22.....	10.8	84.0	57.8	17.0	27.6	14.0	13.2	17.0	10.0	12.0	18.8	292.0
23.....	10.8	595.0	49.5	15.2	20.0	18.8	30.0	17.0	17.0	26.0	34.0	98.4
24.....	13.2	148.0	46.2	26.0	12.0	15.2	27.6	14.0	17.0	23.0	18.8	122.0
25.....	190.0	93.0	62.0	23.0	10.8	36.0	24.8	14.0	15.2	14.0	10.0	26.0
26.....	143.0	44.0	52.8	20.0	10.0	24.8	17.0	209.0	15.2	14.0	10.0	20.0
27.....	13.2	30.0	49.5	18.8	17.0	23.0	17.0	126.0	14.0	30.0	17.0	18.8
28.....	12.0	27.6	32.4	18.8	32.4	21.2	15.2	84.0	14.0	26.0	15.2	18.8
29.....	10.8	27.6	23.0	17.0	23.0	18.8	18.8	30.0	12.0	23.0	18.8	15.2
30.....	10.8	-----	18.8	15.2	21.2	17.0	17.0	20.0	6.8	20.0	17.0	15.2
31.....	13.2	-----	17.0	-----	18.8	-----	14.0	15.2	-----	20.0	-----	8.0

*Monthly discharge of Makaweli River near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	190.0	10.0	23.3	1,430	A.
February.....	595.0	10.8	54.2	3,120	A.
March.....	674.0	17.0	175.0	10,800	A.
April.....	500.0	10.8	48.9	2,910	B.
May.....	36.0	10.0	21.7	1,330	A.
June.....	36.0	10.8	18.0	1,070	A.
July.....	1,110.0	10.0	58.1	3,570	B.
August.....	209.0	10.0	28.6	1,760	B.
September.....	209.0	10.0	30.3	1,800	A.
October.....	55.0	3.6	14.4	885	B.
November.....	66.2	10.0	20.5	1,220	A.
December.....	2,020.0	3.0	198.0	12,200	B.
The year.....	2,020.0	3.0	57.8	42,100	

**HALEKUA STREAM NEAR WAIMEA, KAUAI.**

**Location.**—About 12 miles northeast of Waimea; station reached by saddle horse over trail from Waimea via Gay's mountain house; two days required for round trip; a guide is necessary.

**Records available.**—October 11, 1912, to December 31, 1912.

**Gage.**—Barrett & Lawrence automatic register.

**Channel.**—Practically permanent.

**Discharge measurements.**—Measurements are made by wading.

**Cooperation.**—Station maintained in cooperation with Hawaiian Sugar Co.

*Discharge measurements of Halekua Stream near Waimea, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Oct. 12	W. V. Hardy.....	<i>Feet.</i> 3.52	<i>Sec.-ft.</i> 0.48
Nov. 18	.....do.....	3.60	1.50

**OLOKELE DITCH AT TUNNEL NO. 12, NEAR MAKAWELI, KAUAI.**

**Location.**—About 12 miles northeast of Waimea; about 9 miles, straight-line measurement, northeast of Makaweli; and about 2 miles below intake.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—A vertical staff gage; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from a plank which is thrown across ditch when measurement is taken.

**Accuracy.**—Very good.

**Cooperation.**—Gage is the property of the Hawaiian Sugar Co., which furnishes gage heights at the end of the year.

*Discharge measurements of Olokele ditch at tunnel No. 12, near Makaweli, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Feb. 10	W. V. Hardy.....	<i>Feet.</i> 2.72	<i>Sec.-ft.</i> 69.1
Mar. 7	.....do.....	3.01	78.8
Nov. 28	.....do.....	2.04	45.3

*Daily gage height, in feet, of Olokele ditch at tunnel No. 12, near Makaweli, Kauai, for 1912.*

[Hawaiian Sugar Co., observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.40	2.40	3.10	2.40	2.20	2.30	2.10	2.20	2.80	2.30	2.90	3.80
2.....	2.40	2.80	2.90	2.50	2.40	2.20	2.20	2.10	3.50	2.50	2.30	3.60
3.....	2.60	2.50	3.50	2.30	3.50	2.10	2.10	2.10	3.40	3.50	2.40	3.70
4.....	2.40	2.60	3.00	2.60	3.50	2.40	2.50	2.00	3.20	2.20	2.60	3.00
5.....	2.50	2.40	2.50	2.40	3.50	2.30	2.10	2.10	2.50	2.50	3.80	3.50
6.....	2.90	2.30	3.00	2.40	2.50	2.20	2.50	2.10	3.50	2.60	2.90	2.70
7.....	2.60	2.30	3.22	3.50	2.30	2.10	3.50	2.10	3.50	2.30	2.90	2.60
8.....	3.50	2.30	2.60	3.30	3.50	2.10	2.40	3.50	2.70	3.20	2.30	3.70
9.....	3.50	2.30	3.50	3.50	2.40	2.70	2.10	3.20	2.40	2.90	3.80	2.40
10.....	2.70	2.51	3.20	3.00	2.20	2.40	2.70	2.40	2.30	3.40	2.70	2.60
11.....	2.50	2.60	3.50	3.00	2.20	2.20	3.50	3.20	2.20	2.20	2.40	2.40
12.....	2.40	2.30	3.50	2.40	2.10	2.10	2.70	2.40	2.30	2.20	2.20	2.20
13.....	3.10	2.30	3.50	2.50	2.20	3.20	3.10	2.50	2.20	2.10	2.20	2.10
14.....	3.20	2.30	3.30	3.40	3.50	3.50	3.30	3.50	2.20	2.10	2.10	2.20
15.....	2.50	2.20	2.70	2.30	3.50	2.50	3.50	3.30	2.10	2.10	2.10	2.30
16.....	2.40	2.20	2.50	2.50	2.50	2.90	2.50	2.30	2.10	2.40	2.10	2.80
17.....	2.40	2.20	2.40	2.40	2.40	2.20	3.50	2.30	2.90	2.20	2.10	2.10
18.....	2.30	2.20	2.80	3.20	2.20	2.90	2.60	2.10	2.20	2.60	2.40	2.20
19.....	2.30	2.20	2.40	2.40	2.10	3.50	2.40	2.10	2.40	3.50	3.60	2.20
20.....	2.30	2.20	2.40	2.80	2.30	2.50	2.20	2.10	2.20	2.60	2.30	3.70
21.....	2.50	2.40	2.50	2.40	2.60	3.50	2.50	2.40	2.30	3.50	3.70	3.00
22.....	2.40	3.50	2.50	2.40	3.50	3.30	2.60	2.30	3.40	3.30	3.00	3.30
23.....	2.40	3.50	2.30	2.70	3.50	3.10	3.50	2.30	2.20	3.50	2.70	3.70
24.....	2.80	3.50	2.20	2.40	3.50	3.50	3.50	2.30	2.10	2.40	2.50	3.70
25.....	2.50	3.00	3.50	2.90	2.50	2.60	2.50	2.30	2.00	2.20	2.20	3.70
26.....	2.40	2.60	2.50	3.50	2.30	2.30	3.50	2.30	2.00	3.50	2.20	3.70
27.....	2.40	2.80	2.30	2.40	3.50	2.50	2.40	3.50	2.00	3.30	2.10	2.90
28.....	2.40	2.60	2.90	2.50	3.50	2.20	2.20	2.90	2.00	3.50	2.02	3.00
29.....	2.30	2.40	2.40	2.30	3.50	2.20	2.30	2.40	2.20	3.10	3.70	2.50
30.....	2.30	.....	2.30	2.20	2.90	2.10	2.50	3.50	3.50	3.40	2.60	3.00
31.....	2.80	.....	2.60	.....	2.40	.....	2.20	3.40	.....	3.00	.....	2.40

*Daily discharge, in second-feet, of Olokele ditch at tunnel No. 12, near Makaweli, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	57	57	83	57	50	54	47	50	71	54	75	110
2.....	57	71	75	61	57	50	50	47	98	61	54	102
3.....	64	61	98	54	98	47	47	47	94	98	57	106
4.....	57	64	79	64	98	57	61	44	86	50	64	79
5.....	61	57	61	57	98	54	47	47	61	61	110	98
6.....	75	54	79	57	61	50	61	47	98	64	75	68
7.....	64	54	87	98	54	47	98	47	98	54	75	64
8.....	98	54	64	90	98	47	57	98	68	86	54	106
9.....	98	54	98	98	57	68	47	86	57	75	110	57
10.....	68	61	86	79	50	57	68	57	54	94	68	64
11.....	61	64	98	79	50	50	98	86	50	50	57	57
12.....	57	54	98	57	47	47	68	57	54	50	50	50
13.....	83	54	98	61	50	86	33	61	50	47	50	47
14.....	86	54	90	94	98	98	90	98	50	47	47	50
15.....	61	50	68	54	98	61	98	90	47	47	47	54
16.....	57	50	61	61	61	75	61	54	47	57	47	71
17.....	57	50	57	57	57	50	98	54	75	50	47	47
18.....	54	50	71	86	50	75	64	47	50	64	57	50
19.....	54	50	57	57	47	98	57	47	57	98	102	50
20.....	54	50	57	71	54	61	50	47	50	64	54	106
21.....	61	57	61	57	64	98	61	57	54	98	106	79
22.....	57	98	61	57	98	90	64	54	94	90	79	90
23.....	57	98	54	68	98	83	98	54	50	98	68	106
24.....	71	98	50	57	98	98	98	54	47	57	61	106
25.....	61	79	98	75	61	64	61	54	44	50	50	106
26.....	57	64	61	98	54	54	98	54	44	98	50	106
27.....	57	71	54	57	98	61	57	98	44	90	47	75
28.....	57	64	75	61	98	50	50	75	44	98	44	79
29.....	54	57	57	54	98	50	54	57	47	83	106	61
30.....	54	.....	54	50	75	47	61	98	98	94	64	79
31.....	71	.....	64	.....	57	.....	50	94	.....	79	.....	57

*Monthly discharge of Olokele ditch at tunnel No. 12, near Makaweli, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	98	54	63.9	3,930	A.
February.....	98	50	62.0	3,570	A.
March.....	98	50	72.7	4,470	A.
April.....	98	50	67.5	4,020	A.
May.....	98	47	72.0	4,430	B.
June.....	98	47	64.2	3,820	A.
July.....	98	47	67.8	4,170	B.
August.....	98	44	63.2	3,890	A.
September.....	98	44	62.7	3,730	A.
October.....	98	47	71.2	4,380	B.
November.....	110	44	65.8	3,920	A.
December.....	110	47	76.8	4,720	A.
The year.....	110	44	67.5	49,000	

#### OLOKELE DITCH AT WEIR NEAR WAIMEA, KAUAI.

**Location.**—About 8 miles northeast of Waimea and 1 mile east of Camp 9.

**Records available.**—January 1 to December 31, 1912.

**Gage.**—A vertical staff gage spiked to the right side of ditch. Zero on gage is equal to crest of weir.

**Discharge measurements.**—Made from plank over ditch and by a 12-foot weir with end contractions.

**Accuracy.**—Conditions and records are good.

**Cooperation.**—Station is the property of and records are furnished by the Hawaiian Sugar Co.

*Daily discharge, in second-feet, of Olokele ditch at weir near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	56.6	60.1	58.7	63.0	47.7	53.1	46.4	51.7	81.2	64.4	79.6	86.0
2.....	56.6	63.0	82.9	64.4	49.0	50.4	58.7	46.4	82.9	65.9	56.6	92.5
3.....	64.4	63.0	74.9	54.5	58.7	47.7	50.4	45.1	90.9	57.3	50.4	81.2
4.....	60.1	70.3	87.6	51.7	76.5	50.4	46.4	44.4	84.5	64.4	64.4	60.1
5.....	79.6	51.7	61.5	67.4	89.3	58.7	49.0	43.8	65.9	51.7	58.7	84.5
6.....	82.9	49.0	70.3	57.3	67.4	50.4	76.5	50.4	70.3	51.7	76.5	73.4
7.....	64.4	47.7	79.6	87.6	55.8	47.7	64.4	49.0	92.5	51.7	70.3	60.1
8.....	74.9	47.7	73.4	92.5	60.1	46.4	76.5	80.4	70.3	64.4	55.8	70.3
9.....	74.9	46.4	78.0	87.6	76.5	55.8	50.4	76.5	63.0	64.4	81.2	70.3
10.....	81.2	46.4	87.6	87.6	50.4	61.5	60.1	74.9	53.1	57.3	78.0	65.9
11.....	60.1	67.4	92.5	78.0	47.7	46.4	68.9	58.7	50.4	56.6	58.7	64.4
12.....	57.3	57.3	92.5	61.5	46.4	47.7	86.0	63.0	55.2	51.7	53.1	51.7
13.....	70.3	51.7	92.5	63.0	46.4	50.4	61.5	53.1	54.5	47.7	49.0	47.7
14.....	68.2	51.0	92.5	68.9	50.4	89.3	89.3	61.5	47.7	46.4	46.4	50.4
15.....	65.9	50.4	70.3	57.3	90.9	65.9	87.6	92.5	45.1	49.0	45.1	50.4
16.....	55.8	50.4	64.4	54.5	84.5	67.4	74.9	70.3	45.1	50.4	46.4	73.4
17.....	55.8	50.4	57.3	61.5	54.5	57.3	64.4	51.0	64.4	50.4	46.4	53.1
18.....	54.5	50.4	65.9	80.4	50.4	50.4	81.2	47.7	61.5	79.6	46.4	46.4
19.....	53.1	50.4	58.7	64.4	47.7	70.3	58.7	46.4	47.7	76.5	78.0	46.4
20.....	53.1	50.4	54.5	55.8	51.7	70.3	53.1	45.1	51.7	82.9	60.8	70.3
21.....	61.5	53.1	64.4	70.3	51.7	64.4	53.1	46.4	51.7	74.9	78.0	76.5
22.....	55.8	68.9	57.3	55.8	79.6	89.3	70.3	53.1	51.7	90.9	74.9	90.9
23.....	54.5	92.5	57.3	64.4	71.9	64.4	65.9	64.4	61.5	76.5	81.2	94.2
24.....	81.2	94.2	50.4	64.4	74.9	76.5	63.0	58.7	45.1	64.4	78.0	95.8
25.....	61.5	78.0	71.9	53.1	78.0	84.5	70.3	67.4	44.4	51.7	51.7	95.8
26.....	55.8	70.3	74.9	82.9	58.7	55.8	57.3	51.7	41.2	73.4	46.4	94.2
27.....	54.5	68.9	54.5	64.4	70.3	60.1	73.4	78.0	42.5	91.7	45.1	81.2
28.....	54.5	65.9	60.1	61.5	92.5	53.1	51.7	89.3	42.5	67.4	43.8	71.9
29.....	53.1	57.3	58.7	58.7	94.2	47.7	55.8	67.4	49.0	89.3	58.7	63.0
30.....	53.1	.....	54.5	50.4	84.5	46.4	55.8	74.9	62.2	61.5	76.5	58.7
31.....	71.9	.....	64.4	.....	58.7	.....	54.5	91.7	.....	76.5	.....	60.1

NOTE.—Discharge computed from Francis's formula,  $Q=3.33 (L-2 H) H^{\frac{3}{2}}$  when  $L=12$  feet.



*Monthly discharge of Olokele ditch at weir near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	82.9	53.1	62.8	3,860
February.....	94.2	46.4	59.3	3,420
March.....	92.5	50.4	69.8	4,290
April.....	92.5	50.4	66.2	3,940
May.....	94.2	46.4	65.1	4,000
June.....	89.3	46.4	59.3	3,530
July.....	89.3	46.4	63.7	3,920
August.....	92.5	43.8	61.1	3,760
September.....	92.5	41.2	59.0	3,510
October.....	91.7	46.4	64.6	3,970
November.....	81.2	43.8	61.2	3,640
December.....	95.8	46.4	70.3	4,320
The year.....	95.8	41.2	63.6	46,000

**POOWAIOMAHAIHAI DITCH NEAR WAIMEA, KAUAI.**

**Location.**—About 2 miles northeast of Waimea, 250 feet below intake and 110 feet below bridge station on Makaweli River.

**Records available.**—October 27, 1911, to December 31, 1912.

**Gage.**—A vertical staff gage spiked to tree on left bank of ditch; read at noon each day.

**Channel.**—Permanent.

**Discharge measurements.**—Made from timber bridge 15 feet above gage.

**Accuracy.**—Good.

*Discharge measurements of Poowaiomahaihai ditch near Waimea, Kauai, in 1912.*

[Hydrographer, W. V. Hardy.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
Mar. 4.....	1.12	9.17	Dec. 3.....	3.05	47.3
July 14.....	1.58	12.4	4.....	1.36	7.23
Sept. 30.....	1.12	5.62	10.....	1.21	5.52
Nov. 30.....	1.86	14.7			

*Daily gage height, in feet, of Poowaiomahaihai ditch near Waimea, Kauai, for 1912.*

[Taguchi Umeichi, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.20	1.00	0.99	0.90	0.90	0.80	1.20	1.00	1.00	1.10	1.20	3.10
2.....	1.21	.98	1.19	.80	1.00	.70	1.00	.90	.90	1.10	1.10	3.40
3.....	1.19	.98	1.20	.80	.90	.70	1.00	.80	1.00	1.60	1.40	3.22
4.....	1.19	1.20	1.10	.80	1.10	1.20	1.10	.80	1.60	1.30	1.30	1.40
5.....	1.20	1.21	1.29	.78	1.20	1.00	1.20	1.00	1.50	1.20	1.20	1.30
6.....	1.18	1.10	1.35	.90	1.10	.80	.90	1.20	1.40	1.10	1.42	1.32
7.....	1.17	.99	1.20	1.50	1.00	.70	.90	1.00	1.30	1.10	1.30	1.20
8.....	1.20	1.08	1.10	1.00	.90	.70	1.00	1.10	1.30	1.10	1.60	1.30
9.....	1.21	1.00	1.40	1.40	1.20	.70	.90	1.10	1.20	1.00	1.50	1.20
10.....	1.30	.98	1.52	1.00	.90	.70	.90	1.20	1.30	1.00	1.20	1.20
11.....	1.22	1.08	1.78	.90	.90	.80	1.50	1.20	1.20	1.00	1.20	1.20
12.....	1.20	1.12	1.65	.90	.80	.80	1.40	1.10	1.20	1.10	1.10	1.10
13.....	1.20	1.08	1.60	.88	.70	1.20	2.30	1.00	1.00	1.10	1.10	1.10
14.....	1.24	1.08	1.53	.88	1.10	1.10	1.57	1.10	1.10	1.20	1.10	1.10
15.....	1.10	.99	1.50	.80	1.10	1.00	1.20	1.10	1.10	1.20	1.00	1.00
16.....	1.00	.98	1.48	.80	1.00	.80	1.10	1.20	1.10	1.00	1.00	.90
17.....	1.10	.98	1.35	1.10	.90	.80	1.10	1.20	1.10	1.30	1.10	.90
18.....	1.25	.99	1.30	1.00	.90	.80	1.00	1.20	1.10	1.25	1.00	.90
19.....	1.15	.98	1.27	.90	.80	.80	.90	1.20	1.00	1.30	1.10	.90
20.....	1.12	.99	1.23	.90	.70	.80	.80	1.00	1.00	1.20	1.70	1.30

*Daily gage height, in feet, of Poowaiomahaihai ditch near Waimea, Kauai, for 1912—Con.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.11	0.97	1.19	0.90	1.30	0.70	0.80	1.00	0.90	1.20	1.40	2.70
22.....	1.10	1.20	1.14	1.00	1.20	.70	.80	1.30	.80	1.20	1.20	2.40
23.....	1.00	1.40	1.12	.90	1.10	.90	1.20	1.30	1.10	1.40	1.50	1.40
24.....	1.10	1.23	1.10	1.10	.80	.80	1.10	1.20	1.10	1.30	1.20	1.50
25.....	1.30	1.10	.90	1.00	.80	1.30	1.00	1.20	1.10	1.20	1.10	1.60
26.....	1.25	1.09	.95	1.00	.70	1.10	.90	1.50	1.00	1.20	1.10	1.30
27.....	1.00	.98	.92	.90	.80	1.00	.90	1.40	1.20	1.60	1.20	1.30
28.....	.98	.97	.92	.90	1.20	.80	.90	1.40	1.12	1.40	1.20	1.30
29.....	.97	.97	.83	.80	1.00	1.00	.90	1.30	1.10	1.30	1.30	1.20
30.....	.97	.....	.81	.70	.90	.90	.80	1.20	1.10	1.20	1.58	1.20
31.....	1.00	.....	.80	.....	.90	.....	.80	1.30	.....	1.20	.....	1.00

*Daily discharge, in second-feet, of Poowaiomahaihai ditch near Waimea, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.2	4.3	4.2	3.5	3.5	2.8	6.2	4.3	4.3	5.2	6.2	49.0
2.....	6.3	4.1	6.1	2.8	4.3	2.3	4.3	3.5	3.5	5.2	5.2	60.0
3.....	6.1	4.1	6.2	2.8	3.5	2.3	4.3	2.8	4.3	11.2	8.5	52.8
4.....	6.1	6.2	5.2	2.8	5.2	6.2	5.2	2.8	11.2	7.3	7.3	8.5
5.....	6.2	6.3	7.2	2.7	6.2	4.3	6.2	4.3	9.8	6.2	6.2	7.3
6.....	6.0	5.2	7.9	3.5	5.2	2.8	3.5	6.2	8.5	5.2	8.8	7.5
7.....	5.9	4.2	6.2	9.8	4.3	2.3	3.5	4.3	7.3	5.2	7.3	6.2
8.....	6.2	5.0	5.2	4.3	3.5	2.3	4.3	5.2	7.3	5.2	11.2	7.3
9.....	6.3	4.3	8.5	8.5	6.2	2.3	3.5	5.2	6.2	4.3	9.8	6.2
10.....	7.3	4.1	10.1	4.3	3.5	2.3	3.5	6.2	7.3	4.3	6.2	6.2
11.....	6.4	5.0	14.2	3.5	3.5	2.8	9.8	6.2	6.2	4.3	6.2	6.2
12.....	6.2	5.4	12.0	3.5	2.8	2.8	8.5	5.2	6.2	5.2	5.2	5.2
13.....	6.2	5.0	11.2	3.4	2.3	6.2	25.0	4.3	4.3	5.2	5.2	5.2
14.....	6.6	5.0	10.2	3.4	5.2	5.2	10.8	5.2	5.2	6.2	5.2	4.3
15.....	5.2	4.2	9.8	2.8	5.2	4.3	6.2	5.2	5.2	6.2	4.3	4.3
16.....	4.3	4.1	9.5	2.8	4.3	2.8	5.2	6.2	5.2	4.3	4.3	3.5
17.....	5.2	4.1	7.9	5.2	3.5	2.8	5.2	6.2	5.2	7.3	5.2	3.5
18.....	6.8	4.2	7.3	4.3	3.5	2.8	4.3	6.2	5.2	6.8	4.3	3.5
19.....	5.7	4.1	7.0	3.5	2.8	2.8	3.5	6.2	4.3	7.3	5.2	3.5
20.....	5.4	4.2	6.5	3.5	2.3	2.8	2.8	4.3	4.3	6.2	12.8	7.3
21.....	5.3	4.1	6.1	3.5	7.3	2.3	2.8	4.3	3.5	6.2	8.5	36.0
22.....	5.2	6.2	5.6	4.3	6.2	2.3	2.8	7.3	2.8	6.2	6.2	27.0
23.....	4.3	8.5	5.4	3.5	5.2	3.5	6.2	7.3	5.2	8.5	9.8	8.5
24.....	5.2	6.5	5.2	5.2	2.8	2.8	5.2	6.2	5.2	7.3	6.2	9.8
25.....	7.3	5.2	3.5	4.3	2.8	7.3	4.3	6.2	5.2	6.2	5.2	11.2
26.....	6.8	5.1	3.9	4.3	2.3	5.2	3.5	9.8	4.3	6.2	5.2	7.3
27.....	4.3	4.1	3.7	3.5	2.8	4.3	3.5	8.5	6.2	11.2	6.2	7.3
28.....	4.1	4.1	3.7	3.5	6.2	2.8	3.5	8.5	5.4	8.5	6.2	7.3
29.....	4.1	4.1	3.0	2.8	4.3	4.3	3.5	7.3	5.2	7.3	7.3	6.2
30.....	4.1	.....	2.9	2.3	3.5	3.5	2.8	6.2	5.2	6.2	10.8	6.2
31.....	4.3	.....	2.8	.....	3.5	.....	2.8	7.3	.....	6.2	.....	4.3

*Monthly discharge of Poowaiomahaihai ditch near Waimea, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	7.3	4.1	5.66	348	C.
February.....	8.5	4.1	4.86	280	C.
March.....	14.2	2.8	6.72	413	C.
April.....	9.8	2.3	3.94	234	C.
May.....	7.3	2.3	4.12	253	C.
June.....	7.3	2.3	3.45	205	C.
July.....	25.0	2.8	5.38	331	B.
August.....	9.8	2.8	5.77	355	B.
September.....	11.2	2.8	5.64	336	B.
October.....	11.2	4.3	6.40	394	B.
November.....	12.8	4.3	6.87	409	A.
December.....	60.0	3.5	12.50	769	A.
The year.....	60.0	2.3	5.96	4,330	

## HANAPEPE RIVER BASIN.

**EAST BRANCH OF HANAPEPE RIVER<sup>1</sup> AT HANAPEPE FALLS, NEAR ELEELE, KAUAI.****Location.**—About 8 miles north of Eleele and a short distance below Hanapepe Falls.**Records available.**—November 22, 1911, to December 31, 1912.**Gage.**—Vertical staff; datum unchanged.**Discharge measurements.**—Made by wading on crest of masonry dam; crest 3 feet wide and 75 feet long.*Daily gage height, in feet, of East Branch of Hanapepe River at Hanapepe Falls, near Eleele, Kauai, for 1912.*

[S. W. Holmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.												
2.									0.20			0.85
3.									.05			1.18
4.				0.02	0.55	0.03						
5.	0.35										0.16	.05
6.									.22			.01
7.								0.02				
8.	.10			.25	.05						.45	
9.	.10		0.10	.20				.28			.05	0.5
10.				.50								
11.			1.00				0.40					
12.			.35									
13.			.60			.32	.20					
14.	.18		.22		.13			.50				
15.			.15		.09	.03	.34	.02				
16.			.05				.17		.12			
17.							.42			0.15		
18.							.10				.05	
19.						.15	.05			.24		
20.				.25								
21.						.04				.38		.95
22.					.02			.01			.38	
23.	.22	0.50			.05						.20	.70
24.	.16				.22		.10					.76
25.	.20			.70								
26.	.20						.02			.70		.20
27.	.20				.22			.20				.10
28.					.70			.05		.05		.06
29.					.20							
30.					.05			.65		.02	.20	.02
31.								.13		.05		.03

NOTE.—Gage heights represent water flowing over dam; station not visited Sundays, but lack of gage heights on week days indicates that all the water was diverted at the dam.

**HANAPEPE RIVER AT KOULA, NEAR ELEELE, KAUAI.****Location.**—About 5 miles north of Eleele.**Records available.**—August 18, 1910, to December 31, 1912.**Drainage area.**—12.63 square miles.**Gage.**—Friez automatic register; datum unchanged.**Channel.**—Fairly permanent.**Discharge measurements.**—Made from cable and car.**Accuracy.**—Records good.*Discharge measurements of Hanapepe River at Koula, near Eleele, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Mar. 6	W. V. Hardy	<i>Feet.</i> 1.06	<i>Sec.-ft.</i> 17.8
Dec. 16	do.	1.20	20.9

<sup>1</sup> Described in Water-Supply Paper 318, p. 77, as Hanapepe River at Hanapepe Falls, near Eleele Kauai.

*Daily gage height, in feet, of Hanapepe River at Koula, near Eleele, Kauai, for 1912.*

[S. W. Holmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.10	1.05	1.07	1.05	1.05	1.15	1.07	1.19	1.82	1.23	1.29	1.71
2	1.12	1.05	1.08	1.00	1.05	1.10	1.05	1.07	1.81	1.12	1.18	4.18
3	1.18	1.05	1.20	1.00	1.46	1.11	1.04	1.09	1.71	1.38	1.16	4.70
4	1.25	1.07	1.07	1.20	1.64	1.36	1.02	1.23	1.40	1.10	1.15	2.38
5	1.67	1.00	1.00	1.10	1.50	1.38	1.18	1.21	1.28	1.19	1.61	1.61
6	1.21	1.00	1.05	1.49	1.14	1.21	1.11	1.19	2.48	1.20	1.26	1.39
7	1.20	1.00	1.15	2.70	1.07	1.11	1.34	1.22	1.61	1.19	1.20	1.29
8	1.52	1.00	1.06	1.75	1.36	1.13	1.04	1.49	1.42	1.37	1.96	2.05
9	1.47	1.00	1.91	2.27	1.07	1.21	1.10	1.55	1.34	1.19	2.03	1.60
10	1.21	1.00	1.57	1.47	1.06	1.07	1.38	1.11	1.18	1.20	1.31	1.31
11	1.15	1.00	3.00	1.35	1.08	1.05	1.92	1.10	1.24	1.13	1.18	1.22
12	1.19	1.00	2.35	1.15	1.05	1.06	1.21	1.06	1.30	1.17	1.12	1.10
13	1.49	1.00	2.80	1.11	1.07	1.65	2.74	1.04	1.19	1.12	1.10	1.12
14	1.64	1.00	1.90	1.20	1.46	1.37	2.48	2.19	1.17	1.13	1.09	1.12
15	1.17	1.00	1.50	1.08	1.80	1.28	2.05	1.55	1.14	1.11	1.10	1.09
16	1.15	1.00	1.27	1.18	1.22	1.20	1.52	1.19	1.19	1.12	1.10	1.29
17	1.10	1.00	1.25	1.60	1.08	1.08	2.44	1.10	1.18	1.41	1.09	1.10
18	1.09	1.00	1.35	1.28	1.05	1.18	1.58	1.05	1.04	1.42	1.30	1.12
19	1.07	1.00	1.10	1.05	1.08	1.34	1.36	1.07	1.14	1.98	1.29	1.15
20	1.14	1.00	1.10	1.42	1.07	1.12	1.20	1.07	1.11	1.52	1.16	1.83
21	1.05	1.08	1.10	1.06	1.14	1.57	1.37	1.14	1.12	2.21	1.36	2.79
22	1.05	1.31	1.10	1.18	1.31	1.32	1.04	1.38	1.29	1.68	1.51	2.98
23	1.50	2.55	1.08	1.27	1.37	1.25	1.03	1.24	1.13	1.57	1.69	2.82
24	1.52	1.88	1.12	1.10	1.55	1.78	1.54	1.64	1.08	1.21	1.25	3.81
25	1.30	1.25	1.55	1.50	1.24	1.23	1.19	1.38	1.06	1.59	1.17	2.87
26	1.35	1.13	1.13	1.31	1.18	1.17	1.39	1.55	1.04	2.53	1.10	1.89
27	1.35	1.02	1.05	1.15	1.81	1.22	1.16	2.58	1.03	1.75	1.07	1.61
28	1.33	1.00	1.06	1.10	2.82	1.11	1.12	1.58	1.07	1.81	1.09	1.44
29	1.09	1.06	1.05	1.05	2.07	1.09	1.19	1.47	1.15	1.56	1.41	1.35
30	1.18	-----	1.05	1.05	1.52	1.05	1.18	2.50	1.19	1.48	1.42	1.29
31	1.18	-----	1.07	-----	1.08	-----	1.22	1.81	-----	1.52	-----	1.27

*Daily discharge, in second-feet, of Hanapepe River at Koula, near Eleele, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	18.0	15.5	16.5	15.5	15.5	20.5	16.5	22.5	90.2	25.1	29.3	73.5
2	19.0	15.5	17.0	13.0	15.5	18.0	15.5	16.5	88.6	19.0	22.0	581.0
3	22.0	15.5	23.0	13.0	44.0	18.5	15.0	17.5	73.5	36.4	21.0	701.0
4	26.5	16.5	16.5	23.0	64.2	34.8	14.0	25.1	38.0	18.0	20.5	191.0
5	68.1	13.0	13.0	18.0	48.0	36.4	22.0	23.7	28.6	22.5	60.3	60.3
6	23.7	13.0	15.5	47.0	20.0	23.7	18.5	22.5	211.0	23.0	27.2	37.2
7	23.0	13.0	20.5	256.0	16.5	18.5	33.2	24.4	60.3	22.5	23.0	99.3
8	50.2	13.0	16.0	79.5	34.8	19.5	15.0	47.0	40.0	35.6	113.0	129.0
9	45.0	13.0	105.0	170.0	16.5	23.7	18.0	53.5	33.2	22.5	125.0	48.0
10	23.7	13.0	55.7	45.0	16.0	16.5	36.4	18.5	22.0	23.0	30.8	30.8
11	20.5	13.0	320.0	34.0	17.0	15.5	106.0	18.0	25.8	19.5	22.0	24.4
12	22.5	13.0	186.0	20.5	15.5	16.0	23.7	16.0	30.0	21.5	19.0	18.0
13	47.0	13.0	277.0	18.5	16.5	65.5	264.0	15.0	22.5	19.0	18.0	19.0
14	64.2	13.0	103.0	23.0	44.0	35.6	211.0	155.0	21.5	19.5	17.5	19.0
15	21.5	13.0	48.0	17.0	87.0	28.6	129.0	53.5	20.0	18.5	18.0	17.5
16	20.5	13.0	27.9	22.0	24.4	23.0	50.2	22.5	22.5	19.0	18.0	29.3
17	18.0	13.0	26.5	59.0	17.0	17.0	203.0	18.0	22.0	39.0	17.5	18.0
18	17.5	13.0	34.0	28.6	15.5	22.0	56.8	15.5	15.0	40.0	30.0	19.0
19	16.5	13.0	18.0	15.5	17.0	33.2	34.8	16.5	20.0	117.0	29.3	20.5
20	20.0	13.0	18.0	40.0	16.5	19.0	23.0	16.5	18.5	50.2	21.0	91.8
21	15.5	17.0	18.0	16.0	20.0	55.7	35.6	20.0	19.0	159.0	34.8	275.0
22	15.5	30.8	18.0	22.0	33.2	31.6	15.0	36.4	29.3	69.4	49.1	316.0
23	48.0	225.0	17.0	27.9	35.6	26.5	14.5	25.8	19.5	55.7	70.7	281.0
24	50.2	100.0	19.0	18.0	53.5	84.0	52.4	64.2	17.0	23.7	26.5	498.0
25	30.0	26.5	53.5	48.0	25.8	25.1	22.5	36.4	16.0	57.9	21.5	292.0
26	34.0	19.5	19.5	30.8	22.0	21.5	37.2	53.5	15.0	221.0	18.0	101.0
27	34.0	14.0	15.5	20.5	88.6	24.4	21.0	231.0	14.5	79.5	16.5	60.3
28	32.4	13.0	16.0	18.0	281.0	18.5	19.0	56.8	16.5	88.6	17.5	42.0
29	17.5	16.0	15.5	15.5	133.0	17.5	22.5	45.0	20.0	54.6	39.0	34.0
30	22.0	-----	15.5	15.5	50.2	15.5	22.0	215.0	22.5	46.0	40.2	29.3
31	22.0	-----	16.5	-----	17.0	-----	24.4	88.6	-----	50.2	-----	27.9

*Monthly discharge of Hanapepe River near Eleele, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	68.1	15.5	29.3	1,800	B.
February.....	225.0	13.0	25.3	1,460	B.
March.....	320.0	13.0	51.0	3,140	B.
April.....	256.0	13.0	39.7	2,360	B.
May.....	281.0	15.5	42.6	2,620	B.
June.....	84.0	15.5	27.5	1,640	B.
July.....	264.0	14.0	51.3	3,150	B.
August.....	231.0	15.0	48.1	2,960	B.
September.....	211.0	14.5	36.4	2,170	B.
October.....	221.0	18.0	48.9	3,010	B.
November.....	125.0	16.5	33.9	2,020	B.
December.....	701.0	17.5	133.0	8,180	B.
The year.....	701.0	13.0	47.5	34,500	

**HANAPEPE DITCH AT HANAPEPE FALLS, NEAR ELEELE, KAUAI.**

**Location.**—About 8 miles northeast of Eleele, near Hanapepe Falls, and 400 feet below the intake.

**Records available.**—November 22, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily (at irregular hour), except Sundays; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Measurements made from cross timber of flume 4 feet above gage.

**Accuracy.**—Records good.

*Discharge measurements of Hanapepe ditch at Hanapepe Falls, near Eleele, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Mar. 6	W. V. Hardy.....	<i>Feet.</i> 0.82	<i>Sec.-ft.</i> 10.5
Nov. 7	Larrison and Hardy.....	1.08	15.9

*Daily gage height, in feet, of Hanapepe ditch at Hanapepe Falls, near Eleele, Kauai, for 1912.*

[S. W. Holmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	.....	0.90	0.90	0.91	0.96	1.15	1.05	1.00	.....	1.28	1.27	.....
2.....	1.10	.89	.85	.88	.97	.....	.97	.98	1.50	.95	1.16	1.82
3.....	1.10	.89	.....	.87	1.20	1.08	.94	.95	1.43	1.18	.....	1.37
4.....	1.07	.....	.86	1.38	1.60	1.40	.....	.....	1.34	.98	.95	.....
5.....	1.35	.86	.83	.92	.....	1.14	1.20	1.23	1.28	.95	1.48	1.40
6.....	1.13	.85	.82	.92	1.04	1.07	.91	1.09	1.52	.....	1.21	1.35
7.....	.....	.85	.83	.....	1.08	1.05	.....	1.39	1.20	1.12	1.06	1.32
8.....	1.25	.85	.90	1.37	1.14	1.05	.92	1.37	.....	1.22	1.62	.....
9.....	1.25	.90	1.33	1.32	1.10	.....	1.14	1.54	1.20	1.02	1.43	1.42
10.....	1.18	.86	.....	1.26	1.02	1.00	1.22	1.15	1.17	1.00	.....	1.33
11.....	1.10	.....	1.69	1.23	1.00	.99	1.60	.....	1.12	.94	1.14	1.20
12.....	1.10	.84	1.43	1.14	.....	1.14	1.16	1.05	1.15	1.07	1.08	1.16
13.....	1.10	.83	1.55	1.06	1.20	1.60	1.30	1.04	1.10	.....	1.02	1.29
14.....	.70	.82	1.24	.....	1.45	1.37	.....	1.62	1.05	1.10	1.00	1.09
15.....	1.05	.81	1.20	1.02	1.44	1.40	1.20	1.40	.....	.92	.99	.....
16.....	1.02	.81	1.17	1.02	1.16	.....	1.17	1.20	1.46	.94	.95	1.10
17.....	1.01	.83	.....	1.10	1.04	1.05	1.24	1.01	1.09	1.42	.....	1.02
18.....	1.00	.....	1.24	1.10	1.01	1.18	1.14	.....	1.00	1.00	1.42	1.00
19.....	.98	.80	1.11	.99	.....	1.50	1.12	1.13	1.32	1.50	1.10	.98
20.....	1.15	.80	1.11	1.55	.96	1.15	1.27	1.10	1.07	.....	1.02	1.28

*Daily gage height, in feet, of Hanapepe ditch at Hanapepe Falls, near Eleele, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	.....	0.90	1.11	.....	1.00	1.42	.....	1.10	1.05	1.60	1.12	1.84
22.....	0.95	1.20	1.05	1.22	1.37	1.25	1.15	1.40	.....	1.38	1.58	.....
23.....	1.34	1.50	.98	1.37	1.43	.....	1.10	1.08	.99	1.30	1.49	1.40
24.....	.55	1.27	.....	1.05	1.50	1.33	1.30	1.22	.96	1.13	.....	1.45
25.....	.14	.....	1.25	1.67	1.22	1.12	1.10	.....	.94	1.11	1.04	.....
26.....	.14	1.00	1.04	1.32	.....	1.07	1.38	1.21	.92	1.68	1.00	1.28
27.....	.14	.91	.96	1.15	1.50	1.07	1.10	1.54	.92	.....	.96	1.22
28.....	.....	.88	.95	.....	1.43	1.02	.....	1.42	1.00	1.43	.94	1.22
29.....	.88	.87	.93	1.01	1.28	1.02	1.05	1.22	.....	1.33	1.15	.....
30.....	.86	.....	.92	.97	1.28	.97	1.18	1.90	1.28	1.41	1.50	1.18
31.....	.90	.....	.94	.....	1.20	.....	1.03	1.48	.....	1.43	.....	1.20

*Daily discharge, in second-feet, of Hanapepe ditch at Hanapepe Falls, near Eleele, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	16.0	12.0	12.0	12.2	13.2	17.5	15.0	14.0	24.8	20.6	20.4	28.7
2.....	16.0	11.8	11.0	11.6	13.4	16.6	13.4	13.6	25.0	13.0	17.8	32.4
3.....	16.0	11.8	11.1	11.4	19.0	15.6	12.8	13.0	23.6	18.4	15.4	22.4
4.....	15.4	11.5	11.2	22.6	28.0	23.0	15.9	16.3	21.8	13.6	13.0	22.7
5.....	22.0	11.2	10.6	12.4	21.4	17.2	19.0	19.6	20.6	13.0	24.6	23.0
6.....	16.9	11.0	10.4	12.4	14.8	15.4	12.2	15.8	25.6	14.8	19.2	22.0
7.....	18.6	11.0	10.6	17.4	15.6	15.0	12.3	22.8	19.0	16.6	15.2	21.4
8.....	20.0	11.0	12.0	22.4	17.2	15.0	12.4	22.4	19.0	19.4	28.4	22.4
9.....	20.0	12.0	21.6	21.4	16.0	14.5	17.2	26.2	19.0	14.4	23.6	23.4
10.....	18.4	11.2	25.7	20.2	14.4	14.0	19.4	17.5	18.1	14.0	20.4	21.6
11.....	16.0	11.0	29.8	19.6	14.0	13.8	28.0	16.2	16.6	12.8	17.2	19.0
12.....	16.0	10.8	23.6	17.2	16.5	17.2	17.8	15.0	17.5	15.4	15.6	17.8
13.....	16.0	10.6	26.5	15.2	19.0	28.0	21.0	14.8	16.0	15.7	14.4	20.8
14.....	8.3	10.4	19.8	14.8	24.0	22.4	20.0	28.4	15.0	16.0	14.0	15.8
15.....	15.0	10.2	19.0	14.4	23.8	23.0	19.0	23.0	19.6	12.4	13.8	15.9
16.....	14.4	10.2	18.1	14.4	17.8	19.0	16.1	19.0	24.2	12.8	13.0	16.0
17.....	14.2	10.6	19.4	16.0	14.8	15.0	19.8	14.2	15.8	23.4	18.2	14.4
18.....	14.0	10.3	19.8	16.0	14.2	18.4	17.2	15.6	14.0	14.0	23.4	14.0
19.....	13.6	10.0	16.3	13.8	13.7	25.0	16.6	16.9	21.4	25.0	16.0	13.6
20.....	17.5	10.0	16.3	26.5	13.2	17.5	20.4	16.0	15.4	26.5	14.4	20.6
21.....	15.2	12.0	16.3	23.0	14.0	23.4	19.0	16.0	15.0	28.0	16.6	32.8
22.....	13.0	19.0	15.0	19.4	22.4	20.0	17.5	23.0	14.4	22.6	27.4	27.9
23.....	21.8	25.0	13.6	22.4	23.6	20.8	16.0	15.6	13.8	21.0	24.8	23.0
24.....	57.5	20.4	16.3	15.0	25.0	21.6	21.0	19.4	13.2	16.9	19.8	24.0
25.....	.9	17.2	20.0	29.4	19.4	16.6	16.0	19.3	12.8	16.3	14.8	22.3
26.....	.9	14.0	14.8	21.4	22.2	15.4	22.6	19.2	12.4	29.6	14.0	20.6
27.....	.9	12.2	13.2	17.5	25.0	15.4	16.0	26.2	12.4	26.6	13.2	19.4
28.....	10.4	11.6	13.0	15.8	23.6	14.4	15.5	23.4	14.0	23.6	12.8	19.4
29.....	11.6	11.4	12.6	14.2	20.6	14.4	15.0	19.4	17.3	21.6	17.5	18.9
30.....	11.2	.....	12.4	13.4	20.6	13.4	18.4	34.0	20.6	23.2	25.0	18.4
31.....	12.0	.....	12.8	.....	19.0	.....	14.6	24.6	.....	23.6	.....	19.0

NOTE.—Discharge interpolated for days for which gage heights are missing.

*Monthly discharge of Hanapepe ditch at Hanapepe Falls, near Eleele, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	57.5	0.9	15.5	953	B.
February.....	25.0	10.0	12.5	719	B.
March.....	29.8	10.4	16.3	1,000	B.
April.....	29.4	11.4	17.4	1,040	B.
May.....	28.0	13.2	18.7	1,150	B.
June.....	28.0	13.4	18.0	1,070	B.
July.....	28.0	12.2	17.3	1,080	B.
August.....	34.0	13.0	17.9	1,170	B.
September.....	25.6	12.4	17.9	1,070	B.
October.....	29.6	12.4	18.9	1,160	B.
November.....	28.4	12.8	18.1	1,080	B.
December.....	32.8	13.6	21.1	1,300	B.
The year.....	57.5	.9	17.6	12,800	

**HANAPEPE DITCH AT KOULA, NEAR ELEELE, KAUAI.**

**Location.**—About 4 miles north of Eleele, and 4 miles below intake.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from cross timber of flume.

**Accuracy.**—Good.

**Cooperation.**—Station maintained in cooperation with Hawaiian Sugar Co.

*Discharge measurements of Hanapepe ditch at Koula, near Eleele, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Mar. 5	W. V. Hardy.....	<i>Feet.</i> 2.56	<i>Sec.-ft.</i> 40.0
Nov. 7	Larrison and Hardy.....	2.78	41.9

*Daily gage height, in feet, of Hanapepe ditch at Koula, near Eleele, Kauai, for 1912.*

[S. W. Holmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.40	3.10	3.10	2.63	2.90	3.00	2.80	2.80	3.10	3.00	3.10	3.10
2.....	3.40	3.10	3.10	2.61	2.72		2.77	1.74	3.10	2.72	2.80	3.10
3.....	3.45	3.05		2.90	3.10	2.84	2.70	1.68	3.10	3.10		3.10
4.....	3.35	3.00	3.25	2.65	3.10	3.04	2.80		3.10	2.62	2.78	3.10
5.....	3.70	3.00	3.00	2.80		3.06	2.95	3.10	3.08	2.70	3.10	3.10
6.....	3.70	2.95	3.10	2.70	3.08	3.10	2.70	3.10	3.10		3.00	3.10
7.....	3.70	2.95	2.85	3.10	2.92	2.88	3.06	3.10	3.10	2.80	3.00	
8.....	3.70	2.95	2.60	3.10	3.10	2.88	2.86	3.10		2.90	2.80	3.10
9.....	3.70	2.95	3.10	3.10	3.00	3.10	2.78	3.10	2.10	3.08	3.10	3.10
10.....	3.60	3.20	3.10	3.10	2.80	2.88	3.10	3.00	3.00	3.00		3.10
11.....	3.45	3.00	3.10	3.10	2.79	2.78	3.10	3.10	2.92	2.55	2.98	3.10
12.....	3.40	2.90	3.10	3.05		2.68	3.10	2.06	2.92	2.52	2.78	2.94
13.....	3.70	2.90	3.10	2.90	2.90	3.10	3.10	2.94	2.92	2.52	2.70	2.84
14.....		2.90	3.10		3.10	3.10	3.10	3.10	2.77	2.51	2.65	2.80
15.....	3.30	2.88	3.10	2.84	3.10	3.10	3.10	3.10	2.73	2.51	2.59	
16.....	3.25	2.88	3.10	2.82	3.10	3.10	3.10	3.08	2.70	2.50	2.50	2.70
17.....	3.20	2.92	3.10	2.10	2.96	2.77	3.10	2.93	3.10	2.58		2.70
18.....	3.18	2.90	3.10	2.10	2.60	3.10	3.10		2.73	2.85	2.70	2.60
19.....	3.15	2.88	3.20	2.94		3.10	3.10	2.80	2.96	3.10	3.10	2.64
20.....	3.40	2.80	2.95	3.10	2.72	3.00	3.10	2.74	2.80	3.10	2.62	3.10
21.....	3.20	3.05	2.92	2.94	2.74	3.10	3.10	2.67	2.76	3.10	3.10	3.10
22.....	3.18	3.70	2.80	3.10	3.10	3.10	3.10	3.10	3.10	3.10	2.96	
23.....	3.15	3.70	2.60	3.10	3.10		3.10	2.84	2.70	3.10	3.10	3.10
24.....	1.90	3.70		2.92	3.10	3.10	3.10	3.10	2.60	2.90	3.00	3.10
25.....	2.45		3.10	3.10	3.10	3.10	3.06	3.10	2.52	2.75	2.75	3.10
26.....	2.40	3.35	2.80	3.10	3.00	3.00	3.10	3.10	2.48	3.10	2.60	3.10
27.....	2.40	3.20	2.74	3.06	3.10	3.00	3.02	3.10	2.48	3.10	2.55	3.10
28.....	2.20	3.15	2.73		3.10	2.84		2.78	2.45	3.10	2.55	3.10
29.....	3.00	3.02	2.60	2.80	3.10	2.77	2.88	3.08	2.55	3.10	3.08	
30.....	2.98		2.63	2.70	3.10	2.77	3.08	3.10	3.00	3.10	3.10	3.10
31.....	3.20		2.74		3.10		2.85			3.10		3.10

NOTE.—No reading on days for which gage heights are missing.

*Daily discharge, in second-feet, of Hanapepe ditch at Koula, near Eleele, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	59.3	51.5	51.5	39.8	46.5	49.0	44.0	44.0	51.5	49.0	51.5	51.5
2.....	59.3	51.5	51.5	39.2	42.0	47.0	43.2	20.2	51.5	42.0	44.0	51.5
3.....	60.6	50.2	53.4	46.5	51.5	45.0	41.5	19.0	51.5	51.5	43.8	51.5
4.....	58.0	49.0	55.4	40.2	51.5	50.0	44.0	35.2	51.5	39.5	43.5	51.5
5.....	65.4	49.0	49.0	44.0	50.2	50.5	47.8	51.5	51.0	41.5	51.5	51.5
6.....	65.4	47.8	51.5	41.5	51.0	51.5	41.5	51.5	51.5	42.8	49.0	51.5
7.....	65.4	47.8	45.2	51.5	47.0	46.0	50.5	51.5	51.5	44.0	49.0	51.5
8.....	65.4	47.8	39.0	51.5	51.5	46.0	45.5	51.5	39.4	46.5	44.0	51.5
9.....	65.4	47.8	51.5	51.5	49.0	51.5	43.5	51.5	27.3	51.0	51.5	51.5
10.....	62.7	54.1	51.5	51.5	44.0	46.0	51.5	49.0	49.0	49.0	50.0	51.5
11.....	60.6	49.0	51.5	51.5	43.8	43.5	51.5	51.5	47.0	37.8	48.5	51.5
12.....	59.3	46.5	51.5	50.2	45.2	41.0	51.5	26.5	47.0	37.1	43.5	47.5
13.....	65.4	46.5	51.5	46.5	46.5	51.5	51.5	47.5	47.0	37.1	41.5	45.0
14.....	61.0	46.5	51.5	45.8	51.5	51.5	51.5	51.5	43.2	36.8	40.2	44.0
15.....	56.7	46.0	51.5	45.0	51.5	51.5	51.5	51.5	42.2	36.8	38.8	42.8
16.....	55.4	46.0	51.5	44.5	51.5	51.5	51.5	51.0	41.5	36.6	36.6	41.5
17.....	54.1	47.0	51.5	27.3	48.0	43.2	51.5	47.2	51.5	38.5	39.0	41.5
18.....	53.6	46.5	51.5	27.3	39.0	51.5	51.5	45.6	42.2	45.2	41.5	39.0
19.....	52.8	46.0	54.1	47.5	40.5	51.5	51.5	44.0	48.0	51.5	51.5	40.0
20.....	59.3	44.0	47.8	51.5	42.0	49.0	51.5	42.5	44.0	51.5	39.5	51.5
21.....	54.1	50.2	47.0	47.5	42.5	51.5	51.5	40.8	43.0	51.5	51.5	51.5
22.....	53.6	65.4	44.0	51.5	51.5	51.5	51.5	51.5	51.5	51.5	48.0	51.5
23.....	52.8	65.4	39.0	51.5	51.5	51.5	51.5	45.0	41.5	51.5	51.5	51.5
24.....	23.2	65.4	45.2	47.0	51.5	51.5	51.5	51.5	39.0	46.5	49.0	51.5
25.....	35.4	61.7	51.5	51.5	51.5	51.5	50.5	51.5	37.1	42.8	42.8	51.5
26.....	34.2	58.0	44.0	51.5	49.0	49.0	51.5	51.5	36.1	51.5	39.0	51.5
27.....	34.2	54.1	42.5	50.5	51.5	49.0	49.5	51.5	36.1	51.5	37.8	51.5
28.....	29.5	52.8	42.2	47.2	51.5	45.0	47.8	43.5	35.4	51.5	37.8	51.5
29.....	49.0	49.5	39.0	44.0	51.5	43.2	46.0	51.0	37.8	51.5	51.0	51.5
30.....	48.5	-----	39.8	41.5	51.5	43.2	51.0	51.5	49.0	51.5	51.5	51.5
31.....	54.1	-----	42.5	-----	51.5	-----	45.2	51.5	-----	51.5	-----	51.5

NOTE.—Discharge interpolated for days for which gage heights are missing.

*Monthly discharge of Hanapepe ditch at Koula, near Eleele, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	65.4	23.2	54.0	3,320	A.
February.....	65.4	44.0	51.1	2,940	A.
March.....	55.4	39.0	48.1	2,960	A.
April.....	51.5	27.3	45.9	2,730	A.
May.....	51.5	39.0	48.3	2,970	A.
June.....	51.5	41.0	48.5	2,890	A.
July.....	51.5	41.5	48.9	3,010	A.
August.....	51.5	19.0	46.0	2,830	A.
September.....	51.5	27.3	44.5	2,650	A.
October.....	51.5	36.6	45.8	2,820	A.
November.....	51.5	36.6	45.3	2,700	A.
December.....	51.5	39.0	49.2	3,030	A.
The year.....	65.4	19.0	48.0	34,800	

#### HANAPEPE DITCH AT WEIR NEAR HANAPEPE,<sup>1</sup> KAULAI

**Location.**—About 2½ miles northeast of Hanapepe, below the last siphon crossing Hanapepe River.

**Records available.**—January, 1910, to December 31, 1912.

**Gage.**—Staff gage spiked to right bank of ditch; read once daily; zero on gage equals crest of weir.

**Channel.**—Permanent.

<sup>1</sup> Described in Water-Supply Paper 318, p. 85, as near Makaweli.



**Discharge measurements.**—Measured by a 12-foot sharp-crested weir with end contraction and from a plank across ditch.

**Accuracy.**—Records good.

**Cooperation.**—Station is the property of the Hawaiian Sugar Co. and records are furnished at end of calendar year.

*Daily discharge, in second-feet, of Hanapepe ditch at weir near Hanapepe, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	42.5	37.5	34.0	37.5	40.0	46.4	35.2	40.6	44.4	37.5	45.8	43.8
2.....	42.5	37.5	37.5	36.3	40.0	42.5	35.2	38.8	45.1	37.5	45.1	45.1
3.....	42.5	37.5	37.5	35.8	41.2	40.0	35.2	36.3	44.4	29.8	40.6	47.7
4.....	42.5	37.5	41.2	35.2	45.8	40.0	35.2	34.0	45.1	37.5	40.6	10.8
5.....	42.5	36.3	37.5	40.0	49.0	43.8	35.2	37.5	45.1	32.8	40.0	10.8
6.....	45.1	35.2	36.3	38.8	49.0	43.8	37.5	45.1	46.4	34.0	46.4	49.0
7.....	45.1	35.2	37.5	42.5	45.1	43.8	35.2	43.8	46.4	35.8	45.8	46.4
8.....	45.1	35.2	38.8	46.4	43.8	38.8	41.2	46.4	45.1	38.8	42.5	46.4
9.....	46.4	35.2	40.0	46.4	46.4	40.0	36.3	46.4	45.1	42.5	46.4	46.4
10.....	46.4	35.2	45.1	47.7	41.2	42.5	37.5	46.4	44.4	38.8	49.0	46.4
11.....	46.4	37.5	46.4	47.7	40.0	37.5	42.5	45.8	41.2	37.5	49.0	46.4
12.....	43.8	35.2	47.7	46.4	37.5	35.2	45.1	45.1	41.2	35.2	43.8	41.2
13.....	43.8	35.2	47.7	44.4	35.2	37.5	46.4	40.6	42.5	35.2	38.8	43.8
14.....	12.4	34.0	47.7	42.5	35.2	45.1	49.0	40.6	40.0	32.8	37.5	43.8
15.....	12.4	34.0	46.4	42.5	45.1	45.1	47.7	46.4	34.0	34.0	35.8	43.8
16.....	40.0	34.0	46.4	38.8	46.4	43.8	46.4	46.4	36.3	30.4	34.6	43.8
17.....	21.8	34.0	47.7	41.2	43.8	40.0	46.4	43.8	38.8	34.0	32.8	43.8
18.....	40.0	34.0	47.7	46.4	39.4	37.5	46.4	37.5	40.0	41.2	32.8	40.6
19.....	38.8	32.8	47.7	45.1	35.2	43.8	46.4	35.2	36.3	41.2	41.2	40.0
20.....	38.8	32.8	42.5	40.0	35.8	45.1	46.4	34.6	37.5	45.1	37.5	42.5
21.....	41.2	34.0	41.2	45.1	35.2	43.8	46.4	32.8	37.5	46.4	40.0	45.1
22.....	40.0	36.3	40.0	40.0	40.0	46.4	46.4	37.5	32.8	47.7	40.6	45.1
23.....	37.5	45.1	38.8	42.5	42.5	45.1	46.4	43.8	37.5	47.7	43.8	42.5
24.....	37.5	47.7	37.5	43.8	45.1	45.1	46.4	41.2	32.8	46.4	43.8	42.5
25.....	12.4	46.4	40.0	38.8	45.1	45.1	46.4	42.5	30.4	42.5	42.5	47.7
26.....	26.0	45.1	43.8	47.7	43.8	45.1	46.4	45.1	29.3	43.8	39.4	35.2
27.....	26.0	41.2	37.5	47.7	41.2	41.2	46.4	45.1	28.2	46.4	35.8	45.1
28.....	26.0	38.8	37.5	45.1	46.4	40.0	42.5	43.8	28.2	46.4	35.2	45.8
29.....	28.2	37.5	37.5	41.2	46.4	37.5	42.5	36.3	30.4	46.4	36.3	45.8
30.....	35.2	.....	37.5	42.5	42.5	35.2	40.6	45.8	35.2	45.8	42.5	45.1
31.....	37.5	.....	37.5	.....	44.4	.....	42.5	45.8	.....	46.4	.....	45.1

*Monthly discharge of Hanapepe ditch at weir near Hanapepe, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	46.4	12.4	36.3	2,230
February.....	47.7	32.8	37.2	2,140
March.....	47.7	34.0	41.4	2,550
April.....	47.7	35.2	42.5	2,530
May.....	49.0	35.2	42.2	2,590
June.....	46.4	35.2	41.0	2,490
July.....	49.0	35.2	42.6	2,620
August.....	46.4	32.8	41.7	2,560
September.....	46.4	28.2	38.8	2,310
October.....	47.7	29.8	39.9	2,450
November.....	49.0	32.8	40.9	2,430
December.....	49.0	10.8	42.2	2,590
The year.....	49.0	10.8	40.6	29,500

**HANAPEPE RIVER AT HANAPEPE FALLS, NEAR ELEELE, KAUAI.<sup>1</sup>**

**Location.**—About 8 miles north of Eleele and just above confluence with Hanapepe River.

**Records available.**—November 21, 1911, to December 31, 1912.

**Drainage area.**—6.55 square miles.

**Gage.**—Vertical staff; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from crest of dam. Dam is 75 feet long, 3 feet wide, and height is 5 feet on lower side.

*Daily gage height, in feet, of Hanapepe River at Hanapepe Falls, near Eleele, Kauai, for 1912.*

[S. W. Holmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.										0.12		
2.									0.44			1.47
3.					0.12				.42			2.45
4.					.65				.24			
5.	0.50						0.24		.12		0.80	.27
6.									.72		.05	.17
7.								0.16	.02			.12
8.	.20			0.35	.15			.10		.03	.12	
9.	.20		0.28	.36				.52	.02		.32	.34
10.				.20			.08					.17
11.			.77				.65					
12.			.72				.02					
13.			1.12			0.70	.60					
14.	.45		.40		.12	.12		.68				
15.			.25		.27	.20	.58	.27				
16.			.02				.17		.10			
17.							.68			.36		
18.			.05			.02	.27				.27	
19.					.12	.12	.07			.64		
20.				.25								.22
21.						.42				1.00		1.45
22.		0.20		.50	.09	.08				.12	.15	
23.	.75	1.00		.10	.18					.08	.75	1.60
24.	.30	.30			.52	.38	.58					1.35
25.	.15		.12	.70								
26.	.14			.18	.50		.35	.19		.63		.42
27.	.14							.80				.28
28.					1.25			.30		.24		.17
29.					.62					.12		
30.					.14			1.30	.05	.20	.48	.08
31.								.40		.18		

NOTE.—Gage heights show days when water was flowing over dam. Station not visited Sundays, but lack of gage heights on week days indicates that all the water was diverted at the dam.

**HILOA DITCH AT HANAPEPE FALLS, NEAR ELEELE, KAUAI.**

**Location.**—About 8 miles north of Eleele and 335 feet below intake.

**Records available.**—November 22, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read at irregular hour once each day except Sundays; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from plank across ditch at gage.

<sup>1</sup> Described in Water-Supply Paper 318, p. 86, as "Hiloa Stream at Hanapepe Falls, near Eleele, Kauai."

*Discharge measurements of Hiloa ditch at Hanapepe Falls, near Eleele, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Mar. 6	W. V. Hardy.....	Feet. 1.86	Sec.-ft. 35.7
Nov. 7	Larrison and Hardy.....	1.82	35.5

*Daily gage height, in feet, of Hiloa ditch at Hanapepe Falls, near Eleele, Kauai, for 1912.*

[S. W. Holmer, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.60	1.90	1.50	1.52	1.86	1.90	1.64		2.15	2.02	
2.....	1.82	1.58	1.59	1.50	1.53		1.65	1.60	2.07	1.56	1.79	2.78
3.....	1.80	1.55		1.47	2.14	1.70	1.54	1.55	2.02	2.00		2.10
4.....	1.74		1.70	1.90	2.48	2.00			1.92	1.57	1.67	
5.....	2.35	1.50	1.55	1.58		1.88	2.22	1.80	1.94	1.60	2.50	2.10
6.....	1.95	1.49	1.83	1.56	1.77	1.78	1.58	1.76	1.80		2.12	2.06
7.....		1.49	1.64		1.75	1.66		2.20	2.03	1.77	1.81	2.02
8.....	2.15	1.49	1.60	2.18	2.20	1.68	1.60	2.20		2.08	2.22	
9.....	2.15	1.51	2.37	2.13	1.80		1.62	2.45	2.03	1.71	2.24	2.14
10.....	2.02	1.65		2.04	1.58	1.60	2.12	1.86	1.85	1.78		2.04
11.....	1.80		2.65	2.00	1.59	1.63	2.48		1.74	1.55	1.80	1.90
12.....	1.79	1.48	2.09	1.86		1.62	2.11	1.63	1.80	1.62	1.68	1.86
13.....	2.01	1.47	2.19	1.70	1.66	2.50	2.30	1.64	1.75		1.60	1.86
14.....	1.48	1.46	2.12		2.16	2.17		2.52	1.67	1.68	1.56	1.71
15.....	1.78	1.46	2.05	1.64	2.20	2.24	2.12	1.95		1.62	1.53	
16.....	1.70	1.45	2.02	1.66	1.96		2.17	1.88	2.09	1.57	1.50	1.73
17.....	1.66	1.48		2.05	1.67	1.65	2.42	1.68	1.85	2.28		1.65
18.....	1.63		2.05	2.00	1.59	2.08	2.07		1.60	1.82	2.32	1.62
19.....	1.62	1.44	1.80	1.66		2.18	2.05	1.62	1.80	2.45	1.72	1.70
20.....	2.12	1.43	1.80	2.27	1.53	1.92	2.05	1.60	1.70		1.62	2.18
21.....		1.50	1.75		1.74	2.35		1.60	1.63	2.30	1.76	2.74
22.....	1.59	2.04	1.78	2.18	2.15	2.14	2.00	2.02		2.15	2.22	
23.....	2.58	2.37	1.62	2.18	2.22		1.99	1.62	1.59	2.10	2.49	2.80
24.....	1.06	2.00		1.67	2.34	2.32	2.40	2.00	1.54	1.81		2.35
25.....	1.35		2.10	2.52	2.00	2.02	1.98		1.50	1.77	1.60	
26.....	1.35	1.76	1.68	1.97		1.75	1.94	1.95	1.48	2.45	1.52	2.10
27.....	1.35	1.65	1.58	1.78	2.30	1.85	1.87	1.97	1.47		1.48	2.00
28.....		1.59	1.57		1.98	1.64		2.07	1.54	2.22	1.46	2.05
29.....	1.58	1.55	1.54	1.58	1.74	1.62	1.69	2.04		2.12	1.65	
30.....	1.56		1.50	1.53	2.10	1.55	1.84	2.10	2.10	2.19	2.20	1.97
31.....	1.70		1.72		2.02		1.64	2.05		2.18		2.06

### HULEIA RIVER BASIN.

#### HULEIA RIVER NEAR LIHUE, KAUAI.

**Location.**—Three hundred feet above stone bridge where wagon road from Lihue to the Rice plantation crosses stream and about 4 miles southwest of Lihue.

**Records available.**—May 8, 1912, to December 31, 1912.

**Gage.**—Vertical low-water staff gage; inclined high-water gage; read once daily, about 9 a. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

**Cooperation.**—Station is maintained in cooperation with Charles Rice.

*Discharge measurements of Huleia River near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 12	W. V. Hardy.....	6.21	5.57
May 8	.....do.....	6.31	7.45
Oct. 30	.....do.....	6.45	10.2
Nov. 13	Larrison and Hardy.....	6.25	6.26

*Daily gage height, in feet, of Huleia River near Lihue, Kauai, for 1912.*

[Wm. Kaiawe, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						6.30	6.25	6.29	6.30	6.22	6.31	6.40
2						6.30	6.24	6.25	6.25	6.20	6.31	8.10
3						6.30	6.22	6.25	6.30	6.20	6.30	8.50
4						6.40	6.21	6.24	6.30	6.20	6.30	7.60
5						6.50	6.20	6.24	6.30	6.21	6.30	7.30
6						6.42	6.20	6.29	7.70	6.20	6.30	7.10
7					6.31	6.36	6.20	6.25	6.38	6.20	6.30	7.10
8					6.30	6.31	6.20	6.22	6.30	6.23	6.30	7.10
9					6.30	6.30	6.20	6.20	6.30	6.29	7.30	6.90
10					6.30	6.30	6.32	6.21	6.30	6.30	6.35	6.81
11					6.30	6.31	6.40	6.20	6.25	6.31	6.35	6.75
12					6.30	6.31	6.31	6.20	6.22	6.31	6.33	6.75
13					6.30	6.30	6.29	6.20	6.21	6.22	6.25	6.70
14					6.30	6.31	7.30	6.30	6.20	6.22	6.22	6.65
15					6.40	6.31	6.95	6.41	6.20	6.20	6.22	6.63
16					6.35	6.50	6.31	6.26	6.20	6.20	6.21	6.60
17					6.31	6.30	6.40	6.25	6.20	6.20	6.21	6.60
18					6.30	6.30	6.31	6.22	6.20	6.20	6.29	6.59
19					6.30	6.30	6.30	6.22	6.25	6.25	6.24	6.55
20					6.29	6.30	6.30	6.22	6.21	6.30	6.21	6.60
21					6.28	6.30	6.30	6.22	6.20	7.10	6.25	6.60
22					6.26	6.29	6.30	6.24	6.20	6.40	6.30	6.55
23					6.30	6.27	6.29	6.22	6.20	6.30	6.35	7.60
24					6.31	6.25	6.29	6.30	6.20	6.30	6.31	8.10
25					6.30	6.25	6.30	6.29	6.20	6.29	6.30	7.90
26					6.30	6.25	6.30	6.29	6.20	6.90	6.26	7.75
27					6.30	6.25	6.30	7.55	6.20	6.25	6.21	7.00
28					6.35	6.25	6.29	6.30	6.20	6.30	6.21	6.65
29					6.37	6.25	6.30	6.29	6.20	6.40	6.80	6.60
30					6.32	6.25	6.30	6.30	6.20	6.42	6.35	6.60
31					6.31		6.30	6.31		6.37		6.60

## HANAMAULU RIVER BASIN.

**HANAMAULU RIVER AT KAPAIA, NEAR LIHUE, KAUAI.**

**Location.**—At wagon-road bridge about 600 feet north of the village of Kapaia and 1 mile north of Lihue.

**Records available.**—September 4, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 9 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from lower side of bridge during high water and by wading at low water.

**Accuracy.**—Records good.

*Discharge measurements of Hanamaulu River at Kapaia, near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 28	W. V. Hardy.....	4.95	6.47
Mar. 15	.....do.....	5.80	35.9

Daily gage height, in feet, of Hanamaulu River at Kapāia, near Lihue, Kauai, for 1912.

[J. K. Gandall, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.2	4.9	4.9	5.1	5.6	5.7	5.0	5.5	.....	4.9	4.7	.....
2.....	5.2	4.8	4.9	5.2	5.1	.....	5.0	5.1	5.1	4.9	4.7	.....
3.....	5.2	4.8	.....	5.1	5.1	5.8	5.0	5.1	4.9	4.9	.....	.....
4.....	5.1	.....	5.4	5.1	5.1	5.7	5.0	.....	4.8	5.0	5.8	.....
5.....	5.1	5.2	5.5	5.1	.....	5.6	5.0	5.1	4.8	5.0	5.8	.....
6.....	5.0	5.1	5.5	5.2	5.0	5.3	5.0	5.1	4.9	.....	5.0	.....
7.....	.....	5.1	5.5	.....	5.0	5.2	.....	4.9	5.0	.....	5.0	.....
8.....	5.2	4.9	5.5	5.2	5.0	5.5	5.0	4.9	.....	5.0	5.0	.....
9.....	5.2	4.9	5.7	5.0	5.0	.....	5.3	4.9	4.9	5.0	4.8	.....
10.....	5.1	4.9	.....	5.6	5.0	5.1	5.0	4.8	4.8	4.9	.....	.....
11.....	5.0	.....	5.5	5.4	5.0	5.1	5.0	.....	4.9	4.9	4.9	.....
12.....	5.0	5.5	5.7	5.0	.....	5.1	5.0	4.8	4.9	4.9	5.0	.....
13.....	5.0	5.3	5.7	5.0	5.0	5.1	5.0	4.9	4.9	.....	4.9	.....
14.....	.....	4.9	5.8	.....	5.0	5.0	.....	4.9	4.9	4.9	4.7	.....
15.....	5.2	4.9	5.8	5.1	5.1	5.1	5.8	4.9	.....	4.8	4.7	.....
16.....	5.1	4.9	5.8	5.0	5.1	.....	5.1	4.9	4.8	4.8	4.8	.....
17.....	5.1	4.9	.....	7.5	5.1	5.6	5.2	4.8	4.8	5.0	.....	5.38
18.....	4.9	.....	5.3	6.15	5.1	5.4	5.3	.....	4.9	4.9	4.8	.....
19.....	4.9	5.4	5.3	5.7	.....	5.3	5.2	4.8	5.0	4.9	4.8	.....
20.....	4.9	4.9	5.2	5.5	5.1	5.2	5.2	4.8	5.0	.....	4.8	.....
21.....	.....	4.9	5.2	.....	5.0	5.2	.....	4.8	5.0	4.8	4.8	5.7
22.....	4.8	4.9	5.5	5.3	5.1	5.1	5.2	4.8	.....	4.8	.....	.....
23.....	4.8	5.3	5.5	5.2	5.1	.....	5.1	4.85	5.0	4.9	.....	5.7
24.....	5.6	5.3	.....	5.1	5.1	5.1	5.0	4.8	5.0	5.0	.....	5.7
25.....	5.6	.....	5.6	5.3	5.1	5.1	5.0	.....	5.0	5.0	.....	5.8
26.....	5.3	5.3	5.4	5.3	.....	5.1	5.0	4.8	5.0	5.0	.....	5.7
27.....	5.3	5.3	5.3	5.3	5.0	5.0	5.0	4.8	5.0	.....	.....	5.65
28.....	.....	4.9	5.1	.....	5.0	5.0	.....	4.8	5.0	4.7	.....	5.65
29.....	5.5	4.9	5.0	5.6	5.6	5.0	5.0	4.8	.....	4.7	.....	.....
30.....	5.4	.....	5.0	5.3	5.7	.....	5.0	5.0	4.9	4.7	.....	5.6
31.....	5.4	.....	.....	.....	5.7	.....	5.7	4.9	.....	4.7	.....	5.5

Daily discharge, in second-feet, of Hanamaulu River at Kapāia, near Lihue, Kauai, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	11.3	5.6	5.6	9.0	25.1	29.9	7.1	20.9	7.3	5.6	3.2	.....
2.....	11.3	4.3	5.6	11.3	9.0	32.6	7.1	9.0	9.0	5.6	3.2	.....
3.....	11.3	4.3	11.4	9.0	9.0	35.2	7.1	9.0	5.6	5.6	19.2	.....
4.....	9.0	7.8	17.2	9.0	9.0	29.9	7.1	9.0	4.3	7.1	35.2	.....
5.....	9.0	11.3	20.9	9.0	8.0	25.1	7.1	9.0	4.3	7.1	35.2	.....
6.....	7.1	9.0	20.9	11.3	7.1	14.0	7.1	9.0	5.6	7.1	7.1	.....
7.....	9.2	9.0	20.9	11.3	7.1	11.3	7.1	5.6	7.1	7.1	7.1	.....
8.....	11.3	5.6	20.9	11.3	7.1	20.9	7.1	5.6	6.4	7.1	7.1	.....
9.....	11.3	5.6	29.9	7.1	7.1	15.0	14.0	5.6	5.6	7.1	4.3	.....
10.....	9.0	5.6	25.4	25.1	7.1	9.0	7.1	4.3	4.3	5.6	5.0	.....
11.....	7.1	13.2	20.9	17.2	7.1	9.0	7.1	4.3	5.6	5.6	5.6	.....
12.....	7.1	20.9	29.9	7.1	7.1	9.0	7.1	4.3	5.6	5.6	7.1	.....
13.....	7.1	1.0	29.9	7.1	7.1	9.0	7.1	5.6	5.6	5.6	5.6	.....
14.....	9.2	5.6	35.2	8.0	7.1	7.1	21.2	5.6	5.6	5.6	3.2	.....
15.....	11.3	5.6	35.2	9.0	9.0	9.0	35.2	5.6	5.0	4.3	3.2	.....
16.....	9.0	5.6	35.2	7.1	9.0	17.0	9.0	5.6	4.3	4.3	4.3	.....
17.....	9.0	5.6	24.6	160.0	9.0	25.1	11.3	4.3	4.3	7.1	4.3	16.6
18.....	5.6	11.4	14.0	57.6	9.0	17.2	14.0	4.3	5.6	5.6	4.3	.....
19.....	5.6	17.2	14.0	29.9	9.0	14.0	11.3	4.3	7.1	5.6	4.3	.....
20.....	5.6	5.6	11.3	20.9	9.0	11.3	11.3	4.3	7.1	5.0	4.3	.....
21.....	5.0	5.6	11.3	17.4	7.1	11.3	11.3	4.3	7.1	4.3	4.3	29.9
22.....	4.3	5.6	20.9	14.0	9.0	9.0	11.3	4.3	7.1	4.3	.....	29.9
23.....	4.3	14.0	20.9	11.3	9.0	9.0	9.0	5.0	7.1	5.6	.....	29.9
24.....	25.1	14.0	23.0	9.0	9.0	9.0	7.1	4.3	7.1	7.1	.....	29.9
25.....	25.1	14.0	25.1	14.0	9.0	9.0	7.1	4.3	7.1	7.1	.....	35.2
26.....	14.0	14.0	17.2	14.0	8.0	9.0	7.1	4.3	7.1	7.1	.....	29.9
27.....	14.0	14.0	14.0	14.0	7.1	7.1	7.1	4.3	7.1	5.2	.....	27.5
28.....	17.4	5.6	9.0	19.6	7.1	7.1	7.1	4.3	7.1	3.2	.....	27.5
29.....	20.9	5.6	7.1	25.1	25.1	7.1	7.1	4.3	6.4	3.2	.....	26.3
30.....	17.2	.....	7.1	14.0	29.9	7.1	7.1	7.1	5.6	3.2	.....	25.1
31.....	17.2	.....	8.0	.....	29.9	.....	29.9	5.6	.....	3.2	.....	20.9

*Monthly discharge of Hanamaulu River at Kapaia, near Lihue, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	25.1	4.3	11.00	676	A.
February.....	17.2	4.3	9.14	526	A.
March.....	35.2	5.6	19.10	1,170	A.
April.....	160.0	7.1	19.70	1,170	A.
May.....	29.0	7.1	10.60	652	A.
June.....	35.2	7.1	14.50	863	A.
July.....	35.2	7.1	10.40	640	A.
August.....	20.9	4.3	6.04	371	B.
September.....	9.0	4.3	6.14	365	B.
October.....	7.1	3.2	5.57	342	B.
November 1-21.....			8.43	351	B.
December 17 and 21-31.....			27.40	652	B.
The period.....				7,780	

## WAILUA RIVER BASIN.

## SOUTH FORK OF WAILUA RIVER ABOVE WAIERU FALLS, NEAR LIHUE, KAUAI.

**Location.**—About 7 miles northeast of Lihue, and 1 mile above Waiehu Falls.

**Records available.**—December 10, 1911, to December 31, 1912.

**Drainage area.**—22.40 square miles.

**Gage.**—Friez automatic register.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made from cable and car.

**Accuracy.**—Records good.

*Discharge measurements of South Fork of Wailua River above Waiehu Falls, near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
		Feet.	Sec.-ft.
Feb. 18	W. V. Hardy.....	3.18	10.8
Mar. 12	do.....	4.93	521
Oct. 29	do.....	3.76	112
Nov. 13	do.....	3.46	38.6

*Daily gage height, in feet, of South Fork of Wailua River above Waiehu Falls, near Lihue, Kauai, for 1912.*

[Gus Schilling, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.80	3.48	3.52	3.48	3.55	3.57	3.32	3.63	3.82	.....	3.66	4.08
2.....	3.83	3.44	3.46	3.42	3.55	3.52	3.29	3.48	3.88	.....	3.60	6.53
3.....	3.84	3.42	3.60	3.40	3.64	3.57	3.24	3.40	3.90	.....	3.60	6.75
4.....	3.84	3.38	3.60	3.60	3.61	3.70	3.39	3.55	3.90	.....	3.58	4.78
5.....	4.02	3.34	3.36	3.58	3.65	3.71	3.55	3.60	3.88	.....	3.98	4.22
6.....	3.76	3.30	3.38	3.95	3.40	3.60	3.36	3.58	4.25	.....	3.71	4.01
7.....	3.76	3.33	3.47	4.90	3.39	3.52	3.55	3.54	3.90	.....	3.66	3.93
8.....	3.92	3.34	3.56	4.09	3.60	3.65	3.49	3.53	3.93	.....	4.30	4.68
9.....	3.96	3.38	4.62	4.27	3.50	3.87	3.41	3.50	3.83	.....	4.20	4.12
10.....	3.88	3.38	4.40	4.00	3.51	3.54	3.84	3.46	3.72	.....	3.67	3.91
11.....	3.88	3.25	5.10	3.84	3.52	3.47	4.14	3.52	3.72	.....	3.59	3.87
12.....	3.78	3.13	4.85	3.72	3.42	3.44	3.85	3.66	3.64	.....	3.53	3.79
13.....	3.66	3.10	6.08	3.63	3.58	3.95	4.66	3.89	3.53	.....	3.46	3.74
14.....	3.94	3.09	4.64	3.66	3.74	3.75	6.26	4.03	3.40	.....	3.43	3.65
15.....	3.76	3.09	4.20	3.55	4.08	3.64	5.00	3.78	3.47	.....	3.40	3.60

*Daily gage height, in feet, of South Fork of Wailua River above Waiehu Falls, near Lihue, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	3.70	3.11	3.98	3.78	3.62	-----	5.16	3.67	3.54	-----	3.32	3.67
17.....	3.70	3.21	3.86	5.62	3.51	-----	4.08	3.60	3.55	-----	3.32	3.53
18.....	3.68	3.31	3.80	4.26	3.42	-----	4.73	3.58	3.55	-----	3.40	3.47
19.....	3.68	3.31	3.90	3.98	3.32	-----	4.08	3.55	3.50	-----	3.47	3.54
20.....	3.60	3.34	3.74	4.00	3.25	-----	3.92	3.52	3.50	-----	3.39	4.17
21.....	3.55	3.38	3.70	3.80	3.29	-----	-----	3.45	3.40	-----	3.51	4.58
22.....	3.60	3.58	3.70	3.81	3.53	-----	-----	3.52	3.40	-----	3.90	5.73
23.....	3.82	4.73	3.68	3.80	3.48	-----	-----	3.48	3.40	-----	4.15	5.85
24.....	3.61	3.96	3.65	3.60	3.58	-----	-----	3.47	3.40	-----	3.83	7.05
25.....	3.52	3.66	3.99	3.75	3.45	-----	-----	3.50	3.35	-----	3.69	6.05
26.....	3.45	3.56	3.76	3.66	3.45	-----	-----	3.48	3.30	-----	3.66	4.80
27.....	3.48	3.55	3.94	3.52	3.98	-----	3.55	4.24	3.25	-----	3.64	4.05
28.....	3.50	3.52	3.98	3.53	4.92	-----	3.58	3.55	3.20	-----	3.61	3.70
29.....	3.44	3.47	3.20	3.60	4.32	3.31	3.68	3.42	3.20	3.80	3.93	3.62
30.....	3.43	-----	3.50	3.57	3.78	3.30	4.06	3.94	3.20	3.96	3.96	3.60
31.....	3.51	-----	3.50	-----	3.64	-----	3.76	3.80	-----	3.75	-----	3.59

NOTE.—Gage heights for September affected by flow of water in float-well, but results are fair. Gage heights Oct. 1-28 not published because unreliable.

*Daily discharge, in second-feet, of South Fork of Wailua River above Waiehu Falls, near Lihue, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	115.0	47.0	53.6	47.0	59.0	62.6	25.4	74.6	120.0	-----	81.2	197.0
2.....	123.0	41.0	44.0	38.0	59.0	53.6	22.0	47.0	137.0	-----	68.0	1,220.0
3.....	126.0	38.0	50.0	35.0	76.8	62.6	17.0	35.0	142.0	-----	68.0	1,320.0
4.....	126.0	32.6	68.0	68.0	70.2	90.0	33.8	59.0	142.0	-----	64.4	462.0
5.....	177.0	27.8	30.2	64.4	79.0	92.5	59.0	68.0	137.0	-----	165.0	244.0
6.....	105.0	23.0	32.6	156.0	35.0	68.0	30.2	64.4	255.0	-----	92.5	174.0
7.....	105.0	26.6	45.5	510.0	33.8	53.6	59.0	57.2	142.0	-----	81.2	151.0
8.....	148.0	27.8	60.8	200.0	68.0	79.0	48.5	55.4	151.0	-----	273.0	422.0
9.....	159.0	32.6	398.0	262.0	50.0	134.0	36.5	50.0	123.0	-----	237.0	210.0
10.....	137.0	32.6	311.0	171.0	51.8	57.2	126.0	44.0	95.0	-----	83.4	145.0
11.....	137.0	18.0	590.0	126.0	53.6	45.5	217.0	53.6	95.0	-----	66.2	134.0
12.....	110.0	7.4	490.0	95.0	38.0	41.0	128.0	81.2	76.8	-----	55.4	112.0
13.....	81.2	5.0	990.0	74.6	64.4	156.0	414.0	139.0	55.4	-----	44.0	100.0
14.....	154.0	4.5	406.0	81.2	100.0	102.0	1,080.0	181.0	35.0	-----	39.5	79.0
15.....	105.0	4.5	237.0	59.0	197.0	76.8	550.0	110.0	46.0	-----	35.0	68.0
16.....	90.0	5.8	165.0	110.0	72.4	73.0	614.0	83.4	57.2	-----	25.4	83.4
17.....	90.0	14.0	131.0	798.0	51.8	69.2	197.0	68.0	59.0	-----	25.4	55.4
18.....	85.6	24.2	115.0	259.0	38.0	65.4	442.0	64.4	59.0	-----	35.0	45.5
19.....	85.6	24.2	142.0	165.0	25.4	61.7	197.0	59.0	50.0	-----	45.5	57.2
20.....	68.0	27.8	100.0	171.0	18.0	57.9	148.0	53.6	50.0	-----	33.8	227.0
21.....	59.0	32.6	90.0	115.0	22.0	54.1	135.0	42.5	35.0	-----	51.8	382.0
22.....	68.0	64.4	90.0	118.0	55.4	50.3	123.0	53.6	35.0	-----	115.0	842.0
23.....	120.0	442.0	85.6	115.0	47.0	46.7	110.0	47.0	35.0	-----	220.0	890.0
24.....	70.2	157.0	79.0	68.0	64.4	42.9	97.2	45.5	35.0	-----	123.0	1,500.0
25.....	53.6	81.2	168.0	102.0	42.5	39.2	84.5	50.0	29.0	-----	87.8	975.0
26.....	42.5	60.8	105.0	81.2	42.5	35.4	71.8	47.0	23.0	-----	81.2	470.0
27.....	47.0	59.0	154.0	53.6	165.0	31.7	59.0	251.0	18.0	-----	76.8	187.0
28.....	50.0	53.6	165.0	55.4	518.0	28.0	64.4	59.0	13.0	-----	70.2	30.0
29.....	41.0	45.5	13.0	68.0	281.0	24.2	85.6	38.0	13.0	115.0	151.0	72.4
30.....	39.5	-----	50.0	62.6	110.0	23.0	190.0	154.0	13.0	131.0	159.0	68.0
31.....	51.8	-----	50.0	-----	76.8	-----	105.0	115.0	-----	102.0	-----	66.2

NOTE.—Discharge interpolated for days for which gage heights are missing from June 16-28.

*Monthly discharge of South Fork of Wailua River above Waiehu Falls, near Lihue, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	177.0	39.5	95.8	5,890	A.
February.....	442.0	4.5	50.4	2,900	A.
March.....	990.0	13.0	178.0	10,900	A.
April.....	798.0	35.0	144.0	8,570	A.
May.....	518.0	18.0	86.0	5,290	A.
June.....	156.0	23.0	62.6	3,720	C.
July.....	1,080.0	17.0	180.0	11,100	B.
August.....	251.0	35.0	75.8	4,660	B.
September.....	255.0	13.0	75.9	4,520	B.
October.....					
November.....	273.0	25.4	91.8	5,460	A.
December.....	1,500.0	45.5	356.0	21,900	B.
The period.....				84,900	

NOTE.—No record Oct. 1-28.

#### LIHUE DITCH NEAR LIHUE, KAUAI.

**Location.**—About 5 miles northwest of Lihue, at point where Kauai Electric Co.'s power line crosses the ditch.

**Records available.**—July 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once each day, at 6 a. m.; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made by wading at various sections near gage.

**Accuracy.**—Records good.

*Discharge measurements of Lihue ditch near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Mar. 10	W. V. Hardy.....	<i>Feet.</i> 1.12	<i>Sec.-ft.</i> 7.57
Nov. 13	Larrison and Hardy.....	1.54	8.96

*Daily gage height, in feet, of Lihue ditch near Lihue, Kauai, for 1912.*

[Mori, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.0	1.4	0.9	1.4	1.6	1.55	1.5	1.65	1.55	1.55	1.55
2.....		1.0	1.4	1.1	1.4	1.55	1.55	1.5	1.65	1.60	1.60	1.60
3.....		.9	1.4	1.05	1.5	1.55	1.5	1.5	1.6	1.60	1.60	1.60
4.....		.9	1.4	1.1	1.5	1.6	1.5	1.5	1.6	1.55	1.60	.70
5.....		.9	1.4		1.5	1.6	1.5	1.55	1.6	1.60	1.70	
6.....	0.9	.9	1.4		1.5	1.5	1.5	1.6	1.6	1.60	1.70	
7.....	.9	.9	1.1		1.45	1.5	1.6	1.6	1.6	1.60	1.65	
8.....	.9	.9	1.1		1.5	1.5	1.6	1.6	1.6	1.60	1.65	
9.....	.9	1.0	1.1		1.5	1.6	1.6	1.6	1.55	1.55	1.66	
10.....	.9	1.0	1.1		1.4	1.6	1.6	1.6	1.5	1.70	1.65	
11.....	.9	1.0	1.25	1.0	1.4	1.55	1.6	1.6	1.5	1.70	1.62	
12.....	.9	.95	1.3	1.0	1.4	1.5	1.6	1.6	1.45	1.65	1.50	
13.....	.9	.95	1.3	1.0	1.4	1.5	1.6	1.6	1.45	1.65	1.52	
14.....	.9	.85	1.3	1.2	1.5	1.6	1.6	1.65	1.45	1.65	1.50	
15.....	.9	.85	1.3	1.2	1.5	1.6		1.6	1.45	1.65	1.50	
16.....	.9	.85		1.2	1.5	1.5	1.5	1.6	1.45	1.65	1.45	
17.....	.9	.85		1.2	1.4	1.5	1.65	1.6	1.45	1.65	1.45	1.49
18.....	.9	.85		.6	1.4	1.5	1.6	1.6	1.45	1.65	1.50	1.49
19.....	.9	.85		.6	1.4	1.5	1.6	1.6	1.45	1.70	1.55	1.55
20.....	1.1	.85		.6	1.4	1.5	1.6	1.6	1.5	1.65	1.60	1.70



*Daily gage height, in feet, of Lihue ditch near Lihue, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.1	0.85	.....	0.6	1.5	1.55	1.6	1.55	1.5	1.65	1.63	1.50
22.....	1.1	1.1	.....	.6	1.5	1.6	1.6	1.6	1.5	1.65	1.65	1.60
23.....	1.4	1.1	0.9	.6	1.5	1.6	1.5	1.6	1.5	1.65	1.36	1.45
24.....	1.4	1.2	.9	1.4	1.5	1.6	1.55	1.55	1.5	1.60	1.36	1.55
25.....	1.4	1.2	.9	1.4	1.5	1.55	1.5	1.6	1.4	1.60	1.36	1.35
26.....	1.2	1.2	.9	1.4	1.5	1.55	1.5	1.6	1.4	1.70	.....	1.30
27.....	1.2	1.2	.9	1.35	1.5	1.55	1.5	1.6	1.4	1.70	.....	1.30
28.....	1.2	1.2	.9	1.35	1.6	1.55	1.55	1.6	1.4	.95	.....	1.30
29.....	1.2	1.4	.9	1.4	1.6	1.5	1.55	1.65	1.55	1.65	.....	1.30
30.....	1.2	.....	.9	1.4	1.6	1.5	1.55	1.65	1.6	1.50	1.45	1.30
31.....	1.2	.....	.9	.....	1.6	.....	1.55	1.65	.....	1.50	.....	1.25

NOTE.—Ditch dry Jan. 1-5, Mar. 16-22, Apr. 5-10, July 15, Nov. 26-29, and Dec. 5-16.

*Daily discharge, in second-feet, of Lihue ditch near Lihue, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	.....	5.8	8.8	5.1	8.8	10.4	10.0	9.6	10.8	10.0	10.0	10.0
2.....	.....	5.8	8.8	6.5	8.8	10.0	10.0	9.6	10.8	9.6	10.4	10.4
3.....	.....	5.1	8.8	6.2	9.6	10.0	9.6	9.6	10.4	10.4	10.4	10.4
4.....	.....	5.1	8.8	6.5	9.6	10.4	9.6	9.6	10.4	10.0	10.4	3.7
5.....	.....	5.1	8.8	.....	9.6	10.4	9.6	10.0	10.4	10.4	11.2	.....
6.....	5.1	5.1	8.8	.....	9.6	9.6	9.6	10.4	10.4	10.4	11.2	.....
7.....	5.1	5.1	6.5	.....	9.2	9.6	10.4	10.4	10.4	10.4	10.8	.....
8.....	5.1	5.1	6.5	.....	9.6	9.6	10.4	10.4	10.4	10.4	10.8	.....
9.....	5.1	5.8	6.5	.....	9.6	10.4	10.4	10.4	10.0	10.0	10.9	.....
10.....	5.1	5.8	6.5	.....	8.8	10.4	10.4	10.4	9.6	11.2	10.8	.....
11.....	5.1	5.8	7.6	5.8	8.8	10.0	10.4	10.4	9.6	11.2	10.6	.....
12.....	5.1	5.4	8.0	5.8	8.8	9.6	10.4	10.4	9.2	10.8	9.6	.....
13.....	5.1	5.4	8.0	5.8	8.8	9.6	10.4	10.4	9.2	10.8	9.8	.....
14.....	5.1	4.8	8.0	7.2	9.6	10.4	10.4	10.8	9.2	10.8	9.6	.....
15.....	5.1	4.8	8.0	7.2	9.6	10.4	.....	9.2	9.2	10.8	9.6	.....
16.....	5.1	4.8	.....	7.2	9.6	9.6	9.6	10.4	9.2	10.8	9.2	.....
17.....	5.1	4.8	.....	7.2	8.8	9.6	10.8	10.4	9.2	10.8	9.2	9.5
18.....	5.1	4.8	.....	3.1	8.8	9.6	10.4	10.4	9.2	10.8	9.6	9.5
19.....	5.1	4.8	.....	3.1	8.8	9.6	10.4	10.4	9.2	11.2	10.0	10.0
20.....	6.5	4.8	.....	3.1	8.8	9.6	10.4	10.4	9.6	10.8	10.4	11.2
21.....	6.5	4.8	.....	3.1	9.6	10.0	10.4	10.0	9.6	10.8	10.6	9.6
22.....	6.5	6.5	.....	3.1	9.6	10.4	10.4	10.4	9.6	10.8	10.8	10.4
23.....	8.8	6.5	5.1	3.1	9.6	10.4	9.6	10.4	9.6	10.8	8.5	9.2
24.....	8.8	7.2	5.1	8.8	9.6	10.4	10.0	10.0	9.6	10.4	8.5	10.0
25.....	8.8	7.2	5.1	8.8	9.6	10.0	9.6	10.4	8.8	10.4	8.5	8.4
26.....	7.2	7.2	5.1	8.8	9.6	10.0	9.6	10.4	8.8	11.2	.....	8.0
27.....	7.2	7.2	5.1	8.4	9.6	10.0	9.6	10.4	8.8	11.2	.....	8.0
28.....	7.2	7.2	5.1	8.4	10.4	10.0	10.0	10.4	8.8	5.4	.....	8.0
29.....	7.2	8.8	5.1	8.8	10.4	9.6	10.0	10.8	10.0	10.8	.....	8.0
30.....	7.2	.....	5.1	8.8	10.4	9.6	10.0	10.8	10.4	9.6	9.2	8.0
31.....	7.2	.....	5.1	.....	10.4	.....	10.0	10.8	.....	9.6	.....	7.6

NOTE.—Ditch dry Jan. 1-5, Mar. 16-22, Apr. 5-10, July 15, Nov. 26-29, and Dec. 5-16.

*Monthly discharge of Lihue ditch near Lihue, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January 6-31.....	8.8	5.1	6.17	318	C.
February.....	8.8	4.8	5.74	330	C.
March 1-15, 23-31.....	8.8	5.1	6.85	326	C.
April 1-4, 11-30.....	8.8	3.1	6.25	297	C.
May.....	10.4	8.8	9.43	580	B.
June.....	10.4	9.6	9.97	593	B.
July 1-14, 16-31.....	10.8	9.6	10.10	601	B.
August.....	10.8	9.6	10.30	633	B.
September.....	10.8	8.8	9.68	576	B.
October.....	11.2	5.4	10.40	640	B.
November 1-25, 30.....	11.2	8.5	10.00	517	B.
December 1-4, 17-31.....	11.2	3.7	8.94	337	B.
The year.....	11.2	3.1	8.76	5,750	

NOTE.—Ditch dry Jan. 1-5, Mar. 16-22, Apr. 5-10, July 15, Nov. 26-29, Dec. 5-16.

Mean for month is mean of actual number of days when ditch carried water. Mean for year is mean of actual number of days when ditch carried water.

## HANAMAULU DITCH AT SIPHON NEAR LIHUE, KAUAI.

**Location.**—About 6 miles northwest of Lihue, in flume 180 feet above point at which the Kauai Electric Co.'s power line crosses the South Fork of Wailua River.

**Records available.**—July 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily at 6 a. m. September 30, 1911, a gage was installed on left side of flume, 18 feet from its upper end.

**Channel.**—Wooden flume.

**Discharge measurements.**—Made in flume.

**Accuracy.**—Records good.

*Discharge measurements of Hanamaulu ditch at siphon near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Mar. 10	W. V. Hardy.....	Feet.	Sec.-ft.
Do.	do.....	0.80	6.22
Nov. 13	Larrison and Hardy.....	1.52	20.8
		2.28	38.8

*Daily gage height, in feet, of Hanamaulu ditch at siphon near Lihue, Kauai, for 1912.*

[Mori, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.10	2.50	2.40	1.80	2.20	2.50	2.40	2.40	2.45	2.45	2.30	2.25
2.....	1.10	2.50	2.40	1.80	2.20	2.40	2.40	2.40	2.45	2.40	2.15	2.30
3.....	1.10	2.50	2.50	1.80	2.50	2.40	2.30	2.25	2.45	2.45	2.15	2.30
4.....	1.10	2.50	2.40	1.85	2.50	2.40	2.30	2.25	2.45	2.45	2.25	1.30
5.....	1.10	2.45	2.40	2.15	2.50	2.40	2.30	2.40	2.45	2.45	2.45	.90
6.....	1.10	2.50	2.40	2.15	2.50	2.40	2.35	2.45	2.45	2.45	2.45	.90
7.....	1.10	2.50	2.30	2.30	2.45	2.40	2.40	2.45	2.45	2.45	2.40	.90
8.....	1.10	2.45	2.30	2.25	2.50	2.40	2.40	2.45	2.45	2.45	2.45	1.00
9.....	1.10	2.50	2.30	2.15	2.50	2.40	2.45	2.50	2.40	2.45	2.45	.90
10.....	1.10	2.40	1.30	2.15	2.40	2.40	2.45	2.50	2.30	2.45	2.45	.90
11.....	.70	2.40	1.35	2.10	2.40	2.40	2.45	2.50	2.30	2.50	2.43	.90
12.....	1.10	2.40	1.30	2.05	2.50	2.40	2.45	2.40	2.25	2.45	2.25	.90
13.....	1.10	2.40	1.30	2.10	2.50	2.40	2.45	2.35	2.25	2.45	2.26	2.05
14.....	1.10	2.40	1.00	2.10	2.50	2.40	2.45	2.35	2.25	2.35	2.25	2.00
15.....	1.10	2.40	1.00	2.10	2.50	2.40	2.45	2.50	2.25	2.35	2.25	2.00
16.....	1.10	2.40	1.00	2.15	2.50	2.40	2.20	2.40	2.45	2.35	2.25	2.00
17.....	1.10	2.40	1.00	2.25	2.50	2.45	2.45	2.45	2.40	2.45	2.25	2.05
18.....	1.10	2.35	1.30	1.40	2.45	2.30	2.45	2.40	2.40	2.45	2.25	2.05
19.....	1.10	2.35	1.30	1.40	2.40	2.30	2.45	2.40	2.40	2.45	2.30	2.25
20.....	1.85	2.35	1.30	1.40	2.40	2.30	2.45	2.35	2.45	2.45	2.45	2.45
21.....	1.85	2.35	1.30	1.40	2.50	2.45	2.45	2.35	2.45	2.45	2.45	2.30
22.....	1.80	2.50	2.00	1.40	2.50	2.45	2.40	2.40	2.45	2.45	2.40	2.30
23.....	1.80	2.50	2.00	1.40	2.50	2.45	2.40	2.40	2.40	2.45	1.30	2.30
24.....	1.80	2.50	2.00	2.25	2.50	2.45	2.40	2.40	2.40	2.40	1.30	2.40
25.....	2.10	2.50	2.00	2.25	2.50	2.40	2.40	2.45	2.40	2.40	1.30	2.30
26.....	2.10	2.50	1.80	2.20	2.55	2.40	2.40	2.45	2.40	2.45	(a)	2.25
27.....	2.10	2.20	1.80	2.20	2.55	2.40	2.45	2.45	2.40	2.45	(a)	2.25
28.....	2.10	2.20	1.80	2.20	2.55	2.40	2.45	2.45	2.40	2.45	2.40	2.25
29.....	2.30	2.40	1.80	2.20	2.55	2.40	2.40	2.45	2.40	2.43	2.45	2.25
30.....	2.30	-----	1.80	2.20	2.50	2.40	2.45	2.45	2.45	2.45	2.30	2.20
31.....	2.20	-----	1.80	-----	2.50	-----	2.45	2.45	-----	2.45	-----	2.20

<sup>a</sup> Ditch dry Nov. 26-27.

*Daily discharge, in second-feet, of Hanamaulu ditch at siphon near Lihue, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	11.0	44.0	42.0	27.0	37.0	44.0	42.0	42.0	43.0	43.0	39.0	38.0
2.....	11.0	44.0	42.0	27.0	37.0	42.0	42.0	42.0	43.0	42.0	35.5	39.0
3.....	11.0	44.0	44.0	27.0	44.0	42.0	39.0	38.0	43.0	43.0	35.5	39.0
4.....	11.0	44.0	42.0	28.0	44.0	42.0	39.0	38.0	43.0	43.0	38.0	15.0
5.....	11.0	43.0	42.0	35.5	44.0	42.0	39.0	42.0	43.0	43.0	43.0	7.6
6.....	11.0	44.0	42.0	35.5	44.0	42.0	40.5	43.0	43.0	43.0	43.0	7.6
7.....	11.0	44.0	39.0	39.0	43.0	42.0	42.0	43.0	43.0	43.0	42.0	7.6
8.....	11.0	43.0	39.0	38.0	44.0	42.0	42.0	43.0	43.0	43.0	43.0	9.2
9.....	11.0	44.0	39.0	35.5	44.0	42.0	43.0	44.0	42.0	43.0	43.0	7.6
10.....	11.0	42.0	15.0	35.5	42.0	42.0	43.0	44.0	39.0	43.0	43.0	7.6
11.....	5.0	42.0	16.0	34.0	42.0	42.0	43.0	44.0	39.0	44.0	42.6	7.6
12.....	11.0	42.0	15.0	33.0	44.0	42.0	43.0	42.0	38.0	43.0	38.0	7.6
13.....	11.0	42.0	15.0	34.0	44.0	42.0	43.0	40.5	38.0	43.0	38.2	33.0
14.....	11.0	42.0	9.2	34.0	44.0	42.0	43.0	40.5	38.0	40.5	38.0	32.0
15.....	11.0	42.0	9.2	34.0	44.0	42.0	43.0	44.0	38.0	40.5	38.0	32.0
16.....	11.0	42.0	9.2	35.5	44.0	42.0	37.0	42.0	43.0	40.5	38.0	32.0
17.....	11.0	42.0	9.2	38.0	44.0	43.0	43.0	43.0	42.0	43.0	38.0	33.0
18.....	11.0	40.5	15.0	17.0	43.0	39.0	43.0	42.0	42.0	43.0	38.0	33.0
19.....	11.0	40.5	15.0	17.0	42.0	39.0	43.0	42.0	42.0	43.0	39.0	38.0
20.....	28.0	40.5	15.0	17.0	42.0	39.0	43.0	40.5	43.0	43.0	43.0	43.0
21.....	28.0	40.5	15.0	17.0	44.0	43.0	43.0	40.5	43.0	43.0	43.0	39.0
22.....	27.0	44.0	32.0	17.0	44.0	43.0	42.0	42.0	43.0	43.0	42.0	39.0
23.....	27.0	44.0	32.0	17.0	44.0	43.0	42.0	42.0	42.0	43.0	15.0	39.0
24.....	27.0	44.0	32.0	38.0	44.0	43.0	42.0	42.0	42.0	42.0	15.0	42.0
25.....	34.0	44.0	32.0	38.0	44.0	42.0	42.0	43.0	42.0	42.0	15.0	39.0
26.....	34.0	44.0	27.0	37.0	45.0	42.0	42.0	43.0	42.0	43.0	Dry.	38.0
27.....	34.0	37.0	27.0	37.0	45.0	42.0	43.0	43.0	42.0	43.0	Dry.	38.0
28.....	34.0	37.0	27.0	37.0	45.0	42.0	43.0	43.0	42.0	43.0	42.0	38.0
29.....	39.0	42.0	27.0	37.0	45.0	42.0	42.0	43.0	42.0	42.6	43.0	38.0
30.....	39.0	.....	27.0	37.0	44.0	42.0	43.0	43.0	43.0	43.0	39.0	37.0
31.....	37.0	.....	27.0	.....	44.0	.....	43.0	43.0	.....	43.0	.....	37.0

*Monthly discharge of Hanamaulu ditch at siphon near Lihue, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	39.0	5.0	19.1	1,170	A.
February.....	44.0	37.0	42.3	2,430	A.
March.....	44.0	9.2	26.4	1,620	A.
April.....	39.0	17.0	31.1	1,850	A.
May.....	45.0	37.0	43.4	2,670	A.
June.....	44.0	39.0	41.9	2,490	A.
July.....	43.0	37.0	42.0	2,580	A.
August.....	44.0	38.0	42.2	2,590	A.
September.....	43.0	38.0	41.7	2,480	A.
October.....	44.0	40.5	42.7	2,630	A.
November <sup>a</sup> .....	43.0	15.0	37.5	2,080	A.
December.....	43.0	7.6	28.8	1,770	A.
The period.....	45.0	5.0	36.5	26,400	

<sup>a</sup> Ditch dry Nov. 26-27.

<sup>b</sup> Mean for year is mean for 364 days when ditch carried water.

#### NORTH FORK OF WAILUA RIVER NEAR LIHUE, KAUAI.

**Location.**—About 8 miles northwest of Lihue, and 2 miles above the Kaholalele Falls.

**Records available.**—August 1, 1910, to October 28, 1910; December 28, 1910, to December 31, 1912.

**Drainage area.**—14.63 square miles.

**Gage.**—Friez automatic register; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made from a footbridge and wire suspension bridge.

**Accuracy.**—Record good.

*Discharge measurements of North Fork of Wailua River near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Feb. 18	W. V. Hardy.....	<i>Fect.</i> 0.45	<i>Sec.-ft.</i> 19.4
Mar. 11	.....do.....	2.40	358.0
July 31	.....do.....	.62	43.0

*Daily gage height, in feet, of North Fork of Wailua River near Lihue, Kauai, for 1912.*

[Mori, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.85	0.75	0.82	0.81	0.79	0.62	0.50	0.57	0.93	0.76	0.62	1.42
2.....	.86	.75	.69	.78	.79	.65	.52	.50	.99	.48	.58	3.12
3.....	.87	.75	.94	.77	.88	.73	.54	.50	.88	.82	.58	3.52
4.....	1.08	.60	.70	.95	.92	.84	.56	.49	.72	.82	.56	2.33
5.....	1.04	.57	.64	.92	.81	.68	.58	.64	.60	.80	.....	1.67
6.....	.98	.59	.65	1.14	.78	.66	.60	.70	1.25	.58	.....	1.32
7.....	.97	.59	.70	1.92	.78	.65	.82	.76	.76	.70	.63	1.19
8.....	1.16	.54	.72	1.21	.84	.68	.61	.82	.68	.94	1.12	1.81
9.....	1.19	.48	1.66	1.35	.76	.68	.62	.81	.62	.68	1.08	1.25
10.....	1.03	.47	1.66	1.01	.76	.68	1.02	.60	.58	.74	.77	1.09
11.....	.96	.47	1.98	.92	.66	.68	1.40	.54	.64	1.01	.68	.93
12.....	.96	.46	1.90	.86	.60	.68	.82	.50	.58	.83	.61	.86
13.....	.96	.45	2.95	1.01	.60	.92	1.74	.50	.52	.62	.55	.83
14.....	1.23	.45	1.82	.98	.82	.72	2.93	1.45	.49	.61	.52	.77
15.....	.97	.45	1.44	.84	.92	.70	2.00	.89	.47	.56	.58	.78
16.....	.90	.45	1.20	1.08	.61	.70	1.28	.66	.57	.57	.52	.82
17.....	.89	.45	1.16	3.04	.60	.70	1.96	.60	.54	.67	.....	.61
18.....	.88	.45	1.08	1.56	.60	.70	1.20	.52	.47	.69	.....	.60
19.....	.86	.45	.92	1.23	.60	.75	1.01	.50	.50	1.06	.....	1.10
20.....	.86	.45	.92	1.30	.60	.70	1.00	.49	.51	1.06	.....	1.06
21.....	.84	.45	.87	1.14	.62	.76	1.06	.50	.52	1.17	.....	1.36
22.....	.81	.46	1.05	1.12	.65	.70	.96	.76	.76	.97	1.10	1.63
23.....	.83	1.40	.90	1.06	.65	.50	.91	.59	.52	.88	1.37	1.77
24.....	.78	.80	1.14	.93	.72	.82	1.04	.68	.47	.67	.98	3.14
25.....	.77	.77	1.64	1.01	.60	.50	.81	.60	.44	.84	.85	1.92
26.....	.76	.77	1.00	.95	.60	1.20	.96	.80	.42	1.32	.76	1.44
27.....	.76	.74	.90	.85	.86	.90	.74	1.59	.42	.88	.63	1.17
28.....	.74	.73	.86	.81	1.66	.57	.65	.81	.44	.97	.70	1.03
29.....	.75	.72	.82	.80	1.15	.50	.65	.84	.46	.81	1.28	.90
30.....	.75	.....	.84	.80	.72	.50	.72	1.27	.53	.77	.98	.86
31.....	.75	.....	.84	.....	.62	.....	.63	.92	.....	.73	.....	.85

NOTE.—Low water gage heights previous to July 25 may be high by 0.1 to 0.3 on account of mud in float well. No record Nov. 17-21.

*Daily discharge, in second-feet, of North Fork of Wailua River near Lihue, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	54.5	44.0	51.2	50.1	48.0	31.8	23.0	27.9	63.6	45.0	31.8	133.0
2.....	55.6	44.0	38.1	47.0	48.0	34.5	24.4	23.0	70.8	21.8	28.6	638.0
3.....	56.7	44.0	64.8	46.0	57.8	42.0	25.8	23.0	57.8	51.2	28.6	809.0
4.....	82.4	30.0	39.0	66.0	62.4	53.4	27.2	22.4	41.8	51.2	27.2	356.0
5.....	77.2	27.9	33.6	62.4	50.1	37.2	28.6	33.6	30.0	49.0	29.0	181.0
6.....	69.6	29.3	34.5	90.6	47.0	35.4	30.0	39.0	106.0	28.6	30.9	117.0
7.....	68.4	29.3	39.0	239.0	47.0	34.5	51.2	45.0	45.0	39.0	32.7	97.6
8.....	93.4	25.8	41.0	100.0	53.4	37.2	30.9	51.2	37.2	64.8	87.8	212.0
9.....	97.6	21.8	179.0	123.0	45.0	37.2	31.8	50.1	31.8	37.2	82.4	106.0
10.....	75.9	21.2	179.0	73.3	45.0	37.2	74.6	30.0	28.6	43.0	46.0	83.7
11.....	67.2	21.2	255.0	62.4	35.4	37.2	130.0	25.8	33.6	73.3	37.2	63.6
12.....	66.0	20.6	234.0	55.6	30.0	37.2	51.2	23.0	28.6	52.3	30.9	55.6
13.....	67.2	20.0	571.0	73.3	30.0	62.4	196.0	23.0	24.4	31.8	26.5	52.3
14.....	104.0	20.0	215.0	69.6	51.2	41.0	563.0	138.0	22.4	30.9	24.4	46.0
15.....	68.4	20.0	137.0	53.4	62.4	39.0	260.0	58.9	21.2	27.2	28.6	47.0

*Daily discharge, in second-feet, of North Fork of Wailua River, near Lihue, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	60.0	20.0	99.0	82.4	30.9	39.0	111.0	35.4	27.9	27.9	24.4	51.2
17.....	58.9	20.0	93.4	606.0	30.0	39.0	250.0	30.0	25.8	36.3	.....	30.9
18.....	57.8	20.0	82.4	158.0	30.0	39.0	99.0	24.4	21.2	38.1	.....	30.0
19.....	55.6	20.0	62.4	104.0	30.0	44.0	73.3	23.0	23.0	79.8	.....	85.0
20.....	55.6	20.0	62.4	114.0	30.0	39.0	72.0	22.4	23.7	79.8	.....	79.8
21.....	53.4	20.0	56.7	90.6	31.8	45.0	79.8	23.0	24.4	94.8	.....	124.0
22.....	50.1	20.6	78.5	87.8	34.5	39.0	67.2	45.0	45.0	68.4	85.0	172.0
23.....	52.3	130.0	60.0	79.8	34.5	23.0	61.2	29.3	24.4	57.8	125.0	203.0
24.....	47.0	49.0	90.6	63.6	41.0	51.2	77.2	37.2	21.2	36.3	69.6	647.0
25.....	46.0	46.0	174.0	73.3	30.0	23.0	50.1	30.0	19.4	53.4	54.5	239.0
26.....	45.0	46.0	72.0	66.0	30.0	99.0	67.2	49.0	18.2	117.0	45.0	137.0
27.....	45.0	43.0	60.0	54.5	55.6	60.0	43.0	164.0	18.2	57.8	32.7	94.8
28.....	43.0	42.0	55.6	50.1	179.0	27.9	34.5	50.1	19.4	68.4	39.0	75.9
29.....	44.0	41.0	51.2	49.0	92.0	23.0	34.5	53.4	20.6	50.1	111.0	60.0
30.....	44.0	.....	53.4	49.0	41.0	23.0	41.0	110.0	25.1	46.0	69.6	55.6
31.....	44.0	.....	53.4	.....	31.8	.....	32.7	62.4	.....	42.0	.....	54.5

*Monthly discharge of North Fork of Wailua River near Lihue, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	104	43.0	61.5	3,780	B.
February.....	130	20.0	33.0	1,900	C.
March.....	571	33.6	107.0	6,580	B.
April.....	606	46.0	79.8	4,750	B.
May.....	179	30.0	47.3	2,910	C.
June.....	99	23.0	40.4	2,400	C.
July.....	563	23.0	88.4	5,440	B.
August.....	164	22.4	45.2	2,780	A.
September.....	106	18.2	33.3	1,980	A.
October.....	117	21.8	51.6	3,170	A.
November <sup>a</sup> .....	125	24.4	49.1	2,440	A.
December.....	809	30.0	166.0	10,200	A.
The period.....	809	18.2	67.5	48,300	

<sup>a</sup> No record Nov. 17-21. Mean for November is mean of 25 days.

<sup>b</sup> Mean for the year is mean of 361 days.

#### UHAU IOLE STREAM AT 750-FOOT ELEVATION NEAR LIHUE, KAUAI.

**Location.**—About 11 miles northwest of Lihue, 3 miles from boundary of forest reserve, and 400 feet below falls.

**Records available.**—From July 28, 1912, to December 31, 1912.

**Drainage area.**—1.21 square miles.

**Gage.**—A vertical staff gage; read once a week; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

*Discharge measurements of Uhaui Iole Stream at 750-foot elevation near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
May 5	W. V. Hardy.....	<i>Feet.</i> <sup>a</sup> 5.20	<i>Sec.-ft.</i> 3.83
July 28	.....do.....	4.73	5.91
Oct. 20	.....do.....	5.15	17.3
Do...	.....do.....	4.96	11.2

<sup>a</sup> Gage height of no value, as water level was disturbed in cleaning channel to make good measuring section.

*Daily gage height, in feet, of Uhu Iole Stream at 750-foot elevation near Lihue, Kauai, for 1912.*

[S. Takabayashi, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		4.65			5.12	16.					
2.						17.				4.68	
3.				4.70		18.	4.63				
4.	4.69					19.					
5.						20.			5.18		
6.			4.63			21.					
7.						22.		4.65			4.85
8.		4.70			5.36	23.					
9.						24.				4.71	
10.				4.71		25.	4.62				
11.						26.					
12.	4.70			4.70		27.			4.74		
13.			4.70			28.					
14.						29.		4.61			4.98
15.		4.63			4.84	30.					
						31.					

#### EAST BRANCH OF NORTH FORK OF WAILUA RIVER NEAR LIHUE, KAUAI.

**Location.**—About 8 miles northwest of Lihue, 600 feet above gaging station on the North Wailua, and 400 feet above the confluence of the north and east branches of North Wailua River.

**Records available.**—July 27, 1912, to December 31, 1912.

**Gage.**—Inclined staff gage; read once a day, about 1 p. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

*Discharge measurements of East Branch of North Fork of Wailua River at 300-foot elevation near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 31	W. V. Hardy	Feet.	Sec.-ft.
Oct. 21	.....do.....	6.35	28.0
		6.70	60.4

*Daily gage height, in feet, of East Branch of North Fork of Wailua River at 300-foot elevation near Lihue, Kauai, for 1912.*

[Mori and Takabayashi, observers.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		6.32	6.40	6.50	6.42	6.70	16.		6.45	6.25	6.30	6.32	6.40
2.			6.50	6.80	6.35		17.		6.40	6.25	6.40	6.29	6.40
3.		6.30	6.45	6.80	6.32		18.		6.31	6.25	6.35	6.33	6.40
4.		6.28	6.40	6.32		6.15	19.		6.35	6.25	6.52	6.48	6.38
5.		6.27	6.40	6.30	6.56	6.13	20.		6.32	6.30	6.40	6.40	6.62
6.		6.40	6.60	6.27	6.50	6.90	21.		6.30	6.28	6.70		6.15
7.		6.45	6.45	6.28	6.45	6.72	22.		6.30	6.29	6.50	6.68	7.23
8.		6.40	6.38	6.45	6.47	6.71	23.		6.30	6.25	6.45	6.76	6.72
9.		6.40	6.40	6.35	6.65	6.63	24.		6.28	6.23	6.42	6.37	
10.		6.32	6.33	6.32	6.88	6.62	25.		6.32	6.22	6.41		
11.		6.30	6.30	6.90	6.42		26.		6.40	6.20	6.48	6.32	6.64
12.		6.30	6.30	6.45	6.32	6.59	27.		6.35	6.60	6.20	6.42	6.60
13.		6.30		6.37	6.32	6.52	28.	6.35	6.40	6.21	6.46		6.58
14.			6.28	6.35	6.30	6.50	29.	6.35	6.40	6.23	6.48		6.30
15.		6.40	6.26	6.32	6.32	6.38	30.	6.44	6.50	6.25	6.49	6.65	6.45
							31.	6.34	6.45		6.48		6.45

**KEAHUA STREAM AT 750-FOOT ELEVATION NEAR LIHUE, KAUAI.**

**Location.**—About 12 miles north of Lihue, 4 miles from edge of forest reserve, and at confluence with stream from the east.

**Records available.**—July 29, 1912, to December 31, 1912.

**Gage.**—Vertical staff; read once a week.

**Channel.**—Permanent.

**Discharge measurements.**—Made by wading at about 20 feet below confluence of streams and about 35 feet below gage.

*Discharge measurements of Keahua Stream at 750-foot elevation near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-feet.</i>
May 5	W. V. Hardy.....	5.20	10.8
July 29	.....do.....	a 5.19	12.3
Oct. 22	.....do.....	5.32	13.6

a New datum established since previous measurement of May 5.

*Daily gage height, in feet, of Keahua Stream at 750-foot elevation near Lihue, Kauai, for 1912.*

[S. Takabayashi, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		5.29			5.52	16.....				5.11	
2.....						17.....					
3.....				5.21		18.....	5.12				
4.....	5.11					19.....					
5.....						20.....					
6.....			5.11			21.....					
7.....						22.....		5.14	5.32		5.41
8.....		5.27			5.50	23.....					
9.....						24.....				5.13	
10.....				5.20		25.....	5.23				
11.....	5.12					26.....					
12.....				5.18		27.....			5.13		
13.....			5.13			28.....					
14.....						29.....		5.09			5.12
15.....		5.11			5.10	30.....					
						31.....					

**KAWI STREAM AT 750-FOOT ELEVATION NEAR LIHUE, KAUAI.**

**Location.**—About 8 miles north of Lihue, 3 miles from boundary of forest reserve, and 600 feet above confluence of stream from the east.

**Records available.**—July 30 to December 31, 1912.

**Drainage area.**—0.71 square miles.

**Gage.**—Vertical staff gage; read once a week; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made by wading.

*Discharge measurements of Kawi Stream at 750-foot elevation near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-feet.</i>
Apr. 29	W. V. Hardy.....	5.00	2.01
July 30	.....do.....	a 1.92	1.80
Oct. 22	.....do.....	1.92	2.10
Nov. 12	Larrison and Hardy.....	1.80	1.48

a New datum established since previous measurement.

*Daily gage height, in feet, of Kawi Stream at 750-foot elevation near Lihue, Kauai, for 1912.*

[S. Takabayashi, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.89			2.03	16.....					
2.....						17.....				1.82	
3.....				1.79		18.....	1.88				
4.....	1.88					19.....					
5.....						20.....					
6.....			1.80			21.....					
7.....						22.....		1.92	1.92		2.02
8.....		1.88			1.99	23.....					
9.....						24.....				1.83	
10.....				1.84		25.....	1.98				
11.....	1.89					26.....					
12.....				1.80		27.....			1.90		
13.....			1.90			28.....					
14.....						29.....		1.82			1.81
15.....		1.72			1.81	30.....					
						31.....					

#### KANAHU DITCH AT INTAKE, NEAR LIHUE, KAUAI.

**Location.**—About 9 miles northwest of Lihue and about 500 feet above the point where the Kauai Electric Co.'s power line crosses the ditch and the North Fork of Wailua River.

**Records available.**—August 6, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once each day, at 8 a. m.; datum unchanged.

**Discharge measurements.**—Made in flume 100 feet above gage.

*Discharge measurements of Kanaha ditch at intake, near Lihue, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 11	W. V. Hardy.....	3.02	33.4
July 29	do.....	2.84	29.0
Oct. 31	do.....	2.78	27.7
	do.....	3.14	32.4

*Daily gage height, in feet, of Kanaha ditch at intake, near Lihue, Kauai, for 1912.*

[Mori, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.50	2.30	2.60	2.60	2.75	2.75	2.80	2.70	3.20	3.00	2.90	3.05
2.....	2.50	2.25	2.60	2.55	2.70	2.70	2.75	2.90	3.20	2.90	3.00	3.2
3.....		2.25	2.80	2.50	2.80	2.70	2.80	2.90	3.10	3.00	3.00	3.1
4.....		2.25	2.70	2.60	3.10	2.70	2.75	2.90	3.10	3.00	3.00	1.6
5.....		2.25	2.60	2.80	2.90	2.70	2.75	2.90	3.10	3.15	3.20	1.6
6.....		2.20	2.60	2.70	2.80	2.80	2.80	3.50	3.20	3.05	3.20	1.6
7.....		2.20	2.75	2.90	2.70	2.80	3.00	3.00	3.10	3.05	3.10	1.5
8.....		2.20	2.70	2.90	2.90	2.80	3.10	3.10	3.10	3.10	3.10	1.6
9.....		2.60	2.80	2.90	2.80	2.80	2.80	3.10	3.10	3.05	3.20	1.60
10.....		2.50	2.80	2.80	2.70	2.75	3.10	3.10	3.10	3.05	3.15	2.40
11.....		2.50	3.00	2.70	2.65	2.75	3.10	3.10	3.10	3.10	3.05	2.40
12.....		2.50	3.00	2.70	2.60	2.75	3.10	3.10	2.90	3.10	2.95	2.40
13.....		2.50	3.00	2.60	2.60	2.80	3.10	3.10	.....	3.05	2.90	2.40
14.....		2.40	2.90	2.60	2.80	2.80	3.20	3.20	2.90	3.00	2.90	2.30
15.....		2.40	2.80	2.60	2.80	2.80	3.00	3.00	3.00	3.00	3.10	2.30



*Daily gage height, in feet, of Kanaha ditch at intake, near Lihue, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....		2.40	2.70	2.70	2.80	2.80	2.80	3.10	3.05	2.90	2.85	2.30
17.....		2.50	2.70	3.00	2.80	2.80	3.10	3.50	2.90	3.15	2.83	2.70
18.....		2.50	2.65	2.40	2.80	2.70	3.50	3.00	2.80	3.10	3.05	2.70
19.....		2.50	2.60	2.30	2.75	2.70	3.00	3.00	2.80	3.15	3.10	2.90
20.....		2.50	2.60	2.30	2.75	2.70	3.00	3.00	3.00	3.15	3.15	3.00
21.....		2.40	2.80	2.00	2.80	2.80	3.00	3.00	3.00	3.14	.....	2.80
22.....	2.30	2.60	2.75	2.00	2.80	2.90	2.80	3.50	3.05	3.15	3.20	2.90
23.....	2.40	2.60	2.80	2.00	2.80	2.90	2.80	3.50	3.00	3.15	.....	2.85
24.....	2.40	2.60	2.40	2.60	2.85	2.80	3.00	3.50	2.90	3.10	.....	2.90
25.....	2.40	2.80	2.50	2.80	2.85	2.70	2.90	3.20	2.75	3.10	.....	2.80
26.....	2.30	2.80	2.50	2.50	2.85	2.70	3.00	3.10	2.75	3.20	1.60	2.70
27.....	2.30	2.80	2.50	2.70	2.85	2.90	3.00	3.10	2.75	3.15	1.60	2.70
28.....	2.30	2.60	2.40	2.70	3.00	2.80	3.00	3.10	2.70	3.15	1.65	2.50
29.....	2.20	2.60	2.40	2.80	3.00	2.70	3.50	3.10	3.00	3.10	3.10	2.40
30.....	2.20		2.60	2.80	2.90	2.70	3.10	3.20	3.05	3.00	2.90	2.40
31.....	2.20	.....	2.90	.....	2.80	.....	2.80	3.20	.....	3.05	.....	2.40

## KONOHKI STREAM BASIN.

## KONOHKI STREAM AT MAKAKUALELE MAUKA WEIR, NEAR KAPAA, KAUAI.

**Location.**—About 3 miles west of Kapaa.

**Records available.**—April 1, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once each day; datum unchanged.

**Discharge measurements.**—Made with 3-foot sharp-crested weir.

**Cooperation.**—Station maintained by the Makee Sugar Co.

*Daily discharge, in second-feet, of Konohiki Stream at Makakualele mauka weir, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.17	0.89	0.96	0.89	1.03	0.89	0.83	0.83	0.76	0.58	0.58	0.52
2.....	1.03	.89	.89	.89	1.03	.89	.83	.83	.76	.58	.58	1.81
3.....	1.03	.89	.96	.89	1.03	.89	.83	.83	.76	.58	.58	2.07
4.....	1.03	.89	.83	.89	1.03	.89	.83	.83	.70	.58	.58	1.98
5.....	1.03	.83	.83	.83	1.03	.89	.83	.83	.70	.58	.58	1.40
6.....	1.03	.83	.89	.83	1.03	.89	.83	.83	.76	.58	.58	1.17
7.....	1.03	.83	.83	.96	.96	.89	.83	.83	.76	.58	.58	.96
8.....	1.03	.83	.83	.89	.96	.89	.83	.83	.70	.58	.58	.96
9.....	1.17	.83	1.56	.83	.96	.89	.83	.83	.70	.58	.58	1.17
10.....	1.10	.83	1.72	.83	.96	.89	.83	.83	.70	.58	.64	.96
11.....	1.10	.83	1.48	.83	.96	.83	1.25	.83	.70	.58	.58	.89
12.....	1.10	.83	1.17	.83	1.10	.83	.96	.83	.70	.58	.58	.83
13.....	1.10	.83	.96	.83	.96	.83	.83	.83	.70	.58	.58	.83
14.....	1.10	.83	.96	.83	.96	.83	2.72	.89	.70	.58	.52	.76
15.....	1.10	.83	.89	.83	1.03	.83	1.32	.89	.70	.58	.52	.76
16.....	1.10	.83	.89	.76	.96	.83	1.17	.83	.64	.58	.52	.76
17.....	1.10	.83	.89	3.53	.96	.83	1.10	.83	.64	.58	.52	.76
18.....	1.03	.83	.89	2.82	.96	.83	.96	.83	.64	.58	.52	.70
19.....	1.03	.83	.89	1.81	.96	.83	.89	.83	.64	.64	.52	.70
20.....	1.03	.83	.89	1.56	.96	.83	.83	.83	.64	.83	.52	.70
21.....	1.03	.83	.89	1.48	.96	.83	.83	.83	.64	.76	.52	.76
22.....	.96	.89	.89	1.25	.89	.83	.83	.83	.64	.70	.58	.76
23.....	.96	.89	.89	1.17	.89	.83	.83	.83	.64	.64	.52	.76
24.....	.96	.96	.89	1.17	.96	.76	.83	.83	.64	.58	.52	.70
25.....	.89	.89	1.03	1.17	.89	.76	.83	.83	.64	.58	.52	.70
26.....	.89	.89	.89	1.10	.89	.76	.83	.83	.64	.58	.52	.70
27.....	.89	.83	.89	1.10	.89	.76	.83	.83	.64	.58	.52	.70
28.....	.89	.83	.89	1.10	1.03	1.25	.83	.83	.64	.58	.52	.70
29.....	.89	.83	.89	1.10	1.03	.89	.83	.76	.64	.58	.52	.64
30.....	.89	.....	.89	1.10	.89	.83	.83	.76	.58	.58	.52	.64
31.....	.89	.....	.89	.....	.89	.....	.83	.76	.....	.58	.....	.64

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 LH^{\frac{3}{2}}$  when  $L=3$  feet.

*Monthly discharge of Konohiki Stream at Makakualele mauka weir, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	1.17	0.89	1.02	62.7
February.....	.96	.83	.85	48.9
March.....	1.72	.83	.97	59.6
April.....	3.53	.76	1.17	69.6
May.....	1.10	.89	.97	59.6
June.....	1.25	.76	.86	51.2
July.....	2.72	.83	.95	58.4
August.....	.89	.76	.83	51.0
September.....	.76	.68	.68	40.5
October.....	.83	.68	.60	36.9
November.....	.64	.52	.55	32.7
December.....	2.07	.52	.92	56.6
The year.....	3.53	.52	.86	628

**KONOHIKI STREAM AT MAKAKUALELE MAKAI WEIR, NEAR KAPAA, KAUAI.**

**Location.**—About 2½ miles west of Kapaa.

**Records available.**—January 1, 1912, to December 31, 1912.

**Gage.**—Vertical staff; read once each day; datum unchanged.

**Discharge measurements.**—Made with 3-foot sharp-crested weir.

**Cooperation.**—Station maintained by the Makee Sugar Co.

*Daily discharge, in second-feet, of Konohiki Stream at Makakualele makai weir, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.15	2.62	4.64	5.24	2.53	0.32	0.58	0.58	0.58	0.58	0.58	1.25
2.....	9.10	3.75	4.64	5.24	2.07	.32	.32	.58	.58	.58	.58	1.25
3.....	7.83	5.36	3.02	3.53	1.64	.32	.32	.58	.58	.58	.58	7.83
4.....	9.10	3.75	3.02	3.75	1.10	.32	.32	.58	.58	.58	.32	8.53
5.....	8.53	5.36	4.89	4.07	.89	.32	.32	.58	.89	.58	.32	3.02
6.....	6.75	4.64	4.64	3.53	.89	.32	.32	.58	.89	.58	.58	1.64
7.....	6.75	2.72	4.64	3.53	.58	.32	.32	.58	.89	.58	.58	1.25
8.....	6.88	2.53	5.24	3.53	.58	.32	.32	.58	.58	.58	.32	1.25
9.....	3.53	3.22	5.24	3.53	.58	.58	.58	.58	.58	.58	.32	1.25
10.....	3.32	1.98	5.24	3.53	.32	.58	.58	.58	.58	.58	.32	1.25
11.....	7.42	2.25	6.49	3.53	.32	.58	.32	.58	.58	.58	.32	1.25
12.....	8.25	3.12	5.24	3.53	.32	.58	.32	.58	.58	.58	.32	1.25
13.....	9.99	3.53	1.81	3.53	.32	.58	.32	.89	.58	.58	.32	1.25
14.....	9.99	2.72	2.07	3.53	.58	.58	.32	.89	.58	.58	.32	1.25
15.....	7.83	3.32	1.64	3.53	.58	.58	.32	.58	.58	.58	.32	.89
16.....	7.69	3.53	2.07	3.53	.58	.58	.32	.58	.58	.58	.32	.89
17.....	6.62	2.72	5.24	7.83	.58	.58	.32	.32	.58	.58	.32	.58
18.....	4.64	1.89	5.24	7.83	.58	.58	.32	.58	.58	.58	.32	.58
19.....	4.07	3.02	4.64	5.24	.58	.32	.32	.58	.58	.70	.32	.58
20.....	3.64	2.43	5.24	3.53	.58	.58	.32	.58	.58	1.03	.32	.32
21.....	3.75	3.12	6.10	3.53	.58	.58	.32	.58	.58	1.03	.23	.32
22.....	7.15	3.53	5.85	3.53	.58	.58	.32	.58	.58	1.03	.19	.32
23.....	7.42	2.53	4.07	3.53	.32	.58	.32	.89	.58	1.03	.11	.32
24.....	3.02	3.53	4.07	3.53	.32	.58	.32	.58	.58	.58	.58	.58
25.....	3.64	3.53	4.64	3.75	.58	.58	.32	.58	.58	.70	.58	.58
26.....	4.76	3.53	4.30	3.53	.32	.70	.32	.58	.58	.58	.32	.58
27.....	4.64	3.64	5.48	4.07	.32	.58	.32	.58	.58	.58	.32	.58
28.....	3.64	2.92	5.24	3.53	.58	.58	.32	.58	.58	.58	.32	.32
29.....	4.76	3.02	5.24	3.53	.58	.58	.32	.58	.58	.58	.58	.32
30.....	3.53	.....	5.24	3.53	.58	.58	.58	.58	.58	.32	.58	.32
31.....	3.64	.....	5.24	.....	.58	.....	.58	.58	.....	.89	.....	.32

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 LH^{\frac{3}{2}}$  when  $L=3$  feet.

*Monthly discharge of Konohiki Stream at Makakuaalele, makai weir, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	9.99	3.02	6.10	375
February.....	5.36	1.89	3.24	186
March.....	6.49	1.64	4.53	278
April.....	7.83	3.53	4.04	240
May.....	2.53	.32	.69	42.4
June.....	.70	.32	.53	31.5
July.....	.58	.32	.37	22.8
August.....	.89	.32	.60	36.9
September.....	.89	.58	.61	36.3
October.....	1.03	.32	.65	40.0
November.....	.58	.11	.38	22.6
December.....	8.53	.32	1.34	82.4
The year.....	9.99	.11	1.92	1,390

NOTE.—Maximum and minimum discharge are mean for the day.

### KAEHULUA STREAM BASIN.

#### NORTH FORK OF KAEHULUA STREAM AT KAINAHOLA WEIR, NEAR KAPAA, KAUAI.

**Location.**—About 2 miles northwest of Kapaa.

**Records available.**—April 1, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once each day; datum unchanged.

**Discharge measurements.**—Made with a 3-foot sharp-crested weir.

**Cooperation.**—Station maintained by the Makee Sugar Co.

*Daily discharge, in second-feet, of North Fork of Kaehulua Stream at Kainahola weir, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.83	0.70	0.64	0.76	0.64	0.70	0.64	0.64	0.58	0.52	0.58	0.47
2.....	.83	.64	.64	.76	.64	.64	.64	.64	.58	.52	.58	1.10
3.....	.83	.64	.64	.64	.64	.64	.64	.64	.58	.52	.58	2.34
4.....	.83	.64	.64	.64	.64	.70	.64	.64	.58	.52	.58	.96
5.....	.83	.64	.64	.64	.64	.70	.64	.64	.58	.52	.58	.83
6.....	.83	.64	.64	.64	.64	.64	.64	.64	.58	.52	.58	.70
7.....	.83	.64	.64	.64	.64	.64	.64	.64	.58	.52	.58	.70
8.....	.83	.64	.64	.64	.64	.64	.64	.64	.58	.52	.58	.70
9.....	.83	.64	.70	.64	.64	.64	.64	.64	.58	.52	.58	.64
10.....	.83	.64	.83	.64	.64	.64	.64	.64	.58	.52	.58	.70
11.....	.76	.64	.96	.64	.64	.64	2.62	.64	.58	.52	.58	.70
12.....	.76	.64	.89	.64	.64	.64	.83	.64	.58	.52	.58	.64
13.....	.76	.64	.89	.64	.64	.64	.76	1.17	.58	.52	.58	.64
14.....	.76	.64	.89	.64	.64	.64	1.72	1.17	.58	.52	.58	.64
15.....	.76	.64	.83	.64	.64	.64	.83	.64	.58	.52	.58	.64
16.....	.76	.64	.83	.64	.64	.64	.70	.64	.52	.52	.58	.64
17.....	.76	.64	.76	3.02	.64	.64	.70	.64	.52	.52	.58	.64
18.....	.76	.64	.76	1.72	.64	.64	.70	.64	.52	.52	.52	.64
19.....	.76	.64	.76	.83	.64	.64	.64	.64	.52	.52	.52	.64
20.....	.70	.64	.76	.76	.64	.64	.64	.64	.52	.58	.52	.64
21.....	.70	.64	.76	.76	.64	.64	.64	.64	.52	.58	.52	.70
22.....	.70	.64	.76	.76	.64	.64	.64	.64	.52	.58	.52	.83
23.....	.70	.64	.76	.70	.64	.64	.64	.64	.52	.58	.52	.70
24.....	.70	.64	.76	.70	.64	.64	.64	.64	.52	.58	.52	.64
25.....	.70	.64	.76	.70	.64	.64	.64	.64	.52	.58	.47	.64
26.....	.70	.64	.76	.70	.64	.58	.64	.64	.52	.58	.47	.64
27.....	.70	.64	.76	.64	.64	.58	.64	.64	.52	.58	.52	.64
28.....	.70	.64	.76	.64	.76	.64	.64	.64	.52	.58	.47	.64
29.....	.70	.64	.76	.64	.70	.64	.64	.64	.52	.58	.47	.64
30.....	.70	.....	.76	.64	.70	.64	.64	.64	.58	.52	.58	.47
31.....	.70	.....	.76	.....	.70	.....	.64	.58	.....	.58	.....	.64

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 LH^{\frac{3}{2}}$  when  $L=3$  feet.

*Monthly discharge of North Fork of Kaehulua Stream at Kainahola weir, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	0.83	0.70	0.76	46.7
February.....	.70	.64	.64	36.8
March.....	.96	.64	.75	46.1
April.....	3.02	.64	.79	47.0
May.....	.76	.64	.65	40.0
June.....	.70	.58	.64	38.1
July.....	2.62	.64	.76	46.7
August.....	1.17	.58	.67	41.2
September.....	.58	.52	.55	32.7
October.....	.58	.52	.54	33.2
November.....	.58	.47	.55	32.7
December.....	2.34	.47	.74	45.5
The year.....	3.02	.47	.67	487

#### KAEHULUA STREAM AT KUHINOA WEIR, NEAR KAPAA, KAUAI.

**Location.**—About 1½ miles northwest of Kapaa.

**Records available.**—May 1, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once each day; datum unchanged.

**Discharge measurements.**—Made with 6.5-foot sharp-crested weir.

**Cooperation.**—Station is maintained by Makee Sugar Co.

*Daily discharge, in second-feet, of Kaehulua Stream at Kuhinoa Weir, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.52	1.26	1.65	10.60	0.68	0.68	3.56	0.68	2.71	0.24	0.24	0.68
2.....	2.08	1.13	1.39	4.48	.68	1.26	1.93	1.26	1.93	.24	.24	.68
3.....	1.65	1.39	1.26	2.71	.68	1.26	2.71	.68	1.93	.17	.24	8.83
4.....	2.23	1.79	1.26	2.71	.90	1.26	2.71	1.93	2.23	.17	.24	18.50
5.....	1.26	1.26	1.26	2.71	.68	.68	2.71	1.93	1.93	.24	.24	.17
6.....	1.26	2.39	1.52	1.93	.68	1.26	3.56	1.93	2.23	.24	.24	.06
7.....	1.39	2.87	6.98	1.93	.90	1.26	2.71	1.26	1.26	.24	.24	.68
8.....	1.65	1.01	2.55	1.93	1.26	1.26	2.71	1.93	1.93	.24	.17	.06
9.....	1.26	1.52	2.71	6.53	1.26	1.26	3.56	1.26	1.93	.24	1.26	.06
10.....	1.39	1.39	14.10	2.71	1.26	1.26	3.56	1.93	1.93	.24	.24	.40
11.....	2.23	1.52	17.00	2.71	.68	1.26	2.71	1.93	1.93	.49	.24	.40
12.....	1.65	2.23	11.30	2.71	1.26	1.26	1.93	1.26	2.71	.32	.24	.24
13.....	1.39	3.04	22.30	2.71	1.26	1.26	2.71	2.71	1.93	.68	.68	.68
14.....	1.13	1.39	20.70	2.71	1.93	1.93	2.71	2.71	1.93	.68	.68	.24
15.....	1.79	1.39	9.32	2.71	1.93	1.26	1.93	1.93	1.93	.68	.90	.17
16.....	1.39	2.23	7.65	2.71	2.23	.68	2.23	1.26	1.93	.68	.68	.17
17.....	1.52	1.39	2.71	35.90	1.93	.68	1.93	1.26	1.93	.68	.24	.32
18.....	1.26	1.65	2.71	25.70	1.93	1.26	1.93	1.93	1.93	1.26	.24	.24
19.....	1.13	1.26	2.71	5.90	1.93	1.26	1.26	1.93	1.93	1.26	.17	.24
20.....	1.79	1.01	2.71	2.71	1.93	1.26	1.93	1.93	1.26	1.52	.68	.17
21.....	1.52	1.13	2.71	2.71	1.93	1.26	1.26	1.93	1.26	1.52	.68	.68
22.....	1.65	1.39	3.56	2.71	1.26	1.93	1.26	1.26	1.26	1.52	.68	.68
23.....	2.39	2.23	1.93	2.71	1.93	2.71	2.23	2.71	1.26	1.52	.68	.68
24.....	3.21	1.52	1.93	2.71	1.26	2.71	2.71	1.93	1.26	.68	.24	.68
25.....	2.55	1.79	1.93	2.71	1.26	2.71	1.26	1.93	1.26	1.26	.24	.06
26.....	1.52	1.39	1.93	.68	1.93	3.04	1.26	1.93	1.26	1.26	.06	.06
27.....	1.65	1.52	1.93	.68	1.93	2.71	2.23	1.93	1.26	1.26	.06	.06
28.....	1.52	1.39	1.93	.68	.90	2.71	2.23	1.93	1.26	1.26	.17	.17
29.....	2.23	1.39	1.93	.68	11.30	2.71	1.93	2.23	1.26	1.26	.06	.24
30.....	1.93	.....	1.26	.68	1.93	1.93	1.93	1.93	1.26	.58	.06	.24
31.....	1.93	.....	10.60	.....	1.93	.....	1.26	1.93	.....	.68	.....	.17

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 LH^{\frac{3}{2}}$  when  $L=6.5$  feet.

*Monthly discharge of Kaehulua Stream at Kuhinoa weir, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	3.21	1.13	1.71	105.0
February.....	3.04	1.01	1.62	93.2
March.....	22.30	1.26	5.34	328.0
April.....	35.90	.68	4.72	281.0
May.....	11.30	.68	1.73	106.0
June.....	3.04	.68	1.60	95.2
July.....	3.56	1.26	2.27	140.0
August.....	2.71	.68	1.78	109.0
September.....	2.71	1.26	1.78	106.0
October.....	1.52	.17	.75	46.1
November.....	1.26	.06	.37	22.0
December.....	18.50	.06	1.18	72.6
The year.....	35.90	.06	2.07	1,500

NOTE.—Maximum and minimum discharge are mean for the day.

**SOUTH FORK OF KAEHULUA STREAM AT WAINAMUAMU WEIR, NEAR KAPAA, KAUAI.**

Location.—About 2½ miles northwest of Kapaa.

Records available.—April 1, 1911, to December 31, 1912.

Gage.—Vertical staff; read once each day; datum unchanged.

Discharge measurements.—Made with a 3-foot sharp-crested weir.

Cooperation.—Station maintained by the Makee Sugar Co.

*Daily discharge, in second-feet, of South Fork of Kaehulua Stream at Wainamuamu weir, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.58	0.42	0.42	0.52	0.70	0.52	0.47	0.42	0.42	0.42	0.42	0.36
2.....	.52	.42	.36	.52	.70	.52	.47	.42	.42	.42	.42	.47
3.....	.58	.42	.42	.52	.70	.52	.47	.42	.42	.42	.42	.52
4.....	.52	.42	.36	.52	.64	.52	.47	.42	.42	.42	.42	1.40
5.....	.52	.42	.36	.47	.64	.52	.47	.47	.42	.42	.42	.64
6.....	.52	.42	.42	.17	.64	.47	.47	.47	.42	.42	.42	1.10
7.....	.52	.42	.36	.64	.58	.47	.47	.47	.42	.42	.42	1.10
8.....	.52	.36	.36	.58	.58	.47	.47	.42	.42	.42	.42	.58
9.....	.52	.36	.58	.58	.58	.47	.47	.42	.42	.42	.42	.58
10.....	.58	.36	.58	.58	.52	.47	.47	.42	.42	.42	.42	.58
11.....	.52	.36	.58	.58	.47	.47	1.25	.42	.42	.42	.42	.58
12.....	.52	.36	.47	.58	.52	.47	.70	.42	.42	.42	.42	.52
13.....	.52	.36	.36	.58	.52	.47	.47	.42	.42	.42	.42	.52
14.....	.52	.36	.36	.58	.52	.47	.58	.52	.42	.42	.42	.47
15.....	.52	.36	.36	.58	.52	.47	.70	.52	.42	.42	.42	.47
16.....	.52	.36	.36	.58	.47	.47	.52	.42	.42	.42	.42	.47
17.....	.52	.36	.36	3.53	.47	.47	.52	.42	.42	.42	.42	.47
18.....	.52	.36	.36	3.53	.47	.47	.52	.42	.42	.42	.42	.47
19.....	.47	.36	.36	3.22	.47	.47	.52	.42	.42	.42	.42	.47
20.....	.47	.36	.36	2.92	.47	.47	.47	.42	.42	.64	.42	.47
21.....	.47	.36	.36	2.72	.47	.47	.47	.42	.42	.64	.42	.52
22.....	.47	.36	.36	5.00	.47	.47	.47	.42	.42	.64	.42	.52
23.....	.47	.42	.36	5.00	.47	.47	.47	.42	.42	.47	.42	.52
24.....	.47	.42	.36	5.00	.52	.47	.47	.42	.42	.42	.42	.52
25.....	.47	.36	.36	5.00	.47	.47	.47	.42	.42	.42	.42	.47
26.....	.47	.36	.36	5.00	.47	.47	.47	.42	.42	.42	.42	.47
27.....	.47	.36	.42	5.00	.47	.47	.42	.42	.42	.42	.42	.47
28.....	.47	.36	.42	4.64	.52	.64	.42	.42	.42	.42	.42	.47
29.....	.47	.36	.83	3.02	.70	.52	.42	.42	.42	.42	.42	.47
30.....	.42	.....	.76	.76	.64	.47	.42	.42	.42	.42	.42	.47
31.....	.42	.....	.76	.....	.47	.....	.42	.42	.....	.42	.....	.47

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 L H^{\frac{3}{2}}$  when  $L=3$  feet.

*Monthly discharge of South Fork of Kaehulua Stream at Wainamuanu weir, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	0.58	0.42	0.50	30.7
February.....	.42	.36	.38	21.9
March.....	.83	.36	.44	27.1
April.....	5.00	.47	2.11	126.0
May.....	.70	.47	.54	33.2
June.....	.64	.47	.49	29.2
July.....	1.25	.42	.51	31.4
August.....	.52	.42	.43	26.4
September.....	.42	.42	.42	25.0
October.....	.64	.42	.44	27.1
November.....	.42	.36	.42	25.0
December.....	1.40	.36	.58	35.7
The year.....	5.00	.36	.60	439

### KAPAA RIVER BASIN.

#### KAPAA RIVER AT KAPAHI, NEAR KAPAA, KAUAI.

**Location.**—About one-half mile above the intake of the Kapaa ditch, 5 miles north-west of Kapaa, and 4 miles west of Kealia.

**Records available.**—July 23, 1910, to December 31, 1912.

**Gage.**—Vertical staff gage spiked to left bank of stream; read twice daily, about 7 a. m. and 2 p. m.; datum unchanged.

**Channel.**—Fairly permanent.

**Discharge measurements.**—Made from a wire suspension bridge.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained in cooperation with the Makee Sugar Co.

The following discharge measurement was made by W. V. Hardy:

February 16, 1912: Gage height, 1.42 feet; discharge, 11.8 second-feet.

*Daily gage height, in feet, of Kapaa River at Kapahi, near Kapaa, Kauai, for 1912.*

[S. Okimoto, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.61	1.46	2.06	1.63	1.48	1.50	1.44	1.46	1.58	1.72	1.49	1.86
2.....	1.62	1.46	1.58	1.52	1.46	1.48	1.44	1.45	1.63	1.47	1.47	2.52
3.....	1.63	1.46	2.12	1.56	1.48	1.47	1.43	1.44	1.54	1.82	1.46	3.30
4.....	1.58	1.45	1.66	1.74	1.62	1.84	1.43	1.48	1.54	1.48	1.46	3.75
5.....	1.76	1.44	1.58	1.80	1.52	1.56	1.48	1.89	1.50	1.50	1.76	1.75
6.....	1.60	1.44	1.58	1.86	1.51	1.48	1.53	1.72	2.05	1.50	1.50	1.69
7.....	1.61	1.44	1.70	2.45	1.48	1.46	1.81	1.65	1.57	1.57	1.48	1.66
8.....	1.82	1.44	1.56	1.86	1.58	1.62	1.53	1.60	1.52	1.78	1.77	1.82
9.....	1.88	1.48	2.58	2.14	1.48	1.58	1.54	1.74	1.49	1.58	1.73	1.95
10.....	1.78	1.45	2.80	1.74	1.46	1.50	2.82	1.54	1.48	1.56	1.52	1.69
11.....	1.59	1.45	2.62	1.70	1.45	1.46	2.65	1.57	1.46	1.75	1.52	1.58
12.....	1.55	1.44	2.11	1.68	1.46	1.45	1.79	1.49	1.45	1.56	1.47	1.52
13.....	1.79	1.44	2.92	1.70	1.50	1.70	1.86	1.56	1.45	1.57	1.44	1.50
14.....	2.09	1.44	2.00	1.85	1.95	1.50	3.92	2.56	1.42	1.58	1.44	1.50
15.....	1.66	1.44	1.85	1.64	1.85	1.50	2.21	1.78	1.40	1.50	1.64	1.48
16.....	1.60	1.44	1.68	1.65	1.54	1.54	1.85	1.60	1.48	1.56	1.50	1.52
17.....	1.55	1.44	1.55	6.22	1.56	1.48	2.24	1.66	1.58	1.52	1.44	1.49
18.....	1.53	1.44	1.68	2.38	1.48	1.50	1.74	1.53	1.44	1.59	1.57	1.48
19.....	1.50	1.43	1.66	1.76	1.45	1.59	1.54	1.50	1.51	1.86	1.52	1.56
20.....	1.50	1.43	1.79	1.86	1.45	1.49	1.56	1.48	1.48	2.06	1.56	1.62

*Daily gage height, in feet, of Kapaa River at Kapahi, near Kapaa, Kauai, for 1912—*  
Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.49	1.44	1.66	1.74	1.46	1.55	1.57	1.51	1.50	1.91	1.79	2.32
22.....	1.48	1.74	1.68	1.68	1.58	1.48	1.56	1.60	1.48	1.60	2.20	1.78
23.....	1.48	2.00	1.64	1.61	1.70	1.45	1.59	1.52	1.45	1.62	1.80	1.68
24.....	1.48	1.66	1.66	1.56	1.82	1.45	2.16	1.47	1.43	1.55	1.53	2.38
25.....	1.48	1.58	2.80	1.58	1.56	1.45	1.56	1.48	1.42	1.57	1.45	1.82
26.....	1.47	1.58	1.84	1.66	1.50	1.44	1.74	1.59	1.41	2.18	1.48	1.82
27.....	1.47	1.58	1.64	1.56	1.98	1.57	1.54	1.94	1.41	1.66	1.45	1.58
28.....	1.49	1.51	1.70	1.55	2.90	1.52	1.53	1.57	1.44	1.56	1.44	1.54
29.....	1.48	1.49	1.66	1.51	2.24	1.48	1.54	1.52	1.54	1.54	1.90	1.50
30.....	1.47	.....	1.60	1.48	1.63	1.44	1.52	1.88	1.57	1.66	1.70	1.48
31.....	1.46	.....	1.72	.....	1.52	.....	1.48	1.66	.....	1.50	.....	1.49

*Daily discharge, in second-feet, of Kapaa River at Kapahi, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	18.4	12.8	42.2	19.2	13.4	14.0	12.2	12.8	17.2	23.0	13.7	30.0
2.....	18.8	12.8	17.2	14.8	12.8	13.4	12.2	12.5	19.2	13.1	13.1	80.0
3.....	19.2	12.8	46.4	16.4	13.4	13.1	11.9	12.2	15.6	28.0	12.8	171.0
4.....	17.2	12.5	20.4	24.0	18.8	29.0	11.9	13.4	15.6	13.4	12.8	236.0
5.....	25.0	12.2	17.2	27.0	14.8	16.4	13.4	31.5	14.0	14.0	25.0	24.5
6.....	18.0	12.2	17.2	30.0	14.4	13.4	15.2	23.0	41.5	14.0	14.0	21.6
7.....	18.4	12.2	22.0	73.5	13.4	12.8	27.5	20.0	16.8	16.8	13.4	20.4
8.....	28.0	12.2	16.4	30.0	17.2	18.8	15.2	18.0	14.8	26.0	25.5	28.0
9.....	31.0	13.4	86.0	47.8	13.4	17.2	15.6	24.0	13.7	17.2	23.5	35.0
10.....	26.0	12.5	109.0	24.0	12.8	14.0	111.0	15.6	13.4	16.4	14.8	21.6
11.....	17.6	12.5	90.0	22.0	12.5	12.8	93.0	16.8	12.8	24.5	14.8	17.2
12.....	16.0	12.2	45.7	21.2	12.8	12.5	26.5	13.7	12.5	16.4	13.1	14.8
13.....	26.5	12.2	123.0	22.0	14.0	22.0	30.0	16.4	12.5	16.8	12.2	14.0
14.....	44.3	12.2	38.0	29.5	35.0	14.0	261.0	84.0	11.6	17.2	12.2	14.0
15.....	20.4	12.2	29.5	19.6	29.5	14.0	52.8	26.0	11.0	14.0	19.6	13.4
16.....	18.0	12.2	21.2	20.0	15.6	15.6	29.5	18.0	13.4	16.4	14.0	14.8
17.....	16.0	12.2	16.0	619.0	16.4	13.4	55.2	20.4	17.2	14.8	12.2	13.7
18.....	15.2	12.2	21.2	67.2	13.4	14.0	24.0	15.2	12.2	17.6	16.8	13.4
19.....	14.0	11.9	20.4	25.0	12.5	17.6	15.6	14.0	14.4	30.0	14.8	16.4
20.....	14.0	11.9	26.5	30.0	12.5	13.7	16.4	13.4	13.4	42.2	16.4	18.8
21.....	13.7	12.2	20.4	24.0	12.8	16.0	16.8	14.4	14.0	32.6	26.5	61.8
22.....	13.4	24.0	21.2	21.2	17.2	13.4	16.4	18.0	13.4	18.0	52.0	26.0
23.....	13.4	38.0	19.6	18.4	22.0	12.5	17.6	14.8	12.5	18.8	27.0	21.2
24.....	13.4	20.4	20.4	16.4	28.0	12.5	49.2	13.1	11.9	16.0	15.2	67.2
25.....	13.4	17.2	109.0	17.2	16.4	12.5	16.4	13.4	11.6	16.8	12.5	28.0
26.....	13.1	17.2	29.0	20.4	14.0	12.2	24.0	17.6	11.3	50.6	13.4	28.0
27.....	13.1	17.2	19.6	16.4	36.8	16.8	15.6	34.4	11.3	20.4	12.5	17.2
28.....	13.7	14.4	22.0	16.0	121.0	14.8	15.2	16.8	12.2	16.4	12.2	15.6
29.....	13.4	13.7	20.4	14.4	55.2	13.4	15.6	14.8	15.6	15.6	32.0	14.0
30.....	13.1	.....	18.0	13.4	19.2	12.2	14.8	31.0	16.8	20.4	22.0	13.4
31.....	12.8	.....	23.0	.....	14.8	.....	13.4	20.4	.....	14.0	.....	13.7

*Monthly discharge of Kapaa River at Kapahi, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	44.3	12.8	18.3	1,130	A.
February.....	38.0	11.9	14.5	834	A.
March.....	123.0	16.0	37.0	2,280	A.
April.....	619.0	13.4	45.3	2,700	B.
May.....	121.0	12.5	21.8	1,340	A.
June.....	29.0	12.2	14.9	887	A.
July.....	261.0	11.9	34.4	2,120	A.
August.....	84.0	12.2	20.3	1,250	A.
September.....	41.5	11.0	14.8	881	A.
October.....	50.6	13.1	20.4	1,250	A.
November.....	52.0	12.2	18.0	1,070	A.
December.....	236.0	13.4	36.3	2,230	A.
The year.....	619.0	11.0	24.7	18,000	

## AKULIKULI SPRING AT WEIR NEAR KAPAA, KAUAI.

**Location.**—About 5 miles west of Kealia.

**Records available.**—April 1, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once each day; datum unchanged.

**Discharge measurements.**—Made with a 3-foot sharp-crested weir.

**Cooperation.**—Station maintained by the Makee Sugar Co.

*Daily discharge, in second-feet, of Akulikuli Spring at weir near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.07	1.81	1.89	1.98	1.98	1.17	1.89	1.32	1.17	0.96	1.03	1.03
2.....	2.07	1.72	1.89	1.98	1.98	1.10	1.89	1.32	1.10	.96	1.03	1.25
3.....	1.98	1.72	1.98	1.98	1.98	1.10	1.89	1.32	1.10	.96	1.03	2.92
4.....	1.89	1.72	1.98	1.98	2.16	1.10	1.89	1.32	1.03	.96	1.03	2.53
5.....	1.89	1.98	1.98	1.98	2.16	1.10	1.89	1.32	1.10	.96	1.03	2.43
6.....	1.89	1.98	1.98	1.98	1.98	1.03	1.89	1.25	1.10	.96	1.03	1.72
7.....	1.89	1.89	1.81	2.16	1.98	1.03	1.89	1.25	1.10	.96	1.03	1.17
8.....	1.89	1.89	1.81	2.07	1.98	1.03	1.89	1.25	1.03	.96	1.03	1.10
9.....	1.81	1.89	2.07	2.53	1.98	1.03	1.89	1.17	1.03	.96	1.03	1.10
10.....	1.81	1.89	3.12	2.43	1.98	1.03	1.89	1.17	1.03	.96	1.03	1.40
11.....	1.81	1.89	3.22	2.16	1.98	1.03	2.43	1.17	1.03	1.03	1.03	1.25
12.....	1.81	1.89	2.62	2.16	1.98	1.03	2.43	1.17	1.03	1.03	1.03	1.56
13.....	1.81	1.89	3.02	2.16	1.98	1.03	2.25	1.17	1.03	1.03	1.03	1.03
14.....	1.81	1.89	2.53	2.16	1.81	1.03	3.32	1.17	1.03	1.03	1.03	1.03
15.....	1.89	1.89	2.34	2.16	1.03	1.03	2.53	1.32	1.03	1.03	1.03	1.03
16.....	1.89	1.89	2.16	2.16	1.03	1.03	2.16	1.17	1.03	1.03	1.03	1.03
17.....	1.89	1.89	2.16	4.07	1.03	1.03	2.16	1.17	1.03	1.03	1.03	1.03
18.....	1.89	1.89	1.98	2.53	1.03	1.03	2.16	1.17	1.03	1.03	1.03	1.03
19.....	1.89	1.89	1.98	2.07	1.03	1.03	2.07	1.17	1.03	1.03	1.03	1.03
20.....	1.89	1.89	1.98	2.62	1.03	1.03	2.07	1.17	1.03	1.17	1.03	1.03
21.....	1.89	1.89	1.98	2.53	1.03	1.25	2.07	1.17	1.03	1.10	1.10	1.64
22.....	1.89	1.89	1.98	2.34	1.03	1.25	2.07	1.17	1.03	1.03	1.10	1.25
23.....	1.89	1.89	1.98	2.25	1.03	1.25	2.07	1.17	1.03	1.03	1.10	1.10
24.....	1.89	1.89	1.98	2.25	1.03	1.25	2.16	1.17	1.03	1.03	1.10	1.03
25.....	1.81	1.89	2.34	2.16	1.03	1.25	2.16	1.17	1.03	1.03	1.03	1.03
26.....	1.81	1.89	2.62	2.16	1.03	1.17	1.32	1.17	1.03	1.03	1.03	1.03
27.....	1.81	1.89	2.43	1.98	1.10	1.25	1.32	1.25	1.03	1.03	1.03	1.03
28.....	1.81	1.89	2.16	1.98	1.48	1.17	1.32	1.17	1.03	1.03	1.03	1.03
29.....	1.81	1.89	2.07	1.98	2.07	1.98	1.32	1.17	1.03	1.03	1.03	1.03
30.....	1.81	.....	2.07	1.98	1.17	1.89	1.32	1.17	.96	1.03	1.03	1.03
31.....	1.81	.....	1.98	.....	1.10	.....	1.32	1.17	.....	1.03	.....	1.03

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 LH^{\frac{3}{2}}$  when  $L=3.0$  feet.

*Monthly discharge of Akulikuli Spring at weir near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	2.07	1.81	1.87	115.0
February.....	1.98	1.72	1.88	108.0
March.....	3.22	1.81	2.20	135.0
April.....	4.07	1.98	2.23	133.0
May.....	2.16	1.03	1.53	94.1
June.....	1.98	1.03	1.16	69.0
July.....	3.32	1.32	1.97	121.0
August.....	1.32	1.17	1.21	74.4
September.....	1.17	.96	1.04	61.9
October.....	1.17	.96	1.01	62.1
November.....	1.10	1.03	1.04	61.9
December.....	2.92	1.03	1.29	79.3
The year.....	4.07	.96	1.53	1,110



**KAPAHU DITCH AT KAPAHU, NEAR KAPAA, KAUAI.**

**Location.**—About 4 miles west of Kealia and 600 feet below the diversion dam in Kapaa River.

**Records available.**—April 15, 1909, to December 31, 1912.

**Gage.**—Watson clock register; datum unchanged.

**Discharge measurements.**—There is a 20-foot sharp-crested weir immediately below the gage, but meter measurements give a different rating from the weir formula.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained in cooperation with the Makee Sugar Co.

The following discharge measurement was made by W. V. Hardy:

February 16, 1912: Gage height, 0.31 foot; discharge, 10.6 second-feet.

*Daily gage height, in feet, of Kapahu ditch at Kapahu, near Kapaa, Kauai, for 1912.*

[K. Okimoto, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.26	0.33	0.59	0.42	0.33	0.35	0.32	0.33	0.42	0.43	0.34	0.78
2.....	.35	.....	.42	.41	.33	.35	.32	.32	.46	.34	.32	.57
3.....	.39	.....	.85	.38	.34	.36	.32	.31	.40	.53	.32	.46
4.....	.39	.....	.48	.40	.43	.52	.32	.34	.38	.37	.32	.11
5.....	.39	.....	.39	.43	.40	.42	.33	.61	.35	.38	.46	.04
6.....	.39	.....	.39	.43	.37	.35	.36	.52	.68	.37	.34	.04
7.....	.39	.32	.49	.44	.35	.34	.56	.43	.40	.43	.33	.05
8.....	.39	.32	.48	.43	.41	.37	.38	.41	.36	.47	.52	.38
9.....	.39	.33	.53	.44	.35	.41	.39	.46	.35	.43	.50	.29
10.....	.39	.33	.40	.43	.33	.36	.92	.42	.33	.40	.35	.40
11.....	.40	.32	.34	.43	.33	.33	.68	.40	.32	.48	.34	.40
12.....	.39	.32	.28	.42	.36	.33	.53	.36	.32	.40	.33	.39
13.....	.44	.32	.34	.42	.39	.47	.63	.34	.32	.38	.31	.28
14.....	.47	.32	.34	.43	.54	.36	.67	.36	.31	.36	.30	.25
15.....	.45	.32	.33	.42	.67	.37	.45	.43	.11	.42	.45	.25
16.....	.42	.31	.33	.41	.40	.....	.50	.36	.18	.45	.35	.31
17.....	.39	.31	.33	.52	.39	.....	.56	.35	.41	.....	.31	.34
18.....	.37	.31	.40	.35	.35	.....	.52	.36	.33	.....	.36	.33
19.....	.37	.31	.42	.27	.33	.....	.45	.36	.36	.....	.37	.40
20.....	.....	.31	.43	.27	.33	.....	.41	.38	.34	.80	.44	.42
21.....	.....	.32	.43	.26	.36	.....	.41	.97	.35	.58	.67	.63
22.....	.....	.43	.42	.26	.45	.....	.42	.60	.33	.45	.83	.42
23.....	.....	.66	.42	.26	.42	.....	.43	.43	.32	.42	.58	.38
24.....	.....	.51	.42	.30	.55	.....	.51	.45	.31	.37	.43	.42
25.....	.....	.40	.45	.41	.38	.....	.40	.34	.30	.55	.38	.42
26.....	.....	.48	.42	.41	.35	.....	.52	.....	.30	.65	.24	.42
27.....	.....	.41	.42	.40	.65	.....	.39	.....	.29	.43	.33	.41
28.....	.35	.36	.42	.39	.85	.....	.36	.....	.32	.41	.32	.38
29.....	.35	.36	.41	.37	.46	.....	.37	.....	.37	.38	.53	.35
30.....	.34	.....	.41	.34	.44	.32	.40	.57	.41	.42	.57	.35
31.....	.33	.....	.42	.....	.36	.....	.37	.46	.....	.36	.....	.35

*Daily discharge, in second-feet, of Kapahu ditch at Kapahu, near Kapaa, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8.0	11.8	33.5	17.6	11.8	13.0	11.2	11.8	17.6	18.4	12.4	60.0
2.....	13.0	11.8	17.6	16.9	11.8	13.0	11.2	11.2	20.8	12.4	11.2	31.0
3.....	15.5	11.8	71.0	14.8	12.4	13.6	11.2	10.6	16.2	27.0	11.2	20.8
4.....	15.5	11.8	22.4	16.2	18.4	26.0	11.2	12.4	14.8	14.2	11.2	2.0
5.....	15.5	11.2	15.5	18.4	16.2	17.6	11.8	36.0	13.0	14.8	20.8	.6
6.....	15.5	11.2	15.5	18.4	14.2	13.0	13.6	26.0	45.0	14.2	12.4	.6
7.....	15.5	11.2	23.2	19.2	13.0	12.4	30.0	18.4	16.2	18.4	11.8	.8
8.....	15.5	11.2	22.4	18.4	16.9	14.2	14.8	16.9	13.6	21.6	26.0	14.8
9.....	15.5	11.8	27.0	19.2	13.0	16.9	15.5	20.8	13.0	18.4	24.0	9.5
10.....	15.5	11.8	16.2	18.4	11.8	13.6	32.0	17.6	11.8	16.2	13.0	16.2

*Daily discharge, in second-feet, of Kapahi ditch at Kapahi, near Kapaa, Kauai, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	16.2	11.2	12.4	18.4	11.8	11.8	45.0	16.2	11.2	22.4	12.4	16.2
12.....	15.5	11.2	9.0	17.6	13.6	11.8	27.0	13.6	11.2	16.2	11.8	15.5
13.....	19.2	11.2	12.4	17.6	15.5	21.6	38.5	12.4	11.2	14.8	10.6	9.0
14.....	21.6	11.2	12.4	18.4	28.0	13.6	43.5	13.6	10.6	13.6	10.0	7.5
15.....	20.0	11.2	11.8	17.6	43.5	14.2	20.0	18.4	2.0	17.6	20.0	7.5
16.....	17.6	10.6	11.8	16.9	16.2	.....	24.0	13.6	4.2	20.0	13.0	10.6
17.....	15.5	10.6	11.8	26.0	15.5	.....	30.0	13.0	16.9	.....	10.6	12.4
18.....	14.2	10.6	16.2	13.0	13.0	.....	26.0	13.6	11.8	.....	13.6	11.8
19.....	14.2	10.6	17.6	8.5	11.8	.....	20.0	13.6	13.6	.....	14.2	16.2
20.....	14.2	10.6	18.4	8.5	11.8	.....	16.9	14.8	12.4	63.0	19.2	17.6
21.....	14.2	11.2	18.4	8.0	13.6	.....	16.9	90.0	13.0	32.5	43.5	38.5
22.....	14.2	18.4	17.6	8.0	20.0	.....	17.6	35.0	11.8	20.0	68.0	17.6
23.....	13.6	42.5	17.6	8.0	17.6	.....	18.4	18.4	11.2	17.6	32.5	14.8
24.....	13.6	25.0	17.6	10.0	29.0	.....	25.0	20.0	10.6	14.2	18.4	17.6
25.....	13.6	16.2	20.0	16.9	14.8	.....	16.2	12.4	10.0	29.0	14.8	17.6
26.....	13.0	22.4	17.6	16.9	13.0	.....	26.0	.....	10.0	41.0	12.4	17.6
27.....	13.0	16.9	17.6	16.2	41.0	.....	15.5	.....	9.5	18.4	11.8	16.9
28.....	13.0	13.6	17.6	15.5	71.0	.....	13.6	.....	11.2	16.9	11.2	14.8
29.....	13.0	13.6	16.9	14.2	20.8	.....	14.2	.....	14.2	14.8	27.0	13.0
30.....	12.4	.....	16.9	12.4	19.2	11.2	16.2	31.0	16.9	17.6	31.0	13.0
31.....	11.8	.....	17.6	.....	13.6	.....	14.2	20.8	.....	13.6	.....	13.0

NOTE.—The five discharge measurements made in 1911 and 1912 give a very well-defined curve that has a different slope from the curve of weir formula  $Q=3.33 LH^{3/2}$  when  $L=20$  feet. Daily discharge for 1912 determined from curve derived from meter measurements. Discharge interpolated for days for which gage heights are missing, Jan. 20 to 27 and Feb. 2 to 6.

*Monthly discharge of Kapahi ditch at Kapahi, near Kapaa, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	21.6	8.0	14.8	910	B.
February.....	42.5	10.6	13.9	800	B.
March.....	71.0	9.0	19.1	1,170	A.
April.....	26.0	8.0	15.5	922	A.
May.....	71.0	11.8	19.2	1,180	A.
June 1-15, 30.....	26.0	11.2	14.8	471	A.
July.....	82.0	11.2	22.5	1,380	A.
August 1-25, 30-31.....	90.0	10.6	20.4	1,090	A.
September.....	45.0	2.0	13.5	803	A.
October 1-16, 20-31.....	63.0	12.4	20.7	1,150	A.
November.....	68.0	10.0	18.7	1,110	A.
December.....	60.0	.6	15.3	941	A.
The period.....	.....	.....	.....	11,900	.....

NOTE.—No record obtained June 16-29, Aug. 26-29, and Oct. 17-19. Mean for June is mean of 16 days. Mean for August is mean of 27 days. Mean for October is mean of 27 days.

#### KANEHA DITCH AT WEIR NEAR KEALIA, KAUAI.

**Location.**—About 5 miles northwest of Kealia, a short distance below the outlet from the Kaneha reservoir.

**Records available.**—January 1, 1909, to December 31, 1912.

**Gage.**—Staff gage; read once a day; datum unchanged; record from Watson clock register established in 1910 believed unreliable.

**Discharge measurements.**—Made with 20-foot sharp-crested weir.

**Accuracy.**—Fair.

**Cooperation.**—Estimates of daily discharge in million gallons furnished by Makee Sugar Co.

*Daily discharge, in million gallons, of Kaneha ditch at weir near Kealia, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.09	1.36	15.40	1.36	1.36	1.36	1.36	1.36	1.36	8.94	5.39	20.10
2.....	7.09	1.36	2.50	1.36	1.36	1.36	1.36	1.36	1.36	3.86	5.39	30.90
3.....	7.09	1.36	10.90	1.36	1.36	1.36	1.36	1.36	1.36	10.90	5.39	37.00
4.....	3.86	1.36	3.86	1.36	1.36	1.36	1.36	1.36	1.36	5.39	5.39	20.10
5.....	3.86	1.36	1.36	25.30	1.36	1.36	1.36	10.90	1.36	5.39	5.39	10.90
6.....	3.86	1.36	1.36	8.94	1.36	1.36	1.36	1.36	10.90	5.39	5.39	7.09
7.....	3.86	1.36	7.09	25.30	1.36	1.36	20.10	1.36	1.36	5.39	5.39	7.09
8.....	10.90	1.36	7.09	15.40	1.36	1.36	1.36	1.36	1.36	10.90	10.90	7.09
9.....	3.86	1.36	7.09	3.86	1.36	1.36	3.86	1.36	1.36	7.09	5.39	10.90
10.....	1.36	1.36	30.90	3.86	1.36	1.36	25.30	1.36	1.36	5.39	5.39	7.09
11.....	1.36	1.36	30.90	3.86	1.36	1.36	43.20	1.36	1.36	7.09	5.39	7.09
12.....	1.36	1.36	10.90	3.86	7.09	1.36	10.90	1.36	1.36	7.09	5.39	7.09
13.....	3.86	1.36	30.90	15.40	3.86	15.40	10.90	1.36	1.36	7.09	5.39	7.09
14.....	7.09	1.36	7.09	3.86	15.40	1.36	56.70	20.10	1.36	7.09	5.39	7.09
15.....	1.36	1.36	15.40	3.86	7.09	1.36	10.90	3.86	1.36	5.39	5.39	7.09
16.....	1.36	1.36	3.86	3.86	1.36	1.36	10.90	1.36	7.09	7.09	5.39	20.10
17.....	1.36	1.36	3.86	3.86	1.36	1.36	7.09	1.36	7.09	5.39	5.39	10.90
18.....	1.36	1.36	7.09	10.90	1.36	3.86	3.86	1.36	1.36	7.09	5.39	3.86
19.....	1.36	1.36	3.86	7.09	1.36	3.86	3.86	1.36	1.36	20.10	3.86	3.86
20.....	1.36	1.36	3.86	3.86	1.36	3.86	3.86	1.36	1.36	15.40	3.86	3.86
21.....	1.36	1.36	3.86	3.86	1.36	3.86	3.86	3.86	1.36	20.10	10.90	20.10
22.....	1.36	1.36	3.86	3.86	1.36	3.86	3.86	7.09	1.36	7.09	20.10	15.40
23.....	1.36	10.90	3.86	3.86	1.36	3.86	3.86	1.36	1.36	7.09	8.94	7.09
24.....	1.36	5.39	30.90	3.86	1.36	3.86	3.86	3.86	8.94	5.39	5.39	10.90
25.....	1.36	10.90	30.90	3.86	1.36	10.90	1.36	1.36	8.94	20.10	5.39	15.40
26.....	1.36	10.90	10.90	3.86	1.36	10.90	1.36	1.36	1.36	8.94	5.39	10.90
27.....	1.36	5.39	3.86	3.86	7.09	1.36	1.36	10.90	3.86	5.39	5.39	3.86
28.....	3.86	5.39	3.86	1.36	15.40	3.86	3.86	3.86	5.39	5.39	5.39	1.36
29.....	1.36	5.39	3.86	1.36	3.86	3.86	1.36	7.09	3.86	5.39	13.00	1.36
30.....	1.36	-----	3.86	1.36	1.36	1.36	7.09	7.09	3.86	7.09	13.00	1.36
31.....	1.36	-----	3.86	-----	1.36	-----	1.36	3.86	-----	5.39	-----	1.36

NOTE.—Daily discharge, in million gallons, furnished by Makee Sugar Co. Discharge computed from formula for a 20-foot sharp-crested weir without end contractions. Current-meter measurements show the discharge obtained from formula to be too high by 10 to 12 per cent.

*Monthly discharge of Kaneha ditch at weir near Kealia, Kauai, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	10.90	1.36	2.97	92.12
February.....	10.90	1.36	2.90	84.18
March.....	30.90	1.36	9.96	308.85
April.....	25.30	1.36	5.99	179.61
May.....	15.40	1.36	2.98	92.43
June.....	15.40	1.36	3.21	96.42
July.....	56.70	1.36	8.20	254.14
August.....	20.10	1.36	3.54	109.67
September.....	10.90	1.36	2.95	88.49
October.....	20.10	3.86	8.22	254.82
November.....	20.10	3.86	6.77	203.14
December.....	37.00	1.36	10.50	325.38
The year.....	56.70	1.36	5.71	2,089.25

#### ANAHOLA RIVER BASIN.

##### ANAHOLA RIVER AT 1,140-FOOT ELEVATION NEAR KEALIA, KAUAI.

**Location.**—About 8 miles northwest of Kealia, Kauai, and 60 feet above the lower falls.

**Records available.**—March 28 to December 31, 1912.

**Gage.**—Inclined staff; read at irregular intervals; datum unchanged.

**Channel.**—Rock; probably permanent.

**Discharge measurements.**—Made by wading.

*Discharge measurements of Anahola River at 1,140-foot elevation, near Kealia, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 28	W. V. Hardy .....	9.88	5.95	May 1	W. V. Hardy .....	9.72	2.82
Apr. 21 <sup>a</sup>	.....do.....	10.00	7.67	June 26	.....do.....	9.56	1.72
24	.....do.....	9.87	5.59	Oct. 24	.....do.....	9.79	3.54
28	.....do.....	9.82	4.49	Nov. 11	Larrison and Hardy	9.74	3.41

<sup>a</sup> Measurement made about 5 feet below gage.

NOTE.—All measurements made at same section about one-quarter mile above gage unless otherwise noted.

*Daily gage height, in feet, of Anahola River at 1,140-foot elevation, near Kealia, Kauai, for 1912.*

[Shiraki, observer.]

Day.	Mar.	Apr.	May.	June.	July.	Nov.	Day.	Mar.	Apr.	May.	June.	July.	Nov.
1			9.72	.....	9.62	.....	17				9.65		
2			9.72	9.75	9.62	.....	18				.....		
3			9.72	.....	9.70	.....	19			9.71	.....		
4			.....	.....	.....	.....	20				9.62		
5			9.78	9.72	.....	.....	21		9.99	9.72	.....		
6			.....	.....	.....	.....	22				9.60		
7			9.89	9.70	.....	.....	23			9.89	.....	9.80	
8			.....	.....	.....	.....	24		9.87	.....	9.52	10.22	
9			.....	.....	9.90	.....	25		9.96	9.90	.....	9.88	
10			9.69	9.70	11.00	.....	26				9.56	11.15	
11			.....	.....	10.75	.....	27			10.00	9.65	10.35	
12			9.67	.....	10.00	9.75	28		9.82	10.15	9.65	.....	
13			.....	10.30	.....	9.65	29				9.65	.....	
14			9.72	.....	.....	9.70	30				.....	9.85	
15			.....	9.72	.....	10.00	31			9.83	.....	9.85	
16			9.83	.....	.....	9.72							

NOTE.—Miscellaneous gage readings obtained when observer was in vicinity of station.

**ANAHOLA RIVER ABOVE DAM AT KIOKALA, NEAR KEALIA, KAUAI.****Location.**—About one-fourth mile above the dam at Kiokala and 6 miles northwest of Kealia.**Records available.**—August 22, 1910 to December 31, 1912.**Gage.**—Inclined staff installed August 22, 1910; datum unchanged. Friez automatic gage was carried away by a flood November 2, 1910, and the station relocated at the dam at Kiokala on December 15, 1910, where it was maintained until December 28, 1912, when equipment was moved back to its first site about one-fourth mile above the dam, and Friez automatic register was installed.**Channel.**—Bed of stream rocky and permanent.**Discharge measurements.**—By wading and from footbridge.**Cooperation.**—Station maintained in cooperation with the Makee Sugar Co.*Discharge measurements of Anahola River above dam at Kiokala near Kealia, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 24	W. V. Hardy .....	1.05	17.1	Dec. 22	W. V. Hardy .....	1.38	37.7
May 2	.....do.....	.90	11.9	25	.....do.....	1.17	23.0
June 28	.....do.....	.81	8.72	28	.....do.....	.98	13.3
Dec. 22	.....do.....	1.10	19.6				

The following gage readings were made during the year:

Apr.		May.		June.		July.		Sept.		Dec.	
Day.	Gage height.	Day.	Gage height.	Day.	Gage height.	Day.	Gage height.	Day.	Gage height.	Day.	Gage height.
25.....	1.10	4.....	0.95	1.....	0.90	10.....	1.90	19.....	1.30	22.....	1.24
27.....	1.00	10.....	.86	8.....	.84	13.....	2.09			23.....	1.08
		18.....	.92	15.....	.81	15.....	1.41			24.....	1.51
		25.....	.91	22.....	.79					25.....	1.34
		28.....	1.59							26.....	1.24
										27.....	1.02
										28.....	.96
										29.....	.94
										30.....	.92

# ANAHOLA DITCH AT KIOKALA, NEAR KEALIA, KAUAI.

**Location.**—About 6 miles northwest of Kealia.

**Records available.**—May 10, 1909, to December 31, 1912.

**Gage.**—Watson clock register; datum unchanged.

**Discharge measurements.**—10-foot sharp-crested weir, iron crest.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained in cooperation with the Makee Sugar Co.

*Daily discharge, in second-feet, of Anahola ditch at Kiokala, near Kealia, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.5	5.5	12.5	10.7	7.8	7.2	2.3	7.2	11.8	6.6	6.9	17.9
2.....	7.5	6.3	7.8	9.4	7.8	6.3	1.6	6.3	10.4	4.9	6.0	17.5
3.....	7.5	7.8	14.3	8.7	7.8	6.0	2.8	6.0	10.4	8.7	7.2	16.7
4.....	8.7	6.6	10.4	12.5	8.4	6.3	2.8	7.8	8.1	5.2	6.0	16.7
5.....	9.7	5.7	7.2	16.3	8.7	5.5	9	17.5	7.2	5.2	10.4	14.7
6.....	6.3	5.5	7.2	15.9	7.8	4.9	6.3	15.1	15.1	4.9	7.2	6.6
7.....	3.7	5.5	10.4	18.3	7.5	4.7	11.8	10.1	10.7	6.9	6.3	14.7
8.....	1.9	5.2	11.1	16.3	10.7	4.7	7.2	10.1	9.0	10.1	9.4	16.7
9.....	.5	5.2	17.9	16.3	6.9	5.2	9.7	10.4	8.7	11.1	15.1	16.3
10.....	5.5	4.9	18.7	14.3	6.0	6.0	22.0	8.1	9.4	11.1	7.5	14.7
11.....	5.5	5.7	17.9	13.2	5.7	4.7	22.0	7.5	7.2	10.7	6.3	13.2
12.....	5.5	4.9	16.3	12.8	8.4	4.9	16.7	7.5	6.3	9.7	5.7	11.8
13.....	5.7	4.7	20.0	13.2	7.2	7.5	18.7	6.6	5.7	8.1	5.2	11.1
14.....	6.6	4.7	20.0	15.1	13.2	6.0	25.0	16.7	5.5	11.1	4.7	9.7
15.....	8.1	4.4	15.5	13.2	15.9	4.4	22.0	18.3	4.9	7.5	9.4	9.0
16.....	7.8	4.4	14.3	13.6	11.4	4.4	19.1	12.8	6.0	8.7	6.6	10.7
17.....	8.1	4.2	13.2	.....	11.8	4.2	21.0	10.1	11.1	6.0	4.9	15.9
18.....	7.2	4.7	14.3	.....	8.1	3.9	17.5	8.4	6.3	7.5	6.0	12.1
19.....	6.9	5.5	11.4	.....	7.2	4.2	14.7	7.5	6.9	18.7	6.6	12.5
20.....	8.7	4.2	14.0	.....	6.6	3.9	12.5	7.8	6.3	12.5	5.2	12.5
21.....	6.3	4.7	11.8	.....	6.3	3.4	11.4	9.0	5.7	14.0	12.1	13.2
22.....	5.5	7.5	10.4	.....	9.4	.....	10.7	15.9	5.7	9.7	16.7	13.6
23.....	5.5	14.3	10.4	.....	7.8	.....	10.7	12.1	4.9	8.1	16.7	12.8
24.....	5.7	13.2	14.0	.....	12.5	.....	13.6	9.4	4.4	7.2	10.7	14.3
25.....	5.2	10.4	19.1	.....	8.1	.....	9.4	9.7	4.2	9.0	7.8	14.3
26.....	4.9	10.7	15.9	10.7	6.3	.....	12.5	7.8	3.9	15.5	6.9	13.6
27.....	4.4	9.0	14.7	10.7	9.4	.....	9.4	16.7	3.7	10.7	6.0	11.8
28.....	6.6	6.6	13.6	10.4	16.7	.....	8.4	9.7	3.9	8.1	6.9	10.7
29.....	3.9	6.3	12.1	9.4	14.7	4.2	8.7	8.1	5.7	8.7	14.7	9.7
30.....	0.0	.....	11.1	8.4	10.1	2.8	14.0	14.3	6.0	10.7	16.3	9.4
31.....	0.0	.....	11.1	.....	8.1	.....	8.7	10.1	.....	9.4	.....	9.0

NOTE.—Discharge computed from Francis's formula:  $Q=3.33 LH^{\frac{3}{2}}$  when  $L=10$  feet. Comparative measurements made in 1911 show a seepage loss in ditch between intake and weir. To find discharge at intake multiply discharge given by factor 1.55.

*Monthly discharge of Anahola ditch at Kiokala, near Kealia, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	9.7	0.0	5.71	351.0
February.....	14.3	4.2	6.49	373.0
March.....	20.0	7.2	13.5	830.0
April <sup>a</sup> .....	18.3	8.4	12.8	534.0
May.....	16.7	5.7	9.17	564.0
June <sup>b</sup> .....	7.5	2.8	5.01	229.0
July.....	25.0	.9	1.21	744.0
August.....	18.3	6.0	10.5	646.0
September.....	15.1	3.7	7.17	427.0
October.....	18.7	4.9	9.24	568.0
November.....	16.7	4.7	8.58	511.0
December.....	17.9	6.6	13.0	799.0
The period.....	25.0	.0	9.06	6,580

<sup>a</sup> Ditch was dry Apr. 17-25. Mean for April is the mean of 21 days when ditch carried water.

<sup>b</sup> No record June 22-28; clock register out of order. Mean for June is the mean of 23 days.

<sup>c</sup> Mean for year is mean for 350 days.

## KALIHIWAI RIVER BASIN.

## KALIHIWAI RIVER NEAR KILAUEA, KAUAI.

**Location.**—About 2 miles southwest of Kilauea, at an elevation of about 600 feet, about 5 miles above mouth of river and one-half mile below Hoopouli Falls, and is reached by saddle horse on trail from Princeville plantation.

**Records available.**—August 21 to December 31, 1912.

**Gage.**—A vertical staff gage; read once each day; hour of reading irregular.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

**Cooperation.**—Station maintained in cooperation with the Princeville plantation.

The following discharge measurement was made by W. V. Hardy:

August 21, 1912: Gage height, 6.22 feet; discharge, 33.9 second-feet.

*Daily gage height, in feet, of Kalihiwai River near Kilauea, Kauai, for 1912.*

[Kakimoto, observer.]

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		6.20	6.00	6.10	6.18	16.....		6.10	6.10	6.00	6.30
2.....		6.25	5.95	6.00	6.30	17.....		6.08	6.00	6.00	6.33
3.....		6.20	5.92	6.00	6.6	18.....		6.08	6.05	6.20	6.38
4.....		6.20	5.85	5.98	11.70	19.....		6.50	6.20	6.10	6.35
5.....		6.20	5.85	6.10	7.10	20.....		6.50	6.40	6.75	6.30
6.....		6.40	5.92	6.25	6.6	21.....	6.20	6.00	6.60	6.20	6.30
7.....		6.25	5.98	6.00	6.4	22.....	6.80	5.92	6.10	6.18	6.30
8.....		6.20	6.70	6.00	6.4	23.....	6.30	5.90	6.20	6.10	6.45
9.....		6.20	6.30	6.25	6.35	24.....	6.20	5.95	6.30	6.15	6.40
10.....		6.20	6.10	6.00	6.35	25.....	6.20	5.85	6.25	6.10	6.40
11.....		6.20	6.00	6.00	6.32	26.....	6.20	5.80	6.27	6.10	6.38
12.....		6.20	6.00	5.98	6.30	27.....	6.70	5.80	6.25	6.05	6.35
13.....		6.15	6.00	5.98	6.30	28.....	6.30	5.80	6.20	6.15	6.30
14.....		6.10	5.95	5.95	6.40	29.....	6.35	5.80	6.18	6.20	6.28
15.....		6.10	5.90	6.10	6.35	30.....	6.30	5.90	6.15	6.10	6.27
						31.....	6.25		6.13		6.20

## HANALEI RIVER BASIN.

## HANALEI RIVER NEAR HANALEI, KAUAI.

**Location.**—About 5 miles up the river from Hanalei.

**Records available.**—December 28, 1911, to December 31, 1912.

**Gage.**—Staff gage; read once daily; datum unchanged.

**Channel.**—Boulders; probably permanent.

**Discharge measurements.**—Cable and car.

*Discharge measurements of Hanalei River near Hanalei, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Feb. 20	W. V. Hardy.....	<i>Feet.</i> 6.39	<i>Sec.-ft.</i> 86.7
Aug. 14	.....do.....	7.42	665

*Daily gage height, in feet, of Hanalei River near Hanalei, Kauai, for 1912.*

[Sam Opio, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.60	6.5	6.5	6.5	6.7	6.5	6.5	6.4	6.5	6.4	6.4	6.7
2.....	6.50	6.5	6.5	6.5	6.6	6.5	6.4	6.4	6.6	6.4	6.4	6.9
3.....	6.55	6.5	6.6	6.5	6.6	6.4	6.4	6.4	6.6	6.4	6.4	7.3
4.....	6.55	6.4	6.6	6.6	6.6	6.4	6.4	6.4	6.5	6.4	6.4	6.5
5.....	6.50	6.4	6.6	6.6	6.6	6.4	6.5	6.4	6.6	6.4	6.5	6.4
6.....	6.50	6.5	6.6	6.6	6.5	6.4	6.5	6.4	8.6	6.3	6.5	6.4
7.....	6.60	6.5	6.7	7.8	6.6	6.4	6.5	6.4	6.6	6.3	6.5	6.5
8.....	6.60	6.5	6.7	7.8	6.6	6.4	6.4	6.4	6.5	7.2	6.6	6.6
9.....	6.70	6.5	6.7	7.8	6.6	6.4	6.4	6.4	6.4	6.5	6.6	6.5
10.....	6.50	6.5	6.9	7.8	6.6	6.4	6.6	6.4	6.4	6.4	6.5	6.6
11.....	6.40	6.4	6.9	7.6	6.6	6.4	6.5	6.4	6.4	6.4	6.5	6.6
12.....	6.40	6.4	6.8	7.6	6.4	6.4	6.5	6.4	6.4	6.3	6.4	6.5
13.....	6.40	6.4	6.7	7.6	6.4	6.4	6.5	6.4	6.4	6.3	6.4	6.5
14.....	6.70	6.4	6.6	7.5	6.6	6.4	6.5	7.8	6.4	6.3	6.4	6.5
15.....	6.50	6.5	6.7	7.5	6.8	6.4	6.5	6.5	6.4	6.3	6.5	6.5
16.....	6.50	6.5	6.7	6.6	6.6	6.4	6.4	6.4	6.5	6.4	6.4	6.5
17.....	6.50	6.5	6.7	8.6	6.6	6.4	6.5	6.4	6.4	6.4	6.4	6.5
18.....	6.50	6.5	6.7	7.9	6.5	6.4	6.4	6.4	6.4	6.4	6.5	6.5
19.....	6.50	6.5	6.5	7.8	6.6	6.4	6.4	6.4	6.4	6.4	6.4	6.5
20.....	6.50	6.5	6.5	7.7	6.4	6.4	6.4	6.4	6.4	6.9	6.5	6.5
21.....	6.50	6.5	6.5	6.9	6.4	6.4	6.5	6.4	6.4	6.9	6.6	6.6
22.....	6.50	6.5	6.5	6.7	6.5	6.4	6.5	7.0	6.4	6.7	6.8	6.8
23.....	6.50	6.5	6.5	6.7	6.5	6.5	6.4	6.6	6.4	6.4	6.5	6.7
24.....	6.50	6.6	7.0	6.7	6.5	6.4	6.4	6.5	6.4	6.4	6.4	6.9
25.....	6.60	6.6	7.3	6.7	6.5	6.4	6.4	6.4	6.4	6.4	6.4	6.6
26.....	6.50	6.5	6.7	6.7	6.5	6.4	6.5	6.5	6.4	6.6	6.4	6.6
27.....	6.50	6.5	6.6	6.7	6.8	6.4	6.5	8.1	6.4	6.4	6.4	6.5
28.....	6.50	6.5	6.6	6.7	6.8	6.4	6.4	6.6	6.4	6.6	6.4	6.5
29.....	6.50	6.5	6.5	6.7	6.7	6.4	6.4	6.5	6.4	6.5	6.4	6.5
30.....	6.50	-----	6.5	6.7	6.5	6.4	6.5	6.6	6.4	6.5	6.4	6.5
31.....	6.50	-----	6.5	-----	6.5	-----	6.5	6.5	-----	6.4	-----	6.5

*Daily discharge, in second-feet, of Hanalei River near Hanalei, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	171	127	127	127	220	127	127	88	127	88	88	220
2.....	127	127	127	127	171	127	88	88	171	88	88	330
3.....	149	127	171	127	171	88	88	88	171	88	88	582
4.....	149	88	171	171	171	88	88	88	127	88	88	127
5.....	127	88	171	171	171	88	127	88	171	88	127	88
6.....	127	127	171	171	127	88	127	88	1,530	55	127	88
7.....	171	127	220	930	171	88	127	88	171	55	127	127
8.....	171	127	220	930	171	88	88	88	127	515	171	171
9.....	220	127	220	930	171	88	88	88	88	127	171	127
10.....	127	127	330	930	171	88	171	88	88	88	127	171
11.....	88	88	330	790	171	88	127	88	88	88	127	171
12.....	88	88	273	790	88	88	127	88	88	55	88	127
13.....	88	88	220	790	88	88	127	88	88	55	88	127
14.....	220	88	171	720	171	88	127	930	88	55	88	127
15.....	127	127	220	720	273	88	127	127	88	55	127	127
16.....	127	127	220	171	171	88	88	88	127	88	88	127
17.....	127	127	220	1,530	171	88	127	88	88	88	88	127
18.....	127	127	220	1,000	127	88	88	88	88	88	127	127
19.....	127	127	127	930	171	88	88	88	88	88	88	127
20.....	127	127	127	860	88	88	88	88	88	330	127	127
21.....	127	127	127	330	88	88	127	88	88	330	171	171
22.....	127	127	127	220	127	88	127	389	88	220	273	273
23.....	127	127	127	220	127	127	88	171	88	88	127	220
24.....	127	171	389	220	127	88	88	127	88	88	88	330
25.....	171	171	582	220	127	88	88	88	88	88	88	171
26.....	127	127	220	220	127	88	127	127	88	171	88	171
27.....	127	127	171	220	273	88	127	1,150	88	88	88	127
28.....	127	127	171	220	273	88	88	171	88	171	88	127
29.....	127	127	127	220	220	88	88	127	88	127	88	127
30.....	127	.....	127	220	127	88	127	171	88	127	88	127
31.....	127	.....	127	.....	127	.....	127	127	.....	88	.....	127

*Monthly discharge of Hanalei River near Hanalei, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	220	88	136.0	8,360	B.
February.....	171	88	122.0	7,020	B.
March.....	582	127	205.0	12,600	B.
April.....	1,530	127	508.0	30,200	B.
May.....	273	88	161.0	9,900	B.
June.....	127	88	91.9	5,470	C.
July.....	171	88	111.0	6,320	B.
August.....	1,150	88	173.0	10,600	C.
September.....	1,530	88	152.0	9,040	C.
October.....	515	55	124.0	7,620	C.
November.....	273	88	114.0	6,780	C.
December.....	582	88	171.0	10,500	B.
The year.....	1,530	55	172.0	125,000	

#### CHINA DITCH NEAR HANALEI, KAUAI.

**Location.**—About one-fourth mile below the point of diversion from Hanalei River and nearly opposite Sam Opio's house.

**Records available.**—December 28, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once each day, about 10 a. m.; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made from footbridge.



*Discharge measurements of China ditch near Hanalei, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Feb. 20	W. V. Hardy.....	<i>Fect.</i> 3.50	<i>Sec.-ft.</i> 15.4
Aug. 14	.....do.....	4.00	33.0

*Daily gage height, in feet, of China ditch near Hanalei, Kauai, for 1912.*

[Sam Opio, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.4	3.4	3.6	2.6	4.6	0.33	3.3	3.2	3.3	4.0	4.0	4.6
2.....	3.3	3.4	3.5	2.6	3.1	.33	3.2	3.2	3.6	4.0	4.0	4.9
3.....	3.35	3.4	3.6	2.6	3.1	.32	3.2	3.3	3.6	4.0	4.0	5.9
4.....	3.3	3.3	3.5	2.7	3.1	.32	3.2	3.4	3.5	4.0	4.0	4.2
5.....	3.3	3.3	3.5	2.7	3.1	.32	3.3	3.3	3.6	4.0	4.2	4.1
6.....	3.3	3.4	3.3	2.7	3.1	.32	3.3	3.3	5.1	3.9	4.2	4.1
7.....	3.4	3.4	3.4	3.5	3.2	.32	3.4	3.2	3.6	3.9	4.2	4.2
8.....	3.4	3.4	3.4	3.5	3.1	.32	3.4	3.2	3.2	5.8	4.3	3.6
9.....	3.6	.....	3.4	3.4	3.1	.32	3.4	3.2	3.2	4.2	4.3	3.2
10.....	3.5	3.4	2.9	3.4	3.1	.32	3.5	3.2	3.2	4.0	4.1	3.3
11.....	3.4	3.4	2.9	3.4	3.1	.32	3.4	3.2	3.2	4.0	4.1	3.3
12.....	3.4	3.6	2.8	3.4	3.2	.32	3.4	3.2	3.2	3.9	4.0	3.2
13.....	3.5	3.6	2.7	3.4	3.2	.32	3.4	3.2	3.2	3.9	4.0	3.2
14.....	3.6	3.6	2.7	3.3	3.3	.32	3.5	4.6	3.2	3.9	4.0	3.2
15.....	3.4	3.6	2.8	3.3	3.5	.32	3.5	3.4	3.2	3.9	4.3	3.2
16.....	3.4	3.5	2.8	2.8	3.3	.32	3.4	3.2	3.6	4.0	4.1	3.2
17.....	3.4	3.5	2.8	5.1	3.3	.32	3.4	3.2	4.0	4.0	4.1	3.2
18.....	3.4	3.5	2.9	4.9	3.2	.32	3.4	3.2	4.0	4.0	4.2	3.1
19.....	3.4	3.5	2.9	4.8	3.3	.33	3.4	3.2	4.0	4.0	4.1	3.1
20.....	3.4	3.5	3.0	4.6	3.2	.32	3.4	3.2	3.9	4.9	4.2	3.1
21.....	3.4	2.5	3.0	3.8	3.2	.32	3.3	3.2	3.9	4.9	4.3	3.2
22.....	3.4	3.5	3.0	3.5	3.3	.32	3.3	4.2	3.9	4.3	4.6	3.5
23.....	3.4	3.5	3.0	3.7	3.3	.33	3.2	3.6	3.9	4.0	4.2	3.4
24.....	3.4	3.6	3.0	3.7	3.3	.32	3.2	3.4	3.9	4.0	4.1	3.7
25.....	3.5	3.6	3.2	3.7	3.3	.32	3.3	3.3	3.8	4.0	4.1	3.2
26.....	3.4	3.4	2.9	3.7	3.3	.32	3.3	3.4	3.8	4.5	4.1	3.2
27.....	3.4	3.4	2.8	3.7	3.6	.32	3.3	4.8	3.8	4.0	4.1	3.2
28.....	3.4	3.5	2.8	4.6	3.6	.32	3.2	3.6	4.0	4.5	4.0	3.2
29.....	3.4	3.6	2.7	4.6	3.5	.32	3.2	3.4	4.0	4.3	4.0	3.2
30.....	3.4	.....	2.7	4.6	3.5	.32	3.3	3.5	4.0	4.3	4.0	3.2
31.....	3.4	.....	2.7	.....	3.3	.....	3.3	3.4	.....	4.0	.....	3.2

**KUNA DITCH NEAR HANAIEI, KAUAI.****Location.**—About 4 miles up the river from Hanalei and 500 feet below the intake.**Records available.**—January 17 to December 31, 1912.**Gage.**—Vertical staff; read once daily, in the morning; datum unchanged.**Channel.**—Probably permanent.**Discharge measurements.**—Made from a footbridge.**Accuracy.**—Records fair.*Discharge measurements of Kuna ditch near Hanalei, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Jan. 17	W. V. Hardy.....	<i>Fect.</i> 3.83	<i>Sec.-ft.</i> 10.9
Feb. 20	.....do.....	4.40	18.5
Aug. 19	.....do.....	5.12	32.5

*Daily gage height, in feet, of Kuna ditch near Hanalei, Kauai, for 1912.*

[W. K. Samuel, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		3.8	4.5	4.5	4.7	4.5	5.5	5.3	5.3	4.7	4.8	5.6
2.....		3.8	4.5	4.5	4.6	4.5	5.3	5.3	5.5	4.7	4.8	5.8
3.....		3.8	4.6	4.5	4.6	4.5	5.3	5.1	5.5	4.7	4.8	6.2
4.....		3.7	4.6	4.6	4.6	4.5	5.3	5.1	5.5	4.7	4.8	5.5
5.....		3.7	4.6	4.6	4.6	4.5	5.4	5.1	5.5	4.7	5.0	5.4
6.....		3.8	4.6	4.6	4.6	4.5	5.4	5.1	5.8	4.7	5.0	5.4
7.....		3.8	4.7	4.9	4.6	4.5	5.4	5.1	5.3	4.7	5.0	5.5
8.....		3.8	4.7	4.9	4.6	4.4	5.3	5.1	5.3	5.5	5.1	4.2
9.....		3.8	4.7	4.8	4.6	4.4	5.3	5.1	5.3	5.1	5.1	4.1
10.....		3.8	4.8	4.8	4.6	4.4	5.4	5.1	5.3	4.8	5.4	4.2
11.....		4.4	4.8	4.7	4.6	4.4	5.3	5.1	5.3	4.8	5.4	4.2
12.....		4.4	4.7	4.7	4.5	4.4	5.3	5.1	5.3	4.7	5.3	4.1
13.....		4.4	4.7	4.7	4.5	4.4	5.3	5.1	5.3	4.7	5.3	4.1
14.....		4.4	4.6	4.6	4.6	4.4	5.5	5.8	5.3	4.7	5.3	4.1
15.....		4.4	4.7	4.6	4.8	4.4	5.5	5.3	5.3	4.7	5.5	4.1
16.....		4.4	4.7	4.4	4.6	4.4	5.4	5.2	5.5	4.8	5.4	4.1
17.....	3.8	4.4	4.7	5.6	4.6	4.4	5.3	5.2	5.3	4.8	5.4	4.1
18.....	3.8	4.4	4.8	5.3	4.5	4.4	5.3	5.1	5.3	4.8	5.5	4.1
19.....	3.8	4.4	4.8	5.2	4.5	4.5	5.3	5.1	5.2	4.8	5.4	4.1
20.....	3.8	4.4	4.9	5.0	4.5	4.4	5.3	5.1	5.2	5.8	5.5	4.1
21.....	3.8	4.4	4.9	4.9	4.5	4.4	5.3	5.1	5.2	5.8	5.6	4.2
22.....	3.8	4.4	4.9	4.6	4.6	4.4	5.3	5.8	5.0	5.6	5.8	4.5
23.....	3.8	4.4	4.9	4.7	4.6	4.5	5.3	5.2	5.0	4.8	5.5	4.4
24.....	3.8	4.0	5.1	4.7	4.6	4.4	5.3	5.2	5.0	4.8	5.4	4.7
25.....	3.9	4.0	5.3	4.7	4.6	4.4	5.3	5.2	4.9	4.8	5.4	4.2
26.....	3.8	4.5	4.8	4.7	4.6	4.4	5.4	5.4	4.9	5.1	5.4	3.2
27.....	3.8	4.5	4.7	4.7	4.9	4.4	5.4	5.8	4.9	4.8	5.4	3.2
28.....	3.8	4.5	4.7	4.7	4.9	4.4	5.4	5.5	4.8	5.1	5.3	3.2
29.....	3.8	4.5	4.6	4.7	4.7	4.4	5.4	5.4	4.8	5.0	5.3	3.2
30.....	3.8		4.6	4.7	4.6	4.4	5.4	5.5	4.8	5.0	5.3	3.2
31.....	3.8		4.6		4.5		5.3	5.4		4.8		3.2

*Daily discharge, in second-feet, of Kuna ditch near Hanalei, Kauai, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		10.4	20.0	20.0	24.0	20.0	42.0	37.0	37.0	24.0	26.0	44.0
2.....		10.4	20.0	20.0	22.0	20.0	37.0	37.0	42.0	24.0	26.0	49.0
3.....		10.4	22.0	20.0	22.0	20.0	37.0	32.0	42.0	24.0	26.0	60.0
4.....		9.3	22.0	22.0	22.0	20.0	37.0	32.0	42.0	24.0	26.0	42.0
5.....		9.3	22.0	22.0	22.0	20.0	39.0	32.0	42.0	24.0	30.0	39.0
6.....		10.4	22.0	22.0	22.0	20.0	39.0	32.0	49.0	24.0	30.0	39.0
7.....		10.4	24.0	28.0	22.0	20.0	39.0	32.0	37.0	24.0	30.0	42.0
8.....		10.4	24.0	28.0	22.0	18.4	37.0	32.0	37.0	42.0	32.0	15.4
9.....		10.4	24.0	26.0	22.0	18.4	37.0	32.0	37.0	32.0	32.0	14.0
10.....		10.4	26.0	26.0	22.0	18.4	39.0	32.0	37.0	26.0	39.0	15.4
11.....		18.4	26.0	24.0	22.0	18.4	37.0	32.0	37.0	26.0	39.0	15.4
12.....		18.4	24.0	24.0	20.0	18.4	37.0	32.0	37.0	24.0	37.0	14.0
13.....		18.4	24.0	24.0	20.0	18.4	37.0	32.0	37.0	24.0	37.0	14.0
14.....		18.4	22.0	22.0	22.0	18.4	42.0	49.0	37.0	24.0	37.0	14.0
15.....		18.4	24.0	22.0	26.0	18.4	42.0	37.0	37.0	24.0	42.0	14.0
16.....		18.4	24.0	18.4	22.0	18.4	39.0	35.0	42.0	26.0	39.0	14.0
17.....	10.4	18.4	24.0	44.0	22.0	18.4	37.0	35.0	37.0	26.0	39.0	14.0
18.....	10.4	18.4	26.0	37.0	20.0	18.4	37.0	32.0	37.0	26.0	42.0	14.0
19.....	10.4	18.4	26.0	35.0	20.0	20.0	37.0	32.0	35.0	26.0	39.0	14.0
20.....	10.4	18.4	28.0	30.0	20.0	18.4	37.0	32.0	35.0	49.0	42.0	14.0
21.....	10.4	18.4	28.0	28.0	20.0	18.4	37.0	32.0	35.0	49.0	44.0	15.4
22.....	10.4	18.4	28.0	22.0	22.0	18.4	37.0	49.0	30.0	44.0	49.0	20.0
23.....	10.4	18.4	28.0	24.0	22.0	20.0	37.0	35.0	30.0	26.0	42.0	18.4
24.....	10.4	12.7	32.0	24.0	22.0	18.4	37.0	35.0	30.0	26.0	39.0	24.0
25.....	11.5	12.7	37.0	24.0	22.0	18.4	37.0	35.0	28.0	26.0	39.0	15.4
26.....	10.4	20.0	26.0	24.0	22.0	18.4	39.0	39.0	28.0	32.0	39.0	5.0
27.....	10.4	20.0	24.0	24.0	28.0	18.4	39.0	49.0	28.0	26.0	39.0	5.0
28.....	10.4	20.0	24.0	24.0	28.0	18.4	39.0	42.0	26.0	32.0	37.0	5.0
29.....	10.4	20.0	22.0	24.0	24.0	18.4	39.0	39.0	26.0	30.0	37.0	5.0
30.....	10.4		22.0	24.0	22.0	18.4	39.0	42.0	26.0	30.0	37.0	5.0
31.....	10.4		22.0		20.0		37.0	39.0		26.0		5.0

*Monthly discharge of Kuna ditch near Hanalei, Kauai, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January 17-31.....	11.5	10.4	a 10.5	312	B.
February.....	20.0	9.3	15.4	886	B.
March.....	37.0	20.0	24.7	1,520	B.
April.....	44.0	18.4	25.2	1,500	B.
May.....	28.0	20.0	22.2	1,360	B.
June.....	20.0	18.4	18.9	1,120	B.
July.....	42.0	37.0	39.1	2,340	B.
August.....	49.0	32.0	35.9	2,210	B.
September.....	49.0	26.0	35.3	2,100	B.
October.....	49.0	24.0	28.7	1,760	B.
November.....	49.0	26.0	36.4	2,170	B.
December.....	60.0	5.0	20.1	1,240	B.
The period.....			b 26.7	18,500	

*a* Mean for January is mean for 15 days.*b* Mean for year is mean for 351 days.

## LUMAHAI RIVER BASIN.

## LUMAHAI RIVER NEAR WAINIHA, KAUAI.

**Location.**—About 4½ miles west of Hanalei and 300 feet below the point at which the Kauai Electric Co.'s power line crosses the river.

**Records available.**—March 24 to December 31, 1912.

**Gage.**—Staff; datum unchanged.

**Channel.**—Rocky; probably permanent.

**Discharge measurements.**—Made from wire suspension bridge.

*Discharge measurements of Lumahai River near Wainiha, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 18	W. V. Hardy.....		74.7
Mar. 26	.....do.....	7.99	154
Aug. 16	.....do.....	a 8.08	107

*a* Dam was built about 125 feet below the gage during April, 1912.

NOTE.—Gage heights unreliable, not published.

## WAINIHA RIVER BASIN.

## WAINIHA RIVER NEAR WAINIHA, KAUAI.

**Location.**—About 2 miles south of Wainiha and just northeast of the Kauai Electric Co.'s power house.

**Records available.**—East Channel, February 25 to December 31, 1912. West Channel, December 30, 1911, to December 31, 1912.

**Gage.**—Inclined timber gages on both channels; read twice daily, 7 a. m. and 5 p. m.

**Channels.**—There are two large channels, the East Channel and the West Channel, and two gages have to be maintained to obtain the total flow of the river at this point; both channels rocky and probably permanent. The natives build fish dams at the point where the river divides above the stations, and these shift the water from one channel to the other.

**Discharge measurements.**—Made from wire suspension bridges over each channel.

**Cooperation.**—Stations maintained in cooperation with the Kauai Electric Co.

*Discharge measurements of East Channel of Wainiha River near Wainiha, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Mar. 19	W. V. Hardy.....	<i>Feet.</i> 6.44	<i>Sec.-ft.</i> 6.6
25	.....do.....	8.90	364
Aug. 23	.....do.....	6.89	18.5

*Daily gage height, in feet, of East Channel of Wainiha River near Wainiha, Kauai, for 1912.*

[Kauai Electric Co., observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			7.95	7.10	6.65	6.80	6.75	6.60	7.40	6.85	6.80	8.55
2.....			7.75	6.90	6.70	6.80	6.70	6.58	7.30	6.80	6.60	10.05
3.....			7.95	6.75	6.85	6.80	6.70	6.50	7.20	7.30	6.70	11.35
4.....			7.55	7.15	6.90	6.90	6.70	6.55	6.90	6.65	6.65	8.35
5.....			7.65	7.15	7.05	6.80	6.85	6.80	6.75	6.80	6.65	7.20
6.....			7.70	7.95	7.00	6.80	6.95	6.95	8.80	6.75	6.60	7.05
7.....			7.45	8.85	7.10	6.80	7.25	7.05	7.35	6.75	6.70	6.85
8.....			7.70	9.20	7.20	6.80	6.75	7.20	6.90	6.82	7.80	6.95
9.....			8.25	8.80	6.80	6.90	7.08	7.10	6.90	6.85	8.30	6.95
10.....			8.85	7.75	6.70	6.80	8.12	6.65	6.70	7.00	6.90	6.70
11.....			9.85	7.55	6.70	6.80	8.20	6.80	6.70	6.70	6.75	6.65
12.....			8.55	7.65	6.70	6.80	7.40	6.75	6.68	6.70	6.60	6.60
13.....			8.05	7.35	6.80	6.90	8.70	6.95	6.50	6.80	6.60	6.70
14.....			7.75	7.20	8.15	6.80	7.55	8.75	6.42	6.80	6.60	6.65
15.....			7.40	7.25	7.75	6.85	7.30	7.20	6.50	6.70	6.85	6.70
16.....			7.20	6.95	7.10	6.90	6.88	6.80	6.50	6.85	6.75	6.85
17.....			6.95	7.35	7.05	6.80	8.05	6.65	6.70	7.22	6.70	6.70
18.....			6.80	7.00	6.95	6.90	6.82	6.60	6.58	7.05	6.75	6.70
19.....			6.45	6.65	6.80	6.95	6.75	6.60	6.50	7.38	7.05	6.75
20.....			7.10	6.45	6.80	7.00	6.75	6.60	6.50	7.40	6.85	7.05
21.....			7.00	6.50	6.85	7.00	6.85	6.90	6.55	8.05	8.30	6.95
22.....			6.70	6.60	7.15	6.85	6.75	7.05	6.85	7.30	8.35	7.05
23.....			6.55	6.65	6.90	6.85	6.75	6.85	6.65	7.10	8.00	7.70
24.....			7.10	6.70	7.00	6.95	6.85	6.80	6.62	6.80	6.95	8.50
25.....		6.70	9.15	6.75	6.85	6.80	6.70	6.68	6.55	6.85	6.75	8.25
26.....		6.60	7.25	6.80	6.80	6.80	6.95	6.70	6.50	8.70	6.70	8.00
27.....		6.80	7.00	6.65	7.00	6.80	6.75	7.80	6.50	7.20	6.65	6.90
28.....		6.75	7.20	6.60	8.85	6.70	6.60	7.65	6.65	7.20	6.70	6.85
29.....		6.85	6.90	6.65	7.90	6.70	6.65	7.65	6.70	6.90	8.15	6.70
30.....			6.85	6.50	7.10	6.70	6.75	8.15	6.70	7.00	8.30	6.70
31.....			6.85	.....	6.90	.....	6.70	7.95	.....	7.15	.....	6.70

*Discharge measurements of West Channel of Wainiha River near Wainiha, Kauai, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Mar. 19	W. V. Hardy.....	<i>Feet.</i> 5.60	<i>Sec.-ft.</i> 143
24	.....do.....	6.55	578
Aug. 23	.....do.....	5.74	162

*Daily gage height, in feet, of West Channel of Wainiha River near Wainiha, Kauai, for 1912.*

[Kauai Electric Co., observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.40	5.45	6.20	5.95	5.60	5.60	5.55	5.50	6.10	5.58	5.65	6.60
2.....	5.50	5.75	5.95	5.80	5.60	5.55	5.50	5.50	6.05	5.55	5.55	6.95
3.....	5.60	5.80	6.15	5.65	5.62	5.50	5.50	5.50	5.95	6.00	5.60	7.70
4.....	5.50	5.75	5.90	5.90	5.65	5.60	5.50	5.40	5.80	5.50	5.55	6.30
5.....	5.60	5.60	5.90	6.00	5.75	5.55	5.60	5.70	5.65	5.65	5.50	5.90
6.....	5.50	5.50	6.15	6.30	5.60	5.60	5.70	5.75	6.55	5.62	5.50	5.95
7.....	5.50	5.50	5.90	6.55	5.60	5.50	5.80	5.80	5.95	5.55	5.55	5.75
8.....	5.70	5.55	6.00	6.70	5.70	5.50	5.65	5.95	5.80	5.60	5.95	5.80
9.....	5.60	5.60	6.35	6.65	5.60	5.60	5.70	5.90	5.7	5.68	6.30	5.80
10.....	5.55	5.60	6.75	6.15	5.50	5.50	6.15	5.60	5.55	5.70	5.85	5.90
11.....	5.40	5.65	6.90	5.90	5.50	5.50	6.05	5.65	5.5	5.50	5.65	5.60
12.....	5.50	5.55	6.30	6.00	5.50	5.50	5.70	5.55	5.5	5.55	5.50	5.50
13.....	5.70	5.55	6.00	5.85	5.85	5.60	6.15	5.70	5.45	5.55	5.50	5.80
14.....	5.60	5.55	5.90	5.90	6.25	5.50	5.95	6.45	5.40	5.55	5.50	5.80
15.....	5.50	5.55	5.75	5.95	6.00	5.55	5.85	6.00	5.50	5.50	5.85	5.90
16.....	5.40	5.50	5.75	5.85	5.65	5.55	5.70	5.70	5.50	5.60	5.70	5.75
17.....	5.40	5.50	5.75	6.20	5.65	5.50	6.05	5.55	5.60	5.85	5.60	5.60
18.....	5.40	5.65	5.65	5.95	5.55	5.70	5.65	5.60	5.5	5.70	5.75	5.60
19.....	5.40	5.60	5.55	5.65	5.60	5.75	5.60	5.50	5.5	6.10	5.95	5.75
20.....	5.40	5.65	5.95	5.65	5.60	5.70	5.55	5.50	5.5	6.15	5.75	6.20
21.....	5.40	5.95	6.00	5.55	5.65	5.65	5.60	5.70	5.5	6.35	6.25	5.90
22.....	5.40	6.10	5.75	5.55	5.75	5.55	5.60	5.80	5.70	5.95	6.25	5.95
23.....	5.45	6.20	5.65	5.55	5.65	5.65	5.60	5.70	5.52	5.80	5.90	6.35
24.....	5.70	6.10	5.90	5.60	5.75	5.70	5.65	5.65	5.45	5.65	6.00	6.30
25.....	5.55	5.90	6.55	5.65	5.65	5.55	5.60	5.70	5.45	5.70	5.65	6.05
26.....	5.45	5.85	5.95	5.75	5.60	5.50	5.75	5.60	5.40	6.40	5.60	5.85
27.....	5.60	5.95	5.80	5.90	5.80	5.58	5.60	6.30	5.40	5.85	5.50	5.62
28.....	5.50	5.75	5.90	5.70	6.30	5.50	5.50	5.90	5.60	5.95	5.50	5.60
29.....	5.50	5.80	5.80	5.75	6.00	5.50	5.55	5.75	5.60	5.70	6.05	5.60
30.....	5.55	.....	5.80	5.65	5.60	5.50	5.55	6.40	5.50	5.70	6.20	5.50
31.....	5.60	.....	5.85	.....	5.60	.....	5.60	6.00	.....	5.85	.....	5.60

# **WAINIHA CANAL AT INTAKE, NEAR WAINIHA, KAUAI.**

**Location.**—At 700-foot elevation, just below the point of diversion and about 4 miles above the Kauai Electric Co.'s power house.

**Records available.**—August 1, 1910, to December 31, 1912.

**Channel.**—Probably permanent.

**Cooperation.**—Gage heights furnished by Kauai Electric Co.

The following discharge measurement was made by W. V. Hardy:

March 20, 1912: Gage height, 4.14 feet; discharge, 80.0 second-feet.

*Daily gage height, in feet, of Wainiha canal at intake, near Wainiha, Kauai, for 1912.*

[Kauai Electric Co., observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.50	3.50	4.00	4.70	3.55	4.05	3.75	3.65	4.70	4.20	4.60	4.70
2.....	4.10	3.50	4.00	4.70	3.55	4.05	3.75	3.45	4.70	3.70	4.05	4.70
3.....	4.35	3.50	4.70	4.60	4.70	3.70	3.50	3.35	4.70	4.50	4.40	0.00
4.....	4.10	4.00	4.70	4.55	4.70	3.90	3.75	3.30	4.70	3.65	4.15	0.00
5.....	.....	4.00	4.70	4.70	4.65	3.70	4.20	4.20	2.55	4.15	4.60	0.00
6.....	.....	2.50	4.70	4.70	4.15	3.60	4.35	4.40	4.70	3.65	4.40	1.50
7.....	.....	3.40	4.70	4.70	4.10	3.45	4.70	4.20	4.70	4.20	4.35	1.60
8.....	.....	3.40	4.70	4.70	4.70	3.40	3.90	4.70	4.70	4.60	4.30	2.60
9.....	.....	3.40	4.70	4.70	4.10	4.45	3.65	4.70	4.70	4.40	3.80	4.50
10.....	.....	3.50	4.70	4.70	3.85	4.10	4.70	4.40	3.95	4.40	4.70	4.50
11.....	.....	3.90	4.70	4.70	3.60	3.60	4.70	4.60	3.80	4.00	4.35	4.10
12.....	.....	3.50	4.70	4.70	3.50	3.90	4.70	4.50	3.90	3.60	4.00	3.70
13.....	.....	3.40	4.70	4.70	3.75	4.35	4.50	4.60	3.65	3.40	3.75	3.60
14.....	.....	3.40	4.70	4.70	4.70	4.70	4.70	4.70	3.55	3.65	3.55	3.60
15.....	.....	3.30	4.70	4.70	4.70	4.50	4.70	4.70	3.45	3.50	4.10	3.90

Daily gage height, in feet, of Wainiha canal at intake near Wainiha, Kauai, for 1912—  
Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....		3.30	4.70	4.70	4.70	4.60	4.70	4.60	4.05	4.00	4.40	4.10
17.....		3.30	2.50	4.70	4.50	4.00	4.70	4.10	4.13	4.10	3.90	3.50
18.....		3.30	2.80	4.70	4.10	4.80	4.50	3.80	3.50	4.50	4.40	3.40
19.....		3.40	4.00	4.70	3.95	4.70	4.00	3.60	3.50	4.70	4.70	3.40
20.....		3.30	4.00	4.60	4.35	4.35	3.90	3.55	3.45	4.70	4.65	4.70
21.....		4.00	4.00	4.45	4.40	4.70	4.20	4.70	3.75	4.70	4.70	4.50
22.....		4.00	4.25	4.45	4.70	4.40	4.50	4.50	4.10	4.70	4.70	4.70
23.....		4.00	4.00	4.40	4.70	4.50	4.50	4.40	3.50	4.70	4.70	4.70
24.....		4.00	4.50	4.20	4.70	4.70	4.70	4.50	3.20	4.35	4.70	4.70
25.....		4.00	4.60	4.40	4.65	4.25	4.40	4.20	3.20	4.40	4.70	2.00
26.....		4.00	4.70	4.70	4.50	4.00	4.30	4.20	3.20	4.70	3.80	4.70
27.....		4.00	4.70	4.40	4.70	4.15	3.90	4.70	3.20	4.70	3.65	0.00
28.....		4.00	4.70	4.50	4.60	3.70	3.80	4.70	3.80	4.70	3.55	0.00
29.....		4.00	4.70	3.90	3.50	3.45	4.00	4.70	4.15	4.60	4.70	1.60
30.....			4.70	3.65	4.70	3.40	4.40	4.70	4.10	4.60	4.70	4.00
31.....			4.70		4.30		3.80	4.70		4.70		4.00

NOTE.—Power plant was partly closed for repairs Jan. 5-31.

### MISCELLANEOUS MEASUREMENTS ON KAUAI IN 1912.

[By W. V. Hardy.]

Date.	Stream.	Gage height.	Dis-charge.
Jan. 27	Wainiha canal at Tunnel No. 18, near Wainiha.....	<i>Feet.</i> 3.40	<i>Sec.-feet.</i> 67.3
29	.....do.....	3.70	77.4
Mar. 20	.....do.....	4.14	91.4
Feb. 11	Wilcox ditch above county road near Koloa.....		6.07
12	Huleia River below county road near Lihue.....		2.11
12	Hakenanahu Stream above county road, Lihue.....		.20
12	Kamooloa ditch below county road, Lihue.....		8.33
12	Hooleinakauualihua ditch below county road.....		3.72
12	Hooleinakauualihua Stream below county road.....		1.77
12	Puhi Stream below county road near Lihue.....		.75
Jan. 19	Kahiliholo Stream below stone dam, Kilauea.....		9.20
20	Kilauea River below confluence, Kilauea.....		8.83
20	Waiule ditch, intake, above reservoir, Kilauea.....		3.85
21	Kalihiwai intake ditch above reservoir, Kilauea.....		1.17
Feb. 11	Lawai Stream, west, Homestead, Kauai.....		1.64
11	Lawai Stream, east, Lawai, Kauai.....		.10
11	Lawai ditch, Lawai.....		.26
Apr. 4	Hanapepe ditch, Hanapepe weir, Makauli.....	<i>a</i> 11½	4.07
Dec. 13	Manuahi Stream above Hanapepe River.....		3.43
May 5	Uhaui Stream 400 feet below falls.....		4.79
July 31	North Wailua River above mouth of East Branch.....		15.00
Jan. 22	Kialakua Stream below county road, Hanalei.....		.28
31	Kialakua ditch below county road, Hanalei.....		1.06
Feb. 19	Kalihiwai River, 1½ miles above mouth.....		21.3
19	West Branch Kalihiwai just above confluence.....		1.84
Aug. 21	Kalihiwai River below Kaapua Falls.....		<i>b</i> 38.4
21	Kalihiwai River above Kaapua Falls.....		<i>b</i> 28.3
Feb. 12	Halehaku Stream below county road, Lihue.....		1.96
Nov. 18	North Fork Halekua Stream trail crossing, Waimea.....		.69
Feb. 28	East Branch Kapaia Stream below county road.....		1.81
Jan. 22	Kaua ditch below county road, Hanalei.....		1.27
31	Molokaa Stream below county road, Kilauea.....		2.11
Feb. 12	Nawiliwili Stream above county road, Lihue.....		1.46
Jan. 31	Papaa Stream above county road, Kilauea.....		.75
22	Poakumu Stream above county road, Kilauea.....		1.27
Dec. 3	Waimea River at bridge at Waimea.....		9,780.00
Feb. 11	Omuu Stream above old county road, Koloa.....		.27
11	Eleele ditch above county road, Eleele.....		2.25
11	Poeloelo Stream above old county road, Koloa.....		.08
11	Waihoonuu Stream below old county road, Koloa.....		.13
11	Wahiaua Stream below county road, Eleele.....		.30
July 3	Kauaikanana Stream near Waimea.....		.80
Aug. 7	.....do.....		.46
Oct. 7	.....do.....		.50

*a* Head in inches on 12-foot sharp-crested weir.

*b* River fluctuating.

## PUMPED WATER ON KAUAI.

Several small pumping plants on Kauai are used to pump underground water for irrigation at very dry times or to lift fresh water to higher elevations. At only one place, however, is pumped water from underground sources depended upon as a regular irrigation supply.

The McBryde Sugar Co. has five electric plants with seven pumps and two steam plants with two pumps which are used for pumping underground water from Hanapepe and Lawai valleys.

During 1912 the quantity of water pumped daily by this company averaged 25,600,000 gallons, or 39.6 second-feet. A large part of this water is lifted more than 400 feet.

## DITCH SEEPAGE AND LOSSES ON KAUAI.

The following investigations of ditch seepage and losses have been made during the year at the request of plantation and power company officials:

*Ditch and canal loss or gain, 1912.*

## Wainiha canal (Kauai Electric Co.).

Date and hour.	Location.	Discharge.	Loss or gain.
Jan. 27:		<i>Second-feet.</i>	<i>Second-feet.</i>
9 a. m. ....	6,000 feet below intake. ....	67.3	
10 a. m. ....	6,225 feet below intake. ....	66.6	-0.7
11 a. m. ....	6,490 feet below intake. ....	64.3	-2.3
11.40 a. m. .	6,815 feet below intake. ....	63.2	-1.1
Jan. 29:			
11.10 a. m. .	7,115 feet below intake. ....	62.6	
Noon. ....	7,440 feet below intake. ....	60.2	-2.4
3.15 p. m. .	4,500 feet above forebay. ....	77.4	
4.15 p. m. .	3,865 feet above forebay. ....	75.8	-1.6

## Stone Dam ditch (near Kilauea).

Jan. 19:			
2.45 p. m. .	450 feet below intake at Stone Dam. ....	3.2	
4 p. m. ....	Added to above by inflow from mill supply ditch 3,500 feet below Stone Dam intake. ....	2.7	
	Total. ....	5.9	
4.45 p. m. .	At bridge 5,500 feet below Stone Dam intake. ....	4.6	-1.3

## Waiuli ditch (near Kilauea).

Jan. 20:			
1 p. m. ....	300 feet below reservoir. ....	12.1	
2 p. m. ....	Discharge of lateral ditch diverting at point 4,500 feet below reservoir. ....	4.2	
	Without loss or gain there should be remaining in ditch below diversion. ....	7.9	
2.30 p. m. .	Discharge at wasteway. ....	0.7	
	Without loss or gain there should be remaining in ditch below wasteway. ....	7.2	
3 p. m. ....	Below wasteway at point about 16,000 feet below reservoir. ....	8.4	+1.2
4 p. m. ....	At bridge on Kilauea-Kolako road. ....	6.6	-1.8

*Ditch and canal loss or gain, 1912—Continued.***Waiuli Intake ditch (near Kilauea).**

Date and hour.	Location.	Discharge.	Loss or gain.
Jan. 21:		<i>Second-feet.</i>	<i>Second-feet.</i>
8 a. m. ....	60 feet below headgate.....	3.7	
	Surface drainage into ditch between points of measurements..	.2	
	Total.....	3.9	
9.30 a. m. ....	About 7,000 feet below headgate.....	3.6	-0.3

**Hanapepe ditch (near Eleele).**

Mar. 6:			
10 a. m. ....	Flume No. 6, $\frac{1}{2}$ mile below intake.....	43.6	
	Surface drainage added to canal between flumes No. 6 and No. 25.	.6	
	Total.....	44.2	
Noon.....	Flume No. 25, $3\frac{1}{2}$ miles below intake.....	39.4	-4.8
Mar. 7:			
4 p. m. ....	Flume No. 35.....	44.1	
4.50 p. m. ....	Flume No. 36, 2,900 feet below flume No. 35.....	42.1	-2.0

NOTE.—These measurements were made to determine leakage at flume No. 36.

**ISLAND OF OAHU.****PALOLO STREAM BASIN.****WAIOMAO STREAM AT 900-FOOT ELEVATION<sup>1</sup> NEAR HONOLULU, OAHU.**

**Location.**—About 3 miles above Pukele in the Palolo Valley and about 9 miles from Honolulu.

**Records available.**—October 10, 1911, to December 31, 1912.

**Gage.**—Watson weekly clock register above 3-foot sharp-crested weir; datum uncertain on account of leaks under weir.

**Channel.**—One channel at all stages; shifting.

**Discharge measurements.**—By wading.

**Diversions.**—None above station; proposed to divert all of low-water discharge by pipe line for Honolulu water supply in 1913.

**Accuracy.**—Records poor, owing to uncertainty regarding leakage around and under the weir.

*Discharge measurements of Waiomao Stream at 900-foot elevation, near Honolulu, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 15	Pierce and Hardy..	0.01	0.39	June 17	W. B. Hardy.....	0.11	0.82
21	W. V. Hardy.....	.34	2.87	July 29	C. H. Pierce.....	.07	.44
21	do.....	.30	2.70	Oct. 4	G. K. Larrison.....	.07	.42
21	do.....	.25	2.09	Nov. 25	Larrison and Dort..	.22	b 1.42
21	do.....	.20	1.64	Dec. 20	G. K. Larrison.....	.24	1.38

<sup>a</sup> Discharge of stream proper, 0.37 second-foot; small diversion immediately above station estimated at 0.05; total discharge 0.42.

<sup>b</sup> Small loss through rocks at edge of measuring section.

<sup>1</sup> 950-foot elevation in Water-Supply Paper 313, p. 149.



*Daily gage height, in feet, of Waiomao Stream at 900-foot elevation, near Honolulu, Oahu, for 1912.*

[Ramon Suvaco, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.30	-----	-----	0.12	0.05	0.14	0.08	0.07	0.14	0.09	0.11	0.62
2.....	-----	-----	-----	.10	.05	.14	.08	.10	.13	.08	.09	.49
3.....	-----	-----	0.14	.10	.05	.12	.08	.22	.11	.08	.07	.85
4.....	-----	-----	.13	.13	.05	.25	.08	.32	.10	.08	.08	.45
5.....	-----	-----	.12	.18	.10	.18	.12	.20	.10	.07	.07	.30
6.....	-----	-----	-----	.12	.10	.14	.11	-----	.10	.06	.06	.25
7.....	-----	-----	-----	.11	.10	.14	.10	-----	.10	-----	.06	.29
8.....	-----	-----	-----	.10	.09	.13	.11	-----	.09	-----	.13	.30
9.....	.17	0.10	-----	.14	.09	.13	.32	-----	.08	-----	.18	.26
10.....	.17	.14	.76	.16	.09	-----	.55	-----	.08	-----	.10	.18
11.....	.15	.16	.88	.24	.08	-----	.35	.25	.07	-----	.08	.14
12.....	.14	.12	.52	.18	.09	-----	.24	.14	.07	-----	.07	.12
13.....	.26	.15	.68	.17	.10	-----	.22	.11	.06	.19	.06	.18
14.....	.35	.11	.42	.16	.13	-----	.19	.23	.06	-----	.06	.12
15.....	-----	.10	.28	.23	.12	-----	.18	.22	.06	-----	.30	.12
16.....	-----	.10	.44	.24	.12	.12	.19	.50	.06	-----	.12	.10
17.....	-----	.09	.35	.17	.12	.11	.18	.27	.06	-----	.10	.09
18.....	-----	.09	.26	.13	.12	.12	.15	.19	.06	-----	.09	.12
19.....	-----	.09	.22	.12	.15	.11	.14	.12	.06	-----	.09	.40
20.....	-----	.09	.19	.11	.10	.10	.13	.12	.06	.10	.08	.25
21.....	.12	.14	.17	.12	.17	.09	.12	.12	.06	.09	.27	.23
22.....	-----	.18	.14	.11	.14	.09	.12	.11	.06	.13	.28	.24
23.....	-----	.90	.12	.10	.11	.09	.11	.10	.06	.10	.37	.18
24.....	-----	.57	.11	.09	.32	.09	.10	.09	.06	.08	.22	.15
25.....	-----	.34	.13	.09	.16	.09	.10	.08	.06	.26	.19	.13
26.....	-----	-----	.11	.07	.25	.09	.09	.23	.07	.58	.15	.12
27.....	-----	-----	.10	.07	.50	.09	.08	.30	.08	.33	.14	.09
28.....	-----	-----	.10	.06	.35	.09	.08	.19	.09	.27	.48	.09
29.....	-----	-----	.11	.06	.24	.09	.07	.16	.09	.19	.50	.08
30.....	-----	-----	.11	.05	.19	.09	.07	.23	.10	.15	.42	.09
31.....	-----	-----	.10	-----	.16	-----	.07	.19	-----	.14	-----	.10

*Discharge, in second-feet, of Waiomao Stream at 900-foot elevation, near Honolulu, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.64	-----	-----	0.50	0.40	1.02	0.50	0.43	1.02	0.58	0.70	5.50
2.....	-----	-----	-----	.40	.40	1.02	.50	.66	.93	.50	.54	4.25
3.....	-----	-----	0.52	.40	.40	.84	.50	1.79	.75	.50	.40	8.20
4.....	-----	-----	.47	.55	.40	2.09	.50	2.84	.66	.50	.45	3.72
5.....	-----	-----	.42	.85	.40	1.39	.84	1.59	.66	.43	.35	2.14
6.....	-----	-----	-----	.50	.40	1.02	.75	1.69	.66	.36	.35	1.57
7.....	-----	-----	-----	.45	.40	1.02	.66	1.79	.66	.50	.35	1.98
8.....	-----	-----	-----	.40	.40	.93	.75	1.89	.58	.66	.77	2.08
9.....	.70	0.40	-----	.60	.40	.93	2.84	1.99	.50	.84	1.23	2.67
10.....	.70	.40	6.62	.75	.40	.93	5.48	1.99	.50	1.02	.53	.89
11.....	.58	.42	8.25	1.17	.40	.93	3.17	2.09	.43	1.20	.40	.56
12.....	.52	.42	3.75	.76	.40	.93	1.99	1.02	.43	1.39	.40	.41
13.....	1.32	.44	5.60	.70	.40	.84	1.79	.75	.36	1.49	.40	.89
14.....	2.07	.44	2.72	.64	.55	.84	1.49	1.89	.36	1.39	.40	.41
15.....	-----	.46	1.48	1.10	.50	.84	1.39	1.79	.36	.93	2.39	.41
16.....	-----	.46	2.92	1.17	.50	.84	1.49	4.88	.36	.50	.64	.35
17.....	-----	.48	2.07	.80	.50	.75	1.39	2.29	.36	.50	.49	.35
18.....	-----	.48	1.32	.55	.50	.84	1.11	1.49	.36	.50	.41	.41
19.....	-----	.50	1.03	.50	.65	.75	1.02	.84	.36	.66	.41	3.10
20.....	-----	.50	.90	.45	.66	.66	.93	.84	.36	.66	.40	1.51
21.....	.42	.52	.80	.50	1.29	.58	.84	.84	.36	.58	1.99	1.28
22.....	-----	.76	.60	.45	1.02	.58	.84	.75	.36	.93	2.09	1.38
23.....	-----	8.53	.50	.40	.75	.58	.75	.66	.36	.66	3.07	.82
24.....	-----	4.30	.45	.40	2.84	.58	.66	.58	.36	.50	1.39	.58
25.....	-----	1.98	.55	.40	1.20	.58	.66	.50	.36	2.19	1.11	.43
26.....	-----	-----	.45	.40	2.09	.58	.58	1.89	.43	5.84	.75	.35
27.....	-----	-----	.40	.40	4.88	.58	.50	2.62	.50	2.93	.67	.35
28.....	-----	-----	.40	.40	3.17	.58	.50	1.49	.58	2.29	4.16	.35
29.....	-----	-----	.45	.40	1.99	.58	.43	1.20	.58	1.47	4.40	.35
30.....	-----	-----	.45	.40	1.49	.58	.43	1.89	.66	1.09	3.47	.35
31.....	-----	-----	.40	-----	1.20	-----	.43	1.49	-----	.96	-----	.35

*Monthly discharge of Waiomao Stream at 900-foot elevation near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....			<sup>a</sup> 0.99	<sup>a</sup> 15.7	D.
February.....			<sup>b</sup> 1.26	<sup>b</sup> 42.5	D.
March.....			<sup>c</sup> 1.74	<sup>c</sup> 86.2	D.
April.....	1.17	0.40	.58	34.5	D.
May.....	4.88	.40	1.00	61.5	D.
June.....	2.09	.58	.84	50.0	C.
July.....	5.48	.43	1.15	70.7	B.
August.....	4.88	.43	1.56	95.9	C.
September.....	1.02	.36	.51	30.3	C.
October.....	5.84	.36	1.11	68.2	D.
November.....	4.40	.35	1.17	69.6	D.
December.....	5.50	.35	1.52	93.5	D.
The period.....			<sup>d</sup> 1.12	<sup>d</sup> 719	

<sup>a</sup> Eight days.

<sup>b</sup> Seventeen days.

<sup>c</sup> Twenty-five days.

<sup>d</sup> Three hundred twenty-five days.

**WAIOMAO STREAM ABOVE PUKELE STREAM, NEAR HONOLULU, OAHU.**

**Location.**—At Pukele highway bridge in Palolo Valley, about 6 miles east of Honolulu.

**Records available.**—April 8 to December 29, 1911, and May 15 to December 31, 1912.

**Drainage area.**—Not measured.

**Gage.**—Vertical staff; read once daily, about 9 a. m.; datum unchanged.

**Channel.**—One channel at all stages; shifting.

**Discharge measurements.**—Low and medium stage measurements made by wading; flood measurements made from bridge.

**Diversions.**—None above station.

**Accuracy.**—Records poor.

*Discharge measurements of Waiomao Stream above Pukele Stream, near Honolulu, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
May 15	Pierce and Hardy..	0.74	0.19	Oct. 15	G. K. Larrison.....	0.95	0.42
21	W. V. Hardy.....	.93	1.01	Nov. 26	Larrison, Dort and Bailey.....	1.03	.81
June 17	do.....	.82	.27	Dec. 20	G. K. Larrison.....	1.13	1.37
July 28	C. H. Pierce.....	.88	.32				
Sept. 17	G. K. Larrison.....	.82	.10				

*Daily gage height, in feet, of Waiomao Stream above Pukele Stream, near Honolulu, Oahu, for 1912.*

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.85	0.87	0.98	0.85	0.98	0.98	1.52
2.....		.83	.85	.98	.85	.90	.96	1.35
3.....		.82	.88	.96	.85	.92	.91	1.23
4.....		.81	.87	.95	.87	.90	.91	1.18
5.....		.80	.86	.94	.81	.90	.91	1.16
6.....		.84	.87	.93	.85	.91	.91	1.13
7.....		.82	.89	.92	.86	.92	.91	1.11
8.....		.81	.96	.92	.86	.99	.92	1.09
9.....		.80	.96	.92	.90	.98	.92	1.09
10.....		.81	1.20	.91	.88	.98	1.00	1.09

Daily gage height, in feet, of Waiomao Stream above Pukele Stream, near Honolulu, Oahu, for 1912—Continued.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....		0.83	1.10	0.98	0.86	1.03	0.98	1.09
12.....		.82	1.00	.94	.86	1.00	.95	1.09
13.....		.80	.96	.92	.83	1.04	.93	1.09
14.....		.80	.99	.92	.85	1.02	.92	1.09
15.....	0.74	.81	1.00	.91	.87	.97	.98	1.09
16.....		.71	.81	1.00	.95	.87	.90	2.13
17.....		.71	.80	1.00	1.13	.86	.90	1.05
18.....		.70	.89	1.00	1.00	.86	.90	.98
19.....		.79	.81	.99	.95	.86	.95	1.15
20.....		.82	.80	.99	.95	.86	.98	1.13
21.....		.82	.79	.99	.95	.87	.98	1.00
22.....		.83	.79	.99	.95	.88	.96	1.03
23.....		.85	.79	.98	.93	.87	.95	1.00
24.....		1.00	.83	.98	.88	.86	.95	1.08
25.....	1.15	.86	.98	.82	.82	1.12	1.07	1.07
26.....		1.18	.84	.98	.81	.81	1.06	1.05
27.....		1.19	.86	.97	1.01	.85	1.06	1.03
28.....		2.00	.86	.96	.93	.90	1.03	1.00
29.....		1.98	.84	.95	.97	.92	1.06	1.36
30.....		1.50	.83	.93	1.20	1.02	1.04	1.29
31.....	1.20		.90	.91		1.00		1.05

Discharge, in second-feet, of Waiomao Stream above Pukele Stream, near Honolulu, Oahu, for 1912.

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.48	0.50	1.00	0.20	0.80	0.53	8.90
2.....		.37	.38	1.00	.20	.31	.42	5.00
3.....		.31	.51	.84	.20	.41	.17	2.90
4.....		.26	.45	.77	.30	.31	.17	2.21
5.....		.20	.40	.70	.09	.27	.17	1.88
6.....		.43	.45	.63	.20	.30	.21	1.56
7.....		.31	.57	.57	.25	.37	.21	1.39
8.....		.26	1.04	.57	.25	.79	.26	1.21
9.....		.20	1.04	.57	.45	.72	.26	1.21
10.....		.26	4.20	.45	.35	.72	.72	1.21
11.....		.37	2.42	1.00	.25	1.02	.59	1.21
12.....		.31	1.30	.70	.25	.81	.40	1.21
13.....		.20	.96	.57	.12	1.11	.30	1.11
14.....		.20	1.20	.57	.20	.95	.26	1.11
15.....	0.19	.26	1.30	.51	.30	.61	.59	1.11
16.....	.11	.26	1.30	.77	.30	.13	28.00	1.11
17.....	.11	.18	1.30	2.60	.20	.13	1.10	1.06
18.....	.10	.66	1.30	1.16	.20	.13	.59	1.30
19.....	.33	.21	1.12	.77	.20	.36	.40	1.70
20.....	.44	.18	1.12	.77	.20	.53	.59	1.50
21.....	.37	.13	1.12	.77	.26	.53	.72	1.21
22.....	.37	.13	1.12	.77	.30	.42	.93	.41
23.....	.48	.13	1.05	.63	.22	.36	.72	1.04
24.....	1.62	.31	1.05	.35	.18	.36	1.36	.96
25.....	3.81	.45	1.05	.10	.09	1.67	1.28	.89
26.....	4.34	.33	1.05	.09	.08	1.10	1.10	.81
27.....	4.52	.45	.97	1.24	.13	1.10	.79	.74
28.....	24.90	.45	.90	.63	.37	1.28	.53	.74
29.....	24.40	.33	.77	.92	.41	1.10	5.30	.74
30.....	11.90	.28	.63	3.70	1.08	.94	3.90	.74
31.....	4.70		.45	.51		.67		.74

*Monthly discharge of Waiomao Stream, above Pukele Stream, near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
May 15-31.....	24.9	0.10	5.16	164.0	D.
June.....	.66	.13	.30	17.8	D.
July.....	4.20	.38	1.07	65.8	D.
August.....	3.70	.09	.85	52.3	C.
September.....	1.08	.08	.26	15.5	D.
October.....	1.67	.13	.66	40.6	D.
November.....	28.0	.17	1.75	104.0	D.
December.....	8.90	.41	1.58	97.2	D.
The period.....	28.0	.08	1.22	557.0	

**PUKELE STREAM AT MAHOE SPRINGS, NEAR HONOLULU, OAHU.**

**Location.**—About 500 feet above Pukele in upper Palolo Valley and about 6½ miles northeast of Honolulu.

**Records available.**—April 16 to December 31, 1912.

**Gage.**—Staff; read once daily, about 10 a. m.

**Channel.**—One channel at all stages; shifting.

**Discharge measurements.**—Made by wading.

**Diversions.**—None above station; two small irrigation ditches divert water immediately below the station.

**Accuracy.**—Records poor.

*Discharge measurements of Pukele Stream at Mahoe Springs, near Honolulu, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Apr. 16	C. H. Pierce.....	0.73	1.14	July 29	C. H. Pierce.....	0.56	0.37
May 15	do.....	.62	.55	Sept. 19	G. K. Larrison.....	.57	.31
15	W. V. Hardy.....	.62	.45	Oct. 15	do.....	.64	.36
21	do.....	.61	.40	Nov. 26	Larrison, Dort and Bailey.....	.79	.87
21	do.....	.60	.40	Dec. 24	G. K. Larrison.....	.78	.92
June 17	do.....	.59	.44				

*Daily gage height, in feet, of Pukele Stream at Mahoe Springs, near Honolulu, Oahu, for 1912.*

[Sam Kepano, observer.]

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.68	0.76	0.56	0.58	0.45	0.52	0.70	1.28
2.....		.68	.75	.56	.58	.45	.50	.70	1.12
3.....		.67	.74	.56	.58	.45	.58	.71	1.03
4.....		.66	.73	.56	.60	.47	.57	.71	1.03
5.....		.66	.75	.56	.59	.47	.57	.71	1.02
6.....		.66	.73	.56	.62	.48	.59	.71	1.00
7.....		.65	.70	.56	.62	.63	.59	.71	.98
8.....		.65	.68	.57	.61	.63	.60	.72	.90
9.....		.65	.65	.57	.61	.62	.60	.72	.90
10.....		.64	.64	.95	.60	.61	.60	.71	.90
11.....		.64	.63	.69	.60	.60	.80	.70	.90
12.....		.64	.62	.67	.59	.59		.69	.90
13.....		.64	.61	.63	.59	.58	.66	.69	.89
14.....		.63	.60	.62	.86	.53	.66	.69	.89
15.....		.62	.60	.60	.73	.50	.66	.75	.89
16.....	0.73	.62	.59	.60	.68	.48	.60	.83	.88
17.....	.73	.61	.59	.59	.57	.60	.60	.79	.88
18.....	.74	.61	.59	.60	.59	.60	.59	.75	.87
19.....	.73	.60	.58	.60	.61	.60	.58	.70	.83
20.....	.73	.61	.57	.60	.60	.63	.65	.78	.80

*Daily gage height, in feet, of Pukele Stream at Mahoe Springs, near Honolulu, Oahu, for 1912—Continued.*

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	0.73	0.69	0.57	0.60	0.61	0.65	0.65	0.82	0.79
22.....	.73	.69	.57	.60	.60	.68	.66	1.01	.79
23.....	.73	.69	.57	.60	.68	.66	.68	.95	.78
24.....	.73	.70	.57	.60	.62	.65	.67	.88	.77
25.....	.73	.85	.57	.60	.61	.68	.80	.83	.76
26.....	.72	.89	.56	.59	.60	.70	.78	.80	.75
27.....	.71	1.11	.56	.58	.78	.....	.80	.80	.74
28.....	.70	1.15	.56	.57	.68	.....	.79	.83	.74
29.....	.69	1.13	.56	.60	.57	.....	.75	.89	.74
30.....	.68	1.00	.56	.60	.50	.65	.73	1.00	.75
31.....	.....	.98	.....	.60	.49	.....	.70	.....	.73

*Daily discharge, in second-feet, of Pukele Stream at Mahoe Springs, near Honolulu, Oahu, for 1912.*

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	.....	0.8	1.8	0.4	0.4	0.3	0.3	0.5	8.0
2.....	.....	.8	1.7	.4	.4	.3	.3	.5	5.6
3.....	.....	.7	1.6	.4	.4	.3	.3	.6	4.2
4.....	.....	.6	1.4	.4	.5	.3	.3	.6	4.2
5.....	.....	.6	1.7	.4	.4	.3	.3	.5	3.8
6.....	.....	.6	1.4	.4	.6	.3	.3	.5	3.8
7.....	.....	.6	1.1	.4	.6	.5	.3	.5	3.4
8.....	.....	.6	1.0	.4	.5	.5	.3	.6	2.2
9.....	.....	.6	.7	.4	.5	.5	.3	.6	2.2
10.....	.....	.5	.7	4.6	.5	.4	.3	.6	2.2
11.....	.....	.5	.6	1.0	.5	.4	.4	.5	2.2
12.....	.....	.5	.6	.9	.4	.4	.8	.4	2.2
13.....	.....	.5	.5	.6	.4	.3	.4	.4	2.1
14.....	.....	.5	.5	.6	3.1	.3	.4	.4	2.1
15.....	.....	.4	.5	.5	1.4	.3	.4	.7	2.1
16.....	1.2	.4	.4	.5	1.0	.3	.3	1.3	1.9
17.....	1.2	.4	.4	.4	.4	.4	.3	.9	1.9
18.....	1.2	.4	.4	.5	.4	.4	.3	.7	1.8
19.....	1.2	.4	.4	.5	.5	.4	.3	.4	1.4
20.....	1.2	.4	.4	.5	.4	.5	.4	.9	1.1
21.....	1.2	.8	.4	.5	.5	.6	.4	1.0	1.0
22.....	1.2	.8	.4	.5	.4	.7	.4	3.5	1.0
23.....	1.2	.8	.4	.5	.9	.6	.5	2.7	.9
24.....	1.2	.9	.4	.5	.5	.5	.4	2.0	.8
25.....	1.2	2.6	.4	.5	.5	.7	1.2	1.1	.8
26.....	1.1	3.2	.4	.4	.4	.8	1.0	1.0	.7
27.....	1.0	6.5	.4	.4	1.8	.7	1.2	1.0	.6
28.....	.9	7.1	.4	.4	.8	.6	1.1	1.3	.6
29.....	.8	7.3	.4	.5	.4	.6	.8	2.0	.6
30.....	.8	5.4	.4	.5	.3	.5	.7	3.7	.7
31.....	.....	5.0	.....	.5	.3	.....	.5	.....	.7

*Monthly discharge of Pukele Stream at Mahoe Springs, near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
April 16-30.....	1.2	0.8	1.11	66.0	C.
May.....	7.3	.4	1.65	101.0	C.
June.....	1.8	.4	.73	43.4	C.
July.....	4.6	.4	.63	38.7	C.
August.....	3.1	.3	.65	40.0	C.
September.....	.8	.3	.46	27.4	D.
October.....	1.2	.3	.49	30.1	D.
November.....	3.7	.4	1.05	62.5	C.
December.....	8.0	.6	2.16	133.0	C.
The period.....	8.0	.3	.99	542.0	

## MANOA STREAM BASIN.

## MANOA STREAM AT UPPER END OF VALLEY NEAR HONOLULU, OAHU.

**Location.**—Below confluence of two main branches in upper Manoa Valley, about 5 miles east of Honolulu.

**Records available.**—November 7, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 6 a. m. and 5 p. m.

**Channel.**—One channel at all stages; shifting.

**Discharge measurements.**—By wading at low and medium stages up to a gage height about 4 feet; above this stage from footbridge at gage.

**Diversions.**—Several small irrigation ditches divert from the branches of the stream above the station.

**Accuracy.**—Records poor.

*Discharge measurements of Manoa Stream at upper end of valley, near Honolulu, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
1912.		<i>Feet.</i>	<i>Sec.ft.</i>
Jan. 12	H. R. Schulz.....	2.73	1.95
Sept. 17	G. K. Larrison.....	2.87	1.43
Oct. 30	Larrison and Dort.....	3.24	5.19
Dec. 20	G. K. Larrison.....	3.32	7.89

*Daily gage height, in feet, of Manoa Stream at upper end of valley, near Honolulu, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.70	2.52	2.72	2.68	2.70	2.70	2.70	2.65	2.60	2.80	3.10	3.80
2.....	2.70	2.52	2.75	2.68	2.70	2.70	2.70	2.75	2.60	2.80	3.00	3.80
3.....	2.70	2.55	2.65	2.65	2.70	2.70	2.70	2.75	2.60	2.85	3.00	4.65
4.....	2.65	2.55	2.60	2.70	2.70	2.75	2.70	2.75	2.70	2.82	3.05	3.45
5.....	2.65	2.55	2.60	2.75	2.75	2.70	2.70	2.80	2.80	2.80	3.05	3.35
6.....	2.68	2.55	2.60	2.80	2.65	2.68	2.70	2.80	2.80	2.80	3.00	3.25
7.....	2.70	2.58	2.60	2.95	2.60	2.65	2.70	2.80	2.85	2.62	3.05	3.30
8.....	2.85	2.60	2.70	3.00	2.60	2.70	2.70	2.80	2.80	2.60	3.10	3.30
9.....	2.70	2.55	3.10	3.05	2.60	2.66	3.15	2.80	2.80	2.95	3.35	3.30
10.....	2.70	2.62	3.30	2.90	2.60	2.65	3.30	2.60	2.80	2.82	3.00	3.25
11.....	2.70	2.55	3.90	2.80	2.60	2.65	3.00	3.15	2.80	2.95	3.00	3.20
12.....	2.60	2.55	3.45	2.75	2.60	2.65	2.80	2.60	2.80	3.15	3.00	3.10
13.....	2.60	2.55	3.50	2.90	2.60	2.68	2.80	2.80	2.80	3.05	3.00	3.10
14.....	2.70	2.65	3.15	2.80	2.65	2.68	3.85	2.80	2.80	3.10	2.98	3.10
15.....	2.65	2.55	3.00	2.99	2.60	2.68	2.70	2.70	2.80	3.00	3.08	3.10
16.....	2.60	2.55	2.95	3.40	2.60	2.65	2.70	3.55	2.80	2.80	3.05	3.10
17.....	2.60	2.55	2.90	3.15	2.60	2.68	2.75	2.70	2.85	2.60	2.98	3.50
18.....	2.60	2.55	2.85	3.02	2.60	2.70	2.70	2.80	2.80	2.60	3.00	3.50
19.....	2.60	2.55	2.80	2.90	2.60	2.70	2.70	2.80	2.80	2.60	3.00	3.45
20.....	2.60	2.55	2.80	2.85	2.60	2.65	2.70	2.80	2.80	2.80	3.00	3.30
21.....	2.60	2.70	2.80	2.80	2.65	2.65	2.70	2.80	2.80	2.60	3.90	3.35
22.....	2.60	2.60	2.80	2.80	2.60	2.65	2.70	2.80	2.80	3.20	3.45	3.30
23.....	2.60	3.60	2.80	2.80	2.60	2.65	2.70	2.80	2.80	3.00	3.25	3.30
24.....	2.60	3.10	2.70	2.78	3.00	2.65	2.70	2.80	2.80	3.00	3.20	3.30
25.....	2.60	3.00	2.80	2.75	2.75	2.65	2.70	2.80	2.80	3.10	3.15	3.10
26.....	2.55	2.85	2.70	2.72	2.95	2.65	2.65	3.25	2.80	3.80	3.00	3.05
27.....	2.54	2.80	2.70	2.70	3.40	2.65	2.65	3.20	2.80	3.50	3.00	3.00
28.....	2.55	2.70	2.70	2.70	3.10	2.72	2.65	3.00	2.80	3.40	3.20	3.00
29.....	2.52	2.70	2.70	2.70	2.80	2.72	2.70	2.60	2.80	3.10	3.45	3.00
30.....	2.50	.....	2.70	2.70	2.80	2.70	2.70	3.20	2.80	3.10	3.10	3.00
31.....	2.52	.....	2.70	.....	2.75	.....	2.70	3.00	.....	3.15	.....	3.00

*Daily discharge, in second-feet, of Manoa Stream at upper end of valley, near Honolulu, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.8	0.6	1.5	1.2	1.2	1.0	0.9	0.7	0.4	1.1	3.5	14.5
2.....	1.8	.6	1.7	1.2	1.2	1.0	.9	1.1	.4	1.1	2.5	14.5
3.....	1.8	.8	1.2	1.0	1.2	1.0	.9	1.1	.4	1.4	2.5	35.0
4.....	1.5	.8	.8	1.3	1.2	1.3	.9	1.1	.7	1.2	3.0	10.0
5.....	1.5	.8	.8	1.6	1.4	1.0	.9	1.3	1.1	1.1	3.0	8.2
6.....	1.7	.8	.8	1.8	.9	.9	.9	1.3	1.1	1.1	2.5	6.8
7.....	1.8	.9	.8	3.1	.7	.8	.9	1.3	1.4	.5	3.0	7.5
8.....	3.0	1.0	1.4	3.5	.7	1.0	.9	1.3	1.1	.4	3.5	7.5
9.....	1.8	.8	4.2	4.0	.7	.8	4.8	1.3	1.1	2.1	6.8	7.5
10.....	1.8	1.1	6.7	2.6	.7	.8	6.3	.5	1.1	1.2	2.5	6.8
11.....	1.8	.8	19.0	1.8	.7	.8	2.9	4.2	1.1	2.1	2.5	6.2
12.....	1.2	.8	10.0	1.6	.7	.8	1.4	.5	1.1	4.0	2.5	4.9
13.....	1.2	.8	11.0	2.6	.7	.9	1.4	1.3	1.1	3.0	2.5	4.9
14.....	1.8	.8	4.8	1.8	.9	.9	16.0	1.3	1.1	3.5	2.3	4.9
15.....	1.5	.8	3.8	2.6	.7	.9	.9	.8	1.1	2.5	3.3	4.9
16.....	1.2	.8	3.3	8.9	.7	.8	.9	10.0	1.1	1.1	3.0	4.9
17.....	1.2	.8	2.8	5.3	.7	.9	1.2	.8	1.4	.4	2.3	11.0
18.....	1.2	.8	2.4	3.7	.7	1.0	.9	1.3	1.1	.4	2.5	11.0
19.....	1.2	.8	2.1	2.6	.7	1.0	.9	1.3	1.1	.4	2.5	10.0
20.....	1.2	.8	2.1	2.2	.7	.8	.9	1.3	1.1	1.1	2.5	7.5
21.....	1.2	1.5	2.1	1.8	.9	.8	.9	1.3	1.1	.4	16.5	8.2
22.....	1.2	1.0	2.1	1.8	.7	.8	.9	1.3	1.1	4.5	8.2	7.5
23.....	1.2	13.2	2.1	1.8	.7	.8	.9	1.3	1.1	2.5	5.2	7.5
24.....	1.2	5.2	1.4	1.7	3.3	.8	.9	1.3	1.1	2.5	4.5	7.5
25.....	1.2	4.0	2.1	1.6	1.4	.8	.9	1.3	1.1	3.5	4.0	4.9
26.....	1.0	2.6	1.4	1.4	2.8	.8	.7	5.5	1.1	14.5	2.5	4.3
27.....	.9	2.2	1.4	1.3	8.5	.8	.7	4.8	1.1	9.0	2.5	3.7
28.....	1.0	1.5	1.4	1.3	4.3	1.1	.7	2.7	1.1	7.5	4.5	3.7
29.....	.8	1.5	1.4	1.3	1.7	1.1	.9	.5	1.1	3.5	8.2	3.7
30.....	.7	-----	1.4	1.3	1.7	1.0	.9	4.8	1.1	3.5	3.5	3.7
31.....	.8	-----	1.4	-----	1.4	-----	.9	2.7	-----	3.0	-----	3.7

NOTE.—Daily discharge, Feb. 1 to Aug. 31, computed by indirect methods for shifting channels.

*Monthly discharge of Manoa Stream at upper end of valley, near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January .....	3.0	0.7	1.39	85.6	D.
February .....	13.2	.6	1.68	97.0	D.
March .....	19.0	.8	3.21	197.0	D.
April .....	8.9	1.0	2.32	138.0	D.
May .....	8.5	.7	1.44	88.3	D.
June .....	1.3	.8	.91	54.0	D.
July .....	16.0	.7	1.77	109.0	D.
August .....	10.0	.5	1.98	122.0	D.
September .....	1.4	.4	1.04	61.7	C.
October .....	14.5	.4	2.71	167.0	C.
November .....	16.5	2.3	3.94	235.0	C.
December .....	35.0	3.7	7.96	490.0	C.
The year .....	35.0	.4	2.54	1,840	

**MANOA STREAM AT COLLEGE OF HAWAII, NEAR HONOLULU.**

**Location.**—In ravine about half a mile southeast of College of Hawaii, and 3 miles east of Honolulu.

**Records available.**—March 23, 1909, to November 24, 1910; November 1, 1912, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6.30 a. m. and 5. p. m.; weir destroyed by flood November 24, 1910; several changes in datum previous to 1912.

**Channel.**—One channel for all stages; practically permanent.

**Discharge measurements.**—By wading.

**Diversions.**—One small irrigation ditch (maximum capacity about 1.5 second-feet), diverts water at a few hundred feet above the gage.

**Accuracy.**—Record good.

**Cooperation.**—Maintained in cooperation with the College of Hawaii.

*Discharge measurements of Manoa Stream at College of Hawaii, near Honolulu, Oahu, in 1912.*

Date.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 23	A. R. Keller.....	18.0	30.2	2.28	43.8
Dec. 13	.....do.....	12.1	7.82	1.07	2.19
20	G. K. Larrison.....	12.6	12.9	1.41	7.23

NOTE.—A ditch diverts water a few hundred feet above station. Discharge of ditch at time measurement was made=0.74; this gives total run-off for stream (7.23+0.74) 7.97 second-feet.

*Daily gage height, in feet, of Manoa Stream at College of Hawaii, near Honolulu, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....	1.06	2.30	11.....	1.25	1.20	21.....	2.25	1.90
2.....	1.00	2.35	12.....	1.30	1.00	22.....	2.30	3.25
3.....	1.10	3.75	13.....	1.00	1.15	23.....	2.35	2.25
4.....	.91	2.15	14.....	.92	1.15	24.....	1.85	3.65
5.....	1.19	1.98	15.....	1.35	1.00	25.....	1.60	1.90
6.....	1.00	1.88	16.....	1.05	.98	26.....	1.40	2.50
7.....	1.40	1.80	17.....	1.00	.95	27.....	1.40	2.15
8.....	1.10	1.60	18.....	1.02	.98	28.....	2.75	1.90
9.....	2.15	1.40	19.....	1.03	2.20	29.....	2.25	1.40
10.....	1.18	1.40	20.....	1.00	1.38	30.....	1.70	1.40
						31.....	.....	1.40

**MANOA STREAM AT WAIALAE ROAD, NEAR HONOLULU, OAHU.**

**Location.**—At Waialae road bridge, Honolulu, Oahu.

**Records available.**—November 5, 1910, to February 6, 1911, and June 15 to September 30, 1912, when station was discontinued.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 4 p. m.; new datum established June 15, 1912.

**Channel.**—One at all stages; practically permanent.

**Discharge measurements.**—At low water made by wading; at flood stages from bridge.

**Diversions.**—All low-water discharge diverted above station.

**Accuracy.**—No discharge rating obtained for new datum.

The following discharge measurement was made by G. K. Larrison:  
September 18, 1912: Gage height, 3.18 feet; discharge, 0.



*Daily gage height, in feet, of Manoa Stream at Waialae road, near Honolulu, Oahu, for 1912.*

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1. ....		3.45	3.40	4.40	16. ....	3.50	3.90	4.50	3.20
2. ....		3.50	3.40	4.30	17. ....	3.40	3.70	4.20	3.25
3. ....		3.50	3.40	4.10	18. ....	3.40	3.65	4.45	3.20
4. ....		3.45	3.45	3.70	19. ....	3.40	4.10	4.90	3.15
5. ....		3.50	3.50	3.70	20. ....	3.40	3.90	3.90	3.10
6. ....		4.20	3.60	3.80	21. ....	3.40	3.90	3.60	3.10
7. ....		5.30	3.60	3.80	22. ....	3.45	4.05	3.40	3.30
8. ....		5.90	3.55	3.60	23. ....	3.50	4.00	3.40	3.40
9. ....		5.80	3.40	3.55	24. ....	3.55	3.45	3.40	3.35
10. ....		4.25	3.40	3.50	25. ....	3.60	3.40	4.45	3.20
11. ....		4.25	3.40	3.40	26. ....	3.55	3.40	4.80	3.20
12. ....		4.20	3.95	3.40	27. ....	3.55	3.40	4.00	3.30
13. ....		4.60	3.90	3.40	28. ....	3.45	3.40	3.70	3.60
14. ....		4.90	3.90	3.40	29. ....	3.45	3.95	3.50	3.30
15. ....	3.40	4.30	4.40	3.30	30. ....	3.45	3.40	4.30	3.10
					31. ....		3.40	4.15	

NOTE.—Station was abandoned, as records had little value; a better location was found at the College of Hawaii, about half a mile upstream, and a station was reestablished at that place. (See p. 108.)

#### PAUOA STREAM BELOW KAHUAWAI SPRING, NEAR HONOLULU, OAHU.

**Location.**—Upper Pauoa Valley about 1 mile above Punchbowl and about 2.5 miles northeast of Honolulu.

**Records available.**—April 14, 1911, to December 31, 1912.

**Gage.**—October 17, 1911, to December 31, 1912, Watson weekly clock register; April 14 to October 16, 1911, staff gage.

**Channel.**—One channel at all stages.

**Discharge measurements.**—Between April 14 and October 16, 1911, current-meter measurements were made by wading; from October 17, 1911, to December 31, 1912, measurement was made by a 4-foot sharp-crested weir, which has been checked by meter measurements.

**Diversions.**—None above station.

**Accuracy.**—Records good.

The following discharge measurement was made by C. H. Pierce:

August 25, 1912: Width, 1 foot; area of section, 0.73 square foot; gage height, 0.12 foot; discharge, 0.57 second-foot.

*Discharge, in second-feet, of Pauoa Stream below Kahuawai Spring, near Honolulu, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1. ....	1.97	0.93	1.10	1.47	1.37	1.47	1.10	1.02	1.02	1.02	1.10	8.14
2. ....	1.87	.93	1.02	1.47	1.37	1.37	1.66	1.02	.93	2.53	.93	9.18
3. ....	1.77	.85	1.02	1.47	1.37	1.19	2.08	.93	.85	3.00	.85	13.52
4. ....	1.77	.77	1.02	1.37	1.37	1.10	1.37	.85	.77	1.57	.85	3.76
5. ....	1.66	.77	.93	1.47	2.30	1.10	1.10	.77	.77	1.37	.93	2.64
6. ....	1.57	.77	.93	1.47	1.37	1.10	1.19	.70	.77	1.10	.93	2.30
7. ....	1.66	.77	.93	1.57	1.37	1.10	1.02	.70	.85	1.02	4.85	2.08
8. ....	2.19	.70	.93	1.87	1.37	1.10	.93	.70	.85	1.10	3.63	1.97
9. ....	2.19	.70	1.87	1.57	1.47	1.10	.77	.70	.77	1.10	3.37	1.87
10. ....	1.87	.85	2.19	2.88	1.47	1.02	.77	.70	.77	1.10	1.77	1.77
11. ....	1.87	.85	1.10	1.37	1.47	1.02	.77	.93	.77	1.02	1.19	1.77
12. ....	1.87	.85	5.14	1.37	1.28	1.02	.77	.77	.77	.85	1.10	1.77
13. ....	1.87	.85	3.89	1.28	1.19	1.02	.77	.70	.77	.93	1.02	1.97
14. ....	1.87	.85	2.30	2.08	1.37	1.02	.77	.70	.77	.85	.85	1.66
15. ....	1.77	.85	1.87	1.97	1.37	1.02	.77	.77	.70	.85	.85	1.77

*Discharge, in second-feet, of Pauoa Stream below Kahuawai Spring, near Honolulu, Oahu, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	1.77	0.85	1.66	1.87	1.28	1.02	0.77	0.70	0.70	0.85	0.93	1.77
17.....	1.66	.85	1.57	1.77	1.19	1.02	.77	.70	.62	.77	.85	1.77
18.....	1.66	.85	1.47	1.67	1.10	.93	.77	.62	.62	.77	1.47	1.97
19.....	1.57	.85	1.77	1.57	1.10	.93	.77	.62	.62	.77	1.10	7.30
20.....	1.47	.85	1.47	1.47	1.19	.93	.70	.70	.62	.77	.85	3.24
21.....	1.37	1.02	1.47	1.37	1.37	.93	.93	.70	.62	.77	2.19	6.98
22.....	1.37	1.66	1.37	1.57	1.19	.93	.93	.70	.55	1.97	3.63	4.85
23.....	1.28	10.87	1.37	1.57	1.19	.85	.93	.70	.62	6.50	2.76	3.63
24.....	1.19	4.43	1.37	1.57	2.88	.85	.85	.62	.62	.93	1.57	3.12
25.....	1.19	2.08	1.37	1.57	1.37	.85	.85	.62	.62	2.53	1.57	2.76
26.....	1.19	1.57	1.28	1.77	3.89	1.10	.85	2.64	.62	12.92	1.47	2.53
27.....	1.10	1.28	1.37	1.57	4.57	1.10	.85	1.77	.55	2.64	1.37	2.30
28.....	1.10	1.19	1.28	1.37	3.63	.93	.85	.85	.55	1.77	1.37	2.30
29.....	1.10	1.10	1.37	1.47	1.97	1.19	1.97	.77	.55	1.61	1.87	2.19
30.....	.93	.....	1.37	1.47	1.66	2.53	1.10	1.47	.85	1.44	2.08	2.08
31.....	.93	.....	.....	.....	1.57	.....	1.02	1.19	.....	1.27	.....	2.08

*Monthly discharge of Pauoa Stream below Kahuawai Spring, near Honolulu, Oahu, for 1912.*

[Drainage area, 0.79 square mile.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	2.19	0.93	1.57	96.5	A.
February.....	10.9	.70	1.44	82.8	B.
March.....	11.0	.93	1.91	117	B.
April.....	2.88	1.28	1.61	95.8	B.
May.....	4.57	1.10	1.70	1.04	A.
June.....	2.53	.85	1.09	64.9	A.
July.....	2.08	.70	.99	60.9	A.
August.....	2.64	.62	.88	54.2	A.
September.....	1.02	.55	.72	42.8	A.
October.....	12.9	.77	1.86	114	B.
November.....	4.85	.85	1.64	97.6	A.
December.....	13.5	1.66	3.45	212	A.
The year.....	13.5	.55	1.58	1,140	

#### KAHUAWAI SPRING NEAR HONOLULU, OAHU.

**Location.**—Upper Pauoa Valley about  $1\frac{1}{2}$  miles above Punchbowl and one-fourth mile above Pauoa Stream weir station, about  $2\frac{1}{2}$  miles northeast of Honolulu.

**Records available.**—September 23 to December 31, 1912.

**Gage.**—2-inch by 2-inch heavy stake driven into pool of spring 10 feet above weir to measure head on weir; head read twice daily, at 6 a. m. and 6 p. m., by graduated stick.

**Channel.**—Spring boils up vertically in pool about 10 feet in diameter.

**Weir discharge.**—Weir is built between rock abutments on south side of pool about 15 feet from pool center; discharge computed by Francis formula for sharp-crested weirs with end contractions.

**Accuracy.**—Records excellent.

*Discharge, in second-feet, of Kahuawai Spring near Honolulu, Oahu, for 1912.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.47	0.50	0.57	16.....	0.47	0.50	0.64
2.....	.50	.50	.60	17.....	.47	.50	.63
3.....	.47	.50	.67	18.....	.47	.50	.62
4.....	.47	.50	.75	19.....	.47	.54	.61
5.....	.47	.47	.75	20.....	.47	.54	.60
6.....	.47	.47	.71	21.....	.47	.54	.59
7.....	.47	.47	.71	22.....	.47	.54	.58
8.....	.47	.50	.71	23.....	.47	.54	.57
9.....	.47	.50	.71	24.....	.47	.54	.57
10.....	.47	.50	.71	25.....	.47	.54	.57
11.....	.50	.50	.71	26.....	.54	.50	.57
12.....	.47	.50	.71	27.....	.54	.50	.57
13.....	.47	.50	.71	28.....	.54	.50	.57
14.....	.47	.50	.64	29.....	.50	.54	.57
15.....	.50	.50	.64	30.....	.50	.54	.57
				31.....	.50	.....	.57

NOTE.—Daily discharge computed by formula for sharp-crested weirs with end contractions:  $D=3.33 (L-0.2H) H^{\frac{3}{2}}$  when  $L=1.50$ .

*Monthly discharge of Kahuawai Spring near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
October.....	0.54	0.47	0.48	29.5	A.
November.....	.54	.47	.51	30.3	A.
December.....	.75	.57	.64	39.4	A.
The period.....	.75	.47	.54	99.2	

#### NUUANU STREAM BASIN.

##### NUUANU STREAM AT KUAKINI STREET, HONOLULU, OAHU.

**Location.**—At Kuakini Street bridge, Honolulu, Oahu.

**Records available.**—November 15, 1911, to September 30, 1912, when station was discontinued.

**Drainage area.**—Not measured.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages.

**Discharge measurements.**—At low-water stages made by wading; at flood stages from bridge.

**Diversions.**—All low-water discharge is diverted above station.

**Accuracy.**—Records fair.

The following discharge measurement was made by C. H. Pierce:

August 23, 1912: Width, 2.4 feet; area of section, 0.63 square foot; gage height, 0.18 foot; discharge, 0.24 second-foot.

*Daily gage height, in feet, of Nuuanu Stream at Kuakini Street, Honolulu, Oahu,  
for 1912.*

[Oshimo, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	0.49	0.28	0.29	0.30	0.32	0.35	0.26	0.15	0.23
2.....	.49	.30	.28	.30	.30	.35	.30	.16	.29
3.....	.45	.29	.29	.29	.30	.35	.29	.15	.30
4.....	.48	.28	.30	.28	.30	.36	.34	.16	.28
5.....	.44	.28	.30	.30	.31	.35	.29	.15	.26
6.....	.40	.28	.30	.28	.30	.35	.25	.15	.26
7.....	.41	.28	.30	.55	.31	.35	.25	.21	.29
8.....	.48	.28	.30	.39	.31	.35	.24	.22	.22
9.....	.51	.28	.31	.72	.30	.29	.24	.20	.20
10.....	.49	.30	.74	.48	.30	.28	.26	.20	.20
11.....	.44	.30	1.36	.34	.28	.28	.25	.26	.20
12.....	.40	.28	1.21	.35	.28	.25	.25	.24	.20
13.....	.36	.25	1.01	.32	.28	.25	.26	.20	.20
14.....	.39	.25	.71	.32	.30	.19	.51	.20	.20
15.....	.35	.25	.51	.29	.29	.26	.34	.20	.20
16.....	.31	.25	.46	.85	.28	.20	.28	.20	.20
17.....	.30	.25	.45	.56	.28	.26	.28	.20	.16
18.....	.28	.25	.41	.45	.28	.21	.26	.20	.16
19.....	.28	.25	.52	.42	.29	.19	.20	.20	.16
20.....	.28	.28	.50	.39	.29	.18	.18	.20	.19
21.....	.30	.29	.41	.42	.30	.26	.20	.20	.18
22.....	.30	.34	.42	.36	.32	.26	.20	.20	.18
23.....	.31	1.58	.41	.42	.36	.22	.21	.20	.19
24.....	.30	1.32	.38	.38	.39	.32	.18	.20	.20
25.....	.28	.79	.38	.39	.32	.29	.19	.20	.20
26.....	.26	.42	.35	.36	.36	.26	.18	.20	.20
27.....	.28	.40	.36	.35	.36	.25	.18	.68	.20
28.....	.25	.32	.38	.35	.55	.32	.18	.41	.20
29.....	.28	.28	.38	.34	.42	.29	.16	.25	.20
30.....	.28	.....	.38	.35	.36	.26	.15	.32	.20
31.....	.28	.....	.38	.....	.35	.....	.15	.30	.....

*Discharge, in second-feet, of Nuuanu Stream at Kuakini Street, Honolulu, Oahu,  
for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1.....	3.8	1.0	1.1	1.2	1.4	1.7	0.8	0.1	1.0
2.....	3.8	1.2	1.0	1.2	1.2	1.7	1.2	.1	1.1
3.....	3.0	1.1	1.1	1.1	1.2	1.7	1.1	.1	1.2
4.....	3.6	1.0	1.2	1.0	1.2	1.8	1.6	.1	1.0
5.....	2.8	1.0	1.2	1.2	1.3	1.7	1.1	.1	.8
6.....	2.2	1.0	1.2	1.0	1.2	1.7	.7	.1	.8
7.....	2.3	1.0	1.2	5.0	1.3	1.7	.7	.4	1.1
8.....	3.6	1.0	1.2	2.1	1.3	1.7	.6	.5	.5
9.....	4.2	1.0	1.3	10.6	1.2	1.1	.6	.4	.4
10.....	3.8	1.2	11.4	3.6	1.2	1.0	.8	.4	.4
11.....	2.8	1.2	42.0	1.6	1.0	1.0	.7	.8	.4
12.....	2.2	1.0	34.0	1.7	1.0	.7	.7	.6	.4
13.....	1.8	.7	24.0	1.4	1.0	.7	.8	.4	.4
14.....	2.1	.7	.2	1.4	1.2	.3	4.2	.4	.4
15.....	1.7	.7	4.2	1.1	1.1	.8	1.6	.4	.4
16.....	1.3	.7	3.2	16.2	1.0	.4	1.0	.4	.4
17.....	1.2	.7	3.0	5.2	1.0	.8	1.0	.4	.1
18.....	1.0	.7	2.3	3.0	1.0	.4	.8	.4	.1
19.....	1.0	.7	4.4	2.4	1.1	.3	.4	.4	.1
20.....	1.0	1.0	4.0	2.1	1.1	.2	.2	.4	.3
21.....	1.2	1.1	2.3	2.4	1.2	.8	.4	.4	.2
22.....	1.2	1.6	2.4	1.8	1.4	.8	.4	.4	.2
23.....	1.3	55.0	2.3	2.4	1.8	.5	.4	.4	.3
24.....	1.2	40.0	2.0	2.0	2.1	1.4	.2	.4	.4
25.....	1.0	13.5	2.0	2.1	1.4	1.1	.3	.4	.4
26.....	.8	2.4	1.7	1.8	1.8	.8	.2	.4	.4
27.....	1.0	2.2	1.8	1.7	1.8	.7	.2	9.0	.4
28.....	.7	1.4	2.0	1.7	5.0	1.4	.2	2.3	.4
29.....	1.0	1.0	2.0	1.6	2.4	1.1	.1	.7	.4
30.....	1.0	.....	2.0	1.7	1.8	.8	.1	1.4	.4
31.....	1.0	.....	2.0	.....	1.7	.....	.1	1.2	.....

*Monthly discharge of Nuuanu Stream at Kuakini Street, Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	4.2	0.7	1.95	120	B.
February.....	55.0	.7	4.72	272	B.
March.....	42.0	1.0	5.67	349	B.
April.....	16.2	1.0	2.78	165	B.
May.....	5.0	1.0	1.46	89.8	B.
June.....	1.8	.2	1.03	61.3	B.
July.....	4.2	.1	.75	46.1	B.
August.....	9.0	.1	.77	47.4	B.
September.....	1.2	.1	.49	29.2	B.
The period.....	55.0	.1	2.17	1,180	

**LULUMAHU DITCH IN NUUANU VALLEY, NEAR HONOLULU, OAHU.**

**Location.**—About 500 feet east of spillway of upper Nuuanu Valley reservoir, about 7 miles northeast of Honolulu.

**Records available.**—September 2, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at 4 p. m.; no change of datum.

**Channel.**—One channel at all stages; shifting.

**Discharge measurements.**—By wading.

**Accuracy.**—Records fair.

*Discharge measurements of Lulumahu ditch in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

[L. A. Moore, observer.]

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 4	H. R. Schulz.....	0.43	0.52
Sept. 18	G. K. Larrison.....	.28	.38
Oct. 21	.....do.....	.31	.53
Dec. 24	.....do.....	.35	.86

*Daily gage height, in feet, of Lulumahu ditch in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

[L. A. Moore, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.45	0.40	0.40	0.45	0.40	0.40	0.35	.030	0.30	0.30	0.30	1.60
2.....	.45	.40	.40	.44	.40	.40	.35	.30	.30	.30	.30	.60
3.....	.45	.40	.40	.43	.40	.40	.35	.30	.30	.30	.30	1.70
4.....	.44	.40	.40	.50	.40	.42	.34	.30	.30	.30	.30	.60
5.....	.43	.40	.40	.54	.40	.40	.34	.30	.30	.30	.32	.45
6.....	.44	.40	.40	.50	.40	.40	.32	.30	.30	.30	.30	.45
7.....	.46	.40	.40	.50	.40	.40	.32	.30	.30	.30	.35	.45
8.....	.48	.40	.45	.65	.38	.50	.50	.30	.30	.30	.32	.45
9.....	.45	.50	.70	.50	.38	.40	.60	.30	.29	.40	.33	.45
10.....	.44	.41	.80	.48	.38	.40	.45	.35	.28	.30	.31	.40
11.....	.43	.40	1.10	.46	.38	.40	.40	.60	.28	.35	.30	.40
12.....	.42	.40	.55	.45	.38	.40	.40	.40	.28	.30	.30	.40
13.....	.41	.40	.53	.43	.38	.50	.40	.30	.27	.30	.30	.40
14.....	.40	.40	.50	.45	.38	.40	.43	.50	.27	.30	.30	.39
15.....	.40	.40	.50	.60	.38	.40	.45	.30	.27	.30	.55	.39
16.....	.40	.40	.50	1.45	.38	.40	.42	.60	-----	.30	.33	.38
17.....	.40	.40	.55	.60	.37	.45	.41	.35	.27	.30	.32	.37
18.....	.40	.40	.50	.50	.37	.40	.40	.30	.27	.30	.31	.40
19.....	.40	.40	.50	.43	.45	.40	.40	.30	.30	.30	.30	.70
20.....	.40	.40	.50	.50	.40	.40	.30	.28	.30	.30	.30	.45

*Daily gage height, in feet, of Lulumaho ditch in Nuuanu Valley, near Honolulu, Oahu, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	0.40	0.40	0.48	0.40	0.45	0.40	0.30	0.27	0.30	0.30	0.73	0.54
22.....	.40	.40	.46	.40	.40	.40	.30	.27	.30	.30	.50	.50
23.....	.40	1.50	.45	.40	.40	.40	.30	.26	.30	.30	.40	.43
24.....	.40	.50	.44	.40	.50	.40	.30	.25	.30	.30	.35	.40
25.....	.40	.45	.55	.40	.45	.38	.30	.25	.30	.30	.35	.33
26.....	.40	.45	.50	.40	.45	.37	.30	1.30	.30	.90	.34	.32
27.....	.40	.43	.50	.40	.50	.37	.30	.55	.30	.35	.33	.30
28.....	.40	.41	.43	.40	.45	.36	.30	.45	.30	.35	.35	.30
29.....	.40	.40	.43	.40	.40	.36	.30	.40	.30	.35	.50	.30
30.....	.40	.....	.43	.40	.40	.37	.30	.55	.30	.34	.35	.30
31.....	.40	.....	.42	.....	.40	.....	.30	.40	.....	.32	.....	.32

*Daily discharge, in second-feet, of Lulumaho ditch in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.7	0.4	0.4	0.7	0.4	0.4	0.1	0.5	0.5	0.5	0.5	18.5
2.....	.7	.4	.4	.7	.4	.4	.1	.5	.5	.5	.5	3.8
3.....	.7	.4	.4	.6	.4	.4	.1	.5	.5	.5	.5	20.0
4.....	.7	.4	.4	1.2	.4	.5	.1	.5	.5	.5	.5	3.8
5.....	.6	.4	.4	1.6	.4	.4	.1	.5	.5	.5	.6	1.9
6.....	.7	.4	.4	1.2	.4	.4	.1	.5	.5	.5	.6	1.9
7.....	.8	.4	.4	1.2	.4	.4	.1	.5	.5	.5	.9	1.9
8.....	1.0	.4	.7	2.9	.3	1.2	1.2	.5	.5	.5	.6	1.9
9.....	.7	1.2	3.6	1.2	.3	.4	2.3	.5	.4	1.4	.7	1.9
10.....	.7	.4	4.9	1.0	.3	.4	.7	.9	.3	.5	.5	1.4
11.....	.6	.4	9.1	.8	.3	.4	.4	3.8	.3	.9	.5	1.4
12.....	.5	.4	1.7	.7	.3	.4	.4	1.4	.3	.5	.5	1.4
13.....	.4	.4	1.5	.6	.3	1.2	.4	.5	.3	.5	.5	1.4
14.....	.4	.4	1.2	.7	.3	.4	.6	2.5	.3	.5	.5	1.3
15.....	.4	.4	1.2	2.3	.3	.4	.7	.5	.3	.5	3.1	1.3
16.....	.4	.4	1.2	15.0	.3	.4	.5	3.8	.3	.5	.7	1.2
17.....	.4	.4	1.7	2.3	.2	.7	.4	.9	.3	.5	.6	1.1
18.....	.4	.4	1.2	1.2	.2	.4	.4	.5	.3	.5	.5	1.4
19.....	.4	.4	1.2	.6	.7	.4	.4	.5	.5	.5	.5	5.1
20.....	.4	.4	1.2	1.2	.4	.4	.5	.3	.5	.5	.5	1.9
21.....	.4	.4	1.0	.4	.7	.4	.5	.3	.5	.5	5.6	2.9
22.....	.4	.4	.8	.4	.4	.4	.5	.3	.5	.5	2.5	2.5
23.....	.4	16.0	.7	.4	.4	.4	.5	.2	.5	.5	1.4	1.7
24.....	.4	1.2	.7	.4	1.2	.4	.5	.2	.5	.5	.9	1.4
25.....	.4	.7	1.7	.4	.7	.3	.5	.2	.5	.5	.9	.7
26.....	.4	.7	1.2	.4	.7	.2	.5	14.0	.5	8.0	.8	.6
27.....	.4	.6	1.2	.4	1.2	.2	.5	3.1	.5	.9	.7	.5
28.....	.4	.4	.6	.4	.7	.2	.5	1.9	.5	.9	.9	.5
29.....	.4	.4	.6	.4	.4	.2	.5	1.4	.5	.9	2.5	.5
30.....	.4	.....	.6	.4	.4	.2	.5	3.1	.5	.8	.9	.5
31.....	.4	.....	.5	.....	.4	.....	.5	1.4	.....	.6	.....	.6

*Monthly discharge of Lulumaho ditch in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	1.0	0.4	0.52	32.0	B.
February.....	16.0	.4	1.02	58.7	B.
March.....	9.1	.4	1.38	84.8	B.
April.....	15.0	.4	1.39	82.7	B.
May.....	1.2	.2	.46	28.3	B.
June.....	1.2	.2	.43	25.6	B.
July.....	2.3	.1	.49	30.1	C.
August.....	14.0	.2	1.49	91.6	B.
September.....	.5	.3	.44	26.2	B.
October.....	8.0	.5	.84	51.6	B.
November.....	5.6	.5	1.03	61.3	B.
December.....	20.0	.5	2.80	172.0	B.
The year.....	20.0	.1	1.03	745.0	

## LUAKAHA WEIR IN NUUANU VALLEY, NEAR HONOLULU, OAHU.

**Location.**—About 1 mile below reservoir No. 4 (main) in upper Nuuanu Valley, about 5 miles from Honolulu post office.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Head is measured in iron pipe set about 3 feet back of weir crest; read once daily, at 4 p. m.; no change in datum.

**Channel.**—Concrete aqueduct; permanent.

**Discharge measurements.**—4-foot sharp-crested weir of concrete with end contractions; check measurements made with current meter by wading.

**Diversions.**—Aqueduct diverts low-water flow from Luakaha Stream, including seepage from reservoir No. 4.

**Cooperation.**—Records furnished by department of water works, city of Honolulu.

*Discharge measurements of Luakaha weir in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Sept. 19	G. K. Larrison <i>a</i> .....	<i>Feet.</i> 0.195	<i>Sec.-ft.</i> 0.901
19	.....do. <i>b</i> .....	.195	1.43
20	.....do. <i>a</i> .....	.208	.964
20	.....do. <i>b</i> .....	.202	1.50

*a* Measurements made through notch in concrete aqueduct at a point about 15 feet below the weir. Owing to roughness of bottom and sides of the aqueduct the water was very turbulent and the results obtained are uncertain.

*b* Measurements made at point in stream about 20 feet above intake and about 200 feet above weir. On Sept. 19 the weir formula (end contracted, sharp crested) gave a discharge of 1.14 second-feet; on Sept. 20 gave a discharge of 1.20 second-feet and 1.31 second-feet.

*Daily discharge, in second-feet, of Luakaha weir in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.4	3.1	3.1	4.2	3.6	3.6	3.1	2.1	1.7	1.3	2.1	5.4
2.....	5.4	3.6	3.1	4.2	3.6	3.6	2.6	2.1	1.7	1.3	2.1	10.0
3.....	5.4	3.1	3.1	4.2	3.6	3.6	2.6	2.1	1.7	1.3	2.1	21.0
4.....	4.8	3.1	3.1	4.2	3.6	3.6	2.6	2.6	1.7	1.3	2.1	5.4
5.....	4.8	3.1	3.6	4.8	3.6	3.1	2.6	2.6	1.7	1.3	2.1	4.2
6.....	4.8	3.1	3.6	4.8	3.6	3.1	2.6	2.1	1.7	1.3	1.7	3.6
7.....	4.8	3.1	3.6	4.8	3.6	3.1	2.6	2.1	2.6	1.3	1.7	4.8
8.....	4.2	3.1	3.6	4.8	3.6	3.6	4.8	2.1	1.7	1.3	2.1	4.8
9.....	4.2	3.6	6.0	6.0	3.1	3.1	3.6	2.1	1.7	1.3	2.6	4.8
10.....	4.2	3.1	10.	4.2	3.1	3.1	3.1	2.1	1.3	1.7	2.1	3.6
11.....	4.2	3.6	10.	4.2	3.1	3.1	3.1	2.1	1.3	1.7	1.7	3.6
12.....	4.2	3.1	6.0	4.2	3.1	3.1	3.1	2.1	1.3	2.1	1.7	3.6
13.....	4.2	3.1	10.	4.2	3.1	4.8	3.1	2.1	1.3	1.7	1.7	3.6
14.....	5.4	3.1	4.8	4.8	3.1	4.2	13.0	2.6	1.3	2.1	1.7	3.1
15.....	4.2	2.6	4.2	4.8	3.1	3.6	3.6	2.6	1.3	1.7	1.7	3.6
16.....	3.6	2.6	4.2	13.	3.1	3.6	3.6	3.6	1.3	1.7	2.6	3.1
17.....	3.6	2.6	4.8	6.0	3.1	3.6	3.6	2.6	1.3	1.7	2.1	3.1
18.....	3.6	2.6	4.8	4.8	3.1	3.1	3.1	2.1	1.3	1.7	2.1	3.1
19.....	3.6	2.6	4.8	4.8	3.1	3.1	3.1	2.1	1.3	1.7	2.1	21.0
20.....	3.6	2.6	4.2	4.8	3.1	3.1	3.1	2.1	1.3	2.1	2.1	4.8
21.....	3.6	3.1	4.2	4.2	3.1	3.1	3.1	1.7	1.3	1.7	7.3	4.8
22.....	3.1	3.1	4.2	4.2	3.1	3.1	3.1	1.7	1.3	1.7	3.6	3.6
23.....	3.1	3.1	4.2	4.8	3.1	2.6	2.6	1.7	1.3	1.7	2.6	3.6
24.....	3.1	21.	4.2	4.8	3.6	3.6	2.6	1.7	1.3	1.7	2.6	3.6
25.....	3.1	10.	4.8	4.2	3.6	2.6	2.6	1.7	1.3	1.7	2.6	3.6
26.....	3.1	4.8	4.2	4.8	3.6	2.6	2.6	6.0	1.3	13.0	2.6	3.6
27.....	3.1	3.6	4.2	4.2	4.8	2.6	2.6	6.0	1.1	4.8	2.6	3.1
28.....	3.1	3.1	4.2	4.2	6.0	2.6	2.6	3.6	1.1	4.2	3.1	3.1
29.....	3.1	3.1	4.2	4.2	3.6	2.6	2.6	3.1	1.1	3.1	3.6	3.1
30.....	3.1	.....	4.2	4.2	3.6	2.6	2.6	3.1	1.7	3.1	3.1	3.1
31.....	3.1	.....	4.2	.....	3.6	.....	2.6	3.1	.....	2.1	.....	3.6

NOTE.—Weir has some velocity of approach, and discharge as published is probably too low; because of this velocity of approach the weir formula  $Q=3.33 LH^{3/2}$  is used instead of  $Q=3.33 (L-0.2H)H^{3/2}$ .

*Monthly discharge of Luakaha weir in Nuuanu Valley, near Honolulu, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January .....	5.4	3.1	3.96	243	C.
February .....	21.0	2.6	3.98	229	C.
March .....	10.0	3.1	4.75	292	C.
April .....	13.0	4.2	4.85	289	C.
May .....	6.0	3.1	3.47	213	C.
June .....	4.8	2.6	3.23	192	C.
July .....	13.0	2.6	3.30	203	C.
August .....	6.0	1.7	2.55	157	C.
September .....	2.6	1.1	1.44	85.7	C.
October .....	13.0	1.3	2.27	140	C.
November .....	7.3	1.7	2.46	146	C.
December .....	21.0	3.1	5.13	315	C.
The year .....	21.0	1.1	3.45	2,250	

### WAIKANE STREAM BASIN.

#### WAIKANE STREAM NEAR WAIKANE, OAHU.

**Location.**—One-half mile above belt road highway bridge at Waikane, opposite house of Japanese gage keeper.

**Records available.**—January 27 to September 30, 1912, when station was discontinued.

**Gage.**—Vertical staff; read once daily, about 7 a. m.; washed out September 30, 1912, and not replaced.

**Channel.**—One at all stages; shifting.

**Discharge measurements.**—Made by wading.

**Diversions.**—Several above station.

**Accuracy.**—No discharge rating obtained.

*Discharge measurements of Waikane Stream near Waikane, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 27	Pierce and Schulz .....	1.05	6.31
May 24	W. V. Hardy .....	1.11	8.27
Aug. 1	C. H. Pierce .....	.92	4.34

*Daily gage height, in feet, of Waikane Stream near Waikane, Oahu, for 1912.*

[Sado, observer.]

Day.	Jan.	Feb.	Mar.	May.	June.	July.	Aug.	Sept.
1. ....		1.05	1.05	-----	1.00	1.00	1.00	0.90
2. ....		1.10	1.05	-----	1.05	1.00	1.00	.90
3. ....		1.05	1.05	-----	1.05	1.00	1.00	1.00
4. ....		1.05	1.05	-----	1.05	1.00	1.20	.90
5. ....		1.05	1.05	-----	1.05	1.00	1.00	.90
6. ....		1.05	1.05	-----	1.05	.90	1.00	1.00
7. ....		1.05	1.05	-----	1.05	.90	1.20	1.00
8. ....		1.05	1.05	-----	1.00	1.00	1.20	1.00
9. ....		1.05	1.05	-----	1.00	-----	1.20	.90
10. ....		1.15	1.10	-----	.90	.90	1.00	.90



*Daily gage height, in feet, of Waikane Stream near Waikane, Oahu, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	May.	June.	July.	Aug.	Sept.
11.....		1.05	1.20		0.90	0.90	1.00	1.00
12.....		1.05	1.10		1.00	1.20	.90	.90
13.....		1.05	1.05		1.00	1.20	.90	.90
14.....		1.05	1.05		.90	1.20	1.00	.90
15.....		1.05	1.05		1.00	1.10	.90	1.00
16.....		1.05	1.30		1.00	1.10	.90	1.00
17.....		1.05	1.05		.90	1.10	1.00	1.00
18.....		1.05	1.05		.90	1.10	1.00	1.00
19.....		1.05	1.05		.90	1.20	.90	1.00
20.....		1.05	1.05		.90	1.20	.90	.90
21.....		1.05	1.05		1.00	1.00	.90	.90
22.....		1.05	1.05		1.00	1.00	.90	.90
23.....		1.05	1.05		1.00	1.00	.90	1.00
24.....		1.05	1.05	1.10	1.00	.90	1.00	1.00
25.....		1.05	1.05		1.00	.90	1.00	.90
26.....		1.05	1.05		1.00	.90	1.00	.90
27.....	1.05	1.05	1.05	1.00	.90	.90	1.00	1.00
28.....	1.05	1.05	1.05	1.00	.90	1.00	.90	1.00
29.....	1.05	1.05	1.05	1.00	.90	1.00	.90	.91
30.....	1.05		1.05	1.05	1.00	.90	1.00	.91
31.....	1.05		1.05	1.00		.90	.90	

#### WAIHOLE STREAM BASIN.

##### WAIHOLE STREAM AT MANIANIAULA, NEAR WAIKANE, OAHU.

**Location.**—3½ miles southwest of Waikane, Oahu, by road and trail in upper Waiahole Valley, at boundary line of Government and private land.

**Records available.**—September 25, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 6 p. m.; no change in datum.

**Channel.**—One at all stages; somewhat shifting.

**Discharge measurements.**—By wading.

**Diversions.**—None above gage.

**Accuracy.**—Fair.

*Discharge measurements of Waiahole Stream at Manianiaula, near Waikane, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 3	H. R. Schulz.....	0.99	25.1	Sept. 16	C. K. Larrison.....	0.94	19.8
26	Pierce and Schulz...	.98	25.1	Oct. 16	do.....	.98	23.6
May 24	W. V. Hardy.....	.94	21.5	Dec. 31	Larrison & Dort...	.91	18.2
Aug. 3	C. H. Pierce.....	.96	21.6				

*Daily gage height, in feet, of Waiahole Stream at Manianiaula, near Waikane, Oahu, for 1912.*

[Pelehoholani, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.00	1.00	1.00	1.00		0.95	0.98	0.95	0.98	0.95	0.95	0.95
2.....	1.00	1.00	1.00	1.00		.95	.98	.95	.98	.95	.95	.98
3.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	1.88
4.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	1.00
5.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	.98
6.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	.98
7.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	.95
8.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	.95
9.....	1.00	1.00	1.00	1.00		.95	.98	.95	.95	.95	.95	.95
10.....	1.00	1.01	1.00	1.00		.95	1.00	.95	.95	.95	.95	.95

*Daily gage height, in feet, of Waiahole Stream at Manianiaula, near Waikane, Oahu, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	1.00	1.00	1.00	1.00	.....	0.95	1.00	0.98	0.95	0.95	0.95	0.95
12.....	1.00	1.00	1.00	1.00	.....	.95	1.00	.98	.95	.95	.95	.92
13.....	1.00	1.00	1.00	1.00	.....	.95	1.10	.98	.95	.95	.95	.92
14.....	1.00	1.02	1.00	1.00	.....	.95	1.00	.98	.95	.95	.95	.92
15.....	1.00	1.00	1.00	1.00	.....	.95	1.00	.98	.95	.95	.95	.92
16.....	1.00	1.00	1.00	1.00	.....	.95	1.00	.98	.95	.95	.95	.92
17.....	1.00	1.00	1.00	1.08	.....	.95	.98	.95	.95	.98	.95	.92
18.....	1.00	1.00	1.00	1.00	.....	.95	.98	.95	.95	.98	.95	.92
19.....	1.00	1.00	1.00	1.00	.....	.95	.98	.95	.95	.98	.95	.92
20.....	1.00	1.00	1.00	1.00	.....	.95	.98	.95	.95	.98	.95	.92
21.....	1.00	1.00	1.00	1.00	.....	.95	.98	.95	.95	.98	.98	.92
22.....	1.00	1.00	1.00	1.00	.....	.95	.98	.95	.95	.99	.98	.90
23.....	1.00	1.00	1.00	1.00	.....	.95	.98	.95	.95	.95	.98	.95
24.....	1.00	1.00	1.00	1.00	0.95	.95	.98	.95	.95	.95	.95	.95
25.....	1.00	1.00	1.00	1.00	.95	.95	.98	.95	.95	.95	.95	.95
26.....	1.00	1.00	1.00	1.00	.95	.95	.98	.95	.95	1.05	.95	.92
27.....	1.00	1.00	1.00	1.00	1.05	1.00	.98	.95	.95	.98	.95	.92
28.....	1.00	1.00	1.00	1.00	.96	1.00	.95	.95	.95	1.15	.95	.92
29.....	1.00	1.00	1.00	1.00	.95	1.00	.95	.95	.95	1.00	1.02	.....
30.....	1.00	.....	1.00	1.00	.95	1.00	.95	.98	.95	.98	.98	.....
31.....	1.00	.....	1.00	.....	.95	.....	.95	.98	.....	.95	.....	.91

*Daily discharge, in second-feet, of Waiahole Stream at Manianiaula, near Waikane, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	24.5	21.5	21.5	21.5
2.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	24.5	21.5	21.5	24.5
3.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	132.0
4.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	26.5
5.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	24.5
6.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	24.5
7.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	21.5
8.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	21.5
9.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	21.5	21.5
10.....	26.5	27.5	26.5	26.5	.....	21.5	26.5	21.5	21.5	21.5	21.5	21.5
11.....	26.5	26.5	26.5	26.5	.....	21.5	26.5	24.5	21.5	21.5	21.5	21.5
12.....	26.5	26.5	26.5	26.5	.....	21.5	26.5	24.5	21.5	21.5	21.5	18.7
13.....	26.5	26.5	26.5	26.5	.....	21.5	38.0	24.5	21.5	21.5	21.5	18.7
14.....	26.5	28.5	26.5	26.5	.....	21.5	26.5	24.5	21.5	21.5	21.5	18.7
15.....	26.5	26.5	26.5	26.5	.....	21.5	26.5	24.5	21.5	21.5	21.5	18.7
16.....	26.5	26.5	26.5	26.5	.....	21.5	26.5	24.5	21.5	21.5	21.5	18.7
17.....	26.5	26.5	26.5	36.0	.....	21.5	24.5	24.5	21.5	24.5	21.5	18.7
18.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	24.5	21.5	18.7
19.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	24.5	21.5	18.7
20.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	24.5	21.5	18.7
21.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	24.5	24.5	18.7
22.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	25.5	24.5	25.5
23.....	26.5	26.5	26.5	26.5	.....	21.5	24.5	21.5	21.5	21.5	24.5	21.5
24.....	26.5	26.5	26.5	26.5	21.5	21.5	24.5	21.5	21.5	21.5	21.5	21.5
25.....	26.5	26.5	26.5	26.5	21.5	21.5	24.5	21.5	21.5	21.5	21.5	21.5
26.....	26.5	26.5	26.5	26.5	21.5	21.5	24.5	21.5	21.5	32.0	21.5	18.7
27.....	26.5	26.5	26.5	26.5	32.0	26.5	24.5	21.5	21.5	24.5	21.5	18.7
28.....	26.5	26.5	26.5	26.5	22.5	26.5	21.5	21.5	21.5	44.0	21.5	18.7
29.....	26.5	26.5	26.5	26.5	21.5	26.5	21.5	21.5	21.5	26.5	28.5	18.7
30.....	26.5	.....	26.5	26.5	21.5	26.5	21.5	21.5	21.5	24.5	24.5	17.8
31.....	26.5	.....	26.5	.....	21.5	.....	21.5	24.5	.....	21.5	.....	17.8

*Monthly discharge of Waiahole Stream at Manianiaula, near Waikane, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	26.5	26.5	26.5	1,630	C.
February.....	26.5	26.5	26.6	1,530	C.
March.....	26.5	26.5	26.5	1,630	C.
April.....	36.0	26.5	26.8	1,590	C.
May.....	32.0	21.5	22.9	1,410	B.
June.....	26.5	21.5	22.2	1,320	B.
July.....	38.0	21.5	24.9	1,530	B.
August.....	24.5	21.5	22.4	1,380	B.
September.....	24.5	21.5	21.7	1,290	B.
October.....	44.0	21.5	23.5	1,440	B.
November.....	28.5	21.5	22.1	1,320	B.
December.....	132.0	17.8	24.1	1,480	B.
The year.....	132.0	17.8	24.3	17,600	

a 8 days only.

**WAIHOLE STREAM AT WAIHOLE, NEAR WAIKANE, OAHU.**

**Location.**—One-fourth mile above belt road highway bridge, 1 mile southeast of Waikane, Oahu.

**Records available.**—September 23, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, about 7 a. m.; no change in datum.

**Channel.**—One at all stages, slightly shifting.

**Discharge measurements.**—Low-water measurements made by wading; flood measurements from bridge.

**Diversions.**—Several irrigation ditches divert water above the station; none below.

**Accuracy.**—Record fair.

*Discharge measurements of Waiahole Stream at Waiahole, near Waikane, Oahu, 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 2	H. R. Schulz.....	1.25	38.7	Aug. 1	C. H. Pierce.....	1.11	27.0
23	C. H. Pierce.....	1.22	39.3	5	.....do.....	1.14	29.2
May 23	W. V. Hardy.....	1.10	25.1	Dec. 31	Larrison and Dort.	1.10	26.3

*Daily gage height, in feet, of Waiahole Stream at Waiahole, near Waikane, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.25	1.22	1.20	1.18	.....	1.10	1.12	.....	1.15	1.10	1.15	1.25
2.....	1.25	1.22	1.18	1.18	.....	1.10	1.13	.....	1.15	1.10	1.15	1.25
3.....	1.25	1.25	1.18	1.18	.....	1.13	1.13	.....	1.10	1.15	1.15	1.40
4.....	1.25	1.25	1.18	1.18	.....	1.13	1.13	1.10	1.10	1.10	1.15	1.40
5.....	1.25	1.25	1.18	1.18	.....	1.10	1.13	1.10	1.10	1.10	1.15	1.25
6.....	1.25	1.22	1.18	1.18	.....	1.13	1.13	1.15	1.10	1.10	1.10	1.10
7.....	1.28	1.25	1.18	1.20	.....	1.13	1.20	1.15	1.10	1.10	1.10	1.10
8.....	1.25	1.22	1.18	1.20	.....	1.10	1.20	1.12	1.10	1.10	1.10	1.10
9.....	1.25	1.25	1.18	1.20	.....	1.10	1.20	1.10	1.10	1.10	1.10	1.10
10.....	1.25	1.22	1.18	1.18	.....	1.10	1.20	1.10	1.10	1.10	1.15	1.10
11.....	1.25	1.22	1.22	1.18	.....	1.10	1.45	1.25	1.10	1.15	1.15	1.10
12.....	1.25	1.22	1.18	1.15	.....	1.10	1.20	1.10	1.10	1.15	1.20	1.10
13.....	1.25	1.22	1.18	1.15	.....	1.10	1.20	1.10	1.10	1.10	1.20	1.10
14.....	1.28	1.22	1.18	1.20	.....	1.10	.....	1.10	1.10	1.10	1.20	1.10
15.....	1.25	1.22	1.18	1.20	.....	1.10	.....	1.10	1.10	1.10	1.20	1.10

*Daily gage height, in feet, of Waiahole Stream at Waiahole, near Waikane, Oahu, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	1.25	1.22	1.18	1.20	.....	1.10	.....	1.10	1.10	1.10	1.20	1.10
17.....	1.25	1.22	1.18	1.20	.....	1.10	.....	1.10	1.10	1.10	1.20	1.10
18.....	1.25	1.22	1.18	1.20	.....	1.10	.....	1.15	1.10	1.10	1.20	1.25
19.....	1.25	1.22	1.18	1.20	.....	1.10	.....	1.10	1.10	1.10	1.20	1.10
20.....	1.25	1.22	1.18	1.18	.....	1.13	.....	1.10	1.10	1.10	1.20	1.10
21.....	1.25	1.25	1.18	1.18	.....	1.13	.....	1.10	1.10	1.10	1.20	1.25
22.....	1.25	1.22	1.18	1.18	.....	1.13	.....	1.10	1.10	1.10	1.20	1.25
23.....	1.25	1.22	1.18	1.20	1.10	1.13	.....	1.10	1.10	1.10	1.20	1.10
24.....	1.28	1.18	1.18	1.20	1.10	1.13	.....	1.10	1.10	1.15	1.20	1.10
25.....	1.25	1.18	1.18	1.18	1.10	1.13	.....	1.10	1.10	1.15	1.20	.....
26.....	1.22	1.18	1.15	1.18	1.10	1.13	.....	1.10	1.10	1.15	1.20	.....
27.....	1.22	1.18	1.15	1.18	1.15	1.13	.....	1.10	1.10	1.20	1.20	.....
28.....	1.25	1.18	1.15	1.18	1.10	1.20	.....	1.10	1.10	1.20	1.20	.....
29.....	1.25	1.18	1.15	1.18	1.10	1.13	.....	1.10	1.10	1.20	1.20	.....
30.....	1.25	.....	1.18	1.18	1.10	1.13	.....	1.10	1.15	1.15	1.20	.....
31.....	1.22	.....	1.15	.....	1.10	.....	.....	1.10	.....	1.15	.....	1.10

*Daily discharge, in second-feet, of Waiahole Stream at Waiahole, near Waikane, Oahu, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	.....	39	36	33	.....	26	27	26	30	26	30	44
2.....	44	39	33	33	.....	26	28	26	30	26	30	44
3.....	44	44	33	33	.....	28	28	26	26	30	30	70
4.....	44	44	33	33	.....	28	28	26	26	26	30	70
5.....	44	44	33	33	.....	26	28	26	26	26	30	44
6.....	44	39	33	33	.....	28	28	30	26	26	26	26
7.....	49	44	33	36	.....	28	36	30	26	26	26	26
8.....	44	39	33	36	.....	26	36	27	26	26	26	26
9.....	44	44	33	36	.....	26	36	26	26	26	26	26
10.....	44	55	33	33	.....	26	36	26	26	26	30	26
11.....	44	39	39	33	.....	26	30	44	26	30	30	26
12.....	44	39	33	30	.....	26	36	26	26	30	36	26
13.....	44	39	33	30	.....	26	36	26	26	26	36	26
14.....	49	39	33	36	.....	26	35	26	26	26	36	26
15.....	44	39	33	36	.....	26	35	26	26	26	36	26
16.....	44	39	33	36	.....	26	34	26	26	26	36	26
17.....	44	39	33	36	.....	26	34	26	26	26	36	26
18.....	44	39	33	36	.....	26	33	30	26	26	36	44
19.....	44	39	33	36	.....	26	33	26	26	26	36	26
20.....	44	39	33	33	.....	28	32	26	26	26	36	26
21.....	44	44	33	33	.....	28	32	26	26	26	36	44
22.....	44	39	33	33	.....	28	31	26	26	26	36	44
23.....	44	39	33	36	26	28	31	26	26	26	36	26
24.....	49	33	33	36	26	28	30	26	26	30	36	26
25.....	44	33	33	33	26	28	30	26	26	30	36	26
26.....	39	33	30	33	26	28	29	26	26	30	36	26
27.....	39	33	30	33	30	28	29	26	26	36	36	26
28.....	44	33	30	33	26	36	28	26	26	36	36	26
29.....	44	33	30	33	26	28	28	26	26	36	36	26
30.....	44	.....	33	33	26	28	27	26	30	30	36	26
31.....	39	.....	30	.....	26	.....	27	26	.....	30	.....	26

NOTE.—Discharge from July 14 to Aug. 3 estimated by comparison with Waiahole Stream at Manianiaula.

*Monthly discharge of Waiahole Stream at Waiahole near Waikane, Oahu, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	49	39	42.6	2,620	B.
February.....	55	33	39.4	2,260	B.
March.....	39	30	32.8	2,020	B.
April.....	36	30	33.9	2,020	B.
May <sup>a</sup> .....	30	26	26.5	1,630	D.
June.....	36	26	27.3	1,620	B.
July.....	80	27	32.9	2,020	C.
August.....	44	26	27.0	1,660	C.
September.....	30	26	26.4	1,570	B.
October.....	36	26	28.0	1,720	B.
November.....	36	26	33.3	1,980	B.
December.....	70	26	32.3	1,990	C.
The year.....	80	26	32.2	23,100	

<sup>a</sup> 9-day period.

#### KAHANAIKI STREAM NEAR WAIMANALO, OAHU.

**Location.**—At highway bridge on Waimanalo-Honolulu road, about 12 miles east of Honolulu by road.

**Records available.**—Gage heights and discharge measurements from November 12 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages; permanent.

**Diversions.**—One from each of the two branches of the stream above the station.

**Accuracy.**—Good.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

**Discharge measurements.**—Low-water stages by wading; flood measurements from bridge.

*Discharge measurements of Kahanaiki Stream near Kailua, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Nov. 20	G. K. Larrison.....	<i>Feet.</i> 1.00	<i>Sec.-feet.</i> 0.65
Dec. 27	Larrison and Dort.....	.99	.82

*Daily gage height, in feet, of Kahanaiki Stream near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.72	11.....		1.25	21.....	1.12	1.20
2.....		1.39	12.....	1.05	1.22	22.....	1.14	1.22
3.....		2.24	13.....	1.02	1.22	23.....	1.14	1.15
4.....		1.62	14.....	1.04	1.20	24.....	1.12	1.15
5.....		1.58	15.....	1.10	1.19	25.....	1.11	1.15
6.....		1.36	16.....	1.04	1.16	26.....	1.10	1.15
7.....		1.36	17.....	1.02	1.16	27.....	1.09	1.00
8.....		1.35	18.....	1.02	1.16	28.....	1.09	.98
9.....		1.31	19.....	1.04	1.16	29.....	1.15	.98
10.....		1.29	20.....	1.02	1.15	30.....	1.12	.98
						31.....		.96

**KAILUA STREAM NEAR WAIMANALO, OAHU.**

**Location.**—Three-fourths mile east of point on Waimanalo-Honolulu road, where road to rice mill leaves main highway; about 150 feet below intake at Wong Leong ditch.

**Records available.**—Gage heights and discharge measurements from November 12 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages; fairly permanent.

**Discharge measurements.**—By wading.

**Diversions.**—Wong Leong ditch diverts all low-water discharge at point 150 feet above gage.

**Accuracy.**—Record fair.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

*Discharge measurements of Kailua Stream near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Nov. 20	G. K. Larrison	<i>Fect.</i> 1.79	<i>Sec.-ft.</i> ( <i>a</i> ) 1.64
Dec. 27 <sup>b</sup>	Larrison and Dort	2.19	

<sup>a</sup> Water diverted by ditch at dam 150 feet above.

<sup>b</sup> Wading 100 feet above gage.

*Daily gage height, in feet, of Kailua Stream near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		2.89	11.....	1.78	2.31	21.....	1.84	2.30
2.....		2.20	12.....	2.30	2.30	22.....	1.83	2.30
3.....		4.25	13.....	1.78	2.30	23.....	1.81	2.28
4.....		2.60	14.....	1.78	2.30	24.....	1.80	2.28
5.....		2.54	15.....	1.89	2.30	25.....	1.80	2.20
6.....		2.31	16.....	1.80	2.29	26.....	1.80	2.20
7.....		2.40	17.....	1.80	2.28	27.....	1.80	2.20
8.....		2.41	18.....	1.80	2.26	28.....	2.00	2.20
9.....		2.34	19.....	1.80	2.32	29.....	2.01	2.20
10.....		2.31	20.....	1.80	2.29	30.....	1.80	2.20
						31.....		2.19

**POHAKEA STREAM NEAR WAIMANALO, OAHU.**

**Location.**—One-half mile above highway bridge on the Waimanalo-Honolulu road, about 12 miles by road east of Honolulu.

**Records available.**—November 12 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages; fairly permanent.

**Discharge measurements.**—By wading for all stages.

**Diversions.**—None above station; two small ditches below station.

**Accuracy.**—Fair.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

*Discharge measurements of Pohakea Stream near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Nov. 20	G. K. Larrison.....	<i>Feet.</i> 0.92	<i>Sec.-ft.</i> 0.06
Dec. 27	Larrison and Dort.....	1.18	.17

*Daily gage height, in feet, of Pohakea Stream near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.69	11.....		1.28	21.....	1.14	1.22
2.....		1.21	12.....	0.95	1.24	22.....	1.11	1.21
3.....		1.74	13.....	.95	1.28	23.....	1.06	1.20
4.....		1.55	14.....	.92	1.24	24.....	1.02	1.20
5.....		1.52	15.....	1.04	1.22	25.....	1.01	1.20
6.....		1.38	16.....	.95	1.22	26.....	1.00	1.20
7.....		1.38	17.....	.95	1.22	27.....	1.00	1.15
8.....		1.34	18.....	.92	1.21	28.....	1.02	1.15
9.....		1.31	19.....	.94	1.21	29.....	1.20	1.15
10.....		1.29	20.....	.94	1.20	30.....	1.05	1.15
						31.....		1.15

**KAMAKALEPO STREAM NEAR WAIMANALO, OAHU.**

**Location.**—At highway bridge on Waimanalo-Honolulu road, about 12 miles east, by road, of Honolulu.

**Records available.**—November 12 to December 3, 1912.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 4 p. m.; washed out by flood December 3, 1912; not replaced.

**Channel.**—One at all stages; fairly permanent.

**Discharge measurements.**—Low-water measurements made by wading; flood measurements made from bridge.

**Diversions.**—None.

**Accuracy.**—Fair.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

*Discharge measurements of Kamakalepo Stream near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Nov. 20	G. K. Larrison.....	<i>Feet.</i> 1.24	<i>Sec.-ft.</i> 0.96
Dec. 27	Larrison and Dort.....		1.52

*Daily gage height, in feet, of Kamakalepo Stream near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.92	11.....			21.....	1.25	
2.....		1.40	12.....	1.25		22.....	1.29	
3.....		1.60	13.....	1.22		23.....	1.28	
4.....			14.....	1.22		24.....	1.25	
5.....			15.....	1.28		25.....	1.25	
6.....			16.....	1.24		26.....	1.25	
7.....			17.....	1.22		27.....	1.25	
8.....			18.....	1.22		28.....	1.26	
9.....			19.....	1.24		29.....	1.34	
10.....			20.....	1.22		30.....	1.28	
						31.....		

**KAIMI STREAM NEAR WAIMANALO, OAHU.**

**Location.**—At highway bridge on Waimanalo-Honolulu road about 12½ miles east by road from Honolulu.

**Records available.**—Gage heights and discharge measurements from November 12 to December 31, 1912.

**Drainage area.**—Not measured.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages; fairly permanent.

**Discharge measurements.**—Low-water by wading; floods from bridge.

**Diversions.**—None.

**Accuracy.**—Good.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

*Discharge measurements of Kaimi Stream near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 20	G. K. Larrison.....	1.59	1.38
Dec. 27	Larrison and Dort.....	1.86	3.72

*Daily gage height, in feet, of Kaimi Stream near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		2.48	11.....		1.80	21.....	1.64	1.90
2.....		1.82	12.....	1.58	1.70	22.....	1.66	1.89
3.....		2.72	13.....	1.58	1.70	23.....	1.62	1.88
4.....		2.01	14.....	1.58	1.70	24.....	1.60	1.90
5.....		1.99	15.....	1.68	1.88	25.....	1.61	1.90
6.....		1.84	16.....	1.58	1.89	26.....	1.60	1.90
7.....		1.88	17.....	1.58	1.90	27.....	1.65	1.90
8.....		1.89	18.....	1.58	1.89	28.....	1.76	1.85
9.....		1.89	19.....	1.60	1.95	29.....	1.75	1.85
10.....		1.90	20.....	1.59	1.89	30.....	1.69	1.85
						31.....		1.88

**MAKAWAO STREAM NEAR WAIMANALO, OAHU.**

**Location.**—One-fourth mile upstream from confluence of Makawao and Kaimi streams and 100 feet above intake of irrigation ditch on Waimanalo-Honolulu road about 12½ miles east by road of Honolulu, Oahu.

**Records available.**—November 12 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 7 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages; practically permanent.

**Discharge measurements.**—By wading.

**Diversions.**—Low-water discharge of two main branches is diverted into the Makawao ditch at points about three-fourths mile above station. An irrigation ditch diverts most of the low-water discharge at a point about 100 feet below the gage.

**Accuracy.**—Records excellent.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

*Discharge measurements of Makawao Stream near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Nov. 20	G. K. Larrison.....	0.81	0.96
Dec. 27	Larrison and Dort.....	.90	2.24



*Daily gage height, in feet, of Makawao Stream near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.45	11.....		0.95	21.....	0.84	0.90
2.....		1.99	12.....	0.80	.96	22.....	.84	.94
3.....		2.46	13.....	.80	.95	23.....	.82	.91
4.....		1.14	14.....	.81	.92	24.....	.82	.91
5.....		1.09	15.....	.81	.92	25.....	.82	.90
6.....		.86	16.....	.81	.92	26.....	.82	.90
7.....		.94	17.....	.80	.92	27.....	.82	.90
8.....		.96	18.....	.80	.95	28.....	.89	.90
9.....		.99	19.....	.81	.95	29.....	.84	.90
10.....		.95	20.....	.80	.92	30.....	.82	.90
						31.....		.90

#### MAKAWAO DITCH NEAR WAIMANALO, OAHU.

**Location.**—At east end of flume in Makawao Gulch, 4 miles west of Waimanalo plantation headquarters. Waimanalo plantation is about 15 miles east of Honolulu, Oahu.

**Records available.**—November 1 to December 31, 1912.

**Gage.**—Vertical staff on right side at east end of flume; graduated to hundredths; read twice daily, at 8 a. m. and 4 p. m., by ditch tender at plantation.

**Channel.**—Flume 2.0 x 1.25 feet; clean and in good condition.

**Discharge measurements.**—By wading.

**Accuracy.**—Excellent.

**Cooperation.**—Maintained in cooperation with the Waimanalo Plantation Co.

*Discharge measurements of Makawao ditch near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Oct. 24	Larrison and Rea.....	0.62	1.81
31	G. K. Larrison.....	.64	2.36
Dec. 27	Larrison and Dort.....	.25	

*Daily gage height, in feet, of Makawao ditch near Waimanalo, Oahu, for 1912.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.65	0.72	11.....		0.65	Dry.	21.....		0.70	Dry.
2.....		.65	.95	12.....		.65	Dry.	22.....		.73	Dry.
3.....		.65	.95	13.....		.66	Dry.	23.....		.68	Dry.
4.....		.65	.91	14.....			Dry.	24.....	0.62		Dry.
5.....			.94	15.....			Dry.	25.....		.70	Dry.
6.....		.65	Dry.	16.....		.68	Dry.	26.....		.69	Dry.
7.....		.65	Dry.	17.....			Dry.	27.....		.69	Dry.
8.....		.70	Dry.	18.....		.67	Dry.	28.....		.92	Dry.
9.....		.70	Dry.	19.....			Dry.	29.....		.84	Dry.
10.....			Dry.	20.....		.67	Dry.	30.....		.78	Dry.
								31.....	.64		Dry.

#### WONG LEONG DITCH NEAR WAIMANALO, OAHU.

**Location.**—Three-fourths mile east of point where road to rice mill leaves Waimanalo-Honolulu road, and about 100 feet below ditch intake on the Kailua Stream.

**Records available.**—Gage heights and discharge measurements from November 12 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 4 p. m.; no change in datum.

**Channel.**—One at all stages; permanent.

**Discharge measurements.**—By wading.

**Diversions.**—This ditch diverts the low-water discharge of the Kailua Stream.

**Accuracy.**—Excellent.

**Cooperation.**—Maintained in cooperation with the Kaneohe Ranch Co.

*Discharge measurements of Wong Leong ditch near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Nov. 20	G. K. Larrison.....	<i>Feet.</i> 1.13	<i>Sec.-feet.</i> 3.10
Dec. 27	Larrison and Dort.....	1.51	6.48

*Daily gage height, in feet, of Wong Leong ditch near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.58	11.....		1.50	21.....	1.30	1.52
2.....		1.42	12.....	1.50	1.50	22.....	1.31	1.51
3.....		1.55	13.....	1.52	1.50	23.....	1.25	1.50
4.....		1.40	14.....	1.52	1.50	24.....	1.15	1.50
5.....		1.45	15.....	1.72	1.50	25.....	1.15	1.50
6.....		1.50	16.....	1.59	1.50	26.....	1.15	1.50
7.....		1.50	17.....	1.56	1.50	27.....	1.15	1.50
8.....		1.50	18.....	1.55	1.50	28.....	1.38	1.50
9.....		1.50	19.....	1.12	1.52	29.....	1.38	1.50
10.....		1.50	20.....	1.12	1.52	30.....	1.25	1.50
						31.....		1.51

#### WAIMANALO DITCH BELOW RESERVOIR NEAR WAIMANALO, OAHU.

**Location.**—On main ditch immediately below main reservoir on the Waimanalo plantation on windward Oahu, about 2 miles southwest of the plantation headquarters. Waimanalo is about 15 miles east of Honolulu.

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

**Gage.**—Vertical staff on left bank immediately below reservoir; read to quarter-tenths twice daily by plantation employee.

**Channel.**—Straight, practically permanent, and clean; bed and both banks are firm clay.

**Accuracy.**—Excellent.

**Cooperation.**—Maintained in cooperation with the Waimanalo Plantation Co.

*Discharge measurements of Waimanalo ditch below reservoir near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Oct. 31	Larrison and Rea.....	<i>Feet.</i> 1.39	<i>Sec.-feet.</i> 7.38
Dec. 27	Larrison and Dort.....		Dry

NOTE.—Ditch operated 11 hours per day. Dry during remainder of 24 hours.

*Daily gage height, in feet, of Waimanalo ditch below reservoir near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....	1.32	.....	11.....	1.41	.....	21.....	1.35	.....
2.....	1.29	1.40	12.....	1.38	.....	22.....	1.38	.....
3.....	.....	1.40	13.....	1.34	.....	23.....	1.32	.....
4.....	1.35	1.40	14.....	1.34	.....	24.....	.....	.....
5.....	1.36	1.40	15.....	1.38	.....	25.....	1.38	.....
6.....	1.32	1.40	16.....	1.32	.....	26.....	1.34	.....
7.....	1.32	1.40	17.....	.....	.....	27.....	1.38	.....
8.....	1.26	.....	18.....	1.38	.....	28.....	1.32	.....
9.....	1.36	1.40	19.....	1.38	.....	29.....	1.40	.....
10.....	.....	.....	20.....	1.32	.....	30.....	1.40	.....
						31.....	.....	.....

**PUMP DITCH NEAR WAIMANALO, OAHU.**

**Location.**—Below outlet pipe at pumping plant, about  $1\frac{1}{2}$  miles north of plantation headquarters; Waimanalo plantation is about 15 miles east of Honolulu.

**Records available.**—November 1 to December 31, 1912.

**Gage.**—Vertical staff on right bank below pipe outlet; read twice daily, about 7 a. m. and 5 p. m., by water foreman.

**Channel.**—Clean, of stiff clay; permanent; one channel; banks covered with grass and small weeds; does not overflow.

**Discharge measurements.**—By wading.

**Diversions.**—This ditch discharges the water pumped from the Waimanalo Lagoon.

**Cooperation.**—Maintained in cooperation with the Waimanalo Plantation Co.

*Discharge measurements of pump ditch near Waimanalo, Oahu, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Oct. 31	G. K. Larrison.....	<i>Feet.</i>	<i>Sec.-ft.</i>
Dec. 27	Larrison and Dort.....	1.28	2.44

*Daily gage height, in feet, of pump ditch near Waimanalo, Oahu, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....	1.20	.....	11.....	.....	.....	21.....	.....	.....
2.....	1.22	.....	12.....	1.30	.....	22.....	.....	.....
3.....	.....	.....	13.....	1.28	.....	23.....	.....	.....
4.....	1.26	.....	14.....	1.25	.....	24.....	.....	.....
5.....	1.28	.....	15.....	.....	.....	25.....	.....	.....
6.....	1.20	.....	16.....	.....	.....	26.....	.....	.....
7.....	.....	.....	17.....	.....	.....	27.....	.....	.....
8.....	.....	.....	18.....	1.19	.....	28.....	.....	.....
9.....	.....	.....	19.....	1.30	.....	29.....	.....	.....
10.....	.....	.....	20.....	.....	.....	30.....	.....	.....
						31.....	.....	.....

**NOTE.**—Pump working 12 hours per day; balance of 24 hours ditch was dry.

## MISCELLANEOUS MEASUREMENTS ON OAHU IN 1912.

Date.	Stream.	Tributary to—	Locality.	Dis-charge.
				<i>Sec.-ft.</i>
Aug. 27	Kahuawai Spring	Pauoa Stream	Pauoa Valley	0.75
27	do	do	do	.83
Feb. 29	Pukele Stream	Palolo Stream	Below Mahoe Springs, Upper Palolo Valley	.80
Apr. 5	Makawao ditch	(a)	Irwins Flume, Kailua Valley	3.49
5	Kailua Stream	Kailua Bay	Below intake Wong Leong ditch, Kailua Valley	2.21
5	Wong Leong ditch	(b)	Flume below intake Kailua Valley	4.86
5	Box Flume ditch	(c)	Kailua Valley	.61
5	Kahanaiki Stream	Kailua Bay	Government road bridge, Kailua Valley	.93
Mar. 9	Waikalua ditch		Above box flume, Kaneohe	2.62
9	do		Ah Lo flume, Kaneohe	6.78
9	do		do	8.29
9	do		Sugar mill, Kaneohe	10.6
9	Old Waikalua ditch		50 feet below intake, Kaneohe	1.28
9	Kepo ditch		60 feet below Government road, Kaneohe	2.56
9	do		200 feet below Government road, Kaneohe	2.66
9	Waste ditch		Below rice mill, Kaneohe	.93
Nov. 3	Rice-mill ditch No. 4		Intake, Kaneohe	6.81
7	do		do	6.87
Aug. 3	Waihi Stream	Waiahole Stream	Upper Waiahole Valley	9.40
May 24	North Fork, Halona Stream	Halona Stream	do	.76
24	Halona Stream	Waiahole Stream	do	5.15
Aug. 3	do	do	do	4.35
4	Uwau Stream	Wainu Stream	do	.58
4	Waianu Stream	Waiahole Stream	do	9.13
May 24	McCandless ditch	(d)	Waiahole Valley	1.30

a Diverts low-water discharge of headwaters of Makawao and Kaimi streams.

b Diverts low-water discharge of Kailua Stream.

c Diverts low-water discharge of Kawainui Stream.

d Diverts part of low-water discharge of Waiahole Stream.

## ARTESIAN WELLS.

Artesian wells play an important part in connection with the water supply of Honolulu and the irrigation of sugar cane.

Records have been kept, more or less continuously, of the heads of Oahu wells for the past 30 years. During this period the mean yearly head has dropped about 15 feet. During the past dry year the heads on the wells dropped so low that many wells became seriously impregnated with salt, and the supply was reduced to an alarming degree. However, this condition brought to the attention of the Territorial officials the great waste that has been going on for years from this source of supply. Mr. T. F. Sedgwick, who has been making an investigation of the Oahu artesian wells, reports that the entire supply from this source for the city of Honolulu from Diamond Head to Fort Shafter amounted in 1912 to about 55 second-feet, and of this about one-third was allowed to waste into the sea. The following table shows the monthly fluctuation of the wells under investigation during 1912:

*Height of water (elevation in feet above sea level) in artesian wells on Oahu in 1912.*

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	The year.	
													Max.	Min.
Government stables.....	31.30	30.91	31.00	30.66	30.10	29.45	28.80	28.65	28.17	28.10	28.22	28.50	31.30	28.10
Mo Hop.....	26.20	24.95	25.38	25.14	24.03	24.10	24.65	23.47	22.99	23.06	24.51	25.71	26.20	22.99
Lund Do Wai.....	26.10	24.65	25.20	24.98	23.85	23.92	24.41	23.15	22.70	22.80	24.35	25.65	26.10	22.70
Sing Loy.....	31.85	31.45	31.60	31.16	30.61	29.85	29.25	28.98	28.50	28.40	28.65	29.24	31.85	28.40
Oahu Railway & Land Co.	31.90	32.20	32.10	31.44	31.00	30.42	29.47	29.52	29.22	28.82	29.04	29.57	32.20	28.82
Ah Yin.....	31.03	30.91	30.87	30.64	29.96	29.11	28.81	28.35	28.11	27.70	28.16	28.75	31.03	27.70
Young Hotel Gardens.....	29.68	28.95	28.73	29.18	28.78	28.29	27.38	27.33	27.13	27.18	27.53	28.27	29.68	27.13
Mr. Damon's.....	27.42	27.42	27.60	27.38	26.46	25.96	25.62	25.25	25.16	24.88	25.34	26.17	27.60	24.88
Waimalu.....	22.75	22.37	22.47	22.42	21.08	20.53	20.22	19.92	19.62	19.95	20.92	21.22	22.75	19.62
Sing Chong.....	19.25	19.55	19.45	19.20	18.10	18.19	17.45	17.15	16.95	16.90	17.10	18.49	19.55	16.90
Waipahu.....	20.67	21.80	21.22	20.42	19.35	18.60	18.22	18.12	17.92	17.63	18.12	19.22	21.80	17.63
Honouliuli.....	22.27	22.30	22.29	21.89	20.84	20.18	19.79	19.36	19.02	18.89	19.65	20.89	22.30	18.89
Waialua.....	12.52	12.47	12.42	12.14	12.02	11.97	11.72	11.62	11.46	11.45	11.67	12.12	12.52	11.45
Kahuku <sup>a</sup> .....	1.66	1.62	1.23	1.46	.51	.62	.54	.56	.29	.61	.96	1.00	1.66	.29
Hauula.....	21.27	21.15	20.80	20.96	20.37	19.96	19.37	20.08	19.57	.....	19.76	20.26	.....	.....
Oahu College <sup>b</sup> .....	31.65	31.50	31.60	31.40	30.90	30.38	29.70	29.25	28.90	28.40	28.52	29.25	31.65	28.25
Beretania street pump <sup>b</sup> .....	31.55	31.40	31.50	31.03	30.50	29.70	29.35	28.92	28.47	28.25	28.25	28.52	31.55	28.25
	31.66	31.52	31.56	31.39	30.83	30.43	29.68	29.31	28.98	28.33	28.54	29.12	31.66	28.33
	31.41	31.37	31.43	31.00	30.43	29.79	29.27	28.96	28.83	28.33	28.44	28.65	31.41	28.33

<sup>a</sup> B. M. unsatisfactory; height taken above flange on well. <sup>b</sup> Maximum and minimum for month.

## ISLAND OF MAUI.

## West Maui.

## KAHAKULOA STREAM BASIN.

## KAHAKULOA STREAM AT KAHAKULOA, NEAR WAIHEE, MAUI.

**Location.**—About 13 miles northwest of Wailuku at trail bridge of Kahakuloa, below all diversions.

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

**Drainage area.**—Not measured.

**Gage.**—Staff; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Good.

*Discharge measurements of Kahakuloa Stream at Kahakuloa, near Waihee, Maui, in 1912.*

[Hydrographer, J. B. Stewart.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 13	<i>Feet.</i> 0.82	<i>Sec.-ft.</i> 13.4	Oct. 1	<i>Feet.</i> 0.75	<i>Sec.-ft.</i> 10.0
15	1.10	25.5	4	.90	14.1
28	.60	5.25	30	1.40	47.7
Sept. 14	.60	4.03			

*Daily gage height, in feet, of Kahakuloa Stream at Kahakuloa, near Waihee, Maui, for 1912.*

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.65	0.78	0.72	1.00	16.....		0.55	0.78	1.58	0.88
2.....		.95	1.05	.68	.72	17.....		.55	.65	1.05	.62
3.....		.70	.78	.70	1.45	18.....		.55	.60	.90	.60
4.....		.62	.62	.65	.75	19.....		.55	.60	.82	.62
5.....		.60	.60	.60	.68	20.....		.60	.60	.82	.62
6.....		.65	.60	.60	.65	21.....		.60	.82	.95	.60
7.....		.78	.60	.60	.95	22.....		.58	1.02	.85	1.12
8.....		.68	.60	.60	.80	23.....		.58	.85	.78	.75
9.....		.60	.60	1.78	.78	24.....		.55	.68	.70	.68
10.....		.60	.62	.75	.68	25.....		.55	.65	.62	.65
11.....		.60	.68	.65	.60	26.....		.55	.70	.68	.60
12.....		.60	.83	.58	.60	27.....	0.60	.55	.70	.65	.60
13.....		.60	1.15	.58	.60	28.....	.60	.60	1.08	.60	.60
14.....		.60	1.12	.60	.65	29.....	.68	.70	.70	.60	.68
15.....		.60	1.52	.62	.60	30.....	.65	.88	.80	.95	.68
						31.....	.65		.88		.60

*Daily discharge, in second-feet, of Kahakuloa Stream at Kahakuloa, near Waihee, Maui, for 1912.*

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		6.5	10.4	8.6	20.0	16.....		4.0	10.4	61.4	14.2
2.....		17.5	23.0	7.4	8.6	17.....		4.0	6.5	23.0	5.6
3.....		8.0	10.4	8.0	51.0	18.....		4.0	5.0	15.0	5.0
4.....		5.6	5.6	6.5	9.5	19.....		4.0	5.0	11.8	5.6
5.....		5.0	5.0	5.0	7.4	20.....		5.0	5.0	11.8	5.6
6.....		6.5	5.0	5.0	6.5	21.....		5.0	11.8	17.5	5.0
7.....		10.4	5.0	5.0	17.5	22.....		4.6	21.2	13.0	27.2
8.....		7.4	5.0	5.0	11.0	23.....		4.6	13.0	10.4	9.5
9.....		5.0	5.0	77.4	10.4	24.....		4.0	7.4	8.0	7.4
10.....		5.0	5.6	9.5	7.4	25.....		4.0	6.5	5.6	6.5
11.....		5.0	7.4	6.5	5.0	26.....		4.0	8.0	7.4	5.0
12.....		5.0	12.2	4.6	5.0	27.....	5.0	4.0	8.0	6.5	5.0
13.....		5.0	29.0	4.6	5.0	28.....	5.0	5.0	24.8	5.0	5.0
14.....		5.0	27.2	5.0	6.5	29.....	7.4	8.0	8.0	5.0	7.4
15.....		5.0	56.6	5.6	5.0	30.....	6.5	14.2	11.0	17.5	7.4
						31.....	6.5		14.2		5.0

*Monthly discharge of Kahakuloa Stream at Kahakuloa, near Waihee, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
August.....	7.4	5.0	6.08	60.3	B.
September.....	17.5	4.0	6.01	358.0	B.
October.....	56.6	5.0	12.20	750.0	B.
November.....	77.4	4.6	12.70	756.0	B.
December.....	51.0	5.0	9.75	600.0	B.
The period.....				2,520.0	

#### WAIHEE STREAM BASIN.

##### WAIHEE STREAM AT DAM NEAR WAIHEE, MAUI.

**Location.**—About 2½ miles west of Waihee at intake of Waihee canal.

**Records available.**—November 17, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily; datum unchanged.

**Channel.**—Crest of concrete diversion dam.

**Discharge measurements.**—Made by wading and from footbridge. To get total flow of Waihee Stream add flow of Waihee canal to discharge at this station.

**Accuracy.**—Records at this point show amount of water passing over the diversion dam and do not include flow in Waihee canal.

The following discharge measurement was made by C. T. Bailey:

December 1, 1912: Gage height, 0.49 foot; discharge, 59.2 second-feet.

*Daily gage height, in feet, of Waihee Stream at dam near Waihee, Maui, for 1912.*

[Joaquin Santos, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.20	0.00	0.15	0.50	0.60	0.20	0	0	0	0.35	0	0.55
2.....	.20	.0	.70	.70	.40	.20	0.05	0	0.30	0	0	.40
3.....	.10	.0	.25	.60	.40	.15	.05	0	0	.55	0	1.20
4.....	.00	.0	.40	1.55	.30	.15	.10	0	0	.50	0	0
5.....	.00	.0	.50	2.20	.50	.20	.30	0	0	0	0	0
6.....	.00	.0	.35	1.15	.70	.10	0	0	0	0	0	.35
7.....	.00	.0	.60	1.30	.20	.25	.15	0	.30	0	0	.40
8.....	.00	.0	.50	.60	.30	.15	.30	0	0	0	0	0
9.....	.10	.0	.40	.60	.20	.10	1.20	.20	0	0	1.10	0
10.....	.15	.0	.35	.70	.20	.10	2.15	0	0	0	0	0
11.....	.10	.0	.40	1.50	.20	1.00	1.10	.20	0	.40	0	0
12.....	.00	.0	.40	.70	.15	.70	.90	.20	0	.55	0	0
13.....	.00	.40	.40	.35	.05	.70	.85	.25	0	.12	0	0
14.....	.00	.10	.20	.50	.00	.40	.50	.40	0	.15	0	0
15.....	.00	.10	.20	.50	.00	.30	0	.50	0	.40	.50	0
16.....	.00	.10	.50	.70	.00	.70	.25	.40	0	.00	1.50	.40
17.....	.0	.10	1.55	.70	.0	.40	0	0	0	0	.70	0
18.....	.0	.20	1.60	.75	.0	.30	0	0	0	0	1.25	.45
19.....	.0	1.00	1.20	.85	.05	.50	0	0	0	0	0	0
20.....	.0	.70	1.10	.50	.0	.10	0	0	0	0	.60	0
21.....	.0	.60	.80	.50	.0	.15	.25	.40	0	.60	.85	0
22.....	.0	.70	.85	.00	.0	.20	0	.40	0	.40	0	0
23.....	.0	.70	.75	.50	.05	.20	0	0	0	0	.20	.10
24.....	.0	.65	.60	.40	.05	.20	.10	0	0	0	.50	0
25.....	.0	.60	.50	.40	.0	.20	0	0	0	0	.25	0
26.....	.0	.60	.10	.60	.15	.10	0	.60	0	0	.25	0
27.....	.0	.50	.30	.50	.85	.10	0	0	0	.05	.25	0
28.....	.0	.20	.60	.50	.65	0	0	0	0	.25	.25	.55
29.....	.0	.10	.40	.40	.50	0	0	0	0	0	.25	.05
30.....	.0	-----	.50	.40	.40	0	0	0	0	0	.45	.20
31.....	.0	-----	.50	-----	.25	-----	0	-----	-----	.22	-----	.05

*Daily discharge, in second-feet, of Waihee Stream at dam near Waihee, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	12.0	0	8.3	53.0	71.0	12.0	0	0	0	29.0	0	62.0
2.....	12.0	0	90.0	90.0	36.0	12.0	2.3	0	22.0	0	0	36.0
3.....	4.6	0	17.0	71.0	36.0	8.3	2.3	0	0	62.0	0	195.0
4.....	0	0	36.0	275.0	22.0	8.3	4.6	0	0	53.0	0	0
5.....	0	0	53.0	435.0	53.0	12.0	22.0	0	0	0	0	0
6.....	0	0	29.0	184.0	90.0	4.6	0	0	0	0	0	29.0
7.....	0	0	71.0	217.0	12.0	17.0	8.3	0	22.0	0	0	36.0
8.....	0	0	53.0	71.0	22.0	8.3	22.0	0	0	0	0	-----
9.....	4.6	0	36.0	71.0	12.0	4.6	195.0	12.0	0	0	173.0	-----
10.....	8.3	0	29.0	90.0	12.0	4.6	422.0	0	0	0	0	-----
11.....	4.6	0	36.0	263.0	12.0	152.0	173.0	12.0	0	36.0	0	-----
12.....	0	0	36.0	90.0	8.3	90.0	131.0	12.0	0	62.0	0	-----
13.....	0	36.0	36.0	29.0	2.3	90.0	120.0	17.0	0	6.1	0	-----
14.....	0	4.6	12.0	53.0	0	36.0	53.0	36.0	0	8.3	0	-----
15.....	0	4.6	12.0	53.0	0	22.0	0	53.0	0	36.0	53.0	-----
16.....	0	4.6	53.0	90.0	0	90.0	17.0	36.0	0	0	263.0	36.0
17.....	0	4.6	275.0	90.0	0	36.0	0	0	0	0	90.0	0
18.....	0	12.0	287.0	100.0	0	22.0	0	0	0	0	206.0	44.5
19.....	0	152.0	195.0	120.0	2.3	53.0	0	0	0	0	0	0
20.....	0	90.0	173.0	53.0	0	4.6	0	0	0	0	71.0	0

*Daily discharge, in second-feet, of Waihee Stream at dam near Waihee, Maui, for 1912—*  
Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	0	71.0	110.0	53.0	0	8.3	17.0	36.0	0	71.0	120.0	0
22.....	0	90.0	120.0	71.0	0	12.0	0	36.0	0	36.0	0	0
23.....	0	90.0	100.0	53.0	2.3	12.0	0	0	0	0	12.0	4.6
24.....	0	80.5	71.0	36.0	2.3	12.0	4.6	0	0	0	53.0	0
25.....	0	71.0	53.0	36.0	0	12.0	0	0	0	0	17.0	0
26.....	0	71.0	4.6	71.0	8.3	4.6	0	71.0	0	0	17.0	0
27.....	0	53.0	22.0	53.0	120.0	4.6	0	0	0	2.3	17.0	0
28.....	0	12.0	71.0	53.0	80.5	0	0	0	0	17.0	17.0	62.0
29.....	0	4.6	36.0	36.0	53.0	0	0	0	0	0	17.0	2.3
30.....	0	53.0	36.0	36.0	0	0	0	0	0	0	44.5	12.0
31.....	0	53.0	53.0	17.0	17.0	0	0	0	0	14.0	2.3	2.3

*Monthly discharge of Waihee Stream at dam near Waihee, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	12.0	0.0	1.49	91.6	C.
February.....	152.0	0	29.40	1,690.0	B.
March.....	287.0	4.6	72.00	4,430.0	B.
April.....	435.0	29.0	99.90	5,940.0	B.
May.....	120.0	0	22.90	1,410.0	C.
June.....	152.0	0	25.10	1,490.0	C.
July.....	422.0	0	38.50	2,370.0	C.
August.....	71.0	0	10.40	640.0	C.
September.....	22.0	0	1.47	87.5	C.
October.....	71.0	0	14.00	861.0	C.
November.....	263.0	0	39.00	2,320.0	C.
December.....	195.0	0	16.80	1,030.0	C.
The year.....	435.0	0	30.80	22,400	

#### WAIHEE CANAL NEAR WAIHEE, MAUI.

**Location.**—About 2 miles west of Waihee and one-half mile below canal intake; 5½ miles above Wailuku.

**Records available.**—November 17, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 6 p. m.; datum unchanged.

**Channel.**—Cement lined.

**Discharge measurements.**—Made from plank at gage. Gage read with diversion gate shut.

*Discharge measurements of Waihee canal near Waihee, Maui, in 1912.*

[Hydrographer, J. B. Stewart.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
March 7.....	1.85	41.6	September 7.....	1.85	52.4
July 3.....	2.15	55.7	October 29.....	1.60	41.4
August 6.....	1.82	45.6			



*Daily gage height, in feet, of Waihee canal near Waihee, Maui, for 1912.*

[Joaquin Santos, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.20	1.90	2.20	2.30	2.15	2.10	2.10	1.80	1.70	2.00	1.65	.....
2.....	2.20	1.90	2.20	2.15	2.20	2.10	2.15	1.80	2.30	1.75	1.60	0.85
3.....	2.20	1.90	2.20	2.20	2.50	2.10	2.20	1.80	1.70	2.00	1.60	1.80
4.....	2.15	1.90	2.15	2.20	2.40	2.10	2.20	1.80	1.70	2.10	1.70	1.70
5.....	2.10	1.90	2.15	2.20	2.55	2.10	2.25	1.90	1.85	1.75	1.60	1.70
6.....	2.10	1.90	2.20	2.20	2.30	2.10	2.25	1.80	1.70	1.60	1.60	2.00
7.....	2.10	1.90	2.20	2.20	2.15	2.10	2.25	1.80	1.95	1.65	1.60	2.10
8.....	2.10	1.90	2.40	2.20	2.20	2.10	2.25	1.80	1.70	1.60	1.75	1.65
9.....	2.10	1.90	2.40	2.20	2.20	2.10	2.40	2.20	1.65	1.70	2.30	1.60
10.....	2.10	1.90	2.40	2.30	2.10	2.10	2.30	1.95	1.65	1.65	1.85	1.60
11.....	2.10	1.90	2.30	2.20	2.00	2.40	2.40	2.25	1.40	2.05	1.65	1.60
12.....	2.10	1.90	2.20	2.15	2.00	2.40	2.40	2.30	1.60	1.95	1.60	1.60
13.....	2.10	2.20	2.20	2.15	1.90	2.50	2.40	2.40	1.60	2.15	1.55	1.60
14.....	2.10	2.20	2.20	2.15	1.95	2.50	2.40	2.25	1.60	2.00	1.50	1.60
15.....	2.10	2.20	2.40	2.10	1.90	2.50	2.05	2.30	1.60	2.10	1.85	1.60
16.....	2.10	2.20	2.30	2.50	1.90	2.40	2.15	2.35	1.60	1.75	2.30	1.95
17.....	2.10	2.20	2.30	2.50	1.90	2.20	2.00	2.05	1.60	1.95	2.25	1.60
18.....	2.10	2.20	2.20	2.40	1.90	2.20	2.00	2.00	1.70	1.85	1.10	1.75
19.....	2.10	2.20	2.15	2.30	1.90	2.10	2.05	1.85	1.80	1.65	1.90	1.85
20.....	2.10	2.20	2.15	2.30	1.90	2.05	1.95	1.80	1.70	1.60	2.25	1.70
21.....	2.10	2.20	2.10	2.20	1.90	2.10	2.25	0.00	1.60	2.15	2.30	1.70
22.....	2.10	2.20	2.20	2.20	2.05	2.10	2.05	2.20	1.60	2.25	2.10	1.60
23.....	2.10	2.60	2.20	2.30	2.10	2.10	1.90	1.80	1.60	2.15	2.20	1.90
24.....	2.00	2.60	2.20	2.30	2.15	2.15	2.15	1.85	1.65	1.80	.00	1.60
25.....	2.00	2.40	2.15	2.10	1.95	2.20	1.90	1.85	1.65	1.65	.85	1.80
26.....	2.00	2.40	2.10	2.20	2.05	2.20	1.90	2.05	1.75	1.95	.80	1.70
27.....	2.00	2.20	2.10	2.20	2.10	2.15	2.05	1.70	1.65	2.10	.80	1.60
28.....	1.90	2.20	2.10	2.30	2.65	2.25	1.80	1.75	1.85	2.00	.80	1.90
29.....	1.90	2.20	2.10	2.20	2.40	2.15	1.90	1.90	1.80	1.60	.80	1.80
30.....	1.90	.....	2.05	2.20	2.30	2.15	1.80	1.85	1.60	1.60	2.00	2.00
31.....	1.90	.....	2.10	.....	2.40	.....	1.80	1.70	.....	.....	.....	1.80

NOTE.—On July 27 a small board was substituted for a larger one in the canal below the gage; gage height of 1.7, beginning July 27, equivalent to 1.8 before that date.

#### WAIHEE CANAL AT WEIR NEAR WAILUKU, MAUI.

**Location.**—About half a mile above Wailuku and about 1,000 feet below the inverted siphon crossing Iao Valley.

**Records available.**—January 1, 1911, to December 31, 1912.

**Discharge.**—Measured by 14-foot sharp-crested weir, without end contractions.

**Cooperation.**—Records furnished by Hawaiian Commercial & Sugar Co.

*Daily discharge, in million gallons, of Waihee canal at weir near Wailuku, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	19.80	11.40	19.30	22.40	19.80	14.00	13.30	11.20	9.77	13.20	12.70	29.20
2.....	16.80	12.90	19.00	28.60	26.10	14.50	11.40	11.40	12.70	15.90	13.30	15.20
3.....	16.10	17.40	21.40	37.40	24.30	13.40	11.50	11.00	13.30	11.80	10.40	34.50
4.....	15.10	14.40	17.90	39.20	18.30	11.80	12.00	11.00	10.50	20.80	9.23	15.60
5.....	14.30	13.70	17.60	26.10	17.60	13.10	17.00	11.30	10.20	14.20	10.20	14.30
6.....	13.40	12.70	19.10	33.00	18.70	12.70	15.60	11.70	11.20	11.10	9.33	19.30
7.....	14.60	12.50	21.80	40.10	17.10	13.40	15.80	12.40	12.70	10.80	9.77	35.80
8.....	18.40	11.70	13.40	29.80	17.10	13.30	23.80	11.00	11.00	10.80	12.40	35.40
9.....	16.40	11.60	21.00	27.70	18.30	13.90	32.30	11.60	11.30	10.60	33.60	19.00
10.....	15.50	10.60	24.70	28.20	18.10	24.60	32.10	12.60	11.00	12.10	14.00	14.30
11.....	15.40	13.00	17.70	29.30	17.20	23.70	20.40	16.10	10.80	20.00	9.93	14.00
12.....	13.30	11.50	18.60	42.00	17.50	19.90	23.00	13.30	10.60	22.90	9.53	13.60
13.....	13.70	23.30	18.20	26.60	16.00	19.60	30.90	13.90	9.80	21.00	9.37	13.40
14.....	14.40	18.30	17.90	56.40	13.30	22.80	24.90	21.10	9.00	22.70	9.67	15.40
15.....	14.80	12.40	14.70	28.90	13.10	23.80	15.40	20.60	9.70	13.50	16.80	14.40

*Daily discharge, in million gallons, of Waihee canal at weir near Wailuku, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	13.20	11.00	17.00	38.10	14.60	19.30	16.80	18.60	9.87	11.40	39.40	23.30
17.....	12.10	11.30	20.10	34.00	14.30	13.80	14.30	14.10	9.60	11.90	29.00	13.70
18.....	12.70	11.20	25.40	28.70	14.20	13.90	13.70	11.90	11.30	11.00	31.60	21.50
19.....	12.30	40.50	22.30	30.50	16.30	12.80	14.70	12.30	10.70	10.10	18.10	19.10
20.....	12.30	45.40	23.30	28.30	14.30	13.50	13.80	11.30	11.50	12.70	27.40	12.60
21.....	13.00	22.90	22.30	26.00	15.10	17.10	17.90	9.33	10.30	12.90	28.60	27.20
22.....	10.90	9.50	18.90	26.40	13.60	14.40	14.40	13.00	10.00	14.50	24.10	34.10
23.....	11.50	15.00	17.60	22.10	13.20	14.60	13.20	10.80	10.10	13.30	12.70	22.20
24.....	11.50	16.40	17.30	21.40	18.90	18.50	13.20	9.86	8.50	11.50	15.20	16.30
25.....	11.50	30.10	17.20	18.30	16.60	13.20	11.10	9.63	9.07	10.10	12.40	26.00
26.....	10.40	22.00	23.00	24.50	23.20	14.40	11.20	19.70	10.20	12.30	12.00	17.90
27.....	10.10	22.00	21.60	17.50	30.50	16.00	11.70	16.60	10.70	16.60	8.03	15.90
28.....	9.75	15.50	22.30	19.10	20.43	13.60	12.60	10.30	10.70	16.30	9.33	17.30
29.....	9.82	12.30	22.20	16.60	23.20	13.50	11.60	11.60	12.00	11.20	9.20	13.50
30.....	10.80	.....	26.60	16.40	16.20	13.50	12.10	10.50	20.00	12.70	18.20	16.10
31.....	11.60	.....	29.40	.....	15.00	.....	11.80	.....	.....	13.20	.....	21.70

*Monthly discharge of Waihee canal at weir near Wailuku, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	19.80	9.75	13.4	415
February.....	45.40	9.50	17.0	492
March.....	29.40	13.40	20.3	629
April.....	56.40	18.40	28.8	864
May.....	30.50	13.10	17.8	552
June.....	24.60	11.80	15.9	477
July.....	32.30	11.10	16.6	514
August.....	21.10	8.23	13.0	390
September.....	20.00	8.50	10.9	328
October.....	22.90	10.10	14.0	453
November.....	39.40	8.03	16.2	485
December.....	35.80	12.60	20.1	622
The year.....	56.40	8.03	17.0	6,200

#### SPRECKELS DITCH NEAR WAIHEE, MAUI.

**Location.**—About 2 miles west of Waihee and about 500 feet below intake.

**Records available.**—November 17, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at about 4 a. m. and 3.30 p. m. September 7, 1912, gage was removed to a point a short distance upstream and placed at new datum.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made by wading.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Spreckels ditch near Waihee, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Fect.</i>	<i>Sec.-ft.</i>			<i>Fect.</i>	<i>Sec.-ft.</i>
July 3	J. B. Stewart.....	0.24	2.06	Oct. 29	J. B. Stewart.....	0.21	1.67
Aug. 6	.....do.....	.15	1.01	Dec. 1	C. T. Bailey.....	1.66	58.7
Sept. 7	.....do.....	.30	2.82				

*Daily gage height, in feet, of Spreckels ditch near Waihee, Maui, for 1912.*

[Joaquin Santos, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.40	0.10	1.30	1.25	0.30	0.75	0.10	0.20	0.15	0.92	0.20	1.70
2.....	.40	.10	1.20	1.65	.50	.50	.10	.20	.85	.20	.20	1.10
3.....	.60	.10	1.20	1.80	.60	.20	.10	.20	.15	.90	.20	1.80
4.....	.50	.10	1.20	1.70	.40	.15	.15	.20	.15	1.00	.20	.40
5.....	.30	.10	1.50	1.60	.30	.15	1.00	.20	.15	.18	.20	.30
6.....	.20	.10	1.20	1.50	.40	.10	.62	.18	.15	.15	.20	.95
7.....	.20	.10	1.00	1.70	.50	.15	.70	.15	.90	.15	.20	1.05
8.....	.20	.10	1.20	1.50	.70	.10	.90	.20	.20	.15	.20	.30
9.....	.20	.10	1.20	.95	.60	.10	1.75	.60	.20	.20	1.80	.40
10.....	.20	.10	1.20	.80	.50	.05	1.05	.25	.15	.25	.25	.25
11.....	.15	.10	1.20	.80	.40	1.50	1.60	.60	.15	.90	.20	.25
12.....	.10	.10	1.10	.70	.35	1.00	1.70	.70	.15	.90	.20	.20
13.....	.10	1.00	1.10	.70	.30	.90	1.60	.65	.15	.55	.20	.20
14.....	.10	.60	1.10	.80	.25	.95	1.15	.90	.15	.65	.20	.20
15.....	.00	.60	1.10	.60	.20	.80	.20	1.05	.15	1.00	1.00	.20
16.....	.00	.40	1.25	1.90	.20	.45	.85	1.00	.15	.20	1.80	1.00
17.....	.00	.40	1.20	1.70	.20	.50	.20	.15	.15	.20	1.40	.30
18.....	.00	.60	1.30	1.25	.20	.30	.20	.15	.15	.20	1.80	1.10
19.....	.10	1.00	1.10	1.10	.20	.30	.20	.15	.15	.18	.30	.45
20.....	.10	.70	1.15	1.20	.25	.20	.20	.15	.15	.20	1.10	.30
21.....	.00	.80	.80	.70	.15	.50	.60	1.20	.15	1.35	1.75	.30
22.....	.00	1.20	.70	.60	.20	.40	.20	1.45	.15	1.30	.35	.30
23.....	.00	1.60	.60	.70	.15	.15	.20	.15	.15	.20	.70	.30
24.....	.00	1.50	.40	.90	.15	.30	.45	.15	.15	.20	1.40	.30
25.....	.05	.55	.40	.70	.15	.20	.20	.15	.30	.20	.90	.40
26.....	.10	1.40	.40	.50	.20	.20	.20	.92	.15	.20	.80	.30
27.....	.10	1.40	.80	.40	1.50	.15	.22	.00	.20	.50	.80	.35
28.....	.10	1.20	.60	.70	1.70	.15	.20	.00	.20	1.00	.80	1.02
29.....	.10	1.20	.70	.50	1.70	.10	.20	.00	.15	.25	.80	.55
30.....	.10	.....	.50	.40	.80	.10	.20	.00	.18	.30	1.05	1.00
31.....	.10	.....	.50	.....	1.50	.....	.20	.15	.....	1.05	.....	.45

#### WAIIEHU STREAM BASIN.

##### NORTH WAIIEHU STREAM NEAR WAILUKU, MAUI.<sup>1</sup>

**Location.**—About 2½ miles northwest of Wailuku, 1 mile above Waihee Canal crossing, and 50 feet above the intake of the North Waiehu ditch.

**Records available.**—July 9 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 4 p. m.; datum unchanged.

**Channel.**—Probably shifting; bed of stream of gravel and small boulders.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Good.

**Cooperation.**—Station is maintained in cooperation with Wailuku Sugar Co.

*Discharge measurements of North Waiehu Stream near Wailuku, Maui, in 1912.*

[Hydrographer, J. B. Stewart.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
July 5.....	a 1.10	2.06	July 16.....	0.63	5.09
8.....	.65	5.51	Sept. 6.....	.62	4.13
13.....	.65	5.52	Oct. 28.....	.77	8.92

<sup>a</sup> Old gage.

<sup>1</sup> This station replaces the two stations formerly maintained on North Waiehu Stream and North Waiehu ditch.

*Daily gage height, in feet, of North Waiehu Stream near Wailuku, Maui, for 1912.*

[E. Soper, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.60	0.60	0.60	0.65	0.72	16.....	0.80	0.62	0.60	0.65	0.80	0.60
2.....		.60	.62	.68	.65	.70	17.....	.60	.60	.60	.65	.70	.68
3.....		.60	.60	.62	.65	.78	18.....	.60	.60	.60	.65	.70	.60
4.....		.60	.60	.88	.65	.70	19.....	.62	.60	.60	.65	.65	.60
5.....		.60	.60	.65	.65	.68	20.....	.60	.60	.60	.65	.75	.60
6.....		.60	.60	.65	.65	.60	21.....	.60	.60	.60	.66	.70	.61
7.....		.60	.61	.65	.62	.65	22.....	.60	.65	.60	.70	.70	.60
8.....		.60	.60	.65	.66	.60	23.....	.60	.60	.65	.68	.70	.60
9.....	0.70	.60	.60	.65	.70	.60	24.....	.60	.60	.60	.65	.70	.60
10.....	.68	.60	.60	.65	.65	.60	25.....	.60	.60	.60	.65	.70	.60
11.....		.65	.62	.60	.64	.62	26.....	.60	.60	.62	.65	.70	.60
12.....		.65	.64	.60	.70	.62	27.....	.60	.60	.61	.70	.65	.60
13.....		.68	.61	.60	.74	.62	28.....	.60	.60	.68	.68	.65	.60
14.....		.65	.62	.60	.75	.62	29.....	.60	.60	.61	.65	.65	.60
15.....		.60	.64	.60	.70	.62	30.....	.60	.60	.60	.65	.78	.60
							31.....	.60	.60		.65		.60

*Daily discharge, in second-feet, of North Waiehu Stream near Wailuku, Maui, for 1912.*

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		4.2	4.2	4.2	5.5	7.4	16.....	4.2	4.7	4.2	5.5	10.0	4.2
2.....		4.2	4.7	6.3	5.5	6.8	17.....	4.2	4.2	4.2	5.5	6.8	6.3
3.....		4.2	4.2	4.7	5.5	9.4	18.....	4.2	4.2	4.2	5.5	6.8	4.2
4.....		4.2	4.2	13.2	5.5	6.8	19.....	4.7	4.2	4.2	5.5	5.5	4.2
5.....		4.2	4.2	5.5	5.5	6.3	20.....	4.2	4.2	4.2	5.5	8.4	4.2
6.....		4.2	4.2	5.5	5.5	4.2	21.....	4.2	4.2	4.2	5.8	6.8	4.5
7.....		4.2	4.4	5.5	4.7	5.5	22.....	4.2	5.5	4.2	6.8	6.8	4.2
8.....		4.2	4.2	5.5	5.8	4.2	23.....	4.2	4.2	5.5	6.3	6.8	4.2
9.....	6.8	4.2	4.2	5.5	6.8	4.2	24.....	4.2	4.2	4.2	5.5	6.8	4.2
10.....	6.3	4.2	4.2	5.5	5.5	4.2	25.....	4.2	4.2	4.2	5.5	6.8	4.2
11.....	5.5	4.7	4.2	5.2	4.7	4.2	26.....	4.2	4.2	4.7	5.5	6.8	4.2
12.....	5.5	5.2	4.2	6.8	4.7	4.2	27.....	4.2	4.2	4.5	6.8	5.5	4.2
13.....	6.3	4.5	4.2	8.1	4.7	4.2	28.....	4.2	4.2	6.3	6.3	5.5	4.2
14.....	5.5	4.7	4.2	8.4	4.7	4.2	29.....	4.2	4.2	4.5	5.5	5.5	4.2
15.....	4.2	5.2	4.2	6.8	4.7	4.2	30.....	4.2	4.2	4.2	5.5	9.4	4.2
							31.....	4.2	4.2		5.5		4.2

*Monthly discharge of North Waiehu Stream near Wailuku, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
July.....	6.8	4.2	4.69	214.0	B.
August.....	5.5	4.2	4.36	268.0	B.
September.....	6.3	4.2	4.40	262.0	B.
October.....	13.2	4.2	6.10	375.0	B.
November.....	10.0	4.7	6.12	364.0	B.
December.....	9.4	4.2	4.83	297.0	B.
The period.....				1,780.0	

#### SOUTH WAIIEHU STREAM NEAR WAILUKU, MAUI.<sup>1</sup>

**Location.**—About  $1\frac{1}{2}$  miles northwest of Wailuku and 75 feet below diversion dam for South Waiehu ditch.

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

**Gage.**—Inclined-staff gage; read daily, at 5 a. m. and 5 p. m.; datum unchanged

**Channel.**—Shifting.

<sup>1</sup> This station replaces the one formerly maintained at the diversion dam.

**Discharge measurements.**—Made by wading.

**Accuracy.**—A discharge rating has not yet been obtained.

**Cooperation.**—Station maintained in cooperation with Wailuku Sugar Co.

*Discharge measurements of South Waiehu Stream near Wailuku, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 10	J. B. Stewart.....	<i>Feet.</i> 0.30	<i>Sec.-ft.</i> 0.20
16	.....do.....	.28	.15
Sept. 6	.....do.....	.33	.20
Dec. 1	C. T. Bailey.....	.34	.20

*Daily gage height, in feet, of South Waiehu Stream near Wailuku, Maui, for 1912.*

Day.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.40	0.40	0.40	0.40	0.40	16.....	0.45	0.40	0.40	0.80	0.75
2.....	.45	.65	.65	.40	.40	17.....	.45	.40	.40	.48	.45
3.....	.48	.40	.45	.40	.85	18.....	.40	.40	.40	.75	.40
4.....	.45	.40	.60	.40	.40	19.....	.40	.40	.40	.40	.40
5.....	.45	.40	.45	.40	.40	20.....	.40	.40	.40	.48	.40
6.....	.45	.40	.45	.40	.60	21.....	.40	.40	.60	.60	.45
7.....	.45	.40	.42	.40	.90	22.....	.52	.50	.48	.45	.52
8.....	.45	.40	.40	.40	.40	23.....	.42	.45	.40	.40	.40
9.....	.50	.40	.40	.80	.40	24.....	.40	.45	.40	.40	.40
10.....	.50	.40	.40	.48	.40	25.....	.40	.45	.40	.40	.40
11.....	.55	.40	.40	.40	.40	26.....	.52	.45	.40	.40	.40
12.....	.55	.40	.40	.40	.40	27.....	.45	.40	.40	.40	.40
13.....	.45	.40	.55	.40	.40	28.....	.45	.40	.40	.40	.40
14.....	.52	.40	.50	.40	.40	29.....	.45	.40	.40	.40	.40
15.....	.60	.40	.40	.50	.40	30.....	.45	.40	.40	.40	.40
						31.....	.40	.....	.40	.....	.40

### IAO STREAM BASIN.

#### IAO STREAM NEAR WAILUKU, MAUI.

**Location.**—About 3 miles west of Wailuku and one-fourth mile below the forks of the stream.

**Records available.**—May 7, 1910, to December 31, 1912.

**Drainage area.**—Not mapped.

**Gage.**—Friez clock register; datum unchanged.

**Channel.**—Rough; several changes in control since station was established.

**Discharge measurements.**—Made by wading and from cable and car at gage.

**Accuracy.**—Records very good.

*Discharge measurements of Iao Stream near Wailuku, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 15	J. B. Stewart.....	<i>Feet.</i> 2.90	<i>Sec.-ft.</i> 38.5
Aug. 30	.....do.....	2.78	24.9

*Daily gage height, in feet, of Iao Stream near Wailuku, Maui, for 1912.*

[F. G. Duarte, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.82	2.70	3.69	3.54	2.98	2.90	2.71	2.65	2.68	2.92	2.81	2.95
2.....	2.80	3.30	3.95	3.63	2.98	2.85	2.72	2.68	2.90	3.02	2.78	2.88
3.....	2.78	3.20	3.94	3.78	2.94	2.82	2.74	2.68	2.72	2.80	2.72	3.25
4.....	2.73	3.02	3.46	4.43	2.92	2.80	2.78	2.65	2.78	3.09	2.70	2.95
5.....	2.72	2.98	3.42	4.62	3.22	2.79	2.78	2.62	2.70	2.95	2.68	2.85
6.....	2.67	2.90	3.43	3.84	3.08	2.79	2.72	2.65	2.85	2.80	2.68	2.95
7.....	2.73	2.87	3.48	4.20	3.08	2.85	2.82	2.80	3.00	2.85	2.71	3.21
8.....	3.00	2.86	3.25	3.92	3.22	3.02	3.25	2.75	2.78	2.79	3.00	3.08
9.....	2.80	2.84	3.82	3.52	3.08	2.85	3.65	2.85	2.78	2.78	3.89	2.95
10.....	2.70	2.91	3.85	3.38	3.16	3.08	3.17	2.90	2.72	2.82	3.07	2.88
11.....	2.67	3.04	4.36	3.48	3.12	3.05	3.18	2.95	2.68	3.02	3.00	2.82
12.....	2.68	2.93	4.20	3.73	2.90	3.02	3.32	2.87	2.66	3.03	2.90	2.80
13.....	2.70	3.04	3.98	3.38	2.90	2.98	3.29	2.85	2.62	3.08	2.84	2.80
14.....	2.68	2.99	3.53	3.74	2.88	3.10	3.05	2.98	2.60	3.45	2.82	2.85
15.....	2.67	2.96	3.28	3.34	2.87	3.10	2.92	3.35	2.61	3.02	2.88	2.80
16.....	2.66	2.97	3.14	3.68	2.90	2.98	2.93	3.10	2.61	2.90	4.02	2.85
17.....	2.66	2.96	3.47	3.44	2.88	2.98	2.87	2.88	2.67	2.85	3.61	2.81
18.....	2.66	2.90	3.64	3.24	2.90	2.85	2.81	2.80	2.65	2.81	3.62	3.14
19.....	2.65	4.22	3.46	3.17	2.87	2.82	2.80	2.78	2.70	2.72	3.28	3.07
20.....	2.65	4.10	3.42	3.39	2.81	2.80	2.81	2.78	2.75	2.68	3.42	2.93
21.....	2.64	3.92	3.38	3.38	2.82	2.95	3.02	2.77	2.68	2.85	3.60	3.30
22.....	2.63	3.60	3.19	3.27	2.77	2.81	2.92	2.95	2.58	3.00	3.25	3.32
23.....	2.63	3.53	3.10	3.26	2.76	3.04	2.85	2.78	2.62	2.88	3.12	3.32
24.....	2.71	3.51	3.02	3.17	3.02	3.00	2.90	2.73	2.58	2.80	2.92	3.03
25.....	2.65	3.33	3.14	3.08	2.85	2.81	2.83	2.68	2.57	2.78	2.83	3.24
26.....	2.63	3.60	3.13	3.25	3.25	2.78	2.83	3.17	2.75	2.95	2.80	3.17
27.....	2.65	4.25	3.08	3.08	3.35	2.73	2.84	2.95	2.78	3.10	2.78	2.98
28.....	2.67	3.77	3.26	3.02	3.18	2.71	2.71	2.79	2.93	3.05	2.75	3.05
29.....	2.66	3.30	3.30	3.20	2.99	3.10	2.72	2.82	3.19	2.80	2.72	2.94
30.....	2.74	.....	3.90	2.99	3.05	2.67	2.67	2.77	3.01	2.88	3.00	2.98
31.....	2.78	.....	3.76	.....	2.98	.....	2.65	2.72	.....	3.15	.....	2.95

*Daily discharge, in second-feet, of Iao Stream near Wailuku, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	31.2	24.0	112.0	92.8	41.6	36.0	24.6	21.5	23.0	37.4	30.6	39.5
2.....	30.0	67.0	150.0	104.0	41.6	33.0	25.2	23.0	36.0	44.4	28.8	34.8
3.....	28.8	58.0	149.0	124.0	38.8	31.2	26.4	23.0	25.2	30.0	25.2	62.5
4.....	25.8	44.4	83.6	252.0	37.4	30.0	28.8	21.5	28.8	49.3	24.0	39.5
5.....	25.2	41.6	79.2	302.0	59.8	29.4	28.8	20.0	24.0	39.5	23.0	33.0
6.....	22.5	36.0	80.3	133.0	48.6	29.4	25.2	21.5	33.0	30.0	23.0	39.5
7.....	25.8	34.2	85.8	199.0	48.6	33.0	31.2	30.0	43.0	33.0	24.6	58.9
8.....	43.0	33.6	62.5	145.0	59.8	44.4	62.5	27.0	28.8	29.4	43.0	48.6
9.....	30.0	32.4	130.0	90.4	48.6	33.0	106.0	33.0	28.8	28.8	140.0	39.5
10.....	24.0	36.7	134.0	75.0	54.8	48.6	55.6	36.0	25.2	31.2	47.9	34.8
11.....	22.5	45.8	235.0	85.8	51.6	46.5	56.4	39.5	23.0	44.4	43.0	31.2
12.....	23.0	38.1	199.0	117.0	36.0	44.4	69.0	34.2	22.0	45.1	36.0	30.0
13.....	24.0	45.8	156.0	75.0	36.0	41.6	66.1	33.0	20.0	48.6	32.4	30.0
14.....	23.0	42.3	91.6	119.0	34.8	50.0	46.5	41.6	19.0	82.5	31.2	33.0
15.....	22.5	40.2	65.2	71.0	34.2	50.0	37.4	72.0	19.5	44.4	34.8	30.0
16.....	22.0	40.9	53.2	110.0	36.0	41.6	38.1	50.0	19.5	36.0	163.0	33.0
17.....	22.0	40.2	84.7	81.4	34.8	41.6	34.2	34.8	22.5	33.0	101.0	69.0
18.....	22.0	36.0	105.0	61.6	36.0	33.0	30.6	30.0	21.5	30.6	103.0	53.2
19.....	21.5	203.0	83.6	55.6	34.2	31.2	30.0	28.8	24.0	25.2	65.2	47.9
20.....	21.5	178.0	79.2	76.0	30.6	30.0	30.6	28.8	27.0	23.0	79.2	38.1
21.....	21.0	145.0	75.0	75.0	31.2	39.5	44.4	28.2	23.0	33.0	100.0	67.0
22.....	20.5	100.0	57.2	64.3	28.2	30.6	37.4	39.5	18.2	43.0	62.5	69.0
23.....	20.5	91.6	50.0	63.0	27.6	45.8	30.0	28.8	20.0	34.8	51.6	69.0
24.....	24.6	89.2	44.4	55.6	44.4	43.0	36.0	25.8	18.2	30.0	37.4	45.1
25.....	21.5	70.0	53.2	48.6	33.0	30.6	31.8	23.0	17.8	28.8	31.8	61.6
26.....	20.5	100.0	52.4	62.5	62.5	28.8	31.8	55.6	27.0	39.5	30.0	55.6
27.....	21.5	210.0	48.6	48.6	72.0	25.8	32.4	39.5	28.8	50.0	28.8	41.6
28.....	22.5	123.0	63.4	44.4	56.4	24.6	24.6	29.4	38.1	46.5	27.0	45.8
29.....	22.0	67.0	67.0	42.3	50.0	24.0	25.2	31.2	67.2	30.0	25.2	39.5
30.....	26.4	.....	142.0	42.3	46.5	22.5	22.5	28.2	43.7	34.8	43.0	41.6
31.....	28.8	.....	121.0	.....	41.6	.....	21.5	25.2	.....	54.0	.....	39.5

*Monthly discharge of Iao Stream near Wailuku, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	43.0	20.5	24.5	1,510	B.
February.....	210.0	24.0	72.9	4,190	A.
March.....	235.0	44.4	96.6	5,940	A.
April.....	302.0	42.3	97.2	5,780	A.
May.....	72.0	27.6	43.1	2,650	A.
June.....	50.0	22.5	35.8	2,130	B.
July.....	106.0	21.5	38.5	2,370	B.
August.....	72.0	20.0	32.4	1,990	B.
September.....	57.2	17.8	26.9	1,600	B.
October.....	82.5	23.0	38.4	2,360	B.
November.....	163.0	23.0	51.2	3,050	A.
December.....	69.0	30.0	44.0	2,710	A.
The year.....	302.0	17.8	50.0	36,300	

**MANIANIA DITCH NEAR WAILUKU, MAUI.**

**Location.**—About 2½ miles west of Wailuku and 800 feet below intake.

**Records available.**—November 14, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily; gage moved about December 30, 1911; new location and datum.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made from plank 50 feet above gage.

**Accuracy.**—Fair.

**Cooperation.**—Station maintained in cooperation with Wailuku Sugar Co.

*Discharge measurements of Maniania ditch near Wailuku, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
July 9	J. B. Stewart.....	<i>Feet.</i> 1.50	<i>Sec.-ft.</i> 30.0
Dec. 9	C. T. Bailey.....	1.10	19.8

*Daily gage height, in feet, of Maniania ditch near Wailuku, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.50	1.00	1.10	1.35	1.30	1.35	1.20	1.10	1.05	1.45	1.30	1.10
2.....	1.45	1.45	1.10	1.35	1.35	1.30	1.20	1.10	1.40	1.50	.90	1.35
3.....	1.40	1.50	.90	1.35	1.35	1.25	1.20	1.10	1.10	1.30	.90	.90
4.....	1.30	1.20	.90	1.25	1.35	1.25	1.20	1.05	1.20	1.50	1.05	1.00
5.....	1.25	1.20	1.05	1.25	1.20	1.20	1.20	1.05	1.15	1.30	1.05	1.20
6.....	1.20	1.10	1.05	1.25	1.35	1.20	1.25	1.05	1.20	1.10	1.05	1.25
7.....	1.20	1.10	1.05	1.20	1.35	1.25	1.30	1.30	1.30	1.15	1.00	1.20
8.....	1.45	1.05	1.10	1.20	1.35	1.35	1.40	1.10	1.00	1.12	1.20	1.00
9.....	1.40	1.10	1.10	1.20	1.30	1.25	1.40	1.30	1.15	1.05	1.40	1.20
10.....	1.25	1.05	1.00	1.20	1.30	1.40	1.35	1.30	1.05	1.05	1.20	1.25
11.....	1.25	1.30	1.10	1.25	1.30	1.45	1.40	1.30	1.05	1.05	1.40	1.20
12.....	1.15	1.15	1.15	1.10	1.20	1.40	1.40	1.30	1.05	1.30	1.30	1.20
13.....	1.15	1.25	1.20	.95	1.25	1.45	1.20	1.25	.95	1.40	1.25	1.12
14.....	1.10	1.30	1.20	1.00	1.25	1.45	1.20	1.50	.95	1.50	1.15	1.15
15.....	1.10	1.10	1.20	1.20	1.25	1.45	1.40	1.50	.90	1.45	1.40	1.00
16.....	1.10	1.10	1.25	1.20	1.25	1.25	1.50	1.40	.95	1.35	1.35	1.30
17.....	1.10	1.10	.75	1.20	1.25	1.45	1.40	1.35	.95	1.25	1.20	1.20
18.....	1.10	1.00	1.20	1.20	1.25	1.40	1.40	1.15	1.00	1.12	1.20	1.30
19.....	1.10	1.20	1.25	1.00	1.25	1.40	1.35	1.20	1.00	1.10	1.20	1.45
20.....	1.10	.40	1.25	1.05	1.35	1.40	1.25	1.10	1.00	.95	1.20	1.35

*Daily gage height, in feet, of Maniania ditch near Wailuku, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.00	0.90	1.25	1.10	1.30	1.50	1.40	1.10	1.00	1.20	1.20	1.35
22.....	1.05	.70	1.25	1.30	1.30	1.40	1.25	1.30	.90	1.35	1.20	1.20
23.....	1.05	.70	1.25	1.30	1.25	1.30	1.25	1.10	.95	1.35	.....	1.35
24.....	1.15	.70	1.10	1.30	1.35	1.45	1.30	1.05	.85	1.30	.....	1.35
25.....	1.05	.50	1.25	1.35	1.25	1.40	1.20	1.00	.85	1.15	.....	1.20
26.....	1.05	1.00	1.25	1.35	1.30	1.35	1.20	1.35	1.00	1.40	.....	1.35
27.....	1.00	1.05	1.30	1.35	1.35	1.30	1.25	1.40	1.10	1.35	1.10	1.40
28.....	.90	1.05	1.35	1.20	1.30	1.25	1.20	1.25	1.20	1.45	1.20	1.45
29.....	.95	1.05	1.35	1.30	1.30	1.20	1.25	1.35	1.10	1.35	1.15	1.20
30.....	.95	.....	1.35	1.30	1.35	1.15	1.15	1.25	1.40	1.40	1.30	1.40
31.....	1.05	.....	1.20	.....	1.35	.....	1.10	1.10	.....	1.50	.....	1.40

*Daily discharge, in second-feet, of Maniania ditch near Wailuku, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	30.0	17.5	20.0	26.2	25.0	26.2	22.5	20.0	18.8	28.8	25.0	20.0
2.....	28.8	28.8	20.0	26.2	26.2	25.0	22.5	20.0	27.5	30.0	15.0	26.2
3.....	27.5	30.0	15.0	26.2	26.2	23.8	22.5	20.0	20.0	25.0	15.0	15.0
4.....	25.0	22.5	15.0	23.8	26.2	23.8	22.5	18.8	22.5	30.0	18.8	17.5
5.....	23.8	22.5	18.8	23.8	22.5	22.5	22.5	18.8	21.2	25.0	18.8	22.5
6.....	22.5	20.0	18.8	23.8	26.2	22.5	23.8	18.8	22.5	20.0	18.8	23.8
7.....	22.5	20.0	18.8	22.5	26.2	23.8	25.0	25.0	25.0	21.2	17.5	22.5
8.....	28.8	18.8	20.0	22.5	26.2	26.2	27.5	20.0	17.5	20.5	22.5	17.5
9.....	27.5	20.0	20.0	22.5	25.0	23.8	27.5	25.0	21.2	18.8	27.5	22.5
10.....	23.8	18.8	17.5	22.5	25.0	27.5	26.2	25.0	18.8	18.8	22.5	23.8
11.....	23.8	25.0	20.0	23.8	25.0	28.8	27.5	25.0	18.8	18.8	27.5	22.5
12.....	21.2	21.2	21.2	20.0	22.5	27.5	27.5	25.0	18.8	25.0	25.0	22.5
13.....	21.2	23.8	22.5	16.2	23.8	28.8	22.5	23.8	16.2	27.5	23.8	20.5
14.....	20.0	25.0	22.5	17.5	23.8	28.8	22.5	30.0	16.2	30.0	21.2	21.2
15.....	20.0	20.0	22.5	22.5	23.8	28.8	27.5	30.0	15.0	28.8	27.5	17.5
16.....	20.0	20.0	23.8	22.5	23.8	23.8	30.0	27.5	16.2	26.2	26.2	25.0
17.....	20.0	20.0	11.5	22.5	23.8	28.8	27.5	26.2	16.2	23.8	22.5	22.5
18.....	20.0	17.5	22.5	22.5	23.8	27.5	27.5	21.2	17.5	20.5	22.5	25.0
19.....	20.0	22.5	23.8	17.5	23.8	27.5	26.2	22.5	17.5	20.0	22.5	28.8
20.....	20.0	5.0	23.8	18.8	26.2	27.5	23.8	20.0	17.5	16.2	22.5	26.2
21.....	17.5	15.0	23.8	20.0	25.0	30.0	27.5	20.0	17.5	22.5	22.5	26.2
22.....	18.8	10.5	23.8	25.0	25.0	27.5	23.8	25.0	15.0	26.2	22.5	22.5
23.....	18.8	10.5	23.8	25.0	23.8	25.0	23.8	20.0	16.2	26.2	22.0	26.2
24.....	21.2	10.5	20.0	25.0	26.2	28.8	25.0	18.8	13.8	25.0	21.5	26.2
25.....	18.8	6.5	23.8	26.2	23.8	27.5	22.5	17.5	13.8	21.2	21.0	22.5
26.....	18.8	17.5	23.8	26.2	25.0	26.2	22.5	26.2	17.5	27.5	20.5	26.2
27.....	17.5	18.8	25.0	26.2	26.2	25.0	23.8	27.5	20.0	26.2	20.0	27.5
28.....	15.0	18.8	26.2	22.5	25.0	23.8	22.5	23.8	22.5	28.8	22.5	28.8
29.....	16.2	18.8	26.2	25.0	25.0	22.5	23.8	26.2	20.0	26.2	21.2	22.5
30.....	16.2	.....	26.2	25.0	26.2	21.2	21.2	23.8	27.5	27.5	25.0	27.5
31.....	18.8	.....	22.5	.....	26.2	.....	20.0	20.0	.....	30.0	.....	27.5

NOTE.—Daily discharge determined from rating curve based on two discharge measurements in 1912.

*Monthly discharge of Maniania ditch near Wailuku, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	30.0	15.0	21.4	1,320	C.
February.....	30.0	6.5	18.8	1,080	C.
March.....	26.2	11.5	21.4	1,320	C.
April.....	26.2	16.2	23.0	1,370	C.
May.....	26.2	22.5	24.9	1,530	C.
June.....	30.0	21.2	26.0	1,550	C.
July.....	30.0	20.0	24.6	1,510	C.
August.....	30.0	17.5	22.9	1,410	C.
September.....	27.5	13.8	19.0	1,130	C.
October.....	30.0	16.2	24.6	1,510	C.
November.....	27.5	15.0	22.0	1,310	C.
December.....	28.8	15.0	23.4	1,440	C.
The year.....	30.0	6.5	22.7	16,500	



## WAIKAPU STREAM BASIN.

## WAIKAPU STREAM NEAR WAIKAPU, MAUI.

**Location.**—About 5 miles southwest of Wailuku and  $1\frac{1}{2}$  miles west of Waikapu, 500 feet below Palolo ditch.

**Records available.**—November 25, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 9 a. m. and 2 p. m.; datum unchanged.

**Channel.**—Shifting.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Fair.

*Discharge measurements of Waikapu Stream near Waikapu, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
July 9	J. B. Stewart.....	0.91	6.60	Oct. 18	J. B. Stewart.....	0.30	0.25
12	.....do.....	.60	.50	Nov. 20	.....do.....	.70	2.34
Aug. 30	.....do.....	.31	.36	Dec. 11	C. T. Bailey.....	.30	.22

*Daily gage height, in feet, of Waikapu Stream near Waikapu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.38	0.32	0.42	1.10	0.38	0.30	0.30	0.35	0.30	0.30	0.30	0.35
2.....	.38	.62	1.49	1.18	.38	.29	.30	.38	.32	.40	.30	.30
3.....	.38	.51	1.40	1.34	.38	.28	.30	.39	.30	.30	.30	.48
4.....	.38	.60	.68	2.02	.35	.28	.30	.38	.30	.31	.30	.30
5.....	.38	.32	.46	1.81	.32	.28	.30	.38	.30	.30	.30	.30
6.....	.38	.32	.48	1.12	.30	.25	.30	.40	.30	.30	.30	.30
7.....	.38	.32	.64	1.38	.30	.30	.29	.40	.31	.28	.30	.38
8.....	.50	.32	.42	1.21	.31	.30	.28	.40	.30	.30	.31	.30
9.....	.41	.34	1.02	.91	.30	.30	1.36	.40	.30	.30	1.48	.30
10.....	.40	.32	1.39	.50	.30	.62	.66	.40	.30	.30	.35	.30
11.....	.38	.49	1.62	.52	.30	.39	.39	.40	.30	.30	.30	.30
12.....	.38	.34	1.26	1.91	.30	.34	.34	.42	.30	.30	.30	.30
13.....	.38	.38	1.26	.89	.30	.31	.54	.40	.30	.34	.30	.28
14.....	.38	.32	.55	1.46	.30	.30	.44	.40	.30	.45	.28	.30
15.....	.38	.32	.35	.86	.30	.48	.42	.74	.30	.30	.28	.30
16.....	.36	.32	.32	.65	.30	.35	.42	.48	.30	.30	1.32	.30
17.....	.40	.32	.70	.68	.30	.38	.41	.40	.30	.30	.92	.31
18.....	.40	.32	1.06	.70	.28	.30	.38	.39	.30	.30	1.22	.30
19.....	.40	1.15	.54	.45	.28	.30	.35	.35	.30	.30	.38	.30
20.....	.40	1.34	.89	.52	.30	.30	.35	.35	.30	.30	1.08	.30
21.....	.40	1.08	.74	.54	.28	.48	.35	.35	.30	.31	.48	.30
22.....	.39	.64	.45	.42	.28	.30	.34	.44	.30	.32	.52	.31
23.....	.40	.46	.40	.42	.28	.30	.32	.36	.31	.30	.31	.30
24.....	.38	.40	.40	.40	.49	.41	.32	.35	.30	.30	.30	.30
25.....	.35	.36	.35	.40	.36	.31	.32	.35	.30	.30	.30	.30
26.....	.32	.55	.38	.40	.36	.30	.32	.38	.30	.30	.31	.30
27.....	.32	1.92	.40	.45	.59	.30	.32	.35	.30	.58	.30	.30
28.....	.32	1.62	.36	.40	.40	.30	.32	.30	.32	.36	.30	.30
29.....	.36	.56	.40	.39	.36	.30	.40	.31	.30	.30	.30	.30
30.....	.36	.....	.59	.38	.30	.30	.40	.30	.38	.30	.30	.30
31.....	.32	.....	.74	.....	.30	.....	.38	.30	.....	.30	.....	.30

*Daily discharge, in second-feet, of Waikapu Stream near Waikapu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.3	0.2	0.3	13.0	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2
2.....	.3	1.2	34.3	16.2	.3	.2	.2	.3	.2	.3	.2	.2
3.....	.3	.6	28.0	24.4	.3	.2	.2	.3	.2	.2	.2	.5
4.....	.3	1.0	1.8	87.6	.2	.2	.2	.3	.2	.2	.2	.2
5.....	.3	.2	.4	63.1	.2	.2	.2	.3	.2	.2	.2	.2

*Daily discharge, in second-feet, of Waikapu Stream near Waikapu, Maui, for 1912—Contd.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
6.....	0.3	0.2	0.5	13.8	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2
7.....	.3	.2	1.4	26.8	.2	.2	.2	.3	.2	.2	.2	.3
8.....	.5	.2	.3	17.5	.2	.2	.2	.3	.2	.2	.2	.2
9.....	.3	.2	9.8	6.3	.2	.2	25.6	.3	.2	.2	33.6	.2
10.....	.3	.2	27.4	.5	.2	1.2	1.6	.3	.2	.2	.2	.2
11.....	.3	.5	44.8	.6	.2	.3	.3	.3	.2	.2	.2	.2
12.....	.3	.2	20.0	74.2	.2	.2	.2	.3	.2	.2	.2	.2
13.....	.3	.3	20.0	5.8	.2	.2	.7	.3	.2	.2	.2	.2
14.....	.3	.2	.8	32.2	.2	.2	.4	.3	.2	.4	.2	.2
15.....	.3	.2	.2	5.2	.2	.5	.3	2.8	.2	.2	.2	.2
16.....	.3	.2	.2	1.5	.2	.2	.3	.5	.2	.2	23.2	.2
17.....	.3	.2	2.0	1.8	.2	.3	.3	.3	.2	.2	6.6	.2
18.....	.3	.2	11.4	2.0	.2	.2	.3	.3	.2	.2	18.0	.2
19.....	.3	15.0	.7	.4	.2	.2	.2	.2	.2	.2	.3	.2
20.....	.3	24.4	5.8	.6	.2	.2	.2	.2	.2	.2	12.2	.2
21.....	.3	12.2	2.8	.7	.2	.5	.2	.2	.2	.2	.5	.2
22.....	.3	1.4	.4	.3	.2	.2	.2	.4	.2	.2	.6	.2
23.....	.3	.4	.3	.3	.2	.2	.2	.3	.2	.2	.2	.2
24.....	.3	.3	.3	.3	.5	.3	.2	.3	.2	.2	.2	.2
25.....	.2	.3	.2	.3	.3	.2	.2	.3	.2	.2	.2	.2
26.....	.2	.8	.3	.3	.3	.2	.2	.3	.2	.2	.2	.2
27.....	.2	75.4	.3	.4	1.0	.2	.2	.2	.2	.2	.2	.2
28.....	.2	44.8	.3	.3	.3	.2	.2	.2	.2	.2	.2	.2
29.....	.3	1.0	.3	.3	.2	.2	.3	.2	.2	.2	.2	.2
30.....	.3	.....	1.0	.3	.2	.2	.2	.2	.3	.2	.2	.2
31.....	.2	.....	2.8	.....	.2	.....	.3	.2	.....	.2	.....	.2

*Monthly discharge of Waikapu Stream near Waikapu, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	0.5	0.2	0.29	17.8	C.
February.....	75.4	.2	6.28	361.0	C.
March.....	44.8	.2	7.07	435.0	C.
April.....	87.6	.3	13.20	785.0	C.
May.....	1.0	.2	.25	15.4	C.
June.....	1.2	.2	.26	15.5	C.
July.....	25.6	.2	1.11	68.2	C.
August.....	2.8	.2	.36	22.1	C.
September.....	.3	.2	.20	11.9	C.
October.....	.9	.2	.24	14.8	C.
November.....	33.6	.2	.33	19.6	C.
December.....	.5	.2	.21	12.9	C.
The year.....	87.6	.2	2.70	1,780.0	

#### SOUTH SIDE WAIKAPU DITCH NEAR WAIKAPU, MAUI.

**Location.**—About 1½ miles west of Waikapu, 1 mile below ditch intake, and 5 miles southwest of Wailuku.

**Records available.**—November 21, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 9 a. m. and 2 p. m.

**Channel.**—Permanent.

**Discharge measurements.**—Made from plank over ditch about 400 feet below gage.

**Accuracy.**—Records good.

**Cooperation.**—Station is maintained in cooperation with Wailuku Sugar Co.

*Discharge measurements of South Side Waikapu ditch near Waikapu, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 8	J. B. Stewart.....	0.84	8.02	Oct. 18	J. B. Stewart.....	0.59	3.56
July 9	.....do.....	1.07	11.4	Nov. 20	.....do.....	.90	9.68
Aug. 30	.....do.....	.65	4.90	Dec. 11	C. T. Bailey.....	.62	4.58

<sup>a</sup> New gage Oct. 18, 1912.

*Daily gage height, in feet, of South Side Waikapu ditch near Waikapu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.60	0.51	0.89	1.05	0.80	0.71	0.70	0.70	0.65	0.60	0.60	0.68
2.....	.60	.91	1.05	1.14	.80	.70	.70	.70	.70	.35	.60	.60
3.....	.58	.82	1.01	1.11	.80	.70	.70	.70	.66	.61	.58	.78
4.....	.58	.72	1.00	1.20	.78	.70	.70	.70	.65	.62	.58	.68
5.....	.58	.61	.90	.95	.78	.70	.70	.70	.65	.60	.58	.60
6.....	.58	.58	.90	1.10	.75	.70	.69	.70	.65	.60	.58	.60
7.....	.58	.58	.95	1.15	.75	.71	.68	.70	.69	.58	.58	.78
8.....	.78	.55	.89	1.11	.78	.70	.68	.70	.65	.58	.58	.71
9.....	.61	.59	1.06	.96	.75	.70	1.10	.70	.64	.58	.86	.66
10.....	.60	.58	1.11	1.01	.74	.85	.95	.70	.62	.58	.78	.60
11.....	.58	.68	1.15	.98	.74	.89	.81	.71	.61	.58	.65	.60
12.....	.58	.61	1.10	1.28	.71	.84	.80	.75	.60	.60	.60	.60
13.....	.58	.66	1.10	.99	.70	.85	.92	.72	.60	.65	.60	.60
14.....	.58	.60	1.00	1.12	.70	.79	.80	.70	.60	.78	.58	.60
15.....	.55	.60	.90	1.02	.70	.90	.74	.96	.60	.62	.58	.60
16.....	.55	.60	.81	1.02	.71	.88	.75	.89	.60	.60	.96	.61
17.....	.55	.60	.98	1.00	.70	.85	.74	.72	.60	.60	.86	.60
18.....	.55	.58	1.06	.99	.70	.79	.72	.69	.60	.60	.92	.60
19.....	.55	1.05	.80	.98	.70	.75	.70	.66	.60	.58	.81	.60
20.....	.52	1.10	1.00	.96	.71	.70	.70	.65	.60	.58	.95	.58
21.....	.52	.95	.92	.94	.70	.80	.70	.65	.60	.62	.82	.58
22.....	.52	.76	.85	.89	.70	.71	.69	.76	.60	.68	.84	.61
23.....	.52	.79	.81	.89	.69	.70	.70	.62	.61	.60	.75	.60
24.....	.59	.70	.79	.85	.90	.78	.70	.62	.60	.60	.70	.58
25.....	.52	.80	.74	.82	.70	.71	.70	.62	.60	.60	.68	.58
26.....	.50	.90	.79	.80	.79	.70	.70	.71	.64	.60	.65	.58
27.....	.50	1.11	.79	.82	.92	.70	.70	.80	.60	.86	.60	.55
28.....	.50	1.06	.78	.79	.82	.69	.70	.70	.65	.75	.60	.58
29.....	.54	.99	.80	.78	.82	.68	.70	.69	.60	.62	.60	.56
30.....	.64	.....	.95	.80	.79	.68	.70	.69	.68	.60	.61	.58
31.....	.60	.....	.98	.....	.79	.....	.70	.65	.....	.68	.....	.58

*Daily discharge, in second-feet, of South Side Waikapu ditch near Waikapu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.2	2.9	8.8	11.7	7.3	5.9	5.7	5.7	5.0	4.2	4.2	5.4
2.....	4.2	9.2	11.7	13.4	7.3	5.7	5.7	5.7	5.7	1.0	4.2	4.2
3.....	3.9	7.6	11.0	12.8	7.3	5.7	5.7	5.7	5.1	4.4	3.9	7.0
4.....	3.9	6.0	10.8	14.5	7.0	5.7	5.7	5.7	5.0	4.5	3.9	5.4
5.....	3.9	4.4	9.0	9.9	7.0	5.7	5.7	5.7	5.0	4.2	3.9	4.2
6.....	3.9	3.9	9.0	12.6	6.5	5.7	5.6	5.7	5.0	4.2	3.9	4.2
7.....	3.9	3.9	9.9	13.6	6.5	5.9	5.4	5.7	5.6	3.9	3.9	7.0
8.....	7.0	3.5	8.8	12.8	7.0	5.7	5.4	5.7	5.0	3.9	3.9	5.9
9.....	4.4	4.1	11.9	10.1	6.5	5.7	12.6	5.7	4.8	3.9	8.3	5.1
10.....	4.2	3.9	12.8	11.0	6.3	8.2	9.9	5.7	4.5	3.9	7.0	4.2
11.....	3.9	5.4	13.6	10.4	6.3	8.8	7.5	5.9	4.4	3.9	5.0	4.2
12.....	3.9	4.4	12.6	16.1	5.9	8.0	7.3	6.5	4.2	4.2	4.2	4.2
13.....	3.9	5.1	12.6	10.6	5.7	8.2	9.4	6.0	4.2	5.0	4.2	4.2
14.....	3.9	4.2	10.8	13.0	5.7	7.1	7.3	5.7	4.2	7.0	3.9	4.2
15.....	3.5	4.2	9.0	11.2	5.7	9.0	6.3	10.1	4.2	4.5	3.9	4.2

*Daily discharge, in second-feet, of South Side Waikapu ditch near Waikapu, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	3.5	4.2	7.5	11.2	5.9	8.7	6.5	8.8	4.2	4.2	10.1	4.4
17.....	3.5	4.2	10.4	10.8	5.7	8.2	6.3	6.0	4.2	4.2	8.3	4.2
18.....	3.5	3.9	11.9	10.6	5.7	7.1	6.0	5.6	4.2	4.2	9.4	4.2
19.....	3.5	11.7	7.3	10.4	5.7	6.5	5.7	5.1	4.2	3.9	7.5	4.2
20.....	3.1	12.6	10.8	10.1	5.9	5.7	5.7	5.0	4.2	3.9	9.9	3.9
21.....	3.1	9.9	9.4	9.7	5.7	7.3	5.7	5.0	4.2	4.5	7.6	3.9
22.....	3.1	6.7	8.2	8.8	5.7	5.9	5.6	6.7	4.2	5.4	8.0	4.4
23.....	3.1	7.1	7.5	8.8	5.6	5.7	5.7	4.5	4.4	4.2	6.5	4.2
24.....	4.1	5.7	7.1	8.2	9.0	7.0	5.7	4.5	4.2	4.2	5.7	3.9
25.....	3.1	7.3	6.3	7.6	5.7	5.9	5.7	4.5	4.2	4.2	5.4	3.9
26.....	2.8	9.0	7.1	7.3	7.1	5.7	5.7	5.9	4.8	4.2	5.0	3.9
27.....	2.8	12.8	7.1	7.6	9.4	5.7	5.7	7.3	4.2	8.3	4.2	3.5
28.....	2.8	11.9	7.0	7.1	7.6	5.6	5.7	5.7	5.0	6.5	4.2	3.9
29.....	3.4	10.6	7.3	7.0	7.6	5.4	5.7	5.6	4.2	4.5	4.2	3.6
30.....	4.8	.....	9.9	7.3	7.1	5.4	5.7	5.6	5.4	4.2	4.4	3.9
31.....	2.8	.....	10.4	.....	7.1	.....	5.7	5.0	.....	5.4	.....	3.9

*Monthly discharge of South Side Waikapu ditch near Waikapu, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	7.0	2.8	3.73	229.0	A.
February.....	12.8	2.9	6.56	377.0	A.
March.....	13.6	6.3	9.60	590.0	A.
April.....	16.1	7.0	10.50	625.0	A.
May.....	9.4	5.6	6.60	406.0	A.
June.....	9.0	5.4	6.56	390.0	A.
July.....	12.6	5.4	6.39	393.0	A.
August.....	10.1	4.5	5.87	361.0	A.
September.....	5.7	4.2	4.59	273.0	A.
October.....	8.3	1.0	4.47	275.0	A.
November.....	10.1	3.9	5.62	334.0	A.
December.....	7.0	3.5	4.44	273.0	A.
The year.....	16.1	1.0	6.24	4,530.00	

#### **PALOLO (EVERETT) DITCH NEAR WAIKAPU, MAUI.**

**Location.**—About 5½ miles southwest of Wailuku and 1½ miles west of Waikapu and 200 feet below ditch intake.

**Records available.**—November 21, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 9 a. m. and 2 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained in cooperation with Wailuku Sugar Co.

*Discharge measurements of Palolo ditch near Waikapu, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.	Date.	Hydrographer.	Gage height.	Dis- charge.
Mar. 8	J. B. Stewart.....	<i>Feet.</i> 0.98	<i>Sec.-ft.</i> 3.50	Oct. 18	J. B. Stewart.....	<i>Feet.</i> 0.88	<i>Sec.-ft.</i> 3.00
July 12	.....do.....	.98	3.82	Dec. 11	C. T. Bailey.....	.86	2.91
Aug. 30	.....do.....	.89	3.27				

*Daily gage height, in feet, of Palolo ditch near Waikapu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.95	0.98	1.01	1.09	0.98	0.95	0.95	0.95	0.92	0.90	0.88	0.91
2.....	.95	1.18	1.14	1.10	.98	.95	.95	.95	.95	.98	.88	.90
3.....	.95	1.19	1.11	1.15	.96	.95	.95	.95	.94	.90	.88	.96
4.....	.95	1.09	1.09	1.20	.95	.95	.95	.95	.90	.91	.88	.90
5.....	.95	.98	1.02	1.11	.95	.95	.95	.95	.90	.90	.88	.88
6.....	.95	.98	1.04	.95	.95	.95	.95	.95	.92	.90	.88	.88
7.....	.98	.98	1.09	1.05	.95	.96	.95	.95	.91	.90	.88	.99
8.....	1.04	.98	1.00	1.05	.98	.95	.95	.95	.90	.88	.89	.90
9.....	1.00	.99	1.09	1.02	.95	.95	1.11	.95	.90	.88	1.18	.90
10.....	.98	.98	1.14	.95	.95	.99	1.01	.95	.90	.89	.92	.88
11.....	.98	1.05	1.15	.96	.95	1.00	.96	.96	.90	.89	.90	.88
12.....	.98	1.01	1.14	1.16	.95	.96	.95	.98	.90	.90	.89	.88
13.....	.98	1.02	1.11	.95	.95	.98	1.00	.96	.90	.95	.88	.88
14.....	.98	.99	1.01	1.06	.95	.96	.95	.95	.90	.98	.88	.88
15.....	.95	.98	.98	1.05	.95	1.00	.95	.99	.90	.90	.88	.88
16.....	.95	.98	.98	1.04	.96	.98	.96	.98	.90	.90	1.08	.89
17.....	.95	.98	1.06	1.04	.95	.95	.95	.95	.90	.90	1.01	.90
18.....	.95	.98	1.10	1.05	.95	.95	.95	.95	.90	.89	1.08	.88
19.....	.95	1.14	1.00	.99	.95	.95	.95	.95	.90	.88	.95	.88
20.....	.95	1.14	1.04	.98	.96	.94	.95	.95	.90	.88	1.08	.88
21.....	.95	1.11	1.02	.98	.95	.99	.95	.95	.90	.92	.96	.89
22.....	.95	1.09	.99	.95	.95	.96	.95	.98	.90	.92	.96	.89
23.....	.95	1.05	.95	.95	.95	.95	.95	.95	.92	.90	.90	.88
24.....	.99	1.00	.94	.98	1.05	1.00	.95	.92	.90	.90	.90	.88
25.....	.98	.98	.92	.98	.98	.96	.95	.92	.90	.90	.90	.88
26.....	.95	1.01	.94	.95	.98	.95	.95	.94	.91	.90	.90	.88
27.....	.95	1.14	.95	.95	1.05	.95	.95	.98	.90	1.01	.90	.86
28.....	.95	1.11	.96	.98	.98	.95	.95	.94	.92	.98	.88	.85
29.....	.96	1.02	.95	.98	.99	.95	.95	.94	.90	.90	.88	.86
30.....	.98	.....	.98	.98	.95	.95	.95	.96	.94	.88	.89	.88
31.....	.98	.....	.99	.....	.95	.....	.95	.94	.....	.89	.....	.88

*Daily discharge, in second-feet, of Palolo ditch near Waikapu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.6	3.8	4.1	4.9	3.8	3.6	3.6	3.6	3.4	3.2	3.0	3.2
2.....	3.6	5.8	5.4	5.0	3.8	3.6	3.6	3.6	3.6	3.8	3.0	3.2
3.....	3.6	5.9	5.1	5.5	3.7	3.6	3.6	3.6	3.5	3.2	3.0	3.7
4.....	3.6	4.9	4.9	6.0	3.6	3.6	3.6	3.6	3.2	3.3	3.0	3.2
5.....	3.6	3.8	4.2	5.1	3.6	3.6	3.6	3.6	3.2	3.2	3.0	3.0
6.....	3.6	3.8	4.4	3.6	3.6	3.6	3.6	3.6	3.4	3.2	3.0	3.0
7.....	3.8	3.8	4.9	4.5	3.6	3.7	3.6	3.6	3.3	3.2	3.0	3.9
8.....	4.4	3.8	4.0	4.5	3.8	3.6	3.6	3.6	3.2	3.0	3.1	3.2
9.....	4.0	3.9	4.9	4.2	3.6	3.6	5.1	3.6	3.2	3.0	.58	3.2
10.....	3.8	3.8	5.4	3.6	3.6	3.9	4.1	3.6	3.2	3.1	3.4	3.0
11.....	3.8	4.5	5.5	3.7	3.6	4.0	3.7	3.7	3.2	3.1	3.2	3.0
12.....	3.8	4.1	5.4	5.6	3.6	3.7	3.6	3.8	3.2	3.2	3.1	3.0
13.....	3.8	4.2	5.1	3.6	3.6	3.8	4.0	3.7	3.2	3.6	3.0	3.0
14.....	3.8	3.9	4.1	4.6	3.6	3.7	3.6	3.6	3.2	3.8	3.0	3.0
15.....	3.6	3.8	3.8	4.5	3.6	4.0	3.6	3.9	3.2	3.2	3.0	3.0
16.....	3.6	3.8	3.8	4.4	3.7	3.8	3.7	3.8	3.2	3.2	4.8	3.1
17.....	3.6	3.8	4.6	4.4	3.6	3.6	3.6	3.6	3.2	3.2	4.1	3.2
18.....	3.6	3.8	5.0	4.5	3.6	3.6	3.6	3.6	3.2	3.1	4.8	3.0
19.....	3.6	5.4	4.0	3.9	3.6	3.6	3.6	3.6	3.2	3.0	3.6	3.0
20.....	3.6	5.4	4.4	3.8	3.7	3.5	3.6	3.6	3.2	3.0	4.8	3.0
21.....	3.6	5.1	4.2	3.8	3.6	3.9	3.6	3.6	3.2	3.4	3.7	3.1
22.....	3.6	4.9	3.9	3.6	3.6	3.7	3.6	3.8	3.2	3.4	3.7	3.1
23.....	3.6	4.5	3.6	3.6	3.6	3.6	3.6	3.6	3.4	3.2	3.2	3.0
24.....	3.9	4.0	3.5	3.8	4.5	4.0	3.6	3.4	3.2	3.2	3.2	3.0
25.....	3.8	3.8	3.4	3.8	3.8	3.7	3.6	3.4	3.2	3.2	3.2	3.0
26.....	3.6	4.1	3.5	3.6	3.8	3.6	3.6	3.5	3.3	3.2	3.2	3.0
27.....	3.6	5.4	3.6	3.6	4.5	3.6	3.6	3.8	3.2	4.1	3.2	2.9
28.....	3.6	5.1	3.7	3.8	3.8	3.6	3.6	3.5	3.4	3.8	3.0	2.8
29.....	3.7	4.2	3.6	3.8	3.9	3.6	3.6	3.5	3.2	3.2	3.0	2.9
30.....	3.8	.....	3.8	3.8	3.6	3.6	3.6	3.7	3.5	3.0	3.1	3.0
31.....	3.8	.....	3.9	.....	3.6	.....	3.6	3.5	.....	3.1	.....	3.0

*Monthly discharge of Palolo ditch near Waikapu, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	4.4	3.6	3.71	228	A.
February.....	5.9	3.8	4.38	252	A.
March.....	5.5	3.4	4.31	265	A.
April.....	6.0	3.6	4.24	252	A.
May.....	4.5	3.6	3.72	229	A.
June.....	4.0	3.5	3.69	220	A.
July.....	5.1	3.6	3.68	226	A.
August.....	3.9	3.4	3.62	223	A.
September.....	3.6	3.2	3.27	195	A.
October.....	4.1	3.0	3.27	201	A.
November.....	5.8	3.0	3.44	205	A.
December.....	3.9	2.8	3.09	190	A.
The year.....	6.0	2.8	3.70	2,690	

## UKUMEHAME STREAM BASIN.

## UKUMEHAME STREAM NEAR OLOWALU, MAUI.

**Location.**—About 8½ miles southeast of Lahaina and 2½ miles east of Olowalu and 125 feet above intake of Olowalu Plantation ditch.

**Records available.**—August 14, 1911, to December 16, 1912.

**Gage.**—Inclined staff; read twice daily, at 10 a. m. and 4 p. m.; destroyed by freshet December 16, 1912; not replaced before close of year.

**Channel.**—Shifting.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained with Olowalu Sugar Co.

*Discharge measurements of Ukumehame Stream near Olowalu, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
July 30	J. B. Stewart.....	<i>Feet.</i> 0.50	<i>Sec.-ft.</i> 5.40
Dec. 14	C. T. Bailey.....	.53	4.66

*Daily gage height, in feet, of Ukumehame Stream near Olowalu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.50	0.45	0.75	0.82	0.55	0.55	0.55	0.50	0.54	0.55	0.51	0.60
2.....	.50	.72	.95	.95	.52	.55	.50	.50	.50	.61	.50	.55
3.....	.50	.68	.85	.92	.55	.50	.55	.50	.50	.54	.50	.61
4.....	.48	.52	.72	1.00	.55	.50	.55	.50	.50	.52	.50	.56
5.....	.48	.50	.72	1.25	.55	.50	.55	.50	.50	.52	.50	.55
6.....	.48	.48	.70	.90	.55	.50	.55	.50	.50	.50	.50	.55
7.....	.48	.45	.75	.95	.50	.50	.55	.50	.51	.50	.50	.60
8.....	.52	.45	.68	.92	.50	.50	.62	.50	.50	.50	.50	.60
9.....	.50	.45	.75	.80	.50	.50	.85	.50	.50	.50	1.15	.60
10.....	.50	.45	.75	.72	.50	.52	.65	.50	.50	.50	.65	.55
11.....	.48	.48	1.05	.68	.50	.55	.60	.50	.50	.50	.60	.52
12.....	.48	.50	.92	.85	.50	.55	.60	.50	.50	.50	.58	.52
13.....	.48	.45	.85	.72	.50	.55	.62	.50	.50	.50	.55	.52
14.....	.48	.45	.72	.90	.50	.55	.60	.50	.50	.58	.55	.55
15.....	.48	.45	.70	.72	.50	.60	.55	.65	.50	.50	.55	.52

Daily gage height, in feet, of Ukumehame Stream near Olowalu, Maui, for 1912—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	0.48	0.45	0.70	0.70	0.50	0.60	0.58	0.58	0.50	0.50	0.80	0.55
17.....	.45	.45	.65	.68	.50	.60	.55	.52	.50	.50	.85	.....
18.....	.45	.45	.72	.70	.50	.60	.55	.50	.50	.50	.85	.....
19.....	.45	.52	.70	.65	.50	.55	.55	.50	.50	.50	.68	.....
20.....	.45	.80	.78	.60	.50	.55	.52	.50	.50	.50	.80	.....
21.....	.45	.80	.72	.60	.50	.62	.50	.50	.50	.51	.80	.....
22.....	.45	.61	.68	.60	.50	.58	.50	.55	.50	.52	.75	.....
23.....	.45	.56	.60	.60	.50	.55	.50	.50	.50	.50	.66	.....
24.....	.50	.56	.60	.60	.58	.60	.50	.50	.50	.50	.62	.....
25.....	.45	.56	.60	.60	.50	.58	.50	.50	.50	.50	.60	.....
26.....	.45	.60	.60	.60	.52	.55	.50	.50	.51	.50	.60	.....
27.....	.45	1.15	.60	.60	.62	.55	.50	.58	.50	.55	.60	.....
28.....	.45	1.02	.60	.58	.60	.55	.50	.55	.51	.56	.60	.....
29.....	.45	.80	.60	.55	.58	.55	.50	.55	.60	.52	.56	.....
30.....	.48	.....	.68	.55	.55	.55	.50	.55	.58	.52	.52	.....
31.....	.45	.....	.72	.....	.55	.....	.50	.55	.....	.60	.....	.....

### OLOWALU STREAM BASIN.

#### OLOWALU DITCH NO. 1 NEAR OLOWALU, MAUI.

**Location.**—About 7 miles east of Lahaina and 1 mile above Olowalu at Olowalu Plantation power house.

**Records available.**—August 12, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 5.30 a. m. and 5.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made in flume.

**Accuracy.**—Records fair.

**Cooperation.**—Station maintained in cooperation with Olowalu Sugar Co.

*Discharge measurements of Olowalu ditch No. 1 near Olowalu, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 4	J. B. Stewart.....	0.75	13.8	July 30	J. B. Stewart.....	0.26	3.33
4	.....do.....	.24	2.38	Sept. 9	.....do.....	.30	4.00
4	.....do.....	.27	2.71	Dec. 14	C. T. Bailey.....	.31	4.50
June 29	.....do.....	.36	4.74				

*Daily gage height, in feet, of Olowalu ditch No. 1 near Olowalu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.40	0.32	0.75	0.75	0.42	0.35	0.40	0.30	0.32	0.38	0.44	0.42
2.....	.40	.65	.80	.75	.50	.35	.40	.31	.41	.40	.38	.38
3.....	.40	.75	.80	.78	.45	.35	.40	.32	.37	.32	.35	.55
4.....	.42	.55	.75	.75	.50	.35	.42	.35	.35	.30	.35	.42
5.....	.38	.45	.75	.42	.52	.35	.41	.31	.32	.32	.35	.38
6.....	.38	.40	.75	.52	.50	.35	.40	.30	.35	.31	.36	.35
7.....	.48	.35	.72	.60	.52	.35	.40	.35	.35	.32	.30	.58
8.....	.50	.38	.68	.55	.55	.38	.50	.35	.32	.32	.32	.48
9.....	.42	.35	.70	.42	.55	.35	.65	.34	.31	.30	.65	.40
10.....	.40	.35	.85	.35	.50	.38	.62	.35	.31	.30	.58	.36
11.....	.32	.62	.82	.35	.50	.35	.50	.39	.30	.30	.48	.35
12.....	.30	.45	.78	.40	.45	.35	.50	.35	.30	.35	.40	.32
13.....	.30	.42	.80	.68	.40	.45	.58	.32	.30	.36	.36	.32
14.....	.38	.40	.82	.62	.38	.45	.49	.36	.30	.52	.35	.32
15.....	.38	.38	.75	.60	.40	.48	.47	.52	.30	.39	.35	.32

*Daily gage height, in feet, of Olowalu ditch No. 1 near Olowalu, Maui, for 1912—Con.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	0.38	0.30	0.70	0.65	0.42	0.45	0.48	0.45	0.29	0.36	0.49	0.31
17.....	.35	.40	.78	.60	.45	.40	.45	.36	.29	.34	.58	.32
18.....	.32	.38	.75	.55	.48	.38	.45	.32	.29	.30	.60	.39
19.....	.35	.80	.70	.55	.42	.40	.41	.30	.30	.30	.56	.42
20.....	.35	.75	.78	.52	.42	.38	.40	.30	.30	.29	.52	.42
21.....	.38	.75	.75	.58	.45	.38	.44	.30	.30	.39	.58	.57
22.....	.35	.78	.70	.55	.45	.38	.44	.39	.30	.45	.62	.61
23.....	.35	.72	.68	.50	.40	.35	.44	.35	.30	.39	.58	.60
24.....	.45	.75	.62	.50	.45	.48	.44	.31	.29	.36	.49	.55
25.....	.35	.75	.55	.50	.38	.36	.42	.30	.27	.34	.44	.53
26.....	.32	.72	.58	.50	.55	.35	.41	.50	.29	.35	.42	.57
27.....	.30	.80	.58	.48	.64	.35	.40	.50	.30	.45	.38	.45
28.....	.25	.80	.58	.40	.58	.35	.40	.37	.32	.49	.38	.42
29.....	.25	.75	.62	.45	.58	.38	.37	.37	.37	.39	.35	.40
30.....	.30	.....	.78	.42	.45	.40	.34	.38	.51	.38	.36	.39
31.....	.32	.....	.80	.....	.45	.....	.30	.35	.....	.59	.....	.86

*Daily discharge, in second-feet, of Olowalu ditch No. 1 near Olowalu, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.5	3.3	14.8	14.8	4.9	3.8	5.5	4.0	4.3	5.2	6.3	5.9
2.....	4.5	10.7	17.0	14.8	6.5	3.8	5.5	4.2	5.7	5.5	5.2	5.2
3.....	4.5	14.8	17.0	16.1	5.5	3.8	5.5	4.3	5.0	4.3	4.8	9.0
4.....	4.9	7.8	14.8	14.8	6.5	3.8	5.9	4.8	4.8	4.0	4.8	5.9
5.....	4.2	5.5	14.8	4.9	7.0	3.8	5.7	4.2	4.3	4.3	4.8	5.2
6.....	4.2	4.5	14.8	7.0	6.5	3.8	5.5	4.0	4.8	4.2	4.9	5.2
7.....	6.1	3.8	13.4	9.0	7.0	3.8	5.5	4.8	4.8	4.3	4.0	9.9
8.....	6.5	4.2	11.8	7.8	7.8	4.2	7.5	4.8	4.3	4.3	4.3	7.1
9.....	4.9	3.8	12.5	4.9	7.8	3.8	12.2	4.6	4.2	4.0	12.2	5.5
10.....	4.5	3.8	19.5	3.8	6.5	4.2	11.2	4.8	4.2	4.0	9.9	4.9
11.....	3.3	9.7	18.0	3.8	6.5	3.8	7.5	5.4	4.0	4.0	7.1	4.8
12.....	3.0	5.5	16.1	4.5	5.5	3.8	7.5	4.8	4.0	4.8	5.5	4.3
13.....	3.0	4.9	17.0	11.8	4.5	5.5	9.9	4.3	4.0	4.9	4.9	4.3
14.....	4.2	4.5	18.0	9.7	4.2	5.5	7.3	4.9	4.0	8.1	4.8	4.3
15.....	4.2	4.2	14.8	9.0	4.5	6.1	6.9	8.1	4.0	5.4	4.8	4.3
16.....	4.2	3.0	12.5	10.8	4.9	5.5	7.1	6.5	3.9	4.9	7.3	4.6
17.....	3.8	4.5	16.1	9.0	5.5	4.5	6.5	4.9	3.9	4.6	9.9	4.3
18.....	3.3	4.2	14.8	7.8	6.1	4.2	6.5	4.3	3.9	4.0	10.5	5.4
19.....	3.8	17.0	12.5	7.8	4.9	4.5	5.7	4.0	4.0	4.0	9.3	5.9
20.....	3.8	14.8	16.1	7.0	4.9	4.2	5.5	4.0	4.0	3.9	8.1	5.9
21.....	4.2	14.8	14.8	8.5	5.5	4.2	6.3	4.0	4.0	5.4	9.9	8.1
22.....	3.8	16.1	12.5	7.8	5.5	4.2	6.3	5.4	4.0	6.5	11.2	10.8
23.....	3.8	13.4	11.8	6.5	4.5	3.8	6.3	4.8	4.0	5.4	9.9	10.5
24.....	5.5	14.8	9.7	6.5	5.5	6.1	6.3	4.2	3.9	4.9	7.3	9.0
25.....	3.8	14.8	7.8	6.5	4.2	3.9	5.9	4.0	3.7	4.6	6.3	9.9
26.....	3.3	13.4	8.5	6.5	7.8	3.8	5.7	7.5	3.9	4.8	5.9	8.1
27.....	3.0	17.0	8.5	6.1	10.4	3.8	5.5	7.5	4.0	6.5	5.2	6.5
28.....	2.5	17.0	8.5	4.5	8.5	3.8	5.5	5.0	4.3	7.3	5.2	5.9
29.....	2.5	14.8	9.7	5.5	8.5	5.2	5.0	5.0	5.0	5.4	4.8	5.5
30.....	3.0	.....	16.1	4.9	5.5	5.5	4.6	5.2	7.8	5.2	4.9	5.4
31.....	3.3	.....	17.0	.....	5.5	.....	4.0	4.8	.....	10.2	.....	4.9



*Monthly discharge of Olowalu ditch No. 1 near Olowalu, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	6.5	2.5	4.00	246.0	A.
February.....	17.0	3.0	9.33	537.0	A.
March.....	19.5	7.8	13.9	855.0	A.
April.....	16.1	3.8	8.08	481.0	A.
May.....	10.4	4.2	6.16	379.0	A.
June.....	6.1	3.8	4.36	259.0	B.
July.....	12.2	4.0	6.51	400.0	A.
August.....	8.1	4.0	4.94	304.0	A.
September.....	7.8	3.7	4.36	259.0	A.
October.....	10.2	3.9	5.13	315.0	A.
November.....	12.2	4.0	6.80	405.0	A.
December.....	10.8	4.3	6.34	390.0	A.
The year.....	19.5	2.5	6.65	4,830.0	

## LAUNIUPOKO STREAM BASIN.

## LAUNIUPOKO STREAM NEAR LAHAINA, MAUI.

**Location.**—About 5½ miles southeast of Lahaina, 1 mile above storage reservoir, and about 175 feet above ditch intake of Pioneer Mill Co.

**Records available.**—July 25, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 8.30 a. m. and 4.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Records very good.

**Cooperation.**—Station is maintained in cooperation with Pioneer Mill Co.

*Discharge measurements of Launiupoko Stream near Lahaina, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Mar. 3	J. B. Stewart.....	0.69	3.19	Sept. 10	J. B. Stewart.....	0.40	0.94
July 31	.....do.....	.41	1.03	Nov. 23	.....do.....	.42	1.11
Sept. 10	.....do.....	.40	.93	Dec. 14	C. T. Bailey.....	.41	.97

*Daily gage height, in feet, of Launiupoko Stream near Lahaina, Maui, for 1912.*

[O. Brecht, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.45	0.45	0.50	0.55	0.50	0.45	0.45	0.40	0.40	0.40	0.42	0.40
2.....	.45	.65	.58	.68	.50	.45	.45	.40	.40	.40	.40	.40
3.....	.45	.58	.69	.72	.50	.45	.45	.40	.40	.40	.40	.42
4.....	.45	.50	.60	.62	.50	.45	.45	.40	.40	.40	.40	.40
5.....	.45	.40	.58	.74	.64	.45	.45	.40	.40	.40	.40	.40
6.....	.45	.40	.50	.60	.50	.45	.45	.40	.40	.40	.40	.40
7.....	.45	.42	.55	.78	.50	.45	.45	.40	.40	.40	.40	.40
8.....	.45	.52	.52	.80	.50	.45	.45	.40	.40	.40	.40	.40
9.....	.45	.50	.62	.68	.50	.45	.58	.40	.40	.40	.78	.40
10.....	.45	.52	.70	.62	.49	.45	.45	.40	.40	.40	.44	.40
11.....	.50	.42	1.15	.60	.49	.45	.45	.42	.40	.48	.40	.40
12.....	.50	.45	.64	.64	.49	.45	.45	.40	.40	.40	.40	.40
13.....	.45	.45	.55	.60	.49	.45	.45	.40	.40	.40	.40	.40
14.....	.45	.45	.50	.67	.47	.45	.45	.40	.40	.40	.40	.40
15.....	.45	.45	.50	.60	.47	.45	.45	.40	.40	.40	.40	.40

*Daily gage height, in feet, of Launiupoko Stream near Lahaina, Maui, for 1912—Contd.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	0.45	0.45	0.50	0.62	0.45	0.45	0.45	0.40	0.40	0.40	0.40	0.40
17.....	.45	.45	.58	.60	.45	.45	.45	.40	.40	.40	.48	.40
18.....	.45	.45	.60	.60	.45	.45	.45	.40	.40	.40	.48	.40
19.....	.45	.58	.55	.58	.45	.40	.45	.40	.40	.40	.42	.42
20.....	.45	.82	.52	.52	.45	.40	.45	.40	.40	.40	.42	.40
21.....	.45	.72	.52	.50	.45	.42	.45	.40	.40	.40	.57	.48
22.....	.45	.60	.50	.50	.45	.45	.42	.40	.40	.40	.44	.70
23.....	.45	.50	.50	.50	.45	.45	.40	.40	.40	.40	.42	.70
24.....	.45	.65	.50	.50	.47	.45	.40	.40	.40	.40	.40	.42
25.....	.45	.50	.50	.50	.45	.45	.40	.40	.40	.40	.40	.40
26.....	.45	.50	.50	.50	.50	.45	.40	.45	.40	.42	.40	.40
27.....	.45	.85	.50	.50	.60	.45	.40	.40	.40	.40	.40	.40
28.....	.45	.60	.50	.50	.54	.45	.40	.40	.40	.40	.40	.40
29.....	.45	.50	.50	.50	.50	.45	.40	.40	.44	.40	.40	.40
30.....	.45	.....	.60	.50	.50	.45	.40	.40	.40	.40	.40	.40
31.....	.45	.....	.64	.....	.48	.....	.40	.40	.....	.60	.....	.40

*Daily discharge, in second-feet, of Launiupoko Stream near Lahaina, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.3	1.3	1.6	2.0	1.6	1.3	1.3	1.0	1.0	1.0	1.1	1.0
2.....	1.3	2.8	2.2	3.1	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.0
3.....	1.3	2.2	3.2	3.5	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.1
4.....	1.3	1.6	2.4	2.6	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.0
5.....	1.3	1.0	2.2	3.7	2.8	1.3	1.3	1.0	1.0	1.0	1.0	1.0
6.....	1.3	1.0	1.6	2.4	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.0
7.....	1.3	1.1	2.0	4.1	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.0
8.....	1.3	1.8	1.8	4.3	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.0
9.....	1.3	1.6	2.6	3.1	1.6	1.3	2.2	1.0	1.0	1.0	4.1	1.0
10.....	1.3	1.8	3.3	2.6	1.5	1.3	1.5	1.0	1.0	1.0	1.2	1.0
11.....	1.6	1.1	8.2	2.4	1.5	1.3	1.3	1.1	1.0	1.5	1.0	1.0
12.....	1.6	1.3	2.8	2.8	1.5	1.3	1.3	1.0	1.0	1.0	1.0	1.0
13.....	1.5	1.3	2.0	2.4	1.5	1.3	1.3	1.0	1.0	1.0	1.0	1.0
14.....	1.3	1.3	1.6	3.0	1.4	1.3	1.3	1.0	1.0	1.0	1.0	1.0
15.....	1.3	1.3	1.6	2.4	1.4	1.3	1.3	1.0	1.0	1.0	1.0	1.0
16.....	1.3	1.3	1.6	2.6	1.3	1.3	1.3	1.0	1.0	1.0	1.0	1.0
17.....	1.3	1.3	2.2	2.4	1.3	1.3	1.3	1.0	1.0	1.0	1.5	1.0
18.....	1.3	1.3	2.4	2.4	1.3	1.3	1.3	1.0	1.0	1.0	1.5	1.0
19.....	1.3	2.2	2.0	2.2	1.3	1.0	1.3	1.0	1.0	1.0	1.1	1.1
20.....	1.3	4.5	1.8	1.8	1.3	1.0	1.3	1.0	1.0	1.0	1.1	1.0
21.....	1.3	3.5	1.8	1.6	1.3	1.1	1.3	1.0	1.0	1.0	2.2	1.5
22.....	1.3	2.4	1.6	1.6	1.3	1.3	1.1	1.0	1.0	1.0	1.2	3.3
23.....	1.3	1.6	1.6	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.1	3.3
24.....	1.3	2.8	1.6	1.6	1.4	1.3	1.0	1.0	1.0	1.0	1.0	1.1
25.....	1.3	1.6	1.6	1.6	1.3	1.3	1.0	1.0	1.0	1.0	1.0	1.0
26.....	1.3	1.6	1.6	1.6	1.6	1.3	1.0	1.3	1.0	1.1	1.0	1.0
27.....	1.3	4.8	1.6	1.6	2.4	1.3	1.0	1.0	1.0	1.0	1.0	1.0
28.....	1.3	2.4	1.6	1.6	1.9	1.3	1.0	1.0	1.0	1.0	1.0	1.0
29.....	1.3	1.6	1.6	1.6	1.6	1.3	1.0	1.0	1.2	1.0	1.0	1.0
30.....	1.3	.....	2.4	1.6	1.6	1.3	1.0	1.0	1.0	1.0	1.0	1.0
31.....	1.3	.....	2.8	.....	1.5	.....	1.0	1.0	.....	2.4	.....	1.0

*Monthly discharge of Launiupoko Stream near Lahaina, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	1.6	1.3	1.33	81.8	B.
February.....	4.8	1.0	1.91	110.0	B.
March.....	8.2	1.6	2.22	136.0	B.
April.....	4.3	1.6	2.39	142.0	B.
May.....	2.8	1.3	1.55	95.3	B.
June.....	1.3	1.0	1.27	75.6	B.
July.....	2.2	1.0	1.24	76.2	B.
August.....	1.3	1.0	1.01	62.1	B.
September.....	1.2	1.0	1.01	60.1	B.
October.....	2.4	1.0	1.06	65.2	B.
November.....	4.1	1.0	1.20	71.4	B.
December.....	3.3	1.0	1.17	71.9	B.
The year.....	8.2	1.0	1.45	1,050.0	

## KAUAULA STREAM BASIN.

## KAUAULA STREAM NEAR LAHAÏNA, MAUI.

**Location.**—About 3 miles east of Lahaina, 200 feet above Kauaula ditch intake, which is the uppermost diversion.

**Records available.**—March 7 to December 31, 1912; also discharge measurements in 1911.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 4 p. m.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading at low-water stages in Kauaula ditch, which carries all the normal flow.

**Accuracy.**—Records good.

**Cooperation.**—Station is maintained in cooperation with the Pioneer Mill Co.

*Discharge measurements of Kauaula Stream near Lahaina, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
June 27	J. B. Stewart.....	0.21	7.13
Aug. 1	.....do.....	.16	6.00
Sept. 11	.....do.....	.12	5.71
Dec. 13	C. T. Bailey.....	.09	6.05

*Daily gage height, in feet, of Kauaula Stream near Lahaina, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....				0.98	0.28	0.25	0.20	0.15	0.12	0.20	0.30	0.20
2.....				.75	.43	.25	.17	.15	.17	.17	.20	.23
3.....				.75	.28	.25	.17	.15	.17	.17	.17	.25
4.....				.75	.28	.25	.17	.12	.12	.17	.17	.13
5.....				.98	.33	.25	.20	.12	.12	.17	.17	.13
6.....				.98	.45	.20	.17	.12	.15	.17	.17	.13
7.....				.98	.40	.20	.17	.17	.31	.20	.17	.20
8.....			0.95	.77	.98	.43	.30	.15	.15	.17	.15	.17
9.....			.85	.90	.23	.23	.55	.20	.12	.17	.30	.17
10.....			.75	.85	.23	.23	.27	.35	.12	.17	.30	.12
11.....			1.50	.78	.25	.23	.20	.20	.12	.17	.20	.12
12.....			1.00	.78	.23	.23	.20	.20	.12	.17	.16	.12
13.....			1.00	.73	.23	.23	.23	.17	.12	.17	.15	.12
14.....			.78	.72	.23	.23	.17	.27	.12	.23	.15	.12
15.....			.52	.70	.23	.25	.17	.27	.12	.20	.15	.12

*Daily gage height, in feet, of Kauaula Stream near Lahaina, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....			0.45	0.85	0.23	0.23	0.17	0.27	0.12	0.17	0.15	0.12
17.....			.45	.73	.23	.23	.17	.20	.10	.17	.40	.75
18.....			.80	.72	.23	.23	.17	.17	.10	.17	.15	.75
19.....			.52	.55	.28	.20	.17	.17	.10	.17	.28	.20
20.....			.50	.43	.28	.20	.17	.25	.12	.17	.15	.13
21.....			.48	.43	.23	.20	.17	.20	.12	.17	.20	.17
22.....			.45	.38	.23	.23	.17	.20	.10	.17	.30	1.20
23.....			.45	.40	.23	.23	.17	.17	.10	.15	.30	1.10
24.....			.45	.37	.23	.38	.17	.17	.10	.12	.15	.30
25.....			.45	.33	.23	.28	.17	.17	.10	.12	.18	.23
26.....			.40	.40	.23	.23	.17	.17	.10	.30	.18	.30
27.....			.40	.34	.80	.23	.17	.27	.10	.30	.15	.23
28.....			.37	.31	.35	.23	.15	.20	.10	.18	.15	.15
29.....			.45	.38	.28	.20	.15	.20	.12	.20	.15	.15
30.....			1.25	.30	.25	.20	.15	.17	.53	.17	.15	.15
31.....			1.15		.25		.15	.17		.90		.15

#### KAUAAULA DITCH NEAR LAHAINA, MAUI.

**Location.**—About 3 miles east of Lahaina. It is 100 feet below ditch intake, which is uppermost on the stream.

**Records available.**—October 16, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 4 p. m.; datum unchanged.

**Channel.**—Straight wooden flume, 3 feet wide.

**Discharge measurements.**—Made in flume at gage.

**Accuracy.**—Very good.

**Cooperation.**—Station maintained in cooperation with Pioneer Mill Co.

*Discharge measurements of Kauaula ditch near Lahaina, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Mar. 4	J. B. Stewart.....	<i>Feet.</i> 0.45	<i>Sec.-ft.</i> 2.82
June 27	.....do.....	.78	7.18
Aug. 1	.....do.....	.71	6.00
Sept. 11	.....do.....	.68	5.71
Nov. 25	.....do.....	.75	6.91
Dec. 13	C. T. Bailey.....	.65	6.05

*Daily gage height, in feet, of Kauaula ditch near Lahaina, Maui, for 1912.*

[Nakayama, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.45	0.45	1.05	1.05	0.88	0.80	0.75	0.70	0.67	0.71	1.00	0.70
2.....	.45	.45	1.05	.75	1.05	.80	.72	.70	.70	.85	.80	.95
3.....	.45	.45	1.05	.75	.88	.80	.72	.70	.70	.70	.73	1.00
4.....	.45	.45	1.05	.75	.88	.80	.72	.68	.70	.70	.70	1.02
5.....	.45	.45	1.05	1.14	1.00	.80	.72	.67	.70	.70	.70	.82
6.....	.45	.45	1.05	1.11	1.10	.78	.75	.67	.70	.70	.70	.72
7.....	.45	.45	1.05	1.70	.93	.78	.75	.70	1.02	.70	.70	.75
8.....	.45	.45	1.05	1.15	1.10	.93	.70	.67	.70	.75	.70	.92
9.....	.45	.45	1.05	1.08	.87	.83	1.15	.90	.70	.70	1.00	.80
10.....	.45	.45	1.20	.95	.86	.80	.82	.90	.70	.70	1.00	.75

Daily gage height, in feet, of Kauaula ditch near Lahaina, Maui, for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	0.45	0.95	1.05	0.75	0.83	0.80	0.75	0.70	0.70	0.70	0.80	0.75
12.....	.45	.95	1.05	1.05	.83	.77	.75	.70	.70	.70	.80	.75
13.....	.45	.96	1.05	1.10	.83	.75	.75	.70	.70	.70	.70	.73
14.....	.45	1.00	1.05	1.10	.83	.70	.70	.75	.67	.70	.70	.70
15.....	.45	1.00	1.00	1.10	.80	.83	.70	.90	.67	1.05	.67	.70
16.....	.45	1.10	.93	1.10	.80	.77	.70	.90	.67	.86	.67	.70
17.....	.45	1.10	.93	1.10	.80	.75	.75	.88	.65	.70	1.38	.67
18.....	.45	.89	.95	1.05	.80	.70	.70	.70	.65	.70	.67	.68
19.....	.45	.85	1.05	.98	.90	.70	.70	.70	.65	.70	.88	.95
20.....	.45	.85	1.05	.90	.80	.70	.70	.80	.73	.67	.68	.80
21.....	.45	.93	1.05	.90	.90	.73	.70	.72	.70	.70	.72	.77
22.....	.45	.97	.97	.90	.80	.73	.70	.70	.67	.70	.90	1.40
23.....	.45	1.05	.90	.87	.80	1.20	.70	.70	.67	.72	.90	1.15
24.....	.45	1.05	.87	.98	.80	.80	.70	.70	.67	.63	.70	1.15
25.....	.45	1.05	.85	.95	.80	.73	.70	.70	.67	.63	.67	.90
26.....	.45	1.10	.83	.98	.80	.75	.70	.80	.65	1.00	.67	1.00
27.....	.45	1.10	.83	.93	1.20	.75	.70	.70	.65	1.00	.65	.88
28.....	.45	.99	.85	.90	.95	.75	.70	.70	.70	.85	.63	.85
29.....	.45	.95	.80	.90	.83	.73	.70	.70	.70	.90	.63	.84
30.....	.45	.....	.90	.90	.80	.73	.70	.70	1.20	1.20	.63	.82
31.....	.45	.....	1.10	.....	.80	.....	.70	.70	.....	1.10	.....	.80

Daily discharge, in second-feet, of Kauaula ditch near Lahaina, Maui, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.8	2.8	11.9	11.9	8.9	7.5	6.8	6.0	5.6	6.2	11.0	6.0
2.....	2.8	2.8	11.9	6.8	11.9	7.5	6.3	6.0	6.0	8.4	7.5	10.1
3.....	2.8	2.8	11.9	6.8	8.9	7.5	6.3	6.0	6.0	6.0	6.4	11.0
4.....	2.8	2.8	11.9	6.8	8.9	7.5	6.3	5.7	6.0	6.0	6.0	11.4
5.....	2.8	2.8	11.9	13.5	11.0	7.5	6.3	5.6	6.0	6.0	6.0	7.8
6.....	2.8	2.8	11.9	13.0	12.8	7.2	6.8	5.6	6.0	6.0	6.0	6.3
7.....	2.8	2.8	11.9	23.6	9.7	7.2	6.8	6.0	11.4	6.0	6.0	6.8
8.....	2.8	2.8	11.9	13.7	12.8	9.7	6.0	5.6	6.0	6.8	6.0	9.6
9.....	2.8	2.8	11.9	12.4	8.7	8.0	13.7	9.2	6.0	6.0	11.0	7.5
10.....	2.8	2.8	14.6	10.1	8.5	7.5	7.8	9.2	6.0	6.0	11.0	6.8
11.....	2.8	10.1	11.9	6.8	8.0	7.5	6.8	6.0	6.0	6.0	7.5	6.8
12.....	2.8	10.1	11.9	11.9	8.0	7.0	6.8	6.0	6.0	6.0	7.5	6.8
13.....	2.8	10.3	11.9	12.8	8.0	6.8	6.8	6.0	6.0	6.0	6.0	6.4
14.....	2.8	11.0	11.9	12.8	8.0	6.0	6.0	6.8	5.6	6.0	6.0	6.0
15.....	2.8	11.0	11.0	12.8	7.5	8.0	6.0	9.2	5.6	11.9	5.6	6.0
16.....	2.8	12.8	9.7	12.8	7.5	7.0	6.0	9.2	5.6	8.5	5.6	6.0
17.....	2.8	12.8	9.7	12.8	7.5	6.8	6.8	8.9	5.3	6.0	17.8	5.6
18.....	2.8	9.0	10.1	11.9	7.5	6.0	6.0	6.0	5.3	6.0	5.6	5.7
19.....	2.8	8.4	11.9	10.6	9.2	6.0	6.0	6.0	5.3	6.0	8.9	10.1
20.....	2.8	8.4	11.9	9.2	7.5	6.0	6.0	7.5	6.4	5.6	5.7	7.5
21.....	2.8	9.7	11.9	9.2	9.2	6.4	6.0	6.3	6.0	6.0	6.3	7.0
22.....	2.8	10.5	10.5	9.2	7.5	6.4	6.0	6.0	5.6	6.0	9.2	18.2
23.....	2.8	11.9	9.2	8.7	7.5	14.6	6.0	6.0	5.6	6.3	9.2	13.7
24.....	2.8	11.9	8.7	10.6	7.5	7.5	6.0	6.0	5.6	5.0	6.0	13.7
25.....	2.8	11.9	8.4	10.1	7.5	6.4	6.0	6.0	5.6	5.0	5.6	9.2
26.....	2.8	12.8	8.0	10.6	7.5	6.8	6.0	7.5	5.3	11.0	5.6	11.0
27.....	2.8	12.8	8.0	9.7	14.6	6.8	6.0	6.0	5.3	11.0	5.3	8.9
28.....	2.8	10.8	8.4	9.2	10.1	6.8	6.0	6.0	6.0	8.4	5.0	8.4
29.....	2.8	10.1	7.5	9.2	8.0	6.4	6.0	6.0	6.0	9.2	5.0	8.2
30.....	2.8	.....	9.2	9.2	7.5	6.4	6.0	6.0	14.6	14.6	5.0	7.8
31.....	2.8	.....	12.8	.....	7.5	.....	6.0	6.0	.....	12.8	.....	7.5

*Monthly discharge of Kauaula ditch near Lahaina, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	2.8	2.8	2.80	172.0	B.
February.....	12.8	2.8	8.08	465.0	B.
March.....	14.6	7.5	10.8	664.0	B.
April.....	23.6	6.8	10.5	625.0	B.
May.....	14.6	7.5	8.62	530.0	B.
June.....	14.6	6.0	7.29	434.0	B.
July.....	13.7	6.0	6.53	402.0	B.
August.....	9.2	5.6	6.29	387.0	B.
September.....	14.6	5.3	6.26	372.0	B.
October.....	14.6	5.0	7.31	449.0	B.
November.....	17.8	5.0	7.18	427.0	B.
December.....	18.2	5.6	8.51	523.0	B.
The year.....	23.6	2.8	7.51	5,450.0	

## LAHAINALUNA STREAM BASIN.

## LAHAINALUNA STREAM NEAR LAHAINA, MAUI.

**Location.**—About 1½ miles northeast of Lahaina, one-fourth mile above Lahainaluna Seminary, and 8 feet above Pioneer Mill Co.'s upper ditch intake.

**Records available.**—August 5, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 4 p. m.; datum unchanged

**Channel.**—Shifting.

**Discharge measurements.**—Made by wading.

**Cooperation.**—Station maintained in cooperation with Pioneer Mill Co.

*Discharge measurements of Lahainaluna Stream near Lahaina, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
June 27	J. B. Stewart.....	<i>Fect.</i> 0.20	<i>Sec.-fect.</i> 1.42
Dec. 13	C. T. Bailey.....	.16	1.28

*Daily gage height, in feet, of Lahainaluna Stream near Lahaina, Maui, for 1912.*

[Kawashima, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.25	0.17	0.20	0.55	0.22	0.20	0.25	0.16	0.25	0.36	0.24	0.28
2.....	.26	.28	.36	.72	.34	.19	.21	.16	.80	.30	.12	.24
3.....	.22	.26	.38	.53	.19	.18	.25	.16	.19	.14	.12	.30
4.....	.22	.20	.24	.48	.51	.18	.38	.16	.22	.10	.11	.20
5.....	.24	.20	.22	1.16	.41	.70	.24	.16	.12	.10	.13	.20
6.....	.21	.19	.21	.86	.45	.16	.16	.15	.86	.12	.13	.13
7.....	.21	.18	.32	1.36	.20	.16	.20	.15	.49	.12	.12	.32
8.....	.25	.18	.26	.96	.40	.16	.16	.19	.14	.22	.21	.15
9.....	.24	.18	.42	.64	.20	.28	.58	.28	.15	.12	2.00	.15
10.....	.21	.24	.28	.56	.20	.19	.20	.42	.10	.13	.38	.15
11.....	.22	.18	1.00	.35	.20	.18	.20	.60	.10	.13	.45	.15
12.....	.22	.18	.36	.33	.19	.18	.18	.32	.10	.12	.26	.14
13.....	.21	.18	.32	.32	.18	.18	.25	.15	.10	.15	.20	.14
14.....	.21	.17	.20	.60	.18	.20	.19	.15	.10	.26	.15	.14
15.....	.21	.17	.20	.22	.18	.22	.17	.35	.10	.12	.15	.18
16.....	.21	.17	.20	.21	.18	.24	.16	.24	.10	.13	.32	.18
17.....	.21	.17	.70	.23	.18	.22	.18	.22	.12	.12	.48	.18
18.....	.20	.17	.52	.22	.18	.18	.16	.10	.12	.12	.52	.15
19.....	.18	.72	.21	.20	.29	.20	.16	.10	.14	.12	.40	.28
20.....	.18	1.35	.29	.20	.20	.22	.15	.10	.13	.12	.88	.24

*Daily gage height, in feet, of Lahainahuna Stream near Lahaina, Maui, for 1912—Contd.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	0.18	1.95	0.20	0.20	0.52	0.60	0.18	0.10	0.13	0.32	0.40	0.86
22.....	.18	1.45	.20	.32	.30	.20	.18	.24	.13	.30	.28	1.45
23.....	.18	.60	.18	.21	.22	.21	.18	.15	.13	.40	.30	1.12
24.....	.18	.38	.18	.39	.29	.45	.36	.10	.13	.16	.14	.34
25.....	.18	.36	.17	.64	.20	.20	.19	.10	.14	.11	.15	.27
26.....	.18	.35	.17	.38	.36	.20	.15	.14	.14	.60	.12	.80
27.....	.18	1.80	.15	.24	.92	.18	.24	.10	.14	.55	.12	.28
28.....	.18	.54	.15	.22	.41	.13	.16	.16	.14	.28	.19	.24
29.....	.17	.22	.19	.20	.21	.13	.16	.22	.22	.18	.19	.27
30.....	.17	.....	.45	.22	.20	.18	.16	.23	.66	.33	.19	.32
31.....	.17	.....	.54	.....	.20	.....	.15	.25	.....	1.65	.....	.26

## KAHOMA STREAM BASIN.

## KAHOMA STREAM NEAR LAHAINA, MAUI.

**Location.**—About 3½ miles above Lahaina, 500 feet below small dam that diverts all low-water flow, and 125 feet above concrete dam for Pioneer Mill Co.'s upper ditch.

**Records available.**—August 3, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 7 a. m. and 3 p. m.; datum unchanged.

**Channel.**—Liable to shift.

**Discharge measurements.**—Made by wading.

**Accuracy.**—No discharge rating has been obtained.

**Cooperation.**—Station maintained in cooperation with Pioneer Mill Co.

The following discharge measurement was made by C. T. Bailey:

December 13, 1912: Gage height, 0.40 foot; discharge, 0.16 second-foot.

*Daily gage height, in feet, of Kahoma Stream near Lahaina, Maui, for 1912.*

[E. C. Bortfeld, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.....	.....	.....	0.75	0.80	0.70	.....	.....	.....	.....	.....	.....	.....
4.....	.....	.....	.....	.80	.75	.....	.....	.....	.....	.....	.....	.....
5.....	.....	.....	.....	1.00	.....	.....	.....	.....	.....	.....	.....	.....
6.....	.....	.....	.....	.80	.....	.....	.....	.....	0.75	.....	.....	.....
7.....	.....	.....	.....	1.20	.75	.....	.....	.....	.....	0.65	.....	.....
8.....	.....	.....	.....	1.55	.....	.....	.....	.....	.....	.....	3.25	.....
9.....	.....	.....	.....	.90	.....	.....	0.90	.....	.....	.....	.....	.....
10.....	.....	.....	.95	1.00	.....	.....	.....	.....	.....	.....	.70	.....
11.....	.....	.....	.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
12.....	.....	.....	.....	.80	.....	.....	.....	.....	.....	.....	.....	.....
13.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14.....	.....	.....	.....	.95	.....	.....	.....	0.65	.....	.....	.....	.....
15.....	.....	.....	.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
16.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.25	.....
17.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.70	.....
18.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.00	.....
19.....	.....	0.85	.75	.....	.....	.....	.....	.....	.....	.....	.....	0.70
20.....	.....	1.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21.....	.....	1.95	.....	.....	.....	.....	.....	.....	.....	.80	2.10	1.45
22.....	.....	1.15	.....	.....	.....	.....	.....	.....	.....	1.05	.....	1.45
23.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.35
24.....	.....	.....	.....	.....	.....	0.85	.....	.....	.....	.....	.....	.....
25.....	.....	.90	.....	1.00	.....	.....	.....	.....	.....	.....	.....	.....
26.....	.....	.....	.....	.....	1.15	.....	.....	.65	.....	.....	.....	.75
27.....	.....	1.10	.....	.....	.85	.....	.....	.....	.....	.....	.....	.....
28.....	.....	.80	.....	.....	.....	.....	.....	.....	.....	.70	.....	.....
29.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30.....	.....	.....	1.05	.....	.....	.....	.....	.....	.....	.....	.....	.....
31.....	.....	.....	3.00	.....	.....	.....	.....	.....	.....	1.75	.....	.....

NOTE.—On days for which gage heights are not given there was no discharge at station, all low-water flow being diverted at dam 500 feet above.

## KAHOMA DITCH AT WEIR NEAR LAHAINA, MAUI.

**Location.**—About  $3\frac{1}{2}$  miles above Lahaina at portal of the lower of two development tunnels of Pioneer Mill Co.

**Records available.**—August 1, 1911, to December 31, 1912.

**Gage.**—Staff; read twice daily, at 7 a. m. and 3 p. m.; datum unchanged.

**Discharge measurements.**—By 4-foot sharp-crested weir with end contractions, measuring discharge from development tunnel and amount diverted by small pipe from stream.

**Cooperation.**—Records kept by Pioneer Mill Co.

*Discharge measurements of Kahoma ditch at weir near Lahaina, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Aug. 1	J. B. Stewart	Inches.	Sec.-feet.
Dec. 13	C. T. Bailey	5.1	3.58
		4.4	2.98

*Daily discharge, in second-feet, of Kahoma ditch at weir near Lahaina, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.71	3.89	6.66	6.19	6.19	3.76	4.85	4.02	4.85	6.19	4.71	6.35
2.....	5.58	5.58	7.14	6.19	3.89	3.76	6.50	4.02	7.14	4.02	3.89	3.89
3.....	4.99	6.66	7.14	6.98	7.30	3.63	6.50	4.02	4.99	4.02	3.63	5.58
4.....	4.43	4.99	5.58	6.98	7.14	3.63	5.14	3.89	4.16	3.63	3.37	3.63
5.....	4.43	4.15	4.71	7.80	6.50	3.50	5.14	3.89	4.71	5.14	3.37	3.12
6.....	4.43	3.89	6.19	7.14	4.16	3.50	4.57	3.89	6.82	3.89	3.37	3.12
7.....	4.43	3.89	6.98	8.65	7.80	3.50	4.43	4.43	6.50	5.88	3.37	5.58
8.....	4.99	3.89	5.14	8.65	4.29	3.63	4.02	4.71	4.16	4.43	3.37	4.43
9.....	5.29	3.89	6.50	7.97	3.89	3.89	7.47	6.19	4.71	3.63	8.65	3.24
10.....	4.43	3.89	7.47	7.80	3.76	4.57	4.71	4.71	3.89	3.89	5.88	3.12
11.....	4.43	5.58	7.64	5.58	3.76	3.89	4.43	6.50	3.89	3.37	6.82	3.00
12.....	4.29	4.02	6.82	7.14	3.63	3.76	4.16	4.85	3.76	4.71	3.76	3.00
13.....	4.29	3.89	4.71	4.99	3.63	5.73	5.88	4.29	3.76	3.63	3.37	3.00
14.....	4.16	3.89	4.16	7.47	3.63	4.43	4.43	6.19	3.76	6.19	3.37	3.00
15.....	4.16	3.76	7.47	5.14	3.63	5.14	4.29	6.66	3.63	3.63	3.37	3.50
16.....	4.16	3.76	4.02	6.19	3.63	5.14	4.16	6.04	3.63	3.50	7.47	3.00
17.....	4.16	3.76	3.89	6.50	3.63	4.43	4.16	4.16	3.63	3.37	6.35	2.88
18.....	1.16	3.76	6.04	5.29	6.19	4.16	4.16	4.02	3.50	3.24	7.47	5.14
19.....	4.16	7.30	7.64	5.73	5.43	4.85	4.02	3.89	3.50	3.24	5.88	6.66
20.....	4.16	8.14	4.71	6.19	6.66	4.02	4.02	3.89	3.50	3.24	4.43	5.14
21.....	4.16	8.65	4.57	4.85	4.16	5.58	4.16	3.89	3.63	6.50	7.80	7.14
22.....	4.16	8.14	6.04	6.50	3.76	4.16	4.16	4.16	3.63	7.47	4.99	7.80
23.....	4.16	5.58	4.16	6.50	4.43	5.88	4.16	4.16	3.50	6.19	5.29	7.64
24.....	4.16	7.14	4.02	5.58	3.89	7.47	7.30	3.89	3.50	4.43	3.89	5.58
25.....	4.16	7.47	3.76	7.97	5.73	4.71	4.29	3.89	3.50	3.63	3.37	5.58
26.....	4.02	7.47	4.43	6.82	7.80	4.43	4.16	6.19	3.50	6.50	3.24	6.19
27.....	4.02	8.14	3.89	5.29	7.14	4.02	4.16	4.99	3.50	6.50	3.12	4.43
28.....	4.02	7.80	3.89	4.16	5.14	3.89	4.43	4.02	3.87	6.82	3.12	4.99
29.....	3.89	5.14	4.71	3.89	3.89	3.89	4.29	6.50	4.71	3.89	3.12	3.63
30.....	4.02	.....	7.97	3.89	4.16	3.89	4.16	5.58	4.71	5.88	3.12	5.88
31.....	4.02	.....	7.14	.....	3.76	.....	4.16	5.58	.....	8.14	.....	4.16

NOTE.—Daily discharge computed from formula  $Q=3.33 LH^{\frac{3}{2}}$ ,  $L=4$  feet;  $H$ =mean of two daily readings.



*Monthly discharge of Kahoma ditch at weir near Lahaina, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	5.58	3.89	4.34	267
February.....	8.65	3.76	5.45	313
March.....	7.97	3.76	5.65	347
April.....	8.65	3.89	6.33	377
May.....	7.80	3.63	4.92	303
June.....	7.47	3.50	4.36	259
July.....	7.47	4.02	4.72	290
August.....	6.66	3.89	4.75	292
September.....	7.14	3.37	4.20	250
October.....	8.14	3.24	4.80	295
November.....	8.65	3.12	4.57	272
December.....	7.80	2.88	4.63	285
The year.....	8.65	2.88	4.89	3,550

## HONOKAWAI STREAM BASIN.

## HONOKAWAI DITCH NEAR LAHAINA, MAUI.

**Location.**—About 7 miles northeast of Lahaina, 2 miles above Pioneer Mill Co.'s power house, 1,000 feet below intake, and 250 feet below junction with Amalu wooden flume.

**Records available.**—July 1 to December 31, 1912.

**Gage.**—A graduated rod-gage, placed in the center of flume each time a reading is desired; read twice daily, at 7.30 a. m. and 3 p. m.

**Channel.**—Galvanized-iron semicircular flume.

**Discharge measurements.**—Made in flume near gage.

**Accuracy.**—No discharge rating yet available.

**Cooperation.**—Station is maintained in cooperation with Pioneer Mill Co.

*Discharge measurements of Honokawai ditch near Lahaina, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
June 28	J. B. Stewart.....	<i>Feet.</i> 0.98	<i>Sec.-feet.</i> 5.37
Sept. 12	.....do.....	.98	6.03
Nov. 26	.....do.....	.95	4.98
Dec. 17	C. T. Bailey.....	.91	5.21

*Daily gage height, in feet, of Honokawai ditch near Lahaina, Maui, for 1912.*

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.08	1.01	1.00	1.32	1.03	1.14	16.....	1.06	1.35	.98	.99	1.62	1.00
2.....	1.08	1.00	1.50	1.02	1.00	1.28	17.....	1.00	1.08	.98	.99	1.63	.98
3.....	1.12	1.00	1.04	1.01	.98	1.56	18.....	1.00	1.01	.98	.98	1.66	.96
4.....	1.06	1.00	1.06	1.00	.97	1.01	19.....	1.00	1.00	.98	.98	1.24	1.48
5.....	1.12	1.00	1.02	1.04	.96	.96	20.....	1.30	1.00	.99	.97	1.13	1.10
6.....	1.16	1.00	1.02	1.02	.98	.96	21.....	1.10	1.00	1.04	1.12	1.35	1.47
7.....	1.01	1.06	1.38	.98	.98	1.24	22.....	1.03	1.12	1.02	1.57	1.12	1.64
8.....	1.46	1.06	1.01	1.02	.99	1.33	23.....	1.28	1.02	.98	1.22	1.15	1.39
9.....	1.20	1.32	1.05	1.00	1.65	1.00	24.....	1.02	1.00	.98	1.11	1.02	1.13
10.....	1.08	1.42	1.00	1.00	1.14	.97	25.....	1.00	1.00	.98	1.00	.98	1.00
11.....	1.01	1.08	1.00	1.14	1.10	.96	26.....	1.00	1.32	.98	1.38	.98	1.47
12.....	1.26	1.10	.98	1.06	1.00	.96	27.....	1.02	1.15	.98	1.40	.96	1.01
13.....	1.04	1.08	.98	1.04	.98	.96	28.....	1.04	1.01	1.01	1.46	.98	1.30
14.....	1.01	1.12	.98	1.30	.98	1.04	29.....	1.01	1.18	1.15	1.00	.96	1.03
15.....	1.00	1.50	.98	1.16	.97	1.04	30.....	1.01	1.10	1.21	1.27	.95	1.38
							31.....	1.02	1.04	.....	1.62	.....	1.00

## HONOLUA STREAM BASIN.

## HONOLUA DITCH NEAR HONOKAHAU, MAUI.

**Location.**—About 5½ miles southwest of Honokahau, about 3 miles above Honolulu ranch, and 150 feet below ditch intake.

**Records available.**—August 7, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 6 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made in flume.

**Accuracy.**—No discharge rating yet available.

**Cooperation.**—Honolua Ranch Co. furnishes gage reader and otherwise assists in obtaining records.

*Discharge measurements of Honolua ditch near Honokahau, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Fect.</i>	<i>Sec.-feet.</i>
June 22	J. B. Stewart.....	0.52	2.15
Sept. 13	.....do.....	.27	.25
Dec. 16	C. T. Bailey.....	.56	2.71

*Daily gage height, in feet, of Honolua ditch near Honokahau, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.50	0.29	0.75	0.63	0.33	0.30	0.53	0.45	0.74
2.....	.49	.34	.90	.85	.34	.65	.58	.45	.58
3.....	.47	.72	.90	.83	.35	.50	.42	.38	.99
4.....	.43	.48	.69	.74	.35	.44	.30	.35	.58
5.....	.40	.38	.58	.77	.35	.42	.50	.34	.50
6.....	.40	.32	.70	.66	.30	.42	.27	.31	.48
7.....	.40	.30	.74	.56	.30	.53	.30	.29	.76
8.....	.55	.31	.52	.62	.30	.40	.32	.30	.58
9.....	.51	.30	.90	.80	.35	.40	.32	1.00	.50
10.....	.46	.30	.88	.80	.45	.36	.32	.60	.46
11.....	.41	.67	.90	.70	.46	.35	.37	.48	.41
12.....	.38	.44	.90	.75	.50	.28	.54	.39	.40
13.....	.36	.55	.90	.85	.50	.26	.77	.38	.40
14.....	.36	.80	.88	.74	.78	.25	.86	.36	.39
15.....	.35	.52	.74	.64	.82	.24	.74	.32	.40
16.....	.35	.40	.64	.53	.80	.23	.45	1.00	.56
17.....	.34	.36	.76	.64	.48	.20	.33	.90	.36
18.....	.34	.34	.90	.45	.48	.20	.34	.85	.38
19.....	.34	.85	.88	.42	.35	.22	.31	.78	.72
20.....	.33	.90	.90	.32	.32	.26	.30	.68	.47
21.....	.33	.85	.88	.48	.54	.23	.55	.76	.72
22.....	.32	.80	.74	.48	.42	.20	.72	.76	.87
23.....	.32	.89	.60	.36	.35	.18	.80	.68	.67
24.....	.47	.83	.58	.42	.35	.15	.44	.49	.55
25.....	.36	.90	.58	.40	.35	.70	.40	.44	.47
26.....	.33	.58	.82	.40	.50	.50	.58	.40	.58
27.....	.33	.90	.68	.35	.60	1.45	.80	.40	.47
28.....	.32	.90	.64	.56	.40	.20	.92	.40	.46
29.....	.32	.68	.62	.46	.40	.40	.48	.40	.52
30.....	.30	.....	.76	.45	.42	.76	.51	.48	.60
31.....	.30	.....	.89	.38	.32	.....	.76	.....	.50

NOTE.—Gage not read during April, May, and June.

## HONOKAHAU STREAM BASIN.

## HONOKAHAU DITCH AT INTAKE, NEAR HONOKAHAU, MAUI.

**Location.**—About 9 miles by trail from Honokahau and 250 feet below ditch intake.

**Records available.**—February 3, 1907, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 6 p. m.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made from plank at gage.

**Accuracy.**—Records good.

**Cooperation.**—Gage is the property of the Honolua Ranch Co.

*Discharge measurements of Honokahau ditch at intake, near Honokahau, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Inches.</i>	<i>Sec.-ft.</i>			<i>Inches.</i>	<i>Sec.-ft.</i>
Feb. 29	J. B. Stewart.....	27.8	30.6	Nov. 27	J. B. Stewart.....	22.0	19.2
Mar. 1	.....do.....	17.0	12.6	Dec. 16	C. T. Bailey.....	23.9	22.5
Sept. 13	.....do.....	22.2	19.0				

*Daily gage height, in inches, of Honokahau ditch at intake, near Honokahau, Maui, for 1912.*

[Takahashi, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	28.2	23.8	30.8	32.5	30.6	27.5	27.5	24.5	23.5	29.4	34.0	33.5
2.....	30.4	26.9	34.0	31.5	34.0	27.0	27.9	24.5	33.0	29.0	23.8	30.0
3.....	27.8	33.0	34.0	34.0	34.0	26.6	28.0	24.4	25.2	23.0	22.2	32.2
4.....	27.0	26.2	30.8	34.0	32.0	26.5	30.4	24.2	23.8	29.5	23.2	24.6
5.....	26.5	24.5	31.0	34.0	33.5	26.2	31.0	24.1	25.0	25.2	21.8	22.4
6.....	26.2	24.0	32.5	34.0	32.4	26.1	28.0	24.0	23.5	23.0	21.9	22.0
7.....	28.6	23.9	32.0	34.0	29.6	27.2	32.0	26.0	30.0	22.8	21.5	34.0
8.....	32.8	24.9	28.0	34.0	32.6	33.0	30.2	25.5	23.4	28.8	21.8	28.0
9.....	30.8	25.4	34.0	34.0	29.5	28.5	34.0	30.8	24.2	24.0	23.0	24.8
10.....	27.4	24.1	33.5	34.0	29.0	31.9	33.0	28.2	22.9	22.6	34.0	27.9
11.....	26.1	30.0	34.0	31.5	28.6	33.0	33.0	31.0	22.5	28.2	28.0	22.2
12.....	26.0	24.9	34.0	34.0	28.5	31.5	31.5	26.4	22.4	27.5	24.5	22.0
13.....	25.8	27.5	34.0	32.5	28.4	32.5	34.0	27.8	22.0	30.2	22.2	21.9
14.....	25.5	30.1	31.9	34.0	28.1	31.9	32.0	34.0	22.0	31.0	21.5	24.0
15.....	25.5	24.2	28.5	33.0	27.9	34.0	27.4	29.4	21.6	30.0	21.1	23.2
16.....	25.5	24.0	27.4	34.0	27.8	30.6	30.1	31.8	21.5	23.5	21.0	24.2
17.....	25.5	24.1	30.8	34.0	27.6	31.5	28.2	27.4	21.5	22.4	31.5	21.9
18.....	25.2	23.8	34.0	34.0	27.6	28.0	26.2	24.9	21.5	21.9	34.0	28.8
19.....	25.2	33.5	32.0	34.0	31.8	27.5	26.2	24.4	24.4	21.6	29.8	33.0
20.....	25.2	34.0	34.0	34.0	30.0	27.0	25.9	24.2	22.5	21.5	28.1	25.2
21.....	24.9	34.0	32.1	33.5	31.0	31.0	31.8	24.0	23.8	30.5	32.0	29.0
22.....	24.8	29.8	28.6	34.0	28.4	28.5	28.4	27.0	22.4	31.2	29.5	34.0
23.....	24.8	34.0	27.8	32.8	27.8	31.4	26.8	24.2	21.9	28.8	30.5	30.4
24.....	26.1	34.0	27.2	32.5	30.8	34.0	30.5	23.6	21.4	24.5	23.2	26.2
25.....	24.9	34.0	27.9	31.6	29.6	27.9	25.8	23.4	21.4	22.5	22.2	29.2
26.....	24.8	34.0	31.5	33.0	34.0	27.2	25.2	28.6	23.2	30.2	22.0	29.8
27.....	24.5	34.0	29.5	31.8	34.0	26.5	27.0	27.5	25.1	30.8	21.9	23.8
28.....	24.5	34.0	29.6	30.5	34.0	26.0	27.0	24.2	26.5	30.4	21.8	28.0
29.....	24.1	28.4	30.8	29.6	32.5	25.9	26.2	29.5	27.2	23.4	22.0	23.8
30.....	23.9	.....	34.0	32.5	31.0	25.5	25.8	26.5	30.5	29.0	28.2	29.2
31.....	23.9	.....	33.5	.....	29.4	.....	24.9	25.4	.....	33.0	.....	28.8

*Daily discharge, in second-feet, of Honokahau ditch at intake, near Honokahau, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	31.4	22.6	35.0	40.0	36.2	30.0	30.0	24.0	22.0	33.8	43.0	42.0
2.....	35.8	28.8	43.0	38.0	43.0	29.0	30.8	24.0	41.0	33.0	22.6	35.0
3.....	30.6	41.0	43.0	43.0	43.0	28.2	31.0	23.8	25.4	21.0	19.4	39.4
4.....	29.0	27.4	36.6	43.0	39.0	28.0	35.8	23.4	22.6	34.0	21.4	24.2
5.....	28.0	24.0	37.0	43.0	42.0	27.4	37.0	23.2	25.0	25.4	18.7	19.8
6.....	27.4	23.0	40.0	43.0	39.8	27.2	31.0	23.0	22.0	21.0	18.8	19.0
7.....	32.2	22.8	39.0	43.0	34.2	29.4	39.0	27.0	35.0	20.6	18.2	43.0
8.....	40.6	24.8	31.0	43.0	40.2	41.0	35.4	26.0	21.8	32.6	18.7	31.0
9.....	36.6	25.8	43.0	43.0	34.0	32.0	43.0	36.6	23.4	23.0	21.0	24.6
10.....	29.8	23.2	42.0	43.0	33.0	38.8	41.0	31.4	20.8	20.2	43.0	30.8
11.....	27.2	35.0	43.0	38.0	32.2	41.0	41.0	37.0	20.0	31.4	31.0	19.4
12.....	27.0	24.8	43.0	43.0	32.0	38.0	38.0	27.8	19.8	30.0	24.0	19.0
13.....	26.6	30.0	43.0	40.0	31.8	40.0	43.0	30.6	19.0	35.4	19.4	18.8
14.....	26.0	35.2	38.8	43.0	31.2	38.8	39.0	43.0	19.0	37.0	18.2	23.0
15.....	26.0	24.8	32.0	41.0	30.8	43.0	29.8	33.8	18.4	35.0	17.6	21.4
16.....	26.0	23.0	29.8	43.0	30.6	36.2	35.2	38.6	18.2	22.0	17.5	23.4
17.....	26.0	23.2	36.6	43.0	30.2	38.0	31.4	29.8	18.2	19.8	38.0	18.8
18.....	25.4	22.6	43.0	43.0	30.2	31.0	27.4	24.8	18.2	18.8	43.0	32.6
19.....	25.4	42.0	39.0	43.0	38.6	30.0	27.4	23.8	23.8	18.4	34.6	41.0
20.....	25.4	43.0	43.0	43.0	35.0	29.0	26.8	23.4	20.0	18.3	31.2	25.4
21.....	24.8	43.0	39.2	42.0	37.0	37.0	38.6	23.0	22.6	36.0	39.0	33.0
22.....	24.6	34.6	32.2	43.0	31.8	32.0	31.8	29.0	19.8	37.4	34.0	43.0
23.....	24.6	43.0	30.6	40.6	30.6	37.8	28.6	23.4	18.8	32.6	36.0	35.8
24.....	27.2	43.0	29.4	40.0	36.6	43.0	36.0	22.2	18.4	24.0	21.4	27.4
25.....	24.8	43.0	30.8	38.2	34.2	30.8	26.6	21.8	18.1	20.0	19.4	33.4
26.....	24.8	43.0	38.8	41.0	43.0	29.4	25.4	32.2	21.4	35.4	19.0	34.6
27.....	24.0	43.0	34.8	38.6	43.0	28.0	29.0	30.0	25.2	36.6	18.8	22.6
28.....	24.0	43.0	34.2	36.0	43.0	27.0	29.0	23.4	28.0	35.6	18.7	31.0
29.....	23.2	31.8	36.6	34.2	40.0	26.8	27.4	34.0	29.4	21.8	19.0	22.6
30.....	22.8	-----	43.0	40.0	37.0	26.0	26.6	28.0	36.0	33.0	31.4	33.4
31.....	22.8	-----	42.0	-----	33.8	-----	24.8	25.8	-----	41.0	-----	32.6

*Monthly discharge of Honokahau ditch at intake, near Honokahau, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	40.6	22.8	27.4	1,680	A.
February.....	43.0	22.6	32.2	1,850	A.
March.....	43.0	29.4	37.8	2,320	A.
April.....	43.0	34.2	41.2	2,450	A.
May.....	43.0	30.2	36.0	2,210	A.
June.....	43.0	26.0	33.1	1,970	A.
July.....	43.0	24.8	32.8	2,020	A.
August.....	43.0	21.8	28.0	1,720	A.
September.....	41.0	18.1	23.0	1,370	A.
October.....	41.0	18.3	28.5	1,750	A.
November.....	43.0	17.5	25.9	1,540	A.
December.....	43.0	18.8	29.1	1,790	A.
The year.....	43.0	17.5	31.3	22,700	

#### HONOKAHAU DITCH AT HONOKAWAI WEIR, NEAR HONOKAHAU, MAUI.

**Location.**—About 8 miles north of Lahaina and 6 miles south of Honolua ranch office.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Friez automatic clock register.

**Discharge measurements.**—By contracted weir consisting of three 5-foot panels.

**Cooperation.**—Weir is the property of and records are furnished by the Honolua Ranch Co.

*Daily discharge, in million gallons, of Honokahau ditch at Honokawai weir, near Honokahau, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	14.00	9.90	14.70	15.00	15.00	13.60	10.30	9.40	10.10	12.40	13.60	10.70
2.....	14.20	12.30	15.00	15.00	15.00	13.10	11.60	9.10	9.70	10.00	9.20	13.70
3.....	13.40	14.50	15.00	15.00	15.00	12.60	11.80	9.10	12.50	12.40	8.60	12.80
4.....	12.50	12.40	15.00	15.00	15.00	12.20	11.70	9.20	10.70	8.80	8.20	13.70
5.....	12.10	11.00	15.00	15.00	14.90	12.00	12.20	8.90	10.00	11.10	7.30	10.00
6.....	11.90	10.50	15.00	15.00	14.70	11.80	13.30	9.00	9.20	11.00	7.10	9.30
7.....	12.80	9.50	14.30	15.00	13.60	12.20	13.30	8.90	11.30	8.40	6.80	10.90
8.....	14.90	10.70	14.40	15.00	14.90	14.80	13.00	11.20	12.50	8.70	6.40	13.10
9.....	14.20	11.80	15.00	15.00	13.90	13.60	13.30	10.40	10.40	8.50	8.50	10.90
10.....	12.60	8.60	15.00	15.00	13.10	14.20	14.90	12.00	9.60	8.20	14.80	10.30
11.....	11.90	12.30	15.00	15.00	13.40	15.00	14.90	12.50	8.60	8.90	12.30	8.60
12.....	11.60	11.40	15.00	15.00	13.50	14.30	14.70	13.80	8.20	12.10	11.00	8.00
13.....	11.40	12.80	15.00	15.00	13.20	14.90	14.30	12.80	7.60	13.50	8.40	7.50
14.....	11.20	13.20	15.00	15.00	13.10	14.40	13.60	7.30	7.80	13.60	7.70	7.30
15.....	11.00	10.90	15.00	15.00	13.10	15.00	14.50	12.50	7.60	14.10	7.30	7.40
16.....	11.60	10.30	14.50	15.00	13.40	15.00	12.40	14.70	7.40	13.20	10.20	8.50
17.....	10.90	10.00	14.90	15.00	13.10	14.90	12.80	13.70	7.40	9.40	12.50	9.10
18.....	10.80	9.60	15.00	15.00	13.20	13.60	12.80	11.60	7.60	8.20	9.20	7.70
19.....	10.80	14.80	15.00	15.00	15.00	13.40	11.20	10.30	8.00	7.60	8.20	11.20
20.....	10.90	15.00	15.00	15.00	15.00	12.30	10.80	9.70	8.30	7.10	7.90	14.10
21.....	10.80	15.00	15.00	15.00	15.00	13.20	10.80	9.30	9.20	7.10	6.50	10.50
22.....	10.60	15.00	15.00	15.00	14.30	12.90	13.30	9.20	8.40	13.00	5.70	13.40
23.....	10.90	15.00	14.40	15.00	13.50	13.20	12.30	11.80	7.60	14.90	7.20	14.50
24.....	12.00	15.00	13.70	15.00	13.70	14.20	11.10	9.80	7.60	12.40	15.00	13.80
25.....	11.40	15.00	13.80	15.00	10.00	12.90	12.20	9.10	7.50	9.40	14.20	11.40
26.....	11.00	15.00	15.00	15.00	14.60	11.80	10.50	8.70	7.40	8.70	15.00	10.60
27.....	10.60	15.00	15.00	15.00	15.00	11.60	10.20	11.70	8.00	11.40	12.70	11.60
28.....	10.50	15.00	14.50	15.00	15.00	8.90	11.20	12.10	8.40	13.30	13.50	9.10
29.....	10.20	15.00	14.90	15.00	15.00	10.70	10.90	11.40	8.80	13.00	14.60	9.90
30.....	10.10	15.00	15.00	15.00	15.00	10.40	10.40	12.30	12.40	9.10	13.50	9.50
31.....	10.20	15.00	15.00	15.00	15.00	15.00	9.70	11.10	9.20	9.20	11.20	11.20

*Monthly discharge of Honokahau ditch at Honokawai weir, near Honokahau, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	14.9	10.1	11.70	363
February.....	15.0	8.6	12.60	366
March.....	15.0	13.7	14.80	459
April.....	15.0	15.0	15.00	450
May.....	15.0	10.0	14.10	437
June.....	15.0	8.9	13.10	393
July.....	14.9	9.7	12.80	380
August.....	14.7	7.3	10.70	333
September.....	13.5	7.4	9.03	271
October.....	14.9	7.1	10.60	329
November.....	15.0	5.7	10.10	303
December.....	14.5	7.3	10.70	331
The year.....	15.0	5.7	12.10	4,420

## MISCELLANEOUS MEASUREMENTS.

The following miscellaneous discharge measurements have been made by J. B. Stewart on streams of West Maui:

*Miscellaneous measurements on West Maui in 1912.***Kahakuloa Stream above Kahakuloa, near Walluku, Maui.**

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 28 .....	0.68	5.60	Oct. 1.....	0.85	9.92
Sept. 3 .....	.75	7.88	16.....	.77	8.58
14 .....	.65	6.10	31.....	1.05	19.3

**Honokahua ditch above Honolua Stream, Honokahau, Maui.**

Mar. 1.....	28.3	28.3	Sept. 13.....	22.1	16.1
1.....	23.2	19.8			

**South Waiehu ditch near Walluku, Maui.**

July 13.....	0.48	4.16	Sept. 6.....	0.42	3.47
16.....	.45	3.79	Nov. 21.....	.43	4.27

**East Maui.****KOOLAU DITCH REGION.****KOOLAU DITCH NEAR KEANAE, MAUI.**

**Location.**—About 3 miles southwest of Keanae, at portal of tunnel extending from Keanae Valley to Alo Stream.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 6 p. m.

**Channel.**—Straight and probably permanent.

**Discharge measurements.**—Made from plank.

**Accuracy.**—Very good.

**Cooperation.**—Gage belongs to and records are furnished annually by East Maui Ditch Co.

The following discharge measurement was made by J. B. Stewart:

January 11, 1912: Gage height, 24.5 inches; discharge, 44.8 second-feet.

*Daily gage height, in inches, of Koolau ditch near Keanae, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	34.2	16.4	55.8	55.4	37.5	23.8	21.5	18.0	23.9	23.1	51.8	47.8
2.....	37.0	15.9	55.9	54.2	38.0	23.0	22.0	17.4	53.2	28.8	46.8	63.5
3.....	33.4	16.0	56.0	56.1	38.0	22.0	24.5	18.2	46.8	24.0	55.0	59.2
4.....	31.2	15.4	55.5	57.8	49.5	21.4	32.1	17.1	49.1	19.6	44.0	55.0
5.....	29.8	14.9	54.0	56.5	51.5	20.8	27.8	16.5	35.2	18.2	35.2	53.5
6.....	28.2	14.8	54.0	56.0	47.5	20.1	24.0	15.9	39.5	17.5	32.5	52.0
7.....	27.2	14.6	55.2	56.8	40.1	20.5	22.5	17.8	52.6	18.1	34.0	50.5
8.....	28.2	15.8	53.8	56.0	47.8	23.9	33.2	16.0	37.0	18.8	33.0	44.2
9.....	27.4	28.8	54.0	56.0	38.5	22.2	45.5	20.8	31.8	26.8	63.5	46.2
10.....	25.0	17.8	54.5	55.6	35.0	37.4	30.5	21.0	29.0	23.6	58.8	38.5
11.....	24.4	16.5	56.5	55.0	33.0	37.5	31.8	32.1	26.6	23.5	56.2	30.0
12.....	23.6	16.5	56.0	56.0	30.6	29.2	26.8	28.9	25.5	22.2	46.0	32.8
13.....	23.1	42.0	56.0	54.8	30.0	30.2	29.6	26.5	24.5	22.6	41.5	32.0
14.....	22.9	23.0	54.8	55.2	30.4	27.8	27.2	35.0	23.0	49.5	36.5	34.0
15.....	22.1	19.1	53.0	54.5	28.1	25.2	24.0	47.4	22.4	41.0	36.0	31.8
16.....	21.6	17.8	48.0	55.0	27.2	26.2	23.1	36.8	21.8	35.0	63.5	45.0
17.....	21.2	16.9	48.0	55.0	26.2	23.9	21.8	27.1	21.0	27.1	61.5	33.2
18.....	20.6	16.4	54.2	52.8	25.9	22.5	21.0	24.9	20.0	24.4	63.5	49.8
19.....	20.0	33.5	51.8	50.8	26.0	26.4	20.1	25.4	19.8	22.9	58.5	51.2
20.....	19.1	56.0	50.8	52.2	29.0	25.1	19.2	22.6	19.9	26.0	57.0	50.0
21.....	18.5	56.0	47.5	50.8	26.8	31.9	20.0	21.9	18.8	56.5	53.8	54.0
22.....	18.5	55.5	42.2	51.2	25.2	25.2	19.0	28.5	18.0	61.5	55.5	58.5
23.....	19.4	53.8	39.8	49.2	23.2	23.0	18.2	22.5	17.4	60.5	52.5	59.5
24.....	18.5	46.2	38.0	48.5	24.5	39.5	25.1	22.1	17.2	56.2	46.8	56.5
25.....	17.8	42.2	43.0	51.5	22.5	27.5	22.4	19.5	16.9	43.5	50.8	51.5
26.....	17.1	45.6	46.0	52.5	32.0	24.5	20.8	21.6	16.5	47.2	45.5	56.5
27.....	16.6	56.1	36.9	53.5	45.4	23.5	21.6	21.8	16.5	63.0	42.0	54.2
28.....	16.2	56.2	34.2	47.5	31.9	22.2	22.0	22.0	16.0	60.0	40.8	51.5
29.....	16.0	55.8	54.5	41.0	31.2	21.2	24.5	25.4	16.4	53.2	37.8	45.8
30.....	16.4	.....	54.8	40.6	26.9	20.4	21.4	21.5	40.9	56.5	37.0	41.2
31.....	16.2	.....	52.8	.....	25.8	.....	18.6	24.5	.....	63.5	.....	41.2

*Daily discharge, in second-feet, of Koolau ditch near Keanae, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	76.8	24.8	174.0	172.0	90.0	42.4	35.5	28.0	42.7	40.3	154.0	134.0
2.....	88.0	23.8	174.0	166.0	92.0	40.0	37.0	26.8	161.0	57.4	129.0	212.0
3.....	73.6	24.0	175.0	176.0	92.0	37.0	44.5	28.4	129.0	43.0	170.0	191.0
4.....	64.8	22.8	172.0	184.0	142.0	35.2	68.4	26.2	140.0	31.2	116.0	170.0
5.....	60.4	21.8	165.0	178.0	152.0	33.6	54.4	25.0	80.8	28.4	80.8	162.0
6.....	55.6	21.6	165.0	175.0	132.0	32.2	43.0	23.8	98.0	27.0	70.0	155.0
7.....	52.6	21.2	171.0	179.0	100.0	33.0	38.5	27.6	158.0	28.2	76.0	148.0
8.....	55.6	23.6	164.0	175.0	134.0	42.7	72.8	24.0	88.0	29.6	72.0	117.0
9.....	53.2	57.4	165.0	175.0	94.0	37.6	122.0	33.6	67.2	51.4	212.0	101.0
10.....	46.0	27.6	168.0	173.0	80.0	89.6	62.5	34.0	58.0	41.8	189.0	94.0
11.....	44.2	25.0	178.0	170.0	72.0	90.0	67.2	68.4	50.8	41.5	176.0	61.0
12.....	41.8	25.0	175.0	175.0	62.8	58.6	51.4	57.7	47.5	37.6	125.0	71.2
13.....	40.3	108.0	175.0	169.0	61.0	61.6	59.6	50.5	44.5	38.8	106.0	68.0
14.....	39.7	40.0	169.0	171.0	62.2	54.4	52.6	80.0	40.0	142.0	86.0	76.0
15.....	37.3	30.2	160.0	168.0	55.3	46.6	43.0	132.0	38.2	104.0	84.0	67.2
16.....	35.8	27.6	135.0	170.0	52.6	49.6	40.3	87.2	36.4	80.0	212.0	120.0
17.....	34.6	25.8	135.0	170.0	49.6	42.7	36.4	52.3	34.0	52.3	202.0	72.8
18.....	33.2	24.8	166.0	159.0	48.7	38.5	34.0	45.7	32.0	44.2	212.0	144.0
19.....	32.0	74.0	154.0	149.0	49.0	50.2	32.2	47.2	31.6	39.7	188.0	151.0
20.....	30.2	175.0	149.0	156.0	58.0	46.3	30.4	38.8	31.8	49.0	180.0	145.0
21.....	29.0	175.0	132.0	149.0	51.4	67.6	32.0	36.7	29.6	178.0	164.0	165.0
22.....	29.0	172.0	109.0	151.0	46.6	46.6	30.0	56.5	28.0	202.0	172.0	188.0
23.....	30.8	164.0	99.2	141.0	40.6	40.0	28.4	38.5	26.8	198.0	158.0	192.0
24.....	29.0	126.0	92.0	138.0	44.5	98.0	46.3	37.3	26.4	176.0	129.0	178.0
25.....	27.6	109.0	112.0	152.0	38.5	53.5	38.2	31.0	25.8	114.0	149.0	152.0
26.....	26.2	123.0	125.0	158.0	68.0	44.5	33.6	35.8	25.0	131.0	122.0	178.0
27.....	25.2	176.0	87.6	162.0	122.0	41.5	35.8	36.4	25.0	210.0	108.0	166.0
28.....	24.4	176.0	76.8	132.0	67.6	37.6	37.0	37.0	24.0	195.0	103.0	152.0
29.....	24.0	174.0	188.0	104.0	64.8	34.6	44.5	47.2	24.8	161.0	91.2	124.0
30.....	24.8	.....	169.0	102.0	51.7	32.8	35.2	35.5	104.0	178.0	88.0	105.0
31.....	24.4	.....	159.0	.....	48.4	.....	29.2	44.5	.....	212.0	.....	105.0

*Monthly discharge of Koolau ditch near Keanae, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	88.0	24.0	41.6	2,560	B.
February.....	176.0	21.2	76.5	4,400	B.
March.....	178.0	76.8	149.0	9,160	B.
April.....	184.0	102.0	160.0	9,520	B.
May.....	152.0	38.5	74.9	4,610	B.
June.....	98.0	32.2	48.6	2,890	B.
July.....	122.0	28.4	45.7	2,810	B.
August.....	132.0	23.8	44.3	2,720	B.
September.....	161.0	24.0	58.3	3,470	B.
October.....	212.0	27.0	95.6	5,880	B.
November.....	212.0	70.0	137.0	8,150	B.
December.....	212.0	61.0	134.0	8,230	B.
The year.....	212.0	21.2	88.8	64,400	

## SPRECKELS DITCH REGION.

## HAIPUAENA STREAM NEAR HUELO, MAUI.

**Location.**—About 6½ miles by trail southeast of Huelo post office, about 400 feet below point where the Spreckels ditch joins the stream.

**Records available.**—December 18, 1910, to December 31, 1912.

**Drainage area.**—Not mapped.

**Gage.**—Vertical staff; read once daily, about 4 p. m.; datum unchanged.

**Channel.**—Rough and shifting.

**Discharge measurements.**—Made by wading; no equipment for flood measurements.

**Accuracy.**—A fairly well defined rating curve has been developed for ordinary stages.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Haipuaena Stream near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 23	J. B. Stewart.....	<i>Feet.</i> 0.40	<i>Sec.-ft.</i> σ 6.4
Nov. 10	.....do.....	1.30	σ 47.0

<sup>a</sup> Measurements at Spreckels ditch station No. 4.

<sup>b</sup> Haipuaena and Spreckels ditch at station No. 3.

*Daily gage height, in feet, of Haipuaena Stream near Huelo, Maui, for 1912.*

[Kumagai, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.78	0.31	1.40	1.48	0.93	0.63	0.85	0.60	0.80	0.78	1.30	1.20
2.....	1.00	.30	1.65	1.50	.93	.63	1.20	.58	1.70	1.60	1.10	1.55
3.....	.80	.30	1.53	1.60	1.30	.60	1.30	.63	1.33	.78	1.30	1.65
4.....	.75	.30	1.43	2.90	1.40	.53	1.33	.50	1.30	.60	.98	1.35
5.....	.70	.28	1.38	1.80	1.33	.50	1.23	.48	1.00	.55	.90	1.18
6.....	.68	.27	1.35	1.40	1.25	.47	.95	.45	1.23	.45	.88	.73
7.....	.65	.23	1.60	2.50	1.10	.50	.82	.45	1.30	.50	.88	1.20
8.....	.68	.70	1.33	2.20	1.30	.70	1.50	.43	1.03	.50	.75	1.05
9.....	.73	.43	1.53	1.50	1.00	.83	1.30	.95	.90	.71	2.70	.98
10.....	.63	.49	1.50	1.60	.90	1.50	1.03	.95	.85	.63	1.50	.90



Daily gage height, in feet, of Haipuaena Stream near Huelo, Maui, for 1912—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	0.58	0.40	2.90	1.40	0.83	1.40	1.20	1.13	0.80	0.65	1.33	1.83
12.....	.53	1.00	1.69	1.53	.78	1.00	.95	1.00	.70	.80	1.10	.80
13.....	.51	.80	1.55	1.35	.73	1.10	1.10	1.10	.70	.79	1.00	.75
14.....	.50	.58	1.40	1.45	.70	.85	1.13	1.65	.63	1.33	.90	.83
15.....	.48	.48	1.30	1.38	.65	.93	.93	1.33	.60	1.05	.80	.75
16.....	.45	.48	1.18	1.50	.65	1.00	.83	1.03	.58	.83	2.10	.90
17.....	.43	.48	1.38	1.45	.60	.78	.78	.88	.58	.73	1.48	.70
18.....	.41	.40	1.40	1.40	.60	.70	.75	.85	.50	.58	2.00	.80
19.....	.40	1.23	1.50	1.33	.60	.98	.70	.88	.48	.53	1.35	2.05
20.....	.39	2.00	1.30	1.68	.75	1.25	.70	.75	.50	.78	1.50	1.10
21.....	.38	2.50	1.20	1.35	.63	1.30	.68	.70	.45	1.65	1.35	1.90
22.....	.35	1.50	1.00	1.40	.53	.83	.63	1.25	.43	1.55	1.28	1.70
23.....	.34	1.33	1.15	1.20	.50	.80	.58	.83	.43	1.45	1.20	2.00
24.....	.68	1.10	1.00	1.15	.68	1.10	.93	.70	.45	1.33	1.03	1.53
25.....	.48	1.13	1.00	1.40	.50	.83	.93	.65	.40	1.05	1.35	1.30
26.....	.39	1.45	1.35	1.48	1.60	.78	.80	.80	.38	1.35	1.60	1.45
27.....	.36	1.90	1.03	1.33	1.30	.83	.95	.83	.35	2.10	.97	1.30
28.....	.33	1.55	.98	1.15	1.15	.75	.80	.63	.33	1.50	.95	1.35
29.....	.32	1.45	.85	1.05	.90	.68	1.03	.90	.45	1.30	.80	1.15
30.....	.30	.....	1.98	1.00	.78	.63	.73	.83	1.50	1.35	.90	1.63
31.....	.40	.....	1.58	.....	.70	.....	.65	.80	.....	1.25	.....	.98

Daily discharge, in second-feet, of Haipuaena Stream near Huelo, Maui, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	17.7	4.2	52.0	57.6	24.5	12.0	20.8	11.0	18.5	17.7	45.0	39.0
2.....	28.0	4.0	69.5	59.0	24.5	12.0	39.0	10.5	73.0	66.0	33.0	62.5
3.....	18.5	4.0	64.1	66.0	45.0	11.0	45.0	12.0	47.1	17.7	45.0	69.5
4.....	16.5	4.0	54.1	169.0	52.0	9.2	47.1	8.5	45.0	11.0	27.0	48.5
5.....	14.5	3.7	50.6	80.0	47.1	8.5	40.8	8.0	28.0	9.8	23.0	37.8
6.....	13.8	3.6	48.5	52.0	42.0	7.8	25.5	7.2	40.8	7.2	22.1	15.7
7.....	12.8	3.0	66.0	136.0	33.0	8.5	19.4	7.2	45.0	8.5	22.1	39.0
8.....	13.8	14.5	47.1	112.0	45.0	14.5	59.0	6.8	29.5	8.5	16.5	30.5
9.....	15.7	6.8	61.1	59.0	28.0	19.8	45.0	25.5	23.0	14.9	152.0	27.0
10.....	12.0	8.2	59.0	66.0	23.0	59.0	29.5	25.5	20.8	12.0	59.0	23.0
11.....	10.5	6.0	169.0	52.0	19.8	52.0	39.0	34.8	18.5	12.8	47.1	82.4
12.....	9.6	28.0	66.0	61.1	17.7	28.0	25.5	28.0	14.5	18.5	33.0	18.5
13.....	8.8	18.5	62.5	48.5	15.7	33.0	33.0	33.0	14.5	18.1	28.0	16.5
14.....	8.5	10.5	52.0	55.5	14.5	20.8	24.8	69.5	12.0	47.1	23.0	24.5
15.....	8.0	8.0	45.0	50.6	12.8	24.5	24.5	47.1	11.0	30.5	18.5	16.5
16.....	7.2	8.0	37.8	59.0	12.8	28.0	19.8	29.5	10.5	19.8	104.0	23.0
17.....	6.8	8.0	50.6	55.5	11.0	17.7	17.7	22.1	10.5	15.7	57.6	15.7
18.....	6.3	6.0	52.0	52.0	11.0	14.5	16.5	20.8	8.5	10.5	96.0	18.5
19.....	6.0	40.8	59.0	47.1	11.0	27.0	14.5	22.1	8.0	9.2	48.5	100.0
20.....	5.8	96.0	45.0	71.6	16.5	42.0	14.5	16.5	8.5	17.7	59.0	33.0
21.....	5.6	136.0	39.0	48.5	12.0	45.0	13.8	14.5	7.2	69.5	48.5	88.0
22.....	5.0	59.0	28.0	52.0	9.2	19.8	12.0	42.0	6.8	62.5	43.8	73.0
23.....	4.8	47.1	36.0	39.0	8.5	18.5	10.5	19.8	6.8	55.5	39.0	96.0
24.....	13.8	33.0	28.0	36.0	13.8	33.0	24.5	14.5	7.2	47.1	29.5	61.1
25.....	8.0	34.8	28.0	52.0	8.5	19.8	24.5	12.8	6.0	30.5	48.5	45.0
26.....	5.8	55.5	48.5	57.6	66.0	17.7	18.5	18.5	5.6	48.5	66.0	55.5
27.....	5.2	88.0	29.5	47.1	45.0	19.8	25.5	19.8	5.0	104.0	26.5	45.0
28.....	4.6	62.5	27.0	36.0	36.0	16.5	18.5	12.0	4.6	59.0	25.5	48.5
29.....	4.4	55.5	20.8	30.5	23.0	13.8	29.5	23.0	7.2	45.0	18.5	36.0
30.....	4.0	.....	94.4	28.0	17.7	12.0	15.7	19.8	59.0	48.5	23.0	27.0
31.....	6.0	.....	64.6	.....	14.5	.....	12.8	18.5	.....	42.0	.....	29.5

*Monthly discharge of Haipuaena Stream near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	28.0	4.0	9.94	611	B.
February.....	136.0	3.0	29.60	1,700	B.
March.....	169.0	20.8	53.30	3,280	A.
April.....	169.0	28.0	61.20	3,640	A.
May.....	66.0	8.5	24.60	1,510	B.
June.....	59.0	7.8	22.20	1,320	B.
July.....	59.0	10.5	26.30	1,620	B.
August.....	69.5	6.8	21.30	1,310	B.
September.....	73.0	4.6	20.10	1,200	B.
October.....	104.0	7.2	31.80	1,960	A.
November.....	152.0	16.5	44.30	2,640	A.
December.....	100.0	15.7	43.40	2,670	A.
The year.....	169.0	3.0	32.30	23,500	

**PUOHAKAMOA STREAM NEAR HUELO, MAUI.**

**Location.**—About 6½ miles by trail southeast of Huelo post office, immediately below point where Spreckels ditch falls into stream.

**Records available.**—December 18, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at no regular hour, but usually about 5 p. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Puohakamoa Stream near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 23	J. B. Stewart.....	<i>Feet.</i> 0.45	<i>Sec.-feet.</i> 11.1
Nov. 8	.....do.....	1.64	67.1

*Daily gage height, in feet, of Puohakamoa Stream near Huelo, Maui, for 1912.*

[Tokunaga, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.01	0.28	1.90	1.76	1.05	0.73	1.06	0.66	0.98	1.00	1.50	1.50
2.....	1.22	.28	2.16	1.91	1.10	.72	1.49	.64	2.18	1.50	1.30	2.20
3.....	.92	.28	2.20	2.12	1.40	.67	1.72	.70	1.50	1.25	1.43	3.34
4.....	.81	.26	1.64	4.50	1.46	.54	1.68	.46	1.40	.58	1.13	1.42
5.....	.79	.24	1.52	2.41	1.58	.43	1.28	.42	1.17	.55	.90	1.45
6.....	.73	.22	1.50	1.70	1.39	.40	1.04	.41	1.40	.50	.88	1.12
7.....	.87	.21	1.98	2.18	1.19	.43	.90	.43	1.62	.52	.86	1.35
8.....	.81	.72	1.72	3.50	1.53	.81	1.60	.41	1.30	.52	.88	1.18
9.....	.70	.48	1.70	1.95	1.18	.67	1.50	1.28	1.04	1.00	.35	1.05
10.....	.67	.32	1.85	1.82	1.05	2.30	1.22	.98	.98	.67	1.69	1.00
11.....	.59	.30	3.25	1.65	.97	1.70	1.15	1.30	.87	.82	1.50	.89
12.....	.55	1.65	2.25	1.91	.90	1.05	1.06	1.09	.81	.88	1.28	.85
13.....	.52	1.38	2.70	1.46	.84	1.60	1.13	1.23	.75	.80	1.12	.81
14.....	.51	.67	1.75	2.05	.79	.97	1.42	1.43	.70	2.10	1.01	1.00
15.....	.50	.32	1.48	1.65	.70	1.22	1.18	1.40	.68	1.15	.88	.86
16.....	.48	.32	1.29	1.64	.68	1.09	.98	1.18	.63	1.00	3.20	.82
17.....	.45	.31	1.38	1.60	.67	.95	.90	.97	.62	.75	2.15	.82
18.....	.42	.32	1.73	1.51	.65	.92	.79	.91	.53	.71	2.40	2.50
19.....	.40	1.40	1.80	1.50	.70	1.08	.70	1.02	.50	.65	1.82	1.75
20.....	.39	2.25	1.78	1.95	.90	1.10	.69	.99	.54	.70	1.65	1.67

*Daily gage height, in feet, of Puohakamoa Stream near Huelo, Maui, for 1912—Contd.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	0.37	2.89	1.42	1.64	0.88	1.38	0.66	0.73	0.50	0.95	1.68	1.84
22.....	.35	1.95	1.22	1.70	.56	.91	.70	1.45	.48	2.40	1.39	1.80
23.....	.32	1.60	1.10	1.65	.50	.72	.65	.90	.43	1.78	1.65	1.40
24.....	.80	1.34	1.07	1.69	.71	1.35	1.32	.71	.48	1.47	1.19	1.65
25.....	.45	1.35	1.00	1.80	.55	.91	.97	.68	.45	1.10	1.62	1.30
26.....	.32	1.24	1.25	1.82	1.61	.89	.89	.99	.45	1.03	1.25	1.45
27.....	.30	2.62	1.12	1.58	1.42	.97	1.03	.87	.44	3.03	1.17	1.38
28.....	.29	2.11	1.00	1.52	1.20	.88	.93	.68	.42	1.88	1.02	1.40
29.....	.29	1.92	.98	1.28	.98	.74	1.12	1.41	.50	1.50	.92	1.23
30.....	.28	.....	2.48	1.18	.96	.68	.70	.95	1.40	1.62	.88	1.30
31.....	.39	.....	1.57	.....	.73	.....	.68	.94	.....	1.54	.....	1.12

*Daily discharge, in second-feet, of Puohakamoa Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	34.5	4.6	85.0	75.6	36.5	21.2	37.0	18.4	33.0	34.0	60.0	60.0
2.....	45.0	4.6	103.0	85.7	39.0	20.8	59.4	17.6	105.0	60.0	49.0	106.0
3.....	30.0	4.6	106.0	100.0	54.0	18.8	73.2	20.0	60.0	46.5	55.8	196.0
4.....	24.5	4.2	68.4	289.0	57.6	13.6	70.8	10.4	54.0	15.2	40.5	55.2
5.....	23.6	3.8	61.2	122.0	64.8	9.2	48.0	8.8	42.5	14.0	29.0	57.0
6.....	21.2	3.4	60.0	72.0	53.5	8.0	36.0	8.4	54.0	12.0	28.0	40.0
7.....	27.5	3.2	90.6	105.0	43.5	9.2	29.0	9.2	67.2	12.8	27.0	51.5
8.....	24.5	20.8	73.2	209.0	61.8	24.5	66.0	8.4	49.0	12.8	28.0	43.0
9.....	20.0	11.2	72.0	88.5	43.0	18.8	60.0	48.0	36.0	34.0	6.5	36.5
10.....	18.8	5.6	81.5	79.4	36.5	113.0	45.0	33.0	33.0	18.8	71.4	34.0
11.....	15.6	5.0	189.0	69.0	32.5	72.0	41.5	49.0	27.5	25.0	60.0	28.5
12.....	14.0	69.0	110.0	85.7	29.0	36.5	37.0	38.5	24.5	28.0	48.0	26.5
13.....	12.8	53.0	145.0	57.6	26.0	66.0	40.5	45.5	22.0	24.0	40.0	24.5
14.....	12.4	18.8	75.0	95.5	23.6	32.5	55.2	55.8	20.0	99.0	34.5	34.0
15.....	12.0	5.6	58.8	69.0	20.0	45.0	43.0	54.0	19.2	41.5	28.0	26.5
16.....	11.2	5.6	48.5	68.4	19.2	38.5	33.0	43.0	17.2	34.0	185.0	25.0
17.....	10.0	5.3	53.0	66.0	18.8	31.5	29.0	32.5	16.8	22.0	102.0	25.0
18.....	8.8	5.6	73.8	60.6	18.0	30.0	23.6	29.5	13.2	20.4	121.0	129.0
19.....	8.0	54.0	78.0	60.0	20.0	38.0	20.0	35.0	12.0	18.0	79.4	75.0
20.....	7.7	110.0	76.8	88.5	29.0	39.0	19.6	33.5	13.6	20.0	69.0	70.2
21.....	7.1	160.0	55.2	68.4	28.0	53.0	18.4	21.2	12.0	31.5	70.8	80.8
22.....	6.5	88.5	45.0	72.0	14.4	29.5	20.0	57.0	11.2	121.0	53.5	78.0
23.....	5.6	66.0	39.0	69.0	12.0	20.8	18.0	28.0	9.2	76.8	69.0	201.0
24.....	24.0	51.0	37.5	71.4	20.4	51.5	50.0	20.4	11.2	58.2	43.5	69.0
25.....	10.0	51.5	34.0	78.0	14.0	29.5	32.5	19.2	10.0	39.0	67.2	49.0
26.....	5.6	46.0	46.5	79.4	66.6	28.5	28.5	33.5	10.0	35.5	46.5	57.0
27.....	5.0	139.0	40.0	64.8	55.2	32.5	35.5	27.5	9.6	171.0	42.5	53.0
28.....	4.8	99.7	34.0	61.2	44.0	28.0	30.5	19.2	8.8	83.6	35.0	54.0
29.....	4.8	86.4	33.0	48.0	33.0	21.6	40.0	54.6	12.0	60.0	30.0	45.5
30.....	4.6	.....	127.0	43.0	32.0	19.2	20.0	31.5	54.0	67.2	28.0	49.0
31.....	7.7	.....	64.2	.....	21.2	.....	19.2	31.0	.....	62.4	.....	40.0

*Monthly discharge of Puohakamoa Stream near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	45.0	4.6	15.1	928	B.
February.....	160.0	3.2	40.9	2,350	B.
March.....	189.0	33.0	73.0	4,490	B.
April.....	289.0	43.0	86.7	5,160	B.
May.....	66.6	12.0	34.4	2,120	A.
June.....	113.0	8.0	33.3	1,980	A.
July.....	73.2	18.0	38.0	2,340	A.
August.....	57.0	8.4	30.4	1,870	A.
September.....	105.0	8.8	28.9	1,720	B.
October.....	171.0	12.0	45.1	2,770	B.
November.....	185.0	6.5	54.9	3,270	B.
December.....	201.0	24.5	61.9	3,810	B.
The year.....	289.0	3.2	45.2	32,800	

## ALO STREAM NEAR HUELO, MAUI.

**Location.**—About 5 miles by trail southeast of Huelo post office, immediately below wagon bridge where Old Spreckels ditch trail crosses stream.

**Records available.**—December 18, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 5.30 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Gage heights at low stages may be affected by inflow from Spreckels ditch below the gage.

*Discharge measurements of Alo Stream near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 22	J. B. Stewart.....	1.40	0.97
Dec. 20	C. T. Bailey.....	1.90	5.97

*Daily gage height, in feet, of Alo Stream near Huelo, Maui, for 1912.*

[Tokunaga.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.72	1.20	2.03	2.00	1.72	1.56	1.60	1.50	1.70	1.60	1.96	1.82
2.....	1.84	1.18	2.14	1.88	1.76	1.52	1.70	1.48	2.12	1.72	1.90	2.26
3.....	1.70	1.17	2.10	2.10	1.89	1.50	1.82	1.49	1.93	1.64	2.06	1.75
4.....	1.64	1.17	1.97	3.00	1.94	1.44	1.92	1.45	2.02	1.44	1.88	1.62
5.....	1.60	1.13	1.92	2.48	1.95	1.40	1.84	1.41	1.85	1.40	1.80	1.61
6.....	1.58	1.10	1.91	2.04	1.94	1.40	1.72	1.40	1.88	1.36	1.73	1.64
7.....	1.54	1.10	1.96	2.10	1.84	1.40	1.66	1.41	2.02	1.39	1.66	1.54
8.....	1.57	1.39	1.96	2.56	1.96	1.62	1.76	1.40	1.84	1.38	1.62	1.40
9.....	1.59	1.80	2.04	2.15	1.80	1.52	2.00	1.78	1.76	1.44	2.78	1.34
10.....	1.52	1.34	2.12	2.19	1.72	1.94	1.83	1.74	1.70	1.42	1.92	1.29
11.....	1.46	1.34	2.48	1.98	1.68	1.86	1.96	1.91	1.64	1.36	2.02	1.64
12.....	1.44	1.30	2.15	2.10	1.66	1.76	1.79	1.84	1.60	1.68	1.85	1.60
13.....	1.40	2.19	2.50	2.02	1.60	1.82	1.86	1.80	1.56	1.62	1.78	1.48
14.....	1.40	1.78	2.13	2.11	1.60	1.73	1.90	1.86	1.52	2.22	1.77	1.60
15.....	1.38	1.47	1.94	2.06	1.56	1.79	1.78	2.14	1.50	2.11	1.71	1.58
16.....	1.36	1.39	1.90	2.06	1.52	1.78	1.70	1.85	1.44	1.68	2.44	1.70
17.....	1.34	1.32	1.95	2.00	1.50	1.72	1.66	1.74	1.44	1.28	2.19	1.66
18.....	1.32	1.87	1.98	1.93	1.49	1.67	1.61	1.65	1.40	1.52	2.46	2.30
19.....	1.30	2.01	1.97	1.91	1.53	1.59	1.58	1.74	1.40	1.48	2.04	2.16
20.....	1.30	2.29	1.96	2.09	1.70	1.76	1.56	1.60	1.42	1.54	1.97	1.82
21.....	1.30	2.20	1.89	1.92	1.55	1.70	1.49	1.58	1.38	2.36	1.92	2.29
22.....	1.28	1.98	1.82	1.92	1.43	1.84	1.51	1.90	1.36	2.11	1.91	2.22
23.....	1.25	1.90	1.80	1.89	1.40	1.72	1.50	1.68	1.34	2.02	1.94	2.21
24.....	1.40	1.94	1.78	1.90	1.54	1.63	1.88	1.56	1.40	1.94	1.94	1.83
25.....	1.33	1.82	1.78	1.96	1.40	1.96	1.74	1.51	1.34	1.86	1.88	1.90
26.....	1.25	2.24	1.89	1.99	1.80	1.72	1.63	1.57	1.33	1.85	1.88	2.04
27.....	1.22	2.18	1.80	1.96	2.12	1.65	1.67	1.60	1.32	3.00	1.82	1.96
28.....	1.20	2.01	1.74	1.90	1.86	1.75	1.68	1.51	1.30	2.34	1.78	1.92
29.....	1.20	1.96	1.63	1.84	1.91	1.66	1.64	1.80	1.35	1.98	1.72	1.86
30.....	1.18	.....	1.90	1.80	1.80	1.54	1.62	1.69	2.02	2.03	1.75	1.90
31.....	1.22	.....	1.88	.....	1.64	.....	1.53	1.74	.....	1.98	.....	1.86

*Daily discharge, in second-feet, of Alo Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.2	0.4	10.2	9.0	3.2	1.8	2.0	1.5	3.0	2.0	7.8	4.4
2.....	4.8	.4	15.4	5.6	3.6	1.6	3.0	1.4	14.2	3.2	6.0	22.6
3.....	3.0	.3	13.0	13.0	5.8	1.5	4.4	1.4	6.9	2.4	11.4	3.5
4.....	2.4	.3	8.1	81.0	7.2	1.2	6.6	1.2	9.8	1.2	5.6	2.2
5.....	2.0	.3	6.6	37.6	7.5	1.0	4.8	1.1	5.0	1.0	4.0	2.1
6.....	1.9	.2	6.3	10.6	7.2	1.0	3.2	1.0	5.6	.9	3.3	2.4
7.....	1.7	.2	7.8	13.0	4.8	1.0	2.6	1.1	9.8	1.0	2.6	1.7
8.....	1.8	1.0	7.8	43.8	7.8	2.2	3.6	1.0	4.8	.9	2.2	1.0
9.....	2.0	4.0	10.6	16.0	4.0	1.6	9.0	3.8	3.6	1.2	61.4	.8
10.....	1.6	.8	14.2	18.4	3.2	7.2	4.6	3.4	3.0	1.1	6.6	.7

*Daily discharge, in second-feet, of Alo Stream near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	1.3	0.8	37.6	8.4	2.8	5.2	7.8	6.3	2.4	0.9	9.8	2.4
12.....	1.2	.7	16.0	13.0	2.6	3.6	3.9	4.8	2.0	2.8	5.0	2.0
13.....	1.0	18.4	39.0	9.8	2.0	4.4	5.2	4.0	1.8	2.2	3.3	1.4
14.....	1.0	3.8	14.8	13.6	2.0	3.3	6.0	5.2	1.6	20.2	3.7	2.0
15.....	.9	1.4	7.2	11.4	1.8	3.9	3.8	15.4	1.5	13.6	3.1	1.9
16.....	.9	1.0	6.0	11.4	1.6	3.8	3.0	5.0	1.2	2.8	34.8	3.0
17.....	.8	.8	7.5	9.0	1.5	3.2	2.6	3.4	1.2	.6	18.4	2.6
18.....	.8	5.4	8.4	6.9	1.4	2.7	2.1	2.5	1.0	1.6	36.2	25.0
19.....	.7	9.4	8.1	6.3	1.6	2.0	1.9	3.4	1.0	1.4	10.6	16.6
20.....	.7	24.4	7.8	12.6	3.0	3.6	1.8	2.0	1.1	1.7	8.1	4.4
21.....	.7	19.0	5.8	6.6	1.8	3.0	1.4	1.9	.9	29.2	6.6	24.4
22.....	.6	8.4	4.4	6.6	1.2	4.8	1.6	6.0	.9	13.6	6.3	20.2
23.....	.6	6.0	4.0	5.8	1.0	3.2	1.5	2.8	.8	9.8	7.2	19.6
24.....	1.0	7.2	3.8	6.0	1.7	2.3	5.6	1.8	1.0	7.2	7.2	6.9
25.....	.8	4.4	3.8	7.8	1.0	7.8	3.4	1.6	.8	5.2	5.6	6.0
26.....	.6	21.4	5.8	8.7	4.0	3.2	2.3	1.8	.8	5.0	5.6	10.6
27.....	.5	17.8	4.0	7.8	14.2	2.5	2.7	2.0	.8	81.0	4.4	6.6
28.....	.4	9.4	3.4	6.0	5.2	3.5	2.8	1.6	.7	27.8	3.8	7.8
29.....	.4	7.8	2.3	4.8	6.3	2.6	3.4	4.0	.6	8.4	3.2	6.6
30.....	.4	.....	6.0	4.0	4.0	1.7	2.2	2.9	9.8	10.2	3.5	6.0
31.....	.5	.....	5.6	.....	2.4	.....	1.6	3.4	.....	8.4	.....	5.2

*Monthly discharge of Alo Stream near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	4.8	0.4	1.30	79.9	C.
February.....	24.4	.2	6.05	348.0	C.
March.....	39.0	2.3	9.72	598.0	B.
April.....	81.0	4.0	13.80	821.0	A.
May.....	14.2	1.0	3.79	233.0	A.
June.....	7.8	1.0	3.01	179.0	A.
July.....	9.0	1.4	3.56	219.0	A.
August.....	15.4	1.0	3.18	196.0	A.
September.....	14.2	.7	3.26	194.0	B.
October.....	81.0	.6	8.66	532.0	B.
November.....	61.4	2.2	9.93	591.0	B.
December.....	25.0	.7	7.21	443.0	B.
The year.....	81.0	.2	6.11	4,430.0	

#### WAIKAMOI STREAM NEAR HUELO, MAUI.

**Location.**—About 4½ miles by trail southeast of Huelo and about 500 feet above junction of stream and Spreckels ditch; about 50 feet above trail bridge.

**Records available.**—December 16, 1910, to December 31, 1912.

**Gage.**—Inclined staff; read twice daily, at 5.15 a. m. and about 5 p. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Good.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of Waikamoi Stream near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 22	J. B. Stewart.....	<i>Feet.</i> 1.27	<i>Sec.-feet.</i> 1.43
Nov. 8	.....do.....	1.60	5.43

*Daily gage height, in feet, of Waikamoi Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.62	1.09	2.16	2.36	1.64	1.48	1.54	1.41	1.54	1.50	1.95	2.14
2.....	1.62	1.03	2.46	2.04	1.72	1.47	1.62	1.38	2.48	1.75	1.82	2.28
3.....	1.60	1.02	2.46	2.13	1.82	1.46	1.79	1.40	1.87	1.68	2.00	3.22
4.....	1.56	1.10	2.11	3.08	1.66	1.42	1.96	1.37	1.82	1.50	1.74	1.89
5.....	1.52	1.06	1.99	3.16	1.84	1.40	1.57	1.32	1.66	1.42	1.69	1.82
6.....	1.50	.99	1.96	2.26	1.78	1.36	1.64	1.28	1.70	1.37	1.58	1.80
7.....	1.48	.95	2.22	2.64	1.71	1.36	1.58	1.32	2.34	1.38	1.58	1.76
8.....	1.52	1.08	2.04	2.92	1.78	1.52	1.60	1.29	1.72	1.36	1.57	1.76
9.....	1.54	1.37	2.00	2.39	1.68	1.46	1.94	1.60	1.62	1.37	3.69	1.74
10.....	1.49	1.30	2.22	2.24	1.61	1.84	1.74	1.54	1.56	1.44	2.18	1.71
11.....	1.46	1.29	2.82	2.00	1.54	1.74	1.78	1.80	1.53	1.36	2.09	1.62
12.....	1.44	1.28	2.56	2.57	1.51	1.67	1.64	1.73	1.50	1.52	1.84	1.62
13.....	1.42	1.78	2.46	1.95	1.50	1.74	1.78	1.59	1.48	1.58	1.72	1.60
14.....	1.40	1.76	2.10	2.18	1.54	1.64	1.79	1.81	1.46	2.42	1.68	1.62
15.....	1.38	1.44	1.93	2.10	1.52	1.64	1.67	2.28	1.43	1.75	1.63	1.60
16.....	1.36	1.28	1.78	2.06	1.49	1.74	1.60	1.74	1.40	1.66	2.74	1.66
17.....	1.34	1.20	1.82	2.06	1.48	1.60	1.56	1.60	1.40	1.53	2.60	1.61
18.....	1.32	1.18	2.14	1.93	1.46	1.52	1.53	1.53	1.36	1.49	2.66	1.66
19.....	1.31	1.60	1.88	1.86	1.50	1.64	1.50	1.56	1.32	1.47	2.60	1.88
20.....	1.30	2.88	1.89	2.21	1.58	1.56	1.48	1.51	1.34	1.50	1.99	1.74
21.....	1.28	3.40	1.78	1.94	1.50	1.58	1.49	1.48	1.31	2.24	2.00	2.48
22.....	1.28	2.38	1.70	1.83	1.43	1.57	1.46	1.72	1.26	2.41	1.98	2.08
23.....	1.24	1.95	1.66	1.79	1.40	1.54	1.42	1.58	1.24	2.16	1.90	2.23
24.....	1.40	1.74	1.66	1.78	1.48	1.74	1.68	1.50	1.22	1.92	1.77	1.88
25.....	1.47	1.77	1.68	1.85	1.41	1.63	1.61	1.46	1.18	1.74	1.79	1.84
26.....	1.26	1.64	2.26	1.89	1.70	1.53	1.54	1.46	1.16	1.76	1.84	2.14
27.....	1.22	3.30	1.81	1.86	2.00	1.66	1.58	1.46	1.13	2.84	1.72	2.00
28.....	1.19	2.50	1.68	1.78	1.62	1.58	1.54	1.43	1.08	2.18	1.69	1.86
29.....	1.16	2.16	1.62	1.72	1.68	1.51	1.56	1.65	1.14	1.91	1.63	1.79
30.....	1.12	.....	2.80	1.68	1.56	1.48	1.50	1.55	2.01	2.03	1.66	1.78
31.....	1.11	.....	2.86	.....	1.52	.....	1.46	1.54	.....	1.99	.....	1.74

*Daily discharge, in second-feet, of Waikamoi Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.4	0.5	20.8	26.8	6.8	3.8	4.8	3.1	4.8	4.0	14.5	20.2
2.....	6.4	.5	30.4	17.2	8.4	3.7	6.4	2.8	31.2	9.0	10.6	24.4
3.....	6.0	.5	30.4	21.4	10.6	3.6	9.8	3.0	12.1	7.6	16.0	65.0
4.....	5.2	.5	19.3	58.0	7.2	3.2	14.8	2.7	10.6	4.0	8.8	12.7
5.....	4.4	.5	15.7	62.0	11.2	3.0	5.4	2.2	7.2	3.2	7.8	10.6
6.....	4.0	.5	14.8	23.8	9.6	2.6	6.8	1.8	8.0	2.7	5.6	10.0
7.....	3.8	.5	22.6	37.6	8.2	2.6	5.6	2.2	26.2	2.8	5.6	9.2
8.....	4.4	.5	17.2	50.0	9.6	4.4	6.0	1.9	8.4	2.6	5.4	9.2
9.....	4.8	2.7	16.0	27.7	7.6	3.6	14.2	6.0	6.4	2.7	88.5	8.8
10.....	3.9	2.0	22.6	23.2	6.2	11.2	8.8	4.8	5.2	3.4	21.4	8.2
11.....	3.6	1.9	45.0	16.0	4.8	8.8	9.6	10.0	4.6	2.6	18.7	6.4
12.....	3.4	1.8	34.4	34.8	4.2	7.4	6.8	8.6	4.0	4.4	11.2	6.4
13.....	3.2	9.6	30.4	14.5	4.0	8.8	9.6	5.8	3.8	5.6	8.4	6.0
14.....	3.0	9.2	19.0	21.4	4.8	6.8	9.8	10.3	3.6	28.8	7.6	6.4
15.....	2.8	3.4	13.9	19.0	4.4	6.8	7.4	24.4	3.3	9.0	6.6	6.0
16.....	2.6	1.8	9.6	17.8	3.9	8.8	6.0	8.8	3.0	7.2	41.6	7.2
17.....	2.4	1.0	10.6	17.8	3.8	6.0	5.2	6.0	3.0	4.6	36.0	6.2
18.....	2.2	.9	20.2	13.9	3.6	4.4	4.6	4.6	2.6	3.9	38.4	7.2
19.....	2.1	6.0	12.4	11.8	4.0	6.8	4.0	5.2	2.2	3.7	36.0	12.4
20.....	2.0	48.0	12.7	22.3	5.6	5.2	3.8	4.2	2.4	4.0	15.7	8.8
21.....	1.8	74.0	9.6	14.2	4.0	5.6	3.9	3.8	2.1	23.2	16.0	31.2
22.....	1.8	27.4	8.0	10.9	3.3	5.4	3.6	8.4	1.6	28.4	15.4	18.4
23.....	1.4	14.5	7.2	9.8	3.0	4.8	3.2	5.6	1.4	20.8	13.0	22.9
24.....	3.0	8.8	7.2	9.6	3.8	8.8	7.6	4.0	1.2	13.6	9.4	12.4
25.....	3.7	9.4	7.6	11.5	3.1	6.6	6.2	3.6	.9	8.8	9.8	11.2
26.....	1.6	6.8	23.8	12.7	8.0	4.6	4.8	3.6	.8	9.2	11.2	20.2
27.....	1.2	69.0	10.3	11.8	16.0	7.2	5.6	3.6	.6	46.0	8.4	16.0
28.....	1.0	32.0	7.6	9.6	6.4	5.6	4.8	3.3	.5	21.4	7.8	11.8
29.....	.8	20.8	6.4	8.4	7.6	4.2	5.2	7.0	.7	13.3	6.6	9.8
30.....	.6	.....	44.0	7.6	5.2	3.8	4.0	5.0	16.3	16.9	7.2	9.6
31.....	.6	.....	47.0	.....	4.4	.....	3.6	4.8	.....	15.7	.....	8.8

*Monthly discharge of Waikamoi Stream near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	6.4	0.6	3.04	187	B.
February.....	74.0	.5	12.20	702	C.
March.....	47.0	6.4	19.20	1,180	B.
April.....	62.0	7.6	21.40	1,270	B.
May.....	16.0	3.0	6.24	384	A.
June.....	11.2	2.6	5.60	333	A.
July.....	14.8	3.2	6.51	400	A.
August.....	24.4	1.3	5.52	339	B.
September.....	31.2	.5	5.96	355	B.
October.....	46.0	2.6	10.70	658	B.
November.....	88.5	5.4	17.00	1,010	B.
December.....	65.0	6.0	13.70	842	A.
The year.....	88.5	.5	10.60	7,660	

**OOPUOLA STREAM NEAR HUELO, MAUI.**

**Location.**—About 2 miles by trail southeast of Huelo, and about 400 feet above Spreckels ditch crossing.

**Records available.**—December 16, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at no regular hour; datum unchanged.

**Channel.**—Shifting.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Fair.

The following discharge measurement was made by J. B. Stewart:

September 22, 1912: Gage height, 0.88 foot; discharge, 0.46 second-foot.

*Daily gage height, in feet, of Oopuola Stream near Huelo, Maui, for 1912.*

[John Pachero, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		1.00	1.55	1.50	1.12	1.10	1.09	0.98	.....	1.35	1.45	.....
2.....		1.00	2.20	1.62	1.14	.....	1.15	0.97	1.70	1.32	1.30	3.10
3.....	1.22	.95	.....	1.70	1.11	1.08	1.14	1.00	1.25	1.40	.....	2.40
4.....	1.20	.....	1.50	2.70	1.62	1.02	.....	.....	1.80	.92	1.31	1.80
5.....	1.20	.90	1.49	1.50	.....	1.01	.....	.97	1.25	.91	.....	1.60
6.....	1.22	.89	1.43	1.42	1.36	1.00	.....	.92	1.12	.....	1.30	1.50
7.....	.....	.89	1.50	.....	1.28	1.02	.....	.98	1.52	.90	1.10	1.55
8.....	.....	.88	1.40	1.72	.....	1.20	1.02	.92	.....	.93	1.08	.....
9.....	1.21	1.20	1.45	1.48	.....	.....	2.06	1.40	1.02	1.00	2.51	1.30
10.....	1.12	1.02	.....	1.47	1.15	2.20	1.16	1.35	1.01	1.00	.....	1.28
11.....	1.11	1.20	2.00	1.46	1.10	1.80	1.14	.....	1.00	.91	1.50	1.20
12.....	1.10	1.20	1.90	1.70	.....	1.72	1.12	1.30	.99	1.20	1.40	1.18
13.....	1.07	2.30	1.88	1.54	1.02	1.32	1.12	1.40	.95	.....	1.20	1.10
14.....	.....	2.25	1.70	.....	1.00	1.30	.....	1.32	.94	1.50	1.17	1.11
15.....	1.04	1.13	1.42	2.00	1.00	1.28	1.11	1.48	.....	1.52	1.07	1.40
16.....	1.02	1.12	1.38	1.98	.92	.....	1.10	1.35	.94	1.00	2.60	.....
17.....	1.01	1.11	.....	.....	.92	1.22	1.09	1.26	.91	1.00	.....	1.30
18.....	1.00	.....	2.10	.....	.91	1.10	1.08	.....	.90	1.00	2.10	1.45
19.....	1.00	1.40	1.50	1.40	.....	1.08	1.04	1.20	.99	.99	1.12	2.00
20.....	1.00	3.30	1.45	1.50	1.13	1.08	1.02	1.02	.90	.....	1.10	1.52
21.....	.....	2.40	1.42	.....	1.10	1.20	.....	1.00	.90	1.50	1.20	2.10
22.....	1.00	2.09	1.38	1.32	.90	1.09	1.03	1.20	.....	2.50	1.30	.....
23.....	.99	1.70	1.22	1.30	.90	.....	1.02	1.14	.82	2.20	1.00	1.72
24.....	1.13	1.30	.....	1.29	1.15	1.32	1.31	1.08	.82	1.50	.....	1.61
25.....	1.12	.....	1.30	1.50	1.00	1.22	1.30	.....	.80	1.45	.30	.....
26.....	1.00	1.30	1.34	1.62	.....	1.10	1.03	.97	.82	1.20	1.85	1.11
27.....	1.00	3.00	.....	1.50	1.42	1.08	1.02	.98	.79	.....	1.20	1.09
28.....	.....	1.90	1.10	.....	1.62	1.10	.....	.97	.79	2.10	1.80	2.01
29.....	.95	1.68	1.09	1.32	1.51	1.01	1.12	1.02	1.40	1.45	1.70	.....
30.....	.94	.....	1.52	.....	1.22	.....	1.10	1.00	.....	1.00	1.10	1.23
31.....	1.12	.....	.....	.....	1.20	.....	.99	1.02	.....	1.50	.....	1.20

*Daily discharge, in second-feet, of Oopuola Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.0	0.9	5.6	4.8	1.3	1.2	1.2	0.9	4.5	3.1	4.2	26.1
2.....	2.0	.9	18.0	6.7	1.4	1.2	1.5	.8	8.0	10.4	2.6	51.0
3.....	2.0	.8	11.4	8.0	1.3	1.1	1.4	.9	2.2	3.6	2.6	24.0
4.....	1.8	.8	4.8	34.0	6.7	1.0	1.4	.8	10.0	.7	2.7	10.0
5.....	1.8	.7	4.7	4.8	4.9	.9	1.3	.8	2.2	.7	2.6	6.4
6.....	2.0	.7	4.0	3.8	3.2	.9	1.2	.7	1.3	.7	2.6	4.8
7.....	2.0	.7	4.8	6.1	2.4	1.0	1.1	.8	5.1	.7	1.2	5.6
8.....	1.9	.7	3.6	8.4	2.1	1.8	1.0	.7	3.0	.8	1.1	4.1
9.....	1.9	1.8	4.2	4.6	1.8	9.9	15.0	3.6	1.0	.9	27.3	2.6
10.....	1.3	1.0	9.1	4.4	1.5	18.0	1.6	3.1	.9	.9	16.1	2.4
11.....	1.3	1.8	14.0	4.3	1.2	10.0	1.4	2.8	.9	.7	4.8	1.8
12.....	1.2	1.8	12.0	8.0	1.1	8.4	1.3	2.6	.9	1.8	3.6	1.7
13.....	1.1	21.0	11.6	5.4	1.0	2.8	1.3	3.6	.8	3.3	1.8	1.2
14.....	1.1	19.5	8.0	9.7	.9	2.6	1.3	2.8	.8	4.8	1.6	1.3
15.....	1.0	1.4	3.8	14.0	.9	2.4	1.3	4.6	.8	5.1	1.1	3.6
16.....	1.0	1.3	3.4	13.6	.7	2.2	1.2	3.1	.8	.9	30.0	3.1
17.....	.9	1.3	9.7	10.3	.7	2.0	1.2	2.3	.7	.9	23.0	2.6
18.....	.9	2.4	16.0	7.0	.7	1.2	1.1	2.0	.7	.9	16.0	4.2
19.....	.9	3.6	4.8	3.6	1.0	1.1	1.0	1.8	.7	.9	1.3	14.0
20.....	.9	62.0	4.2	4.8	1.4	1.1	1.0	1.0	.7	2.9	1.2	5.1
21.....	.9	24.0	3.8	3.8	1.2	1.8	1.0	.9	.7	4.8	1.8	16.0
22.....	.9	15.8	3.4	2.8	.7	1.2	1.0	1.8	.7	38.0	2.6	12.2
23.....	.9	8.0	2.0	2.6	.7	2.0	1.0	1.4	.6	18.0	.9	8.4
24.....	1.4	2.6	2.3	2.5	1.5	2.8	2.7	1.1	.6	4.8	.5	6.6
25.....	1.3	2.6	2.6	4.8	.9	2.0	2.6	1.0	.6	4.2	.1	4.0
26.....	.9	2.6	3.0	6.7	2.4	1.2	1.0	.8	.6	1.8	11.0	1.3
27.....	.9	46.0	2.1	4.8	3.8	1.1	1.0	.8	.6	8.9	1.8	1.2
28.....	.9	12.0	1.2	3.8	6.7	1.2	1.1	.8	.6	16.0	10.0	14.2
29.....	.8	7.7	1.2	2.8	5.0	.9	1.3	1.0	3.6	4.2	8.0	8.1
30.....	.8	.....	5.1	2.0	2.0	1.0	1.2	.9	3.4	6.4	1.2	2.0
31.....	1.3	.....	4.9	.....	1.8	.....	.9	1.0	.....	4.8	.....	1.8

*Monthly discharge of Oopuola Stream near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	2.0	0.8	1.29	79.3	C.
February.....	62.0	.7	8.50	489.0	C.
March.....	18.0	1.2	6.11	376.0	C.
April.....	34.0	2.0	6.76	402.0	C.
May.....	6.7	.7	2.03	125.0	C.
June.....	18.0	.9	2.87	171.0	C.
July.....	15.0	.9	1.73	106.0	C.
August.....	4.6	.7	1.65	101.0	C.
September.....	10.0	.6	1.93	115.0	C.
October.....	38.0	.7	5.05	311.0	C.
November.....	30.0	.1	6.18	368.0	C.
December.....	51.0	1.2	8.11	499.0	C.
The year.....	62.0	.1	4.32	3,140.0	

#### SPRECKELS DITCH AT STATION NO. 1, NEAR HUELO, MAUI.

**Location.**—About  $8\frac{1}{2}$  miles by trail southeast of Huelo, and about 20 feet above bridge which crosses ditch in Ulawina Gulch.

**Records available.**—December 18, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 5.30 a. m. and 4.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made by wading and from log near gage.

**Accuracy.**—Records good.



*Discharge measurements of Spreckels ditch at station No. 1, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Sept. 23	J. B. Stewart	Feet.	Sec.-ft.
Nov. 10	do	0.20 1.50	2.78 36.8

*Daily gage height, in feet, of Spreckels ditch at station No. 1, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.50	0.08	1.55	1.58	0.62	0.38	0.47	0.38	0.51	0.46	1.22	1.30
2	.56	.05	1.68	1.40	.62	.39	.69	.36	1.75	.99	.84	2.04
3	.50	.06	1.68	1.65	1.25	.33	.92	.36	.80	.58	1.34	1.46
4	.44	.06	1.55	2.08	1.58	.28	.95	.33	1.36	.40	.66	1.45
5	.39	.04	1.48	1.72	1.18	.26	.79	.29	.74	.34	.69	.....
6	.35	.02	1.38	1.10	1.09	.25	.61	.28	.88	.33	.52	.79
7	.34	.02	1.60	1.72	.78	.29	.54	.29	1.54	.34	.48	1.25
8	.39	.12	1.35	1.48	1.32	.49	1.04	.26	.75	.34	.45	.84
9	.41	.65	1.52	1.32	.75	.46	1.36	.71	.62	.49	1.98	.75
10	.32	.19	1.50	1.59	.62	1.04	.80	.64	.56	.44	1.22	.64
11	.28	.16	1.72	1.38	.56	1.04	.89	1.12	.49	.46	1.60	.56
12	.26	.12	1.92	1.58	.50	.66	.65	.86	.42	.66	.84	.52
13	.22	1.32	1.72	1.25	.46	.86	.92	.80	.39	.89	.69	.46
14	.20	.59	1.22	1.52	.46	.62	1.05	1.07	.36	1.52	.58	.53
15	.18	.27	1.22	1.35	.40	.74	.65	.88	.34	1.20	.52	.5
16	.17	.18	.89	1.64	.40	.75	.52	.80	.30	.55	1.92	.54
17	.16	.16	.88	1.55	.36	.54	.48	.59	.31	.42	1.70	.48
18	.14	.14	1.52	1.18	.36	.46	.49	.66	.28	.40	1.88	1.30
19	.19	1.32	1.28	.96	.39	.74	.41	.68	.25	.40	1.50	1.68
20	.13	1.75	1.12	1.38	.55	.72	.42	.49	.26	.48	1.36	1.02
21	.11	1.86	1.02	1.19	.43	.92	.42	.44	.23	1.80	1.24	1.66
22	.10	1.82	.70	1.18	.32	.58	.39	.68	.20	1.75	.94	1.85
23	.10	1.22	.82	.89	.29	.49	.35	.59	.20	1.62	.58	1.38
24	.25	.84	.73	.85	.36	.84	.84	.44	.33	1.34	1.32	1.36
25	.22	.90	.70	1.40	.28	.54	.67	.39	.20	.78	1.60	1.04
26	.14	1.28	1.42	1.32	1.00	.46	.51	.49	.20	.96	.90	1.25
27	.10	1.76	.78	1.32	1.31	.82	.50	.46	.16	1.95	.64	1.32
28	.09	1.70	.69	.90	.70	.54	.59	.39	.13	1.64	.65	1.22
29	.08	1.52	.54	.76	.66	.42	.67	.74	.20	1.00	.61	1.35
30	.06	.....	1.69	.76	.46	.59	.46	.55	1.20	1.42	.65	.75
31	.10	.....	1.70	.....	.44	.....	.39	.61	.....	1.38	.....	.70

*Daily discharge, in second-feet, of Spreckels ditch at station No. 1, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.0	1.0	33.5	34.4	10.4	5.8	7.5	5.8	8.2	7.3	24.5	26.5
2	9.2	.6	37.4	29.0	10.4	6.0	11.8	5.5	39.5	18.8	15.0	48.2
3	8.0	.7	37.4	36.5	25.2	4.9	17.0	5.5	14.0	9.6	27.5	30.8
4	6.9	.7	33.5	49.4	34.4	4.1	17.8	4.9	28.0	6.2	11.2	30.5
5	6.0	.5	31.4	38.6	23.5	3.7	13.8	4.2	12.8	5.1	11.8	22.1
6	5.3	.2	28.5	21.5	21.2	3.6	10.2	4.1	16.0	4.9	8.4	13.8
7	5.1	.2	35.0	38.6	13.6	4.2	8.8	4.2	33.2	5.1	7.6	25.2
8	6.0	1.5	27.8	31.4	27.0	7.8	20.0	3.7	13.0	5.1	7.1	15.0
9	6.4	11.0	32.6	27.0	13.0	7.3	25.5	12.2	10.4	7.8	46.4	13.0
10	4.8	2.6	32.0	34.7	10.4	20.0	14.0	10.8	9.2	6.9	24.5	10.8
11	4.1	2.1	38.6	28.5	9.2	20.0	16.2	22.0	7.8	7.3	35.0	9.2
12	3.7	1.5	44.6	34.4	8.0	11.2	11.0	15.5	6.6	11.2	15.0	8.4
13	3.0	27.0	38.6	25.2	7.3	15.5	17.0	14.0	6.0	16.2	11.8	7.3
14	2.7	9.8	24.5	32.6	7.3	10.4	20.2	20.8	5.5	32.6	9.6	9.6
15	2.4	3.9	24.5	27.8	6.2	12.8	11.0	16.0	5.1	24.0	8.4	8.6
16	2.2	2.4	16.2	36.2	6.2	13.0	8.4	14.0	4.4	9.0	44.6	8.8
17	2.1	2.1	16.0	33.5	5.5	8.8	7.6	9.8	4.6	6.6	38.0	7.6
18	1.8	1.8	32.6	23.5	5.5	7.3	7.8	11.2	4.1	6.2	43.4	26.5
19	2.6	27.0	26.0	18.0	6.0	12.8	6.4	11.6	3.6	6.2	32.0	37.4
20	1.6	39.5	22.0	27.0	9.0	12.4	6.6	7.8	3.7	7.6	28.0	19.5

*Daily discharge, in second-feet, of Spreckels ditch at station No. 1, near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.4	42.8	19.5	23.8	6.7	17.0	6.6	6.9	3.2	41.0	25.0	36.8
22.....	1.2	41.6	12.0	23.5	4.8	9.6	6.0	11.6	2.7	39.5	17.5	42.5
23.....	1.2	24.5	14.5	16.2	4.2	7.8	5.3	9.8	2.7	35.6	9.6	28.5
24.....	3.6	15.0	12.6	15.2	5.5	15.0	15.0	6.9	4.9	27.5	27.0	28.0
25.....	3.0	16.5	12.0	29.0	4.1	8.8	11.4	6.0	2.7	13.6	35.0	20.0
26.....	1.8	26.0	29.6	27.0	19.0	7.3	8.2	7.8	2.7	18.0	16.5	25.2
27.....	1.2	39.8	13.6	27.0	26.8	14.5	8.0	7.3	2.1	45.5	10.8	27.0
28.....	1.1	38.0	11.8	16.5	12.0	8.8	9.8	6.0	1.6	36.2	11.0	24.5
29.....	1.0	32.6	8.8	13.2	11.2	6.6	11.4	12.8	2.7	19.0	10.2	27.8
30.....	.7	.....	37.7	13.2	7.3	9.8	7.3	9.0	24.0	29.6	11.0	13.0
31.....	1.2	.....	38.0	.....	6.9	.....	6.0	10.2	.....	28.5	.....	12.0

*Monthly discharge of Spreckels ditch at station No. 1, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	9.2	0.7	3.53	217	C.
February.....	42.8	.2	14.20	817	C.
March.....	44.6	8.8	26.50	1,630	B.
April.....	49.4	13.2	27.70	1,650	B.
May.....	34.4	4.1	11.90	732	B.
June.....	20.0	3.6	9.89	588	B.
July.....	25.5	5.3	11.40	701	B.
August.....	22.0	3.7	9.61	591	B.
September.....	39.5	1.6	9.50	565	B.
October.....	45.5	4.9	17.30	1,000	B.
November.....	46.4	7.1	20.80	1,240	B.
December.....	48.2	7.3	21.40	1,320	B.
The year.....	49.4	.2	15.30	11,100	

#### SPRECKELS DITCH AT STATION NO. 2, NEAR HUELO, MAUI.

**Location.**—About 7½ miles by trail southeast of Huelo post office and 100 feet above junction of ditch with Kolea Stream No. 2.

**Records available.**—November 6, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, about 4.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from log across ditch near gage.

**Accuracy.**—Records good.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Spreckels ditch at station No. 2, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 23	J. B. Stewart.....	<i>Feet.</i> 0.69	<i>Sec.-ft.</i> 3.04
Nov. 10	.....do.....	1.85	36.5

*Daily gage height, in feet, of Spreckels ditch at station No. 2, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.00	0.59	1.90	1.88	1.13	0.83	0.80	0.82	1.00	0.83	1.58	1.60
2.....	1.28	.57	1.93	1.93	1.15	.83	1.50	.80	1.93	1.90	1.30	1.20
3.....	.98	.58	1.92	1.98	1.90	.79	1.62	.83	1.70	.90	1.60	1.65
4.....	.93	.55	1.88	2.18	1.92	.78	1.73	.78	1.65	.79	1.20	1.60
5.....	.90	.54	1.89	1.83	1.73	.71	1.40	.73	1.20	.72	1.10	1.43
6.....	.85	.53	1.80	1.78	1.53	.70	1.13	.70	1.50	.70	1.03	1.30
7.....	.83	.52	1.93	1.93	1.33	.79	1.00	.72	1.80	.73	.98	1.48
8.....	.85	.53	1.75	2.10	1.60	.93	1.90	.70	1.23	.70	.91	1.30
9.....	.90	.90	1.90	1.80	1.25	1.09	1.68	1.13	1.10	.98	1.93	1.20
10.....	.83	.67	1.92	1.90	1.13	1.95	1.22	1.13	1.03	.83	1.88	1.10
11.....	.78	.70	1.98	1.93	1.08	1.73	1.39	1.40	.95	.95	1.75	1.00
12.....	.75	.62	1.93	1.90	1.02	1.18	1.30	1.19	.90	1.03	1.30	.98
13.....	.73	1.25	1.88	1.78	.98	1.30	1.29	1.33	.88	.98	1.15	.90
14.....	.71	.97	1.90	1.90	.95	1.08	1.53	1.90	.82	1.80	1.05	1.13
15.....	.71	.75	1.65	1.80	.90	1.15	1.10	1.63	.80	1.28	1.00	.90
16.....	.70	.68	1.40	1.93	.90	1.22	1.00	1.23	.78	1.00	1.95	1.10
17.....	.69	.70	1.70	1.93	.88	.99	.93	1.05	.78	.90	1.90	.90
18.....	.68	.63	1.88	1.70	.88	.90	.93	1.23	.73	.88	2.00	.98
19.....	.65	1.52	1.93	1.53	.88	1.20	.88	1.05	.71	.81	1.85	1.95
20.....	.63	1.93	1.65	1.93	.99	1.63	.90	.95	.75	.93	1.90	1.30
21.....	.62	1.99	1.40	1.68	.89	1.70	.85	.90	.70	1.95	1.85	1.93
22.....	.60	1.81	1.22	1.88	.80	1.03	.81	1.63	.69	1.90	1.60	1.93
23.....	.60	1.73	1.38	1.50	.78	.99	.79	1.00	.69	1.89	1.40	1.95
24.....	.89	1.31	1.20	1.30	.88	1.29	1.10	.90	.70	1.58	1.23	1.70
25.....	.70	1.35	1.28	1.90	.75	1.03	1.13	.85	.68	1.25	1.82	1.75
26.....	.62	2.00	1.73	1.93	1.90	.93	1.00	1.03	.65	1.78	1.37	1.88
27.....	.60	1.90	1.28	1.78	1.60	1.05	1.18	1.00	.63	1.88	1.15	1.63
28.....	.59	1.88	1.19	1.43	1.30	.95	1.03	.85	.61	1.93	1.10	1.88
29.....	.58	1.92	1.05	1.29	1.08	.88	1.28	1.08	.71	1.60	1.00	1.38
30.....	.57	.....	1.93	1.28	.95	.81	.91	1.05	1.35	1.70	1.10	1.30
31.....	.65	.....	1.90	.....	.90	.....	.85	1.00	.....	1.50	.....	1.40

*Daily discharge, in second-feet, of Spreckels ditch at station No. 2, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8.0	1.9	35.0	34.2	10.6	4.6	4.0	4.4	8.0	4.6	22.4	23.0
2.....	13.6	1.7	36.5	36.5	11.0	4.6	20.0	4.0	36.5	35.0	14.0	12.0
3.....	7.6	1.8	36.0	39.0	35.0	3.9	23.8	4.6	27.0	6.0	23.0	25.0
4.....	6.6	1.5	34.2	49.0	36.0	3.8	28.2	3.8	25.0	3.9	12.0	20.0
5.....	6.0	1.4	34.6	32.2	28.2	3.1	17.0	3.3	12.0	3.2	10.0	17.9
6.....	4.6	1.3	31.0	30.2	20.9	3.0	10.6	3.0	20.0	3.0	8.6	14.0
7.....	4.6	1.2	36.5	36.5	14.9	3.9	8.0	3.2	31.0	3.3	7.6	19.4
8.....	5.0	1.3	29.0	45.0	23.0	6.6	35.0	3.0	12.6	3.0	6.2	14.0
9.....	6.0	6.0	35.0	31.0	13.0	9.8	26.2	10.6	10.0	7.6	36.5	12.0
10.....	4.6	2.7	36.0	35.0	10.6	37.5	12.4	10.6	8.6	4.6	34.2	10.0
11.....	3.8	3.0	39.0	36.5	9.6	28.2	16.7	17.0	7.0	7.0	29.0	8.0
12.....	3.5	2.2	36.5	35.0	8.4	11.6	14.0	11.8	6.0	8.6	14.0	7.6
13.....	3.3	13.0	34.2	30.2	7.6	14.0	13.8	14.9	5.6	7.6	11.0	6.0
14.....	3.1	7.4	35.0	35.0	7.0	9.6	20.9	35.0	4.4	31.0	9.0	10.6
15.....	3.1	3.5	25.0	31.0	6.0	11.0	10.0	24.2	4.0	13.6	8.0	6.0
16.....	3.0	2.8	17.0	36.5	6.0	12.4	8.0	12.6	3.8	8.0	37.5	10.0
17.....	2.9	3.0	27.0	36.5	5.6	7.8	6.6	9.0	3.8	6.0	35.0	6.0
18.....	2.8	2.3	34.2	27.0	5.6	6.0	6.6	12.6	3.3	5.6	40.0	7.6
19.....	2.5	20.6	36.5	20.9	5.6	12.0	5.6	9.0	3.1	4.2	33.0	37.5
20.....	2.3	36.5	25.0	36.5	7.8	24.2	6.0	7.0	3.5	6.6	35.0	14.0
21.....	2.2	39.5	17.0	26.2	5.8	27.0	5.0	6.0	3.0	37.5	33.0	36.5
22.....	2.0	31.4	12.4	34.2	4.0	8.6	4.2	24.2	2.9	35.0	23.0	36.5
23.....	2.0	28.2	16.4	20.0	3.8	7.8	3.9	8.0	2.9	34.6	17.0	37.5
24.....	5.8	14.3	12.0	14.0	5.6	13.8	10.0	6.0	3.0	22.4	12.6	27.0
25.....	3.0	15.5	13.6	35.0	3.5	8.6	10.6	5.0	2.8	13.0	31.8	29.0
26.....	2.2	40.0	28.2	36.5	35.0	6.6	8.0	8.6	2.5	30.2	16.1	34.2
27.....	2.0	35.0	13.6	30.2	23.0	9.0	11.6	8.0	2.3	34.2	11.0	24.2
28.....	1.9	34.2	11.8	17.9	14.0	7.0	8.6	5.0	2.1	36.5	10.0	34.2
29.....	1.8	36.0	9.0	13.8	9.6	5.6	13.6	9.6	3.1	23.0	8.0	16.4
30.....	1.7	.....	36.5	13.6	7.0	4.2	6.2	9.0	15.5	27.0	10.0	14.0
31.....	2.5	.....	35.0	.....	6.0	.....	5.0	8.0	.....	20.0	.....	17.0

*Monthly discharge of Spreckels ditch at station No. 2, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	13.6	1.7	4.00	246.0	B.
February.....	40.0	1.2	13.40	771.0	B.
March.....	39.0	9.0	27.70	1,700.0	A.
April.....	49.0	13.6	31.20	1,860.0	A.
May.....	36.0	3.5	12.60	775.0	B.
June.....	37.5	3.0	10.20	607.0	B.
July.....	35.0	3.9	12.30	756.0	B.
August.....	25.0	3.0	9.71	597.0	B.
September.....	36.5	2.1	9.18	546.0	B.
October.....	37.5	3.0	16.00	984.0	B.
November.....	40.0	6.2	20.00	1,190.0	A.
December.....	37.5	6.0	19.00	1,170.0	A.
The year.....	49.0	1.2	15.4	11,200.0	

#### SPRECKELS DITCH AT STATION NO. 3, NEAR HUELO, MAUI.

**Location.**—About 6½ miles by trail southeast of Huelo post office, and 400 feet above junction of ditch with Haipuaena Stream.

**Records available.**—December 18, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, about 4.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from log near gage.

**Accuracy.**—Record good.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of Spreckels ditch at station No. 3, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 23	J. B. Stewart.....	<i>Feet.</i> 0.87	<i>Sec.-ft.</i> 5.22
Nov. 10	.....do.....	2.25	34.0

*Daily gage height, in feet, of Spreckels ditch at station No. 3, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.30	0.72	2.45	2.23	1.50	1.13	1.43	1.10	1.33	1.28	2.18	1.20
2.....	1.75	.71	2.33	2.30	1.50	1.13	1.98	1.05	2.30	2.25	1.75	2.30
3.....	1.33	.72	2.30	2.45	2.23	1.08	2.10	1.10	2.28	1.20	2.13	2.20
4.....	1.28	.70	2.25	3.15	2.30	1.03	2.35	1.05	2.20	1.03	1.60	2.25
5.....	1.20	.69	2.25	2.35	1.25	.99	2.08	.98	1.68	.98	1.48	1.93
6.....	1.15	.68	2.23	2.25	2.05	.95	1.53	.93	1.98	.90	1.38	1.70
7.....	1.13	.66	2.33	2.40	1.78	1.03	1.30	.95	2.20	.95	1.30	1.95
8.....	1.17	.65	2.23	3.00	2.10	1.25	2.26	.90	1.65	.93	1.23	1.78
9.....	1.20	1.20	2.30	2.28	1.70	1.43	2.23	1.50	1.50	1.38	2.65	1.68
10.....	1.10	.87	2.30	2.35	1.50	2.35	1.70	1.50	1.35	1.04	2.23	1.50
11.....	1.05	.91	2.73	2.35	1.40	2.23	2.00	1.80	1.28	1.05	2.20	1.38
12.....	1.05	.81	2.40	2.33	1.30	1.53	1.50	1.55	1.20	1.30	1.75	1.30
13.....	1.00	1.65	2.43	2.25	1.28	1.78	1.73	1.75	1.13	1.23	1.58	1.50
14.....	.98	1.29	2.28	2.28	1.23	1.43	1.80	2.35	1.10	2.20	1.43	1.25
15.....	.97	1.00	2.15	2.25	1.15	1.49	1.45	2.13	1.08	1.70	1.30	1.98
16.....	.93	.90	1.83	2.35	1.15	1.63	1.30	1.73	1.00	1.33	2.50	1.48
17.....	.91	.90	2.25	2.33	1.10	1.30	1.28	1.40	1.00	1.20	2.33	1.23
18.....	.88	.81	2.25	2.23	1.10	1.20	1.25	1.40	.98	1.13	2.70	1.35
19.....	.85	1.98	2.33	2.05	1.10	1.60	1.18	1.40	.95	1.10	2.30	2.43
20.....	.83	2.25	2.15	2.53	1.30	2.20	1.20	1.25	1.00	1.25	2.35	1.80

*Daily gage height, in feet, of Spreckels ditch at station No. 3, near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	0.81	2.43	1.88	2.23	1.13	2.23	1.18	1.20	0.90	2.45	2.30	2.40
22.....	.80	2.30	1.60	2.30	1.05	1.38	1.13	2.10	.89	2.25	2.13	2.35
23.....	.80	2.20	1.70	2.00	1.00	1.33	1.03	1.30	.89	2.30	1.93	2.40
24.....	1.15	1.75	1.53	1.88	1.18	1.80	1.50	1.20	.90	2.20	1.70	2.20
25.....	.89	1.80	1.68	2.30	1.00	1.40	1.50	1.18	.85	1.90	2.35	2.23
26.....	.80	2.30	2.20	2.33	2.35	1.23	1.30	1.35	.83	2.28	1.90	2.30
27.....	.78	2.35	1.65	2.25	2.15	1.40	1.60	1.30	.80	2.43	1.55	2.15
28.....	.76	2.30	1.50	1.93	1.85	1.29	1.33	1.10	.78	2.30	1.52	2.35
29.....	.74	2.25	1.35	1.73	1.48	1.18	1.73	1.40	.93	2.10	1.40	1.90
30.....	.71	.....	2.28	1.55	1.30	1.10	1.20	1.38	1.80	2.20	1.50	1.80
31.....	.84	.....	2.25	.....	1.20	.....	1.13	1.30	.....	2.00	.....	1.70

*Daily discharge, in second-feet, of Spreckels ditch at station No. 3, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	14.0	3.0	37.0	32.6	18.0	10.6	16.6	10.0	14.6	13.6	31.6	12.0
2.....	23.0	2.8	34.6	34.0	18.0	10.6	27.6	9.0	34.0	33.0	23.0	34.0
3.....	14.6	3.0	34.0	37.0	32.6	9.6	30.0	10.0	33.6	12.0	30.6	32.0
4.....	13.6	2.7	33.0	51.0	34.0	8.6	35.0	9.0	32.0	8.6	29.0	33.0
5.....	12.0	2.6	33.0	35.0	13.0	7.8	29.6	7.6	21.6	7.6	17.6	26.6
6.....	11.0	2.5	32.6	33.0	29.0	7.0	18.6	6.6	27.6	6.0	15.6	22.0
7.....	10.6	2.2	34.6	36.0	23.6	8.6	14.0	7.0	32.0	7.0	14.0	27.0
8.....	11.4	2.1	32.6	48.0	30.0	13.0	33.0	6.0	21.0	6.6	12.6	23.6
9.....	12.0	12.0	34.0	33.6	22.0	16.6	32.6	18.0	18.0	15.6	41.0	21.6
10.....	10.0	5.5	34.0	35.0	18.0	35.0	22.0	18.0	15.0	8.8	32.6	18.0
11.....	9.0	6.2	42.6	35.0	16.0	32.6	28.0	24.0	13.6	9.0	32.0	15.6
12.....	9.0	4.4	36.0	34.6	14.0	18.6	18.0	19.0	12.0	14.0	23.0	14.0
13.....	8.0	21.0	36.6	33.0	13.6	22.6	22.6	23.0	10.6	12.6	19.6	13.0
14.....	7.6	13.8	33.6	33.6	12.6	16.6	24.0	35.0	10.0	32.0	16.6	18.0
15.....	7.4	8.0	31.0	33.0	11.0	17.8	17.0	30.6	9.6	22.0	14.0	27.6
16.....	6.6	6.0	24.6	35.0	11.0	20.6	14.0	22.6	8.0	14.6	38.0	17.6
17.....	6.2	6.0	33.0	34.6	10.0	14.0	13.6	16.0	8.0	12.0	34.6	12.6
18.....	5.6	4.4	33.0	32.6	10.0	12.0	13.0	16.0	7.6	10.6	42.0	15.0
19.....	5.1	27.6	34.6	29.0	10.0	20.0	11.6	16.0	7.0	10.0	34.0	36.6
20.....	4.7	33.0	31.0	38.6	14.0	32.0	12.0	13.0	8.0	13.0	35.0	24.0
21.....	4.4	36.6	25.6	32.6	10.6	32.6	11.6	12.0	6.0	37.0	34.0	36.0
22.....	4.2	34.0	20.0	34.0	9.0	15.6	10.6	30.0	5.8	33.0	30.6	35.0
23.....	4.2	32.0	22.0	28.0	8.0	14.6	8.6	14.0	5.8	34.0	26.6	36.0
24.....	11.0	23.0	18.6	25.6	11.6	24.0	18.0	12.0	6.0	32.0	22.0	32.0
25.....	5.8	24.0	21.6	34.0	8.0	16.0	18.0	11.6	5.1	26.0	35.0	32.6
26.....	4.2	34.0	32.0	34.6	35.0	12.6	14.0	15.0	4.7	33.6	26.0	34.0
27.....	3.9	35.0	21.0	33.0	31.0	16.0	20.0	14.0	4.2	36.6	19.0	31.0
28.....	3.6	34.0	18.0	26.6	25.0	13.8	14.6	10.0	3.9	34.0	18.4	35.0
29.....	3.3	33.0	15.0	22.6	17.6	11.6	22.6	16.0	6.6	30.0	16.0	26.0
30.....	2.8	.....	33.6	19.0	14.0	10.0	12.0	15.6	24.0	32.0	18.0	24.0
31.....	4.9	.....	33.0	.....	12.0	.....	10.6	14.0	.....	28.0	.....	22.0

*Monthly discharge of Spreckels ditch at station No. 3, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	23.0	2.8	8.18	503	B.
February.....	36.6	2.1	15.70	903	B.
March.....	42.6	15.0	30.20	1,860	A.
April.....	51.0	19.0	33.50	1,990	A.
May.....	35.0	8.0	17.50	1,080	A.
June.....	35.0	7.0	16.70	994	A.
July.....	35.0	8.6	19.10	1,170	A.
August.....	35.0	6.0	15.50	953	A.
September.....	34.0	3.9	13.90	827	B.
October.....	37.0	6.0	20.20	1,240	A.
November.....	42.0	12.6	25.80	1,540	A.
December.....	36.6	12.0	25.40	1,560	A.
The year.....	51.0	2.1	20.10	14,600	

## SPRECKELS DITCH AT STATION NO. 4, NEAR HUELO, MAUI.

**Location.**—About  $6\frac{1}{4}$  miles by trail southeast of Huelo post office, and about 250 feet above junction with small tributary of Puohakamoa Stream.

**Records available.**—December 18, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, usually between 3 and 5 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from log at gage.

**Accuracy.**—Records good.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of Spreckels ditch at station No. 4, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Sept. 23	J. B. Stewart.....	<i>Feet.</i> 0.55	<i>Sec.-feet.</i> 6.40
Nov. 10	.....do.....	1.70	34.5

*Daily gage height, in feet, of Spreckels ditch at station No. 4, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.03	0.43	1.80	1.80	1.23	0.85	1.15	0.75	1.05	1.05	1.50	1.60
2.....	1.28	.39	1.90	1.83	1.23	.85	1.58	.70	1.90	1.90	1.43	1.45
3.....	1.08	.40	1.83	1.90	1.63	.78	1.70	.80	1.75	1.40	1.63	1.55
4.....	1.00	.39	1.78	2.15	1.73	.68	1.75	.68	1.73	.78	1.30	1.58
5.....	.93	.38	1.75	1.65	1.70	.65	1.60	.63	1.33	.70	1.18	1.50
6.....	.85	.35	1.73	1.75	1.60	.62	1.25	.60	1.58	.60	1.10	1.30
7.....	.83	.33	1.90	2.05	1.45	.68	1.08	.60	1.75	.65	1.03	1.55
8.....	.88	.32	1.73	2.03	1.63	.95	1.83	.58	1.33	.63	.98	1.38
9.....	.93	.98	1.88	1.85	1.33	1.13	1.73	1.23	1.20	.93	2.10	1.30
10.....	.80	.55	1.88	1.80	1.20	1.90	1.35	1.23	1.08	.80	1.70	1.20
11.....	.73	.61	2.30	1.70	1.10	1.78	1.53	1.50	1.00	.70	1.70	1.08
12.....	.70	.51	1.90	1.80	1.03	1.30	1.20	1.30	.93	1.05	1.40	1.05
13.....	.67	1.38	1.80	1.70	1.00	1.45	1.43	1.45	.88	1.03	1.30	.98
14.....	.65	1.08	1.78	1.73	.93	1.15	1.48	1.88	.80	1.73	1.23	1.20
15.....	.63	.73	1.68	1.70	.88	1.23	1.20	1.70	.75	1.40	1.08	.98
16.....	.59	.60	1.50	1.83	.85	1.30	1.10	1.38	.70	1.10	1.90	1.23
17.....	.58	.60	1.73	1.78	.80	1.03	1.00	1.13	.70	.95	1.83	.95
18.....	.55	.53	1.78	1.70	.80	.93	.98	1.10	.65	.85	2.10	1.03
19.....	.55	1.63	1.88	1.60	.80	1.30	.90	1.13	.63	.80	1.70	1.93
20.....	.52	1.95	1.70	1.90	1.00	1.60	.90	.98	.65	1.00	1.85	1.43
21.....	.50	2.10	1.50	1.70	.83	1.73	.88	.90	.60	1.88	1.70	1.83
22.....	.49	1.78	1.32	1.75	.70	1.10	.82	1.65	.58	1.83	1.68	1.80
23.....	.48	1.72	1.45	1.58	.65	1.08	.75	1.08	.53	1.80	1.50	1.90
24.....	.93	1.45	1.28	1.50	.89	1.48	1.23	.90	.60	1.70	1.35	1.55
25.....	.58	1.50	1.33	1.75	.68	1.13	1.23	.85	.52	1.40	1.67	1.53
26.....	.50	1.80	1.70	1.80	1.80	1.00	1.03	1.03	.50	1.75	1.47	1.83
27.....	.47	2.00	1.33	1.70	1.68	1.13	1.23	1.08	.49	1.98	1.25	1.55
28.....	.45	1.88	1.25	1.53	1.50	1.03	1.05	.80	.45	1.80	1.20	1.63
29.....	.42	1.80	1.13	1.40	1.20	.90	1.38	1.15	.58	1.53	1.10	1.43
30.....	.40	.....	2.03	1.30	1.03	.80	.95	1.10	1.50	1.75	1.17	1.40
31.....	.53	.....	1.85	.....	.93	.....	.83	1.05	.....	1.83	.....	1.33

*Daily discharge, in second-feet, of Spreckels ditch at station No. 4, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	16.2	4.0	37.0	37.0	21.2	12.0	19.2	10.0	16.8	16.8	28.0	31.0
2.....	22.5	3.4	40.0	37.9	21.2	12.0	30.4	9.0	40.0	40.0	26.2	26.8
3.....	17.5	3.5	37.9	40.0	31.9	10.6	34.0	11.0	35.5	25.5	31.9	29.5
4.....	15.5	3.4	36.4	47.5	34.9	8.6	35.5	8.6	34.9	10.6	23.0	30.4
5.....	13.8	3.2	35.5	32.5	34.0	8.0	31.0	7.6	23.8	9.0	20.0	28.0
6.....	12.0	2.8	34.9	35.5	31.0	7.4	21.8	7.0	30.4	7.0	18.0	23.0
7.....	11.6	2.4	40.0	44.5	26.8	8.6	17.5	7.0	35.5	8.0	16.2	29.5
8.....	12.6	2.3	34.9	43.9	31.9	14.2	37.9	6.6	23.8	7.6	15.0	25.0
9.....	13.8	15.0	39.4	38.5	23.8	18.8	34.9	21.2	20.5	13.8	46.0	23.0
10.....	11.0	6.0	39.4	37.0	20.5	40.0	24.2	21.2	17.5	11.0	34.0	20.5
11.....	9.6	7.2	52.0	34.0	18.0	36.4	28.9	28.0	15.5	9.0	34.0	17.5
12.....	9.0	5.2	40.0	37.0	16.2	23.0	20.5	23.0	13.8	16.8	25.5	16.8
13.....	8.4	25.0	37.0	34.0	15.5	26.8	26.2	26.8	12.6	16.2	23.0	15.0
14.....	8.0	17.5	36.4	34.9	13.8	19.2	27.5	39.4	11.0	34.9	21.2	20.5
15.....	7.6	9.6	33.4	34.0	12.6	21.2	20.5	34.0	10.0	25.5	17.5	15.0
16.....	6.8	7.0	28.0	37.9	12.0	23.0	18.0	25.0	9.0	18.0	40.0	21.2
17.....	6.6	7.0	34.9	36.4	11.0	16.2	15.5	18.8	9.0	14.2	37.9	14.2
18.....	6.0	5.6	36.4	34.0	11.0	13.8	15.0	18.0	8.0	12.0	46.0	16.2
19.....	6.0	31.9	39.4	31.0	11.0	23.0	13.0	18.8	7.6	11.0	34.0	40.9
20.....	5.4	41.5	34.0	40.0	15.5	31.0	13.0	15.0	8.0	15.5	38.5	26.2
21.....	5.0	46.0	28.0	34.0	11.6	34.9	12.6	13.0	7.0	39.4	34.0	37.9
22.....	4.8	36.4	23.5	35.5	9.0	18.0	11.4	32.5	6.6	37.9	33.4	37.0
23.....	4.7	34.6	26.8	30.4	8.0	17.5	10.0	17.5	5.6	37.0	28.0	40.0
24.....	13.8	26.8	22.5	28.0	12.8	27.5	21.2	13.0	7.0	34.0	24.2	29.5
25.....	6.6	28.0	23.8	35.5	8.6	18.8	21.2	12.0	5.4	25.5	33.1	28.9
26.....	5.0	37.0	34.0	37.0	37.0	15.5	16.2	16.2	5.0	35.5	27.2	37.9
27.....	4.6	43.0	23.8	34.0	33.4	18.8	21.2	17.5	4.8	42.4	21.8	29.5
28.....	4.2	39.4	21.8	28.9	28.0	16.2	16.8	11.0	4.2	37.0	20.5	31.9
29.....	3.8	37.0	18.8	25.5	20.5	13.0	25.0	19.2	6.6	28.9	18.0	26.2
30.....	3.5	.....	43.9	23.0	16.2	11.0	14.2	18.0	28.0	35.5	19.8	25.5
31.....	5.6	.....	38.5	.....	13.8	.....	11.6	16.8	.....	37.9	.....	23.8

*Monthly discharge of Spreckels ditch at station No. 4, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	22.5	3.5	9.08	558	A.
February.....	46.0	2.3	18.30	1,050	A.
March.....	52.0	13.8	33.90	2,080	A.
April.....	47.5	23.0	35.30	2,100	A.
May.....	37.0	8.0	19.80	1,220	A.
June.....	40.0	7.4	18.80	1,120	A.
July.....	35.5	10.0	21.50	1,320	A.
August.....	39.4	6.6	17.50	1,080	A.
September.....	40.0	4.2	15.40	916	A.
October.....	42.4	7.0	23.00	1,410	A.
November.....	46.0	15.0	27.90	1,660	A.
December.....	40.9	14.2	26.40	1,620	A.
The year.....	52.0	2.3	22.20	16,100	

#### SPRECKELS DITCH AT STATION NO. 5, NEAR HUELO, MAUI.

**Location.**—About 5 miles by trail southeast of Huelo post office, and about 500 feet above drop into Alo Stream.

**Records available.**—November 6, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 6 a. m. and 6 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from plank at gage.

**Accuracy.**—Very good.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of Spreckels ditch at station No. 5, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Sept. 22	J. B. Stewart.....	<i>Feet.</i> 0.67	<i>Sec.-ft.</i> 11.9
Nov. 7	.....do.....	1.35	26.3
Dec. 20	C. T. Bailey.....	2.16	49.1

*Daily gage height, in feet, of Spreckels ditch at station No. 5, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.54	0.48	2.35	2.24	1.68	1.04	1.23	0.90	1.45	1.23	2.30	2.42
2.....	1.74	.41	2.34	2.19	1.82	1.00	1.65	.85	2.40	1.64	2.18	1.48
3.....	1.44	.45	2.35	2.40	2.42	.82	2.00	.86	2.16	1.62	2.34	2.90
4.....	1.27	.44	2.22	2.50	2.40	.83	2.23	.79	2.20	.88	1.96	.76
5.....	1.15	.40	2.20	1.92	2.44	.74	2.04	.71	1.92	.80	1.72	.45
6.....	1.11	.38	2.22	2.36	2.36	.70	1.64	.66	2.02	.72	1.54	.44
7.....	1.07	.36	2.29	2.53	2.04	.76	1.40	.71	1.85	.73	1.37	1.27
8.....	1.19	1.18	2.28	2.44	2.30	1.18	1.30	.66	1.93	.72	1.30	1.22
9.....	1.23	1.76	2.35	2.22	1.90	1.10	2.30	1.75	1.64	.96	2.96	1.18
10.....	1.03	.66	2.40	2.34	1.64	1.90	2.00	1.59	1.43	.96	2.34	.92
11.....	.92	.62	2.50	2.28	1.48	2.24	2.10	2.16	1.28	1.11	2.34	1.45
12.....	.86	.60	2.49	2.38	1.34	1.76	1.71	1.97	1.16	1.54	2.16	1.10
13.....	.82	2.14	2.52	2.28	1.25	2.06	2.07	1.80	1.03	1.45	1.98	1.28
14.....	.78	1.76	2.38	2.40	1.26	1.54	2.16	1.97	.99	2.36	1.66	1.44
15.....	.74	.90	2.24	2.42	1.08	1.90	1.71	2.30	.91	2.15	1.46	1.38
16.....	.71	.68	2.18	2.38	1.02	1.90	1.41	2.01	.85	1.46	2.42	1.65
17.....	.68	.64	2.19	2.29	.97	1.38	1.27	1.53	.86	1.18	2.40	1.28
18.....	.66	.58	2.38	2.26	.96	1.18	1.25	1.51	.78	1.22	2.44	2.12
19.....	.62	1.96	2.28	2.26	1.02	1.72	1.09	1.60	.72	.56	2.34	2.40
20.....	.60	2.48	2.22	2.46	1.36	1.68	1.05	1.23	.74	1.13	2.29	2.18
21.....	.59	2.45	2.24	2.28	1.10	2.06	1.11	1.10	.70	2.48	2.22	2.32
22.....	.58	2.43	1.96	2.30	.84	1.48	1.02	2.10	.66	2.46	2.25	2.42
23.....	.54	2.41	1.92	2.29	.77	1.25	.87	1.46	.62	2.39	1.80	2.52
24.....	.54	2.20	1.86	2.28	1.00	2.18	1.88	1.11	.71	2.29	2.04	2.23
25.....	.74	2.18	1.83	2.33	.80	1.47	1.59	.98	.59	2.10	2.10	2.26
26.....	.57	1.90	2.28	2.46	1.73	1.24	1.27	1.12	.59	2.10	2.14	2.35
27.....	.51	1.82	1.94	2.38	2.36	1.62	1.38	1.16	.56	2.50	1.83	2.31
28.....	.48	2.30	1.80	2.30	1.97	1.40	1.41	.98	.50	2.50	1.72	2.30
29.....	.46	2.14	1.54	2.12	1.96	1.08	1.60	1.80	.62	2.30	1.44	2.16
30.....	.44	.....	2.22	1.98	1.34	.94	1.13	1.42	2.15	2.40	1.55	2.12
31.....	.52	.....	2.33	.....	1.26	.....	1.00	1.57	.....	2.16	.....	1.91

*Daily discharge, in second-feet, of Spreckels ditch at station No. 5, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	31.0	8.7	53.5	50.2	34.5	18.8	23.2	16.0	28.8	23.2	52.0	55.6
2.....	36.0	7.6	53.2	48.7	38.0	18.0	33.8	15.0	55.0	33.5	48.4	29.5
3.....	28.5	8.2	53.5	55.0	55.6	14.4	43.0	15.2	47.8	33.0	53.2	71.0
4.....	24.2	8.1	49.6	58.0	55.0	14.6	49.9	13.8	49.0	15.6	41.8	13.2
5.....	21.2	7.5	49.0	40.6	56.2	12.8	44.2	12.2	40.6	14.0	35.5	8.2
6.....	20.2	7.2	49.6	53.8	53.8	12.0	33.5	11.4	43.6	12.4	31.0	8.1
7.....	19.4	6.9	51.7	58.9	44.2	13.2	27.5	12.2	38.8	12.6	26.8	24.2
8.....	22.2	22.0	51.4	56.2	52.0	22.0	25.0	11.4	40.9	12.4	25.0	23.0
9.....	23.2	36.5	53.5	49.6	40.0	20.0	52.0	36.2	33.5	17.2	72.8	22.0
10.....	18.6	11.4	55.0	53.2	33.5	40.0	43.0	32.2	28.2	17.2	53.2	16.4
11.....	16.4	10.8	58.0	51.4	29.5	50.2	46.0	47.8	24.5	20.2	53.2	28.8
12.....	15.2	10.5	57.7	54.4	26.0	36.5	35.2	42.1	21.5	31.0	47.8	20.0
13.....	14.4	47.2	58.6	51.4	23.8	44.8	45.1	37.5	18.6	28.8	42.4	24.5
14.....	13.6	36.5	54.4	55.0	24.0	31.0	47.8	42.1	17.8	53.8	34.0	28.5
15.....	12.8	16.0	50.2	55.6	19.6	40.0	35.2	52.0	16.2	47.5	29.0	27.0



*Daily discharge, in second-feet, of Spreckels ditch at station No. 5, near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	12.2	11.7	48.4	54.4	18.4	40.0	27.8	43.3	15.0	29.0	55.6	33.8
17.....	11.7	11.1	48.7	51.7	17.4	27.0	24.2	30.8	15.2	22.0	55.0	24.5
18.....	11.4	10.2	54.4	50.8	17.2	22.0	23.8	30.2	13.6	23.0	56.2	46.6
19.....	10.8	41.8	51.4	50.8	18.4	35.5	19.8	32.5	12.4	9.9	53.2	55.0
20.....	10.5	57.4	49.6	56.8	26.5	34.5	19.0	23.2	12.8	20.8	51.7	48.4
21.....	10.4	56.5	50.2	51.4	20.0	44.8	20.2	20.0	12.0	57.4	49.6	52.6
22.....	10.2	55.9	41.8	52.0	14.8	29.5	18.4	46.0	11.4	56.8	50.5	55.6
23.....	9.6	55.3	40.6	51.7	13.4	23.8	15.4	29.0	10.8	54.7	37.5	58.6
24.....	16.8	49.0	39.0	51.4	18.0	48.4	39.5	20.2	12.2	51.7	44.2	49.9
25.....	12.8	48.4	38.2	52.9	14.0	29.2	32.2	17.6	10.4	46.0	46.0	50.8
26.....	10.0	40.0	51.4	56.8	35.8	23.5	24.2	20.5	10.4	46.0	47.2	53.5
27.....	9.2	38.0	41.2	54.4	53.8	33.0	27.0	21.5	9.9	58.0	38.2	52.3
28.....	8.7	52.0	37.5	52.0	42.1	27.5	27.8	17.6	9.0	58.0	35.5	52.0
29.....	8.4	47.2	31.0	46.6	41.8	19.6	32.5	37.5	10.8	52.0	28.5	47.8
30.....	8.1	.....	49.6	42.4	26.0	16.8	20.8	28.0	47.5	55.0	31.2	46.6
31.....	9.3	.....	52.9	.....	24.0	.....	18.0	31.8	.....	47.8	.....	40.3

*Monthly discharge of Spreckels ditch at station No. 5, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	36.0	8.1	15.7	965	A.
February.....	57.4	6.9	28.3	1,630	A.
March.....	58.6	31.0	49.2	3,030	A.
April.....	58.9	42.4	52.3	3,110	A.
May.....	56.2	13.4	31.8	1,960	A.
June.....	50.2	12.0	28.1	1,670	A.
July.....	52.0	15.4	31.5	1,940	A.
August.....	52.0	11.4	27.3	1,680	A.
September.....	55.0	9.0	23.9	1,420	A.
October.....	58.0	9.9	34.2	2,100	A.
November.....	72.8	25.0	44.2	2,630	A.
December.....	71.0	8.1	37.7	2,320	A.
The year.....	72.8	6.9	33.7	24,500	

#### SPRECKELS DITCH AT STATION NO. 6, NEAR HUELO, MAUI.

**Location.**—About 4 miles by trail southeast of Huelo post office and about 100 feet below Kolea Stream intake.

**Records available.**—November 4, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, usually about 4 p. m.; datum unchanged.

**Discharge measurements.**—Made from log at gage.

**Channel.**—Permanent.

**Accuracy.**—Records good.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of Spreckels ditch at station No. 6 near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
Sept. 22	J. B. Stewart.....	Feet.	Sec.-ft.
Nov. 7	.....do.....	0.92	21.4
Dec. 20	C. T. Bailey.....	1.49	49.0
		1.19	38.8

*Daily gage height, in feet, of Spreckels ditch at station No. 6, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.46	0.65	1.42	1.59	1.50	1.35	1.45	1.00	1.46	1.48	1.58	1.60
2.....	1.47	.61	1.44	1.59	1.50	1.31	1.55	.98	1.50	1.50	1.59	.75
3.....	1.45	.70	1.43	1.62	1.51	1.20	1.60	1.12	1.50	1.47	1.59	.27
4.....	1.45	.65	1.43	1.68	1.55	1.10	1.55	.93	1.50	1.48	1.58	.22
5.....	1.42	.61	1.42	1.42	1.53	1.00	1.55	.90	1.50	.97	1.52	.25
6.....	1.40	.58	1.42	1.42	1.51	.92	1.45	.85	1.52	.90	1.50	.29
7.....	1.40	.55	1.42	1.40	1.54	1.00	1.45	.90	1.55	.93	1.49	.22
8.....	1.40	1.20	1.42	1.43	1.60	1.39	1.54	.81	1.51	.90	1.50	.15
9.....	1.40	1.42	1.43	1.50	1.59	1.41	1.55	1.54	1.60	1.43	1.50	.14
10.....	1.38	.80	1.44	1.50	1.59	1.45	1.55	1.54	1.50	1.10	1.60	.13
11.....	1.20	.99	1.49	1.49	1.58	1.55	1.56	1.52	1.48	.90	1.58	.40
12.....	1.17	.83	1.50	1.52	1.58	1.51	1.55	1.52	1.45	1.39	1.53	.82
13.....	1.10	1.41	1.48	1.52	1.57	1.50	1.55	1.51	1.39	1.42	1.50	.89
14.....	1.07	1.53	1.43	1.52	1.55	1.49	1.59	1.56	1.27	1.57	1.50	.65
15.....	1.01	1.10	1.52	1.50	1.50	1.40	1.56	1.54	1.19	1.50	1.55	.64
16.....	.99	.90	1.52	1.50	1.38	1.49	1.55	1.51	1.10	1.58	1.58	.90
17.....	.97	.85	1.53	1.49	1.34	1.48	1.50	1.49	1.10	1.38	1.58	.89
18.....	.95	.79	1.21	1.48	1.26	1.31	1.38	1.46	1.02	1.27	1.60	.90
19.....	.90	1.62	1.30	1.48	1.34	1.50	1.25	1.46	1.00	1.00	1.59	1.00
20.....	.88	1.48	1.59	1.50	1.61	1.45	1.22	1.40	1.04	1.31	1.58	1.19
21.....	.80	1.34	1.58	1.49	1.33	1.50	1.21	1.31	.95	1.60	1.60	1.29
22.....	.78	1.30	1.57	1.49	1.12	1.50	1.12	1.50	.89	1.60	1.60	1.24
23.....	.74	1.45	1.57	1.48	1.08	1.45	1.03	1.49	.85	1.60	1.59	1.30
24.....	1.34	1.43	1.56	1.50	1.32	1.60	1.50	1.30	.82	1.54	1.59	1.22
25.....	1.00	1.43	1.55	1.50	1.13	1.50	1.55	1.18	.78	1.53	1.60	1.21
26.....	.76	1.44	1.60	1.51	1.60	1.44	1.40	1.45	.77	1.55	1.59	1.27
27.....	.72	1.48	1.58	1.50	1.60	1.52	1.55	1.40	.74	1.60	1.59	1.25
28.....	.70	1.45	1.45	1.50	1.62	1.42	1.48	1.10	.69	1.60	1.59	1.25
29.....	.68	1.42	1.44	1.49	1.60	1.29	1.55	1.50	.70	1.58	1.58	1.23
30.....	.64	.....	1.53	1.48	1.50	1.15	1.29	1.45	1.50	1.59	1.60	1.22
31.....	.65	.....	1.52	.....	1.41	.....	1.18	1.45	.....	1.48	.....	1.21

*Daily discharge, in second-feet, of Spreckels ditch at station No. 6, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	48.0	16.5	46.0	54.5	50.0	42.5	47.5	27.0	48.0	49.0	54.0	55.0
2.....	48.5	15.3	47.0	54.5	50.0	40.5	52.5	26.4	50.0	50.0	54.5	19.5
3.....	47.5	18.0	46.5	56.0	50.5	35.0	55.0	31.8	50.0	48.5	54.5	7.4
4.....	47.5	16.5	46.5	59.0	52.5	31.0	52.5	24.9	50.0	49.0	54.0	6.4
5.....	46.0	15.3	46.0	46.0	51.5	27.0	52.5	24.0	50.0	26.1	51.0	7.0
6.....	45.0	14.5	46.0	46.0	50.5	24.6	47.5	22.5	51.0	24.0	50.0	7.8
7.....	45.0	13.8	46.0	45.0	52.0	27.0	47.5	24.0	52.5	24.9	49.5	6.4
8.....	45.0	35.0	46.0	46.5	55.0	44.5	52.0	21.3	50.5	24.0	50.0	5.5
9.....	45.0	46.0	46.5	50.0	54.5	45.5	52.5	52.0	50.0	46.5	50.0	5.4
10.....	44.0	21.0	47.0	50.0	54.5	47.5	52.5	52.0	50.0	31.0	55.0	5.3
11.....	35.0	26.7	49.5	49.5	54.0	52.5	53.0	51.0	49.0	24.0	54.0	10.0
12.....	33.8	21.9	50.0	51.0	54.0	50.5	52.5	51.0	47.5	44.5	51.5	21.6
13.....	31.0	45.5	49.0	51.0	53.5	50.0	52.5	50.5	44.5	46.0	50.0	23.7
14.....	29.8	51.5	46.5	51.0	52.5	49.5	54.5	53.0	38.5	53.5	50.0	13.8
15.....	27.4	31.0	51.0	50.0	50.0	45.0	53.0	52.0	34.6	50.0	52.5	13.5
16.....	26.7	24.0	51.0	50.0	44.0	49.5	52.5	50.5	31.0	54.0	54.0	24.0
17.....	26.1	22.5	51.5	49.5	42.0	49.0	50.0	49.5	31.0	44.0	54.0	23.7
18.....	25.5	20.7	35.5	49.0	38.0	40.5	44.0	48.0	27.8	38.5	50.0	24.0
19.....	24.0	56.0	40.0	49.0	42.0	50.0	37.5	48.0	27.0	27.0	54.5	27.0
20.....	23.4	49.0	54.5	50.0	55.5	47.5	36.0	45.0	28.6	40.5	54.0	34.6
21.....	21.0	42.0	54.0	49.5	41.5	50.0	35.5	40.5	25.5	55.0	55.0	39.5
22.....	20.4	40.0	53.5	49.5	31.8	50.0	31.8	50.0	23.7	55.0	55.0	37.0
23.....	19.2	47.5	53.5	49.0	30.2	47.5	28.2	49.5	22.5	55.0	54.5	40.0
24.....	42.0	46.5	53.0	50.0	41.0	55.0	50.0	40.0	21.6	52.0	54.5	36.0
25.....	27.0	46.5	52.5	50.0	32.2	50.0	52.5	34.2	20.4	51.5	55.0	35.5
26.....	19.8	47.0	55.0	50.5	55.0	47.0	45.0	47.5	20.1	52.5	54.5	38.5
27.....	18.6	49.0	54.0	50.0	55.0	51.0	52.5	45.0	19.2	55.0	54.5	37.5
28.....	18.0	47.5	47.5	50.0	56.0	46.0	49.0	31.0	17.7	55.0	54.5	37.5
29.....	17.4	46.0	47.0	49.5	55.0	39.5	52.5	50.0	18.0	54.0	54.0	36.5
30.....	16.2	.....	51.5	49.0	50.0	33.0	39.5	47.5	50.0	54.5	54.0	36.0
31.....	16.5	.....	51.0	.....	45.5	.....	34.2	47.5	.....	49.0	.....	35.5

*Monthly discharge of Spreckels ditch at station No. 6, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	48.5	16.2	31.6	1,940	A.
February.....	56.0	13.8	33.5	1,930	A.
March.....	55.0	35.5	48.9	3,010	A.
April.....	59.0	45.0	50.2	2,990	A.
May.....	56.0	30.2	48.4	2,980	A.
June.....	55.0	24.6	43.9	2,610	A.
July.....	55.0	28.2	47.4	2,910	A.
August.....	53.0	21.3	41.5	2,550	A.
September.....	52.5	17.7	36.7	2,180	A.
October.....	55.0	24.0	44.6	2,740	A.
November.....	55.0	49.5	53.3	3,170	A.
December.....	55.0	5.3	24.2	1,490	B.
The year.....	59.0	5.3	42.0	30,500	

**SPRECKELS DITCH AT STATION NO. 7, NEAR HUELO, MAUI.**

**Location.**—About  $1\frac{1}{4}$  miles by trail east of Huelo post office, between Oopuola and Pa streams.

**Records available.**—November 6, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at irregular hours; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from log at gage.

**Accuracy.**—Fair.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of Spreckels ditch at station No. 7 near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis- charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Sept. 22	J. B. Stewart.....	1.15	23.8
Nov. 8	.....do.....	1.85	54.6
Dec. 21	C. T. Bailey.....	1.45	35.6

*Daily gage height, in feet, of Spreckels ditch at station No. 7, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			1.80	1.65	1.60	1.60	1.60	1.30		1.80	1.80	
2.....			1.95	1.75	1.70		1.75	1.25	1.95	1.90	1.80	2.00
3.....	1.10			1.80	1.65	1.55	1.60	1.30	1.90	1.70		1.60
4.....	1.10		1.75	1.90	1.80	1.35			1.85	1.40	1.80	1.50
5.....	1.05		1.75	1.80		1.35		1.20	1.85	1.30		.70
6.....	1.10		1.75	1.80	1.70	1.30		1.05	1.70		1.70	.70
7.....			1.75		1.70	1.20		1.20	1.80	1.30	1.70	.80
8.....			1.75	1.80		1.40	1.60	1.05		1.12	1.70	
9.....	1.10		1.80	1.75	2.20		1.80	1.80	1.65	1.40	2.00	.45
10.....	1.00			1.80		1.80	1.70	1.75	1.60	1.32		.45
11.....	.95		1.85	1.80	1.70	1.70	1.75		1.60	1.20	1.75	.35
12.....	.95		1.85	1.80		1.70	1.75	1.80	1.60	1.90	1.70	.35
13.....	.95		1.85	1.80	1.65	1.70	1.60	1.85	1.55		1.65	.40
14.....			1.85		1.65	1.70		1.80	1.55	1.70	1.65	.40
15.....	.95		1.80	1.85	1.60	1.70	1.65	1.70		1.90	1.60	.50
16.....	.90		1.80	1.85	1.55		1.60	1.80	1.50	1.70	1.75	
17.....	.95	1.15			1.50	1.65	1.55	1.70	1.45	1.60		.50
18.....	.95		1.85		1.45	1.60	1.50		1.55	1.60	1.90	.55
19.....	.95	1.40	1.75	1.75		1.85	1.50	1.80	1.20	1.50	1.90	1.60
20.....	1.00	2.25	1.75	1.80	1.65	1.60	1.50	1.60	1.20		1.90	1.30

*Daily gage height, in feet, of Spreckels ditch at station No. 7, near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....		2.00	1.70		1.60	1.85		1.55	1.20	1.70	1.95	1.25
22.....	1.00	1.95	1.65	1.70	1.45	1.65	1.40	1.80		1.90	1.85	
23.....	.95	1.85	1.05	1.70	1.40		1.40	1.75	1.10	1.90	1.85	1.25
24.....		1.80		1.70	1.65	1.95	1.70	1.60	1.10	1.80		1.73
25.....			1.70	1.75	1.40	1.65	1.75		1.05	1.80	2.40	
26.....		1.65	1.75	1.80		1.65	1.60	1.40	1.10	1.70	2.40	1.50
27.....		1.90		1.80	1.80	1.60	1.70	1.55	1.00		1.80	1.50
28.....		1.85	1.65		1.80	1.65		1.50	1.00	1.90	1.70	1.22
29.....		1.85	1.70	1.75	1.75	1.50	1.65	1.60		1.80	1.70	
30.....			1.75		1.65		1.60	1.55	1.70	1.80	1.70	.72
31.....					1.60		1.35	1.55				.70

*Daily discharge, in second-feet, of Spreckels ditch at station No. 7, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	23.0		52.0	45.0	43.0	43.0	43.0	31.0	50.2	52.0	52.0	54.5
2.....	23.0		59.5	49.5	47.0	42.0	49.5	29.0	59.5	57.0	52.0	62.0
3.....	23.0		54.5	52.0	45.0	41.0	43.0	31.0	57.0	47.0	52.0	43.0
4.....	23.0		49.5	57.0	52.0	33.0	43.0	29.0	54.5	35.0	52.0	39.0
5.....	21.5		49.5	52.0	49.5	33.0	43.0	27.0	54.5	31.0	49.5	12.0
6.....	23.0		49.5	52.0	47.0	31.0	43.0	21.5	47.0	31.0	47.0	12.0
7.....	23.0		49.5	52.0	47.0	27.0	43.0	27.0	52.0	31.0	47.0	14.0
8.....	23.0		49.5	52.0	60.5	35.0	43.0	21.5	48.5	23.8	47.0	10.5
9.....	23.0		52.0	49.5	74.0	43.5	52.0	52.0	45.0	35.0	62.0	7.0
10.....	20.0		53.2	52.0	60.5	52.0	47.0	49.5	43.0	31.8	55.7	7.0
11.....	18.5		54.5	52.0	47.0	47.0	49.5	50.7	43.0	27.0	49.5	5.0
12.....	18.5		54.5	52.0	46.0	47.0	49.5	52.0	43.0	57.0	47.0	5.0
13.....	18.5		54.5	52.0	45.0	47.0	43.0	54.5	41.0	52.0	45.0	6.0
14.....	18.5		54.5	53.2	45.0	47.0	44.0	52.0	41.0	47.0	45.0	6.0
15.....	18.5		52.0	54.5	43.0	47.0	45.0	47.0	40.0	57.0	43.0	8.0
16.....	17.0		52.0	54.5	41.0	46.0	43.0	52.0	39.0	47.0	49.5	8.0
17.....	18.5	25.0	53.2	52.9	39.0	45.0	41.0	47.0	37.0	43.0	53.8	8.0
18.....	18.5	30.0	54.5	51.2	37.0	43.0	39.0	49.5	41.0	43.0	57.0	9.0
19.....	18.5	35.0	49.5	49.5	41.0	54.5	39.0	52.0	27.0	39.0	57.0	43.0
20.....	20.0	77.0	49.5	52.0	45.0	43.0	39.0	43.0	27.0	43.0	57.0	31.0
21.....	20.0	62.0	47.0	49.5	43.0	54.5	37.0	41.0	27.0	47.0	59.5	29.0
22.....	20.0	59.5	45.0	47.0	37.0	45.0	35.0	52.0	25.0	57.0	54.5	29.0
23.....	18.5	54.5	21.5	47.0	35.0	52.2	35.0	49.5	23.0	57.0	54.5	29.0
24.....		52.0	34.3	47.0	45.0	59.5	47.0	43.0	23.0	52.0	70.2	48.5
25.....		48.5	47.0	49.5	35.0	45.0	49.5	39.0	21.5	52.0	86.0	43.7
26.....		45.0	49.5	52.0	43.5	45.0	43.0	35.0	23.0	47.0	86.0	39.0
27.....		57.0	47.2	52.0	52.0	43.0	47.0	41.0	20.0	52.0	52.0	39.0
28.....		54.5	45.0	50.7	52.0	45.0	46.0	39.0	20.0	57.0	47.0	27.8
29.....		54.5	47.0	49.5	49.5	39.0	45.0	43.0	33.5	52.0	47.0	20.1
30.....			49.5	46.3	45.0	41.0	43.0	41.0	47.0	52.0	47.0	12.4
31.....			47.2		43.0		33.0	41.0		52.0		12.0

NOTE.—Discharge interpolated for days for which gage heights are missing.

*Monthly discharge of Spreckels ditch at station No. 7, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January (1-23).....			20.4	930	A.
February (17-29).....			50.3	1,300	A.
March.....	59.5	21.5	49.3	3,030	A.
April.....	57.0	45.0	50.9	3,030	A.
May.....	74.0	35.0	46.3	2,850	A.
June.....	59.5	27.0	43.9	2,610	A.
July.....	52.0	33.0	43.3	2,660	A.
August.....	54.5	21.5	41.4	2,550	A.
September.....	59.5	20.0	38.4	2,280	A.
October.....	57.0	23.8	45.4	2,790	A.
November.....	86.0	43.0	54.1	3,220	A.
December.....	62.0	5.0	23.2	1,430	A.
The period.....				28,700	

## SPRECKELS DITCH AT STATION NO. 8, NEAR HUELO, MAUI.

**Location.**—About 1 mile by trail east of Huelo post office and 275 feet above gate to storage reservoir.

**Records available.**—November 4, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at irregular hours; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from plank.

**Accuracy.**—Good.

**Cooperation.**—East Maui Ditch Co. assists in securing gage heights.

*Discharge measurements of Spreckels ditch at station No. 8, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Sept. 21	J. B. Stewart.....	<i>Feet.</i> 1.58	<i>Sec.-ft.</i> 26.4
Dec. 25	C. T. Bailey.....	1.56	27.5

*Daily gage height, in feet, of Spreckels ditch at station No. 8, near Huelo, Maui, for 1912.*

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		2.20	2.25	2.10	1.90	2.00	1.70		2.20	2.20	.....
2		2.40	2.40	2.20		2.25	1.65	2.50	2.40	2.20	2.10
3			2.40	2.15	1.85	2.10	1.70	2.25	2.20		2.00
4		2.25	2.55	2.20	1.65			2.40	1.70	2.20	1.30
5		2.25	2.40		1.65		1.60	2.10	1.62		1.30
6		2.25	2.35	2.20	1.60		1.50	2.10		2.10	1.40
7		2.30		2.15	1.60		1.60	2.20	1.62	2.10	2.50
8		2.20	2.30		1.80	2.00	1.50		1.60	2.10	
9		2.30	2.25			2.20	2.20	2.10	1.80	2.60	.70
10			2.30	2.10	2.30	2.10	2.15	2.05	1.70		.70
11		2.40	2.30	2.10	1.20	2.10		2.05	1.60	2.20	.50
12		2.40	2.35		2.10	2.10	2.20	2.04	2.40	2.15	.50
13		2.40	2.30	2.05	2.10	1.85	2.35	1.95		2.10	.65
14		2.35		1.95	2.10	2.10	2.20	1.95	2.10	2.10	.65
15		2.30	2.40	1.95	2.10	2.10	2.10		2.40	2.05	.80
16		2.30	2.40	1.90		2.10	2.20	1.90	2.10	2.20	.....
17	1.50			1.90	2.00	2.05	2.10	1.85	2.10		.80
18		2.40		1.90	1.85	2.00	2.05	1.70	2.00	2.50	.90
19	1.80	2.25	2.25		2.10	1.90	2.20	1.65	2.00	2.40	2.10
20	2.40	2.25	2.30	1.90	1.95	1.90	2.00	1.70		2.40	2.00
21		2.45	2.20		2.10		1.95	1.70	2.30	2.45	1.88
22		2.35	2.15	2.20	1.90	1.95	2.20		2.50	2.30	
23		2.30	2.15	2.20	1.70		2.15	1.50	2.50	2.35	2.70
24		2.30		2.20	2.10	2.35	2.30	2.00	1.50	2.30	1.90
25			2.20	2.20	1.70	1.95	1.90		1.45	2.20	1.90
26		2.10	2.25	2.25		1.95	2.00	1.90	2.00	1.90	1.90
27		2.40	2.25	2.25	2.20	1.95	2.10	1.95	1.40	2.25	1.90
28		2.30	2.10		2.25	2.10		1.75	1.40	2.50	2.20
29		2.30	2.20	2.15	2.20	1.90	2.10	2.05		2.50	2.20
30			2.25	2.10	2.10		2.05	2.00	2.10	2.40	.92
31				2.05		1.75	2.10			2.30	.90

*Daily discharge, in second-feet, of Spreckels ditch at station No. 8, near Huelo, Maui, for 1912.*

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		50.0	52.0	46.0	38.0	42.0	31.0	54.0	50.0	50.0	48.0
2.....		58.0	58.0	50.0	37.0	52.0	29.5	62.0	58.0	50.0	46.0
3.....		55.0	58.0	48.0	36.0	46.0	31.0	52.0	50.0	50.0	42.0
4.....		52.0	64.5	50.0	29.5	45.2	29.5	58.0	31.0	50.0	19.0
5.....		52.0	58.0	50.0	29.5	44.4	28.0	46.0	28.6	48.0	19.0
6.....		52.0	56.0	50.0	28.0	43.6	25.0	46.0	28.6	46.0	22.0
7.....		54.0	55.0	48.0	28.0	42.8	28.0	50.0	28.6	46.0	62.0
8.....		50.0	54.0	47.3	34.0	42.0	25.0	48.0	28.0	46.0	54.0
9.....		54.0	52.0	46.6	44.0	50.0	50.0	46.0	34.0	67.0	6.0
10.....		56.0	54.0	46.0	54.0	46.0	48.0	44.0	31.0	58.5	6.0
11.....		58.0	54.0	46.0	16.0	46.0	49.0	44.0	28.0	50.0	4.0
12.....		58.0	56.0	45.0	46.0	46.0	50.0	43.6	58.0	48.0	4.0
13.....		58.0	54.0	44.0	46.0	36.0	56.0	40.0	52.0	46.0	5.5
14.....		56.0	56.0	40.0	46.0	46.0	50.0	40.0	46.0	46.0	5.5
15.....		54.0	58.0	40.0	46.0	46.0	46.0	39.0	58.0	44.0	8.0
16.....		54.0	58.0	38.0	44.0	46.0	50.0	38.0	46.0	50.0	8.0
17.....	25.0	56.0	56.0	38.0	42.0	44.0	46.0	36.0	46.0	56.0	8.0
18.....	29.5	58.0	54.0	38.0	36.0	42.0	44.0	31.0	42.0	62.0	10.0
19.....	34.0	52.0	52.0	38.0	46.0	38.0	50.0	29.5	42.0	58.0	46.0
20.....	58.0	52.0	54.0	38.0	40.0	38.0	42.0	31.0	48.0	58.0	42.0
21.....	60.0	50.0	52.0	46.0	46.0	36.0	40.0	31.0	54.0	60.0	37.2
22.....	56.0	48.0	50.0	38.0	40.0	34.0	50.0	28.0	62.0	54.0	54.0
23.....	54.0	48.0	50.0	31.0	48.0	34.0	48.0	25.0	62.0	56.0	72.0
24.....	54.0	49.0	50.0	46.0	56.0	54.0	42.0	25.0	54.0	47.0	38.0
25.....	50.0	50.0	50.0	31.0	40.0	38.0	40.0	23.5	50.0	38.0	38.0
26.....	46.0	52.0	52.0	40.5	40.0	42.0	38.0	25.0	42.0	38.0	38.0
27.....	58.0	52.0	52.0	50.0	40.0	46.0	40.0	22.0	52.0	52.0	38.0
28.....	54.0	46.0	50.0	52.0	46.0	46.0	32.5	22.0	62.0	50.0	28.6
29.....	54.0	50.0	48.0	50.0	38.0	46.0	44.0	34.0	62.0	50.0	19.5
30.....		52.0	46.0	46.0	40.0	44.0	42.0	46.0	58.0	50.0	10.4
31.....		52.0		44.0		32.5	46.0		54.0		10.0

*Monthly discharge of Spreckels ditch at station No. 8, near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....					
February.....	60.0	25.0	48.7	1,250	A.
March.....	58.0	46.0	52.8	3,250	A.
April.....	64.5	46.0	53.8	3,200	A.
May.....	52.0	31.0	43.9	2,700	A.
June.....	56.0	15.0	40.0	2,380	A.
July.....	54.0	32.5	43.0	2,640	A.
August.....	56.0	25.0	41.0	2,520	A.
September.....	62.0	22.0	38.7	2,300	A.
October.....	62.0	28.0	46.6	2,870	A.
November.....	67.0	38.0	50.8	3,020	A.
December.....	72.0	4.0	26.7	1,640	A.
The period.....				27,800	

#### CENTER DITCH REGION.

##### CENTER DITCH NEAR HUELO, MAUI.

**Location.**—About 3 miles by trail southeast of Huelo post office and about 1½ miles below ditch intake at Puohakamoa Stream.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Vertical staff; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made from plank across ditch.

**Accuracy.**—Good.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Center ditch near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Mar. 11	J. B. Stewart.....	Inches.	Sec.-ft.
Dec. 20	C. T. Bailey.....	23.2	39.2
		49.9	87.0

*Daily gage height, in inches, of Center ditch near Huelo, Maui, for 1912.*

[Asada, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	21.9	3.8	53.5	54.5	27.5	6.0	8.1	4.1	9.1	13.4	41.1	41.2
2	25.8	2.9	53.5	52.5	27.0	5.5	20.0	4.0	50.9	27.0	33.5	54.8
3	20.4	3.0	53.5	54.2	29.8	5.1	25.5	4.8	38.6	13.9	45.9	50.2
4	15.4	2.9	50.8	52.0	43.5	4.6	36.6	4.2	34.4	4.9	30.2	32.4
5	16.5	2.8	48.0	47.0	49.8	4.2	22.5	3.9	24.1	3.9	21.5	29.5
6	9.5	2.8	48.4	51.0	41.8	4.2	11.4	3.8	28.0	3.2	20.6	32.2
7	7.9	2.5	50.1	54.5	27.8	4.5	9.9	4.5	45.8	3.0	15.6	35.2
8	10.8	5.6	48.4	54.5	39.8	6.8	21.4	4.5	27.9	3.0	13.5	34.8
9	8.4	7.6	49.4	54.0	24.4	6.4	47.5	14.0	17.1	4.9	55.0	33.2
10	6.9	4.6	50.1	53.8	19.1	31.0	27.2	8.2	13.0	6.4	55.8	30.4
11	5.0	9.4	53.0	52.8	15.6	40.9	31.5	32.8	8.4	3.0	48.1	30.0
12	4.1	8.4	54.0	53.8	12.8	23.0	14.4	21.8	5.6	13.1	33.9	48.2
13	3.5	38.2	54.2	53.5	9.8	26.4	29.9	16.0	5.1	12.2	27.0	36.8
14	3.0	22.4	52.8	53.8	8.8	16.0	17.8	28.2	4.8	46.0	25.2	28.2
15	3.0	11.8	50.1	54.2	6.8	21.0	15.8	45.0	4.5	31.2	17.8	30.6
16	3.0	5.2	42.2	54.2	6.0	22.2	9.4	29.6	4.5	15.2	55.0	38.1
17	3.0	4.5	38.6	53.8	5.6	10.0	6.2	17.5	4.5	7.4	55.0	24.6
18	3.0	4.0	35.5	53.2	5.4	6.5	5.8	8.9	4.5	4.1	55.0	45.5
19	3.0	26.9	34.0	52.0	6.5	12.6	5.4	14.6	4.5	3.8	50.4	50.8
20	3.0	49.0	47.5	53.0	9.0	11.0	5.1	5.9	4.5	3.4	47.9	50.8
21	3.0	50.0	40.2	53.8	7.1	28.6	6.1	5.2	4.4	52.0	40.8	43.0
22	3.0	48.5	31.5	52.8	5.2	12.2	5.2	22.6	4.1	54.5	42.4	56.5
23	3.0	46.6	26.5	46.5	4.8	6.6	4.8	10.6	3.9	51.1	39.1	36.0
24	6.2	38.2	25.0	45.5	7.0	35.8	23.5	5.5	3.8	44.2	32.2	55.5
25	4.4	36.1	21.5	52.8	5.4	14.0	9.4	4.9	3.6	32.0	35.1	53.0
26	3.6	29.9	43.2	54.0	24.8	11.8	5.6	5.4	3.5	34.1	32.9	55.8
27	3.1	53.0	14.2	51.0	47.5	14.0	6.6	5.6	3.5	55.0	26.6	55.5
28	3.0	53.8	12.8	41.0	26.8	9.2	6.8	4.8	3.5	53.1	29.0	54.8
29	3.0	51.5	12.8	32.0	29.0	5.8	12.5	17.0	4.4	34.1	18.4	51.4
30	3.0	-----	47.0	31.8	14.1	5.2	5.8	8.4	39.1	45.1	18.5	49.2
31	4.6	-----	55.0	-----	9.8	-----	4.6	13.1	-----	55.0	-----	40.8

NOTE.—Gage read at 6 a. m. and 6 p. m.

*Daily discharge, in second-feet, of Center ditch near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	32.8	2.7	93.5	95.0	45.0	4.9	7.3	3.0	8.6	15.8	72.2	72.4
2	41.6	1.9	93.5	92.0	44.0	4.4	29.0	2.9	89.8	44.0	57.0	95.6
3	29.8	2.0	93.5	94.4	49.6	4.0	41.0	3.7	67.2	16.8	80.9	88.4
4	19.8	1.9	89.6	91.0	77.0	3.5	63.2	3.1	58.8	3.8	50.4	54.8
5	22.0	1.8	85.0	83.0	87.8	3.1	34.0	2.8	37.3	2.8	32.0	49.0
6	9.2	1.8	85.8	90.0	73.6	3.1	11.8	2.7	46.0	2.2	30.2	54.4
7	7.1	1.6	88.2	95.0	45.6	3.4	9.8	3.4	80.8	2.0	20.2	60.4
8	10.8	4.5	85.8	95.0	69.6	5.8	31.8	3.4	45.8	2.0	16.0	59.6
9	7.7	6.7	87.4	94.0	38.2	5.3	84.0	17.0	23.2	3.8	96.0	56.4
10	5.9	3.5	88.2	93.8	27.2	52.0	44.4	7.5	15.0	5.3	96.8	50.8
11	3.9	9.1	93.0	92.6	20.2	71.8	53.0	55.6	7.7	2.0	85.2	50.0
12	3.0	7.7	94.0	93.8	14.6	35.0	17.8	32.6	4.5	15.2	57.8	85.4
13	2.4	66.4	94.4	93.5	9.7	42.8	49.8	21.0	4.0	13.4	44.0	63.6
14	2.0	33.8	92.6	93.8	8.2	21.0	24.6	46.4	3.7	81.0	40.4	46.4
15	2.0	12.6	88.2	94.4	5.8	31.0	20.6	80.0	3.4	52.4	24.6	51.2

*Daily discharge, in second-feet, of Center ditch near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	2.0	4.1	74.4	94.4	4.9	33.4	9.1	49.2	3.4	19.4	96.0	66.2
17.....	2.0	3.4	67.2	93.8	4.5	10.0	5.1	24.0	3.4	6.5	96.0	33.8
18.....	2.0	2.9	61.0	93.2	4.3	5.4	4.7	8.4	3.4	3.0	96.0	80.5
19.....	2.0	43.8	58.0	91.0	5.4	14.2	4.3	18.2	3.4	2.7	88.8	88.4
20.....	2.0	87.0	84.0	93.0	8.5	11.0	4.0	4.8	3.4	2.4	84.8	89.6
21.....	2.0	88.0	70.4	93.8	6.1	47.2	5.0	4.1	3.3	91.0	71.6	76.0
22.....	2.0	86.0	53.0	92.6	4.1	13.4	4.1	34.2	3.0	95.0	74.8	98.0
23.....	2.0	82.2	43.0	82.0	3.7	5.6	3.7	10.6	2.8	90.1	68.2	62.0
24.....	5.1	66.4	40.0	80.5	6.0	61.6	36.0	4.4	2.7	78.4	54.4	96.5
25.....	3.3	62.2	32.0	92.6	4.3	17.0	9.1	3.8	2.5	54.0	60.2	93.0
26.....	2.5	49.8	76.4	94.0	39.4	11.2	4.5	4.3	2.4	58.2	55.8	96.8
27.....	2.1	93.0	17.4	90.0	84.0	17.0	5.6	4.5	2.4	96.0	43.2	96.5
28.....	2.0	93.8	14.6	72.0	43.6	8.8	5.8	3.7	2.4	93.1	48.0	95.6
29.....	2.0	90.5	14.6	54.0	48.0	4.7	14.0	23.0	3.3	58.2	25.8	90.4
30.....	2.0	.....	83.0	53.6	17.2	4.1	4.7	7.7	68.2	80.1	26.0	87.2
31.....	3.5	.....	96.0	.....	9.7	.....	3.5	15.2	.....	96.0	.....	71.6

NOTE.—Discharge computed from mean of two gage readings each day.

*Monthly discharge of Center ditch near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	41.6	2.0	7.69	473	B.
February.....	93.8	1.6	34.90	2,010	A.
March.....	96.0	14.6	72.20	4,440	A.
April.....	95.0	53.6	88.70	5,280	A.
May.....	87.8	3.7	29.30	1,800	B.
June.....	71.8	3.1	18.50	1,100	B.
July.....	84.0	3.5	20.80	1,280	B.
August.....	80.0	2.7	16.30	1,000	B.
September.....	89.8	2.4	20.20	1,200	B.
October.....	96.0	2.0	38.30	2,360	B.
November.....	96.8	16.0	59.80	3,560	A.
December.....	98.0	38.8	73.10	4,490	A.
The year.....	98.0	1.6	67.30	29,000	

#### HAMAKUA DITCH REGION.

##### NAILILIHAELE STREAM NEAR HUELO, MAUI.

**Location.**—About 2 miles by trail above Huelo post office, 1 mile above Lowrie ditch intake, and 50 feet above trail ford.

**Records available.**—July 24 to December 31, 1912. From December 9, 1910, to December 31, 1911, a station was maintained above the New Hamakua ditch intake.

**Gage.**—Vertical staff; read twice daily, at 5.30 a. m. and 5.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made by wading.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Naililihale Stream near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 24	J. B. Stewart.....	Feet. 0.75	Sec.-ft. 1.00
Nov. 11	.....do.....	1.60	44.3



*Daily gage height, in feet, of Naililihaele Stream near Huelo, Maui, for 1912.*

[Eurukawa, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.45	0.50	0.45	1.45	1.45	16.....		1.42	0.45	0.50	1.54	0.90
2.....		.44	1.80	.85	1.15	2.20	17.....		.82	.45	.40	2.30	1.45
3.....		.52	1.30	.45	1.85	3.40	18.....		.70	.45	.40	2.40	1.25
4.....		.48	1.20	.40	.90	1.65	19.....		.60	.42	.40	1.70	2.00
5.....		.42	1.15	.40	.80	1.55	20.....		.52	.40	.40	1.65	1.50
6.....		.40	.80	.40	.50	1.45	21.....		.45	.40	1.80	1.40	2.15
7.....		.48	1.60	.40	.65	1.55	22.....		.40	.40	2.10	1.45	2.55
8.....		.52	.85	.40	.50	1.40	23.....		.62	.40	1.70	1.40	2.25
9.....		.92	.68	.40	3.35	1.15	24.....		.52	.40	1.55	1.15	1.70
10.....		1.30	.52	.40	1.75	.80	25.....	1.05	.42	.40	1.15	1.20	1.30
11.....		1.30	.50	.50	1.65	.65	26.....	.92	.45	.40	1.35	1.20	1.80
12.....		1.32	.45	.40	1.15	.50	27.....	.82	.45	.40	2.80	.85	1.50
13.....		1.88	.45	.40	.95	.45	28.....	.72	.45	.40	2.80	.70	1.60
14.....		1.38	.45	1.50	.80	.65	29.....	.88	.78	.40	1.45	.60	1.35
15.....		2.02	.45	1.25	.60	.45	30.....	.45	.58	.75	1.60	.70	1.25
							31.....	.45	.65		2.25		1.10

#### KAILUA STREAM NEAR HUELO, MAUI.

**Location.**—At wagon bridge about 1,000 feet east of Huelo post office.

**Records available.**—July 25 to December 31, 1912. From December 8, 1910, to December 31, 1911, a station was maintained above the New Hamakua ditch intake.

**Gage.**—Vertical staff; read once daily, at irregular hours; datum unchanged.

**Channel.**—One channel at all stages; probably permanent.

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

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Kailua Stream near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 25	J. B. Stewart	Feet.	Sec.-ft.
Sept. 24	do	0.38	0.30
		.25	.10

*Daily gage height, in feet, of Kailua Stream near Huelo, Maui, for 1912.*

[John Pachero, observer.]

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		0.33	.....	0.82	2.40	1.70	16.....		0.76	0.29	0.62	3.50	1.70
2.....		.33	3.00	.62	2.20	3.50	17.....		.54	.23	.53	3.40	.82
3.....		.34	1.80	.62	2.20	4.50	18.....		.40	.23	.52	3.90	1.80
4.....		.30	2.60	.43	2.20	2.60	19.....		.42	.22	.52	2.70	2.70
5.....		.30	.60	.43	.....	2.30	20.....		.33	.31	.42	2.50	2.70
6.....		.27	.53	.42	.82	2.20	21.....		.31	.30	2.50	2.40	1.90
7.....		.30	2.60	.32	.82	2.30	22.....		.42	.....	2.30	2.30	3.30
8.....		.28	.....	.34	.72	2.20	23.....		.40	.23	2.62	2.50	4.30
9.....		.36	.52	.34	5.50	1.90	24.....		.38	.23	2.30	2.10	2.33
10.....		.36	.42	.33	3.30	1.80	25.....	0.38		.21	2.22	1.50	.....
11.....		.40	.36	.44	2.60	1.00	26.....		.32	.22	2.60	1.48	3.00
12.....		.55	.34	.62	2.10	.82	27.....	.36	.32	.21	4.10	1.70	2.13
13.....		.42	.31	2.12	2.00	.80	28.....	.36	.23	.23	4.60	1.00	2.00
14.....		.41	.30	1.42	.80	.80	29.....	.36	.30	.23	2.22	.92	2.20
15.....		2.95	.30	.42	.78	.72	30.....	.35	.30	1.10	2.60	.82	2.20
							31.....	.33	.31		2.40	.....	2.00

**HOOLAWALILII STREAM NEAR HUELO, MAUI.**

**Location.**—About 3 miles by trail southwest of Huelo post office, 1 mile east of Lupi, 200 feet above inflow of Old Hamakua ditch and 400 feet above New Hamakua ditch crossing.

**Records available.**—April 5, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 6.30 a. m. and 4 p. m.; datum unchanged.

**Channel.**—Rocky.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Very good.

*Discharge measurements of Hoolawalilii Stream near Huelo, Maui, in 1912.*

[J. B. Stewart, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 13.....	0.12	3.09	Sept. 20.....	0.12	2.32
Mar. 12.....	.39	10.0	Nov. 12.....	.28	10.9
July 25.....	.13	3.03			

*Daily gage height, in feet, of Hoolawalilii Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.16	0.09	0.26	0.20	0.20	0.13	0.12	0.12	0.13	0.12	0.24	0.22
2.....	.16	.09	.30	.20	.21	.13	.12	.12	.20	.13	.22	.42
3.....	.15	.09	.32	.26	.18	.12	.14	.12	.19	.12	.35	.74
4.....	.14	.09	.27	.78	.19	.12	.14	.11	.20	.12	.22	.35
5.....	.13	.09	.25	.61	.18	.11	.14	.11	.14	.10	.20	.25
6.....	.12	.09	.24	.46	.21	.11	.14	.11	.14	.10	.18	.24
7.....	.12	.08	.25	.52	.19	.11	.14	.12	.16	.09	.16	.24
8.....	.13	.08	.22	.52	.20	.12	.14	.11	.15	.08	.14	.22
9.....	.12	.12	.28	.52	.18	.11	.21	.13	.14	.08	.52	.21
10.....	.12	.10	.26	.42	.16	.18	.14	.12	.14	.08	.34	.20
11.....	.12	.10	.42	.38	.15	.16	.18	.17	.12	.08	.28	.18
12.....	.12	.10	.38	.36	.14	.13	.14	.12	.12	.08	.24	.17
13.....	.11	.19	.42	.32	.14	.15	.15	.12	.12	.08	.22	.16
14.....	.11	.14	.33	.34	.14	.13	.15	.14	.12	.12	.20	.16
15.....	.11	.12	.29	.34	.12	.13	.14	.27	.13	.16	.18	.16
16.....	.11	.12	.25	.32	.12	.13	.14	.16	.13	.10	.38	.16
17.....	.11	.12	.26	.30	.12	.13	.14	.14	.14	.08	.39	.16
18.....	.11	.12	.36	.25	.12	.13	.13	.13	.12	.08	.42	.18
19.....	.10	.17	.28	.24	.12	.12	.13	.13	.12	.08	.36	.28
20.....	.10	.21	.26	.32	.14	.13	.13	.12	.12	.08	.36	.20
21.....	.10	.30	.24	.24	.12	.13	.13	.12	.12	.16	.28	.32
22.....	.09	.32	.22	.22	.11	.12	.13	.16	.12	.20	.26	.32
23.....	.09	.24	.20	.24	.11	.12	.13	.12	.12	.20	.26	.34
24.....	.12	.22	.20	.22	.12	.22	.14	.12	.12	.18	.24	.33
25.....	.10	.24	.19	.25	.11	.14	.14	.12	.12	.15	.24	.30
26.....	.10	.20	.20	.26	.13	.14	.14	.12	.11	.20	.22	.28
27.....	.09	.34	.18	.24	.18	.13	.13	.12	.11	.34	.20	.26
28.....	.09	.39	.16	.24	.16	.13	.14	.13	.11	.39	.20	.26
29.....	.09	.27	.15	.22	.18	.13	.13	.12	.12	.24	.18	.24
30.....	.09	.....	.18	.20	.13	.12	.13	.13	.15	.26	.18	.24
31.....	.09	.....	.16	.....	.14	.....	.12	.12	.....	.27	.....	.22

*Daily discharge, in second-feet, of Hoolawalilii Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.6	2.2	9.0	6.0	6.0	3.6	3.2	3.2	3.6	3.2	8.0	7.0
2.....	4.6	2.2	11.0	6.0	6.5	3.6	3.2	3.2	6.0	3.6	7.0	17.6
3.....	4.2	2.2	12.1	9.0	5.3	3.2	3.9	3.2	5.6	3.2	13.8	36.4
4.....	3.9	2.2	9.5	38.8	5.6	3.2	3.9	2.8	6.0	3.2	7.0	13.8
5.....	3.6	2.2	8.5	28.6	5.3	2.8	3.9	2.8	3.9	2.5	6.0	8.5
6.....	3.2	2.2	8.0	19.8	6.5	2.8	3.9	2.8	3.9	2.5	5.3	8.0
7.....	3.2	2.0	8.5	23.2	5.6	2.8	3.9	3.2	4.6	2.2	4.6	8.0
8.....	3.6	2.0	7.0	23.2	6.0	3.2	3.9	2.8	4.2	2.0	3.9	7.0
9.....	3.2	3.2	10.0	23.2	5.3	2.8	6.5	3.6	3.9	2.0	23.2	6.5
10.....	3.2	2.5	9.0	17.6	4.6	5.3	3.9	3.2	3.9	2.0	13.2	6.0
11.....	3.2	2.5	17.6	15.4	4.2	4.6	5.3	5.0	3.2	2.0	10.0	5.3
12.....	3.2	2.5	15.4	14.3	3.9	3.6	3.9	3.2	3.2	2.0	8.0	5.0
13.....	2.8	5.6	17.6	12.1	3.9	4.2	4.2	3.2	3.2	2.0	7.0	4.6
14.....	2.8	3.9	12.6	13.2	3.9	3.6	4.2	3.9	3.2	3.2	6.0	4.6
15.....	2.8	3.2	10.5	13.2	3.2	3.6	3.9	9.5	3.6	4.6	5.3	4.6
16.....	2.8	3.2	8.5	12.1	3.2	3.6	3.9	4.6	3.6	2.5	15.4	4.6
17.....	2.8	3.2	9.0	11.0	3.2	3.6	3.9	3.9	3.9	2.0	16.0	4.6
18.....	2.8	3.2	14.3	8.5	3.2	3.6	3.6	3.6	3.2	2.0	17.6	5.3
19.....	2.5	5.0	10.0	8.0	3.2	3.2	3.6	3.6	3.2	2.0	14.3	10.0
20.....	2.5	6.5	9.0	12.1	3.9	3.6	3.6	3.2	3.2	2.0	14.3	6.0
21.....	2.5	11.0	8.0	8.0	3.2	3.6	3.6	3.2	3.2	4.6	10.0	12.1
22.....	2.2	12.1	7.0	7.0	2.8	3.2	3.6	4.6	3.2	6.0	9.0	12.1
23.....	2.2	8.0	6.0	8.0	2.8	3.2	3.6	3.2	3.2	6.0	9.0	13.2
24.....	3.2	7.0	6.0	7.0	3.2	7.0	3.9	3.2	3.2	5.3	8.0	12.6
25.....	2.5	8.0	5.6	8.5	2.8	3.9	3.9	3.2	3.2	4.2	8.0	11.0
26.....	2.5	6.0	6.0	9.0	3.6	3.9	3.9	3.2	2.8	6.0	7.0	10.0
27.....	2.2	13.2	5.3	8.0	5.3	3.6	3.6	3.2	2.8	13.2	6.0	9.0
28.....	2.2	16.0	4.6	8.0	4.6	3.6	3.9	3.6	2.8	16.0	6.0	9.0
29.....	2.2	9.5	4.2	7.0	5.3	3.6	3.6	3.2	3.2	8.0	5.3	8.0
30.....	2.2	.....	5.3	6.0	3.6	3.2	3.6	3.6	4.2	9.0	5.3	8.0
31.....	2.2	.....	4.6	.....	3.9	.....	3.2	3.2	.....	9.5	.....	7.0

*Monthly discharge of Hoolawalilii Stream near Huelo, Maui, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	4.6	2.2	2.96	182.0	B.
February.....	16.0	2.0	5.26	303.0	B.
March.....	17.6	4.2	9.02	555.0	B.
April.....	38.8	6.0	13.1	780.0	B.
May.....	6.5	2.8	4.31	265.0	B.
June.....	7.0	2.8	3.64	217.0	B.
July.....	6.5	3.2	3.89	239.0	B.
August.....	9.5	2.8	3.61	222.0	B.
September.....	6.0	2.8	3.70	220.0	B.
October.....	16.0	2.0	4.47	275.0	B.
November.....	23.2	3.9	9.32	555.0	B.
December.....	36.4	4.6	9.21	566.0	B.
The year.....	38.8	2.0	6.03	4,380.0	

#### HOOLAWANUI STREAM NEAR HUELO, MAUI.

**Location.**—About  $3\frac{3}{4}$  miles by trail southwest from Huelo post office, one-fourth mile east of Lupi, and 250 feet above crossing of New Hamakua ditch.

**Records available.**—December 12, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 6.30 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Very good.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of Hoolawanui Stream near Huelo, Maui, in 1912.*

[J. B. Stewart, hydrographer.]

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 13.	.....	0.11	3.21	Sept. 20.	.....	0.08	2.47
Mar. 12.	.....	.50	27.0	Nov. 12.	.....	.33	19.1
July 25.	.....	.08	3.42				

*Daily gage height, in feet, of Hoolawanui Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.18	0.06	0.34	0.36	0.22	0.12	0.11	0.08	0.07	0.06	0.31	0.21
2.....	.18	.05	.36	.29	.23	.12	.11	.07	.20	.09	.26	.48
3.....	.16	.05	.45	.39	.20	.11	.14	.07	.15	.06	.39	1.28
4.....	.15	.05	.36	.98	.26	.10	.22	.06	.15	.04	.24	.48
5.....	.14	.05	.33	.84	.20	.10	.16	.06	.12	.04	.20	.36
6.....	.14	.05	.30	.52	.24	.10	.13	.06	.12	.04	.20	.34
7.....	.14	.04	.32	.76	.20	.10	.13	.06	.14	.04	.18	.28
8.....	.14	.06	.29	.82	.23	.10	.14	.06	.12	.04	.16	.24
9.....	.12	.12	.32	.73	.20	.10	.26	.12	.10	.04	.96	.22
10.....	.12	.10	.30	.57	.18	.18	.14	.08	.08	.04	.53	.20
11.....	.10	.08	.56	.60	.17	.17	.18	.14	.09	.05	.38	.20
12.....	.10	.06	.49	.46	.16	.13	.14	.08	.08	.04	.29	.18
13.....	.10	.18	.56	.39	.16	.15	.14	.08	.08	.04	.24	.18
14.....	.10	.12	.38	.46	.15	.13	.14	.11	.08	.15	.22	.18
15.....	.09	.08	.33	.44	.14	.12	.13	.24	.07	.12	.56	.17
16.....	.09	.08	.30	.38	.13	.12	.13	.14	.07	.06	.50	.18
17.....	.08	.07	.34	.37	.13	.12	.12	.09	.08	.04	.50	.23
18.....	.08	.06	.45	.33	.13	.12	.12	.08	.06	.04	.62	.30
19.....	.08	.16	.33	.31	.13	.12	.11	.08	.06	.04	.48	.33
20.....	.08	.32	.30	.36	.15	.12	.11	.08	.06	.04	.39	.22
21.....	.08	.40	.28	.30	.14	.12	.12	.06	.05	.22	.33	.45
22.....	.07	.56	.24	.26	.12	.12	.11	1.20	.05	.30	.31	.56
23.....	.07	.27	.22	.32	.11	.11	.11	.07	.05	.24	.30	.54
24.....	.12	.24	.22	.26	.12	.23	.14	.06	.05	.21	.26	.40
25.....	.07	.25	.22	.29	.11	.14	.12	.06	.05	.16	.26	.42
26.....	.07	.19	.23	.32	.15	.12	.12	.06	.04	.22	.24	.38
27.....	.07	.29	.20	.34	.20	.12	.11	.06	.04	.38	.22	.37
28.....	.07	.54	.18	.30	.18	.12	.12	.05	.04	.45	.20	.34
29.....	.06	.37	.17	.27	.17	.12	.11	.07	.06	.26	.18	.32
30.....	.06	.....	.27	.24	.13	.11	.10	.06	.12	.32	.18	.27
31.....	.06	.....	.36	.....	.13	.....	.10	.06	.....	.47	.....	.24

*Daily discharge, in second-feet, of Hoolawanui Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	8.0	2.4	17.8	19.2	10.2	5.0	4.5	3.2	2.8	2.4	15.7	9.6
2.....	8.0	2.0	19.2	14.4	10.8	5.0	4.5	2.8	9.0	3.6	12.6	27.6
3.....	7.0	2.0	25.5	21.3	9.0	4.5	6.0	2.8	6.5	2.4	21.3	100.0
4.....	6.5	2.0	19.2	70.2	12.6	4.0	10.2	2.4	6.5	1.6	11.4	27.6
5.....	6.0	2.0	17.1	57.6	9.0	4.0	7.0	2.4	5.0	1.6	9.0	19.2
6.....	6.0	2.0	15.0	30.6	11.4	4.0	5.5	2.4	5.0	1.6	9.0	17.8
7.....	6.0	1.6	16.4	50.4	9.0	4.0	5.5	2.4	6.0	1.6	8.0	13.8
8.....	6.0	2.4	14.4	55.8	10.8	4.0	6.0	2.4	5.0	1.6	7.0	11.4
9.....	5.0	5.0	16.4	47.7	9.0	4.0	12.6	5.0	4.0	1.6	68.4	10.2
10.....	5.0	4.0	15.0	34.6	8.0	8.0	6.0	3.2	3.2	1.6	31.4	9.0
11.....	4.0	3.2	33.8	37.0	7.5	7.5	8.0	6.0	3.6	2.0	20.6	9.0
12.....	4.0	2.4	28.3	26.2	7.0	5.5	6.0	3.2	3.2	1.6	14.4	8.0
13.....	4.0	8.0	33.8	21.3	7.0	6.5	6.0	3.2	3.2	1.6	11.4	8.0
14.....	4.0	5.0	20.6	26.2	6.5	5.5	6.0	4.5	3.2	6.5	10.2	8.0
15.....	3.6	3.2	17.1	24.8	6.0	5.0	5.5	11.4	2.8	5.0	33.8	7.5

Daily discharge, in second-feet, of Hoolawanui Stream near Huelo, Maui, for 1912—Contd.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	3.6	3.2	15.0	20.6	5.5	5.0	5.5	6.0	2.8	2.4	29.0	8.0
17.....	3.2	2.8	17.8	19.9	5.5	5.0	5.0	3.6	3.2	1.6	29.0	10.8
18.....	3.2	2.4	25.5	17.1	5.5	5.0	5.0	3.2	2.4	1.6	38.6	15.0
19.....	3.2	7.0	17.1	15.7	5.5	5.0	4.5	3.2	2.4	1.6	27.6	17.1
20.....	3.2	16.4	15.0	19.2	6.5	5.0	4.5	3.2	2.4	1.6	21.3	10.2
21.....	3.2	22.0	13.8	15.0	6.0	5.0	5.0	2.4	2.0	10.2	17.1	25.5
22.....	2.8	33.8	11.4	12.6	5.0	5.0	4.5	92.0	2.0	15.0	15.7	33.8
23.....	2.8	13.2	10.2	16.4	4.5	4.5	4.5	2.8	2.0	11.4	15.0	32.2
24.....	5.0	11.4	10.2	12.6	5.0	10.8	6.0	2.4	2.0	9.6	12.6	22.0
25.....	2.8	12.0	10.2	14.4	4.5	6.0	5.0	2.4	2.0	7.0	12.6	23.4
26.....	2.8	8.5	10.8	16.4	6.5	5.0	5.0	2.4	1.6	10.2	11.4	20.6
27.....	2.8	14.4	9.0	17.8	9.0	5.0	4.5	2.4	1.6	20.6	10.2	19.9
28.....	2.8	32.2	8.0	15.0	8.0	5.0	5.0	2.0	1.6	25.5	9.0	17.8
29.....	2.4	19.9	7.5	13.2	7.5	5.0	4.5	2.8	2.4	12.6	8.0	16.4
30.....	2.4	.....	13.2	11.4	5.5	4.5	4.0	2.4	5.0	16.4	8.0	13.2
31.....	2.4	.....	19.2	.....	5.5	.....	4.0	2.4	.....	28.9	.....	11.4

Monthly discharge of Hoolawanui Stream near Huelo, Maui, for 1912.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
January.....	8.0	2.4	4.25	261	B.
February.....	33.8	1.6	8.50	489	B.
March.....	33.8	7.5	16.90	1,040	B.
April.....	70.2	11.4	25.80	1,540	B.
May.....	12.6	4.5	7.40	455	B.
June.....	10.8	4.0	5.24	312	B.
July.....	12.6	4.0	5.67	349	B.
August.....	92.0	2.0	6.22	382	B.
September.....	9.0	1.6	3.48	207	B.
October.....	26.9	1.6	6.79	418	B.
November.....	68.4	7.0	18.30	1,090	B.
December.....	100.0	7.5	18.80	1,160	B.
The year.....	100.0	1.6	10.60	7,700	

#### HONOPOU STREAM NEAR HUELO, MAUI.

**Location.**—About 4 miles southwest of Huelo post office and three-fourths of a mile northwest of Lupi.

**Records available.**—December 12, 1910, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, about 7 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made by wading.

**Accuracy.**—Discharge rating not yet available.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

Discharge measurements of Honopou Stream near Huelo, Maui, in 1912.

[J. B. Stewart, hydrographer.]

Date.	Gage height.	Dis- charge.	Date.	Gage height.	Dis- charge.
Jan. 13.....	<i>Feet.</i> 0.11	<i>Sec.-ft.</i> 1.55	July 26.....	<i>Feet.</i> 0.10	<i>Sec.-ft.</i> 1.65
Mar. 12.....	.48	10.4	Sept. 20.....	.07	1.41

*Daily gage height, in feet, of Honopou Stream near Huelo, Maui, for 1912.*

[Miyabara, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.20	0.06	0.36	0.28	0.24	0.12	0.10	0.08	0.07	0.07	0.29	0.24
2.....	.20	.06	.41	.25	.24	.11	.10	.07	.17	.10	.24	.53
3.....	.18	.06	.40	.34	.23	.10	.13	.07	.11	.06	.37	.96
4.....	.18	.06	.35	1.13	.28	.10	.17	.06	.17	.04	.24	.55
5.....	.16	.06	.33	.83	.22	.10	.12	.06	.10	.04	.20	.39
6.....	.16	.05	.32	.56	.22	.10	.11	.06	.10	.04	.20	.36
7.....	.16	.05	.32	.72	.20	.09	.12	.06	.14	.04	.18	.37
8.....	.15	.06	.28	.78	.22	.09	.11	.06	.11	.04	.16	.34
9.....	.14	.12	.33	.72	.20	.09	.26	.06	.10	.04	.78	.26
10.....	.14	.08	.30	.58	.18	.14	.12	.09	.08	.04	.42	.28
11.....	.12	.08	.52	.52	.17	.12	.16	.14	.08	.04	.36	.26
12.....	.12	.08	.44	.50	.16	.12	.12	.08	.07	.04	.28	.24
13.....	.12	.20	.52	.44	.16	.12	.12	.08	.07	.04	.26	.22
14.....	.12	.13	.42	.50	.15	.11	.11	.10	.06	1.54	.24	.22
15.....	.11	.09	.38	.51	.14	.12	.11	.22	.06	.08	.22	.21
16.....	.11	.08	.32	.44	.13	.12	.11	.12	.06	.06	.40	.21
17.....	.10	.07	.33	.40	.13	.10	.10	.08	.06	.04	.45	.24
18.....	.10	.06	.50	.38	.13	.10	.10	.07	.06	.04	.53	.24
19.....	.09	.18	.34	.36	.13	.10	.10	.06	.05	.04	.47	.38
20.....	.08	.22	.34	.41	.14	.10	.10	.06	.06	.04	.39	.28
21.....	.08	.32	.30	.34	.13	.10	.10	.06	.05	.18	.33	.59
22.....	.08	.38	.28	.30	.12	.10	.09	.12	.05	.21	.32	.66
23.....	.08	.27	.26	.34	.11	.09	.09	.06	.05	.20	.30	.66
24.....	.13	.24	.24	.31	.12	.18	.12	.06	.05	.16	.28	.48
25.....	.10	.23	.22	.30	.10	.12	.12	.06	.04	.14	.30	.43
26.....	.10	.24	.22	.34	.16	.11	.10	.05	.04	.15	.28	.40
27.....	.09	.45	.21	.31	.21	.11	.09	.05	.04	.48	.28	.36
28.....	.08	.47	.20	.28	.18	.11	.11	.05	.04	.52	.24	.38
29.....	.08	.34	.20	.28	.18	.10	.10	.06	.06	.24	.21	.36
30.....	.07	.....	.22	.26	.13	.10	.08	.06	.10	.28	.20	.32
31.....	.07	.....	.....	.....	.14	.....	.08	.06	.....	.41	.....	.28

#### HALEHAKU STREAM WEIR NEAR HUELO, MAUI.

**Location.**—About 7 miles west of Huelo post office and  $3\frac{1}{2}$  miles west of Lupi at New Hamakua ditch crossing.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Head on weir measured by graduated scale to reference point back of diversion dam.

**Discharge measurements.**—By 6-foot Cippoletti weir.

**Cooperation.**—Weir is the property of the East Maui Ditch Co.; discharges copied from records of the Maui Agricultural Co.

*Daily discharge, in million gallons, of Halehaku Stream weir near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	3.33	0.70	9.20	9.90	5.13	1.40	1.30	0.67	0.70	0.60	7.00	4.80
2.....	3.07	.80	11.00	7.50	4.76	1.30	1.20	.53	2.47	1.07	5.64	9.67
3.....	2.90	.97	12.00	9.57	4.57	1.20	1.53	.70	2.10	.60	5.30	12.50
4.....	2.73	.70	10.00	12.80	5.23	1.20	2.90	.43	2.13	.42	3.93	10.50
5.....	2.37	.65	8.73	12.90	4.86	1.20	2.00	.53	1.67	.30	3.43	8.03
6.....	2.33	.60	7.83	12.90	5.23	1.20	1.45	.53	1.23	.30	3.00	7.30
7.....	2.37	.60	8.33	12.90	3.96	1.10	1.30	.56	2.40	.30	2.80	7.97
8.....	2.20	1.87	8.27	12.90	4.23	1.20	1.93	.41	1.37	.30	3.40	5.57
9.....	2.10	1.50	9.60	12.90	3.56	1.10	3.73	.96	1.00	.35	12.20	4.80
10.....	1.90	.80	7.63	12.90	3.35	2.77	2.10	.80	.85	.30	12.20	4.30
11.....	1.83	1.15	9.87	12.90	3.10	2.17	1.90	1.13	.80	.35	10.20	3.90
12.....	1.66	.97	12.90	12.90	2.95	2.13	1.55	.74	.73	.30	6.93	3.60
13.....	1.60	2.40	12.80	12.90	2.73	1.52	1.65	.70	.70	.57	5.53	3.40
14.....	1.60	1.63	10.80	12.90	2.50	1.23	1.50	.86	.60	3.17	4.73	3.80
15.....	1.50	.80	9.00	12.00	2.40	1.70	1.40	2.13	.60	1.37	4.80	2.93

*Daily discharge, in million gallons, of Halehaku Stream weir near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	1.40	0.70	7.83	11.00	2.30	1.17	1.40	1.00	0.58	0.80	10.50	3.60
17.....	1.30	.70	7.77	10.80	2.20	1.22	1.30	.63	.50	.50	12.90	4.70
18.....	1.17	1.03	9.80	9.83	2.20	1.45	1.10	.60	.45	.30	12.90	4.27
19.....	1.15	4.70	8.40	8.80	2.36	1.33	1.00	.58	.40	.30	12.90	4.97
20.....	1.10	6.43	7.33	7.87	2.60	1.92	1.00	.50	.45	.63	11.50	3.70
21.....	1.07	8.70	6.35	7.00	2.00	1.30	1.15	.60	.55	3.07	8.90	8.23
22.....	1.00	12.10	5.60	6.33	1.80	1.40	.97	.95	.40	7.40	7.62	12.60
23.....	1.07	5.63	5.10	6.53	1.67	2.43	1.07	.50	.40	4.40	6.77	12.40
24.....	2.23	3.77	4.70	6.07	1.58	1.50	2.33	.40	.30	3.43	5.93	9.50
25.....	1.10	3.23	5.13	6.97	1.90	1.20	1.40	.40	.30	2.40	5.17	7.60
26.....	1.00	3.50	5.10	6.75	1.63	1.20	1.10	.50	.35	2.77	5.00	9.07
27.....	.95	12.20	4.43	6.50	2.23	1.20	1.00	.50	.40	7.47	4.50	7.20
28.....	.85	12.80	3.90	6.10	3.43	1.10	1.05	.43	.40	6.97	4.10	7.43
29.....	.75	9.97	3.55	5.65	2.30	1.10	1.20	.95	.73	4.40	3.80	5.67
30.....	.70	.....	4.93	5.57	2.13	1.00	.75	.50	2.23	5.13	4.07	5.67
31.....	.70	.....	8.33	.....	1.70	.....	.70	.53	.....	11.90	.....	5.07

NOTE.—Discharge based on two readings daily. A gage was maintained on crest of wasteway at this station to show the amount of water in the stream which was not diverted into the ditch at the weir. No discharge over the wasteway except as noted in the following table, showing gage height in feet. The zero of the gage is at the same elevation as the crest of the wasteway.

Feb. 21.....	0.15	Apr. 4.....	0.54	Apr. 15.....	0.10
Feb. 22.....	.10	Apr. 5.....	.48	Oct. 31.....	.25
Feb. 27.....	.32	Apr. 6.....	.25	Nov. 9.....	.20
Feb. 28.....	.26	Apr. 7.....	.26	Nov. 10.....	.20
Mar. 3.....	.06	Apr. 8.....	.34	Nov. 16.....	.10
Mar. 11.....	.18	Apr. 9.....	.28	Nov. 18.....	.25
Mar. 12.....	.19	Apr. 10.....	.25	Nov. 19.....	.20
Mar. 13.....	.12	Apr. 11.....	.16	Nov. 20.....	.10
Mar. 14.....	.04	Apr. 12.....	.11	Dec. 3.....	.40
Mar. 18.....	.08	Apr. 13.....	.09	Dec. 22.....	.15
Mar. 29.....	.02	Apr. 14.....	.21		

*Monthly discharge of Halehaku Stream weir near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	3.33	0.70	1.65	51.0
February.....	12.80	.60	3.50	102.0
March.....	12.90	3.55	7.94	246.0
April.....	12.90	5.57	9.75	293.0
May.....	5.23	1.53	2.99	92.6
June.....	2.77	1.00	1.43	42.9
July.....	3.73	.70	1.48	46.0
August.....	2.13	.40	.69	21.2
September.....	2.47	.30	.93	27.8
October.....	11.90	.30	2.33	72.2
November.....	12.90	2.80	6.92	208.0
December.....	12.60	2.93	6.60	205.0
The year.....	12.90	.30	3.84	1,410.0

## OPANA STREAM NEAR HUELO, MAUI.

**Location.**—About 8 miles west of Huelo,  $4\frac{1}{2}$  miles west of Lupi, and one-half mile from intake of Opana ditch.

**Records available.**—December 13, 1910, to December 31, 1912.

**Gage.**—Inclined staff; read twice daily, about 7 a. m. and 4.30 p. m.; datum unchanged.

**Channel.**—Probably permanent.

**Discharge measurements.**—Made by wading and from bridge.

The following discharge measurement was made by J. B. Stewart:

January 12, 1912: Gage height, 1.40 feet; discharge, 0.75 second-foot.

*Daily gage height, in feet, of Opana Stream near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.48	1.35	1.60	1.98	1.52	1.45	1.33	1.22	0.85	0.01	1.80	1.60
2.....	1.48	1.35	1.99	1.56	1.52	1.41	1.32	1.19	.95	.01	1.55	1.75
3.....	1.48	1.34	2.14	1.56	1.52	1.41	1.33	1.20	1.41	.00	1.50	2.75
4.....	1.48	1.34	1.60	3.04	1.51	1.41	1.40	1.19	1.42	.00	1.50	1.90
5.....	1.47	1.34	1.59	3.42	1.50	1.41	1.40	1.13	1.42	.00	1.45	1.60
6.....	1.48	1.34	1.62	1.92	1.50	1.40	1.40	1.12	1.32	.00	1.40	1.60
7.....	1.48	1.34	1.60	2.28	1.50	1.40	1.36	1.12	1.40	.00	1.40	1.60
8.....	1.47	1.41	1.62	2.71	1.50	1.40	1.34	1.10	1.48	.00	1.40	1.55
9.....	1.47	1.42	1.60	2.32	1.50	1.40	1.45	1.12	1.38	.00	4.30	1.50
10.....	1.27	1.39	1.60	2.08	1.50	1.44	1.39	1.12	1.28	.....	2.30	1.65
11.....	1.46	1.38	1.74	1.58	1.49	1.44	1.36	1.14	1.21	.....	1.70	1.50
12.....	1.45	1.38	2.10	1.56	1.48	1.40	1.34	1.10	1.17	.....	1.55	1.50
13.....	1.42	1.42	1.60	1.56	1.47	1.42	1.31	1.10	1.14	.....	1.50	1.50
14.....	1.42	1.40	1.60	1.82	1.46	1.40	1.30	1.10	1.08	1.80	1.50	1.50
15.....	1.38	1.37	1.58	1.57	1.45	1.40	1.30	1.18	1.04	1.55	1.50	1.50
16.....	1.39	1.36	1.54	1.57	1.45	1.37	1.26	1.31	1.02	1.35	2.10	1.65
17.....	1.38	1.35	1.54	1.56	1.45	1.36	1.26	1.29	.99	1.25	2.80	1.65
18.....	1.38	1.34	1.60	1.56	1.45	1.36	1.24	1.22	.98	1.10	2.20	1.65
19.....	1.38	1.48	1.56	1.55	1.45	1.34	1.23	1.16	.94	1.00	2.25	1.65
20.....	1.37	1.52	1.56	1.54	1.48	1.38	1.22	1.12	.92	.91	1.70	1.60
21.....	1.37	2.70	1.54	1.53	1.47	1.36	1.21	1.08	.92	.95	1.70	1.75
22.....	1.37	2.21	1.53	1.53	1.42	1.36	1.20	1.13	.82	2.20	1.60	2.20
23.....	1.37	1.58	1.53	1.52	1.41	1.35	1.18	1.05	.70	1.80	1.60	1.75
24.....	1.42	1.50	1.53	1.52	1.44	1.44	1.18	1.02	.59	1.70	1.60	1.66
25.....	1.40	1.44	1.53	1.53	1.42	1.42	1.28	1.01	.46	1.55	1.45	1.60
26.....	1.39	1.39	1.54	1.54	1.45	1.38	1.30	.96	.33	1.50	1.50	1.74
27.....	1.34	2.88	1.53	1.54	1.49	1.35	1.29	.95	.22	1.70	1.50	1.72
28.....	1.36	2.65	1.52	1.52	1.46	1.34	1.30	.92	.05	1.80	1.50	1.56
29.....	1.36	1.81	1.52	1.52	1.47	1.33	1.24	.92	.01	1.65	1.50	1.59
30.....	1.35	.....	1.96	1.52	1.45	1.32	1.24	.90	.14	1.50	1.55	1.53
31.....	1.35	.....	2.53	.....	1.44	.....	1.23	.85	.....	3.75	.....	1.51

## OPANA DITCH NEAR HUELO, MAUI.

**Location.**—About  $8\frac{1}{2}$  miles west of Huelo by trail, 5 miles west of Lupi, and about half a mile below ditch intake.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Head on weir measured by graduated scale on reference point in weir pool.

**Discharge measurements.**—By 6-foot Cippoletti weir.

**Cooperation.**—Records are copies from office of Maui Agricultural Co., but weir is the property of East Maui Ditch Co.

The following discharge measurement was made by J. B. Stewart:

January 12, 1912: Gage height, 1 inch (head on weir); discharge, 0.58 second-foot.



*Daily discharge, in million gallons, of Opana ditch near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.87	0.10	8.77	11.70	1.30	0.10	0.0	(a)	(a)	(a)	5.20	1.27
2.....	.80	.10	12.60	8.63	1.33	.10	.0	(a)	(a)	(a)	.93	5.07
3.....	.90	.10	14.30	10.60	1.16	.10	.15	(a)	(a)	(a)	.17	8.30
4.....	.87	.05	9.30	16.80	1.53	.10	.50	(a)	(a)	(a)	(a)	4.13
5.....	.70	.05	7.05	15.40	1.50	.10	.30	(a)	(a)	(a)	(a)	2.10
6.....	.73	(a)	7.80	12.70	1.12	.10	.15	(a)	(a)	(a)	(a)	1.43
7.....	.60	(a)	8.73	12.60	.90	.10	.10	(a)	(a)	(a)	(a)	1.47
8.....	.43	(a)	8.67	14.00	.89	.10	.20	(a)	(a)	(a)	1.20	.93
9.....	.40	.53	6.37	14.90	.70	.10	1.27	(a)	(a)	(a)	15.40	.67
10.....	.37	.20	6.53	12.60	.60	.63	.20	(a)	(a)	(a)	8.90	.50
11.....	.23	.20	8.23	9.60	.60	.43	.10	(a)	(a)	(a)	5.37	.40
12.....	.20	.17	12.30	7.57	.50	.15	(a)	(a)	(a)	0.05	1.63	.37
13.....	.16	.37	8.90	7.30	.40	.40	(a)	(a)	(a)	4.27	.50	.27
14.....	.10	.40	7.40	11.70	.40	.20	(a)	(a)	(a)	(a)	.30	.40
15.....	.10	.20	6.30	9.33	.40	.10	(a)	(a)	(a)	(a)	.50	.40
16.....	.10	.10	3.57	10.00	.30	.20	(a)	(a)	(a)	(a)	6.20	.93
17.....	.10	.10	3.10	9.23	.20	.10	(a)	(a)	(a)	(a)	9.33	1.40
18.....	.10	(a)	4.90	9.15	.30	.00	(a)	(a)	(a)	(a)	7.50	.90
19.....	.10	1.73	2.13	7.13	.30	.20	(a)	(a)	(a)	(a)	7.50	.93
20.....	.10	4.37	2.00	4.00	.35	.10	(a)	(a)	(a)	(a)	5.93	.63
21.....	.10	14.60	1.50	3.43	.20	.27	(a)	(a)	(a)	.77	5.37	1.30
22.....	.10	12.70	1.35	2.40	.20	.10	(a)	(a)	(a)	9.03	4.43	6.13
23.....	.20	5.07	2.20	2.10	.20	.10	(a)	(a)	(a)	3.03	1.73	6.03
24.....	.80	2.07	2.00	1.70	.30	.70	(a)	(a)	(a)	.03	.90	2.43
25.....	.23	.80	1.10	2.67	.20	.10	(a)	(a)	(a)	(a)	.83	1.77
26.....	.15	1.20	1.40	4.40	.60	(a)	(a)	(a)	(a)	(a)	.60	6.17
27.....	.10	13.90	.90	2.40	1.13	(a)	(a)	(a)	(a)	2.40	.40	6.10
28.....	.10	15.40	.70	1.55	.60	(a)	(a)	(a)	(a)	3.33	.39	3.23
29.....	.10	8.33	.70	1.45	.40	(a)	(a)	(a)	(a)	.70	.33	1.60
30.....	.10	-----	8.70	1.40	.15	(a)	(a)	(a)	(a)	.76	.40	1.07
31.....	.10	-----	13.30	-----	.10	-----	(a)	(a)	(a)	13.20	-----	.93

<sup>a</sup> Channel dry.

*Monthly discharge of Opana ditch near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	0.90	0.10	0.32	10.00
February.....	15.40	.05	3.31	82.80
March.....	14.30	.70	5.90	183.00
April.....	16.80	1.40	7.95	238.00
May.....	1.53	.10	.61	18.90
June.....	.70	.10	.20	4.68
July.....	1.27	.10	.33	2.97
August.....	-----	-----	-----	0.00
September.....	-----	-----	-----	0.00
October.....	13.20	.03	2.96	32.60
November.....	15.40	.17	3.54	91.90
December.....	8.30	.27	2.23	69.30
The period.....	-----	-----	2.95	734.00

**NEW HAMAKUA DITCH AT NAILILIHAELE WEIR, NEAR HUELO, MAUI.**

**Location.**—About 2 miles by trail south of Huelo post office, just before crossing of Naililihale Stream.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—A Friez automatic register.

**Discharge measurements.**—By 17-foot Cippoletti weir.

**Cooperation.**—Weir is property of East Maui Ditch Co. Discharge copied from records of Maui Agricultural Co.

*Daily discharge, in million gallons, of New Hamakua ditch at Naililihale weir, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	32.80	9.12	55.6	56.4	38.0	16.8	14.1	10.50	18.20	16.7	52.8	53.9
2.....	34.80	8.70	56.2	55.6	39.0	15.5	15.2	10.10	45.40	22.2	48.7	60.1
3.....	31.30	8.52	56.0	56.2	39.7	14.8	17.3	10.60	48.60	16.9	54.0	62.2
4.....	36.10	8.23	55.1	58.3	50.8	14.2	22.4	9.66	46.90	12.2	45.4	56.9
5.....	26.00	7.85	54.6	57.7	53.0	13.6	19.7	8.66	34.70	10.7	34.6	56.7
6.....	24.00	7.60	54.6	57.5	48.0	12.6	16.4	8.26	40.20	10.0	30.2	55.0
7.....	22.70	7.43	55.8	57.6	39.8	13.0	15.3	8.50	53.90	10.1	30.4	53.7
8.....	23.60	14.80	54.8	57.4	47.4	16.4	22.1	8.01	38.00	10.6	31.1	47.9
9.....	22.40	26.60	54.6	57.0	37.2	14.7	39.8	11.90	29.70	18.4	56.8	42.7
10.....	20.00	11.10	55.0	57.2	32.9	29.6	24.6	12.30	25.70	15.9	56.0	39.4
11.....	18.60	9.80	56.6	56.8	30.2	36.5	23.8	23.70	23.00	13.8	54.4	35.1
12.....	17.90	9.66	57.0	57.1	28.0	24.4	21.2	20.60	21.20	16.1	48.9	32.4
13.....	17.30	31.90	56.7	56.5	26.2	24.5	24.5	18.90	19.60	20.8	40.6	30.7
14.....	16.70	17.90	55.7	57.1	26.0	20.4	21.3	26.00	16.90	51.4	36.3	31.7
15.....	15.90	12.50	53.7	56.5	23.2	17.9	17.7	43.90	14.90	38.0	36.2	30.5
16.....	15.00	11.10	49.3	56.5	21.7	19.0	16.2	30.70	14.00	25.4	55.9	44.2
17.....	14.40	10.60	50.0	56.4	20.6	16.4	14.9	21.30	12.70	21.2	56.0	35.0
18.....	13.90	9.73	55.1	55.1	20.0	15.0	14.0	18.50	12.20	17.8	56.5	49.1
19.....	13.20	27.40	51.4	54.2	20.4	19.8	12.9	20.20	11.90	16.2	55.9	53.1
20.....	12.40	54.70	52.3	54.7	22.6	17.4	12.0	16.20	11.80	20.2	55.5	45.7
21.....	12.10	55.60	48.3	54.5	21.6	24.8	11.6	15.00	10.90	50.4	54.7	45.8
22.....	11.20	55.20	41.8	54.2	18.0	18.5	12.2	21.90	9.97	55.8	55.0	46.1
23.....	11.10	54.70	38.9	53.2	16.5	16.3	10.4	16.30	9.33	55.4	54.2	46.6
24.....	12.00	48.30	35.9	52.3	18.0	34.0	15.0	14.00	8.80	53.8	49.4	46.2
25.....	11.00	41.90	51.8	54.5	15.8	21.0	13.4	12.50	8.57	43.9	50.9	46.2
26.....	10.10	40.80	56.2	55.2	25.4	17.4	12.4	13.20	8.33	45.1	48.0	46.5
27.....	9.73	56.00	55.6	55.0	40.6	16.4	13.5	14.40	7.90	56.1	43.7	46.3
28.....	9.60	55.80	51.4	50.0	26.4	15.1	14.3	13.20	7.70	56.4	41.2	46.1
29.....	9.17	55.40	34.8	44.4	23.6	13.9	15.9	17.00	11.20	53.4	37.2	45.4
30.....	8.83	.....	50.9	42.0	19.8	13.0	12.7	14.20	33.80	55.0	38.0	45.8
31.....	9.00	.....	56.3	.....	18.1	.....	11.2	17.60	.....	56.4	.....	45.0

*Monthly discharge of New Hamakua ditch at Naililihale weir, near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	36.1	8.83	17.5	543
February.....	56.0	7.43	26.5	769
March.....	57.0	34.80	52.0	1,610
April.....	58.3	42.00	54.9	1,650
May.....	53.0	15.80	29.3	908
June.....	36.5	12.60	18.8	563
July.....	39.8	10.40	17.0	528
August.....	43.9	8.01	16.4	508
September.....	53.9	7.70	18.8	656
October.....	56.4	10.00	31.2	966
November.....	56.8	30.20	47.0	1,410
December.....	62.2	30.50	45.9	1,420
The year.....	62.2	7.43	31.4	11,500

## NEW HAMAKUA DITCH AT HALEHAKU WEIR, NEAR HUELO, MAUI.

**Location.**—About 7 miles west of Huelo post office,  $3\frac{1}{2}$  miles west of Lupi, and just above crossing of Halehaku Stream.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Friez clock register.

**Discharge measurements.**—By 25-foot Cippoletti weir.

**Channel.**—No velocity of approach; conditions good.

**Cooperation.**—Weir is property of East Maui Ditch Co.; discharge copied from records of Maui Agricultural Co.

*Daily discharge, in million gallons, of New Hamakua ditch at Halehaku weir, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	54.1	19.7	55.8	55.2	51.6	35.8	32.2	24.5	32.8	35.3	61.1	61.9
2.....	54.5	18.3	53.7	54.6	50.1	33.1	36.4	23.5	58.7	42.2	59.4	64.3
3.....	53.5	18.7	54.0	56.1	49.6	31.1	42.9	24.0	54.1	38.3	61.3	45.2
4.....	44.3	17.9	54.2	55.5	54.5	29.2	55.7	22.6	57.1	25.8	55.6	52.4
5.....	48.9	16.7	53.9	55.4	55.7	28.0	49.5	21.1	52.9	22.2	54.7	60.8
6.....	46.1	16.2	54.0	55.0	55.7	26.4	40.2	20.1	54.9	20.6	58.0	59.3
7.....	44.4	15.7	56.3	55.6	53.3	26.4	36.0	21.6	61.1	21.0	57.2	59.6
8.....	46.8	19.4	55.5	55.2	53.6	29.6	37.6	20.9	57.7	20.9	56.8	59.2
9.....	44.2	44.5	56.4	54.4	53.9	27.6	56.7	33.0	50.2	27.6	78.9	57.7
10.....	39.3	24.4	56.7	55.0	50.9	46.0	50.1	30.3	43.2	27.6	59.4	56.7
11.....	37.2	26.9	56.0	55.2	54.5	54.2	54.3	48.1	38.8	23.2	57.6	55.5
12.....	35.5	23.4	42.3	55.3	51.9	44.6	47.1	40.8	35.9	26.6	58.0	57.5
13.....	34.6	54.4	47.0	55.7	48.9	51.1	50.6	37.1	33.2	32.2	59.4	55.7
14.....	33.3	44.9	54.5	56.2	46.7	45.3	48.1	41.1	30.1	59.8	58.0	58.1
15.....	31.8	30.6	55.9	55.8	42.3	43.3	40.7	61.6	29.1	56.7	58.8	57.2
16.....	30.6	26.6	58.2	55.9	40.0	43.4	37.6	52.7	27.5	45.2	77.1	61.2
17.....	29.5	24.5	59.0	55.6	37.7	37.3	34.5	41.3	26.9	41.9	66.8	62.2
18.....	28.4	22.3	56.2	56.3	36.8	34.0	32.2	36.6	25.2	31.3	62.1	63.5
19.....	27.3	48.2	57.4	59.8	36.8	40.0	30.3	36.6	24.2	28.2	61.8	61.7
20.....	26.0	54.2	59.2	58.7	40.6	37.4	28.8	31.6	24.3	30.9	60.3	59.2
21.....	25.0	53.7	58.9	57.4	36.8	49.8	30.4	29.3	22.6	59.5	60.1	63.2
22.....	23.4	52.6	57.2	57.6	32.3	41.0	27.5	42.5	21.2	60.8	59.8	60.6
23.....	23.5	54.4	61.8	55.4	29.8	36.8	25.8	32.5	19.9	62.7	59.5	65.5
24.....	29.3	54.7	57.9	53.1	35.0	53.8	40.2	27.6	18.7	60.2	58.5	59.4
25.....	25.6	52.9	59.8	54.3	39.0	43.4	36.1	25.3	18.4	62.1	58.9	58.7
26.....	22.7	52.4	60.3	54.8	44.0	38.1	31.3	26.1	17.9	64.8	58.7	59.2
27.....	21.5	54.1	59.5	54.1	55.1	37.0	31.0	27.2	17.2	63.0	58.6	58.6
28.....	20.7	53.6	58.2	54.0	50.0	35.2	31.6	25.6	17.1	49.6	57.8	58.3
29.....	19.8	54.7	55.4	53.2	48.4	31.8	35.0	34.4	21.6	60.0	57.0	57.4
30.....	19.0	.....	55.0	52.5	43.0	29.9	29.8	39.1	58.8	59.5	57.8	57.8
31.....	20.1	.....	54.8	.....	40.6	.....	26.2	32.7	.....	68.9	.....	57.9

*Monthly discharge of New Hamakua ditch at Halehaku weir, near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	54.5	19.0	33.6	1,040
February.....	54.7	15.7	36.2	1,050
March.....	61.8	42.3	56.0	1,740
April.....	59.8	52.5	55.4	1,460
May.....	55.7	29.8	45.5	1,410
June.....	54.2	26.4	38.0	1,140
July.....	56.7	25.8	38.3	1,190
August.....	61.6	20.1	32.6	1,010
September.....	61.1	17.1	35.0	1,050
October.....	68.9	20.6	42.9	1,330
November.....	78.9	54.7	60.3	1,810
December.....	65.5	45.2	58.9	1,830
The year.....	78.9	15.7	44.4	16,300

**NEW HAMAKUA DITCH AT STATION NO. 1, NEAR HUELO, MAUI.**

**Location.**—About  $1\frac{1}{2}$  miles south from Huelo post office at lower portal of first tunnel west of Nailiilihaele Stream.

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

**Gage.**—A reference point, on top of cement-lined ditch, from which measurement is made to surface of water; observations made twice daily, at 5.30 a. m. and 5.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from plank over ditch.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of New Hamakua ditch at station No. 1, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Sept. 21	J. B. Stewart.....	<i>Feet.</i> 2.78	<i>Sec.-ft.</i> 24.4
Nov. 11	.....do.....	.12	94.8

*Daily gage height, in feet, of New Hamakua ditch at station No. 1, near Huelo, Maui, for 1912.*

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		2.82	2.20	1.30	0.10	0.15	16.....		1.32	2.50	1.46	0.10	1.15
2.....		2.88	1.95	1.45	.10	.10	17.....		1.82	2.55	2.05	.10	.25
3.....		2.75	3.25	2.15	.10	.15	18.....		2.02	2.70	2.30	.10	.12
4.....		2.90	1.10	2.65	.20	.10	19.....		2.22	2.70	2.50	.10	.25
5.....		3.00	1.10	2.85	.40	.10	20.....		2.38	2.75	2.45	.10	.10
6.....		3.50	.80	2.91	1.25	.15	21.....		2.48	2.80	.10	.10	.20
7.....		2.98	.25	2.90	1.25	.20	22.....		2.22	2.85	.10	.10	.25
8.....		3.25	1.10	2.95	1.30	.40	23.....		2.35	2.95	.10	.10	.70
9.....		2.25	.92	2.35	.10	.50	24.....		2.52	3.00	.10	.10	.85
10.....		2.25	1.72	2.22	.10	.55	25.....	2.20	2.65	3.50	.20	.15	.55
11.....		1.25	1.95	2.75	.10	.85	26.....	2.52	2.58	3.10	.35	.20	.50
12.....		1.35	2.08	3.55	.10	1.05	27.....	2.38	2.52	3.12	.10	.35	.45
13.....		1.88	2.25	2.65	.50	1.10	28.....	2.35	2.65	3.10	.10	.45	.35
14.....		1.68	2.35	1.00	.80	1.30	29.....	2.10	2.00	3.05	.10	.65	.40
15.....		.60	2.42	.90	1.05	1.00	30.....	2.52	2.10	1.60	.10	.40	.40
							31.....	2.65	2.12	.....	.10	.....	.45

**NEW HAMAKUA DITCH AT STATION NO. 2, NEAR HUELO, MAUI.**

**Location.**—About  $1\frac{1}{2}$  miles south of Huelo post office at upper end of iron flume crossing Kailua Stream.

**Records available.**—January 14 to December 31, 1912.

**Gage.**—A reference point on top of cement-lined ditch, from which measurements are made to surface of water twice daily, at 6.30 a. m. and 4.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from flume covering.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Daily gage height, in feet, of New Hamakua ditch at station No. 2, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		3.00	0.08	0.04	0.36	2.25	2.22	2.25	1.98		0.20	0.15
2.....		3.06	.06	.09	.20	2.18	1.75	2.30	1.50	1.45	.20	.10
3.....		3.05	.06	.03	.25	2.28	1.22	2.32	.18	1.71	.20	.15
4.....		3.11	.10	.03	.18	2.35	.80	2.58	.12	2.21	.30	.10
5.....		3.14	.12	.04	.14	2.42	1.18	2.62	.72	2.11	.30	.10
6.....		3.20	.10	.06	.20	2.52	1.68	2.72	.48	2.81	1.00	.15
7.....		3.21	.08	.09	.30	2.45	1.88	2.78	.15	2.90	.85	.20
8.....		3.16	.10	.08	.28	2.40	1.68	2.88	.45	2.81	1.00	.25
9.....		1.20	.09	.08	.28	2.38	.38	2.68	1.48	2.45	.20	.30
10.....		2.74	.05	.04	.57	1.15	1.02	2.60	1.42	2.35	.20	.35
11.....		2.42	.06	.09	.91	.68	.92	.78	1.62	2.65	.20	.50
12.....		2.79	.04	.08	.15	1.50	1.50	1.32	1.80	2.40	.20	.65
13.....		.44	.08	.08	1.28	1.40	1.02	1.42	1.88	2.20	.30	.85
14.....	2.26	1.48	.10	.08	1.30	1.35	1.58	.55	1.78	.20	.40	.75
15.....	2.34	2.37	.12	.11	1.62	1.48	1.78	.38	2.12	.25	.75	.85
16.....	2.42	2.61	.14	.08	1.72	1.28	2.02	.62	2.32	1.32	.15	.10
17.....	2.48	2.72	.08	.13	1.60	1.78	2.30	.82	2.85	1.70	.10	.85
18.....	2.55	2.32	.08	.14	1.91	2.00	2.18	1.22	2.45	2.05	.10	.25
19.....	2.60	.70	.13	.10	1.85	1.48	2.32	1.12	2.55	2.30	.10	.20
20.....	2.67	.05	.14	.07	1.78	1.88	2.25	1.22	2.50	2.15	.10	.35
21.....	2.72	.06	.15	.14	1.80	1.65	2.38	1.38	2.58	.20	.15	.45
22.....	2.75	.10	.18	.11	2.08	1.62	2.48	1.32	2.62	.20	.15	.50
23.....	2.80	.12	.22	.12	2.25	1.95	.95	1.42	2.80	.20	.20	.60
24.....	2.39	.12	.44	.19	2.20	2.12	2.02	1.58	2.82	.15	.20	.50
25.....	2.66	.14	.03	.10	2.22	1.52	1.95	2.05	2.90	.10	.20	.45
26.....	2.82	.48	.00	.08	1.28	1.80	2.22	2.32	2.85	.20	.20	.35
27.....	2.88	.04	.02	.10	1.38	1.98	1.78	2.32	2.90	.10	.30	.35
28.....	2.96	.12	.06	.15	1.08	2.00	1.82	2.42	2.92	.10	.30	.20
29.....	2.99	.12	.58	.14	.95	1.78	1.72	1.62	2.88	.20	.45	.30
30.....	3.02	.....	.02	.27	1.55	1.80	1.78	2.02	.50	.20	.50	.25
31.....	2.95	.....	.06	.....	1.55	.....	1.82	2.05	.....	.20	.....	.25

#### NEW HAMAKUA DITCH AT STATION NO. 3, NEAR HUELO, MAUI.

**Location.**—About  $1\frac{1}{2}$  miles south of Huelo post office, at lower end of iron flume crossing Kailua Stream.

**Records available.**—January 14 to December 31, 1912.

**Gage.**—A reference point, on top of cement-lined ditch, from which distance to water surface is measured twice daily, at 6.30 a. m. and 4.30 p. m.; datum unchanged.

**Channel.**—Permanent.

**Discharge measurements.**—Made from plank over ditch. During low stages the flow at station No. 2 is the same as that of No. 3. During high stages, in order to determine the amount of water overflowing the sides of the iron flume and dropping into Kailua Stream, it is necessary to measure the ditch above and below this flume.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of New Hamakua ditch at station No. 3, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 23	J. B. Stewart.....	Feet.	Sec.-ft.
Sept. 21	do.....	2.57	25.3
Nov. 11	do.....	2.69	23.5
		a. 20	86.2

a Gage-height reference mark.

*Daily gage height, in feet, of New Hamakua ditch at station No. 3, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		3.04	0.10	0.08	0.31	1.98	2.08	2.30	1.09	1.60	0.20	0.15
2.		3.11	.10	.12	.26	2.12	1.80	2.18	.75	2.25	.20	.10
3.		3.09	.08	.06	.24	2.25	1.35	2.32	.30	1.80	.20	.15
4.		3.12	.12	.05	.14	2.30	1.98	2.62	.18	2.50	.30	.10
5.		3.18	.15	.07	.15	2.38	1.22	2.68	.80	2.36	.60	.20
6.		3.23	.14	.08	.21	2.48	1.72	2.78	.52	2.91	1.00	.25
7.		3.25	.12	.12	.35	2.45	1.98	2.88	.18	2.92	.85	.20
8.		3.20	.14	.12	.29	2.30	1.72	2.98	.48	2.85	1.00	.30
9.		1.25	.11	.12	.28	2.42	.42	2.72	1.98	2.90	.20	.40
10.		2.75	.08	.06	1.64	2.10	1.08	2.78	.95	2.85	.20	.35
11.		2.46	.09	.12	1.28	2.08	.98	.82	1.68	2.70	.20	.60
12.		2.83	.07	.10	1.20	1.55	1.55	1.38	1.85	2.60	.20	.85
13.		.46	.10	.12	1.32	1.40	1.08	1.52	1.92	2.20	.30	.75
14.	2.30	1.51	.12	.10	1.35	1.40	1.65	.62	1.80	.20	.40	.85
15.	2.38	2.40	.14	.14	1.61	1.58	1.82	.48	2.18	.25	.75	.20
16.	2.48	2.64	.16	.11	1.72	1.35	2.25	.70	2.35	1.32	.15	.85
17.	2.51	2.76	.10	.16	1.78	1.83	2.12	.88	2.38	1.75	.10	.85
18.	2.57	2.86	.10	.16	1.80	2.05	2.25	1.30	2.52	2.05	.10	.30
19.	2.62	.72	.16	.12	1.78	1.52	2.52	1.32	2.55	2.30	.10	.30
20.	2.70	.08	.16	.10	1.88	1.95	2.22	1.30	2.55	2.25	.10	.45
21.		2.72	.10	.18	1.88	.80	1.82	1.42	2.62	.20	.15	.45
22.		2.78	.14	.20	.14	2.18	1.68	2.42	2.78	.20	.20	.50
23.		2.80	.16	.25	.14	1.92	2.00	2.52	1.52	2.82	.20	.50
24.		2.42	.16	.47	.22	2.02	.82	1.00	1.62	2.98	.20	.50
25.		2.68	.18	.06	.12	2.32	1.58	1.72	2.08	2.90	.20	.50
26.		2.84	.50	.00	.10	1.68	1.85	4.68	2.38	2.90	.15	.20
27.		2.92	.07	.05	.14	1.52	2.02	1.85	2.38	2.95	.10	.30
28.		2.98	.14	.08	.18	.88	2.05	1.90	2.48	2.98	.10	.30
29.		3.02	.16	.62	.18	.50	2.30	1.82	1.68	2.95	.20	.55
30.		3.05	.04	.28	.34	2.32	1.88	2.12	.55	.20	.60	.25
31.		2.98	.10		1.72		1.98	2.12		.20		.35

#### NEW HAMAKUA DITCH AT STATION NO. 4, NEAR HUELO, MAUI.

**Location.**—About  $1\frac{1}{2}$  miles south of Huelo post office and immediately above flume crossing Oanui Gulch.

**Records available.**—January 14 to December 31, 1912.

**Gage.**—A reference point, chiseled in cement lining of ditch, from which distance to water surface is measured twice daily, at 6.30 a. m. and 4.30 p. m.; datum unchanged.

**Discharge measurements.**—Made from plank over flume. The difference between the flow at stations No. 4 and No. 3 gives low-water flow of Kailua Stream.

**Cooperation.**—Station maintained in cooperation with East Maui Ditch Co.

*Discharge measurements of New Hamakua ditch at station No. 4, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 23	J. B. Stewart.....	Feet.	Sec.-ft.
Nov. 11	.....do.....	4.90	29.7
		2.52	86.2

*Daily gage height, in feet, of New Hamakua ditch at station No. 4, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		5.42	2.52	2.48	2.90	4.42	4.50	4.45	4.32	4.05	2.60	2.60
2.		5.50	2.50	2.54	2.50	4.42	4.28	4.62	2.40	3.70	2.60	2.60
3.		5.47	2.48	2.46	2.70	4.48	3.80	4.80	2.63	4.20	2.60	2.65
4.		5.50	2.55	2.48	2.58	4.72	2.92	4.88	2.55	4.70	2.70	2.60
5.		5.56	2.64	2.48	2.60	4.85	3.62	4.92	3.10	4.81	2.60	2.60
6.		5.55	2.56	2.48	2.66	4.90	4.30	4.98	2.85	5.15	3.15	2.65
7.		5.58	2.54	2.58	2.82	4.88	4.28	5.17	2.48	5.11	3.35	2.60
8.		5.52	2.56	2.54	2.68	4.65	4.30	5.22	3.10	5.11	3.50	2.65
9.		3.66	2.52	2.55	2.95	4.80	3.38	4.48	3.35	4.60	2.60	2.80
10.		5.14	2.54	2.42	3.10	3.55	4.05	4.25	3.75	4.75	2.60	2.85
11.		4.84	2.52	2.52	3.38	3.08	3.35	3.65	3.98	5.55	2.60	2.90
12.		5.20	2.51	2.52	3.58	4.15	3.90	3.70	4.12	4.85	2.60	3.05
13.		2.60	2.58	2.58	3.72	3.32	3.55	3.78	4.28	4.65	2.75	2.75
14.	4.70	3.92	2.61	2.52	3.78	3.92	4.08	3.62	4.32	2.65	2.80	3.15
15.	4.78	4.78	2.60	2.58	4.05	4.02	4.22	3.50	4.42	2.70	3.20	3.25
16.	4.82	5.15	2.66	2.51	4.32	3.90	4.38	3.20	4.62	3.80	2.50	2.60
17.	4.90	5.12	2.58	2.62	4.42	4.25	4.38	3.58	4.62	4.30	2.50	3.25
18.	4.97	5.22	2.56	2.60	4.35	4.45	4.48	3.72	4.68	4.60	2.55	2.60
19.	5.04	3.18	2.60	2.55	4.32	3.90	4.58	3.68	4.72	4.80	2.60	2.60
20.	5.10	2.50	2.58	2.50	3.65	4.32	4.72	3.78	4.75	4.65	2.60	2.75
21.	5.24	2.56	2.62	2.60	4.25	3.72	4.65	3.88	4.82	2.65	2.60	2.85
22.	5.20	2.64	2.64	2.56	4.40	4.05	4.80	3.62	4.88	2.65	2.60	2.90
23.	5.22	2.60	2.70	2.57	4.68	4.38	4.82	3.72	5.10	2.60	2.60	2.90
24.	4.82	2.60	2.91	2.64	4.50	2.95	3.75	3.88	5.22	2.60	2.60	2.90
25.	5.09	2.18	2.51	2.53	4.68	3.92	4.35	4.35	5.38	2.60	2.60	2.80
26.	5.25	2.98	2.46	2.52	4.55	4.25	2.28	4.68	5.35	2.65	2.60	2.75
27.	5.34	2.54	2.50	2.54	2.95	4.08	4.55	4.88	5.40	2.60	2.70	2.60
28.	5.38	2.62	2.54	2.60	3.62	4.32	4.55	4.98	5.45	2.60	2.70	2.55
29.	5.42	2.58	3.07	2.58	4.28	4.58	4.32	4.00	5.42	2.60	2.95	2.70
30.	5.44		2.51	2.70	3.40	4.68	4.42	4.42	3.00	2.60	2.55	2.65
31.	5.38		2.54		4.08		4.58	4.32		2.60		2.65

#### NEW HAMAKUA DITCH AT STATION NO. 5, NEAR HUELO, MAUI.

**Location.**—About  $1\frac{1}{2}$  miles south of Huelo post office and immediately below flume crossing Oanui Gulch.

**Records available.**—January 14, to December 31, 1912.

**Gage.**—A reference point, chiseled in cement lining of ditch, from which distance to water surface is measured twice daily, at 6.30 a. m. and 4.30 p. m.; datum unchanged.

**Channel.**—Cement lined; permanent.

**Discharge measurements.**—Made from plank at reference point. Difference between flow at this station and station No. 4 equals the low-water flow of Oanui Stream.

**Cooperation.**—East Maui Ditch Co. assists in obtaining gage heights.

*Discharge measurements of New Hamakua ditch at station No. 5, near Huelo, Maui, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
July 23	J. B. Stewart.....	<i>Feet.</i> 5.00	<i>Sec.-ft.</i> 33.3
Sept. 21	.....do.....	5.10	30.6
Nov. 11	.....do.....	2.68	111

*Daily gage height, in feet, of New Hamakua ditch at station No. 5, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		5.50	2.66	2.62	2.86	4.45	4.60	4.62	4.42	4.30	2.60	2.60
2.....		5.56	2.65	2.67	2.18	4.62	4.38	4.72	2.25	3.72	2.60	2.60
3.....		5.56	2.62	2.64	2.85	4.78	3.90	4.90	2.75	4.46	2.70	2.65
4.....		5.60	2.68	2.64	2.65	4.82	3.02	4.98	2.62	4.76	3.70	2.60
5.....		5.66	2.72	2.66	2.70	4.92	3.72	5.25	3.30	4.96	3.45	2.60
6.....		5.65	2.69	2.63	2.65	4.98	4.12	5.12	3.15	5.17	3.45	2.65
7.....		5.68	2.67	2.68	2.82	4.98	4.40	5.22	2.52	5.20	3.60	2.65
8.....		5.61	2.69	2.64	2.72	4.75	4.12	5.32	2.95	5.20	2.60	2.85
9.....		3.76	2.66	2.68	2.90	4.90	2.98	4.55	3.36	4.85	2.60	2.90
10.....		5.24	2.66	2.58	3.12	3.65	3.65	4.38	3.85	4.30	2.60	2.95
11.....		4.94	2.66	2.66	3.48	4.18	3.45	3.70	4.05	5.15	2.60	3.00
12.....		5.30	2.64	2.63	3.68	4.28	4.22	3.88	4.18	4.90	2.60	3.15
13.....		3.02	2.68	2.70	3.85	3.42	3.65	3.92	4.32	4.75	2.75	3.35
14.....	4.80	4.02	2.71	2.63	3.82	4.15	4.18	3.72	4.38	2.08	2.85	3.25
15.....	4.88	4.88	2.72	2.70	4.10	4.12	4.32	3.10	4.62	3.30	3.30	3.25
16.....	4.92	5.05	2.74	2.64	4.20	3.85	4.48	3.55	4.68	3.90	2.50	2.60
17.....	5.00	5.22	2.68	2.72	4.28	4.32	4.55	3.70	4.68	4.25	2.50	3.35
18.....	5.07	5.32	2.66	2.70	4.42	4.32	4.58	3.75	4.72	4.60	2.50	2.70
19.....	5.12	3.28	2.72	2.68	4.42	4.00	4.68	3.75	4.78	4.30	2.55	2.70
20.....	5.20	2.64	2.70	2.64	4.02	4.42	4.82	3.88	4.80	4.80	2.60	2.85
21.....	5.23	2.66	2.73	2.72	4.38	3.42	4.75	4.25	4.87	2.65	2.60	2.95
22.....	5.28	2.70	2.77	2.70	4.58	4.35	4.90	3.52	4.98	2.65	2.60	3.00
23.....	5.31	2.74	2.82	2.70	4.75	4.48	4.90	3.80	5.16	2.60	2.60	3.00
24.....	4.87	2.72	3.04	2.77	4.35	3.05	3.85	4.22	5.32	2.60	2.60	3.00
25.....	5.18	2.78	2.64	2.66	4.78	3.98	4.22	4.45	5.42	2.70	2.60	3.10
26.....	5.35	3.10	2.68	2.65	4.12	4.30	4.75	4.72	5.40	2.75	2.60	2.85
27.....	5.41	2.68	2.62	2.68	3.05	4.12	4.65	4.95	5.45	2.70	2.60	2.85
28.....	5.46	2.72	2.66	2.72	3.70	4.32	4.65	5.30	5.50	2.60	2.80	2.65
29.....	5.47	2.70	3.18	2.78	3.52	4.41	4.38	4.08	5.48	2.60	2.60	2.80
30.....	5.50		2.62	2.82	4.05	4.78	4.50	4.58	3.05	2.60	3.05	2.75
31.....	5.47		2.67		4.42		4.62	4.32		2.60		2.75

#### OLD HAMAKUA DITCH AT OPANA WEIR, NEAR HUELO, MAUI.

**Location.**—About 5 miles northwest of Huelo post office and a short distance below the crossing of Opana Stream.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Friez automatic clock register.

**Discharge measurements.**—By a Cippoletti weir.

**Cooperation.**—Weir is the property of the East Maui Ditch Co.; records copied from Maui Agricultural Co.

*Daily discharge, in million gallons, of Old Hamakua ditch at Opana weir, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.70	0.30	24.60	9.45	17.80	0.60	0.30	.....	.....	.....	18.00	18.40
2.....	.70	.30	26.80	8.30	18.00	.60	.30	.....	2.70	.....	13.80	26.70
3.....	.70	.25	27.10	22.20	14.70	.45	.30	.....	8.53	.....	18.70	35.30
4.....	.67	.20	27.30	23.70	16.70	.40	1.93	.....	6.86	.....	16.40	18.00
5.....	.55	.20	26.10	25.00	16.20	.40	1.23	.....	.86	.....	11.50	18.30
6.....	.55	.13	24.70	27.50	15.90	.40	.40	.....	.80	.....	2.26	18.80
7.....	.46	.10	23.60	28.10	13.00	.40	.40	.....	4.21	.....	.60	21.10
8.....	.50	3.83	20.40	20.10	13.90	.40	2.00	.....	.83	.....	1.73	16.70
9.....	.55	5.03	22.20	26.50	8.16	.30	11.90	.....	.13	.....	28.50	14.10
10.....	.93	.33	21.40	28.00	2.73	4.13	1.80	.....	.....	.....	28.40	12.70



*Daily discharge, in million gallons, of Old Hamakua ditch at Opana weir, near Huelo, Maui, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	0.43	0.30	25.10	27.20	1.30	2.83	1.80	0.96	.....	.....	25.80	9.97
12.....	.40	.30	26.30	26.90	1.20	.70	.45	.....	.....	.....	13.80	5.60
13.....	.40	5.50	27.50	26.10	.70	1.63	1.27	.....	.....	.....	11.40	1.16
14.....	.40	4.83	27.10	26.90	.60	.53	.30	.....	.....	.....	9.23	.30
15.....	.36	.47	22.30	27.00	.60	.33	.25	2.63	.....	.....	27.50	.77
16.....	.30	.23	17.30	27.40	.60	.40	.20	.15	.....	.....	27.30	5.27
17.....	.30	.30	19.60	27.60	.60	.40	.20	.20	.....	.....	27.20	4.10
18.....	.30	.50	25.30	23.00	.60	.40	.20	.20	.....	.....	27.80	10.70
19.....	.37	11.10	19.60	19.00	.60	.40	.20	.08	.....	.....	27.50	23.40
20.....	.47	25.90	7.95	23.40	.60	.40	.10	.....	.....	.....	25.30	15.80
21.....	.27	25.10	16.20	24.40	.60	.70	.10	.05	.....	7.03	17.30	23.30
22.....	.20	26.80	13.90	23.40	.60	.63	.15	.....	.....	13.20	16.00	27.60
23.....	.23	19.80	10.30	23.50	.60	.40	.10	.....	.....	1.97	16.70	27.00
24.....	.43	16.00	5.30	25.10	.60	9.43	.10	.....	.....	3.80	14.30	25.70
25.....	.30	15.40	7.37	16.70	.55	.67	.10	.....	.....	3.13	14.80	21.60
26.....	.25	13.70	10.80	26.30	.52	.40	.15	.....	.....	5.87	13.10	25.80
27.....	.30	21.00	8.13	25.20	8.86	.30	.10	.....	.....	23.70	12.20	20.20
28.....	.35	26.90	7.73	21.90	6.00	.20	.10	.....	.....	25.60	11.70	19.30
29.....	.40	24.20	6.20	19.20	3.30	.20	.10	.....	.....	15.30	8.95	15.90
30.....	.35	.....	16.80	16.60	.80	.30	.10	.....	.....	16.10	10.70	15.80
31.....	.30	.....	25.80	.....	.70	.....	.10	.....	.....	26.80	.....	14.60

*Monthly discharge of Old Hamakua ditch at Opana weir, near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	0.93	0.20	0.43	13.40
February.....	26.90	.10	8.59	249.00
March.....	27.50	5.30	19.00	591.00
April.....	28.10	8.30	23.20	696.00
May.....	18.00	.52	5.41	168.00
June.....	9.43	.20	.98	29.30
July.....	11.90	.10	.86	26.70
August.....	2.63	.05	.61	4.27
September.....	8.53	.13	3.11	24.90
October.....	26.80	1.97	13.00	142.00
November.....	28.50	.60	16.60	498.00
December.....	35.30	.30	16.60	514.00
The period.....	35.30	.05	8.36	2,510.00

#### KALUANUI DITCH AT PUUMALEI, NEAR HAMAKUAPOKO, MAUI.

**Location.**—About 3 miles east of Paia, in Hamakuapoko, just west of Maliko Gulch.

**Records available.**—January 1, 1910, to December 31, 1912.

**Discharge measurements.**—By 6-foot sharp-crested weir with bottom and end contractions.

**Cooperation.**—Weir is the property of the East Maui Ditch Co., but records are copied from records kept by Maui Agricultural Co.

*Daily discharge, in million gallons, of Kaluanui ditch at Puuomalei, near Hamakua-poko, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.56	3.51	3.51	4.56	3.51	2.50	0.86	0.83	2.50	2.03	3.50	3.51
2.....	4.56	3.51	3.51	4.56	3.50	2.50	.86	.83	2.50	1.61	3.20	3.60
3.....	4.56	2.10	3.51	4.56	3.50	2.50	1.24	.83	2.50	1.61	2.70	3.97
4.....	4.03	1.85	3.51	4.56	3.50	2.50	1.24	.83	2.50	1.24	2.37	4.03
5.....	4.03	2.02	3.51	4.56	3.50	2.50	1.24	.83	2.50	1.24	2.43	4.03
6.....	4.03	2.02	3.51	4.56	3.50	2.02	1.24	.61	2.50	1.24	2.38	4.03
7.....	3.51	2.80	3.51	4.56	3.50	2.50	.86	.61	2.50	.32	2.10	4.03
8.....	3.51	3.30	3.51	4.56	3.50	2.50	1.24	.61	2.50	.32	2.47	4.03
9.....	3.51	3.00	3.51	4.56	4.03	2.50	1.24	.61	2.50	.32	3.43	4.03
10.....	3.51	3.00	3.51	4.56	4.03	2.50	.86	.29	1.61	.32	3.63	4.03
11.....	3.51	2.50	3.51	4.56	4.03	2.50	1.24	.29	1.61	.32	3.93	4.03
12.....	2.95	2.00	3.51	4.56	4.03	2.50	1.24	.29	1.24	.32	3.83	4.03
13.....	2.95	2.02	3.51	4.56	2.96	2.50	1.24	.29	1.24	1.61	3.53	4.03
14.....	2.95	2.02	3.51	4.56	2.60	2.50	1.24	.29	1.24	2.01	3.50	4.03
15.....	2.95	2.02	3.51	4.56	2.60	2.50	1.24	.29	1.24	2.01	3.50	4.03
16.....	2.95	2.02	3.51	4.56	2.60	2.50	1.24	.29	.32	1.61	3.50	4.03
17.....	2.50	2.30	3.51	4.56	2.60	2.50	1.24	.29	.32	.86	3.50	4.03
18.....	2.50	3.51	3.51	4.56	2.60	2.50	1.24	.61	.32	.86	3.50	4.03
19.....	2.50	2.80	4.56	4.56	2.60	2.50	1.24	.61	.32	.86	3.50	4.03
20.....	2.50	3.00	4.56	4.56	2.60	2.02	.86	.61	.32	2.50	3.50	4.03
21.....	2.50	3.00	4.56	4.56	2.96	1.61	.87	.83	.32	2.50	3.50	4.03
22.....	2.50	3.30	4.56	3.51	2.50	.86	.87	.83	.32	3.51	3.70	4.03
23.....	2.50	3.50	4.56	3.51	2.50	.86	.87	.29	.32	3.51	3.97	4.03
24.....	2.95	3.50	4.56	3.51	2.50	.86	.87	.29	.32	3.51	4.00	4.03
25.....	2.95	3.50	4.56	3.51	2.50	.86	.87	.29	.32	3.51	3.80	4.03
26.....	2.50	3.50	4.56	3.51	2.50	.86	.87	.29	.32	3.51	3.53	4.03
27.....	2.50	3.50	4.56	3.51	2.50	.86	.87	.29	.32	3.51	3.50	4.03
28.....	2.50	3.50	4.56	3.51	2.50	.86	.87	.29	.32	3.51	3.50	4.03
29.....	2.50	3.50	4.56	3.51	2.50	.86	.87	.61	.32	3.51	3.47	4.03
30.....	2.50	.....	4.56	3.51	2.50	.86	.87	.61	.32	3.51	3.47	4.03
31.....	2.50	.....	4.56	.....	2.50	.....	.87	.83	.....	3.51	.....	4.03

*Monthly discharge of Kaluanui ditch at Puuomalei, near Hamakuapoko, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	4.56	2.50	3.11	96.5
February.....	3.51	1.85	2.83	82.1
March.....	4.56	3.51	3.95	122.0
April.....	4.56	3.51	4.24	127.0
May.....	4.03	2.50	3.01	93.2
June.....	2.50	.86	1.95	58.4
July.....	1.24	.86	1.05	32.5
August.....	.83	.29	.52	16.2
September.....	2.50	.32	1.18	35.5
October.....	3.51	.32	1.96	60.8
November.....	4.00	2.10	3.35	100.0
December.....	4.03	3.51	4.00	124.0
The year.....	4.56	.29	2.59	947.0

## LOWRIE DITCH AT OPANA WEIR, NEAR HUELO, MAUI.

**Location.**—About 4 miles northwest of Huelo post office and a short distance west of Halehaku Gulch.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Friez automatic clock register.

**Discharge measurements.**—By sharp-crested weir  $16\frac{1}{2}$  feet long, with bottom and end contractions.

**Cooperation.**—Weir is the property of East Maui Ditch Co., but records are copied from records of the Hawaiian Commercial Sugar Co.

*Daily discharge, in million gallons, of Lowrie ditch near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	50.20	19.70	55.80	55.10	53.10	36.30	33.80	24.20	38.80	41.90	55.60	57.80
2.....	51.60	17.20	56.30	55.20	53.10	34.00	41.50	22.80	52.70	39.10	56.30	61.10
3.....	49.60	17.00	55.70	55.20	53.30	31.10	51.70	24.10	55.90	41.70	56.60	56.40
4.....	44.20	16.70	53.60	57.10	53.30	29.00	32.70	21.80	53.50	28.80	56.00	45.50
5.....	40.10	15.70	52.00	9.60	53.30	27.10	51.80	19.30	51.70	23.00	54.20	52.30
6.....	39.40	15.40	52.90	1.33	53.20	25.70	43.80	17.90	51.90	19.80	53.60	47.90
7.....	42.70	15.00	52.20	39.10	53.30	26.30	40.20	19.70	55.50	20.00	55.40	47.30
8.....	45.20	21.80	52.30	51.50	56.00	34.10	36.60	18.30	53.00	20.70	55.30	50.10
9.....	45.10	50.00	53.70	58.10	52.80	31.40	55.00	39.00	50.90	23.00	57.30	45.10
10.....	39.70	30.20	53.20	58.00	51.30	48.20	48.60	38.50	43.10	31.30	56.70	42.60
11.....	36.30	27.70	55.70	57.90	52.50	54.60	49.50	50.80	37.30	22.60	56.30	47.40
12.....	34.20	29.60	57.60	58.80	48.00	48.80	46.50	46.60	33.70	40.40	55.20	44.70
13.....	32.50	47.50	57.20	57.90	45.60	54.60	32.50	43.00	30.30	42.70	55.60	49.40
14.....	31.30	45.60	55.10	29.80	44.40	49.90	50.00	45.70	27.70	54.40	55.60	52.00
15.....	29.40	41.90	53.50	57.70	40.30	48.40	47.20	54.40	25.90	54.50	54.70	50.60
16.....	27.80	28.40	54.10	58.20	37.30	50.00	41.20	51.90	24.40	48.60	57.20	54.60
17.....	26.50	25.90	55.00	57.20	35.70	42.60	36.70	46.10	23.50	46.90	56.30	54.10
18.....	25.60	23.70	54.60	56.90	34.00	36.10	34.50	45.10	21.80	35.20	54.10	55.10
19.....	24.50	45.40	54.00	56.60	36.40	43.30	32.70	16.20	20.70	28.30	57.30	57.40
20.....	23.50	50.20	54.70	57.10	42.60	40.80	29.60	33.40	21.30	30.90	57.70	56.10
21.....	22.90	55.40	54.20	57.60	39.50	51.80	31.60	30.20	20.10	53.60	57.50	57.50
22.....	22.00	55.90	54.20	57.80	31.60	42.60	28.80	49.50	18.20	56.50	56.50	57.40
23.....	21.00	52.30	52.70	58.10	28.60	35.90	26.10	39.40	17.50	53.40	57.10	57.10
24.....	29.40	52.30	3.03	57.70	34.90	52.70	43.00	30.00	18.90	53.50	56.80	57.00
25.....	29.30	52.50	.90	57.60	29.80	45.40	42.00	26.00	16.00	54.00	56.60	57.00
26.....	22.10	50.10	.70	57.70	38.70	40.80	34.40	26.60	15.90	53.80	56.30	57.00
27.....	20.30	53.10	.76	57.30	55.20	37.40	33.40	29.30	15.30	56.80	56.10	56.70
28.....	19.20	56.90	9.83	57.20	52.10	42.70	36.00	26.40	14.80	56.00	56.30	56.80
29.....	18.50	51.00	51.70	56.90	49.10	31.60	34.80	40.40	17.40	55.30	55.40	56.40
30.....	17.80	.....	54.00	56.70	49.00	28.90	31.00	34.70	49.90	56.50	55.00	56.20
31.....	20.00	.....	55.50	.....	44.90	.....	26.40	39.40	.....	57.20	.....	56.20

*Monthly discharge of Lowrie ditch near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	51.60	17.80	31.7	982
February.....	58.10	15.00	36.9	1,070
March.....	57.60	.70	46.0	1,430
April.....	58.80	1.33	52.1	1,560
May.....	56.00	28.60	45.3	1,400
June.....	54.60	25.70	40.0	1,200
July.....	55.60	26.10	40.1	1,240
August.....	54.40	16.20	33.9	1,050
September.....	55.90	14.80	32.6	978
October.....	57.20	19.80	41.9	1,300
November.....	57.70	53.60	56.0	1,680
December.....	57.80	42.60	53.3	1,650
The year.....	58.80	.70	42.5	15,500

## HAIKU DITCH AT PEAHI WEIR, NEAR HUELO, MAUI.

**Location.**—In Peahi about 5 miles northwest of Huelo post office.

**Records available.**—January 1, 1910, to December 31, 1912.

**Gage.**—Friez automatic clock register.

**Discharge.**—Measured by sharp-crested weir, 16½ feet long, with bottom and end constructions.

**Cooperation.**—Weir is property of East Maui Ditch Co.; discharge records are copied from records of Hawaiian Commercial & Sugar Co.

*Daily discharge, in million gallons, of Haiku ditch at Peahi weir, near Huelo, Maui, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	40.30	2.00	53.30	53.30	46.50	2.00	2.03	0.55	1.66	14.80	52.60	1.50
2.....	40.30	1.95	53.30	53.30	53.30	2.00	6.43	.60	33.40	11.50	51.50	12.00
3.....	34.80	1.90	53.30	53.30	48.40	1.80	11.30	.50	49.50	10.50	53.10	14.20
4.....	27.00	1.63	53.30	54.70	51.70	1.40	34.40	.40	41.50	2.00	48.00	2.73
5.....	36.90	1.33	53.30	53.40	51.20	1.20	20.50	.20	29.00	1.03	34.70	1.73
6.....	23.00	1.10	53.30	53.80	52.20	1.63	8.17	.10	35.80	.50	42.90	1.47
7.....	18.70	1.10	53.30	53.30	51.20	1.00	2.77	.35	46.90	.....	34.30	1.70
8.....	9.23	8.97	53.30	53.30	53.30	1.13	2.33	.20	30.60	.50	15.90	.30
9.....	3.83	35.80	53.30	53.30	46.10	.90	48.70	7.40	17.80	.14	44.70	.20
10.....	3.73	5.30	53.30	53.30	28.00	16.60	25.60	2.46	2.56	1.50	45.40	.23
11.....	2.96	5.17	53.30	53.30	15.20	41.00	28.10	27.90	1.93	.90	28.00	.90
12.....	2.53	3.60	53.30	54.10	7.37	39.00	21.30	20.20	1.33	3.27	37.50	.....
13.....	2.62	30.90	53.00	53.30	6.00	33.30	35.20	10.20	1.33	3.30	43.10	.03
14.....	3.10	34.90	52.80	53.00	5.90	23.10	27.90	14.90	.80	43.00	40.70	6.00
15.....	3.10	20.20	52.80	53.60	5.90	14.80	17.60	49.10	.01	35.70	34.60	20.70
16.....	.63	4.93	53.20	53.00	5.80	11.50	3.60	37.50	.....	18.00	50.70	34.90
17.....	1.90	3.15	53.10	53.00	9.77	5.20	2.57	19.60	.....	7.90	51.20	34.70
18.....	3.75	3.03	53.50	53.00	4.30	2.05	2.13	9.46	.....	2.80	47.80	48.20
19.....	2.00	30.80	51.90	53.00	4.30	2.26	1.43	2.06	.....	2.03	53.30	53.70
20.....	2.00	52.10	53.40	53.00	4.30	2.03	.....	1.73	.....	1.70	53.40	47.10
21.....	2.00	53.20	53.40	53.30	4.03	19.10	.....	1.80	.....	35.60	53.30	48.30
22.....	1.97	53.30	48.90	53.30	2.17	11.30	.....	10.60	.....	52.80	53.40	53.60
23.....	1.83	53.30	43.00	53.30	1.50	3.10	.....	5.33	.....	53.30	53.40	53.50
24.....	2.63	53.30	49.60	53.30	1.70	13.20	15.30	1.43	.....	53.30	9.37	51.40
25.....	1.97	53.30	53.30	53.30	1.70	16.80	3.03	1.86	.....	40.90	.....	45.20
26.....	1.90	36.20	53.00	53.80	13.40	22.10	2.10	1.46	.....	39.40	.....	50.20
27.....	1.83	53.20	53.00	53.50	49.70	11.70	1.65	1.20	.....	53.40	.....	49.20
28.....	1.83	53.30	47.80	53.30	43.00	4.50	1.60	.76	.....	53.30	.....	49.50
29.....	1.83	53.40	13.20	46.70	29.30	3.90	1.40	4.33	.....	53.30	.....	50.10
30.....	1.83	.....	47.10	42.40	31.30	2.07	.95	1.40	23.30	53.20	.....	49.40
31.....	2.00	.....	51.70	.....	7.23	.....	.60	1.46	.....	53.20	.....	44.70

*Monthly discharge of Haiku ditch at Peahi weir, near Huelo, Maui, for 1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
January.....	40.30	0.63	9.16	284
February.....	53.40	1.10	24.60	712
March.....	53.50	13.20	50.90	1,580
April.....	54.70	42.40	52.80	1,580
May.....	53.30	1.50	23.70	736
June.....	41.00	.90	10.40	312
July.....	.....	.....	12.20	329
August.....	49.10	.10	7.65	257
September.....	.....	.....	19.80	317
October.....	.....	.....	23.40	703
November.....	.....	.....	40.80	979
December.....	.....	.....	27.60	827
The year.....	.....	.....	25.30	8,600

## MISCELLANEOUS MEASUREMENTS.

The following discharge measurement was made by J. B. Stewart on Koolau ditch at Alo division weir, near Huelo, Maui:

March 13, 1912: Width, 8.0 feet; area of section, 33.6 square feet; mean velocity, 4.12 feet per second; gage height, 1.51 feet; discharge, 139 second-feet.

## PUMPED WATER ON MAUI.

Considerable water is pumped for irrigation by different plantations on the leeward side of Maui.

Figures showing the amount of water pumped each month by the Pioneer Mill Co. have been furnished to the United States Geological Survey. These data show the amount of underground water raised by eight pumps, seven steam and one electric, located in the vicinity of Lahaina. The measurements were obtained by means of pump displacement.

*Monthly discharge of pump No. 1, station No. 1, Pioneer Mill Co., near Lahaina, Maui, for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
January.....	29	692½	248	69,500
February.....	17	356	130	36,400
March.....	7	155	58.8	16,500
April.....	24	488½	193	54,000
May.....	31	742½	292	81,700
June.....	30	707½	276	77,300
July.....	31	712½	274	76,600
August.....	31	744	273	76,500
September.....	28	669	251	70,200
October.....	31	741½	272	76,100
November.....	30	710½	268	75,200
December.....	26	577	223	62,600
The year.....	315	7,300	2,760	773,000

*Monthly discharge of pump No. 2, station No. 1, Pioneer Mill Co., near Lahaina, Maui, for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
January.....	16	185½	41.20	11,500
February.....	1	11	2.44	684
March.....				
April.....				
May.....	10	226½	50.30	14,100
June.....	30	678½	151.00	42,200
July.....	31	677½	150.00	42,100
August.....	31	691½	154.00	43,000
September.....	24	621	138.00	38,600
October.....	31	701	156.00	43,600
November.....	30	636	141.00	39,500
December.....	15	155½	34.50	10,700
The year.....	219	4,580	1,020	286,000

*Monthly discharge of pump No. 3, station No. 1, Pioneer Mill Co., near Lahaina, Maui, for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
May.....	6	70½	21.6	2,210
June.....	1	10	3.08	314
July.....	29	397½	122.00	12,500
August.....	30	503½	155.00	15,800
September.....	30	587	181.00	18,500
October.....	21	374	115.00	18,800
November.....				
December.....				
The period.....	117	1,940	598	68,100

*Monthly discharge of electric pump, station No. 1, Pioneer Mill Co., near Lahaina, Maui, for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
January.....	30	694½	260	26,600
February.....	16	369	138	14,100
March.....	26	534½	200	20,400
April.....	29	614½	240	24,500
May.....	31	711	267	27,200
June.....	30	713½	268	27,300
July.....	31	713½	268	27,300
August.....	31	742	278	28,400
September.....	30	717½	269	27,400
October.....	31	716½	268	27,400
November.....	30	707	265	27,000
December.....	26	625½	235	23,900
The year.....	341	7,860	2,960	302,000

*Monthly discharge of pump No. 1, station No. 2, Pioneer Mill Co., near Lahaina, Maui, for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
January.....	29	670	67.0	5,730
February.....	29	642	64.2	5,490
March.....	30	670	67.0	5,730
April.....	30	654	65.4	5,590
May.....	31	744	74.4	6,360
June.....	30	704	70.4	6,020
July.....	31	712	71.2	6,090
August.....	31	686	68.6	5,870
September.....	30	645	64.5	5,510
October.....	31	732	73.2	6,260
November.....	29	548	54.8	4,690
December.....	28	611	61.1	5,220
The year.....	359	8,020	802.0	68,600

*Monthly discharge of pump No. 2, station No. 2, Pioneer Mill Co., near Lahaina, Maui,  
for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
January.....	29	652	65.2	5,570
February.....	29	641½	64.2	5,480
March.....	29	656	65.6	5,610
April.....	30	654	65.4	5,590
May.....	31	744	74.4	6,360
June.....	30	720	72.0	6,160
July.....	31	698	69.8	5,970
August.....	31	670¼	67.1	5,730
September.....	30	573	57.3	4,900
October.....	31	696	69.6	5,950
November.....	29	548	54.8	4,690
December.....	28	509	50.9	4,350
The year.....	358	7,760	776	66,400

*Monthly discharge of pump No. 1, station No. 3, Pioneer Mill Co., near Lahaina, Maui,  
for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
May.....	11	240	66.4	28,500
June.....	30	694	206.0	88,700
July.....	31	735	229.0	98,500
August.....	31	736	265.0	114,000
September.....	30	710	255.0	109,000
October.....	31	727	265.0	114,000
November.....	30	691	242.0	104,000
December.....	12	211	73.4	31,600
The period.....	206	4,740	1,600	688,000

*Monthly discharge of pump No. 2, station No. 3, Pioneer Mill Co., near Lahaina, Maui,  
for 1912.*

Month.	Days.	Hours.	Million gallons water lifted.	Million foot-gallons water lifted.
May.....	20	578	136	58,400
June.....	30	698	209	90,200
July.....	31	737	231	99,200
August.....	31	739	260	112,000
September.....	30	715	256	110,000
October.....	31	730	262	112,000
November.....	30	700	245	105,000
December.....	7	143	48.5	20,900
The period.....	210	5,040	1,650	708,000

## ISLAND OF HAWAII.

## HILO GROUP OF STREAMS.

## WAILUKU RIVER NEAR HILO, HAWAII.

**Location.**—A short distance above Hilo Electric Light Co. power canal intake and about 2 miles west of Hilo.

**Records available.**—March 21, 1911, to December 31, 1912.

**Gage.**—Vertical staff and Barrett & Lawrence hydro-chronograph; datum unchanged since gage was established.

**Channel.**—Probably slightly shifting.

**Discharge measurements.**—Made from cable car 120 feet below gage.

**Accuracy.**—Results considered good.

*Discharge measurements of Wailuku River near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.	Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Jan. 31 <sup>a</sup>	C. H. Pierce.....	5.67	36	Oct. 18	E. O. Christiansen.	6.14	225
July 12	Pierce and Christiansen.....	7.04	475	31	do.....	8.20	780
Sept. 16	E. O. Christiansen.....	5.80	170	Dec. 7	do.....	6.85	380
20	do.....	5.20	102	23	do.....	14.7	5,620

<sup>a</sup> Measurement made by wading 150 feet above gage.

<sup>b</sup> Backwater on gage caused by temporary sandbag dam at intake of power canal.

*Daily gage height, in feet, of Wailuku River near Hilo, Hawaii, for 1912.*

[J. Goorko, observer.]

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		6.69	6.32	6.26	4.38	5.15	4.88	6.24	5.25	8.24	7.92
2.....		6.40	5.95	6.88	4.37	5.60	4.88	7.27	4.91	8.12	8.91
3.....		6.06	5.86	6.80	4.27	7.07	5.50	10.20	4.87	9.72	8.80
4.....		5.78	6.49	8.00	4.26	6.27	5.77	12.45	4.82	7.93	7.92
5.....		5.58	6.88	7.50	4.27	5.95	5.39	9.40	4.71	7.74	7.30
6.....		5.42	6.60	7.80	4.14	5.76	5.07	8.10	4.65	7.61	6.93
7.....		5.29	11.34	7.30	4.11	5.49	5.02	7.40	4.60	7.36	6.89
8.....		5.20	9.47	6.80	4.22	5.28	4.99	7.00	4.59	7.42	7.16
9.....		5.23	10.02	6.53	4.30	5.15	4.97	6.90	4.63	8.3	6.82
10.....		5.28	8.73	6.22	4.77	6.13	4.98	6.57	4.68	10.6	6.48
11.....		5.84	8.16	5.98	5.85	8.30	4.98	6.22	4.79	10.8	6.26
12.....		7.89	7.42	5.72	5.19	6.99	4.93	6.56	5.53	8.84	6.02
13.....		8.58	7.18	5.58	5.09	6.51	4.98	6.02	5.16	8.15	5.82
14.....		8.84	6.76	5.40	4.88	7.17	4.96	6.02	5.04	7.58	5.73
15.....		7.71	6.67	5.22	4.77	6.40	5.23	5.78	5.28	7.13	5.73
16.....		7.04	6.66	5.14	4.77	6.02	5.05	5.77	5.39	7.88	5.96
17.....		7.88	7.56	5.12	4.61	5.85	4.94	5.55	8.13	9.28	5.73
18.....		9.96	7.04	5.03	4.53	5.70	4.95	5.42	6.11	8.73	5.61
19.....		8.26	6.87	4.93	4.56	5.55	5.27	5.33	6.64	9.04	5.94
20.....		6.0	7.62	6.93	4.91	5.40	4.99	5.21	7.26	7.82	6.95
21.....	15.0	7.16	6.33	4.94	5.02	5.30	4.91	5.29	7.11	7.44	6.48
22.....	15.5	6.78	6.10	4.85	4.84	5.25	4.82	5.25	10.32	7.20	8.85
23.....	13.0	6.79	7.07	4.74	4.62	5.20	4.82	5.08	11.31	7.21	14.26
24.....	11.0	6.42	7.41	4.76	5.23	5.56	4.91	5.02	8.40	7.00	11.64
25.....	9.0	6.13	7.60	4.62	5.34	5.34	4.81	4.94	7.43	6.72	8.75
26.....	7.6	5.92	7.63	4.63	5.10	5.14	4.77	4.89	9.30	6.67	9.12
27.....	7.25	5.65	7.36	4.59	5.79	5.10	5.14	4.83	13.57	7.00	8.19
28.....	7.20	5.46	6.98	4.52	5.81	5.04	4.98	4.78	10.82	7.04	7.52
29.....	7.20	5.32	6.60	4.50	5.39	5.13	4.86	4.72	10.41	6.78	7.20
30.....		5.74	6.41	4.44	5.27	5.06	4.80	5.12	8.89	6.98	6.93
31.....		7.33		4.39		4.94	4.81		8.76		6.71



*Daily discharge, in second-feet, of Wailuku River near Hilo, Hawaii, for 1912.*

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1		334	258	247	43	98	75	243	107	790	671
2		273	195	378	42	145	75	476	77	745	1,100
3		213	181	359	37	423	133	1,890	74	1,570	1,040
4		169	291	700	36	249	168	3,660	70	675	671
5		143	378	539	37	195	121	1,380	63	611	484
6		124	314	630	33	166	90	737	59	571	390
7		111	2,740	484	32	132	86	511	56	500	381
8		102	1,420	359	35	110	83	405	55	517	447
9		105	1,760	299	38	98	82	383	58	814	364
10		110	1,010	240	67	224	82	308	61	2,170	289
11		178	760	200	180	814	82	240	68	2,310	247
12		661	517	161	101	406	78	306	137	1,060	206
13		934	452	143	92	295	82	206	98	756	175
14		1,060	350	122	75	449	81	206	88	562	162
15		601	329	104	67	273	105	169	110	439	162
16		415	327	97	67	206	88	168	121	657	197
17		657	556	95	57	180	79	139	748	1,310	162
18		1,720	415	87	52	158	80	124	221	1,010	146
19		798	376	78	54	139	109	115	323	1,170	193
20	203	574	390	77	57	122	83	103	473	637	395
21	5,880	447	260	79	86	112	77	111	434	522	289
22	6,320	354	219	72	72	107	70	107	1,970	457	1,060
23	4,130	357	423	65	57	102	70	91	2,720	460	5,220
24	2,470	277	514	66	105	140	77	86	855	405	2,980
25	1,150	224	568	57	116	116	70	79	519	341	1,020
26	568	190	577	58	93	97	67	75	1,320	329	1,210
27	470	152	500	55	171	93	97	71	4,620	405	771
28	457	129	403	51	174	88	82	68	2,330	415	545
29	457	114	314	50	121	96	73	63	2,040	354	457
30		164	275	46	109	89	69	95	1,080	403	390
31		492		43		79	70		1,020		338

*Monthly discharge of Wailuku River near Hilo, Hawaii, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu- racy.
	Maximum.	Minimum.	Mean.		
February	6,320	203	2,210.0	43,800	A.
March	1,720	102	393.0	24,200	A.
April	2,740	181	569.0	33,900	A.
May	700	43	195.0	12,000	A.
June	180	32	76.9	4,580	A.
July	814	79	194.0	11,900	A.
August	168	67	86.6	5,320	A.
September	3,660	63	420.0	25,000	A.
October	4,620	55	709.0	43,600	A.
November	2,310	329	765.0	45,500	A.
December	5,220	146	715.0	44,000	A.
The period				294,000	

#### HONOLULU RIVER AT KAIWIKI, NEAR HILO, HAWAII.

**Location.**—One-half mile north of Kaiwiki and 6 miles west of Hilo, at an elevation of about 1,425 feet.

**Records available.**—June 1, 1911, to December 31, 1912.

**Gage.**—Vertical staff and Barrett & Lawrence hydro-chronograph; datum unchanged since gage was established.

**Channel.**—Probably slightly shifting.

**Discharge measurements.**—Made from small footbridge 40 feet below gage.

**Accuracy.**—Results considered good.

*Discharge measurements of Honolii River at Kaiwiki, near Hilo, Hawaii, in 1912.*

Date	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 1	C. H. Pierce.....	4.79	2.71	Oct. 30	E. O. Christiansen..	6.59	255
Oct. 17	E. O. Christiansen.	6.68	272	Nov. 23	.....do.....	5.93	125
21	.....do.....	5.95	121	30	.....do.....	5.46	52
23	.....do.....	10.0	2,100	Dec. 13	.....do.....	5.24	28
23	.....do.....	8.8	1,100	31	.....do.....	5.50	63.3

*Daily gage height, in feet, of Honolii River at Kaiwiki, near Hilo, Hawaii, for 1912.*

[J. Goorko, observer.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	5.45	4.80			5.46	4.94	5.30	5.12	6.03	5.39	6.19	6.72
2.....	5.38	4.80	5.63		5.70	4.99	5.57	5.10	6.63	5.22	6.02	6.83
3.....	5.32	4.80	5.47		5.92	5.00	6.39	6.09	8.49	5.26	7.49	6.28
4.....	5.27	4.80	5.30		6.55	5.00	5.85	5.74	8.74	5.20	6.05	5.77
5.....	5.23	4.80	5.19		6.36	4.99	5.73	5.42	6.25	5.12	5.96	5.56
6.....	5.20	4.80	5.11		6.55	4.97	5.58	5.28	5.99	5.10	5.64	5.52
7.....	5.17	4.80	5.13	8.46	5.86	4.97	5.43	5.24	6.42	5.05	5.51	5.82
8.....	5.14	4.80	5.26	7.23	5.62	5.03	5.32	5.24	5.74	5.04	5.50	5.87
9.....	5.11	4.80	5.33	7.32	5.49	5.40	5.28	5.25	5.63	5.05	7.63	5.64
10.....	5.09	4.80	5.34	6.76	5.38	5.53	5.78	5.24	4.85	5.11	9.01	5.45
11.....	5.08	4.80	6.02	6.41	5.30	6.03	6.62	5.20		5.39	7.30	5.34
12.....	5.04	4.79	6.86	5.94	5.24	5.62	5.92	5.20	5.78	5.48	6.37	5.26
13.....	5.02	4.89	6.84	5.77	5.20	5.62	5.72	5.29	5.44	5.28	6.10	5.22
14.....	5.00	4.98	6.68	5.56	5.16	5.44	6.07	5.32	5.47	5.33	5.74	5.25
15.....	4.98	5.84	5.93	5.72	5.08	5.30	5.57	5.49	5.41	5.56	5.59	5.32
16.....	4.97	4.90	5.64	5.82	5.06	5.22	5.41	5.27	5.41	6.47	6.92	5.50
17.....	4.92	4.84	6.39	6.28	5.09	5.17	5.34	5.19	5.30	6.52	7.19	5.35
18.....	4.90	4.80	7.43	5.90	5.03	5.09	5.32	5.23	5.28	5.68	7.06	5.37
19.....	4.88	4.91	6.28	5.75	5.00	5.07	5.26	5.42	5.20	6.03	5.54	5.85
20.....	4.86	5.84	6.02	5.88	4.99	5.14	5.23	5.23	5.16	6.60	5.96	6.42
21.....	4.83	8.13	5.84	6.14	5.04			5.15	5.15	6.01	5.89	6.17
22.....	4.82	9.16	5.55	6.01	5.04			5.10	5.15	7.96	5.86	7.90
23.....	4.80	8.41	5.60	5.94	5.00			5.08	5.08	8.25	6.00	9.54
24.....	4.79	6.96	5.46	6.22	5.00			5.16	5.06	6.38	5.78	7.51
25.....	4.78	6.09	5.38	6.35	5.00			5.12	5.10	5.80	5.60	6.19
26.....	4.76	5.56	5.34	6.28	5.00		5.30	5.08	5.09	7.29	5.51	6.94
27.....	4.75	5.74	5.25	6.09	5.02		5.29	5.41	5.06	8.62	5.48	6.14
28.....	4.74		5.18	5.81	5.01		5.25	5.25	5.04	7.43	5.91	5.77
29.....	4.72		5.12	5.58	5.00	5.80	5.24	5.22	5.02	7.39	5.81	5.69
30.....	4.70		5.72	5.47	4.98	5.80	5.23	5.17	5.47	6.47	5.94	5.58
31.....	4.68				4.96		5.12	5.23		6.91		5.62

*Daily discharge, in second-feet, of Honolii River at Kaiwiki, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	52.0	3.0	80	120	53.0	8.6	35	19	140	45	170	284
2.....	44.0	3.0	76	100	86.0	10.0	82	17	263	27	138	310
3.....	37.0	3.0	54	90	120.0	11.0	210	151	937	31	509	188
4.....	32.0	3.0	35	180	245.0	11.0	108	92	1,070	25	144	96
5.....	28.0	3.0	24	200	204.0	11.0	90	48	182	19	127	66
6.....	25.0	3.0	18	190	245.0	9.8	69	33	132	17	78	61
7.....	23.0	3.0	19	921	110.0	9.8	50	29	216	14	59	103
8.....	20.0	3.0	31	427	75.0	13.0	37	29	92	13	58	111
9.....	18.0	3.0	38	454	57.0	46.0	33	30	76	14	557	78
10.....	16.0	3.0	39	293	44.0	62.0	97	29	56	18	1,250	52
11.....	16.0	3.0	138	214	35.0	140.0	261	25	54	45	448	39
12.....	13.0	2.8	318	123	29.0	75.0	120	35	97	56	206	31
13.....	12.0	6.6	312	96	25.0	75.0	89	34	51	33	153	27
14.....	11.0	10.0	274	66	22.0	51.0	147	37	54	38	92	30
15.....	10.0	9.0	121	89	16.0	35.0	68	57	47	66	71	37

*Daily discharge, in second-feet, of Honolii River at Kaiwika, near Hilo, Hawaii, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	9.8	7.0	78	103	15.0	27.0	47	32	47	227	334	58
17.....	7.8	4.6	210	188	16.0	23.0	39	24	35	238	415	40
18.....	7.0	3.0	490	116	13.0	16.0	37	28	33	83	376	43
19.....	6.2	7.4	188	93	11.0	15.0	31	48	25	140	243	108
20.....	5.4	106.0	138	113	11.0	20.0	28	28	22	256	127	216
21.....	4.2	760.0	106	161	13.0	30.0	30	21	21	136	114	166
22.....	3.8	1,360.0	65	136	13.0	30.0	31	17	21	685	110	660
23.....	3.0	895.0	72	123	11.0	30.0	32	16	16	816	134	1,670
24.....	2.8	346.0	53	176	11.0	40.0	33	22	15	208	97	515
25.....	2.6	151.0	44	202	11.0	40.0	34	19	17	100	72	170
26.....	2.2	66.0	39	188	11.0	35.0	35	16	16	445	59	340
27.....	2.0	92.0	30	151	12.0	130.0	34	47	15	1,000	56	161
28.....	1.8	90.0	23	102	12.0	110.0	30	30	13	490	118	96
29.....	1.4	90.0	19	69	11.0	100.0	29	27	12	477	102	85
30.....	1.0		89	54	10.0	100.0	28	23	54	227	123	69
31.....	.8		150		9.4		19	28		331		75

*Monthly discharge of Honolii River at Kaiwika, near Hilo, Hawaii, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	52	0.8	13.5	830
February.....	1,360	2.8	139.0	8,000
March.....	490	18.0	109.0	6,700
April.....	921	54.0	184.0	10,900
May.....	245	9.4	50.2	3,090
June.....	140	8.6	43.8	2,610
July.....	261	19.0	64.3	3,960
August.....	151	16.0	34.9	2,150
September.....	1,070	12.0	128.0	7,620
October.....	1,000	13.0	204.0	12,500
November.....	1,250	56.0	218.0	13,000
December.....	1,670	27.0	193.0	11,900
The year.....	1,670	.8	115.0	83,300

#### KAWAINUI RIVER AT PEPEEKEO, NEAR HILO, HAWAII.

**Location.**—At highway bridge on government road 7 miles north of Hilo.

**Records available.**—December 4, 1911, to March 30, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 5 p. m.; datum unchanged.

**Discharge measurements.**—Made by wading at low water, and from highway bridge during high water.

**Accuracy.**—Records fair.

*Discharge measurements of Kawainui River at Pepeekeo, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
Feb. 4	C. H. Pierce.....	<i>Feet.</i> —0.1	<i>Sec.-ft.</i> 0.49	Oct. 19	E. O. Christiansen	<i>Feet.</i> 1.89	<i>Sec.-ft.</i> 64
Oct. 9	E. O. Christiansen.	.70	9.5	19	.....do.....	1.76	53.2
12	.....do.....	.90	13.2	Dec. 24	.....do.....	3.6	40.2

One measurement made in January, 1913, used to define rating curve.

*Daily gage height, in feet, of Kawainui River at Pepeekeo, near Hilo, Hawaii, for 1912.*

[M. Matsuna, observer.]

Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.
1.....	2.1	0.35	2.0	16.....	1.0	0.00	2.2
2.....	1.75	.3	2.2	17.....	1.0	.00	2.55
3.....	1.7	.08	1.95	18.....	.9	.00	4.1
4.....	1.6	.00	2.0	19.....	.85	.85	2.75
5.....	1.55	.00	1.8	20.....	.8	1.65	2.35
6.....	1.5	.00	1.65	21.....	.7	2.95	2.2
7.....	1.45	.00	1.8	22.....	.7	3.85	1.95
8.....	1.45	.00	1.7	23.....	.6	3.9	2.2
9.....	1.4	.00	1.7	24.....	.55	2.85	1.9
10.....	1.4	.00	1.6	25.....	.5	2.1	1.85
11.....	1.35	.00	3.35	26.....	.45	2.25	1.75
12.....	1.3	.00	3.95	27.....	.5	2.4	1.7
13.....	1.2	.7	3.0	28.....	.5	2.05	1.6
14.....	1.1	.65	3.05	29.....	.4	2.25	1.5
15.....	1.1	.1	2.35	30.....	.4	.....	1.45
				31.....	.4	.....	.....

*Daily discharge, in second-feet, of Kawainui River at Pepeekeo, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Day.	Jan.	Feb.	Mar.
1.....	82.0	4.0	73.0	16.....	16.0	1.0	96.0
2.....	55.0	3.4	96.0	17.....	16.0	1.0	171.0
3.....	51.0	1.5	69.0	18.....	13.0	1.0	514.0
4.....	44.0	1.0	73.0	19.....	12.0	12.0	215.0
5.....	41.0	1.0	58.0	20.....	11.0	48.0	127.0
6.....	38.0	1.0	48.0	21.....	9.0	259.0	96.0
7.....	36.0	1.0	58.0	22.....	9.0	457.0	69.0
8.....	36.0	1.0	51.0	23.....	7.5	468.0	96.0
9.....	33.0	1.0	51.0	24.....	7.0	237.0	65.0
10.....	33.0	1.0	44.0	25.....	6.0	82.0	62.0
11.....	30.0	1.0	347.0	26.....	5.5	106.0	55.0
12.....	28.0	1.0	480.0	27.....	6.0	138.0	51.0
13.....	24.0	9.0	270.0	28.....	6.0	77.0	44.0
14.....	20.0	8.0	281.0	29.....	4.6	106.0	38.0
15.....	20.0	1.6	127.0	30.....	4.6	.....	35.0
				31.....	4.6	.....	.....

*Monthly discharge of Kawainui River at Pepeekeo, near Hilo, Hawaii, for 1912.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
January.....	82.0	4.6	22.9	1,400
February.....	468.0	1.0	70.0	4,030
March.....	514.0	35.0	129.0	7,660

#### STATIONS NOS. 1, 2, 3, AND 4 AT PIHONUA, NEAR HILO, HAWAII.<sup>1</sup>

**Location.**—About 1½ miles above Hilo, Hawaii, and about one-half mile north of Kaumanu Road.

**Records available.**—February 2 to April 18 and July 30 to August 28, 1912.

**Gage.**—Gage heights were depth of water measured from a reference point. New datum for station No. 4 on July 30; relation to former datum unknown. Regular gages numbered to tenths installed July 30, 1912. Gage No. 1 discontinued, as all water had been diverted for Hilo supply. Gage No. 2, zero of old gage: shank of nail at gage height 0.45 foot on new gage. Gage No. 3, zero of old gage: shank of nail at gage height 0.45 foot on new gage. Gage No. 4, old gage out; no relation determined between old and new gages.

<sup>1</sup> Stations Nos. 1, 2, 3, and 4 on streams not named.

**Discharge measurements.**—Made by wading.

**Channels.**—Fair; beds of streams composed of small cobbles and gravel; probably shifting.

**Cooperation.**—Maintained in cooperation with the county engineer of Hawaii.

*Discharge measurements at station No. 1 at Piihonua, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 2	C. H. Pierce.....	0.68	0.93
July 30	E. O. Christiansen.....		.94

September 9: Water of spring piped away.

*Daily gage height, in feet, at station No. 1 at Piihonua, near Hilo, Hawaii, for 1912.*

Day.	Feb.	Mar.	Apr.	Day.	Feb.	Mar.	Apr.	Day.	Feb.	Mar.	Apr.
1.....		0.71	0.84	11.....	0.77	0.89		21.....	0.81	0.95	
2.....	0.68	.71		12.....	.77	.90		22.....	.76	.94	
3.....	.71	.72	.83	13.....	.78	.92	0.77	23.....		.94	
4.....	.72	.70		14.....	.78	1.02	.76	24.....	.79	.93	
5.....	.75	.69	.83	15.....	.78	.96		25.....	.75	.92	
6.....	.77	.58	.82	16.....	.82	.94	.73	26.....	.73	.92	
7.....	.77	.63		17.....	.69		.74	27.....	.73	.92	
8.....	.77		.81	18.....	.69	.98	.73	28.....	.72	.92	
9.....	.77		.82	19.....	.71	.96		29.....	.72	.92	
10.....	.77		.80	20.....	.69	.96		30.....		.92	
								31.....		.87	

*Discharge measurements at station No. 2 at Piihonua, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Feb. 2	C. H. Pierce.....	0.71	0.47
Sept. 9	E. O. Christiansen.....	1.45	1.53

*Daily gage height, in feet, at station No. 2 at Piihonua, near Hilo, Hawaii, for 1912.*

Day.	Feb.	Mar.	Apr.	July.	Aug.	Day.	Feb.	Mar.	Apr.	July.	Aug.
1.....		1.00			0.78	16.....	0.67	0.97	0.91		0.77
2.....	0.77	.74	0.70		.78	17.....	.76		1.15		.55
3.....	.77	.72	.75			18.....	.76	1.50	.96		
4.....	.68	.70				19.....	.80				
5.....	.69	.76	.89		.45	20.....	1.00	.81			.55
6.....	.66	.74	.75		.43	21.....	1.67	.81			.49
7.....	.67	.72			.42	22.....	1.57	.75			.65
8.....	.70	.77	1.07		.42	23.....		.71			
9.....	.72		1.30		.42	24.....	1.27	.72			
10.....	.65		1.15		.42	25.....	.92	.72			
11.....	.71	.87				26.....	.81	.68			.51
12.....	.72	.96			.42	27.....	.77	.66			
13.....	.72		1.00			28.....	.75	.69			.55
14.....	.74	2.00	.90		.58	29.....	1.16	.71			
15.....	.70	.94				30.....		.70		0.48	
						31.....		1.45		.48	

*Discharge measurements at station No. 3 at Piihonua, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
Feb. 2	C. H. Pierce.....	<i>Feet.</i> 0.88	<i>Sec.-ft.</i> 1.10
Sept. 9	E. O. Christiansen.....	1.58	1.67

*Daily gage height, in feet, at station No. 3 at Piihonua, near Hilo, Hawaii, for 1912.*

Day.	Feb.	Mar.	Apr.	July.	Aug.	Day.	Feb.	Mar.	Apr.	July.	Aug.
1.....		1.03			0.92	16.....	0.86	1.11	1.06		0.92
2.....	0.88	.92	0.94		.92	17.....	.85		1.27		.77
3.....	.89	.94	.95			18.....	.86	1.38	1.12		
4.....	.88	.93				19.....	.87	1.08			
5.....	.87	.90	1.05		.65	20.....	.93	1.02			.78
6.....	.87	.87	.95		.65	21.....	1.18	1.01			.82
7.....	.87	.81			.65	22.....	2.02	.98			.85
8.....	.87	.88	1.07		.65	23.....		.96			
9.....	.87				.65	24.....	1.35	.95			
10.....	.85		1.33		.65	25.....	1.09	.95			
11.....	.89	.96				26.....	1.02	.93			.85
12.....	.89	.98			.65	27.....	1.00	.93			
13.....	.90	1.19	1.12		.65	28.....	.98	.93			.86
14.....	.90	1.79	1.03		.92	29.....	1.11	.94			
15.....	.90	1.12				30.....		.94		0.74	
						31.....		1.40		.70	

*Discharge measurements at station No. 4 at Piihonua, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Velocity.
Feb. 2	C. H. Pierce.....	No flow.
Sept. 9	E. O. Christiansen.....	Do.

*Daily gage height, in feet, at station No. 4 at Piihonua, near Hilo, Hawaii, for 1912.*

Day.	Feb.	Mar.	Apr.	July.	Aug.	Day.	Feb.	Mar.	Apr.	July.	Aug.
1.....		1.50			1.05	16.....	(a)	1.71	1.64		1.30
2.....	0.37	1.58	1.54		1.15	17.....	(a)		1.71		1.32
3.....	.23	1.59	1.49			18.....	(a)	1.83	1.70		
4.....	.28	1.60				19.....	(a)	1.75			
5.....	.10	1.51	1.52		1.02	20.....	(a)	1.64			1.53
6.....	(a)	1.42	1.49		1.01	21.....	1.11	1.62			1.58
7.....	(a)	1.40			1.00	22.....	1.89	1.61			1.67
8.....	(a)	1.34	1.63		.91	23.....		1.60			
9.....	(a)		1.74		.81	24.....	1.79	1.58			
10.....	(a)		1.75		.70	25.....	1.82	1.57			
11.....	(a)	1.49				26.....	1.76	1.56			1.10
12.....	(a)	1.54			.47	27.....		1.72			
13.....	(a)	1.62	1.70			28.....	1.72	1.57			1.00
14.....	(a)	2.23	1.69		1.50	29.....	1.49	1.58			
15.....	(a)	1.79				30.....		1.56		1.08	1.08
						31.....		1.97		1.03	

*a* Channel dry.

**STATIONS AT 2,700-FOOT LEVEL<sup>1</sup> IN THE FOREST BACK OF HILO, HAWAII.**

The perennial streams of the island of Hawaii are in general restricted to two zones, one comprising an area about 10 miles wide in the Kohala and Hamakua districts, and the other, including an area about 12 miles wide, situated in the Hilo district between the South Branch of Wailuku River on the southeast and Maulua Gulch on the northwest.

The run-off from the Kohala-Hamakua district at ordinary stages is now diverted into ditches serving the sugar lands of the north coast of the island. It is proposed to divert the run-off of the Hilo district at an elevation above the 2,500-foot contour and deliver it by a high-line ditch to serve the semi-arid lands of Kau on the south side of the island. Limited funds have restricted operations so far to the area bounded by the South Branch of Wailuku River and the North Branch of Kawainui River. All the streams of this region originate on the east slope of Mauna Kea. Above the wet belt, comprising about 75 square miles, the surface is composed of porous lava rock that absorbs practically all the rainfall.

Ten rain gages, which are read at monthly and bimonthly intervals, are maintained at approximately 500-foot intervals of elevation from sea level to an elevation of 5,000 feet in this district.

**STATION RECORDS.**

**Location.**—On the line of a trail cut out approximately on the 2,700-foot contour, in the forest above Hilo, Hawaii, during September and October, 1911. The trail is about 12 miles in length, trends in a general northerly and southerly direction, and crosses 83 streams having appreciable channels, from the South Branch of the Wailuku to the North Branch of Kawainui River. A gaging station is maintained on each of these streams, whether perennial or not, at the trail crossing. Beginning at the South Branch of the Wailuku with No. 1 the stations are numbered consecutively northward to No. 87, except for a break of 6 numbers between stations No. 18 and No. 25. A camp maintained near the middle of the zone under observation is reached by a foot trail,  $3\frac{1}{2}$  miles long, from the end of the Kaiwiki Homestead road.

**Records available.**—Stations 1–12, October 1, 1911, to December 31, 1912.

Station 12a, November 30 to December 31, 1912.

Stations 13–18, 25–26, October 1, 1911, to December 31, 1912.

Stations 27–41, September 28, 1911, to December 31, 1912.

Stations 42–47, September 26, 1911, to December 31, 1912.

Stations 48–50, September 31, 1911, to December 31, 1912.

Stations 51–52, October 7, 1911, to December 31, 1912.

Stations 53–65, October 10, 1911, to December 31, 1912.

Stations 66–68, October 21, 1911, to December 31, 1912.

Stations 69–74, November 13, 1911, to December 31, 1912.

Stations 75–86, November 14, 1911, to December 31, 1912.

Station 86a, November 18, 1912, to December 31, 1912.

Station 87, November 14, 1911, to December 31, 1912.

<sup>1</sup> Aneroid readings gave elevation of 2,500 feet. More accurate determinations made later by topographers of U. S. Geol. Survey gave elevations 200 to 280 feet higher. The correct elevation of the survey camp at station No. 80 is 2,750 feet.

**Gages.**—Vertical staffs. Two observers have been continuously employed to read these 83 gages twice a day, except at such times when it was impossible to cross the streams at high water. The men alternated trips, north and south from the camp, and different observers were employed at different times.

**Discharge measurements.**—Made by wading.

**Accuracy.**—The total run-off for 1912 for all the stations was found to be 179,000 acre-feet, and that part which was determined from the good stations amounted to 173,000 acre-feet, leaving only 3 per cent of the total that might be very much in error. Although the estimated discharge forms quite a large percentage of the total discharge for the 83 stations, the mean monthly discharge for all the streams is probably correct within less than 25 per cent. See also notes to daily discharge tables.

*Discharge measurements at station No. 1 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13	E. O. Christiansen	-0.62	0.26
Sept. 27	do	-1.17	.06
Nov. 21	do	.82	32.5
Dec. 27	do	1.47	65.7

NOTE.—Channel in bedrock; smooth. Stream flows in one channel at all stages and is permanent. This station is on the South Branch or principal tributary of Wailuku River.

*Daily gage height, in feet, at station No. 1 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								-1.05		-0.40	1.75	
2.										.60		
3.	0.18		0.10	0.48			0.29					1.59
4.	.12		.06	.65	1.38		.08	+.21		.98		1.05
5.	.08		.18	.69		-0.45	-.05	-.70	1.00	-1.00	-1.40	.61
6.	.05			.71	.91		-.22		.94	-1.05		.52
7.	.05		.30			-.42		.45	.90		.62	.55
8.	.08						.35	.41	.62	-1.12	.49	1.00
9.	.05		.10				.49	.35	.45		1.08	.70
10.	.02		.15	1.28			-.05	-.28		.45		.40
11.	-.15		.21	1.24					.22	-.76		.19
12.	-.25		.75	1.00				.94	.40	-.18	1.80	.10
13.	-.38		1.00		.40	.40	.14	.61	.20	+.04	1.50	.10
14.	-.55		1.12	.59					.15	-.16	1.08	.08
15.	-.70		.99	.69		.40	.01	.45	-.05			.18
16.	-.85		.72	.35				.62	.10		1.38	.22
17.			.96		-.20	.30						.02
18.				.41				.48	.10	.48	1.25	.08
19.	-1.20			.44	-.05				.17	.88		.21
20.		0.24	.85	.40					.28		1.22	
21.			.82	.72		.20	-.39		.22		.82	.48
22.			.52	.64				-1.15	.25		.65	
23.			.49	.52	-.11			-1.18	.45		.71	
24.							+.10	-1.00	.65	1.74		
25.			.29	.68	-.30	-.21		-1.02		1.04	.44	1.25
26.			.12	.80		-.45	-.24	-1.05	-.90	.64	.35	
27.			.01	.72	-.31	+.11	.41	-.35	-1.17		.20	1.48
28.			.14	.71		-.10	-.59		-1.25			1.02
29.			-.20				-.60		-1.25			.78
30.			.11						-.25		.48	
31.					-.40					1.16		



*Daily discharge, in second-feet, at station No. 1 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	112.00	0.40	7.20	16.....	13.60	36.20	122.00
2.....	94.80	.40	5.92	17.....	12.60	52.50	124.00
3.....	79.60	2.50	7.20	18.....	8.10	67.00	154.00
4.....	65.20	11.00	6.40	19.....	6.72	85.00	184.00
5.....	52.00	13.00	5.92	20.....	5.47	85.00	140.00
6.....	41.00	13.90	4.10	21.....	4.43	85.00	107.00
7.....	36.60	14.80	2.66	22.....	3.60	85.00	67.00
8.....	32.20	15.70	12.00	23.....	2.90	85.00	45.00
9.....	27.80	16.60	16.60	24.....	2.29	85.00	27.00
10.....	23.50	13.00	13.60	25.....	1.74	79.00	56.20
11.....	19.60	17.50	12.60	26.....	1.20	54.00	37.80
12.....	18.40	22.00	11.40	27.....	1.00	39.00	25.00
13.....	17.20	27.00	46.00	28.....	.80	33.80	24.40
14.....	16.00	29.00	86.40	29.....	.64	27.00	31.00
15.....	14.80	39.00	208.00	30.....	.52	20.50	22.00
				31.....	.40	.....	25.00

*Daily discharge, in second-feet, at station No. 1 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	13.0	(a)	15.0	35	40.0	3.0	6.0	0.2	25.0	3.3	82	80.0
2.....	13.0	(a)	13.0	28	50.0	3.0	8.0	30.0	30.0	1.8	90	90.0
3.....	13.0	(a)	11.0	21	40.0	3.0	16.0	20.0	60.0	1.0	110	72.0
4.....	11.0	(a)	7.9	27	60.0	3.0	11.0	13.0	80.0	.2	70	43.0
5.....	11.0	(a)	5.9	29	80.0	3.0	8.1	1.2	41.0	.2	61	25.0
6.....	10.0	(a)	5.1	29	37.0	3.0	5.3	2.0	39.0	.2	20	23.0
7.....	10.0	(a)	4.3	80	34.0	3.1	4.6	2.9	37.0	.2	26	24.0
8.....	11.0	(a)	8.0	75	31.0	3.1	3.8	3.2	26.0	.1	22	41.0
9.....	10.0	(a)	11.0	70	28.0	3.2	2.6	3.8	21.0	.2	44	29.0
10.....	9.0	(a)	12.0	54	25.0	3.2	8.1	4.6	18.0	2.9	110	19.0
11.....	6.4	(a)	13.0	52	23.0	3.2	40.0	2.4	14.0	.9	100	13.0
12.....	5.0	(a)	31.0	41	21.0	3.3	20.0	.3	19.0	5.9	85	11.0
13.....	3.5	(a)	41.0	33	19.0	3.3	12.0	1.7	13.0	10.0	67	7.2
14.....	2.2	(a)	46.0	25	16.0	3.3	10.0	2.3	12.0	6.2	44	11.0
15.....	1.2	(a)	41.0	29	12.0	3.3	9.0	2.9	10.0	12.0	30	13.0
16.....	.6	(a)	28.0	35	9.0	3.8	8.0	1.7	11.0	10.0	60	14.0
17.....	.4	(a)	39.0	40	5.6	4.3	7.0	2.2	9.0	40.0	80	9.0
18.....	.2	(a)	37.0	19	6.8	4.6	6.0	2.7	7.2	21.0	52	7.6
19.....	.1	(a)	37.0	20	8.1	4.9	5.0	3.0	6.1	36.0	60	13.0
20.....	(a)	14	35.0	19	8.0	5.2	4.0	1.0	4.6	35.0	51	40.0
21.....	(a)	60	34.0	30	8.0	5.6	3.4	.5	5.3	40.0	34	21.0
22.....	(a)	100	23.0	27	7.0	5.6	2.6	.1	5.0	70.0	27	60.0
23.....	(a)	130	22.0	23	7.0	5.6	1.8	.1	2.9	120.0	29	90.0
24.....	(a)	80	19.0	26	5.6	5.6	11.0	.2	1.5	81.0	24	80.0
25.....	(a)	60	16.0	28	4.3	5.5	8.0	.2	1.0	43.0	20	52.0
26.....	(a)	50	11.0	33	4.2	3.0	5.1	.2	.4	27.0	18	70.0
27.....	(a)	40	8.8	30	4.2	11.0	3.2	3.8	.1	135.0	13	66.0
28.....	(a)	30	6.6	29	4.0	7.2	1.9	3.0	.1	90.0	40	42.0
29.....	(a)	20	5.6	25	3.8	7.0	1.8	2.0	.1	80.0	30	32.0
30.....	(a)	.....	11.0	35	3.6	6.0	1.0	1.0	5.0	60.0	21	20.0
31.....	(a)	.....	60.0	.....	3.3	.....	1.0	3.0	.....	48.0	.....	15.0

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station 50.

*Monthly discharge at station No. 1 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	23.10	1,420	June.....	4.40	264
November.....	38.50	2,300	July.....	7.59	467
December.....	52.80	3,260	August.....	3.72	229
1912.			September.....	16.80	1,000
January.....	4.21	259	October.....	31.70	1,950
February.....	20.10	1,170	November.....	50.70	3,120
March.....	21.20	1,300	December.....	36.50	2,240
April.....	34.90	2,080	The year.....	20.90	15,300
May.....	19.50	1,200			

*Discharge measurements at station No. 2 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
		Feet.	Sec.-ft.
Aug. 13	E. O. Christiansen.....	0.47	0.02
Sept. 27	do.....	.48	
Nov. 21	do.....	.55	.03
Dec. 27	do.....	.61	.10

NOTE.—Channel of sand, mud, and gravel; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 2 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.45		0.60	0.60	.....
2.....										.58		
3.....	0.44		0.39	0.44			0.61					0.60
4.....	.42	(a)	.36	.51	0.76		.56	.51		.51		.61
5.....	.41		.35	.54			.50	.45	.60	.50	.50	.52
6.....	.42			.59	.70		.49		.59	.50		.51
7.....	.42		.35					.48	.61		.50	.52
8.....	.45	(a)					.46	.45	.52	.50	.50	.60
9.....	.41	(a)	.40				.45	.55	.52		.55	.56
10.....	.41	(a)	.40	.60			.50	.55		.52		.51
11.....	(a)	(a)	.41	.54					.51	.51		.51
12.....	(a)	(a)	.51	.54				.46	.58	.55	.60	.48
13.....	(a)	(a)	.69		.51	.30	.51	.48	.55	.50	.60	.46
14.....	(a)	(a)	1.00	.50				.50	.55	.51	.51	.48
15.....	(a)	(a)	.89	.52		.28	.48	.50	.52			.52
16.....	(a)	(a)	.70	.64				.48	.55		.59	.55
17.....		(a)	.76		.40	.30						.51
18.....		(a)		.50				.49	.54	.55	.60	.50
19.....	(a)			.54	.38				.51	.55		.52
20.....	(a)	0.63	.61	.55					.50		.60	.....
21.....	(a)		.61	.60		.20	.55		.50		.55	.60
22.....	(a)		.52	.55				.38	.50		.52	.....
23.....	(a)		.49	.55	.32		.50	.40	.49		.55	.....
24.....	(a)						.71	.50	.49	.64		.....
25.....			.45	.56	.28	.51		.50		.54	.55	.61
26.....			.44	.61		.48	.72	.49	.49	.50	.52	.....
27.....	(a)		.42	.58	.21	.48	.55	.50	.49		.51	.62
28.....	(a)		.42	.55		.45	.45		.49			.55
29.....	(a)		.41				.45		.48			.55
30.....	(a)		.60						.60		.60	.....
31.....										.55		.....

a Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Daily discharge, in second-feet, at station No. 2 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.05	.....	.....	11.....	0.02	0.10	.....	21.....	.....	0.10	0.05
2.....	0.05	.....	.....	12.....	0.02	0.10	.....	22.....	.....	0.10	.....
3.....	0.05	.....	.....	13.....	0.02	0.10	0.10	23.....	.....	0.10	.....
4.....	0.05	.....	.....	14.....	0.05	0.10	0.10	24.....	.....	0.10	.....
5.....	0.05	0.05	.....	15.....	0.05	0.10	0.15	25.....	.....	0.10	0.10
6.....	0.05	0.05	.....	16.....	0.05	0.10	0.10	26.....	.....	0.05	0.05
7.....	0.05	0.05	.....	17.....	0.05	0.10	0.10	27.....	.....	0.05	0.05
8.....	0.05	0.05	.....	18.....	0.05	0.10	0.15	28.....	.....	0.05	0.05
9.....	0.05	0.10	.....	19.....	0.05	0.10	0.15	29.....	.....	0.10	0.10
10.....	0.02	0.10	.....	20.....	0.10	0.10	0.10	30.....	.....	0.05	0.05
								31.....	.....	0.05	0.05

*Daily discharge, in second-feet, at station No. 2 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....									0.10	0.10	.....
2.....											0.10
3.....						0.60					0.10
4.....	(a)			0.30	(a)			0.10			0.10
5.....	(a)										
6.....				.20	(a)			.10			
7.....											.10
8.....											
9.....											
10.....			0.10								
11.....											
12.....										.10	
13.....		0.20								.10	
14.....		.50									
15.....		.40									
16.....		.20									
17.....		.30									
18.....										.10	
19.....										.10	
20.....	0.10										
21.....			.10								.10
22.....											
23.....											
24.....						.20			.10		
25.....											.10
26.....			.10			.20					.10
27.....											
28.....											
29.....											
30.....		.10						.10		.10	
31.....				(a)							

<sup>a</sup> Channel dry.

*Monthly discharge at station No. 2 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	—0.03	1.84	June.....	0.01	0.60
November.....	— .08	4.76	July.....	.10	6.15
December.....	.10	6.15	August.....	.10	6.15
1912.			September.....	.20	11.90
January.....	.02	1.23	October.....	.30	18.40
February.....	.20	11.50	November.....	.20	11.90
March.....	.25	15.40	December.....	.10	6.15
April.....	.10	5.95			
May.....	.05	3.07	The year.....	.14	98.40

*Discharge measurements at station No. 3 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13.....	-0.04	1.05	Nov. 21.....	0.72	13.0
Sept. 27.....	- .12	.72	Dec. 27.....	1.11	26.4

Bed of stream, composed of gravel and cobbles, is fairly smooth and probably permanent. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 3 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomén, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		(a)						-0.02		0.25	1.11	.....
2.....		(a)								.11		
3.....	0.12	(a)	0.17	0.41			0.49					1.05
4.....	.08	(a)	.09	.62	1.03		.22	.33		- .10		1.02
5.....	.05	(a)	.02	.71		+0.30	.02	.08	1.20	- .12	.98	.70
6.....	.06	(a)		.73	.70		- .10		.90	- .14		.61
7.....	.08	(a)	.02			+ .34		.04	.96		.64	.64
8.....	.12	(a)					- .25	.02	.78	- .22	.54	.92
9.....	.10	(a)	.10				- .35	.05	.54		.92	.62
10.....	.05	(a)	.15	1.19			.20	.00		.05		.50
11.....	-.02	(a)	.22	1.13					.32	.01		.39
12.....	-.08	(a)	.80	.96				-.09	.42	.28	.85	.28
13.....	-.10	.08	.98		.30	.28	.14	-.04	.26	.14	.70	.14
14.....	-.15	.08	1.02	.75						.05	.64	.14
15.....	-.18	(a)	.89			.20	- .01	.05				.38
16.....	-.20	(a)	.72	.46				.01			.99	.51
17.....		(a)	.99		.10	.20				.52		.25
18.....		(a)		.64				.04	.10	.98	1.01	.18
19.....	-.25	-.75		.66	.20				.08			.38
20.....	-.26	.25	.99	.49					.02		.98	
21.....	-.28		.97	.78		.10	- .15		.05		.73	52
22.....	-.34		.78	.71				-.10	.02		.66	
23.....	-.38		.68	.63	.05		- .35	-.10	.00		.71	
24.....	-.40						.12	-.11	-.02	1.29		
25.....			.41	.77	.00	.10	- .12	- .12		.86	.54	1.01
26.....			.21	.85		+ .31	- .25	- .14	-.10	.70	.40	
27.....	-.40		.10	.80	+ .01	.01	- .28	.08	-.12		.30	1.11
28.....	-.42		.02	.79		+ .02	- .35		-.15			.81
29.....	-.45		+ .09				- .40		-.18			.64
30.....	-.50		.12						.35		.52	
31.....					+ .15					.81		

a Channel dry.

*Daily discharge, in feet, at station No. 3 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	40.0	0.5	4.1	11.....	10.0	13.0	3.0	21.....	1.5	30.0	42.0
2.....	34.0	.5	2.5	12.....	8.2	14.5	2.6	22.....	1.4	30.8	32.0
3.....	30.0	2.5	1.2	13.....	6.4	16.0	16.6	23.....	1.2	31.6	22.8
4.....	26.0	6.4	1.2	14.....	4.9	19.0	34.8	24.....	1.1	31.6	13.3
5.....	22.0	13.0	1.1	15.....	3.6	22.8	70.0	25.....	1.0	31.6	34.0
6.....	19.0	13.3	.9	16.....	2.7	22.0	46.0	26.....	.8	19.0	19.6
7.....	16.0	13.6	1.2	17.....	2.5	22.0	58.0	27.....	.7	13.6	13.0
8.....	14.5	14.2	2.6	18.....	2.3	24.0	70.0	28.....	.6	13.0	6.1
9.....	13.0	14.5	5.2	19.....	2.0	26.0	82.0	29.....	.5	8.6	16.3
10.....	11.5	12.7	2.7	20.....	1.7	28.0	62.0	30.....	.4	6.1	10.0
								31.....	.5		13.0

Daily discharge, in second-feet, at station No. 3 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	-----	(a)	4.00	10.00	15.00	-----	4.00	0.10	18.00	4.20	26.00	20.00
2.....	-----	(a)	3.50	8.00	15.00	-----	5.00	.20	20.00	2.60	30.00	35.00
3.....	2.7	(a)	3.30	7.00	18.00	-----	8.00	10.00	33.00	1.70	40.00	24.00
4.....	2.3	(a)	2.40	11.00	23.00	-----	3.90	5.30	40.00	.80	25.00	23.00
5.....	2.0	(a)	1.70	13.00	30.00	4.9	1.70	2.30	30.00	.70	21.00	13.00
6.....	2.1	(a)	1.70	14.00	13.00	-----	.80	2.10	19.00	.60	16.00	10.00
7.....	2.3	(a)	1.70	40.00	10.00	6.1	.60	1.90	21.00	.50	11.00	11.00
8.....	2.7	(a)	2.10	37.00	8.00	-----	.30	1.70	15.00	.40	8.90	20.00
9.....	2.5	(a)	2.50	35.00	7.00	-----	.20	2.10	8.90	.80	20.00	11.00
10.....	2.0	(a)	3.00	30.00	6.00	-----	3.60	1.50	7.00	1.20	40.00	8.20
11.....	1.4	(a)	3.90	27.00	5.00	-----	30.00	1.20	5.20	1.50	38.00	6.20
12.....	.9	(a)	16.00	21.00	5.00	-----	10.00	.90	6.80	4.60	17.00	4.60
13.....	.8	2.3	21.00	18.00	4.90	4.60	2.90	1.20	4.40	2.90	13.00	2.90
14.....	.6	2.3	23.00	14.00	4.30	-----	3.00	1.60	4.00	1.20	11.00	2.90
15.....	.5	(a)	18.00	12.00	3.70	3.60	.80	2.10	3.60	1.20	10.00	6.10
16.....	.4	(a)	14.00	7.00	3.10	-----	.80	1.50	3.30	1.00	22.00	8.40
17.....	.4	(a)	21.00	9.00	2.50	3.60	.80	1.70	2.90	8.60	25.00	4.20
18.....	.3	(a)	21.00	11.00	3.00	-----	.70	1.90	2.50	21.00	22.00	3.40
19.....	.3	.1	21.00	12.00	3.60	-----	.70	1.70	2.30	25.00	25.00	6.10
20.....	.3	4.2	21.00	8.00	3.20	-----	.60	1.40	1.70	30.00	21.00	12.00
21.....	.2	15.0	21.00	15.00	2.80	2.50	.60	1.00	2.10	30.00	14.00	8.60
22.....	.2	30.0	15.00	13.00	2.40	-----	.40	.80	1.70	35.00	12.00	25.00
23.....	.1	40.0	12.00	11.00	2.00	-----	.20	.80	1.50	40.00	13.00	40.00
24.....	.1	20.0	9.30	13.00	1.80	-----	2.70	.80	1.40	38.00	11.00	30.00
25.....	.1	10.0	6.60	15.00	1.50	2.50	1.00	.70	1.10	18.00	8.90	22.00
26.....	.1	6.0	4.00	17.00	1.50	-----	.30	.60	.80	13.00	6.40	25.00
27.....	.1	5.0	2.50	16.00	1.60	-----	.20	2.30	.70	40.00	4.90	26.00
28.....	.1	5.0	1.70	16.00	2.00	-----	.20	2.00	.60	35.00	15.00	16.00
29.....	.1	4.0	2.40	10.00	2.40	-----	.10	1.50	.50	35.00	12.00	11.00
30.....	.1	-----	3.00	15.00	2.80	-----	.10	1.00	5.70	30.00	8.60	10.00
31.....	.1	-----	15.00	-----	3.10	-----	.10	1.50	-----	16.00	-----	10.00

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 3 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	9.03	558	June.....	4.00	238
November.....	17.10	1,020	July.....	2.56	157
December.....	22.20	1,370	August.....	1.79	110
1912.			September.....	8.82	525
January.....	.83	51	October.....	14.20	1,873
February.....	4.96	285	November.....	18.80	1,120
March.....	9.62	592	December.....	15.20	935
April.....	16.20	964	The year.....	8.18	6,240
May.....	6.36	391			

*Discharge measurements at station No. 4 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
Aug. 13	E. O. Christiansen..	<i>Feet.</i> 0.74	<i>Sec.-ft.</i> 0.15	Nov. 21	E. O. Christiansen..	<i>Feet.</i> 0.78	<i>Sec.-ft.</i> 0.51
Sept. 27	.....do.....	.74	.14	Dec. 27	.....do.....	.80	.77

NOTE.—Bed of stream of sand and gravel, smooth, probably slightly shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily discharge, in second-feet, at station No. 4 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	1.08	(a)	(a)	11.....	0.45	(a)	0.38	21.....	(a)	0.45	0.45
2.....	.08	(a)	(a)	12.....	.45	(a)	.24	22.....	(a)	.52	.24
3.....	.94	(a)	(a)	13.....	.38	(a)	.66	23.....	(a)	.59	(a)
4.....	.80	(a)	(a)	14.....	.38	.31	1.08	24.....	(a)	.66	(a)
5.....	.73	(a)	(a)	15.....	.31	.31	1.92	25.....	(a)	.66	.80
6.....	.66	(a)	(a)	16.....	.24	(a)	1.92	26.....	(a)	.45	.45
7.....	.66	(a)	(a)	17.....	(a)	(a)	1.08	27.....	(a)	.38	.38
8.....	.59	(a)	.24	18.....	(a)	.24	1.08	28.....	(a)	.45	.24
9.....	.52	(a)	.45	19.....	(a)	.31	1.36	29.....	(a)	.24	.52
10.....	.45	(a)	.24	20.....	(a)	.38	.66	30.....	(a)	(a)	.38
								31.....	(a)	.....	.45

*a* Channel dry.

*Daily gage height, in feet, at station No. 4 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.71		0.82	0.80	.....
2.....										.79		.....
3.....	0.72		0.49	0.60			0.80					0.78
4.....	.70			.66	1.22		.75	.79		.75		.80
5.....	.70			.66		0.28	.74	.72	0.89	.74	.84	.75
6.....	.70			.64	1.05		.71		.84	.74		.72
7.....	.70		.35			.25		.74	.91		.75	.72
8.....	.72						.69	.72	.90	.72	.75	.78
9.....	.70		.38				.68	.75	.80		.80	.74
10.....	.70		.38	.75			.75	.74		.75		.74
11.....	.70		.54	.74					.75	.75		.72
12.....	.70		.70	.68				.71	.79	.78	.85	.72
13.....	.69		.79			.50	.71	.75	.75	.78	.82	.71
14.....	.69		.90	.61	.80				.75	.76	.78	.72
15.....	.68		.80	.69		.49	.69	.76	.74			.75
16.....	.65		.62	.68				.72	.79		.80	.78
17.....			.89		.60	.51						.72
18.....				.68				.75	.78	.78	.78	.74
19.....	.64			.70	.56				.78	.80		.78
20.....	.62	0.83	.72	.69					.75		.80	.....
21.....	.62		.70	.80		.50	.52		.75		.79	.75
22.....	.62		.62	.76				.68	.80		.75	.....
23.....	.61		.66	.68	.50			.68	.78		.75	.....
24.....	.60						.65	.70	.75	.86		.....
25.....			.60	.71	.50	.60		.68		.85	.75	.75
26.....			.60	.76		.58	.55	.66	.74	.82	.78	.....
27.....	.62		.58	.72	.45	.60	.55	.75	.73		.75	.80
28.....	.61		.52	.72		.56	.55		.72			.75
29.....	.61		.51				.52		.71			.72
30.....	.60		.64						.85		.78	.....
31.....					.35					.74		.....

Daily discharge, in second-feet, at station No. 4 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.25	(a)	0.10	0.50	0.50	-----	0.10	0.15	0.50	1.10	0.80	2.00
2.	.25	-----	.10	.20	.50	-----	.40	.20	.80	.75	.50	4.00
3.	.25	-----	.05	.05	1.00	-----	.80	1.00	5.00	.60	4.00	.65
4.	.10	(a)	(a)	.10	6.68	-----	.45	.75	3.50	.45	2.00	.80
5.	.10	(a)	(a)	.10	6.00	-----	.40	.25	2.05	.40	1.35	.45
6.	.10	-----	-----	.05	4.30	-----	.15	.20	1.35	.40	.50	.25
7.	.10	-----	-----	4.50	2.00	-----	.10	.40	2.35	.30	.45	.25
8.	.25	(a)	-----	4.00	.50	-----	.10	.25	2.20	.25	.45	.65
9.	.10	-----	-----	2.00	.20	-----	.10	.45	.80	.30	.80	.40
10.	.10	-----	(a)	.45	.20	-----	.45	.40	.60	.45	5.00	.40
11.	.10	-----	.10	.40	.20	-----	1.00	.30	.45	.45	4.00	.25
12.	.10	-----	.10	.10	.20	-----	.40	.15	.75	.65	1.50	.25
13.	.10	-----	.75	.10	.20	-----	.15	.45	.45	.65	1.10	.15
14.	.10	-----	2.20	.05	.80	-----	.30	.50	.45	.50	.65	.25
15.	.10	-----	.80	.10	.50	-----	.10	.50	.40	.50	.20	.45
16.	.05	-----	.05	.10	.50	-----	.10	.25	.75	.30	.80	.65
17.	.05	-----	2.05	.10	.05	-----	.10	.35	.70	1.00	2.00	.25
18.	.05	-----	3.00	.10	.05	-----	.05	.45	.65	.65	.65	.40
19.	.05	(a)	4.00	.10	.05	-----	.05	.60	.65	.80	1.50	.65
20.	.05	1.20	.25	.10	.05	-----	.05	.30	.45	.80	.80	1.00
21.	.05	3.00	.10	.80	.05	-----	.05	.20	.45	.80	.75	.45
22.	.05	5.00	.05	.50	.05	-----	.05	.10	.80	3.00	.45	2.00
23.	.05	6.00	.10	.10	.05	-----	.05	.10	.65	5.00	.45	5.00
24.	.05	4.00	.05	.10	.05	-----	.05	.10	.45	1.65	.45	3.00
25.	.05	2.00	.05	.15	.05	0.05	.05	.10	.40	1.50	.45	.45
26.	.05	1.00	.05	.50	.05	.05	.05	.10	.40	1.10	.65	.60
27.	.05	.50	.05	.25	.05	.05	.05	.45	.30	6.00	.45	.80
28.	.05	.50	.05	.25	.05	-----	.05	.30	.25	4.00	1.00	.45
29.	.05	.30	.05	.20	.05	-----	.05	.20	.15	4.00	.80	.25
30.	.05	-----	.05	.10	.05	-----	.05	.10	1.50	2.00	.65	.20
31.	.05	-----	2.00	-----	.05	-----	.05	.20	-----	.40	-----	.20

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 4 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.31	19.30	June.....	0.05	2.98
November.....	.20	11.80	July.....	.19	11.70
December.....	.49	30.20	August.....	.32	19.70
1912.			September.....	1.01	60.10
January.....	.09	5.53	October.....	1.31	80.60
February.....	.81	46.60	November.....	1.17	69.60
March.....	.52	32.00	December.....	.89	54.70
April.....	.54	32.10	The year.....	.64	465.00
May.....	.81	49.80			

Discharge measurements at station No. 5 at 2,700-foot level, near Hilo, Hawaii, in 1912.

Date.	Hydrographer.	Gage height.	Discharge.
Aug. 13	E. O. Christiansen	Feet.	Sec.-ft.
Sept. 27	do.	0.24	-----
Nov. 21	do.	-----	(a)
Dec. 25	do.	.59	0.20
		.60	.21

<sup>a</sup> Channel dry.

NOTE.—Bed of stream of sand, silt, and gravel; probably shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 5 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								(a)	-----	0.25	0.52	-----
2.										.25		
3.	0.58		(a)	0.41			0.60					0.55
4.	.55	(a)	(a)	.42	0.76		.55	0.60		(a)		.61
5.	.54	(a)	(a)	.46		(a)	.50	(a)	0.59	(a)	.55	.52
6.	.55			.48	.50		.48		.55	(a)		.48
7.	.55		(a)			(a)		.50	.59		.50	.48
8.	.58	(a)					(a)	.45	.50	(a)	.50	.55
9.	.56	(a)	(a)				(a)	.42	.50		.59	.54
10.	.54	(a)	(a)	.50			(a)	.49		(a)		.54
11.	.51	(a)	(a)	.50					.44	(a)		.52
12.	.50	(a)	0.47	.48	(a)			(a)	.50	.32	.55	.45
13.	.60	(a)	.47			0.40	.50	.12	.40	(a)	.52	.45
14.	.44	(a)	.60	.31					.40	(a)	.39	.46
15.	.40	(a)	.49	.42		.38	(a)	.35	.35			.52
16.	.35	(a)	.50	.41				(a)	.36		.55	.56
17.		(a)	.72		(a)	.41						.46
18.		(a)		.50				.34	(a)	.50	.52	.45
19.	(a)	(a)		.50	(a)				(a)	.50		.51
20.	(a)	.71	.60	.44					(a)		.55	
21.	(a)		.59	.50		(a)	(a)		(a)		.59	.52
22.	(a)		.42	.44			(a)	(a)	(a)		.55	
23.	(a)		.51	.41	(a)		(a)	(a)	(a)		.52	
24.	(a)						(a)	(a)	(a)		.56	
25.			.46	.51	(a)	(a)		(a)		.52	.55	.58
26.			.31	.52		(a)	(a)	(a)	(a)	.50	.55	
27.	(a)		.00	.52	(a)	(a)	(a)	.35	(a)		.52	.61
28.	(a)		.00	.52		(a)	(a)		(a)			.54
29.			.00				(a)		(a)			.54
30.	(a)		.50						.38		.56	
31.					(a)					.51		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 5 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.	0.38	0.10	0.15	11.	0.20	0.19	0.16	21.	0.15	0.20	0.24
2.	.35	.10	.12	12.	.20	.20	.14	22.	.14	.21	.21
3.	.31	.10	.11	13.	.19	.20	.20	23.	.13	.21	.20
4.	.28	.12	.12	14.	.18	.20	.28	24.	.12	.21	.18
5.	.24	.15	.14	15.	.17	.20	.28	25.	.11	.21	.28
6.	.21	.15	.12	16.	.16	.20	.48	26.	.10	.20	.20
7.	.21	.16	.11	17.	.15	.20	.25	27.	.10	.20	.20
8.	.20	.17	.14	18.	.15	.20	.25	28.	.10	.21	.20
9.	.20	.18	.18	19.	.15	.20	.26	29.	.10	.19	.21
10.	.20	.19	.14	20.	.15	.20	.26	30.	.10	.18	.20
								31.	.10		.20



*Daily discharge, in second-feet, at station No. 5 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.20	(a)	(a)	0.20				(a)			0.10	
2.	.20	(a)	(a)	.10								
3.	.20	(a)	(a)	.05			0.20					0.15
4.	.15	(a)	(a)	.05	0.35		.15	0.20		(a)		.20
5.	.15	(a)	(a)	.10		(a)	.10	(a)	0.20	(a)	.15	.10
6.	.15	(a)	(a)	.10	.10	(a)	.10		.15	(a)		.10
7.	.15	(a)	(a)	.20		(a)		.10	.20		.10	.10
8.	.20	(a)	(a)	.15				.05	.10	(a)	.10	.15
9.	.15	(a)	(a)	.10				.05	.10		.20	.15
10.	.15	(a)	(a)	.10				.10		(a)		.15
11.	.10	(a)	(a)	.10					.05	(a)		.10
12.	.10	(a)	0.10	.10	(a)			(a)	.10		.15	.05
13.	.10	(a)	.10	.10	(a)	0.05	.10		.05	(a)	.10	.05
14.	.05	(a)	.20	.05	(a)				.05	(a)	.05	.10
15.	.05	(a)	.10	.05	(a)	.05	(a)	.05	.05			.10
16.	.05	(a)	.10	.05	(a)		(a)	(a)	.05		.15	.15
17.	.05	(a)	.30	.05	(a)	.05	(a)					.10
18.	.05	(a)	.30	.10	(a)		(a)		(a)	0.10	.10	.05
19.	(a)	(a)	.20	.10	(a)		(a)		(a)	.10		.10
20.	(a)	0.30	.20	.05	(a)		(a)		(a)		.15	
21.	(a)	.40	.20	.10	(a)	(a)	(a)		(a)		.20	.10
22.	(a)	.50	.05	.05	(a)	(a)	(a)	(a)	(a)		.15	
23.	(a)	1.00	.10	.05	(a)	(a)	(a)	(a)	(a)		.10	
24.	(a)	.60	.10	.10	(a)	(a)	(a)	(a)	(a)	.15		
25.	(a)	.40	.10	.10	(a)	(a)	(a)	(a)	(a)		.15	.20
26.	(a)	.30		.10	(a)	(a)	(a)	(a)	(a)	.10	.15	
27.	(a)	.20	(a)	.10	(a)	(a)	(a)	.05	(a)		.10	.20
28.	(a)	.10	(a)	.10	(a)	(a)	(a)		(a)			.15
29.	(a)	.10	(a)	.10	(a)		(a)		(a)			.15
30.	(a)		.10	.10	(a)				.05		.15	
31.	(a)		.40		(a)					.10		

*a* Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 5 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.18	10.90	June.....	0.02	1.19
November.....	.18	10.70	July.....	.05	3.07
December.....	.20	12.30	August.....	.08	4.92
1912.			September.....	.08	4.76
January.....	.07	4.30	October.....	.20	12.30
February.....	.13	7.48	November.....	.15	8.93
March.....	.09	5.53	December.....	.15	9.22
April.....	.09	5.36	The year.....	.10	71.00
May.....	.07	4.30			

*Discharge measurements at station No. 6 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13	E. O. Christiansen		(a)
Sept. 27	do.		(a)
Nov. 21	do.	0.10	
Dec. 27	do.	.38	0.05

<sup>a</sup> Channel dry.

NOTE.—Bed of stream of sand, silt, and gravel; probably shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 6 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								(a)		0.25	0.40	.....
2										.20		
3	0.32		(a)	0.32			0.58					0.34
4	.31	(a)	(a)	.33	0.70		.32	0.58		(a)		.32
5	.30	(a)	(a)	.34		(a)	.22	(a)	0.55	(a)	.32	(a)
6	.32			.40	.50		.22		.40	(a)		(a)
7	.34		(a)			(a)		.44	.44		(a)	(a)
8	.38	(a)					(a)	.41	.34	(a)	(a)	.31
9	.35	(a)	(a)				(a)	.35	.24		.35	.20
10	.32	(a)	(a)	.41			(a)	.41		(a)		(a)
11	(a)	(a)	(a)	.38					.24	(a)		(a)
12	(a)	(a)	0.29	.34				(a)	.30	(a)	.39	(a)
13	(a)	(a)	.36		(a)	(a)	.40	(a)	.25	(a)	.36	(a)
14	(a)	(a)	.41	.31				(a)	.30	(a)	.30	(a)
15	(a)	(a)	.34	.40		(a)	(a)	.15	.25			.21
16	(a)	(a)	.31					(a)	(a)		.38	.18
17		(a)	.66		(a)	(a)						(a)
18		(a)		.42				.14	(a)	.35	.34	(a)
19	(a)			.45	(a)			(a)	(a)	.32		.21
20	(a)	0.52	.58	.46					(a)		.30	
21	(a)		.51	.46		(a)	(a)		(a)		.20	.20
22	(a)		.41	.41	(a)			(a)	(a)		(a)	
23	(a)		.49	.39			(a)	(a)	(a)		.30	
24	(a)				(a)		.49	(a)	(a)	.38		
25			.42	.43		(a)		(a)		(a)	(a)	.32
26			(a)	.50		(a)	(a)	(a)	(a)	(a)	(a)	
27	(a)		(a)	.51	(a)	(a)	(a)	.18	(a)		(a)	.36
28	(a)		(a)	.50		(a)	(a)		(a)			(a)
29	(a)		(a)				(a)					.21
30	(a)		.43						.28		.35	
31					(a)					.30		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 6 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	0.10	(a)	0.01	11	0.05	0.04	0.02	21	(a)	0.05	0.03
2	.10	(a)	(a)	12	.05	.04	.03	22	(a)	.05	.01
3	.10	0.01		13	.04	.05	.05	23	(a)	.05	(a)
4	.10	.01	.02	14	.03	.05	.10	24	(a)	.05	(a)
5	.10	.02	.02	15	.03	.05	.10	25	(a)	.05	.05
6	.10	.03		16	.02	.05	.05	26	(a)	.05	.05
7	.10	.03	(a)	17	.01	.05	.05	27	(a)	.02	.02
8	.10	.03	.01	18	.01	.05	.05	28	(a)	.02	.02
9	.05	.03	.03	19	(a)	.05	.05	29	(a)	.01	.05
10	.05	.04	.02	20	(a)	.05	.05	30	(a)	.01	.05
								31	(a)		.05

<sup>a</sup> Channel dry.

Monthly discharge at station No. 6 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.03	2.26	June.....	0.00	0.00
November.....	.03	2.06	July.....	.02	1.23
December.....	.03	1.95	August.....	.02	1.23
1912.			September.....	.03	1.79
January.....	.01	.62	October.....	.04	2.46
February.....	.10	5.72	November.....	.01	.60
March.....	.10	6.15	December.....	.01	.62
April.....	.08	4.76	The year.....	.04	25.80
May.....	.01	.62			

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 7 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13.....	0.33	0.04	Nov. 21.....	0.39	0.06
Sept. 27.....	.21	.....	Dec. 27.....	.44	.11

NOTE.—Bed of stream of sand, silt, and gravel; probably shifting. One channel at all stages. This stream is tributary to the Waialuku River.

Daily gage height, in feet, at station No. 7 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bolin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.42		0.39	0.42	.....
2.....										.35		.....
3.....	0.32		0.33	0.31			0.48					0.42
4.....	.31	(a)	.31	.33	0.69		.45	.42		.25		.42
5.....	.30	(a)	.30	.38		(a)	.42	.30	0.44	.21	.41	.38
6.....	.35			.41	.50		.39		.45	.21		.36
7.....	.36		.30			(a)		.35	.58		.35	.35
8.....	.40	(a)					.35	.30	.42	.21	.38	.41
9.....	.39	(a)	.32				.32	.35	.40		.49	.38
10.....	.36	(a)	.32	.44			.38	.38		.32		.34
11.....	.31	(a)	.35	.44					.35	.31		.32
12.....	.30	(a)	.41	.36				.24	.39	.35	.46	.30
13.....	.28	0.24	.49		.40	0.23	.38	.32	.32	.31	.42	.28
14.....	.25	.20	.75	.32					.35	.32	.48	.29
15.....	.10	.15	.49	.38		.20	.35	.36	.32			.34
16.....	(a)	.10	.41	.36				.38	.36		.40	.36
17.....		(a)	.59	.40	.30	.30						.30
18.....		(a)		.40				.38	.34	.38	.40	.31
19.....	(a)	.32		.41	.24				.32	.40		.34
20.....	(a)	.74	.57	.40					.30		.44	
21.....	(a)		.51	.48		.28	.34		.31		.39	.40
22.....	(a)		.39	.44				.20	.29		.38	
23.....	(a)		.44	.38	.25		.32	.20	.25		.40	
24.....	(a)						.38	.23	.22	.48		
25.....			.39	.41	.21	.31		.20		.42	.38	.42
26.....			.32	.44		.28	.25	.20	.21	.40	.35	
27.....	(a)		.30	.44	.20	.32	.20	.34	.21		.32	.42
28.....	(a)		.29	.44		.29	.20		.21			.38
29.....	(a)		.29				.20		.20			.31
30.....	(a)		.34						.40		.40	
31.....					(a)					.40		

a Channel dry.

*Daily discharge, in second-feet, at station No. 7 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.10	0.01	0.01	11.....	0.05	0.05	0.03	21.....	0.05	0.05	0.05
2.....	.10	.01	.01	12.....	.05	.05	.03	22.....	.05	.05	.05
3.....	.10	.01	.01	13.....	.05	.05	.05	23.....	.04	.05	.03
4.....	.10	.03	.02	14.....	.05	.10	.10	24.....	.04	.05	.01
5.....	.10	.05	.02	15.....	.05	.10	.10	25.....	.03	.05	.05
6.....	.10	.05	.03	16.....	.05	.05	.05	26.....	.03	.05	.05
7.....	.10	.05	.03	17.....	.05	.05	.05	27.....	.02	.05	.04
8.....	.05	.05	.03	18.....	.05	.05	.10	28.....	.02	.05	.02
9.....	.05	.05	.03	19.....	.05	.05	.10	29.....	.01	.05	.05
10.....	.05	.05	.03	20.....	.05	.05	.05	30.....	.01	.02	.05
								31.....	.01	.....	.03

*Daily discharge, in second-feet, at station No. 7 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.05		0.05	0.05	.....
2.....										.05		
3.....							0.10					0.05
4.....					0.30		.05	.05				.05
5.....				0.05			.05		0.05		.05	.05
6.....	0.05			.05	.10		.05		.05			.05
7.....	.05							.05	.20		.05	.05
8.....	.05						.05		.05		.05	.05
9.....	.05							.05	.05		.10	.05
10.....	.05			.05			.05	.05				.....
11.....			0.05	.05					.05			.....
12.....			.05	.05					.05	.05	.10	.....
13.....			.10		.05		.05				.05	.....
14.....			.35						.05		.10	.....
15.....			.10	.05			.05	.05				.....
16.....			.05	.05				.05	.05		.05	.05
17.....			.20									.....
18.....				.05				.05		.05	.05	.....
19.....				.05						.05		.....
20.....		0.35	.15	.05							.05	.....
21.....			.10	.10							.05	.05
22.....			.05	.05							.05	.....
23.....			.05	.05							.05	.....
24.....							.05			.10		.....
25.....			.05	.05						.05	.05	.05
26.....				.05						.05	.05	.....
27.....				.05								.05
28.....				.05								.05
29.....												.....
30.....									.05		.05	.....
31.....										.05		.....

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

Monthly discharge at station No. 7 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.05	3.30	June.....	0.02	1.19
November.....	.05	2.82	July.....	.05	3.07
December.....	.04	2.60	August.....	.05	3.07
1912.			September.....	.07	4.17
January.....	.02	1.23	October.....	.20	12.30
February.....	.10	5.75	November.....	.15	8.93
March.....	.10	6.15	December.....	.05	3.07
April.....	.05	2.98	The year.....	.08	55.00
May.....	.05	3.07			

Discharge measurements at station No. 8 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.ft.		Feet.	Sec.ft.
Aug. 13.....	0.92	0.16	Nov. 21.....	1.05	0.84
Sept. 27.....	.73		Dec. 27.....	1.19	1.89

NOTE.—Bed of stream composed of gravel and small cobbles; is fairly smooth; shifting; one channel at all stages. This stream is tributary to Wailuku River.

Daily gage height, in feet, at station No. 8 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.80		1.05	1.05	
2.....										.98		
3.....	0.76		0.81	0.71			1.14					1.12
4.....	.75	(a)	.79	.74	1.19		1.10	.99		.84		1.15
5.....	.74	(a)	.74	.84		0.40	1.00	.88	1.19	.81	1.20	1.15
6.....	.76			.86	.90		.95		1.14	.81		1.12
7.....	.78		.70			.35	.90	.90	1.20		.95	1.12
8.....	.81	(a)					.90	.88	1.10	.80	1.00	1.15
9.....	.79	(a)	.78				.85	.90	1.00		1.20	1.14
10.....	.75	(a)	.74	1.11			.85	.90		.85		1.11
11.....	.72	(a)	.81	1.04					.94			1.04
12.....	.71	(a)	.98	.99				.80	1.01	1.02	1.20	.94
13.....	.70	(a)	.99		.81	.50	1.00	.91	.99	.85	1.11	.91
14.....	.70	(a)	1.32	.85					1.00	.85	.95	.92
15.....	.50	(a)	1.02	.99		.40	.88	.95	.96			1.01
16.....	.41	(a)	.82	.90				.89	.99		1.15	1.18
17.....		(a)	1.01		.72	.65						1.01
18.....		(a)		.89				.91	.95	1.08	1.16	1.02
19.....	(a)	0.68		.89	.71				.91	1.26		1.05
20.....	(a)	1.01	1.05	.86					.89		1.14	
21.....	(a)			1.05		.60	.81		.95		1.06	1.14
22.....	(a)		1.00	.88	1.01			.80	.85		1.02	
23.....	(a)		.90	.89	.69		.80	.80	.82		1.10	
24.....	(a)						.96	.80	.79	1.19		
25.....			.88	.96	.61	.84		.80		1.05	1.02	1.18
26.....			.82	1.02		.80	.89	.79	.75	.98	.98	
27.....	(a)		.78	1.02	.59	.84	.82	.90	.75		.95	1.20
28.....	(a)		.75	1.00		.80	.75		.74			1.12
29.....	(a)		.71				.70		.74			1.12
30.....	(a)		.81						1.19		1.00	
31.....					.50					1.02		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 8 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	2.88	(a)	0.05	11.....	0.24	0.32	0.04	21.....	0.05	0.90	0.12
2.....	2.22	(a)	.03	12.....	.20	.40	.01	22.....	.05	.96	.12
3.....	1.68	(a)	.02	13.....	.18	.48	.24	23.....	.05	1.02	.05
4.....	1.20	0.01	.03	14.....	.17	.60	1.08	24.....	.03	1.08	.05
5.....	.84	.05	.05	15.....	.15	.72	1.60	25.....	.01	1.20	.28
6.....	.52	.17	.02	16.....	.15	.60	.12	26.....	(a)	.56	.10
7.....	.48	.44	.02	17.....	.14	.66	.72	27.....	(a)	.28	.05
8.....	.44	.84	.02	18.....	.12	.72	.60	28.....	(a)	.28	.05
9.....	.36	1.36	.05	19.....	.10	.78	.90	29.....	(a)	.17	.22
10.....	.28	.24	.02	20.....	.05	.84	.28	30.....	(a)	.05	.20
								31.....	(a)	.....	.12

*a* Channel dry.

*Daily discharge, in second-feet, at station No. 8 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.03	0	0.80	0.50	1.40	0.01	0.20	0.05	0.80	0.90	0.90	2.00
2.....	.03	0	.40	.05	1.70	.01	1.00	.05	1.50	.50	.20	2.50
3.....	.03	0	.05	.01	1.00	.01	1.50	1.00	3.00	.60	3.00	1.35
4.....	.02	0	.05	.02	1.90	.01	1.20	.55	4.00	.10	1.50	1.60
5.....	.02	0	.02	.10	2.20	.01	.60	.15	1.90	.05	2.00	1.60
6.....	.03	0	.01	.15	.20	.01	.40	.10	1.50	.05	.20	1.35
7.....	.05	0	.00	3.00	.10	.01	.30	.20	2.00	.05	.40	1.35
8.....	.05	0	.05	2.50	.10	.01	.20	.15	1.20	.05	.60	1.60
9.....	.05	0	.05	2.00	.10	.01	.15	.20	.60	.05	2.00	1.50
10.....	.02	0	.02	1.30	.05	.01	.15	.20	.50	.15	3.50	1.20
11.....	.01	0	.05	.85	.05	.10	2.00	.10	.35	.10	3.00	.85
12.....	.01	0	.50	.55	.05	.10	1.00	.05	.65	.70	2.00	.35
13.....	0	0	.60	.60	.05	.10	.60	.25	.55	.15	1.30	.25
14.....	0	0	3.35	.10	.20	.10	1.00	.30	.60	.15	.40	.30
15.....	0	0	.70	.55	.15	.10	.15	.40	.45	.15	.19	.65
16.....	0	0	.10	.20	.05	.10	.10	.20	.55	.05	1.60	1.85
17.....	0	0	.70	1.10	.01	.10	.10	.20	.30	2.00	2.00	.65
18.....	0	0	1.20	.20	.01	.10	.10	.25	.40	1.10	1.70	.70
19.....	0	0	1.00	.20	.01	.10	.05	.40	.25	2.65	2.00	.90
20.....	0	0.7	.90	.15	.01	.10	.05	.20	.20	1.50	1.50	1.50
21.....	0	.8	.60	.90	.01	.10	.05	.10	.40	1.50	.95	1.50
22.....	0	.8	.15	.70	.01	.10	.05	.05	.15	2.00	.70	2.50
23.....	0	.8	.20	.20	.01	.10	.05	.05	.10	4.00	1.20	5.00
24.....	0	.8	.20	.65	.01	.10	.45	.05	.05	1.90	.90	3.00
25.....	0	.8	.15	.45	.01	.10	.30	.05	.05	.90	.70	1.85
26.....	0	.8	.10	.70	.01	.05	.20	.05	.05	.50	.60	2.00
27.....	0	.8	.04	.70	.01	.10	.10	.20	.05	5.00	.40	2.00
28.....	0	.8	.02	.60	.01	.05	.05	.40	.02	2.00	1.00	1.35
29.....	0	.8	.01	.30	.01	.05	.01	.20	.02	2.20	.80	1.35
30.....	0	.....	.05	.70	.01	.05	.01	1.0	1.90	1.50	.60	.80
31.....	0	.....	1.00	.....	.01	.....	.01	.10	.....	.70	.....	.40

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 8 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.40	25.00	June.....	0.63	3.75
November.....	.52	31.40	July.....	.39	24.00
December.....	.24	14.90	August.....	.20	12.30
1912.			September.....	.80	47.60
January.....	.01	.61	October.....	1.07	65.80
February.....	.27	15.50	November.....	1.26	75.00
March.....	.42	25.80	December.....	1.48	91.00
April.....	.67	39.90	The year.....	.58	420.00
May.....	.30	18.40			

Discharge measurements at station No. 9 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Fect.</i>	<i>Sec.-ft.</i>		<i>Fect.</i>	<i>Sec.-ft.</i>
Aug. 13.....	0.48	0.14	Nov. 21.....	0.60	0.46
Sept. 27.....	.45	.08	Dec. 27.....	.73	1.47

NOTE.—This stream is tributary to Wailuku River.

Bed of stream of sand, gravel, and small cobbles; is fairly smooth and probably only slightly shifting.

One channel at all stages.

Daily gage height, in feet, at station No. 9 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Billkov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.42		0.62	0.78	
2.....										.60		0.60
3.....	0.58		0.57	0.55			0.65					.71
4.....	.55	0.41	.55	.59	0.73		.60	.63		.46		
5.....	.52	.41	.52	.61		+0.05	.58	.48	0.70	.44	.68	.62
6.....	.54			.61	.50		.58		.64	.45		.59
7.....	.55		.52			+ .10	.49	.70			.55	.60
8.....	.58	.40					.51	.44	.62	.45	.56	.70
9.....	.55	.40	.55				.50	.50	.60		.55	.61
10.....	.52	.38	.55	.69			.54	.50		.51		.58
11.....	.51	.38	.56	.67					.54	.49		.54
12.....	.51	.35	.61	.62				.44	.62	.61	.72	.52
13.....	.50	.50	.79		.45	.30	.54	.49	.58	.50	.68	.52
14.....	.50	.42	.90	.58					.56	.52	.60	.54
15.....	.48	.40	.80	.64		.23	.54	.52	.55			.55
16.....	.46	.39	.70	.54				.48	.58		.65	.58
17.....		.36	.97		.40	.40						.45
18.....		.31		.56				.48	.55	.54	.71	.40
19.....	.42	.53		.59	.38				.54	.59		.42
20.....	.41	.88	.89	.59					.52		.69	
21.....	.40		.82	.69		.38	.45		.51		.61	.60
22.....	.40		.72	.65				.44	.50		.58	
23.....	.40		.81	.59	.30			.45	.48	.48	.60	
24.....	.40							.58	.45	.48	.72	
25.....			.70	.60	.23	.52		.42		.65	.58	.68
26.....			.57	.67		.50	.42	.41	.45	.59	.58	
27.....	.41		.49	.63	.20		.54	.35	.52		.54	.72
28.....	.40		.46	.62			.49	.22	.45			.61
29.....	.40		.45				.20		.44			.61
30.....	.39		.52						.69		.58	
31.....					.10					.68		

*Daily discharge, in second-feet, at station No. 9 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Date.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	3.60	-0.15	0.32	11.....	0.62	.62	0.32	21.....	0.36	1.10	0.56
2.....	3.08	.15	.18	12.....	.62	.68	.29	22.....	.32	1.34	.46
3.....	2.56	.15	.15	13.....	.56	.74	.80	23.....	.29	1.46	.43
4.....	2.06	.32	.18	14.....	.56	.80	1.10	24.....	.29	1.58	.32
5.....	1.58	.50	.29	15.....	.56	.80	2.56	25.....	.26	1.70	2.56
6.....	1.04	.56	.18	16.....	.50	.56	3.86	26.....	.18	.80	1.70
7.....	.98	.62	.15	17.....	.50	.68	4.38	27.....	.18	.56	.43
8.....	.86	.68	.18	18.....	.50	.80	3.34	28.....	.15	.56	.36
9.....	.74	.74	.36	19.....	.43	.86	2.30	29.....	.15	.50	.74
10.....	.62	.56	.29	20.....	.39	.98	1.34	30.....	.15	.43	.62
								31.....	.15		.50

*Daily discharge, in second-feet, at station No. 9 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.40	0.05	0.50	1.00	0.70	.....	0.10	0.05	1.80	0.60	2.05	1.50
2.....	.40	.05	.50	.50	.80	.....	.20	.10	2.00	.50	2.50	2.50
3.....	.45	.05	.40	.30	1.00	.....	.80	1.00	2.50	.30	3.00	.50
4.....	.30	.05	.30	.45	1.45	.....	.50	.70	3.00	.10	2.00	1.30
5.....	.20	.05	.20	.55	2.00	.....	.45	.15	1.10	.10	1.00	.60
6.....	.30	.05	.20	.55	.15	.....	.45	.15	.75	.10	.60	.45
7.....	.30	.05	.20	.50	.15	.....	.30	.15	1.10	.10	.30	.50
8.....	.45	.05	.30	.40	.15	.....	.20	.10	.60	.10	.35	1.10
9.....	.30	.05	.30	.20	.15	.....	.15	.15	.50	.20	.30	.55
10.....	.20	.05	.30	1.05	.15	.....	.30	.15	.40	.20	3.00	.45
11.....	.20	.05	.35	.90	.10	.....	.30	.10	.30	.15	2.50	.30
12.....	.20	.05	.55	.60	.10	.....	.30	.10	.60	.55	1.35	.20
13.....	.15	.15	2.20	.50	.10	.....	.30	.15	.45	.15	1.00	.20
14.....	.15	.05	3.60	.45	.10	.....	.30	.20	.35	.20	.50	.30
15.....	.15	.05	2.30	.75	.10	.....	.30	.20	.30	.20	.60	.30
16.....	.10	.05	1.10	.30	.05	.....	.20	.15	.45	.10	.80	.45
17.....	.10	.05	4.50	.30	.05	0.05	.20	.15	.40	.40	1.00	.10
18.....	.05	.05	4.10	.35	.05	.....	.20	.15	.30	.30	1.30	.05
19.....	.05	.25	3.80	.45	.05	.....	.20	.15	.30	.45	1.20	.05
20.....	.05	3.30	3.45	.45	.05	.....	.20	.10	.20	.50	1.05	1.00
21.....	.05	3.50	2.55	1.05	.05	.05	.15	.10	.20	.50	.55	.50
22.....	.05	4.00	1.35	.80	.05	.....	.15	.10	.15	1.00	.45	1.50
23.....	.05	5.00	2.45	.45	.05	.....	.15	.15	.15	3.80	.50	3.00
24.....	.05	4.50	1.80	.50	.05	.....	.45	.10	.15	1.35	.50	2.00
25.....	.05	4.00	1.10	.50	.05	.20	.30	.10	.10	.80	.45	1.00
26.....	.05	3.00	.40	.90	.05	.15	.05	.05	.10	.45	.45	2.00
27.....	.05	2.00	.15	.70	.05	.30	.05	.20	.10	5.00	.30	1.35
28.....	.05	1.00	.10	.60	.05	.15	.05	.15	.10	3.00	.60	.55
29.....	.05	.80	.10	.50	.05	.....	.05	.10	.10	3.00	.50	.55
30.....	.05	.....	.20	.60	.05	.....	.05	.10	1.05	2.00	.45	.40
31.....	.05	.....	3.00	.....	.05	.....	.05	.20	.....	1.00	.....	.30

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 9 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.80	49.50	June.....	0.05	2.98
November.....	.71	42.40	July.....	.24	14.80
December.....	1.01	62.30	August.....	.18	11.10
1912.			September.....	.65	38.70
January.....	.16	9.84	October.....	.85	52.30
February.....	1.12	64.40	November.....	1.04	61.90
March.....	1.37	84.20	December.....	.82	50.40
April.....	.57	33.90	The year.....		
May.....	.26	16.00		.61	441.00



*Discharge measurements at station No. 10 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13	E. O. Christiansen.	0.73	.....	Nov. 21	E. O. Christiansen.	0.98	0.17
Sept. 27	.....do.....	.70	.....	Dec. 27	.....do.....	1.01	.59

NOTE.—Bed of stream of gravel and small cobbles, shifting. One channel at all stages.  
This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 10 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.80		0.82	0.98	.....
2.										.80		.....
3.	0.86		(a)	0.75			0.88					0.98
4.	(a)	(a)	(a)	.82	1.09		.81	.89		.75		1.01
5.	(a)	(a)	(a)	.85		(a)	.80	.80	1.00	.72	.95	.91
6.	.88			.90	.85		.80		.96	.71		.89
7.	.89					(a)		.86	1.00		.82	.88
8.	.91	(a)					.80	.81	.90	.71	.84	.98
9.	.90	(a)					.80	.85	.89		.99	.92
10.	.86	(a)		.99			.80	.82		.70		.88
11.	(a)	(a)		.93					.85	.70		.82
12.	(a)	(a)		.89				.72	.88	.85	1.02	.78
13.	(a)	(a)	0.85		.78	0.61	.80	.72	.81	.72	.92	.74
14.	(a)	(a)	.91	.80				.82	.82	.74	.85	.75
15.	(a)	(a)	.82	.86		.60	.80	.70	.80			.81
16.	(a)	(a)	.75	.74				.70	.80		.90	.85
17.		(a)	1.09		.70	(a)						.72
18.		(a)		.81				.81	.79	.87	.90	.72
19.	(a)			.88	.66				.76	.82		.75
20.	(a)	0.92	1.10	.82					.75		.95	.....
21.	(a)		.97	1.04		(a)	.80		.80		.94	.88
22.	(a)		(a)	.90				.70	.80		.89	.....
23.	(a)		.86	.85	(a)		.80	.70	.78		.90	.....
24.	(a)						.82	.75	.75	.99		.....
25.			.80	.91	(a)	(a)		.71		.94	.95	.95
26.			(a)	.91		(a)	.80	.71	.71	.88	.85	.....
27.	(a)		(a)	.88	(a)	(a)	.80	.84	.69		.74	1.00
28.	(a)		(a)	.82		(a)	.80		.69			.90
29.	(a)		(a)				.80		.68			.88
30.	(a)		.92						.90		.94	.....
31.					(a)					.91		.....

a Channel dry.

*Daily discharge, in second-feet, at station No. 10 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.	0.72	(a)	(a)	11.	0.12	(a)	0.05	21.	(a)	0.17	0.05
2.	.60	(a)	(a)	12.	.11	(a)	.05	22.	(a)	.20	.05
3.	.48	(a)	(a)	13.	.10	(a)	.24	23.	(a)	.28	.05
4.	.36	(a)	0.05	14.	.05	.05	.28	24.	(a)	.32	(a)
5.	.30	(a)	(a)	15.	.05	.05	.88	25.	(a)	.36	.44
6.	.24	(a)	(a)	16.	.05	.05	1.95	26.	(a)	.20	.17
7.	.24	(a)	(a)	17.	.05	.05	1.60	27.	(a)	.14	.05
8.	.22	(a)	.05	18.	(a)	.10	1.60	28.	(a)	.12	.05
9.	.20	(a)	.05	19.	(a)	.11	.44	29.	(a)	.05	.36
10.	.20	(a)	.05	20.	(a)	.14	.12	30.	(a)	.05	.32
								31.	(a)	.....	.30

a Channel dry.

*Daily discharge, in second-feet, at station No. 10 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.15	(a)	0.10	0.50	.....	.....	.....	0.05	0.40	0.10	0.35	0.40
2.....	.15	(a)	.10	.30	.....	.....	.....	.....	.50	.05	.40	.60
3.....	.15	(a)	(a)	.10	.....	.....	0.15	.....	1.00	.05	.60	.35
4.....	(a)	(a)	(a)	.10	0.75	.....	.05	.20	1.50	.05	.50	.45
5.....	(a)	(a)	(a)	.10	.....	.....	.05	.05	.40	.05	.30	.20
6.....	.15	(a)	(a)	.20	.10	.....	.05	.....	.30	.05	.20	.20
7.....	.20	(a)	(a)	.80	.....	.....	.....	.15	.40	.05	.10	.15
8.....	.20	(a)	(a)	.60	.....	.....	.05	.05	.20	.05	.10	.35
9.....	.20	(a)	(a)	.40	.....	.....	.05	.10	.20	.05	.40	.25
10.....	.15	(a)	(a)	.40	.....	.....	.05	.10	.....	.05	1.40	.15
11.....	(a)	(a)	(a)	.25	.....	.....	.....	.....	.10	.05	.50	.10
12.....	(a)	(a)	(a)	.20	.....	.....	.....	.....	.15	.10	.50	.10
13.....	(a)	(a)	.10	.10	.....	.....	.05	.....	.05	.10	.25	.10
14.....	(a)	(a)	.20	.05	.....	.....	.....	.....	.10	.10	.10	.05
15.....	(a)	(a)	.10	.15	.....	.....	.05	.....	.05	.10	.20	.05
16.....	(a)	(a)	.10	.10	.....	.....	.....	.....	.05	.10	.20	.10
17.....	(a)	(a)	.75	.10	.....	.....	.....	.....	.05	.40	.20	.10
18.....	(a)	(a)	.80	.05	.....	.....	.....	.05	.05	.15	.20	.10
19.....	(a)	(a)	.80	.15	.....	.....	.....	.....	.05	.10	.20	.10
20.....	(a)	0.20	.80	.10	.....	.....	.....	.....	.05	.30	.30	.20
21.....	(a)	1.00	.35	.55	.....	.....	.05	.....	.05	.30	.30	.15
22.....	(a)	2.00	(a)	.20	.....	.....	.....	.....	.05	.30	.20	.60
23.....	(a)	2.20	.15	.10	.....	.....	.05	.....	.05	2.00	.20	.90
24.....	(a)	2.00	.10	.15	.....	.....	.10	.....	.05	.40	.20	.50
25.....	(a)	1.00	.05	.20	.....	.....	.....	.....	.05	.30	.30	.30
26.....	(a)	.50	(a)	.20	.....	.....	.05	.....	.05	.15	.10	.50
27.....	(a)	.30	(a)	.15	.....	.....	.05	.10	.05	2.00	.10	.40
28.....	(a)	.10	(a)	.10	.....	.....	.05	.....	.05	1.80	.10	.20
29.....	(a)	.10	(a)	.10	.....	.....	.05	.....	.05	1.50	.20	.15
30.....	(a)	.....	.20	.10	.....	.....	.....	.....	.20	.60	.35	.10
31.....	(a)	.....	1.50	.....	.....	.....	.....	.....	.....	.20	.....	.10

a Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 10 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.13	8.10	June.....	0.00	0.00
November.....	.08	4.83	July.....	.05	3.07
December.....	.30	18.00	August.....	.07	4.30
1912.			September.....	.21	12.50
January.....	.04	2.46	October.....	.38	23.40
February.....	.32	18.40	November.....	.30	17.90
March.....	.20	12.30	December.....	.26	16.00
April.....	.22	13.10	The year.....	.18	130.00
May.....	.10	6.15			

*Discharge measurements at station No. 11 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13.....	.....	(a).....
Sept. 27.....	.....	(a).....
Nov. 21.....	0.36	0.04
Dec. 27.....	.54	1.15

<sup>a</sup> Channel dry.

NOTE.—Composed of silt, sand, and gravel, is shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 11 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								(a)		0.40	0.50	.....
2.....										.22		.....
3.....	0.36		0.22	0.30			0.39					0.44
4.....		(a)	(a)	.31	0.72		.28	0.39		(a)		.52
5.....		(a)	(a)	.32		(a)	.19	(a)	0.59	(a)	.50	.40
6.....	.36			.34	.65		.08		.50	(a)		.30
7.....	.36		(a)			(a)		.28	.59		.28	.35
8.....	.40	(a)					(a)	.19	.42	(a)	.31	.50
9.....	.40	(a)	0.31				(a)	.39	.38		.61	.40
10.....	.35	(a)	.31	.59			(a)	.35		(a)		.30
11.....	(a)	(a)	(a)	.50					.30	(a)		.21
12.....	(a)	(a)	0.29	.39				(a)	.37	(a)	.59	.21
13.....	(a)	(a)	.39		.14	0.15	.29	(a)	.30	(a)	.60	.18
14.....	(a)	(a)	.45	.34				(a)	.35	(a)	.30	.20
15.....	(a)	(a)	.31	.40		(a)	(a)	(a)	(a)			.25
16.....	(a)	(a)	.30	.29				(a)	(a)		.60	(a)
17.....		(a)	.71		(a)	(a)						(a)
18.....		(a)		.32				.34	(a)	.31	.50	(a)
19.....	(a)	(a)		.40	.03				(a)	.28		.21
20.....	(a)	0.51	.29	.37					(a)		.45	
21.....	(a)		.31	.45		(a)	(a)		(a)		.38	.35
22.....	(a)		(a)	.44				(a)	(a)		.31	
23.....	(a)		.38	.40	(a)			(a)	(a)		.40	
24.....	(a)						.30	(a)	(a)	.59		
25.....			.30	.43	(a)	(a)		(a)		.42	.30	.48
26.....			.24	.46		(a)	(a)	(a)		.40	.26	
27.....	(a)		.21	.45	(a)	(a)	(a)	.15	(a)		.25	.53
28.....	(a)		(a)	.41		(a)	(a)		(a)			.40
29.....	(a)		(a)				(a)		(a)			.39
30.....	(a)		.36						.49		.40	
31.....					(a)					.35		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet,\* at station No. 11 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.55	(a)	0.05	11.....	0.30	0.10	0.30	21.....	0.05	1.30	0.55
2.....	.65	(a)	(a)	12.....	.30	.20	.30	22.....	.05	1.40	.30
3.....	.75	0.01	(a)	13.....	.25	.35	.75	23.....	.05	1.50	.20
4.....	.85	.02	(a)	14.....	.20	.55	1.40	24.....	.03	1.60	(a)
5.....	1.00	.05	.15	15.....	.15	1.00	2.30	25.....	.02	1.60	1.10
6.....	1.10	.05	(a)	16.....	.10	.75	.20	26.....	(a)	.55	.45
7.....	1.00	.10	(a)	17.....	.10	.85	1.20	27.....	(a)	.45	.30
8.....	.85	.10	.15	18.....	.10	1.00	1.40	28.....	(a)	.45	.30
9.....	.75	.15	.30	19.....	.05	1.10	1.60	29.....	(a)	.35	.55
10.....	.65	.05	.20	20.....	.05	1.20	.55	30.....	(a)	.15	.45
								31.....	(a)		.30

<sup>a</sup> Channel dry.

Daily discharge, in second-feet, at station No. 11 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.1	(a)	0.5	0.5	0.8	(a)	0.1	(a)	0.5	0.2	0.8	1.0
2.....	.1	(a)	.5	.2	1.2	(a)	.1	(a)	.7	.1	.2	2.0
3.....	.1	(a)	.1	.1	1.0	(a)	.2	1.0	1.0	.1	2.0	.4
4.....	(a)	(a)	(a)	.1	4.0	(a)	.1	.2	2.5	(a)	.8	1.0
5.....	(a)	(a)	(a)	.1	5.0	(a)	.1	(a)	1.9	(a)	.8	.2
6.....	.1	(a)	(a)	.1	2.8	(a)	(a)	(a)	.8	(a)	.1	.2
7.....	.1	(a)	(a)	3.0	.5	(a)	(a)	.1	1.9	(a)	.1	.1
8.....	.2	(a)	(a)	2.5	.1	(a)	(a)	.1	.3	(a)	.1	.8
9.....	.2	(a)	.1	2.5	.1	(a)	(a)	.2	.2	(a)	2.2	.2
10.....	.1	(a)	.1	1.9	.1	(a)	(a)	.1	.1	(a)	5.0	.2
11.....	(a)	(a)	(a)	.8	(a)	(a)	.5	(a)	.1	(a)	4.0	.1
12.....	(a)	(a)	.1	.2	(a)	(a)	(a)	(a)	.1	(a)	1.9	.1
13.....	(a)	(a)	.2	.2	(a)	(a)	.1	(a)	.1	(a)	2.0	.1
14.....	(a)	(a)	.5	.1	(a)	(a)	.2	(a)	.1	(a)	.4	.1
15.....	(a)	(a)	.1	.2	(a)	(a)	(a)	(a)	(a)	.2	.1	.3
16.....	(a)	(a)	.1	.1	(a)	(a)	(a)	(a)	(a)	.1	2.0	(a)
17.....	(a)	(a)	3.8	1.0	(a)	(a)	.2	(a)	(a)	.5	3.0	(a)
18.....	(a)	(a)	4.0	.1	(a)	(a)	.1	.1	(a)	.1	.8	(a)
19.....	(a)	(a)	4.0	.2	(a)	(a)	.1	.2	(a)	.1	1.5	.2
20.....	(a)	0.9	.5	.1	(a)	(a)	.1	(a)	(a)	.5	.5	.1
21.....	(a)	1.5	.5	.5	(a)	(a)	(a)	(a)	(a)	.5	.2	.1
22.....	(a)	2.0	(a)	.4	(a)	(a)	.1	(a)	(a)	.8	.2	1.0
23.....	(a)	3.0	.2	.2	(a)	(a)	(a)	(a)	(a)	4.0	.2	4.0
24.....	(a)	2.0	.1	.5	(a)	(a)	.2	(a)	(a)	1.9	.2	1.5
25.....	(a)	1.0	.1	.4	(a)	(a)	.1	(a)	(a)	.3	.1	.7
26.....	(a)	.5	.1	.6	(a)	(a)	(a)	(a)	(a)	.2	.1	1.2
27.....	(a)	1.0	.1	.5	(a)	(a)	(a)	.1	(a)	6.0	.1	1.2
28.....	(a)	1.0	(a)	.3	(a)	(a)	(a)	.1	(a)	2.0	1.0	.2
29.....	(a)	1.5	(a)	.2	(a)	(a)	(a)	.1	(a)	2.0	.6	.2
30.....	(a)	.....	.1	.6	(a)	(a)	.1	.1	.7	1.0	.2	.3
31.....	(a)	.....	2.0	.....	(a)	.....	.1	.1	.....	.1	.....	.1

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 11 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
October 1911.....	0.32	19.80	June 1912—Continued.....	0.00	0.00
November.....	.57	13.90	July.....	.08	4.92
December.....	.50	30.50	August.....	.08	4.92
January 1912.....	.03	1.84	September.....	.37	22.00
February.....	.50	28.80	October.....	.67	41.20
March.....	.57	35.00	November.....	1.04	61.90
April.....	.61	36.30	December.....	.57	35.00
May.....	.50	30.70	The year.....	.42	303.00

*Discharge measurements at station No. 12 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13 .....	0.89	1.58	Nov. 27 .....	1.14	4.99
Sept. 27 .....	.84	.78	Dec. 27 .....	1.53	23.3

This stream is tributary to Walluku River.

NOTE.—Bed of stream of gravel and small cobbles, is fairly smooth and regular, and probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 12 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.82		1.35	1.50	.....
2.....								1.22		1.22		.....
3.....	1.02		1.05	1.16			1.39					1.40
4.....	1.01	0.65	1.01	1.22	1.55		1.24	1.33		1.09		1.54
5.....	.98	.65	.98	1.29		0.40	1.20		1.55	.96	1.44	1.32
6.....	1.02			1.31	1.39		1.12		1.42	.72		1.28
7.....	1.02		.95			.36		.94	1.52		1.19	1.28
8.....	1.05	.62					1.08	.91	1.32	.82	1.21	1.44
9.....	1.00	.62	.96				1.05	1.02	1.26		1.33	1.26
10.....	.98	.61	.98	1.59			1.00	1.02		.87		1.20
11.....	.95	.61	.98	1.49					1.19	.90		1.14
12.....	.92	.60	1.34	1.32				.84	1.31	1.16	1.51	1.10
13.....	.90	.80	1.43		1.01	.71	1.14	.89	1.19	.98	1.32	1.05
14.....	.89	.76	1.49	1.19					1.04	.95	1.22	1.06
15.....	.85	.70	1.33	1.20		.67	1.04	1.05	.99			1.21
16.....	.82	.69	1.02	1.16				.91	1.11		1.39	1.24
17.....		.68	1.21		.90	.91						1.05
18.....		.65		1.17				.92	1.05	1.07	1.46	1.01
19.....	.80	.71		1.19	.93				1.02	1.14		1.12
20.....	.79	1.29	1.24	1.16					1.00		1.44	.....
21.....	.76		1.19	1.39		.80	.85		1.02		1.28	1.21
22.....	.75		1.08	1.39				.81	1.09		1.28	.....
23.....	.74		1.08	1.22	.79		.75	.81	.95		1.32	.....
24.....	.72						1.09	.81	.89	1.62		.....
25.....			1.04	1.32	.70	1.24		.80		1.34	1.25	1.45
26.....			1.05	1.34		1.00	1.08	.79	.85	1.25	1.14	.....
27.....	.75		1.01	1.32	.65	1.08	.92	1.00	.84		1.12	1.52
28.....	.72		.99	1.30		.99	.90		.82			1.35
29.....	.71		.94				.88		.82			1.28
30.....	.70		1.02						1.41		1.24	.....
31.....					.50					1.32		.....

*Daily discharge, in second-feet, at station No. 12 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	53.0	1.1	3.4	11.....	7.3	11.0	2.3	21.....	2.8	19.8	37.8
2.....	44.1	1.1	2.5	12.....	6.6	12.0	2.0	22.....	2.5	21.7	18.0
3.....	36.0	1.1	2.3	13.....	6.4	13.0	11.0	23.....	2.3	23.8	12.5
4.....	28.0	2.0	2.5	14.....	5.3	14.5	15.6	24.....	2.1	25.9	10.0
5.....	21.0	4.2	2.8	15.....	5.9	16.2	36.0	25.....	1.9	28.8	40.5
6.....	15.0	5.6	2.0	16.....	5.6	14.0	97.0	26.....	1.6	14.0	22.4
7.....	14.0	7.3	1.7	17.....	5.4	15.0	127.0	27.....	1.5	7.3	18.0
8.....	12.5	9.3	1.9	18.....	4.2	16.2	133.0	28.....	1.3	8.0	17.4
9.....	11.0	12.0	2.3	19.....	3.9	17.4	137.0	29.....	1.2	5.4	37.8
10.....	10.0	10.0	1.7	20.....	3.4	18.6	93.0	30.....	1.1	4.0	36.9
								31.....	1.1	.....	36.0

*Daily discharge, in second-feet, at station No. 12 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.80	0.20	3.80	9.00	16.00	0.10	2.00	0.90	18.00	12.50	21.00	12.00
2.....	2.80	.20	3.60	6.00	17.00	.10	3.00	1.00	20.00	7.30	23.00	30.00
3.....	2.80	.20	3.40	5.60	15.00	.10	14.50	18.00	26.00	6.00	25.00	15.00
4.....	2.70	.20	2.70	7.30	24.50	.10	8.00	11.50	32.00	4.00	20.00	23.80
5.....	2.30	.20	2.30	9.70	30.00	.10	6.60	5.00	24.50	2.10	17.40	11.00
6.....	2.80	.20	2.20	10.50	14.50	.10	4.70	3.00	16.20	.40	12.00	9.30
7.....	2.80	.10	2.00	34.00	10.00	.10	4.30	1.90	22.40	.60	6.40	9.30
8.....	3.40	.10	2.00	33.00	5.00	.10	3.90	1.60	11.00	.90	6.90	17.40
9.....	2.50	.10	2.10	32.00	3.00	.10	3.40	2.80	8.60	1.10	14.00	8.60
10.....	2.30	.10	2.30	27.30	3.00	.10	2.50	2.80	7.50	1.30	34.00	6.60
11.....	2.00	.10	2.30	20.40	3.00	.10	20.00	1.90	6.40	1.50	30.00	5.20
12.....	1.70	.10	12.00	11.00	3.00	.20	15.00	1.00	10.50	5.60	28.00	4.20
13.....	1.50	.70	19.80	9.00	2.70	.30	5.20	1.40	6.40	2.30	11.00	3.40
14.....	1.40	.50	20.40	6.40	2.40	.30	4.20	2.40	3.20	2.00	7.30	3.50
15.....	1.10	.30	11.50	6.60	2.10	.20	3.20	3.40	2.40	2.00	7.00	6.90
16.....	.90	.30	2.20	5.60	1.80	.90	2.80	1.60	4.40	1.50	14.50	8.00
17.....	.80	.30	6.90	5.80	1.50	1.60	2.40	1.60	3.80	10.00	22.00	3.40
18.....	.80	.20	7.20	5.90	1.60	1.40	2.00	1.70	3.40	3.70	18.60	2.70
19.....	.70	.30	7.70	6.40	1.80	1.10	1.70	2.00	2.80	5.20	19.00	4.70
20.....	.70	9.70	8.00	5.60	1.50	.90	1.40	1.50	2.50	5.00	17.40	10.00
21.....	.50	20.00	6.40	14.50	1.30	.70	1.10	1.10	2.80	5.00	9.30	6.90
22.....	.50	30.00	3.90	14.50	1.00	2.00	.80	.80	4.00	25.00	9.30	18.00
23.....	.50	36.00	3.90	7.30	.70	4.00	.50	.80	2.00	35.00	11.00	34.00
24.....	.40	28.00	3.50	9.00	.70	6.00	4.00	.80	1.40	29.60	9.60	25.00
25.....	.40	20.00	3.20	11.00	.70	8.00	4.00	.70	1.30	12.00	8.30	18.00
26.....	.50	10.00	3.40	12.00	.50	2.50	3.90	.70	1.10	8.30	5.20	20.00
27.....	.50	6.00	2.70	11.00	.20	3.90	1.70	2.50	1.00	35.00	4.70	22.40
28.....	.40	4.00	2.40	10.00	.20	2.40	1.50	2.00	.90	30.00	12.00	12.50
29.....	.30	4.00	1.90	6.00	.20	2.00	1.30	1.50	.90	25.00	10.00	9.30
30.....	.30	.....	2.80	7.00	.10	2.00	1.00	1.00	15.60	18.00	8.00	6.00
31.....	.30	.....	15.00	.....	.10	.....	1.00	2.00	.....	12.00	.....	5.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 12 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	10.30	633.00	June.....	1.38	82.10
November.....	12.00	718.00	July.....	4.25	261.00
December.....	31.10	1,920.00	August.....	2.61	160.00
1912.			September.....	8.77	522.00
January.....	1.40	86.10	October.....	10.00	615.00
February.....	5.93	341.00	November.....	14.70	875.00
March.....	5.62	346.00	December.....	12.00	738.00
April.....	12.00	714.00	The year.....	6.98	5,070.00
May.....	5.33	328.00			

NOTE.—One channel; bed sand and silt; shifting. This stream is tributary to Waialuku River.

The following discharge measurement was made at station No. 12A by E. O. Christiansen:

December 27, 1912: Gage height, 0.48 foot; discharge, 0.

*Daily gage height, in feet, at station No. 12A at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[A. Fataeff, observer.]

Day.	Dec.	Day.	Dec.	Day.	Dec.
1.....		11.....	0.40	21.....	0.42
2.....		12.....	.39	22.....	
3.....	0.52	13.....	.39	23.....	
4.....	.45	14.....	.40	24.....	
5.....	.42	15.....	.42	25.....	.45
6.....	.41	16.....	.44	26.....	
7.....	.42	17.....	.38	27.....	.46
8.....	.46	18.....	.38	28.....	.42
9.....	.42	19.....	.40	29.....	.42
10.....	.40	20.....		30.....	
				31.....	

*Discharge measurements at station No. 13 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13.....	0.70	2.03	Nov. 27.....	0.90	5.36
Sept. 27.....	.52	.69	Dec. 27.....	1.39	21.2

NOTE.—One channel; bed sand and silt; shifting. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 13 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.52		1.12	1.38	.....
2.....										1.04		.....
3.....	0.74		0.90	1.15			1.34					1.32
4.....	.72		.86	1.20	1.45		1.12	1.14		.84		1.38
5.....	.71		.80	1.27		0.40	1.05	.79	1.48	.70	1.36	1.12
6.....	.72			1.27	1.29		.99		1.34	.68		1.06
7.....	.75		.72			.39		.69	1.34		.99	1.08
8.....	.78	0.10					.89	.68	1.18	.64	.96	1.28
9.....	.75	.10	.81				.84	.70	1.03		1.31	1.09
10.....	.72	.11	.86	1.56			.82	.67		.69		.99
11.....	.70	.11	.89	1.41					.93	.70		.92
12.....	.68	.11	1.28	1.29				.62	1.08	.97	1.44	.88
13.....	.65	.40	1.44		.89	.58	1.09	.69	.96	.81	1.26	.84
14.....	.62	.33	1.51	1.20					.82	.82	1.04	.85
15.....	.55	.32	1.35	1.22		.50	.86	.91	.76			.93
16.....	.52	.31	1.09	1.08				.79	.82		1.35	.96
17.....		.29	1.22		.75	.65						.87
18.....		.26		1.10				.90	.80	1.01	1.30	.82
19.....	.48	.41		1.12	.71				.79	1.09		.95
20.....	.44	1.08	1.29	1.10					.78		1.35	.....
21.....						.60	.41		.80		1.12	1.02
22.....	.32		1.23	1.34				.58	.76		1.04	
23.....	.30		.92	1.27				.55	.79		1.12	
24.....	.30		.94	1.14	.68			.71	.55	.64	1.58	.....
25.....	.30			1.22	.60	.79		.50		1.15	.80	1.26
26.....			.86	1.31		.71	.52	.47	.55	1.05	.94	.....
27.....	.31		.81	1.25	.58	.82	.57	.84	.54		.90	1.36
28.....	.30		.76	1.22		.74	1.02		.52			1.11
29.....	.30		.72				1.15		.48			1.09
30.....	.29		.80						1.32		1.21	.....
31.....					.49					1.11		.....

*Daily discharge, in second-feet, at station No. 13 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	57.5	1.02	5.50	11.....	8.75	12.40	2.54	21.....	3.70	19.50	33.20
2.....	45.0	.95	2.90	12.....	8.50	13.00	2.42	22.....	3.26	22.00	27.50
3.....	38.0	.88	2.54	13.....	8.25	14.20	10.60	23.....	2.90	24.50	19.50
4.....	32.0	2.30	2.90	14.....	8.00	15.00	85.00	24.....	2.54	27.00	10.60
5.....	27.0	5.50	3.26	15.....	7.75	16.20	122.00	25.....	2.30	28.00	49.00
6.....	15.4	7.10	2.30	16.....	7.50	10.60	85.00	26.....	2.10	16.60	32.00
7.....	13.8	9.00	1.80	17.....	7.50	11.50	108.00	27.....	1.70	12.40	24.50
8.....	12.4	11.20	2.10	18.....	5.50	13.00	102.00	28.....	1.30	11.80	22.50
9.....	11.2	13.80	2.42	19.....	4.90	15.00	109.00	29.....	1.02	10.30	36.80
10.....	10.0	11.50	2.30	20.....	4.30	17.00	71.00	30.....	.74	9.50	32.00
								31.....	1.02	.....	32.00

*Daily discharge, in second-feet, at station No. 13 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.50	0.05	4.00	16.00	20.00	0.40	3.00	0.70	7.00	10.60	21.00	20.00
2.....	2.50	.05	6.00	13.00	25.00	.30	10.00	1.00	12.00	8.50	15.00	25.00
3.....	2.80	.05	5.50	11.50	20.00	.20	19.00	15.00	20.00	6.40	30.00	18.00
4.....	2.50	.05	4.70	13.00	24.50	.10	10.60	11.20	30.00	4.30	25.00	21.00
5.....	2.40	.05	3.50	15.80	30.00	.10	8.80	3.40	26.00	2.30	20.00	10.60
6.....	2.50	.05	3.00	15.80	16.60	.10	7.30	2.00	19.00	2.10	10.00	9.00
7.....	2.90	.05	2.50	24.00	10.00	.10	6.30	2.20	19.00	1.90	7.30	9.50
8.....	3.30	.05	3.00	35.00	7.00	.20	5.30	2.10	12.40	1.70	6.70	16.20
9.....	2.90	.05	3.70	32.00	6.00	.40	4.30	2.30	8.20	1.50	17.50	9.80
10.....	2.50	.05	4.70	30.00	6.00	.60	3.90	2.00	7.00	2.20	35.00	7.30
11.....	2.30	.05	5.30	22.50	5.50	.80	20.00	1.70	6.10	2.30	35.00	5.90
12.....	2.10	.05	16.20	16.60	5.50	1.00	15.00	1.50	9.50	6.90	24.00	5.10
13.....	1.80	.10	24.00	17.00	5.30	1.20	9.80	2.20	6.70	3.70	15.40	4.30
14.....	1.50	.05	27.50	13.00	6.00	.90	15.00	4.00	3.90	3.90	8.50	4.50
15.....	1.00	.05	19.50	13.80	7.00	.60	4.70	5.70	3.00	4.00	5.00	6.10
16.....	.70	.05	9.80	9.50	8.00	1.20	2.00	3.40	3.90	2.00	19.50	7.10
17.....	.60	.05	13.80	15.00	2.90	1.80	4.00	4.00	3.00	10.00	30.00	4.90
18.....	.60	.05	20.00	10.00	2.60	1.60	4.00	5.50	3.50	7.80	17.00	3.90
19.....	.50	.10	18.00	10.60	2.40	1.50	2.00	7.00	3.40	9.80	30.00	6.50
20.....	.30	9.50	16.60	10.00	2.30	1.40	.50	1.00	3.30	10.00	19.50	15.00
21.....	.10	15.00	14.20	19.00	2.20	1.30	.10	1.00	3.50	11.00	10.60	8.00
22.....	.05	22.00	5.90	15.80	2.10	1.80	.30	1.20	3.00	15.00	8.50	20.00
23.....	.05	29.00	6.30	11.20	2.10	2.40	.50	1.00	3.40	20.00	10.60	30.00
24.....	.05	35.00	5.00	10.00	4.00	2.90	2.40	1.00	1.70	31.00	7.00	35.00
25.....	.05	15.00	5.90	13.80	1.30	3.40	2.00	.60	1.40	11.50	3.50	15.40
26.....	.05	5.00	4.70	17.50	1.30	2.40	.70	.40	1.00	8.80	6.30	20.00
27.....	.05	3.00	3.70	15.00	1.20	3.90	1.10	4.30	.90	35.00	5.50	20.00
28.....	.05	5.00	3.00	13.80	1.50	2.80	8.00	5.00	.70	30.00	12.00	10.30
29.....	.05	7.00	2.50	10.00	2.00	2.00	11.50	4.00	.50	30.00	15.00	9.70
30.....	.05	.....	3.50	15.00	1.00	2.00	10.00	3.00	18.00	20.00	13.40	5.00
31.....	.05	.....	25.00	.....	.50	.....	5.00	2.00	.....	10.30	.....	5.00

NOTE.—Daily discharge determined from rating curve fairly well defined, except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.



*Monthly discharge at station No. 13 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	3.86	237.00	June.....	1.31	78.00
November.....	12.80	755.00	July.....	6.36	391.00
December.....	33.70	2,070.00	August.....	3.27	201.00
1912.			September.....	8.03	478.00
January.....	1.25	76.90	October.....	10.50	646.00
February.....	5.05	290.00	November.....	16.10	958.00
March.....	9.39	577.00	December.....	12.50	769.00
April.....	16.20	964.00	The year.....	8.11	5,890.00
May.....	7.48	460.00			

*Discharge measurements at station No. 14 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 13.....	0.74		Nov. 27.....	0.85	0.06
Sept. 27.....	.74		Dec. 27.....	.70	.04

NOTE.—Bed sand, gravel, and small cobbles; fairly smooth. Shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 14 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.72		0.95	0.99	
2.....										.89		
3.....	0.78		1.01	0.94			1.39					1.02
4.....	.75	(a)	.97	1.00	1.41		1.28	1.39		.74		.72
5.....	.74	(a)	.94	1.02		(a)	1.14	.79	1.05	.74	.91	.62
6.....	.76			1.07	1.39		1.09		1.00	.74		.58
7.....	.78		.95			(a)		.84	1.24		.90	.59
8.....	.81	(a)					1.05	.80	1.04	.74	.90	.72
9.....	.79	(a)	.98				1.00	.95	.91		.96	.63
10.....	.78	(a)	.99	1.42			.92	1.00		.65		.62
11.....	.72	(a)	1.00	1.40					.80	.64		.60
12.....	.71	(a)	1.00	1.35				.71	1.00	.75	.95	.58
13.....	.70	(a)	1.19		1.22	0.70	1.30	.74	.83	.64	.90	.55
14.....	.70	(a)	1.21	1.24					.85	.65	.88	.56
15.....	.60	(a)	1.04	1.31		.66	1.00	.77	.82			.62
16.....		(a)	.81	1.30				.76	.85		.95	.66
17.....		(a)	1.04		1.00	0.80						.54
18.....		(a)		1.31				.78	.81	.76	.95	.48
19.....	(a)			1.39	.99				.79	.80		.58
20.....	(a)	0.81	1.29	1.40					.76		1.00	
21.....	(a)		1.18	1.44		.78	1.00		.80		.94	.60
22.....	(a)		1.08	1.42				.72	.82		.92	
23.....	(a)		1.05	1.36	.90		.90	.75	.80		.95	
24.....	(a)						1.05	.80	.79	.94		
25.....			1.02	1.41	.88	.99		.75		.85	.90	.74
26.....			1.00	1.41		.88	.95	.75	.75	.75	.84	
27.....	(a)		.99	1.38	.80	1.00	.89	.85	.74		.85	.70
28.....	(a)		.99	1.30		.92	.74		.74			.64
29.....	(a)		.96				.74			1.08		.64
30.....	(a)		1.04								.85	
31.....					.78					.88		

a Channel dry.

*Daily discharge, in second-feet, at station No. 14 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.60	0.05	0.10	11.....	0.15	0.12	0.10	21.....	0.10	0.18	0.29
2.....	.50	.05	.05	12.....	.14	.12	.05	22.....	.05	.19	.22
3.....	.40	.05	.05	13.....	.13	.12	.18	23.....	.05	.22	.19
4.....	.30	.05	.05	14.....	.12	.12	.22	24.....	.05	.25	.10
5.....	.25	.10	.10	15.....	.12	.12	.86	25.....	.05	.28	.25
6.....	.19	.11	.05	16.....	.12	.10	.19	26.....	.05	.19	.19
7.....	.18	.12	.05	17.....	.11	.12	.60	27.....	.05	.16	.15
8.....	.17	.13	.05	18.....	.10	.14	.50	28.....	.05	.16	.15
9.....	.16	.14	.10	19.....	.10	.15	.62	29.....	.05	.13	.34
10.....	.15	.12	.05	20.....	.10	.16	.34	30.....	.05	.11	.30
								31.....	.05	.....	.25

*Daily discharge, in second-feet, at station No. 14 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.10	(a)	0.30	0.30	0.80	.....	0.10	0.05	0.30	0.15	0.20	0.30
2.....	.10	(a)	.30	.20	.70	.....	.20	.10	.40	.15	.15	.40
3.....	.10	(a)	.20	.15	.80	.....	.90	.20	.50	.10	.30	.20
4.....	.05	(a)	.20	.20	.90	.....	.65	.90	.60	.05	.20	.05
5.....	.05	(a)	.15	.20	1.00	.....	.40	.10	.25	.05	.15	.05
6.....	.10	(a)	.15	.25	.90	.....	.30	.10	.20	.05	.15	.05
7.....	.10	(a)	.15	1.00	.80	.....	.30	.10	.60	.05	.15	.05
8.....	.10	(a)	.20	1.00	.80	.....	.25	.10	.25	.05	.15	.05
9.....	.10	(a)	.20	.90	.70	.....	.20	.15	.15	.05	.20	.05
10.....	.10	(a)	.20	.95	.70	.....	.15	.20	.10	.05	.80	.05
11.....	.05	(a)	.20	.90	.60	.....	.80	.10	.10	.05	.70	.05
12.....	.05	(a)	.20	.80	.60	.....	.80	.05	.20	.05	.15	.05
13.....	.05	(a)	.50	.70	.55	0.05	.70	.05	.15	.05	.15	.05
14.....	.05	(a)	.50	.60	.40	.....	.50	.10	.10	.05	.15	.05
15.....	.05	(a)	.25	.70	.30	.05	.20	.10	.10	.10	.15	.05
16.....	(a)	(a)	.10	.70	.20	.....	.20	.10	.10	.10	.15	.05
17.....	(a)	(a)	.25	.70	.20	.10	.20	.10	.10	.30	.15	.05
18.....	(a)	(a)	.80	.70	.20	.....	.20	.10	.10	.10	.15	.05
19.....	(a)	(a)	.70	.90	.20	.....	.20	.10	.10	.10	.15	.10
20.....	(a)	0.10	.70	.90	.20	.....	.20	.10	.10	.20	.20	.30
21.....	(a)	.50	.45	1.00	.20	.10	.20	.05	.10	.20	.15	.20
22.....	(a)	.90	.30	.95	.20	.....	.20	.05	.10	.40	.15	.40
23.....	(a)	1.00	.25	.80	.15	.....	.15	.05	.10	.60	.15	.80
24.....	(a)	.90	.20	.90	.15	.....	.25	.10	.10	.15	.15	.40
25.....	(a)	.80	.20	.90	.15	.20	.20	.05	.10	.10	.15	.05
26.....	(a)	.70	.20	.90	.10	.15	.15	.05	.05	.05	.10	.10
27.....	(a)	.60	.20	.85	.10	.20	.15	.10	.05	1.00	.10	.05
28.....	(a)	.50	.20	.70	.10	.15	.05	.10	.05	1.00	.10	.05
29.....	(a)	.40	.20	.60	.10	.....	.05	.10	.30	.80	.10	.05
30.....	(a)	.....	.25	.70	.10	.....	.05	.10	.40	.60	.10	.05
31.....	(a)	.....	.80	.....	.10	.....	.05	.10	.....	.15	.....	.05

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 14 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.15	9.28	June.....	0.07	4.17
November.....	.13	8.04	July.....	.29	17.80
December.....	.22	13.30	August.....	.12	7.38
			September.....	.20	11.90
1912.			October.....	.22	13.50
January.....	.04	2.46	November.....	.19	11.30
February.....	.22	12.70	December.....	.14	8.61
March.....	.31	19.10			
April.....	.70	41.70	The year.....	.24	176.00
May.....	.42	25.80			

*Discharge measurements at station No. 15 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
		<i>Feet.</i>	<i>Sec.-ft.</i>			<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15	E. O. Christiansen	1.20	1.19	Nov. 27	E. O. Christiansen	1.18	1.56
Sept. 27	.....do.....	1.00	.39	Dec. 27	.....do.....	1.36	6.84
Nov. 27	.....do.....	1.18	1.66				

NOTE.—Bed of stream of gravel, cobbles, and some boulders. Is somewhat rough. Probably permanent. One channel at all stages.

This stream is tributary to Waialuku River.

*Daily gage height, in feet, at station No. 15 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.99		1.29	1.40	.....
2.										1.20		.....
3.	1.22		1.15	1.12			1.34					1.38
4.	1.18	(a)	1.13	1.19	1.58		1.24	1.34		1.08		1.42
5.	1.12	(a)	1.10	1.20		0.64	1.20	1.18	1.52	1.04	1.34	1.29
6.	1.18			1.20	1.50		1.18		1.39	1.02		1.25
7.	1.20		1.08			.60		1.14	1.51		1.20	1.26
8.	1.25	(a)					1.12	1.12	1.30	1.00	1.20	1.32
9.	1.22	(a)	1.11				1.09	1.15	1.24		1.43	1.28
10.	1.20	(a)	1.12	1.48			1.16	1.04		1.02		1.22
11.	1.10	(a)	1.15	1.42					1.08	1.04		1.20
12.	1.02	(a)	1.33	1.32				1.06	1.26	1.27	1.41	1.15
13.	.98	0.79	1.47			.90	1.19	1.09	1.12	1.07	1.25	1.11
14.	.92	.78	1.63	1.29					1.04	1.10	1.19	1.14
15.	.92	.75	1.84	1.37		.86	1.09	1.19	1.02			1.22
16.	.92	.71	1.21	1.22				1.09	1.06		1.40	1.28
17.		(a)	1.38		1.05	.90						1.13
18.		(a)		1.26				1.18	1.05	1.18	1.44	1.12
19.	.91	.71		1.24	1.01				1.04	1.34		1.20
20.	.91	1.32	1.39	1.21					1.02		1.40	
21.	.90		1.27	1.40		.88	.89		1.02		1.29	1.22
22.	.90		1.14	1.38				1.02	1.12		1.28	
23.	.89		1.18	1.26	.90		.81	1.00	1.04		1.32	
24.	.88						1.02	1.00	1.02	1.44		
25.			1.16	1.32	.88	.99		.99		1.30	1.20	1.32
26.			1.14	1.41		.90	.79	.95	1.00	1.20	1.18	
27.	.90		1.11	1.38	.83	1.00	.45	1.15	1.00		1.16	1.38
28.	.90		1.10	1.29		.90	.28		.99			1.30
29.	.85		1.08				.15		.96			1.24
30.	.82		1.02						1.42		1.22	
31.					.73					1.21		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 15 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.	29.00	0.40	0.92	11.	3.05	4.05	0.58	21.	0.92	7.45	5.20
2.	25.00	.38	.64	12.	3.05	4.30	.43	22.	.70	8.35	3.05
3.	21.00	.37	.55	13.	2.80	5.20	4.30	23.	.64	9.62	1.80
4.	17.00	.64	.55	14.	2.55	6.10	17.00	24.	.58	11.30	1.25
5.	12.90	1.80	.64	15.	2.30	7.00	42.50	25.	.55	12.90	29.00
6.				16.	2.05	3.80	7.00	26.	.52	5.20	18.00
7.	7.00	2.55	.55	17.	2.05	4.05	39.20	27.	.46	3.80	7.90
8.	6.10	3.30	.46	18.	1.58	4.75	45.80	28.	.43	3.80	4.75
9.	5.20	4.05	.46	19.	1.36	5.60	52.40	29.	.40	2.05	19.00
10.	4.30	5.20	.55	20.	1.14	6.55	15.40	30.	.38	1.25	17.00
	4.05	3.80	.40					31.	.40		12.90

*Daily discharge, in second-feet, at station No. 15 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.00	(a)	7.00	6.00	12.00	0.10	1.00	0.35	16.00	4.05	8.80	14.00
2.....	2.00	(a)	5.00	2.00	15.00	.10	1.50	.40	20.00	1.80	12.00	20.00
3.....	2.30	(a)	1.25	.90	20.00	.10	6.10	12.00	30.00	1.20	20.00	7.90
4.....	1.60	(a)	1.05	1.70	25.00	.10	2.80	6.10	40.00	.65	14.00	10.45
5.....	.90	(a)	.70	2.05	40.00	.10	1.80	1.60	19.00	.50	6.10	4.05
6.....	1.60	(a)	.70	1.80	17.00	.10	1.60	1.40	5.65	.45	3.00	3.05
7.....	1.80	(a)	.65	30.00	10.00	.10	1.20	1.15	18.00	.40	1.80	3.30
8.....	3.05	(a)	.70	28.00	6.00	.10	.90	.90	4.30	.40	1.80	5.20
9.....	2.30	(a)	.80	25.00	4.00	.10	.67	1.25	2.80	.40	11.20	3.80
10.....	1.80	(a)	.90	15.30	2.00	.10	1.35	.50	1.70	.45	30.00	2.30
11.....	.70	(a)	1.25	10.45	1.00	.20	1.50	.60	.65	.50	20.00	1.80
12.....	.45	(a)	5.65	5.20	1.00	.20	1.60	.60	3.30	3.50	9.60	1.25
13.....	.35	0.10	14.55	4.60	1.00	.25	1.70	.70	.90	.60	3.05	.80
14.....	.25	.10	32.00	4.05	.50	.20	1.20	1.20	.50	.70	1.70	1.15
15.....	.25	.10	52.40	7.45	.50	.20	.67	1.70	.45	.70	1.50	2.30
16.....	.25	.10	2.05	2.30	.50	.20	.50	.70	.60	.50	8.80	3.80
17.....	.25	(a)	7.90	2.80	.55	.25	.50	1.20	.60	10.00	18.00	1.05
18.....	.25	(a)	7.90	3.30	.50	.20	.40	1.60	.55	1.60	12.10	.90
19.....	.25	(a)	7.90	2.80	.45	.20	.30	1.20	.50	6.10	10.40	1.80
20.....	.25	5.20	7.95	2.05	.40	.20	.30	.80	.45	6.00	8.80	8.00
21.....	.25	30.00	3.50	8.80	.30	.20	.25	.60	.45	6.00	4.05	2.30
22.....	.25	50.00	1.15	7.90	.30	.30	.20	.45	.90	30.00	3.80	20.00
23.....	.25	60.00	1.60	3.30	.25	.30	.10	.40	.50	50.00	5.20	40.00
24.....	.25	45.00	1.50	4.20	.20	.30	.45	.40	.45	12.10	3.50	25.00
25.....	.25	35.00	1.35	5.20	.20	.35	.30	.35	.40	4.30	1.80	5.20
26.....	.25	30.00	1.15	9.60	.20	.25	.10	.30	.40	1.80	1.60	6.40
27.....	.25	20.00	.80	7.90	.15	.40	.10	1.25	.40	60.00	1.35	7.90
28.....	.25	10.00	.70	4.05	.10	.25	.10	1.00	.35	50.00	9.00	4.30
29.....	.15	8.00	.65	3.50	.10	.20	.10	.80	.30	40.00	6.00	2.80
30.....	.10	.....	.95	4.00	.10	.20	.20	.60	10.45	20.00	2.30	2.00
31.....	.10	.....	18.00	.....	.10	.....	.20	.90	.....	2.05	.....	2.00

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 15 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
October.....	5.14	318.00	June.....	0.20	11.90
November.....	4.65	278.00	July.....	.96	59.00
December.....	11.30	699.00	August.....	1.39	85.50
January.....	.80	49.20	September.....	6.02	358.00
February.....	10.10	581.00	October.....	10.20	627.00
March.....	6.12	376.00	November.....	8.04	478.00
April.....	7.21	429.00	December.....	6.93	426.00
May.....	5.14	316.00	The year.....	5.23	3,800.00

*Discharge measurements at station No. 16 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.....	0.46	0.10	Nov. 27.....	0.35	0.05
Sept. 26.....	.35	.01	Dec. 27.....	.66	.14

NOTE.—Bed of stream of sand, gravel, and silt. Shifting. One channel at all stages.  
This stream is tributary to Walluku River.

*Daily gage height, in feet, at station No. 16 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.31		0.42	0.48	.....
2.....										.39		.....
3.....	0.46		0.50	0.53			0.60					0.42
4.....	.44	(a)	.46	.54	0.85		.56	.69		.28		.56
5.....	.42	(a)	.40	.59		0.20	.55	.40	0.49	.26	.40	.48
6.....	.45			.59	.69		.54		.44	.25		.45
7.....	.45		.40			.18		.40	.50		.34	.42
8.....	.48	(a)					.52	.39	.50	.25	.39	.52
9.....	.45	(a)	.51				.51	.44	.50		.56	.45
10.....	.44	(a)	.50	.72			.52	.42		.26		.42
11.....	.42	(a)	.51	.71					.48	.28		.40
12.....	.41	(a)	.56	.69				.38	.52	.42	.48	.40
13.....	.41	0.41	.71		.60	.37	.61	.39	.48	.25	.40	.40
14.....	.40	.32	.76	.64					.46	.30	.38	.41
15.....	.34	.30	.64	.69		.31	.54	.44	.42			.44
16.....	(a)	.30	.55	.62				.40	.48		.50	.45
17.....		(a)	.83		.45	.40						.38
18.....		(a)		.61				.41	.39	.40	.55	.40
19.....	(a)	.40		.63	.41				.34	.42		.43
20.....	(a)	.77	.86	.62					.34		.50	.....
21.....	(a)		.68	.72		.39	.54		.35		.46	.42
22.....	(a)		.47	.72				.45	.35		.42	.....
23.....	(a)		.52	.66	.40		.53	.45	.29		.41	.....
24.....	(a)						.52	.45	.25	.45		.....
25.....	(a)		.52	.68	.40	.49		.44		.40	.38	.51
26.....			.51	.70		.45	.42	.44	.24	.38	.37	.....
27.....	(a)		.46	.65	.38	.50	.40	.44	.24		.35	.66
28.....	(a)		.42	.64		.47	.35		.24			.60
29.....	(a)		.41				.35		.24			.45
30.....	(a)		.54						.50		.42	.....
31.....					.30					.40		.....

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 16 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.70	0.01	0.05	11.....	0.18	0.26	0.05	21.....	0.12	0.24	0.22
2.....	.62	.01	.04	12.....	.18	.24	.05	22.....	.11	.26	.18
3.....	.50	.01	.02	13.....	.16	.22	.27	23.....	.10	.27	.16
4.....	.38	.05	.04	14.....	.16	.21	.50	24.....	.10	.30	.15
5.....	.30	.15	.05	15.....	.15	.20	1.18	25.....	.10	.38	.78
6.....	.27	.16	.02	16.....	.15	.16	.16	26.....	.05	.18	.62
7.....	.26	.18	.02	17.....	.15	.18	1.10	27.....	.05	.13	.30
8.....	.24	.20	.04	18.....	.15	.20	.90	28.....	.05	.14	.28
9.....	.22	.21	.05	19.....	.14	.21	1.18	29.....	.05	.10	.70
10.....	.21	.27	.05	20.....	.13	.22	.62	30.....	.01	.05	.50
								31.....	.01		.30

*Daily discharge, in second-feet, at station No. 16 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.			0.05	0.20							0.05	
2.			.05	.10								
3.	0.05		.05	.10			0.15					
4.			.05	.10	0.90		.10	0.30				0.10
5.			.05	.15			.10		0.05			.05
6.	.05		.05	.15	.30		.10					.05
7.	.05		.05	.70					.05			
8.	.05		.05	.60			.05		.05			.05
9.	.05		.05	.50			.05		.05		.10	.05
10.			.05	.40			.05					
11.			.05	.35					.05			
12.			.10	.30					.05		.05	
13.			.35	.30	.15		.15		.05			
14.			.55	.20					.05			
15.			.20	.30			.10					
16.			.10	.20					.05		.05	.05
17.			.80	.20	.05							
18.			.80	.15							.10	
19.			.90	.20								
20.		0.60	.95	.20							.05	
21.			.25	.40			.10				.05	
22.			.05	.40				.05				
23.			.05	.25			.10	.05				
24.			.05	.25			.05	.05				
25.			.05	.25		0.05						.05
26.			.05	.30		.05						
27.			.05	.20		.05						.25
28.			.05	.20		.05						.15
29.			.05	.20								.05
30.			.10	.30					.05			
31.			.40									

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 16 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.19	11.90	June.....	0.04	2.38
November.....	.18	10.70	July.....	.10	6.15
December.....	.34	21.00	August.....	.10	6.15
1912.			September.....	.05	2.98
January.....	.02	1.23	October.....	.40	24.60
February.....	.30	17.30	November.....	.10	5.95
March.....	.21	12.90	December.....	.08	4.92
April.....	.27	16.10	The year.....	.15	107.00
May.....	.10	6.15			

*Discharge measurements at station No. 17 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.....	0.68	0.04	Nov. 27.....	0.69	0.06
Sept. 26.....	.64		Dec. 27.....	.72	.15

NOTE.—Bed of stream of sand, gravel, and silt. Shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 17 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								.62		0.70	0.71	
2.....										.69		
3.....	0.68		0.65	0.70			0.70					0.75
4.....	.65	(a)	.65	.74	0.92		.70	.79		.65		.72
5.....	.64	(e)	.65	.74		0.31	.69	.68	0.70	.65	.75	.70
6.....	.65			.72	.82		.66		.70	.64		.68
7.....	.65		.62			.29		.70	.78		.68	.68
8.....	.68	(a)					.64	.68	.70	.64	.68	.74
9.....	.65	(a)	.68				.61	.66	.68		.72	.70
10.....	.64	(a)	.70	.74			.65	.69		.65		.68
11.....	.64	(a)	.70	.72					.64	.64		.66
12.....	.65	(a)	.72	.71				.66	.68	.72	.78	.66
13.....	.65	0.66	.77		.70	.56	.71	.67	.60	.65	.75	.65
14.....	.65	.60	.88	.71					.60	.66	.71	.66
15.....	.65	.59	.77	.81		.50	.63	.68	.59			.68
16.....	.65	.58	.71	.77				.57	.60		.78	.68
17.....		(a)	.94		.65	.68						.65
18.....		(a)		.70				.68	.61	.68	.78	.65
19.....	.64	.63		.71	.61				.65	.68		.70
20.....	.62	.84	.91	.71					.64		.75	
21.....	.61		.87	.76		.60	.64		.62		.72	.70
22.....	.61		.69	.76				.62	.65		.72	
23.....	.61		.82	.70	.58		.61	.61	.64		.74	
24.....	.60						.65	.62	.64	.74		
25.....			.71	.75	.53	.75		.61		.74	.74	.72
26.....			.65	.78		.71	.65	.61	.64	.75	.74	
27.....	.62		.64	.74	.50	.71	.65	.66	.64		.70	.71
28.....	.61		.64	.72		.70	.64		.63			.70
29.....	.60		.62				.61		.62			.65
30.....	.60		.67						.72		.75	
31.....					.40					.64		

a Channel dry.

*Daily discharge, in second-feet, at station No. 17 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.82	0.10	0.12	11.....	0.22	0.46	0.14	21.....	0.14	0.40	0.32
2.....	.74	.10	.10	12.....	.22	.46	.10	22.....	.12	.43	.22
3.....	.66	.10	.10	13.....	.22	.46	.32	23.....	.10	.43	.18
4.....	.58	.12	.10	14.....	.18	.46	.58	24.....	.10	.46	.15
5.....	.50	.22	.10	15.....	.18	.46	1.70	25.....	.10	.50	1.00
6.....	.50	.29	.05	16.....	.15	.32	.32	26.....	.10	.32	.70
7.....	.43	.36	.05	17.....	.15	.32	1.35	27.....	.10	.18	.50
8.....	.36	.43	.05	18.....	.18	.36	1.30	28.....	.10	.22	.43
9.....	.34	.50	.12	19.....	.15	.36	1.46	29.....	.10	.15	.58
10.....	.29	.46	.10	20.....	.15	.40	.74	30.....	.10	.14	.54
								31.....	.10		.50

*Daily discharge, in second-feet, at station No. 17 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.15	(a)	0.20	1.00						0.15	0.20	0.40
2	.15	(a)	.20	.50						.15	.30	1.00
3	.15	(a)	.15	.15			0.15				.60	.30
4	.15	(a)	.15	.30	1.00		.15	0.45			.40	.25
5	.15	(a)	.15	.30			.15	.15	0.15		.30	.15
6	.15	(a)	.15	.25	.60		.15		.15		.20	.15
7	.15	(a)	.15	1.30				.15	.40		.15	.15
8	.15	(a)	.15	1.10				.15	.15		.15	.30
9	.15	(a)	.15	.90				.15	.15		.25	.15
10	.15	(a)	.15	.30			.15	.15			.90	.15
11	.15	(a)	.15	.25							.80	.15
12	.15	(a)	.25	.20				.15	.15	.25	.40	.15
13	.15	0.15	.40	.20	.15		.20	.15			.30	.15
14	.15	.10	.80	.20							.20	.15
15	.15	.10	.40	.55				.15			.30	.15
16	.15	.10	.20	.40							.40	.15
17	.10	(a)	.10	.30		0.15					.40	.15
18	.10	(a)	.40	.15				.15		.15	.40	.15
19	.10	.10	.60	.20					.15	.15	.40	.15
20	.10	.65	.95	.20							.30	.20
21	.10	1.00	.80	.35							.25	.15
22	.10	1.30	.15	.35					.15		.25	.30
23	.10	1.50	.60	.15							.30	.40
24	.10	1.00	.40	.20			.15			.30	.30	.30
25	.10	.60	.20	.30		.30				.30	.30	.25
26	.10	.40	.15	.40		.20	.15			.30	.30	.30
27	.10	.30	.15	.30		.20	.15	.15			.15	.20
28	.10	.20	.15	.25		.15					.20	.15
29	.10	.20	.15	.20							.20	.15
30	.10		.15	.30					.25		.30	.10
31	.10		3.00									.10

a Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 17 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October	0.26	16.30	June	0.20	11.90
November	.33	19.80	July	.15	9.22
December	.45	27.90	August	.15	9.22
1912.			September	.20	11.90
January	.13	7.99	October	.60	36.90
February	.27	15.50	November	.33	19.60
March	.38	23.40	December	.22	13.50
April	.38	22.60	The year	.28	200.00
May	.30	18.40			



*Discharge measurements at station No. 18 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.....	0.62	0.02	Nov. 27.....	0.53	0.02
Sept. 26.....	.45	.04	Dec. 27.....	.70	.13

NOTE.—Bed of stream of sand, gravel, and small cobbles; shifting. One channel at all stages. This stream is tributary to Wailuku River.

*Daily gage height, in feet, at station No. 18 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.72		0.62	0.59	
2.....										.60		
3.....	0.58		0.75	0.76			0.84					0.60
4.....	.55	0.42	.75	.80	1.02		.80	.81		.51		.68
5.....	.54	.42	.74	.81		0.40	.78	.74	0.54	.49	.60	.62
6.....	.56			.81	.86		.76		.59	.48		.60
7.....	.58		.75			.38		.76	.61		.56	.61
8.....	.62	.41					.75	.75	.54	.45	.55	.66
9.....	.61	.41	.79				.74	.75	.52		.66	.62
10.....	.59	.40	.80	.86			.74	.72		.46		.61
11.....	.55	.40	.80	.79					.45	.49		.61
12.....	.52	.38	.81	.75				.72	.50	.53	.60	.61
13.....	.51	.42	.97		.79	.68	.79	.74	.48	.50	.60	.61
14.....	.50	.41	.96	.72					.49	.52	.58	.62
15.....	.50	.41	.81	.80		.64	.78	.63	.48			.64
16.....	.50	.41	.75	.78				.50	.49		.61	.64
17.....		.38	.89		.73	.70						.60
18.....		.36		.78				.56	.49	.53	.60	.60
19.....	.50	.50		.79	.68				.50	.54		.62
20.....	.50	.92	.89	.81					.49		.60	
21.....	.49		.82	.83		.69	.75		.48		.56	.62
22.....	.49		.78	.81				.50	.50		.56	
23.....	.48		.80	.78	.60		.70	.49	.48		.60	
24.....	.48						.79	.50	.46	.60		
25.....			.77	.82	.56	.81		.50		.60	.57	.65
26.....			.75	.85		.80	.72	.49	.45	.58	.54	
27.....	.50		.75	.82	.51	.82	.72	.55	.45		.51	.70
28.....	.49		.75	.80		.79	.72		.45			.65
29.....	.48		.74				.72		.45			.61
30.....	.46		.81						.65		.60	
31.....					.49					.55		

*Daily discharge, in second-feet, at station No. 18 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....	0.17	0.01	0.05	11.....	0.05	0.05	0.05	21.....	0.05	0.05	0.05
2.....	.15	.01	.03	12.....	.05	.05	.03	22.....	.05	.05	.05
3.....	.13	.01	.01	13.....	.05	.05	.05	23.....	.05	.05	.05
4.....	.11	.05	.03	14.....	.05	.05	.10	24.....	.05	.05	.05
5.....	.10	.05	.05	15.....	.05	.05	.44	25.....	.05	.05	.17
6.....	.05	.05	.05	16.....	.05	.05	.05	26.....	.03	.05	.10
7.....	.05	.05	.02	17.....	.05	.05	.42	27.....	.03	.05	.05
8.....	.05	.05	.03	18.....	.05	.05	.35	28.....	.02	.05	.05
9.....	.05	.05	.05	19.....	.05	.05	.44	29.....	.01	.05	.17
10.....	.05	.05	.05	20.....	.05	.05	.20	30.....	.01	.05	.16
								31.....	.01		.15

*Daily discharge, in second-feet, at station No. 18 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			0.20	0.30			0.20	0.15		0.05		
2.....			.20	.20			.20	.20		.05		
3.....			.20	.20			.30	.20				0.05
4.....			.20	.25	0.65		.25	.25				.15
5.....			.20	.25			.25	.20			0.05	.05
6.....			.20	.25	.40		.20	.20				.05
7.....			.20	.20			.20	.20	0.05			.05
8.....	0.05		.20	.30			.20	.20				.10
9.....	.05		.25	.40			.20	.20			.10	.05
10.....			.25	.40			.20	.15				.05
11.....			.25	.25			.20	.15				.05
12.....			.25	.20			.20	.15			.05	.05
13.....			.55	.20	.25	0.15	.25	.20			.05	.05
14.....			.50	.15			.25	.10				.05
15.....			.25	.25		.10	.25	.10				.10
16.....			.20	.25			.25	.10			.05	.10
17.....			.40	.25	.20	.15	.20	.10				.05
18.....			.40	.25			.20	.10			.05	.05
19.....			.40	.25	.15		.20	.10				.05
20.....		0.45	.40	.25			.20	.10			.05	
21.....			.30	.30		.15	.20	.10				.05
22.....			.25	.25			.20	.10				
23.....			.25	.15	.05		.15	.10			.05	
24.....			.25	.20			.25	.10		.05		
25.....			.25	.30		.25	.20	.10		.05		.10
26.....			.20	.30		.25	.15	.10				
27.....			.20	.30		.30	.15	.10				.15
28.....			.20	.25		.25	.15	.10				.10
29.....			.20	.20			.15	.10				.05
30.....			.25	.30			.15	.10	.10		.05	
31.....			.50				.15	.10				

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 18 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.06	3.52	June.....	0.10	5.95
November.....	.05	2.74	July.....	.20	12.30
December.....	.11	7.05	August.....	.14	8.61
1912.			September.....	.02	1.19
January.....	0.1	.61	October.....	.40	24.60
February.....	.10	5.72	November.....	.05	2.98
March.....	.23	17.20	December.....	.05	3.07
April.....	.25	14.90	The year.....	.14	103.00
May.....	.10	6.15			

*Discharge measurements at station No. 25 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.....	0.30	0.22	Nov. 27.....	0.38	0.19
Sept. 26.....	.06	.04	Dec. 27.....	.64	1.20

NOTE.—Bed of stream of sand and gravel; slightly shifting. One channel at all stages. This stream is tributary to Wailluku River.

*Daily gage height, in feet, at station No. 25 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Date.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.01			0.62	
2.....												
3.....	0.35		0.30	0.36			0.54			0.54		0.60
4.....	.32	(a)	.26	.42	0.84		.48	.39		.48		.69
5.....	.32	(a)	.21	.42		+0.10	.42	.22	0.62		.63	.54
6.....	.40			.41	.79		.40		.53	.40		.45
7.....	.41		.29			+ .15		.28	.56		.38	.45
8.....	.44	(a)					.35	.20	.50	.35	.39	.55
9.....	.42	(a)	.34				.34	.30	.43	.34	.66	.49
10.....	.40	(a)	.39	.68			.28	.30		.28		.37
11.....	.35	(a)	.39	.61					.31			.32
12.....	.30	(a)	.52	.49				.15	.38		.68	.28
13.....	.28	0.21	.65		.51	.30	.42	.20	.30	.42	.49	.22
14.....	.22	.10	.45	.39					.30		.36	.24
15.....	.15	(a)	.39	.42		.21	.32	.31	.24	.32		.33
16.....	.10	(a)	.30	.36				.20	.34		.57	.36
17.....		(a)	.62		.20	.30						.22
18.....		(a)		.42				.30	.22		.68	.22
19.....	(a)	.11		.47	.20				.18			.28
20.....	(a)	.49	.51	.46					.12		.63	
21.....	(a)		.41	.62		.25	.30		.15	.30	.54	.40
22.....	(a)		.30	.62				.10	.19		.50	
23.....	(a)		.49	.53	.19		.22	.10	.12	.22	.54	
24.....	(a)						.35	.20	.10	.35		
25.....			.40	.58	.11	.45		.21			.50	.52
26.....			.31	.64		.40	.26	.18	.06	.26	.42	
27.....	(a)		.26	.63	.10	.48	.22	.30	.06	.22	.38	.61
28.....	(a)		.20	.61		.40	.21		.05	.21		.48
29.....	(a)		(a)				.22		.04	.22		.40
30.....	(a)		.36						.64		.49	
31.....												

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 25 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Date.	Oct.	Nov.	Dec.	Date.	Oct.	Nov.	Dec.	Date.	Oct.	Nov.	Dec.
1.....	2.20	(a)	(a)	11.....	0.68	1.78	(a)	21.....	(a)	1.50	1.57
2.....	1.50	(a)	(a)	12.....	.60	1.57	(a)	22.....	(a)	1.64	.68
3.....	1.00	(a)	(a)	13.....	.54	1.40	1.10.	23.....	(a)	1.78	.54
4.....	.60	(a)	(a)	14.....	.48	1.25	1.64	24.....	(a)	1.92	.45
5.....	.45	0.30	(a)	15.....	.42	1.10	4.20	25.....	(a)	2.06	2.84
6.....	.30	.45	(a)	16.....	.39	1.00	1.64	26.....	(a)	1.20	2.06
7.....	.39	.60	(a)	17.....	.36	1.10	3.96	27.....	(a)	1.00	1.25
8.....	.48	.80	(a)	18.....	(a)	1.20	3.64	28.....	(a)	1.05	1.25
9.....	.57	1.00	(a)	19.....	(a)	1.30	4.12	29.....	(a)	1.00	2.06
10.....	.64	2.06	(a)	20.....	(a)	1.40	2.36	30.....	(a)	.68	1.85
								31.....	(a)		1.50

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 25 at 2,700-foot level, near Hilo, Hawaii,  
for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.20	(a)	0.15	1.00	1.00	0.05	0.30	0.10	0.80	0.90	1.10	1.50
2.....	.20	(a)	.15	.50	1.50	.05	.40	.10	1.00	.70	1.80	2.50
3.....	.20	(a)	.15	.25	2.00	.05	.75	1.00	2.00	.75	2.50	1.00
4.....	.20	(a)	.15	.35	2.50	.05	.55	.30	3.00	.55	1.30	1.45
5.....	.20	(a)	.10	.35	3.00	.05	.35	.10	1.10	.35	1.15	.75
6.....	.30	(a)	.10	.35	2.10	.05	.30	.10	.70	.30	.30	.45
7.....	.35	(a)	.15	3.00	1.00	.05	.20	.15	.85	.20	.25	.45
8.....	.40	(a)	.20	2.50	.50	.05	.20	.10	.60	.20	.30	.80
9.....	.35	(a)	.20	2.00	.40	.05	.20	.15	.40	.20	1.30	.55
10.....	.30	(a)	.30	1.40	.30	.10	.15	.15	.20	.15	3.00	.25
11.....	.20	(a)	.30	1.05	.40	.10	2.00	.10	.15	.20	2.50	.20
12.....	.15	(a)	.70	.55	.50	.15	1.00	.05	.25	.30	1.40	.15
13.....	.15	0.10	1.25	.40	.65	.15	.35	.10	.15	.35	.55	.10
14.....	.10	.05	.45	.30	.50	.10	.50	.10	.15	.30	.25	.10
15.....	.05	(a)	.30	.35	.40	.10	.20	.15	.10	.20	.20	.20
16.....	.05	(a)	.15	.25	.20	.10	.10	.10	.20	.10	.90	.25
17.....	.05	(a)	1.10	.30	.10	.15	.20	.10	.10	.50	1.20	.10
18.....	.05	(a)	1.50	.35	.10	.15	.20	.15	.10	.20	1.40	.10
19.....	(a)	.05	1.00	.50	.10	.10	.20	.20	.10	.30	1.20	.15
20.....	(a)	.55	.65	.50	.10	.10	.20	.15	.05	.40	1.15	.40
21.....	(a)	2.00	.35	1.10	.10	.10	.15	.10	.05	.15	.75	.30
22.....	(a)	3.00	.15	1.10	.10	.20	.10	.05	.10	.20	.60	1.00
23.....	(a)	3.50	.55	.70	.10	.20	.10	.05	.05	.10	.75	3.00
24.....	(a)	2.50	.40	.80	.10	.30	.20	.10	.05	.20	.70	1.50
25.....	(a)	1.50	.30	.90	.05	.45	.20	.10	.05	.10	.60	.70
26.....	(a)	1.00	.15	1.20	.05	.30	.15	.10	.05	.15	.35	1.00
27.....	(a)	.50	.15	1.15	.05	.55	.10	.15	.05	.10	.25	1.05
28.....	(a)	.30	.10	1.05	.05	.30	.10	.10	.05	.10	.70	.55
29.....	(a)	.20	(a)	.50	.05	.30	.10	.10	.10	.10	.60	.30
30.....	(a)	-----	.25	.80	.05	.30	.10	.10	1.20	.10	.55	.20
31.....	(a)	-----	2.00	-----	(a)	-----	.10	.10	-----	.10	-----	.10

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 25 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.37	23.10	June.....	0.16	9.52
November.....	1.71	63.90	July.....	.31	19.10
December.....	1.25	77.10	August.....	.15	9.22
1912.			September.....	.46	27.40
January.....	.11	6.76	October.....	.28	17.20
February.....	.53	30.50	November.....	.99	58.90
March.....	.43	26.40	December.....	.68	41.80
April.....	.85	50.60			
May.....	.58	35.70	The year.....	.46	333.00

*Discharge measurements at station No. 26 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 15.....	<i>Feet.</i> 0.62	<i>Sec.-ft.</i> 0.02	Nov. 27.....	<i>Feet.</i> 0.70	<i>Sec.-ft.</i> 0.05
Sept. 26.....	.61		Dec. 27.....	.90	.31

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 26 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								0.62		0.80	0.68	
2										.75		
3	0.75		0.67	0.69			0.79					0.74
4	.72	(a)	.65	.74	0.90		.71	.79		.62		.84
5	.71	(a)	.63	.70		0.38	.70	.62	0.75	.61	.72	.80
6	.74			.72	.94		.70		.71	.60		.79
7	.75		.65			(a)		.63	.72		.68	.78
8	.78	(a)					.68	.60	.70	.61	.68	.82
9	.75	(a)	.66				.67	.62	.70		.75	.78
10	.72	(a)	.66	.78			.69	.62		.60		.77
11	.70	(a)	.70	.75					.68	.61		.75
12	.68	(a)	.71	.70				.63	.75	.75	.79	.73
13	(a)	(a)	.79		.89	.61	.75	.61	.70	.62	.72	.71
14	(a)	(a)	.81	.68				.70	.70	.64	.64	.72
15	(a)	(a)	.71	.71		.59	.69	.64	.69			.75
16	(a)	(a)	.61	.69				.60	.69		.74	.76
17		(a)	.83		.70	.62						.71
18		(a)		.71				.66	.65	.74	.75	.71
19	(a)	0.60	.74	.68					.64	.74		.77
20	(a)	.92	.88	.72					.62		.74	
21	(a)		.82	.79		.60	.68		.65		.73	.78
22	(a)		.71	.74				.61	.70		.70	
23	(a)		.69	.74	.60			.65	.61	.68		.72
24	(a)						.72	.62	.65	.75		
25			.71	.81	.58	.70		.60		.72	.72	.81
26			.64	.89		.68	.68	.60	.61	.71	.70	
27	(a)		.64	.80	.51	.71	.64	.65	.61		.70	.88
28	(a)		.64	.78		.68	(a)		.60			.86
29	(a)		.62				.65		.68			.81
30	(a)		.71						.60		.72	
31					.48					.72		

<sup>a</sup> Channel dry.

Daily discharge, in second-feet, at station No. 26 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	0.27	0.05	0.05	11	0.05	0.05	0.10	21	0.05	0.12	0.13
2	.15	.05	.05	12	.05	.05	.05	22	.05	.13	.05
3	.15	.05	.05	13	.05	.05	.13	23	.05	.14	.05
4	.15	.05	.05	14	.05	.05	.22	24	.05	.15	.05
5	.13	.05	.05	15	.05	.05	.81	25	.05	.16	.40
6	.13	.05	.05	16	.05	.05	.18	26	.05	.14	.28
7	.11	.05	.05	17	.05	.10	.52	27	.05	.10	.13
8	.10	.05	.05	18	.05	.10	.40	28	.05	.10	.10
9	.05	.10	.10	19	.05	.10	.45	29	.05	.05	.22
10	.05	.05	.05	20	.05	.11	.22	30	.05	.05	.15
								31	.05		.10

*Monthly discharge at station No. 26 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.08	4.72	June.....	0.03	1.79
November.....	.08	4.78	July.....	.05	3.07
December.....	.17	10.50	August.....	.05	3.07
1912.			September.....	.05	2.98
January.....	.03	1.84	October.....	.20	12.80
February.....	.20	11.50	November.....	.07	4.17
March.....	.08	4.92	December.....	.10	6.15
April.....	.08	4.76	The year.....	.09	61.50
May.....	.08	4.92			

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 27 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.....	1.61	4.26	Nov. 27.....	1.64	3.21
Sept. 27.....	1.26	.86	Dec. 27.....	2.00	12.7
Nov. 22.....	1.80	6.45			

NOTE.—Bed of stream of cobbles and boulders. Section near gage is rough; probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 27 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomlin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								1.28		1.71	2.08	
2.....										1.62		
3.....	1.55		1.62	1.71			1.90					1.96
4.....	1.50	0.92	1.56	1.80	2.20		1.80	1.56		1.40		1.98
5.....	1.45	.92	1.49	1.84		1.00	1.74	1.43	2.08	1.31	2.01	1.82
6.....	1.42			1.86	1.98		1.68		1.94	1.26		1.73
7.....	1.42		1.45			.92		1.44	1.97		1.72	1.77
8.....	1.42	.90					1.52	1.34	1.78	1.27	1.69	1.95
9.....	1.41	.90	1.50				1.48	1.38	1.69		2.05	1.81
10.....	1.38	.88	1.52	2.26			1.42	1.34		1.34		1.72
11.....	1.35	.88	1.65	2.08					1.53	1.33		1.64
12.....	1.32	.85	1.98	1.89				1.31	1.85	1.84	1.98	1.59
13.....	1.28	1.25	2.21		1.59	1.20	1.79	1.38	1.69	1.52	2.00	1.54
14.....	1.25	1.20	2.21	1.74					1.48	1.55	1.68	1.54
15.....	1.25	1.05	1.95	1.80		1.16	1.49	1.60	1.39			1.63
16.....	1.21	1.00	1.66	1.71				1.41	1.58		1.92	1.78
17.....		.95	1.78		1.42	1.30						1.41
18.....		.89		1.82				1.52	1.51	1.88	2.02	1.55
19.....	1.18	1.25		1.85	1.41				1.44	2.02		1.70
20.....	1.15	1.87	1.90	1.82					1.29		2.00	
21.....	1.10		1.82	1.99		1.22	1.30		1.04		1.86	1.75
22.....	1.10		1.71	1.95				1.25	1.42		1.81	
23.....	1.09		1.79	1.81	1.37		1.29	1.22	1.34		1.94	
24.....	1.08						1.39	1.46	1.32	2.19		
25.....			1.72	1.89	1.30	1.42		1.37		1.88	1.81	1.92
26.....			1.55	2.14		1.40	1.32	1.34	1.25	1.75	1.70	
27.....	1.00		1.47	2.12	1.23	1.49	1.35	1.45	1.24		1.64	2.64
28.....	.98		1.42	2.05		1.41	1.35		1.22			1.86
29.....	.95		1.39				1.39		1.24			1.82
30.....	.91		1.44						1.84		1.80	
31.....					1.16					2.00		

*Daily discharge, in second-feet, at station No. 27 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		15.0	1.0	2.1	16.....		5.3	6.2	39.4
2.....		15.5	1.0	2.0	17.....		5.3	7.0	61.0
3.....		17.0	1.0	1.7	18.....		3.2	7.9	61.0
4.....		18.0	1.6	1.6	19.....		2.8	8.7	77.0
5.....		20.1	3.2	1.7	20.....		2.5	9.8	42.6
6.....		15.0	3.7	1.6	21.....		2.2	11.4	18.0
7.....		11.0	4.2	1.4	22.....		2.0	13.0	7.6
8.....		9.8	4.9	1.4	23.....		1.9	15.0	4.8
9.....		9.0	8.4	2.2	24.....		1.7	17.0	3.0
10.....		9.6	6.2	1.7	25.....		1.6	19.4	21.5
11.....		6.0	7.9	1.9	26.....		1.5	9.0	8.4
12.....		6.0	9.8	1.6	27.....		1.3	5.3	6.2
13.....		5.8	12.2	11.0	28.....	14.0	1.2	4.2	5.3
14.....		5.7	15.0	18.0	29.....	13.0	1.0	2.5	9.8
15.....		5.5	18.0	77.0	30.....	14.0	.9	2.2	9.0
					31.....		1.0		7.6

*Daily discharge, in second-feet, at station No. 27 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.80	0.10	5.00	15.00	10.00	0.50	3.00	1.00	5.00	4.60	17.00	20.00
2.....	2.80	.10	4.00	9.00	15.00	.40	5.00	1.00	12.00	8.40	15.00	30.00
3.....	2.80	.10	3.40	4.60	20.00	.30	9.00	5.00	20.00	3.00	25.00	11.00
4.....	2.30	.10	2.80	6.20	25.00	.20	6.20	2.80	30.00	1.60	20.00	12.00
5.....	2.00	.10	2.20	7.30	30.00	.20	5.10	1.80	17.00	1.20	14.00	6.80
6.....	1.70	.10	2.10	7.90	12.00	.10	4.20	1.80	11.00	.90	5.00	4.80
7.....	1.70	.10	2.00	30.00	8.00	.10	3.40	1.90	12.00	.90	4.80	5.70
8.....	1.70	.10	2.20	30.00	5.00	.10	2.50	1.30	5.80	1.00	4.30	11.00
9.....	1.70	.10	2.30	30.00	5.00	.20	2.20	1.50	4.30	1.00	16.00	6.50
10.....	1.50	.10	2.50	30.00	5.00	.30	1.70	1.30	3.00	1.30	25.00	4.80
11.....	1.40	.10	3.80	17.00	5.00	.40	15.00	1.20	2.60	1.20	20.00	3.70
12.....	1.20	.10	12.00	8.70	4.00	.50	10.00	1.10	7.60	7.30	12.00	3.10
13.....	1.00	.90	26.00	9.00	3.10	.70	6.00	1.50	4.30	2.50	13.00	2.70
14.....	.90	.70	26.00	5.10	3.00	.60	8.00	3.00	2.20	2.80	4.20	2.70
15.....	.90	.30	11.00	6.20	4.00	.60	2.20	3.20	1.50	3.00	3.00	3.60
16.....	.70	.20	3.90	4.60	3.00	.80	2.00	1.70	3.00	2.00	9.80	5.80
17.....	.70	.10	5.80	10.00	1.70	1.10	1.50	2.00	2.70	20.00	20.00	1.70
18.....	.60	.10	10.00	6.80	2.00	1.00	1.50	2.50	2.40	8.40	14.00	2.80
19.....	.60	.90	10.00	7.60	1.70	.90	1.30	3.00	1.90	14.00	15.00	4.40
20.....	.50	8.20	9.00	6.80	2.00	.80	1.20	2.00	1.10	12.00	13.00	10.00
21.....	.40	15.00	6.80	13.00	1.50	.80	1.10	1.50	.30	12.00	7.90	5.30
22.....	.40	20.00	4.60	11.00	1.00	1.00	1.10	.90	1.70	20.00	6.50	15.00
23.....	.40	25.00	6.00	6.50	1.40	1.20	1.10	.80	1.30	30.00	11.00	30.00
24.....	.40	30.00	5.00	10.00	1.50	1.40	1.60	2.00	1.20	24.00	8.00	20.00
25.....	.30	20.00	4.80	8.70	1.10	1.70	1.40	1.40	1.00	8.40	6.50	9.80
26.....	.30	10.00	2.70	21.00	.90	1.60	1.20	1.30	.90	5.30	4.40	20.00
27.....	.20	5.00	2.10	19.00	.80	2.20	1.30	2.00	.90	30.00	3.70	15.00
28.....	.20	8.00	1.70	15.00	.80	1.70	1.30	2.00	.80	25.00	10.00	7.90
29.....	.10	10.00	1.50	10.00	.70	1.50	1.60	1.50	.90	20.00	8.00	6.80
30.....	.10		1.90	10.00	.60	1.50	1.50	1.50	7.30	15.00	6.20	5.00
31.....	.10		25.00		.60		1.00	1.50		13.00		5.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 27 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.66	40.70	June.....	0.81	48.20
November.....	.79	47.10	July.....	3.39	208.00
December.....	1.64	101.00	August.....	1.84	113.00
1912.			September.....	5.52	328.00
January.....	1.05	64.60	October.....	9.51	585.00
February.....	5.37	309.00	November.....	11.40	678.00
March.....	6.71	413.00	December.....	9.45	581.00
April.....	12.50	744.00	The year.....		6.09 4,420.00
May.....	5.66	348.00			

*Discharge measurements at station No. 28 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.....	1.21	8.27	Nov. 27.....	1.30	9.85
Sept. 26.....	.68	2.01	Dec. 27.....	1.98	42.9
Nov. 22.....	1.58	16.2			

NOTE.—Bed of stream of cobbles and bowlders; section near gage is rough; probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 28 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.69		1.70	2.14	
2.....										1.46		
3.....	1.12		1.29	1.69			1.91					1.88
4.....	1.08	0.13	1.12	1.79	2.25		1.66	1.62		1.01		1.81
5.....	1.02	.10	1.02	1.81		0.61	1.48	1.10	2.12	.86	2.20	1.59
6.....	1.01			1.83	1.95		1.36		1.98	.78		1.49
7.....	1.08		.95			.60		.99	2.06		1.52	1.61
8.....	1.12	.05					1.19	.85	1.69	.65	1.46	1.82
9.....	1.10	.05	1.08				1.11	.98	1.59		2.15	1.67
10.....	1.08	.04	1.15	2.26			.97	.94		.80		1.49
11.....	.85	.04	1.69	2.10					1.34	.80		1.36
12.....	.80	.02	1.99	1.83				.80	1.86	1.92	2.15	1.26
13.....	.75	.51	2.32		1.30	.90	1.69	.90	1.58	1.48	1.58	1.18
14.....	.72	.43	2.30	1.55					1.34	1.40	1.52	1.18
15.....	.70	.31	1.92	1.64		.86	1.14	1.22	1.04		1.20	1.28
16.....	.68	.26	1.64	1.54				.96	1.32		1.85	1.47
17.....		.18	1.77		1.00	.88						1.26
18.....		.09		1.68				1.24	1.11	1.82	1.90	1.13
19.....	.62	.50		1.73	.98				.99	2.05		1.45
20.....	.52	1.48	1.89	1.70					.91	2.80	1.92	2.68
21.....	.46		1.69	1.99		.84	.99		.84		1.72	1.54
22.....	.44		1.50	1.85				.78	.99		1.62	
23.....	.42		1.78	1.68	.81		.89	.64	.81		1.82	
24.....	.41						1.34	1.00	.78	2.32		
25.....			1.68	1.93	.79	.99		.71		1.80	1.54	1.90
26.....			1.24	2.22	.90		.85	.68	.67	1.68	1.40	
27.....	.40		1.07	2.13	.78	1.20	1.02	1.19	.64		1.31	2.04
28.....	.40		.94	2.06		.93	.95		.61			1.74
29.....	.39		.82				.92		.60			1.64
30.....	.38		1.00						1.85		1.88	
31.....			3.41		.69					2.01		



*Daily discharge, in second-feet, at station No. 28 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.		42.0	1.7	6.2	16.		13.8	17.0	61.0
2.		49.0	1.7	4.8	17.		13.5	19.8	79.4
3.		49.0	1.7	4.2	18.		7.0	22.2	81.0
4.		49.0	3.0	4.5	19.		6.0	25.0	99.8
5.		49.0	6.0	4.8	20.		5.5	28.0	69.0
6.		38.5	8.8	3.8	21.		5.0	32.2	33.6
7.		28.0	11.6	2.8	22.		4.5	36.4	28.0
8.		25.0	16.2	3.0	23.		4.0	40.6	25.5
9.		22.2	22.2	6.4	24.		3.5	44.8	23.0
10.		19.8	14.4	5.8	25.		3.0	49.0	58.6
11.		17.0	19.8	6.0	26.		2.6	23.0	42.0
12.		16.2	26.0	5.5	27.		2.1	15.0	35.6
13.		15.4	35.0	24.0	28.	42.0	1.9	13.5	27.0
14.		14.7	44.8	45.5	29.	28.0	1.7	11.0	42.0
15.		14.1	57.0	122.0	30.	35.0	1.4	8.8	38.5
					31.		1.7		35.0

*Daily discharge, in second-feet, at station No. 28 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	6.00	0.20	10.00	90.00	30.00	2.00	4.00	2.10	50.00	23.00	52.00	70.00
2.	6.00	.20	10.00	50.00	40.00	2.00	10.00	40.00	60.00	14.00	90.00	100.00
3.	6.40	.10	9.80	22.60	50.00	1.90	35.70	25.00	100.00	10.00	120.00	34.00
4.	5.80	.10	6.40	27.00	61.00	1.90	21.40	19.80	140.00	5.10	70.00	29.00
5.	5.20	.10	5.20	28.70	100.00	1.80	14.40	6.00	51.00	3.60	57.00	19.00
6.	5.10	.10	5.00	30.10	38.50	1.80	11.20	5.40	41.00	2.80	36.00	15.00
7.	5.80	.10	4.50	160.00	20.00	1.70	9.50	4.90	46.00	2.40	16.00	19.00
8.	6.40	.10	5.00	150.00	10.00	1.80	7.80	3.50	23.00	1.90	14.00	29.00
9.	6.00	.10	5.80	140.00	10.00	1.90	6.20	4.80	19.00	2.40	53.00	22.00
10.	5.80	.10	7.00	61.80	10.00	2.00	4.70	4.40	15.00	3.00	150.00	15.00
11.	3.50	.10	22.60	49.00	10.00	2.50	150.00	3.70	11.00	3.00	120.00	11.00
12.	3.00	.10	41.30	30.10	10.00	3.00	80.00	3.00	32.00	36.00	53.00	9.20
13.	2.60	1.20	66.60	24.00	10.00	4.00	22.60	4.00	18.00	14.00	34.00	7.60
14.	2.40	.90	65.00	17.00	10.00	3.80	50.00	4.50	11.00	12.00	16.00	7.60
15.	2.20	.40	36.40	20.60	5.00	3.60	6.80	8.40	5.40	12.00	8.00	9.60
16.	2.10	.30	20.60	16.60	5.00	3.70	5.00	4.60	10.00	10.00	32.00	14.00
17.	2.00	.20	26.50	30.00	5.00	3.80	5.00	6.00	8.00	60.00	40.00	9.20
18.	1.90	.10	29.00	22.20	5.00	3.70	5.00	8.80	6.20	29.00	35.00	6.60
19.	1.80	1.20	31.50	24.50	4.80	3.60	5.00	15.00	4.90	45.00	40.00	13.00
20.	1.30	14.00	34.30	23.00	4.00	3.50	5.00	10.00	4.10	107.00	36.00	96.00
21.	1.00	100.00	22.60	41.30	4.00	3.40	4.90	6.40	3.40	120.00	24.00	17.00
22.	1.00	140.00	15.00	31.50	4.00	3.80	4.40	2.80	4.90	150.00	20.00	100.00
23.	.90	170.00	27.00	22.20	3.10	4.20	3.90	1.90	3.10	170.00	29.00	150.00
24.	.80	100.00	30.00	40.00	3.00	4.60	10.80	5.00	2.80	67.00	23.00	100.00
25.	.80	40.00	22.20	37.10	2.90	4.90	6.00	2.30	2.40	28.00	17.00	35.00
26.	.80	30.00	8.80	58.60	2.80	4.00	3.50	2.10	2.00	22.20	12.00	60.00
27.	.80	20.00	5.70	51.40	2.80	8.00	5.20	7.80	1.90	170.00	10.00	45.00
28.	.80	10.00	4.40	46.20	2.60	4.30	4.50	6.00	1.70	150.00	50.00	25.00
29.	.80	10.00	3.20	30.00	2.40	4.00	4.20	5.00	1.70	150.00	40.00	21.00
30.	.70		5.00	20.00	2.20	4.00	3.50	4.00	32.00	100.00	34.00	10.00
31.	.70		168.00		2.10		2.80	5.00		43.00		10.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 28 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	17.00	1,040	June.....	8.31	197
November.....	21.90	1,300	July.....	16.50	1,010
December.....	33.20	2,020	August.....	7.49	461
			September.....	23.70	1,410
1912.			October.....	50.50	3,110
January.....	2.92	180	November.....	44.40	2,640
February.....	17.60	1,010	December.....	35.60	2,190
March.....	24.30	1,490			
April.....	46.50	2,770	The year.....	24.00	17,400
May.....	15.20	935			

*Discharge measurements at station No. 29 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Hydrographer.	Gage height.	Dis-charge.	Date.	Hydrographer.	Gage height.	Dis-charge.
Aug. 15	E. O. Christiansen.	<i>Feet.</i> 0.34	<i>Sec.-ft.</i> 0	Nov. 22	E. O. Christiansen.	<i>Feet.</i> 0.45	0
Sept. 26	.....do.....		(*)	Dec. 12	.....do.....	.36	0

<sup>a</sup> Channel dry.

NOTE.—Bed of stream of silt, sand, and gravel. Shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 29 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.30		0.53	0.52	
2.....										.40		
3.....	0.42		0.33	0.31			0.51					0.49
4.....	.41	(a)	.25	.43	1.15		.40	.50		.30		.50
5.....	.40	(a)	.20	.40		(a)	.40	.34	0.48	.22	.51	.42
6.....	.42			.39	.84		.38		.49			.41
7.....	.44		.30			(a)		.37	.50		.42	.41
8.....	.48	(a)					.24	.32	.43	.24	.42	.50
9.....	.45	(a)	.31				.15	.36	.44		.64	.42
10.....	.42	(a)	.31	.49			.25	.35		.30		.41
11.....	(a)	(a)	.32	.49					.38	.32		.38
12.....	(a)	(a)	.54	.40				.31	.40	.53	.52	.37
13.....	(a)	(a)	.59		.49	0.28	.44	.42	.35	.34	.52	.34
14.....	(a)	(a)	.56	.40					.32	.41	.42	.40
15.....	(a)	(a)	.44	.45		.25	.15	.40	.30		.42	.44
16.....	(a)	(a)	.40	.39				.32	.35		.54	.39
17.....		(a)	.66		.12	.26						.36
18.....		(a)		.40				.42	.34	.46	.55	.38
19.....	(a)			.41	(a)				.30	.49		.46
20.....	(a)	0.71	.49	.40					.30	.60	.51	.51
21.....	(a)		.40	.56		.22	.15		.32		.50	.42
22.....	(a)		.35	.55				.31	.34		.42	
23.....	(a)		.41	.40	(a)		.15	.32	.32		.49	
24.....	(a)						.40	.32	.32	.50		
25.....			.41	.49	(a)	.35		.30		.44	.43	.46
26.....			.39	.53		.34	.40	.30	.19	.46	.40	
27.....		(a)	.30	.72	(a)	.40	.35	.41	.28		.40	.52
28.....			.13	.94		.32	.30		(a)			.46
29.....	(a)						.32		(a)			.45
30.....	(a)		.36						.49		.48	
31.....			.75		(a)					.50		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 29 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.01	0.0	0.0	0.03	0.02	0.0	0.01	0.01	0.02	0.0	0.1	0.02
2.	0.01			0.02	0.01				0.05		0.1	0.05
3.	0.01			0.01	0.01				0.15		0.10	0.01
4.	0.01			0.02	0.20				0.20		0.02	
5.	0.01			0.01	0.10				0.10		0.01	
6.	0.01			0.01	0.05				0.05	(a)		
7.	0.01			0.05	0.04				0.05			
8.	0.01			0.15	0.02				0.02			
9.	0.01			0.10	0.01				0.01		0.01	0.01
10.	0.01			0.05	0.01						0.15	0.00
11.	0		0	0.05	0.01						0.10	
12.			0.02	0.02	0.01						0.01	
13.				0.01	0.01						0.01	
14.					0							
15.							0.01					
16.							0				0.01	
17.											0.05	
18.										0	0.02	0.00
19.		0							0.02	0.02	0.03	0.01
20.		0.05				0		0.01	0.02	0.02	0.01	0.01
21.		0.08				0.1		0		0.10		0.01
22.		0.16	0.2							0.15		0.02
23.		0.20	0.1							0.20		0.03
24.		0.10					0		0.01	0.05		0.25
25.		0.05		0.01			0.01		0	0.02		0.16
26.		0.02	0.01	0.02						0.10		0.02
27.		0.02	0.00	0.03						0.25		0.01
28.		0.00	0.00	0.07						0.10		
29.		0.02	(a)	0.02			0.01			0.05		
30.			0.00	0.01		0.01			0	0.02	0.01	
31.	0		0.04		0			0		0.02		

<sup>a</sup> Channel dry.

*Monthly discharge at station No. 29 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September	(a)		May	0.020	1.00
October	(a)		June	0.003	0.20
November	(a)		July	0.006	0.40
December	(a)		August	0.006	0.40
1912.			September	0.030	1.60
January	0.003	0.20	October	0.040	2.20
February	0.020	1.40	November	0.020	1.40
March	0.010	0.60	December	0.020	1.40
April	0.030	1.60	The year	0.02	12.40

<sup>a</sup> Stream dry most of the time. Mean for month less than 0.01.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 30 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 15.	0.40	0.04	Nov. 22.	0.22	
Sept. 26.	0.33		Dec. 12.	0.04	

NOTE.—Bed of stream of silt, sand, and gravel. Shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 30 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.38		0.64	0.30	.....
2.										.42		
3.	0.62		0.36	0.58			0.53					0.24
4.	.60	(a)	.31	.62	0.80		.45	.54		.34		.30
5.	.59	(a)	.30	.56		0.10	.40	.43	0.60	.31	.28	.12
6.	.61			.66	.67		.38		.60	.30		.11
7.	.62		.32			.08		.48	.62		.20	.12
8.	.65	(a)					.16	.42	.49	.32	.20	.25
9.	.64	(a)	.36				.16	.39	.42		.45	.14
10.	.60	(a)	.39	.63			.38	.40		.32		.11
11.	.55	(a)	.40	.62					.40	.32		.09
12.	.50	(a)	.66	.59				.49	.40	.55	.25	.06
13.	.49	0.41	.69		.40	.29	.49	.51	.35	.35	.25	.05
14.	.45	.30	.75	.46					.35	.44	.20	.10
15.	.40	.25	.58	.59		.24	.30	.52	.31		.20	.20
16.	.35	.25	.50	.52				.34	.36		.31	.24
17.		(a)	.65		.30	.31						.09
18.		(a)		.52				.53	.35	.49	.31	.10
19.	(a)	.45		.64	.28				.34	.50		.21
20.	(a)	.88	.51	.56					.32	.69	.28	.30
21.	(a)		.45	.78		.30	(a)		.35		.28	.16
22.	(a)		.40	.75				.32	.35		.24	
23.	(a)		.50	.59	.21		(a)	.35	.34		.28	
24.	(a)						.44	.35	.32	.24		
25.			.50	.71	.20	.40		.30		.24	.22	.23
26.			.41	.68		.38	.45	.30	.32	.27	.20	
27.	(a)		.37	.73	.20	.49	.42	.45	.32		.20	.26
28.	(a)		.31	.66		.39	.40		(a)			.16
29.	(a)		.30				.45		(a)			.19
30.	(a)		.56						.65		.26	
31.			1.08		.19					.35		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 30 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.04	0.00	0.00	0.05	0.05	0.0	0.01	0.01	0.01			
2.	.04				.15							
3.	.04				.15							
4.					.15							
5.					.25		.01					
6.							.00					
7.	.04			.05	.10							
8.	.05			.10	.05							
9.	.05											
10.	.04			.10	.05		.00					
11.			.00		.02		.01					
12.		.00	.07		.02							
13.	.04	.01	.08		.00							
14.	.02	.00	.15									
15.	.01		.05				.01		.01			
16.	.01						.00		0			
17.	.00											
18.												
19.		.00										
20.		.25		.05				.01				
21.		.35		.15				.0				
22.		.65		.15		.0						
23.		.30		.05		.01						
24.		.10		.10								
25.		.05	.05	.15								
26.		.01	.00									
27.				.15								
28.				.05								
29.		.01	.00						.00			
30.			.01	.05		.01			.05			
31.	.00		.40		.00		.0	.0				

*Monthly discharge at station No. 30 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.08	4.92	June.....	0.01	0.40
November.....	a. 10	5.95	July.....	.01	.40
December.....	a. 12	7.37	August.....	.01	.40
			September.....	.01	.40
1912.			October.....	.02	1.20
January.....	.02	1.20	November.....	.03	1.60
February.....	.06	3.60	December.....	.03	2.00
March.....	.04	2.60			
April.....	.07	4.40	The year.....	.03	20.40
May.....	.04	2.20			

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 31 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.75	3.52	Nov. 22.....	0.96	6.45
Sept. 26.....	.58	.81	Dec. 12.....	.76	3.08
Oct. 25.....	.95	6.04			

NOTE.—Bed of stream of cobbles and boulders; section near gage rough; probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 31 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.59		1.09	1.16	
2.....										1.01		
3.....	0.71		0.81	0.84			1.22	1.72				1.08
4.....	.70	0.22	.73	.92	1.22		1.08	1.36		.76		1.12
5.....	.68	.21	.70	1.02		0.48	.97	.77	1.18	.66	1.12	.95
6.....	.71			1.06	1.09		.92		1.18	.62		.90
7.....	.72		.65			.45		.73	1.69		.85	.92
8.....	.75	.12					.80	.70	1.02	.60	.84	1.05
9.....	.72	.11	.76				.77	.72	.90		1.19	.99
10.....	.70	.10	.80	1.32			.78	.70		.66		.88
11.....	.65	.10	.88	1.21					.81	.67		.81
12.....	.62	.10	1.21	1.10				.68	.99	.85	1.28	.77
13.....	.60	.70	1.38		.91	.60	.89	.74	.84	.69	1.16	.72
14.....	.59	.61	1.46	.91					.79	.88	.99	.75
15.....	.56	.41	1.09	1.04		.52	.79	.90	.67		.88	.82
16.....	.55	.38	.91	.90				.74	.82		1.18	.97
17.....		.28	1.11		.69	.66						.82
18.....		.10		.95				.89	.72	.92	1.20	.75
19.....	.51	.27	.94	.67					.69	.93		.92
20.....	.48	1.16	1.20	.91					.67	1.25	1.10	1.36
21.....	.44		1.08	1.13		.61	.70		.68		1.00	
22.....	.42		.94	1.09				.61	.76		.98	
23.....	.41		.94	.91	.61			.63	.60		1.01	
24.....	.41							.96	.69	.64	1.25	
25.....			.89	1.04	.59	.81		.65		.96	.88	1.04
26.....			.78	1.17		.74	.75	.62	.58	.90	.85	
27.....	.42		.69	1.04	.58	.80	.74	.80	.57		.82	1.18
28.....	.41		.64	1.06		.75	.75		.52			.99
29.....	.40		.61				.70		.54			.99
30.....	.40		.72						1.19		.89	
31.....			1.71		.50					1.11		

*Daily discharge, in second-feet, at station No. 31 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		14.8	1.0	2.4	16.....		10.4	6.4	13.5
2.....		14.8	1.0	2.3	17.....		10.4	7.0	33.6
3.....		16.2	1.0	2.0	18.....		6.4	7.7	33.6
4.....		17.6	3.8	2.2	19.....		3.8	8.6	41.5
5.....		19.0	7.4	2.4	20.....		3.5	9.5	25.2
6.....		15.2	8.3	2.0	21.....		3.0	10.4	12.4
7.....		12.0	9.2	1.5	22.....		2.6	11.6	7.4
8.....		12.0	10.4	1.8	23.....		2.6	13.1	6.4
9.....		12.4	12.0	2.6	24.....		2.4	14.8	5.3
10.....		12.4	7.4	2.3	25.....		2.4	16.6	20.6
11.....		8.9	8.6	2.9	26.....	38.2	2.3	7.0	19.5
12.....		9.2	9.8	2.4	27.....	23.2	1.6	4.1	19.0
13.....		9.5	11.2	6.4	28.....	21.6	1.5	4.0	17.1
14.....		9.8	13.1	16.6	29.....	14.3	1.3	3.5	25.2
15.....		10.1	15.2	41.5	30.....	14.3	1.0	2.6	21.6
					31.....		1.0		19.0

*Daily discharge, in second-feet, at station No. 31 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.40	0.10	5.00	25.00	15.00	0.40	5.00	0.90	5.00	10.10	12.70	15.00
2.....	2.40	.10	5.00	12.00	20.00	.40	10.00	1.00	10.00	7.70	10.00	20.00
3.....	2.40	.10	4.00	4.40	12.00	.30	15.20	50.00	20.00	5.40	30.00	9.80
4.....	2.30	.10	2.80	5.70	15.20	.30	9.80	22.10	35.00	3.20	15.00	11.20
5.....	2.00	.10	2.30	8.00	12.00	.30	6.80	3.40	13.50	1.80	11.20	6.30
6.....	2.40	.10	2.00	9.20	10.10	.20	5.70	3.00	13.50	1.30	5.00	5.30
7.....	2.60	.10	1.60	40.00	5.00	.20	5.00	2.80	47.40	1.20	4.50	5.70
8.....	3.00	.10	2.00	55.00	5.00	.20	3.80	2.30	8.00	1.00	4.40	8.90
9.....	2.60	.10	3.20	40.00	5.00	.20	3.30	2.60	5.30	1.40	13.90	7.20
10.....	2.30	.10	3.80	20.00	5.00	.30	3.50	2.30	4.60	1.80	40.00	5.00
11.....	1.60	.10	5.00	14.80	5.00	.40	20.00	2.20	3.90	1.90	35.00	3.90
12.....	1.30	.10	14.80	10.40	5.00	.50	15.00	2.00	7.20	4.60	18.10	3.40
13.....	1.00	2.30	23.20	8.00	5.50	1.00	5.00	2.90	4.40	2.20	12.70	2.60
14.....	.90	1.10	29.30	5.50	4.50	.80	8.00	3.50	3.60	5.00	7.20	3.00
15.....	.80	.10	10.10	8.60	3.50	.50	3.60	5.30	1.90	5.00	5.00	4.10
16.....	.70	.10	5.50	5.30	2.50	1.10	3.00	2.90	4.10	4.00	13.50	6.80
17.....	.60	.10	10.80	10.00	2.20	1.80	3.00	3.00	3.00	20.00	25.00	4.10
18.....	.60	.10	15.00	6.30	2.60	1.60	3.00	5.10	2.60	5.70	14.30	3.00
19.....	.50	.10	20.00	6.10	1.90	1.40	3.00	8.00	2.20	5.90	20.00	5.70
20.....	.30	12.70	14.30	5.50	2.00	1.20	3.00	5.00	1.90	16.60	10.40	22.10
21.....	.20	20.00	9.80	11.60	2.00	1.10	2.30	3.00	2.00	20.00	7.40	10.00
22.....	.20	35.00	6.10	10.10	2.00	1.80	2.20	1.10	3.20	25.00	7.00	20.00
23.....	.10	55.00	6.10	5.50	1.10	2.50	2.00	1.00	1.50	40.00	7.70	35.00
24.....	.10	55.00	5.60	7.00	3.00	3.20	6.60	2.20	1.50	16.60	6.30	20.00
25.....	.10	40.00	5.10	8.60	.90	4.00	4.80	1.60	1.20	6.60	5.00	8.60
26.....	.20	15.00	3.50	13.10	.90	2.90	3.00	1.30	.90	5.30	4.60	15.00
27.....	.20	5.00	2.20	8.60	.90	3.80	2.90	3.80	.80	30.00	4.10	13.50
28.....	.10	4.00	1.50	9.20	1.00	3.00	3.00	5.00	.50	50.00	15.00	7.20
29.....	.10	8.00	1.10	5.00	1.00	2.00	2.30	4.00	.60	40.00	10.00	7.20
30.....	.10		2.60	8.00	.50	2.00	2.00	3.00	13.90	25.00	5.20	5.00
31.....	.10		49.10		.40		1.50	3.00		10.80		5.00

NOTE.—Daily discharges determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 31 at 2,700-foot level near, Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	8.07	498	June.....	1.31	78.00
November.....	8.21	490	July.....	5.40	332.00
December.....	13.50	833	August.....	5.14	316.00
1912.			September.....	7.44	443.00
January.....	1.10	67.60	October.....	12.10	744.00
February.....	8.79	506.00	November.....	12.70	756.00
March.....	8.79	540.00	December.....	9.66	594.00
April.....	12.90	768.00	The year.....	7.50	5,450.00
May.....	4.91	302.00			

*Discharge measurements at station No. 32 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 16.....	0.34	0.27	Nov. 22.....	0.48	1.27
Sept. 26.....	.33	.06	Dec. 12.....	.38	.37
Oct. 25.....	.50	.94			

NOTE.—Bed of stream composed of sand and gravel with few small cobbles; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 32 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.35		0.62	0.70	
2.....								.49		.49		
3.....	0.62		0.42	0.42			0.60	.60				0.60
4.....	.60	(a)	.40	.48	0.85		.54	.59		.34		1.00
5.....	.58	(a)	.40	.54		0.20	.46	.39	0.87	.32	.54	.80
6.....	.62			.61	.62		.42		.80	.32		.59
7.....	.64		.40			.18		.42	.85		.39	.50
8.....	.68	(a)					.35	.38	.53	.32	.39	.51
9.....	.66	(a)	.41				.35	.42	.48		.67	.49
10.....	.62	(a)	.49	.68			.40	.40		.32		.42
11.....	.65	(a)	.40	.62					.40	.32		.40
12.....	.62	(a)	.61	.54				.38	.43	.54	.75	.38
13.....	.51	0.35	.79		.52	.35	.50	.40	.40	.55	.70	.34
14.....	.50	.27	.79	.45				.40	.38	.50	.35	.50
15.....	.48	(a)	.63	.51		.30	.38	.44	.38		.40	.38
16.....	.46	(a)	.57	.48				.34	.40		.68	.45
17.....		(a)	.96		.40	.32						.44
18.....		(a)		.49				.45	.38	.42	.67	.32
19.....	.40	.31		.54	.40				.38	.50		.42
20.....	.38	.59	.88	.54					.35	.60	.58	.65
21.....	.31		.71	.64		.30	.40		.35		.51	.42
22.....	.31		.68	.57				.28	.42			
23.....	.31		.69	.59	.38		.40	.24	.40		.48	
24.....	.30						.35	.30	.39	.84		
25.....			.59	.62	.31	.40		.25		.50	.42	.59
26.....			.45	.68		.38	.45	.22	.32	.47	.41	
27.....	.32		.40	.65	.30	.51	.42	.40	.31		.40	.57
28.....	.31		.40	.64		.42	.40		.31			.42
29.....	.30		.38				.40		.32			.44
30.....	.29		.62						.68		.50	
31.....			1.04		.29					.84		

a Channel dry.

*Daily discharge, in second-feet, at station No. 32 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		7.4	0.5	2.4	16.....		5.6	3.4	9.0
2.....		8.1	.5	2.2	17.....		5.6	3.8	14.9
3.....		8.3	.5	1.4	18.....		3.7	4.2	13.7
4.....		8.5	1.2	1.4	19.....		2.2	4.7	16.2
5.....		8.8	2.2	1.7	20.....		1.8	5.1	11.9
6.....		8.1	2.6	1.2	21.....		1.4	5.8	8.5
7.....		7.2	2.9	.9	22.....		1.1	6.4	5.1
8.....		7.1	3.3	1.2	23.....		1.1	7.1	4.7
9.....		6.9	3.7	2.4	24.....		1.0	7.8	4.1
10.....		6.7	2.7	2.2	25.....		.9	8.5	11.9
11.....		6.1	3.0	2.4	26.....	10.3	.8	6.1	7.8
12.....		6.1	3.4	2.2	27.....	7.2	.8	4.1	7.2
13.....		5.9	4.0	6.1	28.....		.8	4.1	7.1
14.....		5.8	4.5	10.8	29.....	6.4	.6	3.5	10.3
15.....		5.8	5.1	17.5	30.....	6.9	.6	2.8	9.9
					31.....		.6		8.1

*Daily discharge, in second-feet, at station No. 32 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.40	(a)	1.00	4.00	3.00	.....	0.50	0.30	3.00	2.60	3.40	5.00
2.....	.40	(a)	.80	2.00	4.00	.....	1.00	.30	4.00	1.10	3.00	8.00
3.....	.45	(a)	.65	.65	3.00	.....	2.20	2.20	6.00	.70	6.00	2.20
4.....	.40	(a)	.50	1.05	5.60	.....	1.60	2.10	9.00	.30	3.00	8.10
5.....	.35	(a)	.50	1.60	7.00	.....	.90	.45	5.90	.20	1.60	4.80
6.....	.46	(a)	.50	2.30	2.45	.....	.65	.50	4.80	.20	1.00	2.10
7.....	.50	(a)	.50	8.00	2.00	.....	.50	.65	5.60	.20	.50	1.20
8.....	.65	(a)	.50	7.00	1.50	.....	.30	.40	1.50	.20	.50	1.60
9.....	.60	(a)	.60	6.00	1.50	.....	.30	.65	1.10	.20	3.00	1.10
10.....	.45	(a)	1.15	3.15	1.50	.....	.50	.50	.80	.20	9.00	.60
11.....	.55	(a)	.50	2.45	1.50	.....	.40	.40	.50	.20	8.00	.50
12.....	.45	(a)	2.30	1.60	1.50	.....	.30	.40	.70	1.60	4.10	.40
13.....	.20	0.10	4.65	1.20	1.40	0.30	1.20	.50	.50	1.70	3.40	.20
14.....	.20	.05	4.65	.85	1.20	.....	.30	.60	.50	.40	1.20	.30
15.....	.20	(a)	2.55	1.30	1.00	.10	.40	.80	.40	1.00	.50	.40
16.....	.15	(a)	1.90	1.05	.80	.....	.40	.25	.50	2.00	3.20	.90
17.....	.15	(a)	7.40	1.10	.50	.20	.40	.50	.40	4.00	7.00	.80
18.....	.10	(a)	7.00	1.15	.50	.....	.40	.85	.40	.60	3.00	.20
19.....	.10	.05	6.50	1.60	.50	.....	.50	.90	.40	1.20	4.00	.60
20.....	.10	.40	6.10	1.60	.50	.....	.50	.50	.30	2.20	2.00	2.80
21.....	.05	4.00	3.55	2.70	.40	.10	.50	.30	.30	3.00	1.30	.60
22.....	.05	8.00	3.15	1.90	.40	.....	.50	.10	.60	5.00	1.10	8.00
23.....	.05	10.00	3.30	2.10	.40	.....	.50	.05	.80	8.00	1.10	9.00
24.....	.05	6.00	2.70	2.30	.30	.....	.30	.10	.50	5.40	1.00	6.00
25.....	.05	4.00	2.10	2.45	.15	.50	.60	.10	.40	1.20	.60	2.10
26.....	.05	2.00	.85	3.15	.10	.40	.85	.05	.20	1.00	.60	3.00
27.....	.05	2.00	.50	2.80	.10	1.30	.65	.50	.10	10.00	.50	1.90
28.....	.05	2.00	.50	2.70	.10	.65	.50	.40	.10	8.00	2.00	.60
29.....	.05	2.00	.40	2.00	.10	.....	.50	.40	.20	8.00	1.50	.80
30.....	.05	.....	2.45	2.00	.10	.....	.40	.30	3.20	6.00	1.20	.60
31.....	.05	.....	8.80	.....	.10	.....	.30	.30	.....	5.40	.....	.50

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.



Monthly discharge at station No. 32 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912-Continued.		
October.....	4.37	269.00	June.....	0.50	29.80
November.....	3.92	234.00	July.....	.61	37.50
December.....	6.66	411.00	August.....	.53	32.60
1912.			September.....	1.75	104.00
January.....	.24	14.80	October.....	2.64	162.00
February.....	1.40	86.10	November.....	2.61	155.00
March.....	2.53	156.00	December.....	2.42	149.00
April.....	2.48	148.00	The year.....	1.59	1,160.00
May.....	1.39	85.50			

Discharge measurements at station No. 33 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.69	0.07	Nov. 22.....	0.98	0.23
Sept. 26.....	.52	.00	Dec. 12.....	.62	.....
Oct. 25.....	.78	.19			

NOTE.—Bed of stream composed of sand and gravel with few small cobbles; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 33 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.59		0.84	0.84	.....
2.....								.75		.75		.....
3.....	0.81		0.73	0.74			0.89	.98				0.82
4.....	.78	(a)	.70	.80	1.00		.84	.80		.66		.90
5.....	.75	(a)	.65	.82		0.31	.80	.70	0.86	.60	.79	.80
6.....	.82			.88	.86		.78		.78	.55		.78
7.....	.82		.68			(a)	.71	.81			.67	.74
8.....	.88	(a)					.75	.68	.78	.56	.69	.80
9.....	.85	(a)	.69				.75	.70	.80		.98	.78
10.....	.82	(a)	.69	.92			.67	.72		.60		.71
11.....	.75	(a)	.72	.89					.70	.62		.66
12.....	.72	(a)	.90	.80				.68	.78	.84	.84	.62
13.....	.70	0.71	.97		.71	.43	.80	.72	.76	.66	.86	.60
14.....	.70	.60	1.00	.74					.79	.70	.80	.65
15.....	.62	(a)	.83	.81		.38	.72	.76	.76		.72	.70
16.....	.60	(a)	.80	.76				.69	.71		.94	.80
17.....		(a)	1.02		.60	.46						.66
18.....		(a)		.79				.80	.64	.76	.90	.66
19.....	(a)	.75		.80	.60				.62	.86		.79
20.....	(a)	.92	.89	.80					.65	.90	.81	1.04
21.....	(a)		.80	.91		.40	.72		.65		.79	.76
22.....	(a)		.74	.89				.60	.68		.80	
23.....	(a)		.81	.78	.53		.71	.59	.62		.80	
24.....	(a)						.82	.64	.61	.88		
25.....			.80	.86	.50	.70		.59		.74	.74	.83
26.....			.71	.90		.68	.70	.55	.56	.76	.72	
27.....	(a)		.68	.84	.49	.73	.72	.77	.49		.70	.83
28.....	(a)		.64	.80		.69		.65	.48			.73
29.....	(a)		.62				.68		.42			.74
30.....	(a)		.78						.90		.75	
31.....			1.33		.40					.86		

a Channel dry.

*Daily discharge, in second-feet, at station No. 33 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		0.35	(a)	0.12	16.....		0.35	0.27	0.43
2.....		.35	(a)	.11	17.....		.35	.27	.92
3.....		.38	(a)	.10	18.....		.22	.27	.84
4.....		.41	0.15	.11	19.....		.15	.27	1.00
5.....		.45	.25	.12	20.....		.13	.27	.48
6.....		.43	.28	.12	21.....		.12	.27	.23
7.....		.40	.30	.11	22.....		.10	.27	.18
8.....		.40	.33	.12	23.....		.10	.27	.16
9.....		.40	.35	.16	24.....		.10	.27	.15
10.....		.40	.35	.14	25.....		.10	.27	.64
11.....		.33	.36	.16	26.....	0.45	.10	.18	.40
12.....		.33	.37	.15	27.....	.33	.05	.16	.37
13.....		.34	.38	.21	28.....	.35	(a)	.14	.85
14.....		.34	.39	.52	29.....	.35	(a)	.13	.60
15.....		.35	.40	1.24	30.....	.35	(a)	.12	.52
					31.....		(a)		.45

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 33 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.15	(a)	0.10	0.40	0.10		0.10	0.05	0.30	0.15	0.15	0.25
2.....	.15	(a)	.10	.20	.20		.10	.17	.40	.10	.10	.40
3.....	.15	(a)	.10	.10	.20		.20	.25	.50	.10	.30	.15
4.....	.15	(a)	.10	.15	.25		.15	.15	.70	.05	.20	.20
5.....	.10	(a)	.05	.15	.40		.15	.10	.20	.05	.15	.15
6.....	.15	(a)	.05	.20	.20		.15	.10	.15	.05	.10	.15
7.....	.15	(a)	.05	.50	.20		.15	.10	.15	.05	.10	.10
8.....	.20	(a)	.05	.40	.10		.10	.10	.15	.05	.10	.15
9.....	.15	(a)	.10	.30	.10		.10	.10	.15	.05	.25	.15
10.....	.15	(a)	.10	.20	.10		.10	.10	.10	.05	.50	.10
11.....	.10	(a)	.10	.20	.10		.30	.10	.10	.05	.40	.10
12.....	.10	(a)	.20	.15	.10		.20	.10	.15	.15	.15	.05
13.....	.10	0.10	.25	.10	.10		.15	.10	.15	.05	.20	.05
14.....	.10	.05	.25	.10	.10		.10	.10	.15	.10	.15	.05
15.....	.05	(a)	.15	.15	.10		.10	.15	.15	.10	.10	.10
16.....	.05	(a)	.15	.15	.05		.10	.10	.10	.10	.25	.15
17.....	.05	(a)	.25	.15	.05		.10	.10	.05	.30	.20	.10
18.....	.05	(a)	.25	.15	.05		.10	.15	.05	.15	.20	.10
19.....	(a)	.10	.20	.15	.05		.10	.10	.05	.20	.20	.15
20.....	(a)	.20	.20	.15	.05		.10	.10	.05	.20	.15	.30
21.....	(a)	.40	.15	.20	.05		.10	.10	.05	.30	.15	.15
22.....	(a)	.60	.10	.20	.05		.10	.05	.10	.40	.15	.50
23.....	(a)	.80	.15	.15	.10		.10	.05	.05	.50	.15	.70
24.....	(a)	.50	.15	.20	.10		.15	.05	.05	.20	.10	.50
25.....	(a)	.20	.15	.20	.05	.10	.10	.05	.05	.10	.10	.15
26.....	(a)	.10	.10	.20	.05	.10	.10	.05	.05	.15	.10	.20
27.....	(a)	.10	.10	.15	.05	.10	.10	.15	.05	.80	.10	.15
28.....	(a)	.10	.05	.15	.05	.10	.05	.10	.05	.50	.10	.10
29.....	(a)	.10	.05	.10	.05		.10	.10	.05	.40	.10	.10
30.....	(a)		.15	.10	.05		.10	.10	.20	.30	.10	.10
31.....	(a)		.65		.05		.10	.10		.20		

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Monthly discharge at station No. 33 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.24	14.90	June.....	0.10	5.95
November.....	.24	14.60	July.....	.12	7.38
December.....	.36	22.30	August.....	.10	6.15
1912.			September.....	.15	8.93
January.....	.07	4.30	October.....	.19	11.70
February.....	.12	6.90	November.....	.17	10.10
March.....	.15	9.22	December.....	.18	11.10
April.....	.19	11.30	The year.....	.14	99.20
May.....	.10	6.15			

Discharge measurements at station No. 34 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 16.....	0.98	0.66	Nov. 22.....	1.29	2.37
Sept. 26.....	.89	.28	Dec. 12.....	1.02	.76
Oct. 25.....	1.15	1.43			

NOTE.—Bed of stream composed of gravel and small cobbles. Section is somewhat rough, probably permanent. One channel at all stages.

Daily gage height, in feet, at station No. 34 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....								0.90		1.27	1.28	
2.....										1.15		
3.....	1.08		0.99	1.04			1.31	1.32				1.26
4.....	1.02	0.70	.92	1.14	1.34		1.22	1.20		.99		1.29
5.....	1.01	.70	.90	1.17		0.60	1.12	1.05	1.28	.92	1.25	1.16
6.....	1.05			1.16	1.09		1.10		1.29	.89		1.10
7.....	1.05		.90			.58		1.00	1.40		1.09	1.11
8.....	1.10	.70					1.00	.94	1.18	.88	1.08	1.21
9.....	1.10	.70	.99				.96	1.00	1.11		1.38	1.14
10.....	1.08	.68	1.00	1.38			.95	1.00		.90		1.10
11.....	.98	.68	1.00	1.28					1.01	.96		1.05
12.....	.92	.70	1.28	1.18				.95	1.16	1.12	1.29	1.02
13.....	.90	.82	1.48		1.00	.70	1.14	1.00	1.05	1.00	1.30	1.00
14.....	.81	.76	1.48	1.02					.99	1.06	1.20	1.01
15.....	.81	.65	1.18	1.24		.68	.97	1.10	.97		1.11	1.04
16.....	.81	.65	1.10	1.09				.99	1.05		1.37	1.17
17.....		.65	1.21		.92	.71						1.01
18.....		.62		1.12				1.11	.90	1.12	1.32	1.00
19.....	.80	.89		1.14	.91				.97	1.18		1.18
20.....	.80	1.16	1.21	1.11					.95	1.31	1.29	1.40
21.....	.80		1.13	1.31		.70	.95		.95		1.28	1.15
22.....	.78		1.13	1.26				.91	1.04		1.20	
23.....	.76		1.18	1.16	.88		.95	.91	.94		1.28	
24.....	.75						1.04	.94	.92	1.34		
25.....			1.14	1.28	.82	1.00		.91		1.14	1.12	1.26
26.....			1.01	1.30		.95	1.00	.90	.90	1.11	1.11	
27.....	.78		.99	1.20	.80	1.05	.99	1.03	.89		1.10	1.20
28.....	.76		.93	1.16		.96	.95		.84			1.14
29.....	.75		.89				.94		.85			1.14
30.....	.74		1.02						1.29		1.18	
31.....			1.66		.71					1.35		

*Daily discharge, in second-feet, at station No. 34 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....		3.84	0.30	0.64	16.....		2.20	1.52	2.53
2.....		3.99	.30	.55	17.....		2.20	1.76	10.90
3.....		3.99	.30	.50	18.....		1.46	2.09	10.60
4.....		4.14	.55	.52	19.....		.96	2.42	12.30
5.....		4.30	1.65	.60	20.....		.82	2.75	7.04
6.....		3.52	1.98	.50	21.....		.68	3.22	3.06
7.....		2.75	2.31	.35	22.....		.55	3.68	1.52
8.....		2.75	2.64	.42	23.....		.55	4.30	1.13
9.....		2.90	2.90	.78	24.....		.55	5.18	.78
10.....		3.06	1.65	.64	25.....		.52	6.06	9.76
11.....		2.20	1.98	.78	26.....		.52	1.87	5.40
12.....		2.20	2.31	.60	27.....	6.50	.42	1.52	5.40
13.....		2.20	2.75	2.20	28.....	6.50	.40	1.52	4.30
14.....		2.20	3.37	4.74	29.....	3.52	.35	1.06	9.76
15.....		2.20	3.99	16.40	30.....	3.68	.30	.78	9.20
					31.....		.30		7.85

*Daily discharge, in second-feet, at station No. 34 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.90	0.15	0.80	5.00	2.00	0.15	0.40	0.30	2.00	2.40	2.55	4.00
2.....	.90	.15	.60	3.00	2.20	.15	.50	.40	3.00	1.30	7.50	7.00
3.....	.90	.15	.50	.75	2.00	.10	2.90	3.05	5.00	1.00	4.00	2.30
4.....	.65	.15	.35	1.25	3.35	.10	1.85	1.65	8.00	.50	3.00	2.65
5.....	.60	.15	.30	1.45	5.00	.10	1.15	.80	2.55	.35	2.20	1.40
6.....	.80	.15	.30	1.40	.95	.10	1.00	.70	2.65	.30	1.50	1.00
7.....	.80	.15	.30	9.00	.90	.10	.80	.55	4.30	.30	.95	1.05
8.....	1.00	.15	.30	8.00	.80	.10	.55	.40	1.50	.30	.90	1.75
9.....	1.00	.15	.50	7.00	.80	.10	.45	.55	1.05	.30	4.00	1.25
10.....	.90	.15	.55	4.00	.70	.10	.40	.55	.80	.30	9.00	1.00
11.....	.50	.15	.55	2.55	.60	.15	8.00	.50	.60	.45	7.00	.80
12.....	.35	.15	2.55	1.50	.60	.15	4.00	.40	1.40	1.15	2.65	.65
13.....	.30	.20	6.05	1.10	.55	.15	1.25	.55	.80	.55	2.75	.55
14.....	.20	.20	6.05	.65	.40	.15	.80	.60	.50	.80	1.65	.60
15.....	.20	.10	1.50	2.05	.40	.15	.45	1.00	.50	.80	1.05	.75
16.....	.20	.10	1.00	.95	.40	.15	.40	.50	.80	.60	3.85	1.45
17.....	.20	.10	1.75	1.30	.35	.15	.40	.60	.50	2.50	6.00	.60
18.....	.20	.10	1.75	1.15	.30	.15	.40	1.05	.30	1.15	3.05	.55
19.....	.20	.30	1.75	1.25	.30	.15	.40	1.20	.50	1.50	6.00	1.50
20.....	.20	1.40	1.75	1.05	.30	.15	.40	.50	.40	2.90	2.65	4.30
21.....	.20	6.00	1.20	2.90	.30	.15	.40	.40	.40	3.00	2.55	1.30
22.....	.20	10.00	1.20	2.30	.30	.20	.40	.30	.75	6.00	1.65	4.30
23.....	.20	12.00	1.50	1.40	.30	.20	.40	.30	.40	10.00	2.55	7.50
24.....	.20	8.00	1.40	2.00	.20	.40	.75	.40	.35	3.35	1.80	5.80
25.....	.20	3.00	1.25	2.55	.20	.55	.65	.30	.30	1.25	1.15	2.30
26.....	.20	2.00	.60	2.75	.20	.40	.55	.30	.30	1.05	1.05	3.00
27.....	.20	1.00	.50	1.65	.20	.80	.50	.90	.30	12.00	1.00	1.65
28.....	.20	1.00	.40	1.40	.20	.45	.40	.70	.25	5.00	1.20	1.25
29.....	.20	1.00	.30	1.00	.20	.40	.40	.50	.25	5.00	1.40	1.25
30.....	.15		.65	1.20	.15	.40	.40	.40	2.65	4.00	1.50	1.00
31.....	.15		10.90		.15		.30	.50		3.50		1.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 34 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	1.90	117.00	June.....	0.22	13.10
November.....	2.29	137.00	July.....	1.02	62.70
December.....	4.25	262.00	August.....	.67	41.20
1912.			September.....	1.44	85.70
January.....	.42	25.80	October.....	2.37	146.00
February.....	1.67	96.10	November.....	2.94	175.00
March.....	1.58	97.20	December.....	2.11	130.00
April.....	2.45	146.00	The year.....	1.47	1,070.00
May.....	.82	50.40			

Discharge measurements at station No. 35 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.21		Nov. 22.....	0.34	
Oct. 25.....	.35		Dec. 12.....	.31	

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 35 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....										0.42	0.30	.....
2.....										.38		.....
3.....	0.35		0.30	0.32			0.41	0.52				0.31
4.....	(a)	(a)	.30	.36	0.65		.39	.38		.31		.38
5.....	(a)	(a)	(a)	.34		(a)	.35		0.33	.30	.40	.30
6.....	.36			.36	.40		.15		.33			.30
7.....	.38		.32			(a)		.32	.39		.30	.31
8.....	.41	(a)							.36		.30	.34
9.....	.40	(a)	.36						.38	.31	.55	.31
10.....	.38	(a)	.39	.42			.18	.35		.25		.31
11.....	(a)	(a)	.31	.38					.30	.30		.31
12.....	(a)	(a)	.40	.39				.15	.35	.42	.40	.31
13.....	(a)	(a)	.51		(a)	0.28	.34	.37	.31	.35	.38	.30
14.....	(a)	(a)	.51	.31					.31	.36	.32	.32
15.....	(a)	(a)	.38	.38		.25		.32	.25		.25	.34
16.....	(a)	(a)	.35	.32				.30	.30		.44	.34
17.....		(a)	.49		.15	(a)						.31
18.....		(a)		.34				.48	.28	.38	.49	.32
19.....	(a)	0.31	.32	.32	.31				.30	.38		.32
20.....	(a)	.62	.41	.33					.29	.55	.40	.33
21.....	(a)		.34	.45		(a)			.30		.40	.32
22.....	(a)		.30	.37				.30	.30		.32	
23.....	(a)		.44	.33	(a)				.29		.38	
24.....	(a)						.35	.25	.29	.36		
25.....			.45	.34	(a)	(a)				.34	.30	.36
26.....			.30	.41		(a)	.32	.16	.25	.42	.30	.....
27.....	(a)		.15	.34	(a)	.31	.32	.35			.30	.36
28.....	(a)		(a)	.32		(a)						.33
29.....	(a)		(a)				.30					.32
30.....	(a)		.42						.40		.35	
31.....			.54		(a)					.40		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 35 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.05	.....	0.05	0.05	0.10	0.05	0.05	(a)	.....	.....	.....	.....
2.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.....	.05	.....	.....	.....	.....	.....	.....	0.10	.....	.....	.....	.....
4.....	.....	.....	.05	.....	.....	.....	.....	.05	.....	.....	.....	.....
5.....	.....	.....	.....	.....	.10	.....	.....	(a)	.....	.....	.....	.....
6.....	.05	.....	.....	.....	.20	.....	.....	(a)	.....	(a)	.....	.....
7.....	.....	.....	.05	.....	.....	.....	.05	(a)	.....	(a)	.....	.....
8.....	.....	.....	.....	.....	.....	.....	(a)	(a)	.....	(a)	.....	.....
9.....	.....	.....	.....	.....	.....	.....	(a)	.05	.....	.....	.....	.....
10.....	.05	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	.....
11.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12.....	.....	.....	.05	.....	.20	.....	.05	.....	.....	.....	.....	.....
13.....	.....	.....	.10	.....	.....	.....	.05	.....	.....	.....	.....	.....
14.....	.....	.....	.10	.....	.....	.....	.05	.....	.....	.....	.....	.....
15.....	.....	.....	.05	.....	.....	.....	(a)	.....	.....	.....	.....	.....
16.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18.....	.....	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	.....
19.....	.....	0.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20.....	.....	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21.....	.....	.40	.....	.....	.....	.....	(a)	.....	.....	.....	.....	.....
22.....	.....	.50	.....	.....	.....	.....	.....	.05	.....	.....	.....	.....
23.....	.....	.30	.....	.....	.....	.....	(a)	(a)	.....	.....	.....	.....
24.....	.....	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25.....	.....	.05	.....	.....	.....	.....	.....	(a)	.....	.....	.....	.....
26.....	.....	.....	.05	.....	.....	.....	.....	.05	(a)	.....	.....	.....
27.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....
28.....	.....	.....	.....	.....	.....	.....	(a)	.....	(a)	.....	.....	.....
29.....	.....	.05	.....	.....	.....	.....	.....	.....	(a)	.....	.....	.....
30.....	.....	.....	.05	.05	.....	.05	.....	.....	.....	.....	.....	.....
31.....	.....	.....	.10	.....	.....	.....	.....	.05	.....	.....	.....	.....

*a Channel dry.*

*Monthly discharge at station No. 35 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.02	1.23	June.....	0.050	3.00
November.....	a .03	1.79	July.....	.003	.20
December.....	a .04	2.46	August.....	.003	.20
1912.			September.....	.003	.20
January.....	.01	.40	October.....	.030	1.60
February.....	.06	3.60	November.....	.030	2.00
March.....	.05	2.80	December.....	.040	2.40
April.....	.05	3.00	The year.....	.03	23.20
May.....	.06	3.80			

*a Estimated.*

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 36 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.58	0	Nov. 22.....	0.69	0.02
Sept. 26.....	.55	.....	Dec. 12.....	.59	0
Oct. 25.....	.70	0.02			

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 36 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Billkov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.54		0.72	0.72	
2.										.70		
3.	0.48		0.64	0.71			0.78	1.00				0.72
4.	.45	(a)	.62	.73	0.85		.74	.74		.65		.72
5.	.45	(a)	.61	.71		0.24	.72	.62	0.75	.62	.71	.67
6.	.48			.72	.69		.72		.74	.61		.62
7.	.50		.60			.21		.62	.79		.64	.62
8.	.52	(a)	.61				.71	.59	.70	.60	.63	.67
9.	.51	(a)	.62				.70	.64	.70		.84	.64
10.	.50	(a)		.81			.64	.65		.61		.62
11.	.45	(a)	.63	.79					.67	.62		.61
12.	.42	(a)	.74	.71				.58	.66	.73	.74	.60
13.	.40	(a)	.83		.61	.39	.72	.58	.69	.62	.70	.57
14.	.40	(a)	.82	.69					.65	.62	.66	.56
15.	.35	(a)	.71	.74		.35	.70	.63	.64		.62	.58
16.	.30	(a)	.69	.69				.60	.64		.72	.61
17.		(a)	.76		.54	.48						.60
18.		(a)		.72				.63	.64	.72	.74	.55
19.	(a)	0.48		.74	.54				.62	.77		.62
20.	(a)	.49	.78	.77					.61	.82	.71	.72
21.	(a)		.70	.81		.39	.60		.61		.70	.62
22.	(a)		.68	.78				.58	.64		.70	
23.	(a)		.71	.74	.40			.56	.62		.72	
24.	(a)						.75	.56	.61	.76		
25.			.69	.79	.35	.68		.55		.70	.64	.64
26.			.64	.76		.61	.65	.54	.55	.78	.64	
27.	(a)		.61	.75	.31	.69	.59	.61	.55		.62	.66
28.	(a)		.61	.69		.61	.60		.54			.61
29.	(a)		.60				.60		.52			.61
30.	(a)		.69						.72		.68	
31.			1.08		.80					.74		

a Channel dry.

Monthly discharge at station No. 36 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.03	1.84	June.....	0.10	6.00
November.....	a .04	2.38	July.....	.36	22.20
December.....	a .25	15.70	August.....	.07	4.40
1912.			September.....	.03	16.00
January.....	.01	.60	October.....	.40	24.80
February.....	.03	1.80	November.....	.37	22.00
March.....	.33	20.20	December.....	.31	18.80
April.....	.48	28.60	The year.....	.25	180.00
May.....	.25	15.10			

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 37 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.34	0	Nov. 22.....	0.39	0.02
Sept. 26.....	.35		Dec. 12.....	.31	0
Oct. 25.....	.40	0.01			

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 37 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Blikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.30		0.43	0.40	
2.										.40		
3.	0.55		0.57	0.61			0.62	.75				0.40
4.	.52	(a)	.55	.62	0.85		.61	.46		.38		.39
5.	.51	(a)	.53	.61		0.25	.59	.44	0.40	.38	.39	.36
6.	.52			.61	.79		.58		.40	.38		.35
7.	.55		.55			(a)		.39	.42		.36	.35
8.	.61	(a)					.55	.37	.39	.38	.37	.38
9.	.60	(a)	.56				.54	.40	.38		.46	.37
10.	.58	(a)	.54	.62			.58	.38		.38		.36
11.	.56	(a)	.58	.62					.32	.38		.34
12.	.55		.61	.60				.38	.41	.41	.41	.34
13.	.54	0.50	.66		.60	.35	.40	.40	.31	.40	.41	.34
14.	.52	.48	.65	.54					.32	.42	.38	.34
15.	.51	.45	.59	.60		.30	.38	.40	.30		.36	.36
16.	.50	.45	.58	.58				.37	.40		.46	.40
17.		.45	.61		.50	.40						.34
18.		.44		.58				.41	.39	.40	.41	.34
19.	.48	.55		.60	.48				.39	.41		.39
20.	.46	.59	.60	.60					.39	.50	.40	.42
21.	.45		.59	.64		.35	.35		.39		.40	.37
22.	.45		.55	.62				.35	.40		.40	
23.	.45		.59	.60	.45		.35	.34	.38		.40	
24.	.45						.49	.35	.35	.42		
25.			.58	.62	.40	.55		.32		.39	.38	.32
26.			.56	.65		.58	.40	.30	.35	.40	.36	
27.	.50		.54	.63	.38	.61	.34	.39	.35			.39
28.	.49		.51	.60		.55	.32		.36			.34
29.	.45		.50				.44		.36			.34
30.	.44		.53						.45		.40	
31.			.70		.30					.41		

<sup>a</sup> Channel dry.

Daily discharge, in second-feet, at station No. 37 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.		0.05	(a)	0.05	16.		0.05	0.05	0.12
2.		.05	(a)	.05	17.		.05	.05	.34
3.		.05	(a)	.05	18.		.05	.05	.34
4.		.05	0.05	.05	19.		.05	.10	.32
5.		.05	.05	.05	20.		(a)	.10	.12
6.		.05	.05	.05	21.		(a)	.10	.10
7.		.05	.05	.05	22.		(a)	.10	.05
8.		.05	.05	.05	23.		(a)	.10	.05
9.		.05	.05	.10	24.		(a)	.10	.05
10.		.05	.05	.05	25.		(a)	.10	.25
11.		.05	.05	.10	26.		.05	.05	.20
12.		.05	.05	.05	27.	0.10	(a)	.05	.20
13.		.05	.05	.10	28.		(a)	.05	.18
14.		.05	.05	.16	29.		(a)	.05	.24
15.		.05	.10	.45	30.		(a)	.05	.20
					31.		(a)		.18

<sup>a</sup> Channel dry.



*Daily discharge, in second-feet, at station No. 37 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.												
2.												
3.	0.05		0.10	0.10			0.10	0.15				
4.	.05		.05	.10	0.25		.10					
5.	.05		.05	.10			.10					
6.	.05			.10	.20		.10					
7.	.05		.05									
8.	.10						.05					
9.	.10		.10				.05					
10.	.10		.05	.10			.05					
11.	.10		.10	.10								
12.	.05		.10	.10								
13.	.05	0.05	.15		.10							
14.	.05		.10	.05								
15.	.05		.10	.10								
16.	.05		.10	.10								
17.			.10		.05							
18.				.10								
19.		.05		.10								
20.		.10	.10	.10								
21.			.10	.10								
22.			.05	.10								
23.			.10	.10								
24.												
25.			.10	.10		0.05						
26.			.05	.10		.10						
27.			.05	.10		.10						
28.			.05	.10		.05						
29.			.05									
30.			.05									
31.			.15									

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 37 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.03	2.00	June.....	0.03	1.79
November.....	.06	3.48	July.....	.06	3.69
December.....	.14	8.65	August.....	.06	3.69
1912.			September.....	.07	4.17
January.....	.05	3.07	October.....	.08	4.92
February.....	.15	8.63	November.....	.08	4.76
March.....	.08	4.92	December.....	.10	6.15
April.....	.10	5.95	The year.....	.08	55.90
May.....	.07	4.30			

*Discharge measurements at station No. 38 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 16.....	0.87	0.15	Nov. 22.....	0.82	0.10
Sept. 26.....	.75	.02	Dec. 12.....	.75	.06
Oct. 25.....	.81	.12			

NOTE.—Bed of stream is composed of sand, gravel, and some small cobbles; somewhat rough and probably only slightly shifting. One channel at all stages.

Daily gage height, in feet, at station No. 38 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Billkov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								0.75		0.80	0.84	
2										.81		
3	0.76		0.78	0.83			0.89	1.15				0.84
4	.74	(a)	.75	.85	1.05		.84	.89		.77		.84
5	.72	(a)	.71	.84		0.52	.82	.80	0.82	.75	.81	.81
6	.75			.86	.82		.80		.84	.74		.80
7	.75		.75			.50		.80	.87		.78	.80
8	.76	(a)					.78	.79	.82	.74	.79	.84
9	.74	(a)	.80				.77	.80	.79		.92	.81
10	.72	(a)	.80	.98			.79	.80		.76		.80
11	.71	(a)	.79	.89					.78	.77		.78
12	.70	(a)	.89	.85				.78	.82	.80	.84	.75
13	.70	0.79	.97		.71	.61	.80	.80	.79	.76	.88	.74
14	.69	.70	.99	.79					.78	.82	.82	.78
15	.68	.69	.84	.88		.59	.79	.82	.76		.80	.79
16	.68	.66	.80	.82	.71	.70		.79	.80		.90	.82
17	.65	.65	1.04									.77
18		.64		.82	.73			.82	.79	.81	.89	.78
19	.66	.78		.83					.77	.81		.82
20	.66	.80	1.05	.80					.75	.92	.84	.89
21	.65		.94	.95		.68	.78		.78		.80	.81
22	.65		.89	.88				.74	.79		.82	
23	.65		.91	.80	.70		.75	.75	.76		.87	
24	.64						.80	.75	.75	.86		
25			.85	.88	.70	.80		.75		.80	.80	.82
26			.79	.86		.80	.81	.74	.71	.78	.80	
27	.66		.76	.82	.68		.82	.80	.74			.84
28	.65		.74	.81		.79	.78		.72			.80
29	.65		.72				.80		.72			.80
30	.64		.93						.85		.82	
31			1.27		.59					.86		

a Channel dry.

Daily discharge, in second-feet, at station No. 38 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1		0.30	0.05	0.05	16		0.30	0.30	1.36
2		.30	.05	.05	17		.30	.30	4.40
3		.30	.05	.05	18		.20	.30	4.60
4		.35	.10	.05	19		.12	.30	4.30
5		.35	.30	.05	20		.10	.30	.80
6		.30	.35	.05	21		.09	.30	.20
7		.30	.40	.05	22		.09	.30	.10
8		.30	.45	.05	23		.09	.30	.05
9		.30	.50	.05	24		.09	.30	.05
10		.30	.30	.05	25		.10	.30	2.30
11		.26	.35	.10	26		.10	.10	.94
12		.26	.40	.05	27	0.70	.05	.05	.80
13		.28	.45	.25	28	.80	.05	.05	.87
14		.28	.50	1.70	29	.30	.05	.05	2.50
15		.30	.55	5.50	30	.30	.05	.05	2.00
					31		.05		1.50

*Daily discharge, in second-feet, at station No. 38 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.10	0.01	0.20	1.50	0.30	.....	0.10	0.10	0.60	0.10	0.20	1.00
2.....	.10	.01	.20	.50	.50	.....	.20	.20	1.00	.10	.10	2.00
3.....	.10	.01	.10	.15	.50	.....	.30	2.00	2.00	.10	1.50	.20
4.....	.05	(a)	.10	.20	1.15	.....	.20	.30	3.00	.10	.40	.20
5.....	.05	(a)	.05	.20	1.50	.....	.15	.10	.15	.10	.10	.10
6.....	.10	(a)	.05	.20	.15	.....	.10	.10	.20	.05	.10	.10
7.....	.10	(a)	.10	2.00	.10	.....	.10	.10	.25	.05	.10	.10
8.....	.10	(a)	.10	1.50	.05	.....	.10	.10	.15	.05	.10	.20
9.....	.05	(a)	.10	1.00	.05	.....	.10	.10	.10	.10	.40	.10
10.....	.05	(a)	.10	.70	.05	.....	.10	.10	.10	.10	2.50	.10
11.....	.05	(a)	.10	.30	.05	.....	.50	.10	.10	.10	2.00	.10
12.....	.05	(a)	.30	.20	.05	.....	.30	.10	.15	.10	.20	.10
13.....	.05	.10	.65	.20	.05	.....	.10	.10	.10	.10	.25	.05
14.....	.05	.05	.75	.10	.05	.....	.30	.10	.10	.15	.15	.10
15.....	.04	.05	.20	.25	.05	.....	.10	.15	.10	.15	.10	.10
16.....	.04	.03	.10	.15	.05	0.05	.10	.10	.10	.10	.30	.15
17.....	.04	.02	1.10	.50	.10	.....	.10	.10	.10	.80	1.00	.10
18.....	.03	.02	1.80	.15	.05	.....	.10	.15	.10	.10	.30	.10
19.....	.03	.10	1.40	.15	.05	.....	.10	.40	.10	.10	.80	.15
20.....	.03	.10	1.15	.10	.05	.....	.10	.20	.10	.40	.20	.30
21.....	.02	.30	.50	.55	.05	.....	.10	.10	.10	.40	.10	.10
22.....	.02	1.00	.30	.25	.05	.....	.10	.05	.10	1.00	.15	1.00
23.....	.02	2.00	.35	.10	.05	.....	.10	.10	.10	2.50	.25	3.00
24.....	.02	1.00	.20	.20	.20	.....	.10	.10	.10	.20	.20	2.50
25.....	.02	.40	.20	.25	.05	.10	.10	.10	.10	.10	.10	.15
26.....	.03	.20	.10	.20	.05	.10	.10	.05	.05	.10	.10	.30
27.....	.03	.30	.10	.15	.05	.15	.10	.10	.05	3.50	.15	.20
28.....	.02	.30	.05	.10	.05	.10	.10	.30	.05	1.00	.60	.10
29.....	.02	.40	.05	.10	.05	.....	.10	.20	.05	1.00	.20	.10
30.....	.02	.....	.45	.10	.05	.....	.10	.20	.20	.80	.15	.10
31.....	.02	.....	3.20	.....	.05	.....	.10	.20	.....	.20	.....	.10

*a* Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 38 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.20	12.50	June.....	0.05	2.98
November.....	.27	16.00	July.....	.14	8.61
December.....	1.12	69.10	August.....	.20	12.30
1912.			September.....	.32	19.00
January.....	.05	3.07	October.....	.44	27.10
February.....	.22	12.70	November.....	.42	25.00
March.....	.46	28.30	December.....	.42	25.80
April.....	.40	23.80	The year.....	.28	200.00
May.....	.18	11.10			

*Discharge measurements at station No. 39 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.82	0.20	Nov. 22.....	0.99	0.83
Sept. 26.....	.80	.10	Dec. 12.....	.90	.23
Oct. 25.....	.99	.53			

NOTE.—Bed of stream is composed of sand, gravel, and some small cobbles; somewhat rough and probably shifting. One channel at all stages.

Daily gage height, in feet, at station No. 39 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.78		0.92	1.02	.....
2.										.93		1.00
3.	0.85		0.83	0.84			1.00	1.10				1.08
4.	.82	0.65	.81	.88	1.15		.92	.98		.89		1.00
5.	.81	.65	.80	.92		0.60	.90	.83	0.93	.85	1.02	1.00
6.	.84			.91	1.13		.89		.90	.82		.97
7.	.86		.80			.55		.84	.91		.90	.96
8.	.91	.62					.82	.79	.87	.81	.90	1.03
9.	.88	.62	.82				.80	.82	.81		1.12	1.00
10.	.85	.61	.84	1.02			.85	.80		.86		.94
11.	.84	.61	.84	.98				.79	.88			.92
12.	.82	.60	.99	.96				.80	.89	.89	1.06	.90
13.	.81	.81	.99		.99	.98	.89	.83	.84	.90	1.02	.88
14.	.80	.78	1.02	.88					.80	.95	.95	.89
15.	.79	.75	.93	.91		.91	.82	.88	.77		.90	.92
16.		.78	.71	.89				.80	.86		1.12	1.00
17.		.70	1.01		.95	.90						.91
18.		.68		.90				.89	.83	.90	1.09	.90
19.	.75	.81		.89	.96				.81	.91		.98
20.	.75	.90	.96	.89					.80	1.06	1.01	1.09
21.	.74		.90	1.01		.89	.82		.80		1.00	1.00
22.	.72		.85	.97				.76	.84		.99	
23.	.71		.89	.86	.90		.80	.75	.82		1.01	
24.							.99	.80	.81	1.10		
25.			.88	.98	.84	.82		.75		.98	.93	1.02
26.			.84	.99		.70	.86	.75	.81	.98	.92	
27.	.74		.80	.99	.80	.80	.85	.84	.79		.91	1.02
28.	.72		.80	.93		.72	.80		.79			.92
29.	.72		.79				.80		.79			.94
30.	.71		.90						.92		1.00	
31.			1.50		.70					.98		

Daily discharge, in second-feet, at station No. 39 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.		1.00	0.10	0.16	16.		0.70	0.46	1.54
2.		1.00	.10	.10	17.		.70	.52	5.20
3.		1.00	.10	.10	18.		.40	.58	5.30
4.		1.00	.25	.13	19.		.25	.64	4.98
5.		1.09	.40	.22	20.		.22	.70	2.45
6.		.88	.52	.10	21.		.16	.76	1.00
7.		.70	.64	.10	22.		.10	.82	.46
8.		.76	.76	.13	23.		.10	.88	.37
9.		.88	.88	.22	24.		.13	1.00	.16
10.		1.00	.46	.16	25.		.13	1.18	4.32
11.		.52	.52	.25	26.		.16	.46	3.55
12.		.52	.64	.10	27.	1.45	.10	.37	3.88
13.		.58	.76	.52	28.	1.72	.10	.34	3.00
14.		.64	.88	3.00	29.	1.00	.10	.28	5.20
15.		.64	1.00	6.08	30.	1.00	.10	.22	4.65
					31.		.10		4.10

*Daily discharge, in second-feet, at station No. 39 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.20	0.05	0.40	2.00	1.50	0.05	0.20	0.10	1.00	0.50	1.20	2.00
2.....	.20	.05	.50	.80	2.00	.05	.50	.10	1.50	.60	.00	3.50
3.....	.25	.05	.20	.20	2.00	.05	1.00	1.90	4.00	.50	4.00	1.00
4.....	.15	.05	.15	.35	2.45	.05	.50	.90	6.00	.35	3.00	1.70
5.....	.15	.05	.10	.50	3.00	.05	.40	.20	.60	.25	1.20	1.00
6.....	.20	.05	.10	.45	2.25	.05	.35	.20	.40	.15	.50	.80
7.....	.30	.05	.10	6.00	1.00	.05	.30	.20	.45	.10	.40	.75
8.....	.45	.05	.15	6.00	.30	.05	.15	.10	.30	.15	.40	1.25
9.....	.35	.05	.15	4.00	.20	.05	.10	.15	.15	.15	2.10	1.00
10.....	.25	.05	.20	1.20	.20	.05	.25	.10	.10	.30	5.00	.65
11.....	.20	.05	.20	.90	.10	.10	2.00	.10	.10	.35	4.00	.50
12.....	.15	.05	.95	.75	.05	.20	.80	.10	.35	.35	1.55	.40
13.....	.15	.15	.95	1.00	.95	.90	.35	.20	.20	.40	1.20	.35
14.....	.10	.10	1.20	.35	.60	.60	.60	.20	.10	.70	.70	.35
15.....	.10	.10	.60	.45	.70	.45	.15	.35	.10	.80	.40	.50
16.....	.10	.05	.35	.35	.90	.40	.10	.10	.30	.20	2.10	1.00
17.....	.10	.05	1.10	.30	.70	.40	.30	.15	.10	2.50	4.00	.45
18.....	.10	.05	1.70	.40	.30	.40	.30	.35	.20	.40	1.80	.40
19.....	.10	.15	2.00	.35	.75	.40	.10	.60	.15	.45	3.50	.90
20.....	.10	.40	.75	.35	.50	.35	.10	.20	.10	1.55	1.10	1.80
21.....	.05	.80	.40	1.10	.30	.35	.15	.10	.10	1.60	1.00	1.00
22.....	.05	2.00	.25	.80	.30	.30	.15	.10	.20	2.00	.95	2.00
23.....	.05	3.00	.35	.30	.40	.25	.10	.10	.15	4.50	1.10	5.00
24.....	.05	3.00	.20	.40	.80	.20	.95	.10	.15	1.90	1.00	4.00
25.....	.05	1.00	.35	.90	.20	.15	.30	.10	.15	.90	.60	1.20
26.....	.10	.20	.20	.95	.20	.05	.30	.10	.15	.90	.50	1.50
27.....	.05	.60	.10	.95	.10	.10	.25	.20	.10	6.00	.45	1.20
28.....	.05	.60	.10	.60	.20	.05	.10	.60	.10	4.00	1.00	.60
29.....	.05	.90	.10	.30	.40	.05	.10	.40	.10	4.00	1.00	.65
30.....	.05	.....	.40	.70	.20	.05	.10	.20	.50	2.00	1.00	.20
31.....	.05	.....	6.30	.....	.05	.....	.10	.30	.....	.90	.....	.20

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 39 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.51	31.40	June.....	0.21	12.50
November.....	.57	34.30	July.....	.36	22.10
December.....	1.99	122.00	August.....	.28	17.20
1912.			September.....	.60	35.70
January.....	.14	8.61	October.....	1.27	78.10
February.....	.47	27.00	November.....	1.58	94.00
March.....	.66	40.60	December.....	1.22	75.00
April.....	1.12	66.60	The year.....	.72	524.00
May.....	.76	46.70			

*Discharge measurements at station No. 40 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	1.09	0	Nov. 22.....	1.26	0.19
Sept. 26.....	1.05	.....	Dec. 12.....	1.18	1.10
Oct. 25.....	1.31	0.40			

NOTE.—Bed of stream of gravel and small cobbles. Probably shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 40 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								1.09		1.22	1.30	
2									1.38	1.14		
3	1.25		1.16	1.13			1.34					1.32
4	1.18	(a)	1.13	1.21	1.79		1.29	1.28		1.04		1.40
5	1.15	(a)	1.12	1.22		(a)	1.22	1.12	1.33		1.32	1.28
6	1.22			1.26	1.62		1.20		1.30			1.28
7	1.25		1.12			(a)		1.13	1.31		1.21	1.30
8	1.32	(a)					1.20	1.00	1.25		1.22	1.30
9	1.30	(a)	1.11				1.18	1.12	1.20		1.41	1.30
10	1.25	(a)	1.14	1.36			1.12	1.11				1.28
11	1.10	(a)	1.11	1.34					1.14			1.27
12	1.02	(a)	1.31	1.22				1.10	1.19		1.39	1.20
13	1.00	(a)	1.44		1.30	1.20	1.25	1.10	1.15		1.36	1.15
14	.95	(a)	1.51	1.16				1.10			1.28	1.14
15	.88	(a)	1.29	1.26		1.13	1.18	1.11	1.09		1.24	1.16
16	.85	(a)	1.20	1.19				1.09	1.15		1.30	1.13
17		(a)	1.44		1.40	1.19			1.12			1.12
18		(a)		1.22				1.21	1.12	1.21	1.40	1.14
19	(a)	(a)		1.21	1.40				1.12	1.24		1.18
20	(a)	(a)	1.38	1.21					1.11	1.35	1.35	1.36
21	(a)		1.34	1.31		1.18	1.10		1.12		1.29	1.24
22	(a)		1.19	1.29				1.09	1.15		1.28	
23	(a)		1.30	1.25	1.31		1.10	1.19	1.10		1.29	
24	(a)						1.20	1.06	1.08	1.30		
25			1.27	1.28	1.25	1.10		1.04		1.20	1.26	1.42
26			1.18	1.29		1.02	1.20	1.05	1.05	1.26	1.24	
27	(a)		1.16	1.24	1.20	1.18	1.12	1.05	1.00		1.20	1.42
28	(a)		1.14	1.25		1.09	1.12					1.40
29	(a)		1.12				1.15					1.34
30	(a)		1.26						1.26		1.26	
31			1.83		1.10					1.52		

a Channel dry.

*Daily discharge, in second-feet, at station No. 40 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1		0.7	(a)	0.1	16		0.2	0.1	0.2
2		.6	(a)	.1	17		.1	.1	1.0
3		.6	(a)	.1	18		.1	.2	1.1
4		.7	0.0	.1	19		.1	.2	1.0
5		.7	.1	.1	20		.1	.3	1.3
6		.5	.2	.1	21		.1	.3	.6
7		.4	.3	.1	22		.1	.4	.2
8		.4	.4	.1	23		.1	.5	.1
9		.4	.5	.1	24		.1	.6	.1
10		.4	.3	.1	25		.1	.7	1.2
11		.3	.3	.1	26		.1	.4	.5
12		.3	.3	.1	27	0.7	.1	.2	.5
13		.3	.3	.3	28	1.0	.1	.1	.4
14		.2	.3	.8	29		(a)	.1	.7
15		.2	.3	1.8	30	.7	(a)	.1	.6
					31		(a)		.5

a Channel dry.

*Daily discharge, in second-feet, at station No. 40 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.20	(a)	0.10	1.00	1.00	.....	0.20	.....	0.60	0.10	0.30	1.00
2.....	.20	(a)	.10	.50	1.50	.....	.30	.....	.60	.10	.30	2.00
3.....	.20	(a)	.10	.10	2.00	.....	.50	.....	2.00	.10	.40	.40
4.....	.10	(a)	.05	.10	2.90	.....	.30	.....	3.50	.10	.40	.70
5.....	.00	(a)	.05	.10	3.30	.....	.10	.....	.40	(a)	.40	.30
6.....	.10	(a)	.05	.20	1.80	.....	.10	.....	.30	(a)	.20	.30
7.....	.20	(a)	.05	2.50	.80	.....	.10	.....	.30	(a)	.10	.30
8.....	.40	(a)	.05	2.00	.50	.....	.10	.....	.20	(a)	.10	.30
9.....	.30	(a)	.05	1.50	.40	.....	.10	.....	.10	(a)	.70	.30
10.....	.20	(a)	.05	.50	.30	.....	.10	0.10	.10	(a)	.70	.30
11.....	.10	(a)	.05	.50	.30	.....	1.50	.....	.10	(a)	.70	.20
12.....	.10	(a)	.30	.10	.30	.....	1.00	.....	.10	(a)	.70	.10
13.....	.10	(a)	.90	.10	.30	0.10	.20	.....	.10	(a)	.50	.05
14.....	.10	(a)	1.20	.10	.30	.....	.80	.....	.10	(a)	.30	.05
15.....	.10	(a)	.30	.20	.30	.....	.10	.....	.10	.10	.20	.10
16.....	.10	(a)	.10	.10	.30	.....	.10	.....	.05	.10	.30	.05
17.....	(a)	(a)	.90	.10	.70	.10	.10	.....	.05	.10	1.20	.05
18.....	(a)	(a)	.80	.10	.70	.....	.10	.....	.05	.10	.70	.05
19.....	(a)	(a)	.70	.10	.70	.....	.10	.....	.05	.20	.60	.10
20.....	(a)	(a)	.60	.10	.40	.....	.10	.....	.05	.50	.60	.50
21.....	(a)	0.5	.50	.30	.40	.10	.10	.....	.05	.50	.30	.20
22.....	(a)	1.5	.10	.30	.40	.....	.10	.....	.05	1.50	.30	2.00
23.....	(a)	3.5	.30	.20	.30	.....	.10	.....	.05	3.00	.30	3.50
24.....	(a)	3.0	.20	.30	.30	.....	.10	.....	.05	.30	.20	2.50
25.....	(a)	2.0	.20	.30	.20	.....	.10	.....	.05	.10	.20	.80
26.....	(a)	1.0	.10	.30	.20	.....	.10	.....	.05	.20	.20	1.00
27.....	(a)	.5	.10	.20	.10	.10	.10	.....	.05	3.50	.10	.80
28.....	(a)	.2	.05	.20	.10	.....	.05	.....	(a)	2.00	.50	.70
29.....	(a)	.1	.05	.10	.10	.....	.05	.....	(a)	2.00	.30	.40
30.....	(a)	.....	.20	.10	.10	.....	.05	.....	.20	2.00	.20	.20
31.....	(a)	.....	3.20	.....	.10	.....	.05	.....	.....	1.30	.....	.20

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 40 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	0.26	16.10	June.....	0.10	5.95
November.....	.25	15.10	July.....	.22	13.50
December.....	.45	28.00	August.....	.10	6.15
1912.			September.....	.31	18.40
January.....	.08	4.92	October.....	.58	35.70
February.....	.42	24.20	November.....	.40	23.80
March.....	.37	22.80	December.....	.63	38.70
April.....	.41	24.40	The year.....		.33 260.00
May.....	.68	41.80			

*Discharge measurements at station No. 41 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
<i>Feet.</i>			<i>Feet.</i>		
Aug. 16.....	0.42	0.62	Nov. 22.....	1.34	2.33
Sept. 26.....	.20	.14	Dec. 12.....	.25	.52
Oct. 25.....	.90	1.25			

NOTE.—Bed of stream of gravel, small cobbles, and some bowlders. The section is rough, but probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 41 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Blikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								0.22		0.70	1.46	
2									1.52	.59		
3	0.54		1.32	1.32			1.59	.72				1.46
4	.52	(a)	1.22	1.36	1.80		1.44	.72		.42		1.50
5	.52	(a)	1.13	1.52		0.59	1.40	.49	1.30	.32	1.46	1.31
6	.65			1.54	1.60		1.35		1.25	.30		1.23
7	.72		1.05			.58		.48	1.24		.89	1.39
8	.85	(a)					1.28	.40	.84	.29	.92	1.26
9	.78	(a)	1.18				1.20	.46	.78		1.71	1.14
10	.72	(a)	1.11	1.94			.92	.50		.34		.74
11	.65	(a)	1.33	1.79					.69	.34		.39
12	.60	(a)	1.74	1.61				.40	.80	.79	1.50	.24
13	.55	0.51	1.84		1.02	.69	1.31	.56	.59	.66	1.56	.20
14	.50	.45	1.84	1.51					.49	.63	1.12	.24
15	.35	.10	1.52	1.54		.61	1.22	.80	.46		.82	.45
16	.25		1.39	1.44				.44	.64		1.69	1.00
17		.15	1.55		.78	.80						.86
18		.20		1.51				.89	.49	.74	1.55	.27
19	.15	.79		1.51	.78				.40	.82		.90
20	.08	1.33	1.69	1.49					.34	1.46	1.40	1.56
21	-.05		1.54	1.70		.77	.70		.34		1.31	.75
22	-.10		1.34	1.61				.20			1.32	
23	-.25		1.39	1.48	.71		.60	.20	.34		1.39	
24	-.35						.90	.29		1.49		
25			1.36	1.52	.69	1.12		.20		.90	1.00	1.10
26			1.32	1.60		1.01	.59	.12	.19	.87	.95	
27	(c)		1.22	1.55	.68	1.29	.55	.51	.12		.88	1.05
28	(a)		1.14	1.49		1.19	.42		.08			.46
29	(a)		1.06				.42		.05			.60
30	(a)		1.15						.76		.99	
31			2.00		.60					1.58		

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 41 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1		3.6	0.3	0.8	16		3.4	2.5	21.8
2		3.6	.3	.8	17		3.6	2.8	24.2
3		4.2	.3	.5	18		2.2	3.1	26.4
4		4.7	.8	.5	19	2.2	1.2	3.4	25.0
5		5.3	1.0	.5	20	1.2	1.0	3.9	19.0
6		4.4	1.3	.7	21	.9	.8	4.4	5.0
7		3.6	1.9	.6	22	1.9	.7	5.0	2.8
8		4.0	2.6	.6	23	8.2	.7	5.6	2.3
9		4.4	3.6	.8	24	8.2	.7	6.2	1.4
10		5.0	2.1	.8	25	9.8	.7	6.8	18.0
11		3.0	2.5	.8	26	11.6	.8	2.5	11.0
12		3.0	3.0	.8	27	5.9	.5	1.5	10.0
13		3.1	3.5	1.7	28	7.4	.4	1.4	9.1
14		3.2	4.4	2.8	29	3.6	.4	1.0	12.0
15		3.3	5.3	16.0	30	3.6		.8	12.4
					31		.3		10.0



Daily discharge, in second-feet, at station No. 41 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.50	(a)	2.00	5.00	4.00	-----	1.00	0.30	2.00	0.70	3.30	8.00
2.	.50	-----	2.80	3.00	5.00	-----	3.00	.50	3.90	.60	4.00	10.00
3.	.55	-----	2.30	2.30	6.00	-----	4.85	.70	7.00	.50	5.50	3.30
4.	.50	-----	1.70	2.55	8.20	-----	3.10	.70	12.00	.40	4.00	3.60
5.	.50	-----	1.30	3.90	10.00	0.60	2.80	.50	2.20	.40	3.30	2.25
6.	.65	-----	1.20	4.20	5.00	-----	2.50	.50	1.90	.40	1.20	1.80
7.	.70	-----	1.10	12.00	4.50	.60	2.30	.50	1.85	.40	.90	2.75
8.	.85	-----	1.30	12.00	4.00	-----	2.10	.40	.85	.40	.90	1.95
9.	.80	-----	1.50	11.00	3.50	-----	1.60	.45	.80	.40	6.65	1.35
10.	.70	-----	1.25	11.00	3.00	-----	.90	.50	.80	.40	10.00	.70
11.	.65	-----	2.40	8.05	2.50	-----	7.00	.50	.70	.40	7.00	.40
12.	.60	(a)	7.20	5.15	2.00	-----	4.00	.40	.80	.80	3.60	.30
13.	.55	0.50	8.90	4.50	1.05	.70	2.25	.55	.60	.70	4.45	.30
14.	.50	.45	8.90	3.75	1.00	-----	2.00	.60	.50	.60	1.30	.30
15.	.40	.30	3.90	4.20	.90	.60	1.70	.80	.45	.50	.80	.45
16.	.35	.30	2.75	3.10	.85	-----	1.60	.40	.65	.70	6.35	1.00
17.	.35	.30	4.30	4.00	.80	.80	1.40	.50	.50	1.50	10.00	.40
18.	.30	.30	4.90	3.75	.80	-----	1.30	.90	.50	.75	4.30	.30
19.	.30	.80	5.60	3.75	.80	-----	1.10	2.00	.40	.80	6.00	.90
20.	.30	2.40	6.35	3.50	.75	-----	.90	.50	.40	3.30	2.80	4.45
21.	.20	5.00	4.20	6.50	.70	.80	.70	.40	.40	3.50	2.25	.70
22.	.15	10.00	2.45	5.15	.70	-----	.70	.30	.45	5.00	2.30	5.00
23.	.05	12.00	2.75	3.45	6.65	-----	.60	.30	.40	10.00	2.75	10.00
24.	.05	6.00	2.65	3.70	2.00	-----	.90	.30	.30	3.50	2.00	6.00
25.	.05	2.00	2.55	3.90	.70	1.30	.70	.30	.30	.90	1.00	1.20
26.	.05	1.00	2.30	5.00	.70	1.00	.60	.30	.30	.90	.90	2.00
27.	(a)	1.00	1.70	4.30	.70	2.15	.55	.50	.30	12.00	.90	1.10
28.	-----	1.00	1.40	3.50	.80	1.55	.40	.40	.30	10.00	1.50	.45
29.	-----	1.00	1.10	3.00	.70	-----	.40	.30	.25	8.00	1.20	.60
30.	-----	-----	1.40	4.00	.60	-----	.30	.30	.80	6.00	1.00	.50
31.	(a)	-----	12.00	-----	.60	-----	.20	.40	-----	4.70	-----	.50

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 41 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September (19-29).....	5.38	-----	May.....	2.56	157.00
October.....	2.46	151.00	June.....	1.00	59.50
November.....	2.79	167.00	July.....	1.72	106.00
December.....	7.71	475.00	August.....	.52	32.00
1912.			September.....	1.42	84.50
January.....	.36	22.10	October.....	2.55	157.00
February.....	1.53	88.00	November.....	3.40	202.00
March.....	3.41	210.00	December.....	2.34	144.00
April.....	5.11	304.00	The year.....	2.16	1,570.00

Discharge measurements at station No. 42 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 16.....	0.69	0	Nov. 22.....	0.76	0.04
Sept. 26.....	.75	-----	Dec. 12.....	.70	0
Oct. 25.....	.75	0.04			

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 42 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Blilkov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.40		0.76	0.79	.....
2.									0.85			.....
3.	0.65		0.69	0.72			0.80	.94				0.79
4.	(a)	(a)	.62	.78	1.06		.80	.80		.70		.80
5.	(a)	(a)	.60	.78		0.40	.75	.70	.80	.69	.77	.72
6.	0.66			.81	.80		.75		.80	.66		.72
7.	.68		.60			.38		.71	.88		.70	.72
8.	.71	(a)					.72	.69	.89	.66	.71	.74
9.	.70	(a)	.66				.70	.72	.84		.84	.74
10.	.65	(a)	.66	.84			.76	.74		.69		.72
11.	(a)	(a)	.69	.78					.72	.68		.71
12.	(a)	(a)	.81	.79				.70	.72	.78	.82	.70
13.	(a)	0.60	.91		.76	.51	.74	.72	.70	.70	.81	.69
14.	(a)	.58	.92	.72					.70	.74	.74	.70
15.	(a)	.55	.77	.80		.46	.71	.73	.69		.70	.72
16.	(a)	.55	.71	.72				.70	.71		.85	.73
17.		(a)	.94		.68	.50						.71
18.		(a)		.76				.74	.70	.73	.82	.72
19.	(a)	0.62	.80	.64					.68	.76		.72
20.	(a)	.70	.91	.81					.68	.81	.79	.77
21.	(a)		.89	.86		.42	.70		.69		.77	.71
22.	(a)		.78	.79				.67	.70		.75	
23.	(a)		.78	.76	.60			.69	.70	.68		
24.	(a)						.74	.70		.65	.87	
25.			.70	.83	.58	.74		.70		.74	.72	.76
26.			.71	.55		.70	.70	.68	.63	.80	.73	.....
27.	(a)		.68	.80	.55	.77	.70	.72	.60		.72	.72
28.	(a)		.62	.79		.71	.66		.60			.70
29.	(a)		.61				.70		.60			.72
30.	(a)		.85						.76		.72	
31.			1.39		.50					.85		.....

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 42 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.		0.10	(a)	(a)	16.		0.05	0.05	0.20
2.		.10	(a)	(a)	17.		.10	.05	.60
3.		.10	(a)	(a)	18.		.05	.05	.75
4.		.10	(a)	(a)	19.		.03	.10	.65
5.		.10	0.05	(a)	20.		.01	.10	.20
6.		.10	.05	(a)	21.		.01	.10	.10
7.		.10	.05	(a)	22.		(a)	.10	.05
8.		.10	.05	(a)	23.		(a)	.10	.05
9.		.10	.05	0.01	24.		(a)	.10	.05
10.		.10	.05	.01	25.		(a)	.12	.40
11.		.05	.05	.01	26.		(a)	.05	.15
12.		.05	.05	.01	27.	0.10	(a)	.05	.15
13.		.05	.05	.05	28.	.15	(a)	.05	.12
14.		.05	.05	.18	29.	.10	(a)	.03	.30
15.		.05	.05	.70	30.	.10	(a)	.01	.20
					31.		(a)	.....	.15

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 42 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1			0.05	0.30			0.05	0.05	0.10	0.10	0.10	0.30
2			.05	.10			.05	.05	.15	.10	.20	.70
3	0.05		.05	.05			.10	.30	.50	.10	.50	.10
4			.05	.10	0.55		.10	.10	.70	.05	.20	.10
5			.05	.10			.05	.05	.10	.10	.10	.05
6	.05		.05	.10	.10		.05	.05	.10	.10	.10	.05
7	.05		.05	.50			.05	.05	.20	.10	.05	.05
8	.05		.05	.40			.05	.05	.20	.10	.05	.05
9	.05		.05	.30			.05	.05	.15	.10	.15	.05
10	.05		.05	.15			.10	.05	.10	.10	.10	.05
11			.05	.10			.10	.05	.05	.10	.10	.05
12			.10	.10			.05	.05	.05	.10	.10	.05
13			.20	.10	.10		.05	.05	.05	.05	.10	.05
14			.25	.05			.05	.05	.05	.05	.05	.05
15			.10	.10			.05	.05	.05	.05	.05	.05
16			.05	.05			.05	.05	.05	.10	.15	.05
17			.30	.10	.05		.05	.05	.05	.10	.10	.05
18			.30	.10			.05	.05	.05	.05	.10	.05
19			.20	.10			.05	.05	.05	.10	.10	.05
20		0.05	.20	.10			.05	.05	.05	.10	.10	.10
21			.20	.15			.05	.05	.05	.15	.10	.05
22			.10	.10			.05	.05	.05	.30	.05	.50
23			.10	.10			.05	.05	.05	.60	.05	1.00
24			.10	.10			.05	.05	.05	.15	.05	.50
25			.05	.15		0.05	.05	.05	.05	.05	.05	.10
26			.05	.10		.05	.05	.10	.05	.10	.05	.10
27			.05	.10		.10	.05	.05	.05	1.40	.05	.05
28			.05	.10		.05	.05	.10	.05	1.00	.05	.05
29			.10	.10			.05	.10	.05	.50	.05	.05
30			.15	.10			.05	.10	.10	.20	.05	.05
31			1.35				.05	.10		.15		.05

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall; diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 42 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October	0.05	3.18	June	0.03	1.79
November	.05	3.20	July	.06	3.69
December	.16	10.00	August	.07	4.30
1912.			September	.11	6.55
January	.02	1.23	October	.20	12.30
February	.05	2.88	November	.10	5.95
March	.15	9.22	December	.15	9.22
April	.14	8.33	The year	.10	69.80
May	.07	4.30			

*Discharge measurements at station No. 43 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16	0.10	0.05	Nov. 22	0.25	0.21
Sept. 26	.05	0	Dec. 12	.09	.06
Oct. 25	.30	.10			

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 43 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								0.04		0.23	0.30	.....
2.									0.40	.24		
3.	0.25		0.14	0.16			0.33	.45				0.36
4.	.21	0.04	.10	.20	0.50		.24	.35		.13		.30
5.	.21	.02	.09	.22		.00	.20	.15	.35	.10	.36	.20
6.	.32			.29	.25		.11		.30	.08		.14
7.	.32		.10			+.10		.14	.45		.23	.18
8.	.35	.02					.10	.10	.37	.06	.26	.26
9.	.32	.02	.14				.01	.15	.24		.50	.22
10.	.30	.01	.14	.34			.10	.16		.10		.17
11.	.28	.01	.15	.28					.12	.10		.12
12.	.25	.02	.30	.21				.11	.28	.26	.41	.10
13.	.24	.21	.35		.21	.21	.19	.18	.20	.14	.41	.05
14.	.22	.17	.34	.15					.20	.22	.36	.12
15.	.21	.10	.21	.21		.05	.01	.19	.10		.29	.14
16.	.20	.08	.13	.18				.10	.23		.58	.25
17.		.05	.37		.13	.10						.11
18.		.02		.21				.23	.18	.19	.44	.12
19.	.10	.25		.22	.18				.14	.38		.18
20.	.09	.33	.25	.24					.11	.60	.37	.42
21.	.08		.25	.33		.05	.10		.13		.38	.24
22.	.06		.16	.28				.02	.15		.31	
23.	.06		.16	.21	.10			.10	.05	.11	.39	
24.	.06						.19	.08	.08	.39		
25.			.16	.31	.00	.19		.02		.27	.20	.27
26.			.15	.26		.12	.15	.02	.05	.38	.20	
27.	.11		.11	.29	+.05	.20	.12	.13	.04		.19	.30
28.	.10		.09	.28		.11	.10		.02			.20
29.	.08		.06				.12		.05			.22
30.	.06		.14						.28		.28	
31.			.41		+.15					.46		

*Monthly discharge at station No. 43 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.20	12.30	June.....	0.01	0.60
November.....	a .20	11.90	July.....	.05	3.20
December.....	a .40	24.60	August.....	.04	2.60
1912.			September.....	.13	7.70
January.....	.05	3.20	October.....	.23	13.90
February.....	.03	2.00	November.....	.23	13.50
March.....	.07	4.40	December.....	.26	16.10
April.....	.12	7.30	The year.....	.11	78.10
May.....	.06	3.60			

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 44 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 16.....	Feet. 0.51	Sec.-ft. 0	Nov. 22.....	Feet. 0.55	Sec.-ft. 0.05
Sept. 26.....	.52		Dec. 12.....	.11	0
Oct. 28.....	.55	0.05			

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 44 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								0.52		0.55	0.55	-----
2									0.56	.54		-----
3	0.45		0.50	0.52			0.58	.62				0.22
4	.42	0.41	.50	.53	0.75		.55	.58		.54		.34
5	.42	.41	.50	.56		0.39	.54	.52	.55	.52	.55	.12
6	.46			.55	.61		.52		.54	.52		.12
7	.48		.50			.31		.54	.58		.55	.35
8	.51	.40					.52	.52	.53	.52	.55	.42
9	.50	.40	.50				.52	.52	.52		.58	.40
10	.48	.38	.50	.59			.54	.54		.54		.31
11	.45	.38	.50	.54					.52	.52		.16
12	.48	.40	.57	.55				.52	.54	.55	.55	.08
13	.45	.48	.60		.59	.48	.54	.53	.52	.55	.55	.08
14	.44	.40	.60	.55					.52	.55	.55	.40
15	.44	.37	.54	.55		.45	.52	.53	.51		.55	.42
16	.44	.41	.53	.54				.53	.53		.56	.45
17		.39	.59		.55	.46						.31
18		.38		.54				.53	.53	.55	.58	.39
19	.44	.41		.55	.56				.55	.55		.43
20	.42	.45	.58	.55					.52	.59	.55	.43
21	.42		.54	.57		.40	.52		.52		.56	.42
22	.42		.51	.56				.54	.54		.56	-----
23	.42		.56	.55	.51		.52	.52	.52		.56	-----
24	.42						.55	.54	.52	.57		-----
25			.54	.56	.51	.55		.52		.55	.55	.42
26			.54	.58		.54	.55	.54	.53	.58	.55	-----
27	.45		.52	.56	.50	.55	.55	.52	.54		.55	.42
28	.44		.52	.52		.54	.52		.54			.25
29	.42		.51	.52			.52		.54			.23
30	.41		.55						.55		.55	-----
31			.62		.43					.58		-----

Monthly discharge at station No. 44 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.03	1.84	June.....	0.02	1.00
November.....	a .03	1.78	July.....	.02	1.40
December.....	a .05	3.08	August.....	.03	1.60
1912.			September.....	.04	2.60
January.....	.01	.60	October.....	.06	5.00
February.....	.03	2.00	November.....	.05	3.00
March.....	.05	3.00	December.....	.05	3.00
April.....	.06	3.60	The year.....	.04	30.80
May.....	.07	4.00			

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Daily gage height, in feet, at station No. 45 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	0.79	0.05	Nov. 22.....	0.80	0.18
Sept. 26.....	.69	.00	Dec. 12.....	.74	.06
Oct. 25.....	.78	.14			

NOTE.—Bed of stream of sand, gravel and some small cobbles in bed rock. Station probably permanent. One channel at all stages.

*Discharge measurements at station No. 45 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[Bomin, Billkov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								0.74		0.84	0.87	.....
2									0.90	.82		
3	0.75		0.75	0.79			0.86	1.20				0.84
4	.72		.73	.81	1.08		.84	.85		.74		.85
5	.71		.71	.81		0.48	.82	.80	.88	.72	.81	.80
6	.74			.84	.99		.80		.88	.72		.78
7	.75		.65			.44		.80	.92		.76	.79
8	.81						.80	.79	.80	.73	.75	.86
9	.82		.71				.79	.81	.79		.94	.81
10	.80		.71	.88			.78	.80		.72		.78
11	.75		.78	.88					.80	.72		.76
12	.71		.86	.84				.79	.84	.79	.85	.74
13	.70	0.78	.96		.81	.58	.81	.82	.80	.75	.84	.73
14	.68	.73	.99	.81					.79	.82	.80	.74
15	.62	.70	.81	.82		.49	.79	.82	.79		.75	.76
16	.58	.68	.78	.82				.79	.84		.94	.81
17		.65	.93		.75	.60						.74
18		.61		.82				.86	.79	.79	.85	.75
19		.80		.82	.74				.77	.83		.80
20		.89	.91	.81					.76	.92	.81	.94
21			.81	.89		.58	.76		.79		.82	.81
22			.77	.85				.75	.79		.82	
23			.88	.81	.70			.75	.75	.76	.84	
24							.81	.76	.74	.91		
25			.78	.84	.63	.80		.75		.79	.81	.81
26			.76	.82		.79	.84	.74	.70	.80	.75	
27			.74	.81	.61		.81	.81	.68		.78	.81
28			.71	.79		.79	.80		.66			.78
29			.70				.80		.66			.80
30			.86						.87		.79	
31			1.14		.58					.92		

*Daily discharge, in second-feet, at station No. 45 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1		0.4	0.1	0.1	16		0.4	0.3	0.2
2		.4	.1	.1	17		.4	.3	1.0
3		.4	.1	.1	18		.2	.3	1.4
4		.4	.1	.1	19	0.2	.1	.3	1.2
5		.4	.2	.1	20		.1	.4	.7
6		.4	.2	.1	21		.1	.4	.2
7		.3	.3	.1	22		.1	.4	.1
8		.3	.3	.1	23		.5	.4	.1
9		.4	.4	.1	24		.5	.5	.1
10		.4	.2	.1	25		.6	.5	1.0
11		.2	.2	.1	26		.7	.2	.7
12		.3	.3	.1	27		.5	.1	.8
13		.3	.3	.3	28		.5	.1	.6
14		.3	.4	.6	29		.4	.1	1.0
15		.4	.5	1.4	30		.4	.1	.8
					31		.1		.6

Daily discharge, in second-feet, at station No. 45 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.10	(a)	0.30	1.00	0.90	.....	0.10	0.10	0.30	0.30	0.40	0.50
2.....	.10	.....	.30	.60	1.10	.....	.30	.10	.50	.30	.20	.90
3.....	.10	.....	.10	.20	1.00	.....	.40	1.80	.90	.20	.80	.30
4.....	.05	(a)	.10	.20	1.20	.....	.30	.40	1.50	.10	.30	.40
5.....	.05	(a)	.05	.20	1.50	.....	.30	.20	.40	.10	.20	.20
6.....	.10	.....	.05	.30	.80	.....	.20	.20	.40	.05	.10	.20
7.....	.10	.....	.05	1.50	.20	.....	.20	.20	.60	.05	.10	.20
8.....	.20	(a)	.10	1.20	.20	.....	.20	.20	.20	.05	.10	.40
9.....	.30	.....	.10	.90	.20	.....	.20	.20	.20	.10	.60	.20
10.....	.20	.....	.15	.40	.20	.....	.20	.20	.20	.10	1.50	.20
11.....	.10	.....	.20	.40	.20	.....	.80	.20	.20	.10	.90	.10
12.....	.05	(a)	.40	.30	.20	.....	.40	.20	.30	.20	.40	.10
13.....	.02	0.20	.70	.30	.20	.....	.20	.30	.20	.10	.30	.10
14.....	.01	.10	.80	.20	.20	.....	.40	.30	.20	.30	.20	.10
15.....	.01	.05	.20	.30	.20	.....	.20	.30	.20	.30	.10	.10
16.....	.01	.02	.20	.30	.20	.....	.10	.20	.30	.10	.60	.20
17.....	(a)	.01	.60	.50	.10	.....	.20	.30	.20	.80	1.00	.10
18.....	.....	.01	.90	.30	.10	.....	.20	.40	.20	.20	.40	.10
19.....	(a)	.20	.70	.30	.10	.....	.10	.50	.10	.30	.80	.20
20.....	.....	.50	.50	.20	.10	.....	.10	.20	.10	.60	.20	.60
21.....	(a)	1.00	.20	.50	.10	.....	.10	.10	.20	.70	.30	.20
22.....	(a)	1.50	.10	.40	.10	.....	.10	.10	.20	.90	.30	.90
23.....	(a)	1.80	.40	.20	.10	.....	.10	.10	.10	1.30	.30	1.60
24.....	(a)	1.20	.30	.30	.50	.....	.20	.10	.10	.50	.30	1.00
25.....	.....	.80	.20	.30	.02	0.20	.30	.10	.05	.20	.20	.20
26.....	.....	.40	.10	.30	.01	.20	.30	.10	.02	.20	.10	.30
27.....	(a)	.50	.10	.20	.01	.20	.20	.20	.02	1.80	.20	.20
28.....	.....	.50	.05	.20	.01	.20	.20	.30	.02	1.00	.50	.20
29.....	.....	.60	.05	.10	.04	.....	.20	.20	.02	1.00	.30	.20
30.....	(a)	.....	.40	.20	.02	.....	.20	.20	.40	.80	.20	.10
31.....	.....	.....	1.50	.....	.02	.....	.10	.10	.....	.60	.....	.10

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 45 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September 19-29.....	0.40	.....	May.....	0.32	19.70
October.....	.25	15.10	June.....	.01	.60
November.....	.24	14.10	July.....	.23	14.10
December.....	.45	27.80	August.....	.26	16.00
1912.			September.....	.28	16.70
January.....	.05	3.07	October.....	.43	26.40
February.....	.32	18.40	November.....	.40	23.50
March.....	.32	19.70	December.....	.33	20.30
April.....	.41	24.40	The year.....	.28	203.00

Discharge measurements at station No. 46 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 16.....	1.47	3.49	Nov. 28.....	1.76	12.0
Sept. 26.....	1.24	.86	Dec. 10.....	1.76	11.4

NOTE.—Bed of stream of cobbles and some large boulders; section near gage quite rough; probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 46 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								1.25		1.61	2.24	2.96
2.								2.42		1.55		3.40
3.	1.60		1.67	1.82			2.09	2.35			3.60	2.06
4.	1.42	0.55	1.55	1.98	2.45		1.89	2.02		1.44		1.96
5.	1.35	.55	1.49	2.00		1.00	1.82	1.54	2.30	1.34	2.11	1.80
6.	1.42			2.01	2.00		1.74		2.05	1.28		1.74
7.	1.42		1.41			.95		1.40	2.11		1.70	1.90
8.	1.48	.51					1.62	1.39	1.94	1.23	1.72	2.13
9.	1.45	.51	1.50	3.24			1.52	1.40	1.82		2.35	1.91
10.	1.41	.50	1.51	2.42			1.49	1.40		1.34	4.72	1.75
11.	1.35	.50	1.60	2.31				1.65	1.34	3.00	1.65	
12.	1.30	.50	2.21	2.02				1.38	2.02	1.92	2.26	1.59
13.	1.28	1.38	2.41		1.75	1.31	1.79	1.48	1.71	1.74	2.30	1.52
14.	1.25	1.13	2.55	1.76				1.50	1.64	1.74	1.92	1.53
15.	1.20	1.06	2.09	1.84		1.22	1.56	1.65	1.54		1.78	1.62
16.	1.18	.91	1.84	1.76				1.48	1.65		2.16	1.82
17.		.85	2.15		1.45	1.35				2.88	3.20	1.64
18.		.80		1.92				1.67	1.51	1.84	2.19	1.54
19.	1.08	.90		1.91	1.46				1.42	2.06	3.00	1.76
20.	1.05	1.55	2.20	1.90					1.39	2.49	2.08	2.36
21.	1.02		2.00	2.12		1.30	1.41		1.39		1.96	1.84
22.	.98		1.71	2.05				1.29	1.39	2.78	1.90	2.65
23.	.95		1.76	1.86	1.38		1.40	1.25	1.36	3.22	1.94	5.50
24.	.95						1.70	1.50	1.27	2.40		4.20
25.			1.62	2.12	1.85	1.59		1.37		1.98	1.80	2.20
26.			1.56	2.25		1.45	1.44	1.20	1.22	1.96	1.72	2.80
27.	.92		1.48	2.15	1.30	1.55	1.46	1.68	1.19	4.12	1.64	2.20
28.	.90		1.41	2.08		1.48	1.44		1.17	2.98	1.75	1.90
29.	.85		1.36				1.39		1.15	3.10		1.80
30.	.82		1.51						1.62		1.65	
31.			2.61		1.20					2.26		

*Daily discharge, in second-feet, at station No. 46 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.		33.2	0.8	2.9	16.		18.0	14.0	90.5
2.		36.0	.8	3.4	17.		18.0	23.0	140.0
3.		40.8	.8	2.6	18.		10.2	63.0	153.0
4.		45.8	2.4	1.5	19.	15.5	5.2	107.0	105.0
5.		51.2	6.0	2.4	20.	11.4	4.4	151.0	90.5
6.		38.4	10.2	2.3	21.	8.1	3.7	199.0	40.0
7.		27.8	16.5	1.5	22.	9.8	3.0	188.0	20.5
8.		26.0	23.0	1.7	23.	68.5	2.9	192.0	13.0
9.		24.8	31.8	4.4	24.	74.0	2.7	165.0	11.0
10.		23.0	12.2	3.2	25.	58.0	2.4	47.6	40.0
11.		15.5	19.0	4.0	26.	55.0	2.2	18.0	23.0
12.		16.0	26.6	2.7	27.	44.9	1.3	9.8	22.0
13.		16.5	36.0	29.0	28.	38.5	1.1	6.6	18.0
14.		17.0	48.5	48.5	29.	29.0	.9	3.7	30.4
15.		17.5	63.0	138.0	30.	31.1	.8	2.4	23.0
					31.		.9		18.0



*Daily discharge, in second-feet, at station No. 46 at 2,700-foot level, near Hilo, Hawaii,  
for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.00	0.10	10.00	30.00	45.00	.....	10.00	1.00	25.00	6.30	39.20	114.00
2.....	6.00	.10	10.00	20.00	50.00	.....	18.00	5.00	55.00	5.00	40.00	163.00
3.....	6.00	.10	8.10	14.00	50.00	.....	28.00	48.00	85.00	4.00	187.00	27.00
4.....	2.70	.10	5.00	22.00	58.00	.....	18.00	24.00	120.00	3.00	40.00	21.00
5.....	1.80	.10	3.90	23.00	65.00	.....	14.00	4.80	44.00	1.70	30.00	13.00
6.....	2.70	.10	3.20	24.00	23.00	.....	11.00	3.60	26.00	1.20	10.00	11.00
7.....	2.70	.10	2.60	250.00	20.00	.....	8.80	2.40	30.00	1.00	9.00	18.00
8.....	3.70	.10	3.30	200.00	17.00	.....	6.60	2.30	20.00	.90	9.80	31.00
9.....	3.40	.10	4.00	144.00	17.00	.....	4.40	2.40	14.00	1.00	48.00	18.00
10.....	2.60	.10	4.20	55.00	14.00	.....	3.90	2.40	11.20	1.70	332.00	11.00
11.....	1.80	.10	6.00	45.00	14.00	.....	35.00	2.30	7.50	1.70	118.00	7.50
12.....	1.30	.10	37.00	24.00	11.00	.....	20.00	2.20	24.00	19.00	41.00	5.80
13.....	1.20	2.20	53.00	18.00	11.00	1.40	13.00	3.70	9.40	11.00	44.00	4.40
14.....	1.00	.40	64.00	11.00	10.00	.....	15.00	5.00	7.20	11.00	19.00	4.60
15.....	.70	.20	28.00	13.00	10.00	.80	5.20	7.50	4.80	11.00	12.00	6.60
16.....	.60	.10	13.00	11.00	6.60	.....	5.00	3.70	7.50	10.00	33.20	14.00
17.....	.50	.10	32.00	30.00	3.20	1.80	5.00	3.00	5.00	105.00	140.00	7.20
18.....	.40	.10	40.00	19.00	3.30	.....	4.00	8.10	4.20	15.00	35.00	4.80
19.....	.30	.10	38.00	18.00	3.40	.....	4.00	10.00	2.70	27.00	118.00	11.00
20.....	.20	5.00	36.00	18.00	3.10	.....	3.00	5.00	2.30	62.00	28.00	49.00
21.....	.10	100.00	23.00	30.00	2.80	1.30	2.60	3.00	2.30	70.00	21.00	15.00
22.....	.10	300.00	9.40	26.00	2.50	.....	2.50	1.20	2.30	94.00	18.00	80.00
23.....	.10	400.00	11.00	16.00	2.20	.....	2.40	1.00	2.00	142.00	20.00	432.00
24.....	.10	300.00	9.00	40.00	2.00	.....	9.00	4.00	1.10	53.00	16.50	264.00
25.....	.10	100.00	6.60	30.00	1.80	5.80	6.00	2.10	1.00	22.00	13.00	36.00
26.....	.10	50.00	5.20	40.00	1.60	3.20	3.00	.70	.80	21.00	9.80	96.00
27.....	.10	10.00	3.70	32.00	1.30	5.00	3.40	8.40	.70	277.00	7.20	36.00
28.....	.10	10.00	2.60	28.00	1.20	3.70	3.00	7.00	.60	115.00	11.00	18.00
29.....	.10	10.00	2.00	20.00	1.00	.....	2.30	6.00	.50	129.00	9.00	13.00
30.....	.10	.....	4.20	40.00	.80	.....	2.00	5.00	6.60	80.00	7.50	10.00
31.....	.10	.....	74.00	.....	.70	.....	1.50	4.00	.....	41.00	.....	10.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 46 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September 19-29.....	37.00		May.....	14.60	898.00
October.....	16.40	1,020	June.....	2.00	119.00
November.....	49.60	2,960	July.....	8.70	535.00
December.....	35.00	2,160	August.....	6.09	374.00
1912.			September.....	17.40	1,040.00
January.....	1.50	92.20	October.....	43.30	2,660.00
February.....	44.40	2,550.00	November.....	48.90	2,910.00
March.....	17.80	1,090.00	December.....	50.10	3,080.00
April.....	43.00	2,560.00	The year.....	24.50	17,900.00

*Discharge measurements at station No. 47 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 16 .....	1.64	2.11	Nov. 19 .....	2.45	7.85
Sept. 26 .....	1.10	.65	Dec. 10 .....	2.21	4.48
Oct. 25 .....	2.24	5.86			

NOTE.—Bed of stream of cobbles and some large boulders. Section near gage quite rough. Station probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 47 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Blilov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.								1.07		1.81	2.55	3.05
2.								2.55		1.71		3.55
3.	1.52		2.17	2.16			2.55	2.92			3.50	2.48
4.	1.28		1.91	2.36	2.55		2.34	2.37		1.52		2.46
5.	1.25		1.62	2.42		1.00	2.22	1.72	2.50	1.32	2.40	2.30
6.	1.25			2.55	2.10		2.16		2.34	1.24		2.22
7.	1.28		1.48			.90		1.60	2.55		2.16	2.30
8.	1.35						1.94	1.47	2.55	1.22	2.15	2.47
9.	1.34		2.01	3.16			1.71	1.65	2.12		2.75	2.36
10.	1.30		2.01	2.68			1.54	1.65		1.30	3.65	2.20
11.	1.22		2.14	2.59					1.92	1.27	3.10	1.96
12.	1.15		2.60	2.45				1.49	2.32	1.88	2.56	1.92
13.	1.08	1.25	2.76		1.70	1.20	2.08	1.76	2.06	1.54	2.50	1.76
14.	1.00	1.11	2.79	2.25					1.90	1.82	2.35	1.89
15.	.88	.70	2.45	2.43		1.10	1.70	2.10	1.78		2.18	2.06
16.	.82	.48	2.26	2.32				1.69	2.06		2.51	2.30
17.		.35	2.60		1.52	1.27				2.85	3.10	2.04
18.		.28		2.39				2.04	1.76	2.05	2.60	1.91
19.	.75	1.41		2.42	1.58				1.59	2.32	2.95	2.31
20.	.68	2.21	2.54	2.39					1.49	2.78	2.44	2.72
21.	.62		2.39	2.51		1.20	1.39		1.51		2.37	2.30
22.	.58		2.19	2.48				1.19	1.54	2.78	2.34	2.74
23.	.55		2.21	2.32	1.50		1.31	1.16	1.35	3.10	2.45	3.32
24.	.55						2.06	1.28	1.26	2.58		3.00
25.			2.14	2.45	1.40	1.85		1.24		2.25	2.18	2.47
26.			2.06	2.55		1.70	1.65	1.14	1.07	2.30	2.11	2.92
27.	.52		1.81	2.45	1.38	1.90	1.69	1.71	.99	3.75	2.10	2.46
28.	.50		1.59	2.25		1.62	1.56		.91	2.90	2.30	2.30
29.	.48		1.42				1.51		.89	2.92		2.32
30.	.45		1.89						.22		2.14	
31.			3.16		1.30					2.66		

*Daily discharge, in second-feet, at station No. 47 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.		9.20	0.47	1.52	16.		8.72	4.90	16.00
2.		9.20	.47	1.30	17.		8.88	3.72	26.00
3.		10.30	.47	1.04	18.		5.14	14.20	32.50
4.		11.40	1.40	1.00	19.	6.85	2.86	21.20	20.40
5.		12.60	3.10	1.22	20.	5.50	2.14	27.60	18.00
6.		11.00	4.10	1.04	21.	4.40	1.72	35.50	9.20
7.		9.56	5.50	.88	22.	5.50	1.42	31.00	6.10
8.		9.78	7.15	.97	23.	16.00	1.32	34.60	4.90
9.		9.92	9.20	1.64	24.	14.50	1.20	27.00	3.10
10.		10.10	5.14	1.50	25.	13.00	1.08	12.00	9.20
11.		7.30	6.25	1.44	26.	9.56	.97	6.10	3.90
12.		7.60	7.60	1.30	27.	11.00	.82	4.10	3.74
13.		7.92	9.20	13.00	28.	14.50	.70	3.26	2.80
14.		8.24	11.00	21.00	29.	10.10	.58	2.30	5.50
15.		8.56	13.00	34.00	30.	10.10	.50	1.76	4.90
					31.		.47		3.90

*Daily discharge, in second-feet, at station No. 47 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.50	0.10	5.00	15.00	6.00	0.80	2.00	0.65	8.00	2.15	10.10	22.00
2.....	1.50	.10	5.00	10.00	6.00	.60	5.00	1.00	10.10	1.85	20.00	35.50
3.....	1.80	.10	4.60	4.50	7.00	.60	10.10	18.60	35.00	1.65	34.00	8.70
4.....	.95	.10	2.50	7.00	10.10	.60	6.70	6.20	35.00	1.45	10.00	8.55
5.....	.90	.10	1.65	7.90	6.00	.55	5.15	1.85	9.20	1.40	7.60	6.10
6.....	.90	.10	1.50	10.10	3.90	.50	4.50	1.70	6.70	.90	5.00	5.15
7.....	.95	.10	1.35	35.00	3.00	.45	3.60	1.60	10.10	.90	4.50	6.10
8.....	1.10	.10	2.30	30.00	2.00	.50	2.75	1.35	10.10	.90	4.40	8.70
9.....	1.10	.10	3.20	24.80	2.00	.50	1.85	1.70	4.10	.90	14.50	7.00
10.....	1.10	.10	3.20	12.60	2.00	.60	1.50	1.70	3.40	1.00	38.50	4.90
11.....	.90	.10	4.30	10.75	2.00	.70	20.00	1.60	2.60	.95	23.00	2.85
12.....	.75	.10	11.00	8.40	2.00	.70	10.00	1.40	6.40	1.40	10.30	2.60
13.....	.65	.90	15.00	7.00	1.80	.85	3.75	2.00	3.60	1.50	9.20	2.00
14.....	.55	.70	15.50	5.50	1.70	.80	5.00	3.00	2.50	2.15	6.85	2.45
15.....	.45	.30	8.40	8.10	1.60	.70	1.80	3.90	2.05	2.00	4.70	3.60
16.....	.35	.20	5.60	6.40	1.50	.80	1.50	1.80	3.60	2.00	9.40	6.10
17.....	.30	.10	11.00	7.00	1.45	.95	1.50	2.60	2.80	17.00	23.00	3.40
18.....	.30	.10	10.50	7.45	1.50	.90	1.50	3.40	2.00	3.50	11.00	2.55
19.....	.30	1.20	10.00	7.90	1.55	.90	1.50	6.00	1.60	6.40	19.50	6.25
20.....	.30	5.00	9.90	7.45	1.50	.90	1.50	2.00	1.40	15.40	8.25	13.60
21.....	.25	20.00	6.25	9.40	1.50	.85	1.20	1.00	1.40	15.40	7.15	6.10
22.....	.25	35.00	4.80	8.90	1.50	1.00	1.10	.85	1.50	15.40	6.70	14.20
23.....	.20	43.00	5.00	6.40	1.40	1.50	1.00	.65	1.10	23.00	8.40	28.60
24.....	.20	30.00	4.60	7.40	1.30	2.00	3.60	.95	.95	10.70	6.60	21.00
25.....	.20	20.00	4.30	8.40	1.20	2.30	2.60	.90	.80	5.50	4.70	8.70
26.....	.20	10.00	3.60	10.10	1.20	1.80	1.70	.75	.65	6.10	4.00	18.60
27.....	.20	5.00	2.15	8.40	1.15	2.50	1.80	1.85	.55	41.50	3.90	8.55
28.....	.20	5.00	1.60	5.50	1.10	1.65	1.50	1.50	.45	18.00	6.10	6.10
29.....	.20	5.00	1.25	6.00	1.10	1.50	1.40	1.20	.45	18.50	5.20	6.40
30.....	.15	.....	2.45	6.00	1.10	1.50	1.00	1.00	.05	16.00	4.30	5.00
31.....	.15	.....	24.80	.....	1.00	.....	1.00	1.50	.....	12.20	.....	5.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 47 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September 19-29.....	10.10	.....	May.....	2.52	155.00
October.....	5.85	361.00	June.....	1.02	60.70
November.....	10.60	634.00	July.....	3.52	216.00
December.....	8.16	503.00	August.....	2.46	151.00
1912.			September.....	5.60	333.00
January.....	.61	37.50	October.....	7.99	491.00
February.....	6.30	362.00	November.....	11.00	655.00
March.....	4.27	263.00	December.....	9.24	568.00
April.....	10.30	613.00	The year.....	5.38	3,910.00

*Discharge measurements at station No. 48 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 16.....	Feet.	Sec.-ft.	Nov. 19.....	Feet.	Sec.-ft.
Sept. 26.....	0.45	0.07	Dec. 10.....	0.58	0.57
Oct. 25.....	.36	0		.48	.19
	.47	.23			

NOTE.—Bed of stream of gravel and some small cobbles, probably slightly shifting. One channel at all stages.

Daily gage height, in feet, at station No. 48 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								0.47		0.54	0.56	1.10
2									0.68	.55		1.12
3	0.46		0.50	0.61			0.70	.90	1.40		.90	.64
4	.44	(a)	.47	.66	1.06			.60	.69	1.42	.45	.55
5	.42	(a)	.43	.61		0.48	.54	.49	1.57	.42	.56	.49
6	.50			.72	.99		.50		1.57	.42		.46
7	.52		.49			.46		.49	1.67		.43	.51
8	.65	(a)					.48	.44	.51	.42	.44	.56
9	.62	(a)	.51	.91			.45	.51	.52		.84	.52
10	.58	(a)	.51	.72			.47	.51		.44	1.06	.47
11	.52	(a)	.54	.65					.40	.44	.75	.42
12	.48	(a)	.68	.61				.46	.54	.62	.59	.40
13	.45	0.61	.73		.59	.58	.50	.52	.44	.64	.63	.38
14	.44	.50	.77	.59				.44	.56	.52	.46	.46
15	.41	.40	.56	.64		.52	.43	.55	.40		.44	.49
16	.38	.40	.51	.55				.43	.50		.80	.62
17		.39	.76		.53	.43				.72	.90	.43
18		.35		.62				.64	.43	.51	.79	.50
19	(a)	.61		.59	.54				.40	.69	.80	.60
20	(a)	.80	.59	.58					.39	.75	.55	.72
21	(a)	1.20	.52	.68		.45	.40		.42		.67	.52
22	(a)		.50	.65				.40	.42	.70	.54	.72
23	(a)		.49	.64	.57		.44	.40	.40	.88	.62	1.12
24	(a)						.69	.40	.38	.61		.83
25			.52	.69	.52	.58		.40		.47	.46	.58
26			.52	.78		.51	.55	.41	.35	.70	.47	.80
27	(a)		.48	.72	.51	.52	.50	.52	.35	.86	.45	.60
28	(a)		.45	.71		.49	.44		.34	.86	.59	.50
29	(a)		.44				.50		.34	.75		.54
30	(a)		.63						.60		.54	
31			1.00		.50					.70		

a Channel dry.

Daily discharge, in second-feet, at station No. 48 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1		1.00	0.21	0.25	16		1.31	1.17	2.20
2		1.00	.21	.17	17		1.45	2.12	5.80
3		1.10	.21	.13	18		.85	3.40	6.35
4		1.24	.25	.15	19	0.32	.42	4.70	4.92
5		1.45	.60	.17	20	.23	.39	6.13	2.90
6		1.38	.75	.25	21	.15	.32	7.56	1.24
7		1.24	.90	.21	22	.42	.25	6.90	.32
8		1.31	1.05	.25	23	1.10	.28	8.22	.32
9		1.38	1.17	3.20	24	1.00	.32	7.78	.28
10		1.45	.70	1.45	25	1.24	.36	1.96	1.96
11		1.00	.90	1.66	26	1.66	.39	.60	1.45
12		1.05	1.10	.85	27	1.10	.23	.53	1.80
13		1.10	1.38	2.90	28	1.96	.23	.53	1.45
14		1.17	1.66	5.25	29	1.00	.23	.42	2.90
15		1.24	1.96	7.78	30	1.00	.23	.39	2.70
					31		.21		2.20

*Daily discharge, in second-feet, at station No. 48 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.15	(a)	0.50	2.00	2.50	0.20	0.30	0.20	0.50	0.40	0.45	4.70
2.....	.15	(a)	.30	1.00	3.00	.20	.70	.30	1.00	.40	.40	4.90
3.....	.15	(a)	.25	.65	3.00	.20	1.10	2.70	8.00	.40	2.70	.80
4.....	.10	(a)	.20	.90	4.30	.20	.60	1.05	8.20	.15	1.50	.40
5.....	.10	(a)	.10	.65	6.00	.20	.40	.25	9.95	.10	.45	.25
6.....	.25	(a)	.15	1.25	3.60	.20	.25	.25	9.95	.10	.10	.15
7.....	.30	(a)	.20	5.00	1.00	.15	.25	.25	11.10	.10	.10	.30
8.....	.85	(a)	.25	3.50	.80	.20	.20	.15	.30	.10	.15	.45
9.....	.70	(a)	.30	2.80	.60	.20	.15	.30	.30	.10	2.10	.30
10.....	.60	(a)	.30	1.25	.60	.30	.20	.30	.20	.15	4.30	.20
11.....	.30	(a)	.40	.85	.60	.30	4.00	.20	.05	.15	1.45	.10
12.....	.20	(a)	1.00	.65	.60	.40	1.50	.15	.40	.70	.55	.05
13.....	.15	0.65	1.30	.60	.55	.50	.25	.30	.15	.80	.75	.05
14.....	.10	.25	1.60	.65	.60	.40	1.00	.50	.15	.45	.30	.15
15.....	.05	.05	.45	.80	.70	.30	.10	.40	.05	.50	.15	.25
16.....	.05	.05	.30	.45	.80	.20	.10	.10	.25	.40	1.80	.70
17.....	.05	.03	1.50	.90	.35	.10	.10	.20	.20	1.25	2.70	.10
18.....	.05	.05	3.00	.70	.30	.10	.10	.80	.10	.30	1.60	.25
19.....	(a)	.65	2.00	.65	.40	.10	.10	1.00	.05	1.05	1.80	.60
20.....	(a)	1.80	.55	.65	.30	.10	.10	.10	.05	1.45	.40	1.25
21.....	(a)	5.80	.30	1.00	.30	.15	.05	.05	.10	1.50	1.05	.30
22.....	(a)	9.00	.25	.85	.30	.20	.10	.05	.10	1.10	.40	1.25
23.....	(a)	11.00	.20	.80	.50	.30	.15	.05	.05	2.45	.70	4.90
24.....	(a)	8.00	.20	.90	1.00	.40	1.05	.05	.05	.65	.50	2.05
25.....	(a)	3.00	.30	1.05	.30	.50	.80	.05	.05	.20	.20	.55
26.....	(a)	1.00	.30	1.60	.30	.30	.40	.10	.03	1.10	.20	1.80
27.....	(a)	1.00	.20	1.25	.30	.30	.25	.30	.02	2.30	.15	.60
28.....	(a)	1.00	.15	1.15	.40	.20	.15	.30	.02	2.30	.60	.25
29.....	(a)	1.00	.10	.80	.60	.20	.25	.20	.02	1.45	.50	.40
30.....	(a)		.75	1.00	.40	.20	.20	.20	.60	1.20	.40	.20
31.....	(a)		3.70		.25		.20	.20		1.10		.20

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 48 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September 19-29.....	0.93	.....	May.....	1.14	70.10
October.....	1.83	50.80	June.....	.24	14.30
November.....	2.18	130.00	July.....	.49	30.10
December.....	2.05	126.00	August.....	.36	22.10
1912.			September.....	1.73	103.00
January.....	.14	8.61	October.....	.79	48.60
February.....	1.53	88.00	November.....	.95	56.50
March.....	.68	41.80	December.....	.92	56.60
April.....	1.20	71.40	The year.....	.84	611.00

*Discharge measurements at station No. 49 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Feet.			Feet.		
Aug. 16.....	0.09	0	Nov. 19.....	0.12	0.13
Sept. 26.....	(a)	.....	Dec. 10.....	.08	.05
Oct. 25.....	.09	0.05			

<sup>a</sup> Channel dry.

NOTE.—Bed of stream of silt and sand shifting. One channel at all stages.

Daily gage height, in feet, at station No. 49 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1								-0.06		0.08	0.03	0.75
2									0.20	.07		.31
3	0.04		0.12	0.18			0.19	.40	.90		.30	.40
4	(a)	(a)	+ .10	.38	0.78		.11	.19	.88	-.01		.32
5	(a)	(a)	+ .11	.27		(a)	.08	-.02	.16	-.11	.08	.14
6	.02			.32	.73		.02		.28	-.10		.02
7	.04		.10			(a)		.49	.32		.02	.21
8	.09	(a)					.01	-.03	.12	-.10	.08	.42
9	.05	(a)	.15	.38			.02	.05	.08		.42	.14
10	.02	(a)	.15	.35				.05		-.02	.52	.03
11	(a)	(a)	.12	.21					.01	-.05	.20	-.11
12	(a)	(a)	.36	.14				-.05	.88	.08	.12	-.15
13	(a)	0.08	.32		.10	+0.15	.60	.05	.00	-.02	.21	-.15
14	(a)	.05	.39	.06					-.01	.12	.02	-.13
15	(a)	+ .10	.18	.19		+ .09		.05	-.03		-.02	.02
16	(a)	+ .10	.15	.12				-.08	-.04		.48	.28
17		+ .11	.42		(a)	(a)				.34	.50	-.06
18		+ .12		.24				.11	-.01	.02	.35	.08
19	(a)	.15		.11	(a)				-.04	.30	.30	.23
20	(a)	.25	.22	.25					-.05	.50	.16	.35
21	(a)	.50	.12	.23		(a)	.15		-.01		.21	.22
22	(a)		+ .10	.22				-.10	.00	.28	.08	.40
23	(a)		.12	.21	(a)		.10	.00	-.03	.55	.22	.82
24	(a)						.08	-.01	-.05	.25		.30
25			.11	.35	(a)	.09		.04		.05	-.01	.06
26			.11	.41		.06	.01	.04	-.05	.28	-.01	.32
27	(a)		+ .01	.32	(a)	.11		.02	-.06	.50	.12	.72
28	(a)		+ .09	+ .09		.06			-.09	.38	.09	.05
29	(a)		+ .15						-.08	.35		.10
30	(a)		.32						.15		.15	
31			.51		(a)					.21		

<sup>a</sup> Channel dry.

Monthly discharge at station No. 49 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	<sup>a</sup> 0.05	3.08	June.....	0.02	1.00
November.....	a. 10	5.95	July.....	.04	2.60
December.....	a. 10	6.15	August.....	.04	2.40
1912.			September.....	.12	7.30
January.....	.003	.20	October.....	.13	8.30
February.....	.090	5.30	November.....	.13	7.70
March.....	.110	6.70	December.....	.15	9.10
April.....	.180	10.70	The year.....	.09	68.40
May.....	.120	7.10			

<sup>a</sup> Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 50 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 23.....	0.39	0.07	Oct. 25.....	0.46	0.21
Sept. 28.....	.35	.04	Nov. 19.....	.79	.45
Oct. 23.....	1.31	3.00	Dec. 10.....	.40	.15

NOTE.—Bed of stream of sand and gravel; shifting slightly. One channel at all stages.

*Daily gage height, in feet, at station No. 50 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.41	0.24	0.85	0.50	0.69	0.45	0.65	0.47	1.05	0.78	0.82	1.42
2.....	.40	.....	.81	.52	.74	.42	.69	.40	.92	.76	.84	1.22
3.....	.36	.24	.72	.59	.79	.....	2.00	1.15	1.35	.75	1.28	1.39
4.....	.35	.24	.52	.89	1.02	.38	.82	.67	1.52	.72	.78	.76
5.....	.32	.24	.45	.76	.94	.38	.60	.46	.80	.72	.76	.52
6.....	.32	.24	.45	.96	.72	.38	.60	.41	.67	.70	.60	.44
7.....	.34	.22	.52	1.70	.65	.38	.54	.61	1.01	.71	.53	.43
8.....	.39	.22	.72	1.34	.....	.44	.58	.41	.46	.71	.65	.44
9.....	.34	.21	.82	1.02	.62	.44	.52	.72	.51	.75	1.28	.44
10.....	.34	.21	.73	.98	.60	.....	.81	.68	.44	.79	1.49	.40
11.....	.32	.21	.98	.84	.59	.....	1.01	.56	.39	.78	1.00	.38
12.....	.31	.23	1.02	.79	.....	.74	.49	.49	.88	.78	.79	.35
13.....	.31	.41	.98	.71	.59	.49	.60	.68	.59	.74	.76	.35
14.....	.30	.33	1.05	.54	.....	.45	.79	.70	.58	.86	.60	.35
15.....	.29	.26	.78	.81	.69	.45	.53	.81	.46	.90	.48	.34
16.....	.29	.24	.61	.61	.....	.51	.50	.65	.72	.92	1.09	.46
17.....	.29	.22	1.06	.88	.60	.46	.51	.46	.49	1.08	1.25	.34
18.....	.25	.21	1.51	.90	.58	.....	.52	.74	.51	.78	1.12	.32
19.....	.25	.35	1.30	.78	.55	.41	.48	.76	.36	.82	1.00	.45
20.....	.25	.72	.70	.91	.58	.40	.48	.65	.48	1.18	.80	.66
21.....	.25	1.15	.67	.88	.55	.40	.48	.51	.60	.76	.76	.42
22.....	.25	1.55	.44	.75	.52	.48	.46	.39	.62	1.60	.80	.73
23.....	.25	1.68	.78	.71	.46	.....	.58	.39	.50	1.19	.98	1.34
24.....	.25	1.31	.64	.69	.44	.....	.80	.61	.41	.92	.90	.96
25.....	.25	1.20	.54	.92	.42	.71	.67	.36	.39	.68	.72	.43
26.....	.26	.85	.44	.96	.43	.69	.64	.64	.38	1.05	.60	.59
27.....	.30	.80	.40	.72	.44	.82	.59	.79	.36	1.59	.88	.40
28.....	.29	.90	.35	.60	.42	.66	.52	.79	.34	1.36	.86	.25
29.....	.25	.80	.34	.58	.42	.60	.61	.72	.54	1.22	.79	.28
30.....	.24	.....	.71	.54	.45	.55	.58	.95	.96	1.01	.88	.....
31.....	.24	.....	.98	.....	.42	.....	.50	.90	.....	.98	.....	.....

*Daily discharge, in second-feet, at station No. 50 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Sept.	Oct.	Nov.	Dec.	Day.	Sept.	Oct.	Nov.	Dec.
1.....	.....	0.46	0.05	0.10	16.....	0.62	0.18	0.24	1.82
2.....	.....	.22	.05	.10	17.....	.38	.46	.68	1.40
3.....	.....	1.70	.13	.05	18.....	1.00	.21	.32	1.20
4.....	.....	2.78	.18	.05	19.....	.46	.10	1.12	1.20
5.....	.....	.56	.14	.10	20.....	.34	.10	.28	1.12
6.....	.....	.53	.34	.10	21.....	.24	.10	2.96	.15
7.....	.....	.92	.28	.10	22.....	1.45	.10	3.38	.12
8.....	.....	.77	.28	.10	23.....	.84	.10	3.80	.05
9.....	.....	.65	.34	.30	24.....	1.25	.10	2.60	.05
10.....	.....	.50	.16	.15	25.....	.53	.10	.88	.22
11.....	.....	.30	.14	.14	26.....	.84	.10	.18	.05
12.....	.....	.18	.13	.12	27.....	.65	.10	.14	.21
13.....	0.46	.18	.42	.80	28.....	.88	.10	.16	.10
14.....	.46	.10	.24	.56	29.....	.34	.10	.15	.14
15.....	1.04	.46	.80	3.50	30.....	.80	.05	.10	.05
					31.....	.....	.05	.....	.05

*Daily discharge, in second-feet, at station No. 50 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.05	0.05	0.65	0.10	0.30	0.05	0.20	0.10	1.40	0.50	0.60	3.60
2.	.05	.05	.50	.10	.40	.05	.30	.05	.90	.40	.60	2.40
3.	.05	.05	.30	.15	.50	.05	7.10	2.00	3.20	.40	2.80	3.40
4.	.05	.05	.10	.80	1.30	.05	.60	.25	4.20	.30	.50	.40
5.		.05	.05	.40	.95	.05	.15	.10	.50	.30	.40	.10
6.		.05	.05	1.00	.30	.05	.15	.05	.25	.30	.15	.05
7.		.05	.10	5.30	.20	.05	.10	.15	1.25	.30	.10	.05
8.	.05	.05	.30	3.10	.20	.05	.10	.05	.10	.30	.20	.05
9.		.05	.60	1.30	.20	.05	.10	.30	.10	.40	2.80	.05
10.		.05	.40	.90	.15	.05	.50	.30	.05	.50	4.00	.05
11.		.05	1.10	.60	.15	.10	1.25	.10	.05	.50	1.20	.05
12.		.05	1.30	.50	.15	.10	.40	.10	.70	.50	.50	.05
13.		.05	1.10	.30	.15	.10	.15	.30	.15	.40	.40	.05
14.		.05	1.40	.10	.20	.10	.50	.30	.15	.70	.15	.10
15.		.05	.50	.50	.30	.10	.10	.50	.10	.80	.10	.20
16.		.05	.15	.15	.20	.10	.10	.20	.30	.90	1.65	.10
17.		.05	1.50	.70	.15	.10	.10	.10	.10	1.60	2.60	.10
18.		.05	4.20	.80	.15	.10	.10	.40	.10	.50	1.80	.10
19.		.05	2.90	.50	.10	.05	.10	.40	.05	.60	1.20	.10
20.		.30	.30	.80	.15	.05	.10	.20	.10	2.20	.50	.20
21.		2.00	.25	.70	.10	.05	.10	.10	.15	.40	.40	.05
22.		4.40	.05	.40	.10	.10	.10	.05	.20	4.70	.50	.40
23.		5.20	.50	.30	.10	.20	.15	.05	.10	2.20	1.10	3.10
24.		3.00	.10	.30	.05	.20	.50	.10	.05	.90	.80	1.00
25.		2.30	.05	.90	.05	.30	.25	.05	.05	.30	.30	.05
26.		.65	.05	1.00	.05	.30	.20	.20	.05	1.45	.15	.15
27.		.50	.05	.30	.05	.60	.15	.50	.05	4.60	.70	.05
28.		.80	.05	.15	.05	.20	.10	.50	.05	3.30	.70	.05
29.		.50	.05	.15	.05	.15	.15	.30	.10	2.40	.50	.05
30.			.30	.10	.05	.10	.15	1.00	1.00	1.25	.70	.05
31.			1.10		.05		.10	.80		1.10		.05

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near this station.

*Monthly discharge at station No. 50 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September 13-30.	0.70		May.	0.22	13.50
October.	.40	24.60	June.	.12	7.14
November.	.69	41.20	July.	.46	28.30
December.	.45	28.00	August.	.31	19.10
1912.			September.	.52	30.90
January.	.05	3.07	October.	1.13	69.50
February.	.71	40.80	November.	.94	55.90
March.	.65	40.00	December.	.52	32.00
April.	.75	44.60	The year.	.53	385.00

*Discharge measurements at station No. 51 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Feet.			Feet.		
Sec.-ft.			Sec.-ft.		
Aug. 20.	0.84	0.09	Nov. 19.	0.90	0.44
Sept. 28.	.74	.02	Dec. 10.	.80	.20
Nov. 7.	.79	.13			

NOTE.—Bed of stream of silt, sand, and gravel; probably shifting. One channel at all stages.



Daily gage height, in feet, at station No. 51 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.79	0.85			0.82		
2.			1.02				.93	0.80				
3.			.85	1.30				1.65	1.60		1.36	
4.		0.69	.84	1.29				1.14		.80		
5.	0.80	.68	.80	1.11	1.05		.95	.93	.96	.78	.88	0.80
6.	.81		.79	1.01		.78	.97		.98	.76		.78
7.	.80		.85				.90	.90	1.05	.74	.80	.80
8.	.80	.68				.77		.84	.88	.74	.81	.85
9.		.68	.91	1.52			.82	.95	.86		1.06	.80
10.		.68	.92	1.12	.79			.90		.79	1.60	.80
11.	.75	.68	1.40	1.05			1.16		.80	.76	1.01	.78
12.	.75	.66	1.35	1.02	.79			.86	.90	.80	.90	.75
13.	.74	1.05	1.48	.99			.90		.88	.79	.92	.72
14.	.74	.82	1.44	.90		.78	1.00	.90	.90	.88	.82	.75
15.	.74	.74		.91				1.01	.82		.80	.80
16.	.74	.71			.78	.85			.89	.80	1.20	.91
17.		.70	1.12				.83	.82	.84	1.12	1.32	.77
18.			1.47	.90	.73				.80	.90	.98	.80
19.	.74		1.02	.95			.82	.91	.80	.92	.98	.90
20.	.74		1.21	.91		.81	.81			1.10	.86	1.03
21.	.72			.93				.80	.80		.87	.84
22.	.72		.86	1.01	.79			.88	.88	1.08	.84	1.09
23.	.71		.88	.96				.80	.79	1.37	1.00	1.56
24.	.71			1.05	.86			.84	.78	1.04		1.20
25.	.70	.90	.90				.89	.79		.84	.80	.86
26.	.70	.88	.89	1.19	.79	.81	.89	.79	.75	.95	.80	1.18
27.	.72		.83	.99		1.01	.85	.87	.74	1.65	.80	
28.	.70		.82	.95	.79	.91	.82		.74	1.16	.96	.82
29.	.70		.79				.87		.74	1.33	.87	.83
30.	.69		.89				.82			1.11	.80	
31.			1.70				.80					

Monthly discharge at station No. 51 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
September.....			May.....	0.29	17.60
October.....	a 0.40	24.60	June.....	.23	12.10
November.....	a .50	29.80	July.....	.33	20.20
December.....	a .50	30.80	August.....	.35	21.60
1912.			September.....	.43	25.40
January.....	.10	6.20	October.....	.56	34.50
February.....	.14	8.10	November.....	.54	32.00
March.....	.71	43.60	December.....	.46	28.00
April.....	.71	42.50	The year.....	.40	292.00

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 52 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 20.....	0.76	9.13	Nov. 19.....	1.58	49.3
Sept. 28.....	.34	2.84	Dec. 10.....	1.10	20.4

NOTE.—Bed of stream of cobbles and some large boulders. Section at gage is quite rough. Station is probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 52 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.42	1.00					
2			1.46				1.11	0.40		0.71		
3			1.18	1.43				2.08	3.90		3.42	
4		-0.20	.91	1.49				1.29		.70		
5	0.60	-.22	.82	1.76	2.10		1.12	.84	1.91	.60	1.84	1.15
6	.00		.68	1.81		.23	1.11		1.72	.58		1.10
7	.61		.82				1.08	.64	2.38	.46	1.12	1.30
8	.62	-.70				.66		.59	1.45	.46	1.13	1.70
9		-.70	.91	3.36			.82	.62	1.35		1.88	1.35
10		-.71	.96	2.15	1.40			.64		.64	4.16	1.11
11	.42	-.72	1.22	2.35			2.28		1.00	.57	2.57	.95
12	.42	-.75	1.98	1.58	1.28			.61	1.52	1.30	1.91	.87
13	.41	.56	2.06	1.39			1.19		1.29	.82	1.73	.78
14	.41	.52	2.22	1.18		.42	1.74	.81	1.10	1.01	1.35	.85
15	.38	.22		1.23				1.12	.98		1.13	.94
16	.30				.86	.40			.96	1.08	1.84	1.22
17		.05	1.96				.84	.64	.87	2.71	2.85	.99
18			2.25	1.40	.60				.81	1.34	1.80	.81
19	.15		1.16	1.35			.78	.95	.69	1.78	2.26	1.30
20	.12		1.95	1.37		.80	.78			2.11	1.00	2.15
21	.11		1.11	1.33				.60	.60		1.44	1.28
22	.10		1.08	1.49	.48				.60	2.12	1.42	2.45
23	.09		1.12	1.52				.49	.54	3.14	1.56	3.81
24	.09			2.10	.90			.78	.49	2.16		
25	.08	1.00	.96				.79	.64		1.55	1.12	1.80
26	.08	1.21	.86	1.96	.60	1.41	.69	.51	.40	1.41	1.06	2.68
27	.08		.78	1.98		1.50	.75	1.20	.36	3.76	.97	
28	.06		.64	1.91	.58	1.41	.69		.34	2.70	1.11	1.35
29	.05		.54				.63		.31	2.59	1.33	1.28
30	.06		.62				.54			2.16	.98	
31			2.80				.49					

*Daily discharge, in second-feet, at station No. 52 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	78.0	6.8	12.8	11	35.2	21.0	9.7	21	9.4	528.0	55.2
2	76.2	11.0	11.3	12	27.0	14.3	56.0	22	8.4	337.0	17.0
3	68.1	16.4	10.7	13	19.8	23.0	164.0	23	7.6	365.0	15.5
4	173.0	24.0	6.4	14	14.3	20.6	354.0	24	6.8	314.6	55.2
5	128.0	34.0	6.6	15	14.3	24.0	623.0	25	6.1	88.0	40.5
6	92.4	47.2	6.6	16	14.0	27.0	111.0	26	5.6	44.0	37.0
7	64.5	93.5	6.4	17	14.0	37.0	132.0	27	5.1	22.0	21.0
8	62.7	58.4	10.7	18	13.7	50.4	118.0	28	4.8	17.8	37.0
9	60.9	42.6	14.3	19	13.7	70.8	139.0	29	4.5	17.0	40.5
10	45.6	30.5	10.7	20	11.6	93.5	139.0	30	4.3	14.0	37.0
								31	3.0		31.0

*Daily discharge, in second-feet, at station No. 52 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.00	0.20	30.00	100.00	50.00	3.80	17.00	4.10	200.00	6.00	250.00	150.00
2.....	6.00	.20	41.00	50.00	60.00	3.00	21.00	3.50	250.00	8.70	200.00	200.00
3.....	6.00	.20	25.00	39.00	60.00	2.50	90.00	96.00	463.00	8.60	346.00	70.00
4.....	6.00	.20	14.00	45.00	80.00	2.50	50.00	30.00	540.00	8.40	100.00	40.00
5.....	6.40	.20	12.00	65.00	99.00	2.00	22.00	12.00	79.00	6.40	72.00	23.00
6.....	6.40	.20	8.00	70.00	80.00	1.90	21.00	9.50	61.00	6.10	50.00	21.00
7.....	6.60	.10	12.00	500.00	50.00	4.80	20.00	7.00	136.00	4.30	22.00	31.00
8.....	6.80	.10	13.00	400.00	40.00	7.60	16.00	6.20	40.00	4.30	22.00	60.00
9.....	5.80	.10	14.00	333.00	40.00	7.00	12.00	6.80	34.00	5.60	76.00	34.00
10.....	4.80	.10	16.00	105.00	37.00	6.40	10.00	7.00	26.00	7.00	531.00	21.00
11.....	3.80	.10	27.00	132.00	34.00	5.70	120.00	6.80	17.00	5.90	167.00	15.00
12.....	3.80	.10	86.00	50.00	30.00	5.00	60.00	6.60	45.00	31.00	79.00	13.00
13.....	3.60	5.80	95.00	36.00	25.00	4.40	25.00	8.80	30.00	12.00	62.00	10.00
14.....	3.60	5.10	114.00	25.00	20.00	3.80	63.00	11.00	21.00	17.00	34.00	13.00
15.....	3.30	1.00	104.00	27.00	15.00	3.60	40.00	12.00	16.00	18.00	22.00	15.00
16.....	2.50	1.40	94.00	30.00	12.00	3.50	20.00	7.00	15.00	20.00	72.00	27.00
17.....	2.00	.90	84.00	34.00	9.20	5.00	12.00	7.00	13.00	193.00	221.00	17.00
18.....	2.00	.50	118.00	37.00	6.40	7.00	11.00	11.00	11.00	35.00	69.00	11.00
19.....	1.40	.30	24.00	34.00	6.00	9.00	10.00	15.00	8.20	10.50	119.00	31.00
20.....	1.20	2.00	83.00	35.00	5.50	11.00	10.00	10.00	7.20	22.00	52.00	105.00
21.....	1.20	250.00	21.00	32.00	5.00	15.00	10.00	6.40	6.40	22.00	39.00	30.00
22.....	1.10	400.00	20.00	41.00	4.50	19.00	10.00	5.60	6.40	22.00	38.00	147.00
23.....	1.10	500.00	22.00	45.00	9.20	24.00	10.00	4.70	5.40	283.00	48.00	440.00
24.....	1.10	300.00	19.00	21.00	14.00	29.00	10.00	10.00	4.70	106.00	35.00	200.00
25.....	1.00	52.00	16.00	50.00	10.20	33.00	10.00	7.00	4.10	48.00	22.00	69.00
26.....	1.00	26.00	13.00	84.00	6.40	37.00	8.20	4.95	3.50	38.00	19.00	187.00
27.....	1.00	20.00	10.00	86.00	6.20	44.00	9.90	26.00	3.10	424.00	16.00	100.00
28.....	.90	20.00	7.20	79.00	6.10	37.00	8.20	20.00	2.90	191.00	21.00	34.00
29.....	.90	20.00	5.40	40.00	5.00	30.00	7.00	15.00	2.50	171.00	32.00	30.00
30.....	.90	-----	6.80	50.00	4.00	24.00	5.40	10.00	4.00	106.00	16.00	20.00
31.....	.90	-----	211.00	-----	4.00	-----	4.70	15.00	-----	100.00	-----	19.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 52 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	35.30	2,180	June.....	13.00	774
November.....	83.10	4,940	July.....	24.00	1,480
December.....	75.10	4,630	August.....	13.30	818
1912.			September.....	68.50	4,080
January.....	3.20	197	October.....	62.60	3,850
February.....	55.40	3,190	November.....	95.10	5,660
March.....	40.80	2,510	December.....	70.10	4,310
April.....	89.10	5,300	The year.....	46.60	33,800
May.....	26.90	1,650			

*Discharge measurements at station No. 53 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 20.....	0.47	0.01	Nov. 7.....	0.47	0.04
Sept. 28.....	.38	0	Dec. 11.....	.48	.03

NOTE.—Bed of stream of sand and gravel; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 53 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomlin, Bilikov, Goorko, Belayeff, Selitonott, and Knznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.20	0.48					
2.....			0.52				.53	0.40		0.44		
3.....			.51	0.59				.99				
4.....		(a)	.41	.82				.59		.44		
5.....	0.44	(a)	.45	.61	1.61		.58	.54	0.51	.42	0.52	0.60
6.....	.44		.42	.66		.21	.51		.53	.41		.53
7.....	.44		.46				.50	.53	.59	.40	.44	.55
8.....	.45	(a)				.30		.48	.48	.40	.46	.61
9.....		(a)	.56				.50	.50	.45		.64	.60
10.....		(a)	.52	.62	.56			.52		.43		.52
11.....							.70		.50	.41		.48
12.....	.40	(a)	.79	.61				.49	.52	.48	.56	.45
13.....	.40	(a)	1.30	.60	.55				.50	.43	.55	.40
14.....	.38	0.55	.90	.58			.50		.50	.43	.55	.40
15.....	.38	.45	.99	.50		.34	.61	.52	.50	.49	.50	.41
16.....	.35	.40		.54				.64	.44		.48	.46
17.....	.35	.40			.41	.35			.48	.43	.81	.56
18.....		.40	.66				.78	.44	.45		.92	.43
19.....			.98	.56	.41				.44	.50	.70	.47
20.....	(a)		.76	.60			.70	.55	.41	.54	.69	.58
21.....	(a)		.74	.54		.31	.74			.69	.60	.80
22.....	(a)		.66	.56				.42	.42		.55	.54
23.....	(a)		.64	.64	.41				.43	.71	.58	.88
24.....	(a)		.68	.63				.40	.41		.64	
25.....	(a)			.64	.43			.40	.40	.52		.95
26.....	(a)	.53	.55				.50	.40		.50	.52	.56
27.....	(a)	.42	.54	.73	.38	.58	.50	.39	.40	.54	.52	.89
28.....	(a)		.49	.73		.61	.51	.49	.39		.52	
29.....	(a)		.45	.73	.30	.58	.47		.38		.64	.50
30.....	(a)		.42				.49		.39		.61	.50
31.....	(a)		.49				.45			.66	.54	
							.40					

a Channel dry.

*Daily discharge, in second-feet, at station No. 53 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.05	0.01	11.....	0.10	0.10	0.05	21.....	0.05	0.13	0.35
2.....		.05	.01	12.....		.05	.15	22.....	.05	.12	.15
3.....	0.35	.05	.01	13.....		.05	.30	23.....	.05	.12	.15
4.....	.30	.10	.01	14.....		.05	.48	24.....	.05	.11	.35
5.....	.26	.10	.03	15.....		.05	.10	25.....	.05	.11	.28
6.....	.22	.10	.03	16.....		.05	.10	26.....	.05	.05	.26
7.....	.18	.15	.05	17.....		.05	.10	27.....	.05	.05	.23
8.....	.15	.18	.05	18.....		.05	.10	28.....	.05	.05	.23
9.....	.12	.13	.10	19.....		.05	.12	29.....	.05	.05	.28
10.....	.10	.10	.05	20.....		.05	.14	30.....	.05	.03	.28
								31.....	.05		.28

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.			0.05	0.15			0.05	0.05	0.40		0.05	0.40
2.			.05	.10			.05	.10	.50		.10	.90
3.			.05	.10			.05	.65	1.00		.20	.20
4.			.05	.40			.05	.10	1.30		.10	.10
5.			.05	.10	1.55		.05	.05			.05	.10
6.			.05	.15			.05	.05	.05		.05	.10
7.			.05	.35			.05	.05	.10		.05	.10
8.			.05	.30			.05	.05	.10		.10	.10
9.			.10	.20			.05	.05	.10		.15	.10
10.			.05	.10	.05		.05	.05	.05		.40	.05
11.			.35	.10			.20	.05	.05		.20	.05
12.			1.10	.10	.05		.10	.05	.05		.10	.05
13.			.50	.10			.10	.05	.05		.05	.05
14.			.65	.05			.10	.05	.05		.05	.05
15.			.40	.05			.10	.15	.05		.05	.05
16.			.25	.10			.20	.10	.05		.35	.10
17.			.15	.10			.30	.05	.05		.60	.05
18.			.60	.10			.20	.05	.05	0.05	.20	.05
19.			.30	.10			.20	.05	.05	.05	.20	.10
20.			.25	.05			.25	.05	.05	.20	.10	.30
21.			.15	.05			.20	.05	.05		.05	.05
22.			.15	.15			.10	.05	.05	.20	.10	.40
23.			.20	.15			.10	.05	.05		.15	1.50
24.			.10	.15			.20	.05	.05	.05	.10	.50
25.		0.10	.05	.20			.05	.05	.05	.05	.05	.10
26.			.05	.25		0.05	.05	.05	.05	.05	.05	.50
27.			.05	.25		.10	.05	.15	.05		.05	.30
28.			.05	.25		.05	.05	.10	.05		.15	.05
29.			.05	.20			.05	.10	.05		.10	.05
30.			.05				.05	.05	.05		.15	.05
31.			.25				.05	.10				.05

*Monthly discharge at station No. 53 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 3-31.....	0.10	5.52	June.....	0.02	1.19
November.....	.10	5.75	July.....	.10	6.15
December.....	.23	14.30	August.....	.09	5.53
1912.			September.....	.16	9.52
January.....	.03	1.84	October.....	.05	3.07
February.....	.05	2.88	November.....	.13	7.74
March.....	.20	12.30	December.....	.22	13.50
April.....	.15	8.93			
May.....	.04	2.46	The year.....	.10	75.10

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 20.....	<i>Feet.</i> 0.81	<i>Sec.-ft.</i> 0.60	Nov. 7.....	<i>Feet.</i> 0.83	<i>Sec.-ft.</i> 0.60
Sept. 28.....	.67	.09	Dec. 11.....	.83	.75

14694°—WSP 336—14—20

Daily gage height, in feet, at station No. 54 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.61	0.80					
2			0.92				.88	0.66		0.84		
3			.90	0.99				1.70				
4		(a)	.82	1.17				.95		.84		
5	0.69	(a)	.78	.98	1.32		.92	.84	1.01	.80	0.97	0.90
6	.69		.75	.98		.59	.83		1.00	.78		.88
7	.69		.81				.85	.82	1.16	.75	.82	.90
8	.70	(a)				.70		.75	.91	.74	.86	1.00
9		(a)	.89				.80	.80	.89		1.12	.99
10		(a)	.85	1.09	.98			.88		.83		.89
11	.61	(a)	1.04	1.05			1.19		.80	.80		.81
12	.61	(a)	1.10	.93	2.29			.80	.99	.93	1.08	.80
13	.60	0.86	1.29	.95			.84		.91	.88	1.06	.80
14	.60	.76	1.31	.88		.82	1.04	.85	.90	.92	.92	.80
15	.50	.66		.89				1.04	.81		.84	.86
16	.48	.60			.61	.76			.89	.90	1.22	.98
17		.51	1.04				.81	.79		.84	1.56	.84
18			1.39	.95					.82	.97	1.08	.84
19	.44		.99	.92	.60		.75	.90	.77	1.06	1.12	1.04
20	.44		1.14	.89		.80	.74			1.32	.98	1.26
21	.44		.92	.91				.75	.75		.93	.92
22	.42		.91	.99	.72			.79	.79	1.27	.94	1.35
23	.41		.93	.99				.70	.74		1.00	
24	.41			1.11	.75			.71	.71	1.10		1.58
25	.40	.95	.86				.81	.70		.90	.88	.98
26	.40	.78	.84	1.19	.70	.98	.81	.65	.68	.98	.85	1.45
27	.41		.79	1.01		1.08	.82	.88	.64		.82	
28	.38		.74	.99	.68	.98	.79		.62		1.02	.90
29	.36		.72				.80		.62		1.02	.91
30	.35		.79				.75			1.22	.89	
31							.71					

a Channel dry.

Daily discharge, in second-feet, at station No. 54 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.		0.2	0.2	11.	2.0	1.3	0.2	21.	0.4	4.5	2.7
2.		.4	.1	12.	1.2	.7	1.3	22.	.3	4.3	.9
3.	17.0	.7	.1	13.	.8	2.9	4.7	23.	.3	4.1	.9
4.	13.8	1.3	.1	14.	.4	1.3	10.0	24.	.3	3.9	2.7
5.	11.2	2.3	.1	15.	.4	1.3	21.0	25.	.2	3.7	2.7
6.	9.2	3.5	.1	16.	.5	1.3	10.6	26.	.2	1.3	2.4
7.	7.2	4.7	.1	17.	.5	2.0	11.5	27.	.2	.7	2.4
8.	5.4	5.4	.3	18.	.5	2.6	10.6	28.	.1	.5	2.0
9.	3.9	3.7	.3	19.	.5	3.7	12.4	29.	.1	.4	2.7
10.	2.7	2.4	.3	20.	.4	4.7	12.4	30.	.1	.2	2.7
								31.	.1		2.7

*Daily discharge, in second-feet, at station No. 54 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		(a)	1.80	7.00	3.00	0.20	0.50	0.60	2.50	0.60	10.00	12.00
2.....		(a)	1.60	4.00	4.00	.20	1.10	1.00	3.00	.80	15.00	18.00
3.....		(a)	1.30	2.60	5.00	.20	20.00	25.00	6.00	.80	25.00	14.00
4.....		(a)	.70	6.40	8.00	.20	10.00	2.00	10.00	.80	14.00	8.00
5.....	0.20	(a)	.40	2.40	10.60	.20	1.60	.80	2.90	.50	2.30	1.30
6.....	.20	(a)	.30	2.40	8.00	.20	.70	.80	2.70	.50	1.50	1.10
7.....	.20	(a)	.60	12.00	5.00	.20	.90	.70	6.20	.30	.70	1.30
8.....	.20	(a)	.90	11.00	4.00	.20	.70	.40	1.40	.30	1.00	2.70
9.....		(a)	1.20	10.00	3.00	.20	.50	.50	1.20	.50	5.20	2.60
10.....		(a)	.90	4.50	2.40	.30	.50	1.10	.80	.70	12.00	1.20
11.....		(a)	3.50	3.70	3.00	.40	6.90	.80	.50	.50	11.00	.61
12.....		(a)	4.70	1.70	52.50	.50	3.00	.50	2.60	1.70	4.30	.50
13.....		1.00	9.70	2.00	20.00	.60	.80	.70	1.40	1.10	3.90	.50
14.....	.40		10.30	1.10	5.00	.70	3.50	.90	1.30	1.60	1.60	.50
15.....	.10		8.00	1.20	1.00	.50	1.00	3.50	.60	1.50	.80	1.00
16.....	.10		5.80	1.50	.50	.35	.80	.50	1.20	1.30	7.80	2.40
17.....	.10		3.50	1.70	.30	.40	.60	.50	.80	4.00	19.40	.80
18.....	.10		12.70	2.00	.30	.40	.50	.90	.70	2.30	4.30	.80
19.....	.10		2.60	1.60	.30	.40	.40	1.30	.40	3.90	5.20	3.50
20.....		9.00	5.70	1.20	.30	.50	.30	.40	.30	10.60	2.50	8.90
21.....		20.00	1.60	1.40	.30	.80	.30	.40	.30	10.00	1.70	1.60
22.....		40.00	1.40	2.60	.30	1.10	.40	.30	.50	9.20	1.90	11.50
23.....		50.00	1.70	2.60	.30	1.40	.50	.20	.30	20.00	2.70	40.00
24.....		35.00	1.40	4.90	.30	1.70	.60	.20	.20	4.70	1.90	20.20
25.....		2.00	1.00	6.00	.30	2.00	.60	.20	.20	1.30	1.10	2.40
26.....		5.40	.80	7.00	.20	2.40	.60	.10	.20	2.50	.90	15.00
27.....		3.00	.50	2.90	.20	4.30	.70	1.10	.20	50.00	.70	20.00
28.....		2.00	.30	2.60	.20	2.40	.50	1.00	.20	40.00	3.10	1.30
29.....		2.00	.30	2.00	.20	2.00	.50	.80	.20	25.00	3.10	1.40
30.....			.50	3.00	.20	2.00	.40	.50	.50	7.80	1.20	1.00
31.....			16.00		.20		.20	.30		5.00		1.00

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 54 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 3-31.....	2.74	158.0	June.....	0.90	53.60
November.....	2.33	139.0	July.....	1.92	118
December.....	.39	241.0	August.....	1.55	95.30
1912.			September.....	1.64	97.80
January.....	.10	6.15	October.....	6.77	416.00
February.....	5.87	338.00	November.....	5.53	329
March.....	3.28	202	December.....	5.39	331
April.....	3.83	228	The year.....		3.43 2,490.00
May.....	4.48	275			

*Discharge measurements at station No. 55 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>S<sup>c</sup></i>
Aug. 20.....	1.11	0.21	Nov. 7.....	1.18	.28
Sept. 28.....	.97	0	Dec. 11.....	1.16	.29

NOTE.—Bed of stream of gravel and cobbles; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 55 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.90	1.11					
2.....			1.25				1.22	1.02		1.14		
3.....			1.20	1.26				1.62				
4.....		(a)	1.11	1.44				1.28		1.12		
5.....	1.00	(a)	1.16	1.26	1.48		1.28	1.20	1.35	1.08	1.31	1.26
6.....	1.00		1.08	1.18		.84	1.16		1.32	1.07		1.20
7.....	1.00		1.14				1.20	1.12	1.45	1.03	1.17	1.20
8.....	1.01	(a)				.89		1.09	1.26	1.04	1.18	1.30
9.....		(a)	1.21				1.11	1.09	1.21		1.42	1.25
10.....		(a)	1.15	1.40	1.05			1.18		1.10		1.20
11.....	.94	(a)	1.36	1.35			1.49		1.10	1.07		1.16
12.....	.94	(a)	1.40	1.51	1.04			1.10	1.29	1.22	1.41	1.10
13.....	.92	1.12	1.51	1.15			1.19		1.29	1.16	1.40	1.09
14.....	.92	1.05	1.61	1.19		.95	1.34	1.14	1.27	1.22	1.26	1.10
15.....	.92	.98		1.19				1.26	1.18		1.19	1.14
16.....	.92	.95			1.02	1.00		1.10	1.21	1.19	1.51	1.25
17.....		.91	1.34				1.13		1.19		1.65	1.04
18.....			1.69	1.26	.99			1.14	1.17	1.26	1.42	1.11
19.....	.92		1.26	1.26			1.10		1.11	1.36	1.46	1.30
20.....	.92		1.39	1.25		1.00	1.09			1.56	1.31	1.52
21.....	.92		1.22	1.23				1.08	1.10		1.29	1.30
22.....	.91		1.03	1.41	1.00				1.11	1.51	1.29	1.64
23.....	.90		1.24	1.39				1.04	1.08		1.38	
24.....	.90			1.37	1.10			1.05	1.04	1.43		1.64
25.....	.89	1.28	.88				1.15	1.02		1.27	1.20	1.31
26.....	.89	1.10	1.19	1.43	1.00	1.21	1.13	1.01	1.01	1.31	1.18	1.55
27.....	.89		1.12	1.39		1.31	1.12	1.11	1.00		1.15	
28.....	.88		1.09	1.34	.98	1.21	1.09		.99		1.36	1.21
29.....	.86		1.06				1.10		.99		1.35	1.20
30.....	.86		1.16				1.05			1.48	1.20	
31.....							1.02					

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 55 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.01	0.05	11.....	1.45	0.70	0.10	21.....	0.05	3.40	0.02
2.....		.05	.01	12.....	.70	.34	1.15	22.....	.01	2.64	.02
3.....	9.20	.10	.01	13.....	.40	2.05	3.52	23.....	.01	2.65	.02
4.....	8.00	.46	.01	14.....	.10	1.00	6.80	24.....	.01	1.60	.02
5.....	6.80	1.00	.01	15.....	.10	1.00	11.60	25.....	.01	1.30	.02
6.....	5.60	1.75	.02	16.....	.10	1.00	.02	26.....	.01	.58	.02
7.....	4.40	3.40	.02	17.....	.10	1.45	.05	27.....	.01	.22	.02
8.....	3.40	4.18	.34	18.....	.10	1.98	.03	28.....	.01	.16	.01
9.....	2.42	2.64	.58	19.....	.10	2.86	.08	29.....	.01	.10	.02
10.....	1.90	1.45	.34	20.....	.08	3.96	.08	30.....	.01	.08	.02
								31.....	.01		.02



*Daily discharge, in second-feet, at station No. 55 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		(a)	1.00	5.00	1.00	.....	0.20	0.10	2.00	0.20	5.00	4.00
2.....		(a)	1.40	3.00	2.00	.....	1.00	.20	3.00	.30	5.00	8.00
3.....		(a)	.70	1.60	3.00	.....	5.00	9.70	5.00	.40	6.00	5.00
4.....		(a)	.20	5.40	4.00	.....	3.00	1.90	7.00	.20	4.00	3.00
5.....		(a)	.40	1.60	6.30	.....	1.90	.70	3.30	.10	2.40	1.60
6.....		(a)	.10	.60	5.00	.....	.50	.40	2.60	.10	.50	.70
7.....		(a)	.30	10.00	1.00	.....	.70	.20	5.60	.10	.50	.70
8.....		(a)	.60	9.00	.50	.....	.40	.10	1.60	.10	.60	2.20
9.....		(a)	.80	8.00	.20	.....	.20	.10	.80	.10	4.90	1.40
10.....		(a)	.40	4.40	.10	.....	.20	.60	.50	.10	9.00	.70
11.....		(a)	3.50	3.30	.10	.....	6.60	.40	.10	.10	7.00	.50
12.....		(a)	4.40	7.00	.10	.....	2.00	.10	2.00	1.00	4.60	.10
13.....			0.20	7.00	.40	.10	.60	.20	2.00	.50	4.40	.10
14.....			.10	9.40	.60	.10	3.10	.30	1.70	1.00	1.60	.10
15.....			.10	7.30	.60	.10	.60	1.60	.60	.80	.60	.30
16.....			.10	5.20	.50	.10	.40	.10	.80	.60	7.00	1.40
17.....			.10	3.10	.80	.10	.30	.20	.60	2.00	10.00	.60
18.....			.10	11.00	1.60	.10	.20	.30	.50	1.60	4.90	.20
19.....			.10	1.60	1.60	.10	.10	.50	.20	3.50	5.80	2.20
20.....			.30	4.20	1.40	.10	.10	.30	.20	8.20	2.40	7.30
21.....			2.00	1.00	1.10	.10	.10	.10	.10	7.60	2.00	2.20
22.....			6.00	1.10	4.60	.10	.10	.10	.20	7.00	2.00	10.00
23.....			11.00	1.30	4.20	.10	.20	.10	.10	10.00	4.00	11.00
24.....			5.00	1.10	3.70	.10	.30	.10	.10	5.10	2.40	10.00
25.....			1.90	.80	4.40	.10	.40	.10	.10	1.70	.70	2.40
26.....			.10	.60	5.10	.10	0.80	.30	.20	2.40	.60	8.00
27.....			.10	.20	4.20	.10	2.40	.20	.10	11.00	.40	4.00
28.....			.10	.10	3.10	.10	.80	.10	.20	10.00	8.50	.80
29.....			.10	.10	1.00	.10	.10	.10	.10	8.00	3.30	.70
30.....			.50	1.00	.10	.10	.10	.10	.10	6.30	.70	.50
31.....			8.00		.10	.10	.10	.20		5.65		.50

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 55 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 3-31.....	1.56	89.50	June.....	0.30	17.90
November.....	1.45	86.50	July.....	.94	57.80
December.....	.81	49.80	August.....	.63	38.70
1912.			September.....	1.37	81.50
January.....	.10	6.15	October.....	3.09	190.00
February.....	.94	54.10	November.....	3.53	210.00
March.....	2.46	154.00	December.....	2.91	179.00
April.....	3.29	196.00			
May.....	.81	49.80	The year.....	1.70	1,230.00

*Discharge measurements at station No. 56 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 20.....	0.54	0	Nov. 7.....	0.41	0
Sept. 28.....	.40	0	Dec. 11.....	.46	0

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 56 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.38	0.50					
2.....			.62				.61	0.52		0.44		
3.....			.62	.72				1.05				
4.....		(a)	.52	.52				.68		.42		
5.....	0.51	(a)	.52	.68	0.92		.65	.64	0.65	.42	0.52	0.47
6.....	.51		.55	.68		.30	.51		.70	.42		.48
7.....	.52		1.84				.58	.55	.73	.41	.41	.52
8.....	.54	(a)				.30		.55	.67	.41	.44	.52
9.....		(a)	.64				.55	.57	.65		.60	.50
10.....		(a)	.61	.70	.65			.64		.41		.49
11.....	(a)	(a)	.72	.68			.79		.58	.40		.44
12.....	(a)	(a)	.69	.63	.61			.48	.69	.45	.55	.43
13.....	(a)	(a)	.89	.65			.59		.67	.41	.54	.42
14.....	(a)	(a)	.99	.61		.46	.70	.60	.69	.42	.49	.44
15.....	(a)	(a)		.62			.70	.70	.54		.44	.48
16.....	(a)	(a)			.56	.50			.55	.44	.69	.53
17.....		(a)	.66				.65	.54	.52		.72	.49
18.....			1.03	.64	(a)				.51	.52	.61	.45
19.....	(a)		.71	.68			.55	.62	.51	.53	.58	.54
20.....	(a)	.65	.72	.61		.51	.54			.63	.51	.62
21.....	(a)		.62	.69				.54	.50		.51	.51
22.....	.61		.70	.52					.50	.60	.51	.64
23.....	(a)		.64	.68				.54	.50		.54	
24.....	(a)			.70	.53			.51	.50	.54		.67
25.....	(a)		.64				.60	.52		.43	.46	.53
26.....	(a)		.62	.79	.45	.58	.59	.51	.50	.50	.45	1.10
27.....	(a)		.60	.73		.68	.58	.58	.42		.45	
28.....	(a)		.54	.70	.40	.58	.57		.40		.57	.50
29.....	(a)		.52				.57		.40		.55	.50
30.....	(a)		.59				.55			.61	.47	
31.....							.53					

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 56 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.10	(a)	11.....	0.18	0.20	0.01	21.....	0.10	0.44	0.40
2.....		.14	(a)	12.....	.12	.12	.20	22.....	.10	.40	.28
3.....		.18	(a)	13.....	.05	.56	.60	23.....	.10	.36	.20
4.....		.24	(a)	14.....	.01	.28	1.10	24.....	.10	.32	.40
5.....		.32	(a)	15.....	.02	.24	3.38	25.....	.10	.28	.10
6.....		.40	(a)	16.....	.05	.24	1.00	26.....	.10	.03	.10
7.....		.60	(a)	17.....	.06	.32	1.22	27.....	.02	.01	.05
8.....		.65	(a)	18.....	.08	.40	1.05	28.....	.02	.01	.05
9.....	0.36	.52	(a)	19.....	.10	.44	1.22	29.....	.02	.01	.10
10.....	.24	.36	0.01	20.....	.10	.52	1.22	30.....	.02	.01	.10
								31.....	.02		.10

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 56 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.		(a)	0.20	1.50			0.20	0.10	1.00			
2.		(a)	.30	1.00			.20	.10	2.00			
3.		(a)	.30	.70			.60	2.60	3.00			
4.		(a)	.20	.60			.50	.50	5.00			
5.		(a)	.20	.50	1.80		.40	.40	.40			
6.		(a)	.10	.50			.30	.20	.60			
7.		(a)	7.30	4.00			.20	.10	.70			
8.	0.10	(a)	4.00	3.00			.20	.10	.50			
9.		(a)	.40	2.50			.10	.10	.40		0.20	
10.		(a)	.20	.60	.40		.10	.40	.30			
11.		(a)	.70	.50			1.00	.30	.20			
12.		(a)	.60	.30	.20		.50	.30	.60		.10	
13.		(a)	1.60	.40			.20	.30	.50		.10	
14.		(a)	2.20	.20			.60	.20	.60			
15.		(a)	1.60	.30			.50	.60	.10			
16.		(a)	1.00	.40	.10		.50	.20	.10		.60	0.10
17.		(a)	.40	.60			.40	.10	.10		.70	
18.		(a)	2.50	.40			.30	.20	.10		.20	
19.		(a)	.60	.50			.10	.30	.10	0.10	.20	.10
20.		0.40	.70	.20			.10	.20	.10	.30		.30
21.		1.20	.30	.60			.10	.10	.10			
22.		5.00	.20	.60			.10	.10	.10	.20		.40
23.		7.50	.40	.50			.20	.10	.10		.10	
24.		1.50	.40	.60	.10		.30	.10	.10	.10		.50
25.		.50	.40	.80			.20	.10	.10			.10
26.		.20	.30	1.00		0.20	.20	.10	.10			2.90
27.		.10	.20	.80		.50	.20	.20	.10			
28.		.10	.10	.60		.20	.10	.20	.10		.10	
29.		.10	.10	.50			.10	.10	.10		.10	
30.			.20	.40			.10	.10	.20	.20		
31.			3.50				.10	.10				

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 56 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 9-31.....	0.09	4.11	June.....	0.15	8.93
November.....	.29	17.30	July.....	.28	17.20
December.....	.42	25.60	August.....	.28	17.20
1912.			September.....	.58	34.50
January.....	.05	3.07	October.....	.50	30.70
February.....	.57	32.80	November.....	.40	23.80
March.....	1.01	62.10	December.....	.40	24.60
April.....	.84	50.00	The year.....	.44	323.00
May.....	.30	18.40			

*Discharge measurements at station No. 57 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 20.....	<i>Feet.</i> 0.85	<i>Sec.-ft.</i> 0.05	Nov. 7.....	<i>Feet.</i> 0.88	<i>Sec.-ft.</i> 0.12
Sept. 28.....	.75	0	Dec. 11.....	.88	.12

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 57 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.70	•0.85					
2.....			0.80				.93	0.80		0.86		
3.....			.90	0.88				1.20				
4.....		(a)	.86	1.10				.93		.84		
5.....	0.75	(a)	.81	.91	1.20		.95	.91	0.97	.82	0.93	0.90
6.....	.75		.80	.91		.61	.88		.95	.82		.90
7.....	.75		.90				.90	.88	1.00	.80	.88	.90
8.....	.78	(a)				.64		.82	.91	.80	.90	.91
9.....		(*)	.91				.82	.88	.88		1.00	.91
10.....		(a)	.82	.96	.81			.89		.83		.90
11.....	.71	(a)	1.01	.98			1.02		.81	.81		.88
12.....	.71	(a)	1.01	.91	.80			.84	.91	.90	1.02	.85
13.....	.70	0.89	1.11	.91			.90		.88	.86	1.00	.82
14.....	.70	.79	1.21	.89		.75	.98	.89	.87	.90	.93	.85
15.....	.68	.74		.90				.92	.89		.90	.86
16.....	.60	.72			.76	.77				.90	1.08	.91
17.....		.71	.77				.84	.83	.87		1.21	.88
18.....			1.21	.91	.81				.84	.93	1.02	.88
19.....	(a)		.94	.97			.82	.90	.82	.99	1.03	.95
20.....	(a)		.97	.91		.76	.81			1.12	.95	1.18
21.....	(a)		.91	.94				.82	.82		.94	.96
22.....	(a)		.89	1.00	.78				.83	1.08	.93	1.29
23.....	(a)		.91	.97				.81	.81		.98	
24.....	(a)			.98	.81			.94	.80	1.01		1.24
25.....	(a)	.90	.91				.88	.90		.90	.90	.94
26.....	(a)	.79	.88	1.07	.78	.81	.88	.80	.80	.90	.90	1.20
27.....	(a)		.85	.98		.95	.88	.84	.78		.89	
28.....	(a)		.79	.96	.75	.81	.81		.74		.98	.92
29.....	(a)		.76				.83		.72		.97	.90
30.....	(a)		.83				.81			1.00	.91	
31.....							.80					

\* Channel dry.

Daily discharge, in second-feet, at station No. 57 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.03	0.01	11.....	0.20	0.12	0.05	21.....	0.05	0.40	0.13
2.....		.05	.01	12.....	.13	.05	.22	22.....	.05	.40	.10
3.....		.10	.01	13.....	.10	.25	.61	23.....	.05	.40	.10
4.....		.11	.01	14.....	.05	.15	1.08	24.....	.05	.38	.10
5.....		.15	.02	15.....	.05	.15	2.40	25.....	.02	.38	.05
6.....		.18	.01	16.....	.05	.15	.35	26.....	.02	.05	.05
7.....		.40	.03	17.....	.05	.20	.46	27.....	.02	.02	.05
8.....		.49	.05	18.....	.05	.25	.35	28.....	.01	.05	.05
9.....	0.25	.32	.10	19.....	.05	.32	.46	29.....	.01	.05	.05
10.....	.28	.20	.05	20.....	.05	.40	.46	30.....	.01	.01	.05
								31.....	.01		.05

Daily discharge, in second-feet, at station No. 57 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		(a)	0.05	0.30	0.20		0.10	0.05	0.40	0.10	0.30	0.40
2.....		(a)	.05	.20	.30		.20	.05	.50	.10	.20	1.00
3.....		(a)	.15	.15	.40		.40	1.00	.60	.10	1.00	.30
4.....		(a)	.10	.70	.60		.30	.20	.70	.10	.40	.20
5.....	0.05	(a)	.05	.15	1.00		.25	.15	.30	.05	.20	.15
6.....	.05	(a)	.05	.15	.60		.15	.15	.25	.05	.20	.15
7.....	.05	(a)	.15	.90	.30		.15	.15	.40	.05	.15	.15
8.....	.05	(a)	.15	.80	.10		.10	.05	.15	.05	.15	.15
9.....		(a)	.15	.70	.05		.05	.15	.15	.10	.40	.15
10.....		(a)	.05	.30	.05		.05	.15	.10	.10		.15
11.....			.45	.35	.05		.45	.10	.05	.05		.15
12.....		(a)	.45	.15	.05		.30	.10	.15	.15	.45	.10
13.....		0.15	.75	.15	.05		.15	.10	.15	.10	.40	.05
14.....		.05	.05	.15	.05	0.05	.35	.15	.10	.15	.20	.10
15.....		(a)	.05	.15	.05		.20	.20	.15	.15	.15	.10
16.....		(a)	.05	.15	.05	.05	.10	.10	.10	.15	.65	.15
17.....		(a)	.05	.15	.05		.05	.05	.10	.50	1.00	.15
18.....		(a)	.05	.15	.05		.05	.10	.10	.20	.45	.15
19.....		(a)	.25	.30	.05		.05	.15	.05	.35	.50	.25
20.....		.20	.30	.15	.05	.05	.05	.10	.05	.75	.25	.95
21.....		.50	.15	.25	.05		.05	.05	.05	.70	.25	.30
22.....		1.00	.15	.40	.05		.05	.05	.10	.65	.20	1.35
23.....		1.40	.15	.30	.05		.05	.05	.05	1.10	.35	2.50
24.....		.80	.15	.35	.05		.20	.25	.05	.45	.20	1.15
25.....		.15	.15	.60	.05		.15	.15	.05	.15	.15	.25
26.....		.10	.15	.90	.05	.05	.15	.05	.05	.15	.15	1.00
27.....		.10	.10	.35	.05	.25	.15	.10	.05	1.40	.15	.40
28.....		.10	.10	.30	.05	.05	.05	.10	.05	1.00	.35	.20
29.....		.10	.10	.20	.05		.05	.10	.05	.70	.30	.15
30.....			.10	.10	.05		.05	.10	.10	.40	.15	.10
31.....			.80		.05		.05	.10		.20		.10

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Monthly discharge at station No. 57 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 9-31.....	0.07	3.20	June.....	0.05	2.98
November.....	.21	12.30	July.....	.15	9.22
December.....	.24	14.90	August.....	.14	8.61
1912.			September.....	.17	10.10
January.....	.02	1.23	October.....	.33	20.30
February.....	.16	9.20	November.....	.32	19.00
March.....	.24	14.80	December.....	.40	24.60
April.....	.33	19.60	The year.....	.21	149.00
May.....	.15	9.22			

*Discharge measurements at station No. 58 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 20.....	<i>Feet.</i> 0.75	<i>Sec. feet.</i> 0.08	Nov. 7.....	<i>Feet.</i> 0.80	<i>Sec.-ft.</i> 0.16
Sept. 28.....	.60	0	Dec. 11.....	.76	.10

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 58 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Blikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.50	0.72					
2.....			0.85				.83	0.69		0.78		
3.....			.82	0.82				1.25				
4.....		(a)	.81	1.02				.87		.78		
5.....	0.70	(a)	.72	.92	1.19		.88	.82	0.91	.74	0.92	0.88
6.....	.70		.74	.94		.48	.77		.90	.74		.83
7.....	.70		.83				.90	.79	1.02	.72	.83	.85
8.....	.72	(a)				.50		.74	.84	.70	.83	.90
9.....		(a)	.59				.78	.80	.81		1.02	.90
10.....		(a)	.81	.89	.80			.81		.71		.89
11.....	.62	(a)	.96	.72			.99		.78	.70		.86
12.....	.62	(a)	.96	.92	.78			.75	.90	.82	1.01	.82
13.....	.61	0.74	1.19	.91			.98		.86	.78	1.00	.80
14.....	.61	.65	1.26	.78		.60	.89	.80	.83	.82	.90	.82
15.....	.58	.60		.78				.85	.80		.84	.86
16.....	.55	.55			.69	.68			.81	.80	1.14	.91
17.....		.51	.92				.82	.74	.80		1.26	.84
18.....			1.25	.91	.68				.79	.86	.88	.80
19.....	(a)		.85	.92			.72	.80	.75	.91	1.02	1.00
20.....	(a)		1.01	.88		.70	.71			1.10	.95	1.22
21.....	(a)		.82	.89				.72	.74		.94	.92
22.....	(a)		.80	.96	.68				.74	1.04	.93	1.36
23.....	(a)		.85	.97				.70	.72		1.00	
24.....	(a)			1.01	.71			.70	.70	.98		1.22
25.....	(a)	.81	.81				.80	.68		.83	.88	.90
26.....	(a)	.70	.82	1.19	.67	.78	.80	.74	.66	.78	.85	1.19
27.....	(a)		.76	1.11		.88	.79		.64		.84	.88
28.....	(a)		.72	1.09	.60	.78	.73		.61		.98	.89
29.....	(a)		.69				.78		.60		.98	
30.....	(a)		.76				.75			1.03	.89	
31.....							.70					

a Channel dry.

*Daily discharge, in second-feet, at station No. 58 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.05	0.05	11.....	0.28	0.20	0.03	21.....	0.05	0.66	0.84
2.....		.05	.03	12.....	.20	.10	.28	22.....	.05	.54	.60
3.....		.10	.03	13.....	.12	.42	1.04	23.....	.05	.48	.42
4.....		.15	.02	14.....	.10	.25	2.02	24.....	.05	.42	.54
5.....		.22	.03	15.....	.10	.25	6.22	25.....	.05	.30	.36
6.....		.30	.03	16.....	.10	.28	1.74	26.....	.05	.25	.30
7.....		.78	.02	17.....	.10	.30	1.95	27.....	.05	.10	.30
8.....		1.04	.05	18.....	.10	.36	1.88	28.....	.05	.10	.30
9.....	0.60	.66	.10	19.....	.10	.60	1.95	29.....	.02	.05	.36
10.....	.42	.36	.05	20.....	.05	.78	1.95	30.....	.02	.05	.30
								31.....	.01		.30



Daily gage height, in feet, at station No. 59 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.51	0.70					
2			0.86				.81	0.61		0.72		
3			.80	0.79				1.25				
4		(a)	.72	.98				.82		.71		
5	0.62	(a)	.72	.88	1.16		.85	.81	0.90	.68	0.83	0.93
6	.62		.68	.88		.49	.71		.87	.68		.75
7	.62		.75				.78	.74	1.00	.64	.74	.78
8	.64	(a)				.50		.70	.81	.62	.75	.83
9		(a)	.81				.72	.72	.80		.96	.60
10		(a)	.78	.86	.78			.76		.67		.78
11	.62	(a)	.82	.88			.99		.75	.64		.73
12	.62	(a)	.91	.85	.66			.71	.84	.75	.92	.70
13	.60	0.72	1.06	.84			.80		.79	.72	.91	.69
14	.60	.60	1.19	.90		.60	.90	.76	.81	.76	.82	.70
15	.54	.50		.93				.83	.72		.77	.71
16	.49	.46			.68	.63			.79	.74	1.06	.82
17		.41	.84				.88	.70		.75	1.28	.76
18			1.21	.84	.55			.71	.83	.92	.70	
19	.48		.81	.85			.70	.79	.70	.89	.95	.82
20	.45		.79	.88		.69	.69			1.02	.87	.95
21	.45		.92	.94				.68	.69		.84	.84
22	.44		.73	.90	.61				.70	.99	.83	1.08
23	.42		.77	.90				.64	.65		.90	
24	.42			1.05	.62			.64	.64	.95		.81
25	.41	.85	.80				.76	.62		.82	.78	.87
26	.41	.71	.79	1.22	.57	.78	.74	.60	.61	.80	.75	.86
27	.42		.76	1.16		.88	.62	.70	.60		.72	
28	.38		.69	1.15	.55	.78	.70		.59		.88	.82
29	(a)		.66				.71		.59		.87	.81
30	(a)		.72				.68			.98	.77	
31							.64					

a Channel dry.

Daily discharge, in second-feet, at station No. 59 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1		0.05	0.11	11	0.92	0.48	0.12	21	0.12	1.32	1.24
2		.11	.11	12	.60	.20	.40	22	.11	1.24	1.08
3		.18	.05	13	.44	1.08	1.00	23	.10	1.16	1.08
4		.36	.10	14	.28	.60	2.05	24	.10	1.08	.76
5		.56	.10	15	.28	.60	10.20	25	.05	1.00	.60
6		.84	.10	16	.24	.60	2.57	26	.05	.36	.56
7		1.53	.10	17	.24	.76	2.96	27	.05	.28	.52
8		2.70	.17	18	.20	1.00	1.92	28	.05	.24	.52
9		1.66	.20	19	.20	1.24	2.96	29	.05	.17	.76
10	1.32	.92	.17	20	.17	1.53	2.96	30	.05	.12	.68
								31	.05		.60



Daily discharge, in second-feet, at station No. 59 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		(a)	0.60	1.00	2.00	.....	0.20	0.10	0.80	0.20	2.00	2.00
2.....		(a)	1.10	.80	2.00	.....	.70	.05	1.00	.30	2.50	3.00
3.....		(a)	.60	.55	3.00	.....	2.50	6.00	2.50	.30	3.00	2.00
4.....		(a)	.30	2.40	4.00	.....	1.50	.75	4.00	.25	1.00	2.00
5.....	0.10	(a)	.30	1.25	4.80	.....	1.00	.70	1.40	.15	.85	1.80
6.....	.10	(a)	.20	1.25	3.50	.....	.25	.40	1.15	.15	.....	.40
7.....	.10	(a)	.40	4.00	2.00	.....	.50	.35	2.70	.10	.35	.50
8.....	.10	(a)	.50	3.00	1.00	.....	.40	.20	.70	.10	.40	.85
9.....		(a)	.70	2.50	.80	.....	.30	.30	.60	.10	2.20	.60
10.....		(a)	.50	1.10	.50	.....	.30	.45	.50	.15	5.00	.50
11.....	.10	(a)	.80	1.25	.30	.....	2.60	.40	.40	.10	2.50	.30
12.....	.10	(a)	1.55	1.00	.15	.....	1.50	.25	.90	.40	1.65	.20
13.....	.05	0.30	3.50	.90	.15	.....	.60	.40	.55	.30	1.55	.20
14.....	.05	.05	5.20	1.40	.20	0.05	1.40	.45	.70	.45	.75	.20
15.....		.05	3.00	1.80	.20	.....	1.30	.85	.30	.40	.50	.25
16.....		.05	1.50	1.50	.20	.10	1.30	.30	.55	.35	3.50	.75
17.....		.05	.90	2.20	.10	.....	1.25	.20	.40	1.30	6.40	.45
18.....		.05	5.45	.90	.05	.....	.60	.40	.25	.85	1.65	.20
19.....		.05	.70	1.00	.05	.....	.20	.55	.20	1.30	2.05	.75
20.....		.20	.55	1.25	.05	.20	.20	.30	.20	2.95	1.15	2.05
21.....		2.00	1.65	1.90	.10	.....	.20	.20	.20	2.80	.90	.90
22.....		5.00	.30	1.40	.10	.....	.30	.10	.20	2.60	.85	3.75
23.....		6.00	.50	1.40	.10	.....	.30	.10	.10	3.00	1.40	5.00
24.....		3.00	.50	3.35	.10	.....	.40	.10	.10	2.05	1.00	.70
25.....		1.00	.60	4.40	.10	.....	.45	.10	.10	.75	.50	1.15
26.....		.25	.55	5.60	.05	.50	.35	.05	.05	.60	.40	1.10
27.....		.10	.45	4.80	.05	1.25	.10	.20	.05	6.00	.30	.90
28.....		.10	.20	4.65	.05	.50	.20	.20	.05	4.00	1.25	.75
29.....		.10	.15	3.00	.05	.....	.25	.10	.05	4.00	1.15	.70
30.....		.....	.30	2.00	.05	.....	.15	.10	.20	2.45	.50	.50
31.....		.....	2.50	.....	.05	.....	.10	.10	.....	2.00	.....	.50

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Monthly discharge at station No. 59 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 10-31.....	0.26	11.20	June.....	0.15	8.93
November.....	.77	45.40	July.....	.69	42.40
December.....	1.18	72.70	August.....	.48	29.50
1912.			September.....	.70	41.70
January.....	.05	3.07	October.....	1.30	79.90
February.....	.63	36.20	November.....	1.58	94.00
March.....	1.16	71.30	December.....	1.13	69.50
April.....	2.12	126.00	The year.....	.90	654.00
May.....	.83	51.00			

*Discharge measurements at station No. 60 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 20 .....	0.55	0.03	Nov. 7 .....	0.56	0.04
Sept. 28 .....	.34	0	Dec. 11 .....	.54	.03

NOTE.—Bed of stream sand, gravel, and small cobbles; probably shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 60 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltontott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.36	0.51					
2.			0.65				.59	0.48		0.50		
3.			.68	0.66				.89				
4.		(a)	.66	.86				.66		.54		
5.	0.44	(a)	.60	.66	0.93		.62	.63	0.66	.50	0.62	0.49
6.	.44		.55	.69		.35	.56		.63	.50		.54
7.	.44		.61				.55	.59	.71	.48	.56	.58
8.	.45	(a)				.41		.55	.60	.46	.80	.42
9.		(a)	.64				.58	.50	.58		.72	.60
10.		(a)	.62	.69	.56			.60		.48		.59
11.	(a)	(a)	.70	.68			.71		.55	.44		.56
12.	(a)	(a)	.70	.65	.51			.50	.61	.58	.70	.50
13.	(a)	0.50	.96	.66			.61		.68	.47	.66	.48
14.	(a)	.45	1.03	.61		.51	.69	.60	.60	.58	.60	.50
15.	(a)	.40		.60				.66	.53		.50	.52
16.	(a)	.32			.41	.50			.61	.58	.75	.64
17.		(a)	.64				.64	.55	.55		.84	.59
18.			1.05	.66	.39				.52	.66	.71	.52
19.	(a)		.66	.66			.58	.60	.50	.66	.70	.61
20.	(a)		.70	.68		.58	.56			.76	.65	.75
21.	(a)		.62	.69				.51	.48		.64	.67
22.	(a)		.61	.75	.46				.48	.72	.64	.85
23.	(a)		.63	.73				.48	.45		.68	
24.	(a)			.81	.51			.48	.42	.68		.80
25.	(a)	.60	.64				.61	.44		.59	.60	.64
26.	(a)	.52	.62	.98	.40	.58	.67	.40	.40	.60	.59	.64
27.	(a)		.61	.89		.70	.55	.50	.38		.58	
28.	(a)		.56	.85	.39	.58	.51		.34		.69	.61
29.	(a)		.53				.57		.34		.67	.63
30.	(a)		.56				.54			.78	.60	
31.							.50					

a Channel dry.

*Daily discharge, in second-feet, at station No. 60 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.		0.01	0.01	11.	0.14	0.22	0.01	21.	0.01	0.86	1.66
2.		.01	.01	12.	.10	.10	.14	22.	.01	.80	1.52
3.		.05	.01	13.	.10	.30	.74	23.	.01	.74	.62
4.		.10	.01	14.	.03	.22	1.66	24.	.01	.68	1.38
5.		.10	.01	15.	.03	.18	6.02	25.	.01	.62	1.04
6.		.26	.01	16.	.03	.14	2.50	26.	.01	.14	.56
7.		.50	.01	17.	.03	.14	2.90	27.	.01	.02	.42
8.		.68	.01	18.	.05	.14	2.50	28.	.01	.02	.42
9.		.50	.05	19.	.05	.50	2.90	29.	.01	.01	.62
10.	0.30	.38	.01	20.	.03	.98	2.90	30.	.01	.01	.56
								31.	.01		.50

Daily discharge, in second-feet, at station No. 60 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			0.30	0.80			0.10	0.10	0.80	0.10	1.00	0.70
2.....			.30	.50			.10	.10	1.00	.10	1.00	1.00
3.....			.40	.30			.30	1.70	1.50	.10	2.00	.50
4.....		(a)	.30	1.50			.20	.30	2.00	.10	1.00	.20
5.....	(a)	(a)	.10	.30	2.00		.20	.20	.30	.10	.20	.10
6.....	(a)		.05	.50			.10	.10	.20	.10	.10	.10
7.....	(a)		.10	2.50			.05	.10	.60	.10	.10	.10
8.....	(a)	(a)	.20	2.00			.10	.05	.10	.10	.10	.20
9.....		(a)	.30	1.50			.10	.10	.10	.10	.60	.10
10.....		(a)	.20	.50	.10		.10	.10	.10	.10	2.50	.10
11.....	(a)	(a)	.50	.40			.60	.10	.05	.10	2.00	.10
12.....	(a)	(a)	.50	.30			.30	.10	.10	.10	.50	.10
13.....	(a)	(a)	2.20	.30			.10	.10	.40	.10	.30	.10
14.....	(a)	(a)	2.70	.10			.50	.10	.10	.10	.10	.10
15.....	(a)	(a)	1.00	.10			.40	.30	.10	.10	.10	.10
16.....	(a)	(a)	.50	.20			.40	.05	.10	.10	.80	.30
17.....		(a)	.30	.40			.30	.05	.05	.70	1.40	.10
18.....			2.90	.30			.20	.10	.05	.30	.60	.10
19.....	(a)		.30	.30			.10	.10	.05	.30	.50	.10
20.....	(a)		.50	.40		0.10	.10	.10	.05	.90	.30	.80
21.....	(a)		.20	.50			.10	.10	.05	1.10	.30	.40
22.....	(a)		.10	.80			.10	.10	.65	.60	.30	1.40
23.....	(a)		.20	.70			.10	.10	.05	1.50	.40	3.00
24.....	(a)		.20	1.20			.10	.10	.05	.40	.20	1.10
25.....	(a)	0.1	.30	1.80			.10	.10	.05	.10	.10	.30
26.....	(a)		.20	2.40		.10	.40	.10	.05	.10	.10	.30
27.....	(a)		.10	1.70		.50	.05	.10	.05	3.30	.10	.20
28.....	(a)		.10	1.40		.10	.10	.10	.05	2.00	.50	.10
29.....	(a)		.10	.80			.10	.10	.05	2.00	.40	.20
30.....	(a)		.10	.30			.10	.10	.10	1.00	.10	.10
31.....			2.00				.10	.10		.70		.10

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 60 at 2,700-foot level, near Hilo, Hawaii, for 1911–12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 10–31.....	0.05	1.98	June.....	0.10	5.95
November.....	.31	18.70	July.....	.18	11.10
December.....	1.02	62.90	August.....	.16	9.84
1912.			September.....	.28	16.70
January.....	.01	.61	October.....	.54	33.20
February.....	.05	2.88	November.....	.59	35.10
March.....	.56	34.40	December.....	.39	24.00
April.....	.83	49.40	The year.....	.32	235.00
May.....	.20	12.30			

Discharge measurements at station No. 61 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 20.....	0.33	0	Nov. 7.....	0.21	0.01
Sept. 21.....	.20		Dec. 11.....	.24	.01

NOTE.—Bed of stream of silt and sand; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 61 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.30	0.35					
2.			0.42				.47	0.30		0.30		
3.			.40	0.44				.60				
4.		(a)	.62	.39				.43		.32		
5.	0.35		.35	.58	1.25		.50	.42	0.42	.35	0.35	0.24
6.	.35		.31	.60		.28	.39		.41	.28		.22
7.	.35		.35				.40	.38	.50	.28	.21	.22
8.	.38	(a)				.29		.35	.40	.26	.22	.28
9.			.40				.38	.37	.39		.41	.28
10.			.40	.50	.82			.38		.36		.24
11.	(a)		.48	.44			.44		.34	.34		.22
12.			.46	.40	.61			.36	.39	.34	.40	.21
13.		0.46	.79	.48			.39		.39	.32	.45	.20
14.		.40	.79	.40		.40	.41	.37	.40	.34	.28	.21
15.		.30		.46				.40	.35		.24	.22
16.		(a)			.35	.40			.38	.34	.44	.29
17.			.43				.42	.33	.35		.55	.22
18.			.81	.46	.31				.32	.38	.44	.20
19.	(a)		.43	.52			.34	.39	.30	.40	.39	.30
20.			.46	.53		.28	.32			.50	.30	.46
21.			.44	.57				.31	.29		.30	.40
22.			.52	.49	.30				.29	.48	.29	.53
23.			.44	.47				.30	.28		.34	
24.				.60	.31			.30	.24	.44		.61
25.		.40	.41				.39	.29		.36	.25	.40
26.		.33	.40	.76	.30	.31	.35	.28	.22	.40	.25	.50
27.			.38	1.06		.41	.26	.31	.22		.24	
28.			.30	1.03	.28	.31	.31		.21		.38	.30
29.			.30				.35		.21		.34	.32
30.			.47				.28			.51	.27	
31.							.21					

a Channel dry.

Monthly discharge at station No. 61 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.06	3.69	June.....	0 07	4.00
November.....	a 0.08	4.76	July.....	.10	6.00
December.....	a 0.15	9.22	August.....	.10	6.10
1912.			September.....	.12	6.90
January.....	0.000	.00	October.....	.16	8.90
February.....	.005	.30	November.....	.15	8.90
March.....	.17	10.70	December.....	.11	6.90
April.....	.32	18.80	The year.....	.12	83.40
May.....	.08	4.90			

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 62 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 20. ....	<i>Feet.</i> 1.19	<i>Sec.-ft.</i> 3.25	Nov. 7. ....	<i>Feet.</i> 1.25	<i>Sec.-ft.</i> 4.66
Sept. 28. ....	.84	.47	Dec. 11. ....	1.23	3.64

NOTE.—Bed of stream of cobbles and boulders. Some bedrock exposed. Section rough near gage; station probably permanent. One channel at all stages.

Daily gage height, in feet, at station No. 62 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Blikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.90	1.28					
2			1.55				1.37	0.92		1.11		
3			1.40	1.51				2.60				
4		(a)	1.25	1.58				1.55		1.20		
5	1.02	(a)	1.08	1.50	1.84		1.40	1.35	1.60	1.10	1.54	1.35
6	1.02		1.15	1.47		.89	1.28		1.61	1.08		1.30
7	1.02		1.21				1.31	1.18	2.01	1.02	1.25	1.40
8	1.05					.88		1.14	1.41	1.00	1.30	1.60
9		(a)	1.46				1.20	1.18	1.33		1.82	1.45
10		(a)	1.40	1.85	1.40			1.21		1.14		1.30
11	.94	(a)	1.41	1.75			1.94		1.25	1.10		1.16
12	.94	(a)	1.79	1.59	1.12			1.14	1.46	1.42	1.78	1.16
13	.92	1.15	1.87	1.52			1.33		1.28	1.20	1.80	1.10
14	.92	1.10	1.99	1.35		.91	1.68	1.30	1.25	1.36	1.43	1.11
15	.85	.90		1.29				1.57	1.23		1.29	1.30
16	.80				.98	.92			1.34	1.34	2.14	1.50
17			1.76				1.67	1.15	1.20		2.72	1.40
18			1.96	1.39	.90				1.18	1.62	1.80	1.20
19	.75		1.49	1.40			1.15	1.36	1.10	1.72	1.87	1.50
20	.74		1.86	1.41		1.01	1.14			2.32	1.49	2.15
21	.74		1.45	1.42				1.09	1.01		1.46	1.62
22	.72		1.41	1.64	1.02				1.05	1.86	1.50	2.42
23	.71		1.47	1.62				1.00	1.00		1.56	
24	.71			1.71	1.14				.98	1.92		2.82
25	.70	1.50	1.36				1.21	1.02		1.34	1.32	1.80
26	.70	1.30	1.30	1.70	.99	1.58	1.19	.96	.91	1.21	1.26	2.40
27	.71		1.15	1.66		1.70	1.25	1.35	.87		1.21	
28	.66		1.13	1.68	.95	1.58	1.17		.84		1.48	1.36
29	.65		1.11				1.15		.81		1.66	1.32
30	.65		1.19				1.08			2.16	1.30	
31							1.01					

<sup>a</sup> Channel dry.

Daily discharge, in second-feet, at station No. 62 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1		1.38	1.38	11	10.20	10.20	1.92	21	2.36	24.50	22.50
2		2.62	1.38	12	7.20	4.40	7.80	22	2.10	23.00	3.40
3		4.60	1.20	13	5.00	12.80	19.20	23	1.92	22.00	3.40
4		7.80	1.20	14	3.40	11.30	35.80	24	1.74	21.00	22.50
5		12.00	1.20	15	3.40	9.84	85.00	25	1.56	20.00	12.80
6		16.80	1.29	16	3.60	8.40	34.00	26	1.38	12.00	8.40
7		26.20	1.38	17	3.60	11.30	46.00	27	1.20	9.12	5.40
8		40.60	2.23	18	3.80	14.00	35.80	28	1.05	3.40	5.00
9		28.00	3.40	19	3.80	19.60	47.80	29	.90	2.62	12.80
10	13.60	18.00	2.23	20	3.01	26.20	48.40	30	.80	1.38	12.40
								31	.70		12.00

*Daily discharge, in second-feet, at station No. 62 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.40	(a)	6.00	20.00	19.00	0.70	3.60	1.00	25.00	3.00	50.00	25.00
2.....	1.40	(a)	12.00	15.00	19.00	.70	7.50	.80	30.00	2.20	60.00	40.00
3.....	1.40	(a)	8.40	12.00	19.00	.70	15.00	73.00	50.00	3.00	40.00	15.00
4.....	1.40	(a)	4.40	12.00	20.00	.70	11.00	14.00	85.00	3.40	70.00	18.00
5.....	1.40	(a)	1.90	12.00	27.00	.70	8.40	6.50	16.00	2.10	14.00	6.90
6.....	1.40	(a)	2.75	11.00	22.00	.65	5.00	5.00	16.00	1.90	10.00	5.40
7.....	1.40	(a)	3.60	60.00	15.00	.65	5.70	3.15	38.00	1.40	4.40	8.40
8.....	1.60	(a)	7.00	50.00	12.00	.65	4.50	2.60	8.80	1.20	5.40	16.00
9.....	1.40	(a)	11.00	40.00	10.00	.70	3.40	3.10	6.30	1.00	26.00	10.00
10.....	1.20	(a)	8.40	28.00	8.40	.70	3.40	3.60	5.40	2.60	60.00	5.40
11.....	.90	(a)	8.80	22.00	5.40	.70	33.00	3.10	4.40	2.10	50.00	2.90
12.....	.90	(a)	24.00	16.00	2.40	.70	15.00	2.60	11.00	9.10	24.00	2.90
13.....	.80	2.75	29.00	13.00	2.00	.70	6.30	4.50	5.00	3.40	25.00	2.10
14.....	.80	2.10	36.00	6.90	1.60	.75	19.00	5.40	4.40	7.20	9.50	2.25
15.....	.50	.70	30.00	5.20	1.40	.80	14.00	15.00	4.00	7.00	5.20	5.40
16.....	.35	.10	26.00	8.00	1.10	.80	12.00	3.00	6.60	6.60	45.00	12.00
17.....	.30	.10	23.00	12.00	1.00	.90	19.00	2.75	3.40	35.00	80.00	8.40
18.....	.30	.10	35.00	8.10	.70	1.00	10.00	5.00	3.10	17.00	25.00	3.40
19.....	.25	.10	11.60	8.40	1.00	1.20	2.75	7.20	2.10	21.00	29.00	12.00
20.....	.25	10.00	29.00	8.80	1.00	1.30	2.60	3.00	1.70	56.00	12.00	46.00
21.....	.25	40.00	10.00	9.10	1.00	1.60	3.00	2.00	1.30	60.00	11.00	17.00
22.....	.20	80.00	8.80	18.00	1.40	2.00	3.00	1.60	1.65	29.00	12.00	62.00
23.....	.15	90.00	11.00	17.00	4.00	2.00	3.00	1.20	1.20	85.00	14.00	90.00
24.....	.15	50.00	9.00	20.00	2.60	3.00	3.00	1.60	1.10	32.00	10.00	86.00
25.....	.15	12.00	7.20	20.00	2.00	6.00	3.60	1.40	.90	6.60	6.00	25.00
26.....	.15	5.40	5.40	20.00	1.15	12.00	3.30	1.00	.75	3.60	4.60	61.00
27.....	.15	4.00	2.75	18.00	1.00	20.00	4.40	6.90	.60	90.00	3.60	30.00
28.....	.10	4.00	2.50	19.00	.95	15.00	3.00	6.00	.50	60.00	11.00	7.20
29.....	.10	4.00	2.20	15.00	.90	12.00	2.75	5.00	.40	50.00	18.00	6.00
30.....	.10	.....	3.30	18.00	.80	9.00	1.90	4.00	5.00	47.00	5.40	5.00
31.....	.10	.....	36.00	.....	.70	.....	1.30	5.00	.....	48.00	.....	5.00

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 62 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 10-31.....	3.46	152	May.....	6.63	408.00
November.....	14.20	847	June.....	3.28	195.00
December.....	16.10	895	July.....	7.53	463.00
1912.			August.....	6.45	397.00
January.....	.68	41.80	September.....	11.30	672.00
February.....	10.50	604.00	October.....	22.50	1,380.00
March.....	13.40	824.00	November.....	17.30	1,030.00
April.....	18.10	1,080.00	December.....	20.70	1,270.00
			The year.....	11.50	8,360.00

*Discharge measurements at station No. 63 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 20.....	0.45	0.05	Nov. 7.....	0.47	0.10
Sept. 28.....	.40	0	Dec. 11.....	.48	.03

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 63 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Blikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.40	0.42					
2			0.61				.53	0.45		0.46		
3			.52	0.50								
4		0.40	.51	.74				.53		.48		
5	0.51	.40	.48	.54	1.02		.58	.57	0.51	.46	0.52	0.50
6	.51		.45	.55		.30	.45		.54	.43		.42
7	.51		.48				.50	.50	.61	.42	.47	.59
8	.52	.40				.37		.58	.50	.44	.50	.52
9		.40	.56				.49	.50	.49		.62	.51
10		.40	.55	.55	.55			.51		.47		.49
11	.48	.40	.54	.54			.60		.44	.43		.46
12	.48	.40	.52	.57	.50			.49	.50	.48	.54	.44
13	.48	.52	.69	.54			.50		.50	.46	.55	.44
14	.48	.49	.84	.51		.40	.55	.50	.54	.50	.50	.44
15	.50	.42		.51				.53	.51		.48	.50
16	.50	.41			.45	.32			.51	.49	.62	.56
17		.40	.52				.54	.48	.49		.64	.49
18			.91	.51	.43				.48	.52	.56	.48
19	.50		.53	.59			.48	.50	.46	.57	.55	.50
20	.50	.52	.55	.65		.40	.46			.60	.52	.60
21	.50	.48	.51	.64				.44	.44		.52	.50
22	.48		.48	.71	.45				.46	.58	.52	.65
23	.46		.52	.71				.45	.44		.58	
24	.46			.80	.47			.47	.42	.54		
25	.45		.52				.50	.45		.48	.50	.51
26	.45		.51	.92	.48	.41	.50	.42	.42	.47	.50	.60
27	.45		.49	.88		.55	.50	.48	.42		.48	
28	.42		.44	.85	.45	.41	.49		.41		.56	.50
29	.40		.42				.52		.41		.55	.52
30	.40		.49				.50			.59	.50	
31							.48					

Monthly discharge at station No. 63 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.04	2.46	June.....	0.005	0.30
November.....	a 10	5.95	July.....	.07	4.60
December.....	a 12	7.38	August.....	.08	5.00
1912.			September.....	.09	5.30
January.....	.002	.10	October.....	.12	7.50
February.....	.003	.20	November.....	.12	6.90
March.....	.01	.90	December.....	.10	6.10
April.....	.01	.90	The year.....	.05	38.20
May.....	.006	.40			

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 64 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 20.....	Feet.	Sec.-ft.	Nov. 7.....	Feet.	Sec.-ft.
Sept. 28.....	0.58	0.01	Dec. 11.....	0.08	0.03
	.40	0		.40	.03

NOTE.—Bed of stream of sand and silt; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 64 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.29	0.40					
2			0.56				.51	0.41		0.31		
3			.52	0.49								
4		0.00	.44	.69				.59		.42		
5	0.34	.00	.45	.55	1.05		.55	.58	0.49	.32	0.12	0.44
6		.34	.45	.60		.20	.44		.50	.30		.41
7		.34	.51				.49	.49	.54	.28	.13	.46
8		.45	.00			.24		.46	.48	.31	.16	.50
9			.00	.51			.40	.50	.46		.31	.50
10			.00	.50	.50			.51		.42		.48
11	.40	.00	.51	.53			.52		.43	.40		.39
12	.40	.00	.53	.52	.46			.49	.49	.48	.27	.31
13	.40	.50	.64	.52			.48		.48	.46	.30	.30
14	.40	.45	.72	.48		.30	.50	.50	.53	.50	.14	.35
15	.35	.42		.48				.52	.50		.10	.40
16	.25	.36			.32	.24			.50	.49	.57	.54
17		.34	.51			.30	.48		.46		.65	.50
18			.76	.50	.35			.30	.50	.40	.38	
19	.05		.51	.52		.20	.49	.20	.50	.48	.45	
20	.05		.55	.59		.40	.19		.56	.36	.62	
21	.05		.51	.61				.44	.20		.32	.50
22	.04		.48	.62	.31			.30	.54	.36	.78	
23	.02		.52	.62				.42	.18		.44	
24	.02			.74	.37			.45	.09	.45		
25	.00	.50	.51				.41	.44		.41	.29	.52
26	.00	.46	.50	.94	.31	.41	.41	.32	.05	.42	.25	.70
27	.00		.48	.86		.50	.39	.49	.03		.23	
28	.00		.46	.86	.30	.41	.30		.02		.47	.57
29	.00		.43				.32		.02		.48	.54
30	.00		.42				.25			.28	.31	
31							.20					

Monthly discharge at station No. 64 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October.....	a 0.06	3.69	June.....	0.07	4.00
November.....	a .16	9.51	July.....	.06	4.00
December.....	a .40	24.60	August.....	.09	5.50
1912.			September.....	.12	7.10
January.....	.003	.20	October.....	.16	9.70
February.....	.003	.20	November.....	.15	7.10
March.....	.20	12.10	December.....	.13	7.90
April.....	.20	11.90			
May.....	.08	5.10	The year.....	.11	74.80

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.



*Discharge measurements at station No. 65 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 20.....	1.56	0.18	Nov. 7.....	1.54	0.19
Sept. 28.....	1.39	0	Dec. 11.....	1.54	.18

Bed of stream of sand, gravel and silt; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 65 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			1.58			1.40	1.52			1.50		
2.....			1.50	1.59			1.61	1.47				
3.....		1.75	1.42	1.70				1.68		1.58		
4.....	1.50	1.40	1.48	1.68	1.88		1.68	1.64	1.65	1.54	1.62	1.58
5.....	1.50		1.51	1.64		1.29	1.52		1.59	1.52		1.58
6.....	1.50		1.62				1.60	1.59	1.71	1.51	1.54	1.58
7.....	1.55	1.35				1.31		1.54	1.60	1.51	1.60	1.61
8.....		1.32	1.62				1.51	1.60	1.59		1.74	1.60
9.....		1.32	1.61	1.64	1.35			1.61		1.53		1.58
10.....		1.32	1.61	1.62			1.70		1.57	1.51		1.55
11.....	1.50	1.32	1.61	1.68	1.33			1.59	1.61	1.60	1.68	1.54
12.....	1.50	1.31	1.67	1.46			1.59	1.59	1.59	1.54	1.68	1.54
13.....	1.50	1.60	1.68	1.59		1.50	1.65	1.60	1.57	1.60	1.60	1.55
14.....	1.50	1.58	1.94	1.58				1.64	1.55		1.55	1.58
15.....	1.50	1.52			1.29	1.45			1.61	1.60	1.78	1.62
16.....	1.50	1.51	1.56				1.59	1.55	1.57		1.90	1.52
17.....		1.50	1.98	1.54	1.01			1.54	1.66	1.66	1.69	1.54
18.....	1.50		1.66	1.70			1.52	1.61	1.50	1.68	1.63	1.60
19.....	1.50		1.66	1.63		1.51	1.51			1.80	1.62	1.72
20.....	1.50		1.62	1.67				1.52	1.50		1.62	1.58
21.....	1.49		1.58	1.63	1.46			1.52	1.52	1.72	1.63	1.86
22.....	1.49		1.65	1.64				1.50	1.51		1.66	
23.....	1.49				1.60			1.53	1.49	1.70		
24.....	1.49					1.51	1.61	1.51		1.63	1.58	1.64
25.....	1.48	1.50	1.56									
26.....	1.48	1.39	1.60	1.79	1.48	1.68	1.59	1.45	1.44	1.60	1.58	1.90
27.....	1.49		1.49	1.73		1.51	1.60	1.58	1.42		1.56	
28.....	1.46		1.44	1.68	1.49		1.54		1.41		1.67	1.58
29.....	1.45		1.41				1.54		1.41		1.68	1.60
30.....	1.45		1.48				1.82			1.70	1.60	
31.....							1.50					

*Daily discharge, in second-feet, at station No. 65 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.16	0.10	11.....	0.37	0.54	0.25	21.....	0.25	0.68	0.75
2.....		.19	.10	12.....	.28	.34	1.10	22.....	.25	.61	.25
3.....		.25	.10	13.....	.22	.96	2.12	23.....	.25	.54	.25
4.....		.31	.10	14.....	.16	.68	3.24	24.....	.25	.47	.75
5.....		.37	.10	15.....	.16	.54	5.72	25.....	.25	.37	.10
6.....		.47	.16	16.....	.19	.40	1.80	26.....	.25	.13	.10
7.....		.96	.13	17.....	.22	.47	2.44	27.....	.25	.13	.10
8.....		1.38	.37	18.....	.25	.54	1.96	28.....	.22	.10	.10
9.....		1.10	.54	19.....	.25	.61	2.44	29.....	.19	.10	.22
10.....	0.54	.82	.37	20.....	.25	.75	2.52	30.....	.16	.13	.16
								31.....	.13		.10

*Daily discharge, in second-feet, at station No. 65 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.1	0.1	0.1	1.0	1.0	0.1	0.2	0.1	0.8	0.5	1.0	1.0
2.....	.1	.1	.3	.7	1.0	.....	.5	.1	1.0	.1	.5	2.0
3.....	.1	.1	.1	.4	1.5	.....	1.5	1.5	2.0	.2	2.0	.8
4.....	.1	1.4	.1	1.1	2.0	.....	1.2	1.0	3.0	.3	.5	.6
5.....	.1	.1	.1	1.0	2.4	.....	1.0	.7	.8	.2	.5	.3
6.....	.1	.1	.1	.7	2.0	.....	.2	.2	.4	.2	.4	.3
7.....	.1	.1	.5	3.0	1.0	.....	.4	.4	1.2	.1	.2	.3
8.....	.2	.1	.5	2.5	.4	.....	.2	.2	.4	.1	.4	.5
9.....	.1	.1	.5	2.0	.2	.....	.1	.4	.4	.1	1.4	.4
10.....	.1	.1	.5	.7	.1	.....	.1	.5	.4	.2	3.0	.3
11.....	.1	.1	.5	.5	.1	.....	1.1	.4	.3	.1	2.5	.2
12.....	.1	.1	.9	1.0	.1	.....	.7	.4	.5	.4	1.0	.2
13.....	.1	.4	1.0	.1	.1	.....	.4	.4	.4	.2	1.0	.2
14.....	.1	.3	2.9	.4	.1	.1	.8	.4	.3	.4	.4	.2
15.....	.1	.2	1.0	.3	.1	.....	.6	.7	.2	.4	.2	.3
16.....	.1	.1	.5	.8	.1	.1	.4	.2	.5	.4	1.7	.5
17.....	.1	.1	.3	1.5	.1	.....	.4	.2	.3	1.5	2.6	.2
18.....	.1	.1	3.2	.2	.1	.....	.3	.3	.2	.8	1.0	.2
19.....	.1	.3	.8	1.1	.1	.....	.2	.5	.1	1.0	.6	.4
20.....	.1	1.0	.8	.6	.1	.1	.1	.2	.1	1.8	.5	1.2
21.....	.1	2.0	.5	.9	.1	.....	.2	.2	.1	1.5	.5	.3
22.....	.1	2.8	.3	.6	.1	.....	.3	.2	.2	1.2	.6	2.3
23.....	.1	3.4	.8	.7	.8	.....	.4	.1	.1	3.0	.8	3.5
24.....	.1	2.0	.4	1.0	.4	.....	.8	.2	.1	1.1	.6	2.5
25.....	.1	.1	.3	1.4	.2	.1	.5	.1	.1	.6	.3	.7
26.....	.1	.1	.4	1.7	.1	1.0	.4	.1	.1	.4	.3	2.6
27.....	.1	.1	.1	1.3	.1	.1	.4	.3	.1	3.5	.3	1.5
28.....	.1	.1	.1	1.0	.1	.....	.2	.3	.1	2.5	.9	.3
29.....	.1	.1	.1	.5	.1	.....	.2	.2	.1	2.0	1.0	.4
30.....	.1	.....	.1	.8	.1	.....	.2	.2	1.0	1.1	.4	.2
31.....	.1	.....	2.0	.....	.1	.....	.1	.1	.....	1.0	.....	.2

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 65 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 10-31.....	0.24	10.60	June.....	0.10	5.95
November.....	.50	29.90	July.....	.45	27.70
December.....	.92	56.50	August.....	.35	21.50
1912.			September.....	.51	30.30
January.....	.10	6.15	October.....	.87	53.50
February.....	.54	31.10	November.....	.90	53.60
March.....	.64	39.40	December.....	.79	48.60
April.....	.98	58.30	The year.....	.56	406.00
May.....	.48	29.50			

*Discharge measurements at station No. 66 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 20.....	Feet. 0.43	Sec.-ft. 0.05	Nov. 7.....	Feet. 0.45	Sec.-ft. 0.02
Sept. 28.....	(a)	(a)	Dec. 11.....	.44	0

a Channel dry.

NOTE.—Bed of stream of sand, gravel, and silt; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 66 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.30	0.50					
2.			0.60				.59	0.24		0.44		
3.			.60	0.52								
4.		(a)	.50	.55				.61		.50		
5.	0.45	0.00	.48	.59	0.85		.61	.53	0.59	.48	0.62	0.50
6.	.45		.45	.68		.28	.52		.60	.44		.50
7.	.45		.48				.55	.50	.72	.40	.43	.64
8.	.50	.00				.30		.48	.51	.42	.54	.80
9.		.00	.61				.48	.53	.50		1.00	.68
10.		.00	.60	.70	.58			.55		.48		.54
11.	.45	.00	.61	.59			.65		.47	.44		.44
12.	.45	.00	.66	.65	.53			.52	.58	.56	.80	.40
13.	.44	.42	.89	.64			.55		.54	.52	.86	.40
14.	.44	.30	.96	.55		.40	.63	.52	.58	.70	.54	.46
15.	.35	.10		.56				.61	.54		.46	.52
16.	.35	— .25			.42	.36			.57	.60	1.02	.88
17.		— .50	.62				.61	.46	.49		1.11	.62
18.			.95	.62	.42				.44	.82	.90	.49
19.	— .10		.62	.60			.44	.55	.42	.89	.82	.54
20.	— .10		.63	.61		.45	.42			1.04	.70	1.00
21.	— .10		.61	.63				.40	.46		.68	.80
22.	— .09		.59	.61	.46				.44	.93	.81	1.11
23.	(a)		.62	.63				.15	.42		.89	
24.	.00			.73	.49			.25	.40	.86		
25.	.00	.59	.64				.49	.12		.62	.52	.80
26.	.00	.32	.61	.81	.44	.51	.50	.11	.38	.60	.50	1.15
27.	.00		.59	.74		.60	.50	.48	.36		.48	
28.	.00		.48	.70	.41	.51	.46		.35		.88	.51
29.	.00		.46				.48		.35		.87	.65
30.	.00		.47				.46			.90	.52	
31.							.40					

. a Channel dry.

*Monthly discharge at station No. 66 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October .....	a 0.02	1.23	June .....	0.03	1.80
November .....	a .06	3.57	July .....	.04	2.60
December .....	a .05	3.08	August .....	.05	2.80
1912.			September .....	.05	3.20
January .....	.01	.60	October .....	.07	4.40
February .....	.01	.80	November .....	.07	4.20
March .....	.09	5.50	December .....	.06	3.60
April .....	.09	5.30			
May .....	.04	2.40	The year .....	.05	37.20

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 67 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 20.....	<i>Fect.</i> 0.42	<i>Sec.-ft.</i> 0.09	Nov. 7.....	<i>Fect.</i> 0.35	<i>Sec.-ft.</i> 0.11
Sept. 28.....	.24	0	Dec. 11.....	.36	.10

NOTE.—Bed of stream of sand, gravel, and silt; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 67 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.35	0.40					
2.....			0.50				.49	0.31		0.41		
3.....			.40	0.36								
4.....		0.20	.34	.49				.51		.44		
5.....	0.40	(a)	.35	.46	0.68		.51	.48	0.63	.40	0.52	0.40
6.....	.40		.31	.52		.30	.45		.64	.38		.40
7.....	.40		.35				.45	.42	.65	.33	.46	.40
8.....		(a)				.34		.41	.49	.35	.42	.49
9.....		(a)	.49				.40	.48	.49	.48	.67	.42
10.....		(a)	.48	.60	.43			.49		.40		.40
11.....	.40	(a)	.48	.52			.61		.46	.38		.34
12.....	.40	(a)	.52	.51	.41			.46	.51	.48	.52	.30
13.....	.40	.34	.69	.56			.45		.46	.44	.55	.30
14.....	.40	.30	.79	.51		.40	.77	.47	.48	.50	.42	.38
15.....	.35	.22		.51			.77	.45	.46		.36	.40
16.....	.35	.21			.26	.30			.50	.50	.69	.44
17.....		.20	.51				.62	.40	.47		.78	.40
18.....			.79	.50	.21				.41	.52	.56	.36
19.....	.34		.51	.53			.35	.50	.40	.57	.52	.42
20.....	.34		.54	.58		.39	.34			.68	.47	.60
21.....	.34		.46	.58				.39	.34		.46	.45
22.....	.34		.46	.58	.37				.38	.60	.48	.69
23.....	.32		.48	.61				.32	.32		.53	
24.....	.32			.66	.39			.34	.31	.57		
25.....	.31	.49	.46				.41	.32		.42	.41	.50
26.....	.31	.31	.46	.72	.39	.48	.45	.29	.30	.41	.40	.78
27.....	.31		.44	.63		.51	.45	.41	.27		.38	
28.....	.25		.34	.61	.39	.48	.40		.25		.55	.40
29.....	.22		.32				.41		.25		.54	.41
30.....	.21		.39				.38			.64	.40	
31.....							.34					

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 67 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		0.15	0.15	11.....		0.25	0.15	21.....	0.15	0.30	0.85
2.....		.20	.15	12.....		.25	.30	22.....	.15	.30	.70
3.....		.20	.15	13.....		.40	.50	23.....	.15	.30	.60
4.....		.25	.15	14.....		.35	.75	24.....	.15	.30	.85
5.....		.25	.15	15.....		.30	1.50	25.....	.15	.25	.70
6.....		.30	.15	16.....		.25	.90	26.....	.15	.20	.70
7.....		.40	.15	17.....		.30	1.00	27.....	.15	.15	.65
8.....		.35	.15	18.....		.30	.90	28.....	.15	.15	.65
9.....		.30	.20	19.....		.30	1.05	29.....	.15	.15	.70
10.....		.30	.15	20.....		.30	1.10	30.....	.15	.15	.70
								31.....	.15		.70

Daily discharge, in second-feet, at station No. 67 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.15	(a)	0.15	0.20	.....	0.10	0.15	0.05	0.30	0.15	0.30	0.40
2.....	.15	(a)	.25	.15	.....	.....	.25	.05	.40	.15	.20	.50
3.....	.15	(a)	.15	.10	.....	.....	.40	.50	.60	.20	.50	.30
4.....	.15	(a)	.05	.25	.....	.....	.30	.25	.70	.20	.30	.30
5.....	.15	(a)	.10	.20	0.55	.....	.25	.20	.45	.15	.30	.15
6.....	.15	(a)	.05	.30	.....	.05	.20	.15	.45	.15	.20	.15
7.....	.15	(a)	.10	.60	.....	.....	.20	.15	.45	.10	.20	.15
8.....	.15	(a)	.15	.50	.....	.10	.15	.15	.25	.10	.15	.25
9.....	.15	(a)	.25	.50	.....	.....	.15	.20	.25	.10	.50	.15
10.....	.15	(a)	.25	.40	.20	.....	.10	.25	.20	.15	.70	.15
11.....	.15	(a)	.25	.30	.....	.....	.40	.20	.20	.15	.60	.10
12.....	.15	(a)	.30	.25	.15	.....	.30	.20	.25	.20	.30	.05
13.....	.15	0.05	.55	.35	.....	.....	.20	.25	.20	.20	.35	.05
14.....	.15	.05	.70	.25	.....	.15	.65	.25	.20	.25	.15	.15
15.....	.10	.05	.40	.25	.....	.....	.50	.20	.20	.25	.10	.15
16.....	.10	.05	.30	.30	.05	.05	.45	.30	.25	.25	.55	.20
17.....	.10	.05	.25	.40	.....	.....	.40	.15	.25	.50	.65	.15
18.....	.05	.05	.70	.25	.....	.....	.30	.20	.15	.30	.35	.10
19.....	.05	.05	.25	.30	.....	.....	.10	.25	.15	.35	.30	.15
20.....	.05	.20	.30	.40	.....	.15	.10	.20	.10	.50	.25	.40
21.....	.05	.35	.20	.35	.....	.....	.10	.15	.10	.40	.20	.20
22.....	.05	.50	.20	.35	.10	.....	.10	.10	.15	.40	.20	.55
23.....	.05	.70	.25	.40	.....	.....	.20	.05	.05	.60	.30	.70
24.....	.05	.40	.20	.50	.15	.....	.30	.10	.05	.35	.20	.50
25.....	.05	.25	.20	.50	.....	.....	.15	.05	.05	.15	.15	.25
26.....	.05	.05	.20	.60	.15	.28	.20	.05	.05	.15	.15	.65
27.....	.05	.05	.20	.45	.....	.25	.20	.15	.05	.70	.15	.40
28.....	.05	.05	.10	.40	.15	.25	.15	.10	.05	.60	.35	.15
29.....	.05	.05	.05	.30	.....	.....	.15	.10	.05	.50	.30	.15
30.....	.05	.....	.15	.30	.....	.....	.15	.10	.20	.45	.15	.10
31.....	.05	.....	.50	.....	.....	.....	.10	.10	.....	.30	.....	.10

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Monthly discharge at station No. 67 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 21-31.....	0.15	3.28	June.....	0.15	8.90
November.....	.26	15.80	July.....	.24	14.80
December.....	.56	34.80	August.....	.17	10.50
1912.			September.....	.23	13.70
January.....	.10	6.15	October.....	.29	17.80
February.....	.10	5.75	November.....	.30	17.90
March.....	.25	15.40	December.....	.25	15.40
April.....	.35	20.80	The year.....	.22	159.00
May.....	.20	12.30			

*Discharge measurements at station No. 68 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 20 .....	0.96	4.28	Nov. 7 .....	1.23	5.66
Sept. 28 .....	.54	.78	Dec. 11 .....	1.15	5.13

NOTE.—Bed of stream of cobbles and boulders with some exposed bedrock. Section near gage, rough. Station probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 68 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Blikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.70	1.32					
2.....			1.90				1.41	0.70		1.01		
3.....			1.60	1.76								
4.....		0.20	1.40	1.69				1.77		1.18		
5.....	0.80	.20	1.10	1.85	1.94		1.48	1.71	1.87	.91	1.89	1.34
6.....	.80		.91	1.90		.68	1.32		1.59	.87		1.30
7.....	.80		1.05				1.40	1.09	2.41	.78	1.26	1.62
8.....	.81	.15				.70		1.04	1.60	.77	1.38	1.90
9.....		.14	1.66				1.11	1.17	1.50		1.30	1.65
10.....		.11	1.65	2.14	1.60			1.15		1.01		1.36
11.....	.78	.11	1.64	2.01			2.23		1.39	.95		1.15
12.....	.78	.10	2.02	1.64	1.21			1.12	1.70	1.52	2.02	1.00
13.....	.75	1.00	2.12	1.79			1.41		1.47	1.26	2.08	.90
14.....	.75	.96	2.26	1.39		.79	1.94	1.40	1.40	1.47	1.58	.99
15.....	.65	.68		1.41				1.84	1.21		1.30	1.35
16.....	.55	.41			.90	.72			1.46	1.42	2.71	1.80
17.....		.21	1.86				1.59	1.07	1.20		3.00	1.61
18.....			2.29	1.41	.84				1.15	1.76	2.01	1.22
19.....	.44		1.69	1.51			1.00	1.61	1.04	2.01	2.19	1.80
20.....	.44		1.84	1.56		1.18	.99			2.48	1.79	2.52
21.....	.44		1.64	1.58				.93	.78		1.70	1.90
22.....	.42		1.57	1.63	.82				.81	2.18	1.76	2.72
23.....	.42		1.66	1.64				.77	.74		1.88	
24.....	.42			1.79	.86			.79	.68	2.24		
25.....	.41	1.75	1.55				1.14	.79		1.86	1.39	1.77
26.....	.41	1.41	1.41	1.80	.80	1.78	1.15	.70	.60	1.71	1.29	2.90
27.....	.42		1.25	1.79		1.91	1.18	1.51	.59		1.15	
28.....	.40		.94	1.76	.75	1.78	1.12		.54		1.68	1.50
29.....	.39		.92				1.10		.53		1.92	1.59
30.....	.39		.98				.96			2.48	1.34	
31.....							.80					

*Daily discharge, in second-feet, at station No. 68 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1.....		2.82	4.46	11.....		8.00	2.47	21.....	3.90	13.80	11.50
2.....		4.46	4.30	12.....		6.30	7.82	22.....	3.58	13.60	5.50
3.....		6.14	3.18	13.....		11.40	14.50	23.....	3.34	13.40	3.90
4.....		7.91	2.26	14.....		10.50	21.80	24.....	3.10	13.30	11.50
5.....		10.00	2.47	15.....		9.80	24.90	25.....	2.89	13.20	8.20
6.....		11.10	2.54	16.....		9.00	13.50	26.....	2.68	9.20	7.28
7.....		13.40	2.54	17.....		10.40	15.50	27.....	2.47	5.02	7.10
8.....		15.20	2.75	18.....		11.80	14.50	28.....	2.19	5.10	7.10
9.....		12.50	3.03	19.....		12.90	15.50	29.....	1.91	4.70	8.20
10.....		10.00	2.75	20.....		14.00	16.90	30.....	1.64	4.62	7.55
								31.....	1.40		7.10

*Daily discharge, in second-feet, at station No. 68 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.40	0.20	10.00	13.00	11.00	1.70	6.50	2.00	10.00	3.00	15.00	10.00
2.....	2.40	.20	12.00	12.00	11.00	1.70	7.20	1.70	14.00	4.00	10.00	15.00
3.....	2.40	.20	9.00	11.00	11.00	1.70	7.40	15.00	16.00	4.60	18.00	10.00
4.....	2.40	.20	7.10	10.00	11.00	1.60	7.60	11.00	20.00	5.30	15.00	10.00
5.....	2.40	.20	4.70	12.00	12.00	1.60	7.80	10.00	12.00	3.20	12.00	6.60
6.....	2.40	.20	3.20	12.00	13.00	1.60	6.50	5.00	8.90	2.90	5.00	6.30
7.....	2.40	.20	4.30	18.00	15.00	1.65	7.10	4.60	17.00	2.30	6.00	9.20
8.....	2.50	.20	7.00	16.00	14.00	1.70	6.00	4.20	9.00	2.20	6.90	12.00
9.....	2.40	.20	9.60	15.00	13.00	1.80	4.80	5.30	8.00	3.10	6.30	9.50
10.....	2.40	.20	9.50	14.00	9.00	1.90	5.00	5.10	7.50	4.00	15.00	6.80
11.....	2.30	.20	9.40	13.00	8.00	2.00	15.00	5.00	7.00	3.50	15.00	5.10
12.....	2.30	.20	13.00	9.40	5.60	2.10	11.00	4.90	10.00	8.20	13.00	3.90
13.....	2.00	3.90	14.00	11.00	4.00	2.20	7.20	6.00	7.70	6.00	14.00	3.10
14.....	2.00	3.60	16.00	7.00	4.00	2.30	12.00	7.10	7.10	7.70	8.80	3.80
15.....	1.40	1.60	15.00	7.20	4.00	2.00	10.50	11.00	5.60	7.60	6.30	6.70
16.....	.80	.50	13.00	7.20	3.10	1.80	9.50	6.00	7.60	7.30	20.00	11.00
17.....	.60	.30	12.00	7.20	5.00	2.70	8.90	4.50	5.50	20.00	23.00	9.10
18.....	.50	.20	16.00	7.20	2.70	3.60	6.40	6.80	5.10	11.00	13.00	5.60
19.....	.40	.20	10.00	8.10	2.70	4.40	3.90	9.10	4.20	13.00	15.00	11.00
20.....	.40	5.00	11.00	8.60	2.60	5.30	3.80	5.00	3.20	18.00	11.00	18.00
21.....	.40	10.00	9.40	8.80	2.50	6.30	4.00	3.30	2.30	18.00	10.00	12.00
22.....	.40	15.00	8.70	9.30	2.50	7.20	4.00	3.00	2.50	15.00	11.00	20.00
23.....	.40	20.00	9.60	9.40	2.60	8.10	4.00	2.20	2.00	20.00	12.00	25.00
24.....	.40	15.00	9.00	11.00	2.80	9.00	8.00	2.30	1.60	15.00	10.00	18.00
25.....	.30	10.00	8.50	11.00	2.60	10.00	5.00	2.30	1.30	12.00	7.00	11.00
26.....	.30	7.20	7.20	11.00	2.40	11.00	5.10	1.70	1.10	10.00	6.20	22.00
27.....	.40	10.00	5.90	11.00	2.20	12.00	5.30	8.10	1.10	20.00	5.10	15.00
28.....	.30	10.00	3.40	11.00	2.00	11.00	4.90	5.00	.80	20.00	9.80	8.00
29.....	.30	10.00	3.30	11.00	2.00	9.00	4.70	4.00	.70	20.00	12.00	8.90
20.....	.30	.....	3.70	10.00	1.80	7.50	3.50	3.00	4.00	18.00	6.60	5.00
31.....	.30	.....	15.00	.....	1.80	.....	2.40	3.00	.....	12.00	.....	5.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 68 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
October 21-31.....	2.65	57.60	June.....	4.55	271
November.....	9.79	582	July.....	6.61	406
December.....	8.47	520	August.....	5.39	331
1912.			September.....	6.76	402
January.....	1.31	8.06	October.....	10.20	627
February.....	3.27	188	November.....	11.30	672
March.....	9.34	574	December.....	10.40	640
April.....	10.70	637	The year.....	7.67	5,120
May.....	5.97	367			

*Discharge measurements at station No. 69 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 21.....	<i>Feet.</i> 0.71	<i>Sec.-ft.</i> 1.28	Nov. 8.....	<i>Feet.</i> 0.80	<i>Sec.-ft.</i> 2.84
Sept. 28.....	.64	.49	Dec. 11.....	.75	1.80

NOTE.—Bed of stream of cobbles and boulders with some exposed bedrock. Section near gage, rough, but probably permanent. One channel at all stages.

*Daily gage height, in feet, at station No. 69 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomm, Bilikov, Goorko, Belaveff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.60	0.75					
2.			0.92				.87	0.69		0.70		
3.			.85	0.85								
4.		0.55	.82	.92				.84		.72		
5.	0.70	.54	.72	.88	1.22		.88	.83	0.90	.69	0.90	0.80
6.	.70		.70	.91		.60	.78		.87	.68		.80
7.	.70		.84				.81	.79	1.08	.66	.76	.80
8.		.54				.66		.74	.84	.66	.80	.90
9.	.72	.54	.86				.80	.80	.80		1.16	.85
10.		.52	.86	1.00	.72		.85	.81		.70		.85
11.	.68	.52	.84	.95			1.03		.75	.68		.78
12.	.68	.51	1.02	.98	.71			.80	.84	.74	.98	.76
13.	.68	.70	.96	1.04			.81		.81	.70	1.02	.70
14.	.68	.65	1.01	.99			.91	.83	.84	.80	.84	.75
15.	.65	.60		.91				.87	.80		.79	.78
16.	.64	.60			.62				.83	.80	1.22	.90
17.		.59	.94				.88	.70	.75		1.40	.71
18.			1.04	.89	.59				.72	.88	1.02	.72
19.	.62	.94	.93			.70	.72	.81	.70	.94	1.00	.81
20.	.62	.96	.91				.71			1.08	.96	1.00
21.	.62		.82	.96		.66		.70	.68		.90	.82
22.	.61		.80	.93	.65				.70	1.02	.89	1.14
23.	.60		.84	.96				.68	.68		.94	
24.	.60			1.10	.71			.72	.66	1.00		
25.	.60	.81	.85			.70	.81	.70		.92	.82	.87
26.	.60	.69	.84	1.10	.71		.78	.65	.64	.88	.81	1.19
27.	.60		.81	1.03			.85	.81	.62		.81	
28.	.56		.71	1.00	.68	.71	.72		.63		.90	.81
29.	.55		.68			.88	.73		.62		.93	.80
30.	.55		.72			.71	.71			1.10	.83	
31.							.70					

*Daily discharge, in second-feet, at station No. 69 at 2,700-foot level, near Hilo, Hawaii,  
for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.	-----	1.8	11.	-----	1.8	21.	7.1	12.5
2.	-----	1.8	12.	-----	5.3	22.	6.7	6.9
3.	-----	1.5	13.	6.5	9.2	23.	6.5	6.5
4.	-----	1.5	14.	5.5	14.6	24.	6.3	12.5
5.	-----	1.5	15.	4.9	26.0	25.	6.1	8.5
6.	-----	1.5	16.	4.5	18.2	26.	3.1	7.5
7.	-----	1.5	17.	5.3	20.0	27.	2.7	6.5
8.	-----	2.4	18.	6.1	18.5	28.	2.9	6.5
9.	-----	2.9	19.	6.9	20.0	29.	2.4	6.5
10.	-----	2.4	20.	7.5	21.5	30.	1.8	7.5
						31.	-----	6.5



*Daily discharge, in second-feet, at station No. 69 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.20	0.10	3.00	6.00	6.00	0.20	2.00	1.20	4.00	0.90	6.00	8.00
2.....	1.20	.10	4.90	4.00	7.00	.20	4.00	1.10	5.00	1.20	6.00	12.00
3.....	1.20	.10	3.60	3.60	8.00	.20	12.00	5.00	8.00	1.40	12.00	10.00
4.....	1.20	.10	3.10	4.90	10.00	.20	7.00	3.40	10.00	1.50	6.00	6.00
5.....	1.20	.10	1.50	4.10	12.00	.20	4.10	3.20	4.50	1.10	4.50	2.70
6.....	1.20	.10	1.20	4.70	9.00	.20	2.40	2.90	4.00	1.00	3.30	2.70
7.....	1.20	.10	3.40	12.00	5.00	.50	2.90	2.60	8.10	.80	2.10	2.70
8.....	1.50	.10	3.60	11.00	3.00	.80	2.80	1.80	3.40	.80	2.70	4.50
9.....	1.40	.10	3.80	10.00	2.00	.80	2.70	2.70	2.70	1.00	10.00	3.60
10.....	1.20	.10	3.80	6.50	1.50	.80	2.50	2.90	2.40	1.20	15.00	3.90
11.....	1.00	.10	3.40	5.50	1.40	.80	7.10	2.80	2.00	1.00	12.00	2.40
12.....	1.00	.10	6.90	6.10	1.30	.90	5.00	2.70	3.40	1.80	6.10	2.10
13.....	1.00	1.20	5.70	7.30	1.00	.90	2.90	3.00	2.90	1.20	6.90	1.20
14.....	1.00	.70	6.70	6.30	.80	.90	4.70	3.20	3.40	2.70	3.40	1.90
15.....	.70	.20	6.20	4.70	.60	1.00	4.50	4.00	2.70	2.70	2.60	2.40
16.....	.70	.20	5.80	4.50	.40	1.00	4.30	2.00	3.20	2.70	12.00	4.50
17.....	.60	.20	5.30	4.50	.30	1.00	4.10	1.20	2.00	9.00	17.00	1.30
18.....	.50	.20	7.30	4.30	.20	1.20	2.80	2.00	1.50	4.10	6.90	1.50
19.....	.40	.20	5.30	5.10	.40	1.20	1.50	2.90	1.20	5.30	6.50	2.90
20.....	.40	1.50	5.70	4.70	.50	1.00	1.40	2.00	1.10	8.10	5.70	6.50
21.....	.40	10.00	3.10	5.70	.60	.80	1.50	1.20	1.00	8.00	4.50	3.10
22.....	.30	18.00	2.70	5.10	.70	.90	1.50	1.10	1.20	6.90	4.30	9.50
23.....	.20	20.00	3.40	5.70	2.50	1.00	2.00	1.00	1.00	14.00	5.30	17.00
24.....	.20	12.00	3.50	8.50	1.40	1.10	3.00	1.50	.80	6.50	4.20	11.00
25.....	.20	2.90	3.60	8.50	1.40	1.20	2.90	1.20	.70	4.90	3.10	4.00
26.....	.20	1.10	3.40	8.50	1.40	1.20	2.40	.70	.60	4.10	2.90	11.00
27.....	.20	1.00	2.90	7.10	1.20	1.30	3.60	2.90	.40	20.00	2.90	10.00
28.....	.10	1.00	1.40	6.50	1.00	1.30	1.50	2.00	.50	16.00	4.50	2.90
29.....	.10	1.00	1.00	5.00	.80	4.10	1.60	1.80	.40	12.00	5.10	2.70
30.....	.10	.....	1.50	6.00	.60	1.40	1.40	1.50	.60	8.50	3.20	2.00
31.....	.10	.....	12.00	.....	.40	.....	1.20	2.00	.....	5.00	.....	2.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 69 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 13-30.....	5.15	184.00	June.....	0.94	55.90
December.....	8.45	518.00	July.....	3.33	205.00
1912.			August.....	2.24	138.00
January.....	.71	43.70	September.....	2.76	164.00
February.....	2.50	144.00	October.....	5.01	308.00
March.....	4.15	256.00	November.....	6.22	370.00
April.....	6.21	370.00	December.....	5.09	313.00
May.....	2.66	164.00	The year.....	3.49	2,530.00

*Discharge measurements at station No. 70 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 21.....	0.75	0.49	Nov. 8.....	0.97	0.93
Sept. 28.....	.73	.17	Dec. 11.....	.90	.28

NOTE.—Bed of stream of gravel with some small cobbles; probably shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 70 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.64	0.80					
2.....			0.95				.91	0.70		0.80		
3.....			.90	0.98								
4.....		0.62	.88	1.15				.95		.84		
5.....	0.80	.61	.80	.99	1.39		.95	.90	1.00	.81	0.94	0.95
6.....	.80		.78	.79		.59	.82		.97	.80		.95
7.....	.80		.86				.88	.88	1.09	.78	.94	.52
8.....	.81	.60				.60	.78	.96	.74	.95		1.00
9.....		.60	.83				.81	.87	.91		1.10	.94
10.....		.59	.84	1.06	.95			.89		.80		.91
11.....	.75	.59	.86	1.09			1.04		.87	.78		.92
12.....	.74	.56	1.08	1.04	.89			.86	.94	.86	1.12	.90
13.....	.74	.75	1.32	1.08			.89		.89	.82	1.14	.88
14.....	.74	.70	1.36	.90		.70	1.01	.84	.90	.90	1.01	.90
15.....	.71	.65		.90				.85	.86		.94	.91
16.....	.71	.64			.68	.60			.90	.88	1.28	1.00
17.....		.61	.94				.85	.79	.88		1.41	.81
18.....			1.34	.95	.78				.86	.90	1.13	.90
19.....	.70		.88	.99			.78	.86	.85	1.02	1.12	1.00
20.....	.70		.92	1.04		.78	.76			1.21	1.10	1.10
21.....	.70		.86	1.04				.74	.83		1.04	1.02
22.....	.69		.87	1.03	.76				.84	1.02	1.02	1.19
23.....	.68		.84	1.04				.72	.81		1.06	
24.....	.68			1.19	.78				.79	1.11		
25.....	.66	.90	.85				.82	.74		1.02	.95	.80
26.....	.66	.71	.93	1.31	.75	.78	.79	.71	.77	.94	.92	1.18
27.....	.66		.87	1.28		.90	.83	.84	.74		.92	
28.....	.65		.82	1.26	.70	.74	.78		.72		1.02	1.00
29.....	.64		.79				.75		.72		1.02	.97
30.....	.64		.88				.74			1.21	.98	
31.....							.70					

*Daily discharge, in second-feet, at station No. 70 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.8	11.....		0.5	21.....	1.9	0.9
2.....		.8	12.....		.8	22.....	1.9	.6
3.....		.6	13.....	1.4	1.2	23.....	1.8	.6
4.....		.4	14.....	1.4	1.5	24.....	1.8	.9
5.....		.4	15.....	1.3	5.6	25.....	1.8	.6
6.....		.4	16.....	1.2	2.6	26.....	1.0	.6
7.....		.4	17.....	1.3	2.8	27.....	.9	.4
8.....		.6	18.....	1.4	2.8	28.....	1.0	.4
9.....		.8	19.....	1.6	2.8	29.....	.9	.6
10.....		.6	20.....	1.9	2.8	30.....	.8	.5
						31.....		.4

## 335

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.40	0.05	0.50	2.00	2.00	0.05	0.40	0.10	1.00	0.40	2.00	2.00
2.....	.40	.05	1.05	1.50	2.00	.05	.85	.10	2.00	.40	2.00	3.50
3.....	.40	.05	.80	1.20	2.00	.05	2.00	1.50	3.00	.50	3.00	2.00
4.....	.40	.05	.70	2.20	3.00	.05	1.50	1.05	4.00	.55	2.00	1.50
5.....	.40	.05	.40	1.25	3.85	.05	1.05	.80	1.30	.45	1.00	1.05
6.....	.40	.05	.35	.35	3.00	.05	.50	.70	1.15	.40	1.00	1.05
7.....	.40	.05	.65	3.50	2.00	.05	.70	.70	1.85	.35	1.00	1.10
8.....	.45	.05	.65	3.00	1.20	.05	.60	.35	1.10	.35	1.05	1.30
9.....	.40	.05	.65	2.50	1.00	.05	.45	.70	.85	.40	1.90	1.00
10.....	.30	.05	.55	1.65	1.05	.05	.50	.75	.80	.40	3.50	.85
11.....	.15	.05	.65	1.85	.80	.05	1.55	.70	.70	.35	3.00	.90
12.....	.10	.05	1.80	1.55	.75	.10	1.20	.65	1.00	.65	2.00	.80
13.....	.10	.15	3.35	1.80	.60	.10	.75	.60	.75	.50	2.15	.70
14.....	.10	.10	3.60	.80	.40	.10	1.35	.55	.80	.80	1.35	.80
15.....	.10	.10	2.00	.80	.20	.10	1.00	.60	.65	.80	1.00	.85
16.....	.10	.05	1.50	.90	.10	.05	.80	.40	.80	.70	3.05	1.30
17.....	.10	.05	1.00	1.00	.20	.10	.60	.35	.70	1.50	3.95	.45
18.....	.10	.05	1.50	1.05	.35	.10	.40	.40	.65	.80	2.10	.80
19.....	.10	.10	.70	1.25	.30	.20	.35	.65	.60	1.45	2.00	.30
20.....	.10	1.00	.90	1.55	.30	.35	.25	.30	.60	2.55	1.90	1.90
21.....	.10	2.00	.65	1.55	.30	.35	.30	.20	.55	1.50	1.55	1.40
22.....	.10	3.00	.70	1.50	.30	.35	.40	.20	.55	1.45	1.40	2.45
23.....	.10	4.50	.55	1.55	.50	.35	.50	.15	.45	3.00	1.65	4.00
24.....	.10	2.00	.60	1.45	.35	.35	.80	.25	.35	1.95	1.30	3.00
25.....	.10	.80	.60	2.30	.30	.35	.50	.20	.30	1.45	1.05	.40
26.....	.10	.10	.95	3.25	.30	.35	.35	.10	.30	1.00	.90	2.40
27.....	.10	.10	.70	3.05	.20	.80	.55	.55	.20	4.50	.90	3.00
28.....	.10	.10	.50	2.90	.10	.20	.35	.40	.15	.40	1.40	1.30
29.....	.05	.10	.35	2.00	.10	.20	.25	.30	.15	3.00	1.40	1.15
30.....	.05	.....	.70	1.50	.10	.20	.20	.20	.40	2.55	1.20	.50
31.....	.05	.....	3.00	.....	.10	.....	.10	.20	.....	2.00	.....	.50

*Monthly discharge at station No. 70 at 2,700-foot level, near Hilo, Hawaii, for 1911-1912.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 13-30.....	1.40	50.40	June.....	0.18	10.70
December.....	1.15	71.10	July.....	.68	41.80
			August.....	.47	28.90
1912.			September.....	.92	54.70
January.....	.19	11.70	October.....	1.31	80.60
February.....	.51	29.30	November.....	1.79	107.00
March.....	1.05	64.60	December.....	1.43	87.90
April.....	1.76	105.00			
May.....	.90	55.30	The year.....	.93	678.00

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 21.....	<i>Feet.</i> 0.61	<i>Sec.-ft.</i> 0	Nov. 8.....	<i>Feet.</i> 0.65	<i>Sec.-ft.</i> 0.05
Sept. 28.....	.60	.....	Dec. 11.....	.60	.07

NOTE.—Bed of stream of silt, sand and gravel; shifting. One channel at all stages.

Daily gage height, in feet, at station No. 71 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.58	0.62					
2.			0.71				.71	0.58		0.63		
3.			.70	0.77								
4.		(a)	.60	.88				.68		.67		
5.	0.65	(a)	.65	.75	1.08		.78	.65	0.69	.62	0.71	0.62
6.	.65		.62	1.08		.50	.75		.69	.62		.60
7.	.65		.76				.70	.64	.78	.60	.67	.60
8.	.68	(a)				.50		.62	.69	.61	.62	.62
9.		(a)	.83				.68	.68	.65		.76	.62
10.		(a)	.81	.74	.78			.71		.60		.61
11.	.65	(a)	.88	.71			.72		.61	.57		.60
12.	.64	(a)	.98	.74	.73			.68	.68	.62	.70	.60
13.	.64	0.60	.94	.72			.71		.62	.61	.71	.54
14.	.64	.60	1.03	.71		.60	.71	.64	.64	.63	.64	.59
15.	.64	.59		.75				.67	.61		.64	.60
16.	.64	.59			.60	.52			.64	.63	.76	.62
17.		.59	1.11				.70	.53	.61		.85	.52
18.			1.11	.78	.58				.59	.68	.72	.60
19.	.64		.91	.79			.64	.62	.58	.72	.70	.62
20.	.64		1.03	.79		.60	.65			.88	.70	.70
21.	.64		.90	.79				.64	.58		.67	.66
22.	.62		.85	.80	.65				.61	.72	.66	.75
23.	.61		.90	.82				.61	.64		.70	
24.	.61			.90	.68			.65	.64	.72		
25.	.60	.95	.80				.69	.64		.66	.64	.65
26.	.60	.78	.72	.91	.62	.61	.54	.60	.62	.63	.64	.82
27.	.61		.67	.89		.70	.65	.65	.61		.62	
28.	.58		.64	.85	.59	.61	.60		.61		.66	.62
29.	.55		.62				.62		.60		.65	.62
30.	.54		.68				.61			.74	.62	
31.							.59					

<sup>a</sup> Channel dry.

Daily discharge, in second-feet, at station No. 71 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.		0.05	11.		0.10	21.		0.10
2.		.05	12.		.15	22.		.10
3.		.05	13.		.15	23.		.10
4.		.05	14.		.35	24.		.10
5.		.10	15.		1.00	25.		.10
6.		.10	16.		.10	26.		.10
7.		.10	17.		.10	27.		.10
8.		.10	18.		.10	28.		.10
9.		.15	19.		.10	29.		.10
10.		.10	20.		.10	30.		.10
					.45	31.		.25

Daily discharge, in second-feet, at station No. 71 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.10	(a)	0.10	0.30	0.10	0.05	0.05	0.05	0.30	0.10	0.10	0.20
2.....	.10	(a)	.10	.20	.20		.10	.05	.40	.05	.10	.50
3.....	.10	(a)	.10	.15	.30		.20	.20	.50	.10	.10	.20
4.....	.10	(a)	.05	.30	.40		.20	.10	.60	.10	.10	.10
5.....	.10	(a)	.05	.15	.50		.20	.10	.10	.05	.10	.05
6.....	.10	(a)	.05	.50	.40		.15	.10	.10	.05	.10	.05
7.....	.10	(a)	.15	.60	.30		.10	.05	.20	.05	.10	.05
8.....	.10	(a)	.20	.50	.20		.10	.05	.10	.05	.05	.05
9.....	.10	(a)	.25	.40	.20		.10	.10	.10	.05	.15	.05
10.....	.10	(a)	.20	.15	.20		.10	.10	.10	.05	.30	.05
11.....	.10	(a)	.30	.10	.20		.10	.10	.10	.05	.20	.05
12.....	.05	(a)	.40	.15	.15		.10	.10	.10	.05	.10	.05
13.....	.05	0.05	.35	.10	.10		.10	.10	.05	.05	.10	.05
14.....	.05	.05	.45	.10	.10	.05	.10	.05	.05	.05	.05	.05
15.....	.05	.05	.50	.15	.10		.10	.10	.05	.05	.05	.05
16.....	.05	.05	.50	.15	.05		.10	.10	.05	.05	.15	.05
17.....	.05	.05	.50	.20	.05		.10	.10	.05	.30	.30	.05
18.....	.05	.05	.50	.20	.05		.10	.10	.05	.20	.10	.05
19.....	.05	.05	.30	.20	.05		.05	.05	.05	.10	.10	.05
20.....	.05	.10	.45	.20	.05	.05	.05	.05	.05	.10	.10	.10
21.....	.05	.30	.30	.20	.05		.05	.05	.05	.20	.10	.10
22.....	.05	.50	.25	.20	.05		.05	.05	.05	.30	.10	.15
23.....	.05	.70	.30	.20	.20		.05	.05	.05	.60	.10	.30
24.....	.05	.60	.20	.30	.10		.10	.10	.05	.30	.10	.10
25.....	.05	.40	.20	.30	.10		.10	.05	.05	.10	.05	.05
26.....	.05	.20	.10	.30	.05	.05	.10	.05	.05	.05	.05	.20
27.....	.05	.20	.10	.30	.05	.10	.10	.10	.05	.70	.05	.20
28.....	.05	.10	.05	.25	.05	.05	.05	.10	.05	.50	.10	.05
29.....	.05	.10	.05	.20	.05		.05	.10	.05	.30	.05	.05
30.....	.05		.10	.10	.05		.05	.10	.05	.15	.05	.05
31.....	.05		.50		.05		.05	.10		.10		.05

a Channel dry.

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Monthly discharge at station No. 71 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 13-30.....	0.10	3.57	June.....	0.05	2.98
December.....	.24	14.70	July.....	.10	6.15
			August.....	.08	4.92
1912.			September.....	.12	7.14
January.....	.07	4.30	October.....	.16	9.84
February.....	.12	6.90	November.....	.11	6.55
March.....	.25	15.40	December.....	.10	6.15
April.....	.24	14.30			
May.....	.15	9.22	The year.....	.13	93.80

*Discharge measurements at station No. 72 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 21.....	<i>Feet.</i> 0.91	<i>Sec.-ft.</i> 0	Nov. 8.....	<i>Feet.</i> 1.00	<i>Sec.-ft.</i> 0.04
Sept. 28.....	.88		Dec. 11.....	.96	0

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 72 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.82	0.95					
2.....			1.01				1.07	0.90		0.96		
3.....			1.00	1.02								
4.....		(a)	.96	.95				1.09		1.00		
5.....	0.98	(a)	.95	1.05	1.38		1.09	1.05	1.08	.94	1.00	1.00
6.....	.98		.92	1.26		.79	1.05		1.07	.90		1.00
7.....	.98		1.08				1.00	.99	1.11	.88	.99	1.00
8.....	1.00	(a)				.80		.95	1.02	.89	1.00	1.00
9.....		(a)	.95				.91	1.00	.99		1.15	1.00
10.....		(a)	1.02	1.00	.95			1.06		.98		1.00
11.....	.98	(a)	1.09	1.05			1.07		.96	.94		.96
12.....	.98	(a)	1.16	1.04	.93			1.00	1.03	1.02	1.08	.95
13.....	.96	0.92	1.35	1.03			1.00		.99	1.00	1.16	.95
14.....	.95	.90	1.42	1.00		.90	1.01	.99	1.00	1.02	1.01	.96
15.....	.95	.84		1.01				1.01	.97		.99	1.00
16.....	.95	(a)			.88	.77			.99	1.02	1.12	1.02
17.....		(a)	.99			.79	.92		.97		1.25	1.00
18.....			1.42	1.02	.81				.94	1.08	1.10	1.00
19.....	.94		1.12	1.03			.72	.99	.91	1.15	1.08	1.00
20.....	.94		1.15	1.03		.71	.71			1.28	1.08	1.12
21.....	.94		1.11	1.06				.90	.89		1.02	1.02
22.....	.92		1.07	1.11	.90				.91	1.10	1.02	1.20
23.....	.91		1.11	1.14				.88	.90		1.09	
24.....	.91			1.20	.95			.92	.90	1.10		
25.....	.90	1.00	1.04				.92	.90		.98	1.00	1.05
26.....	.90	.88	1.01	1.30	.90	.68	.99	.85	.90	.94	.98	1.09
27.....	.90		.96	1.21	.90	.90	.94	.95	.89		.99	
28.....	.88		.93	1.21	.89	.68	.92		.89		1.03	1.00
29.....	.85		.91				.95		.93		1.04	1.00
30.....	.84		.99				.92			1.10	1.01	
31.....							.90					

<sup>a</sup> Channel dry.

*Monthly discharge at station No. 72 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November.....	<sup>a</sup> 0.10	5.95	June.....	0.05	3.00
December.....	.15	9.22	July.....	.07	4.20
			August.....	.08	4.80
1912.			September.....	.09	5.40
January.....	.02	1.00	October.....	.12	7.50
February.....	.02	1.20	November.....	.11	6.70
March.....	.15	9.30	December.....	.10	5.90
April.....	.15	8.90			
May.....	.06	4.00	The year.....	.09	61.90

<sup>a</sup> Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 73 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 21.....	0.74	0.39	Nov. 8.....	0.88	0.40
Sept. 20.....	.60	0	Dec. 28.....	.84	1.00

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 73 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....			1.08			0.55	0.78					
2.....			1.01	1.09			.87	0.68		0.79		
3.....			.94	1.42								
4.....		0.55	.94					.92		.80		
5.....	0.75	.55	.80	1.14	1.15		.90	.88	1.00	.74	0.95	0.82
6.....	.75		.75	1.24		.50	.88		1.00	.72		.82
7.....	.75		.86				.83	.84	1.09	.68	.81	.85
8.....	.80	.52				.53		.80	.91	.66	.85	.94
9.....		.52	.86				.73	.90	.89		1.25	.91
10.....		.51	.84	1.40	.81			.91		.70		.81
11.....	.70	.51	.86	1.30			1.11		.86	.67		.78
12.....	.70	.50	1.15	1.37	.79			.89	.97	.84	1.01	.75
13.....	.68	.75	1.51	1.28			.85		.94	.80	1.16	.70
14.....	.68	.64	1.56	.90		.60	.99	.88	.95	.87	.88	.72
15.....	.65	.62		.94				.97	.90		.82	.75
16.....	.65	.61			.60	.51			.94	.84	1.35	.90
17.....		.60	.96				.90	.78	.88		1.51	.80
18.....			1.56	.95	.56				.81	.85	1.16	.82
19.....	.65		.83	.98			.79	.88	.76	1.01	1.02	.91
20.....	.64		1.02	.98		.73	.78			1.30	1.01	1.16
21.....	.64		.82	.98				.72	.74		.95	.92
22.....	.64		.80	.98	.65			.75	.75	1.08	.94	1.20
23.....	.62		.82	.98				.72	.69		.99	
24.....	.62			1.00	.66			.75	.66	1.06		
25.....	.61	.97	.85				.74	.74		.82	.84	.84
26.....	.61	.84	1.00	1.08	.62	.81	.80	.65	.64	.76	.82	1.00
27.....	.62		.98	1.03		.91	.75	.85	.64		.82	
28.....	.58		.79	1.01	.60	.81	.72		.61		1.00	.83
29.....	.56		.76				.75		.64		1.00	.84
30.....	.55		.86				.72			1.18	.85	
31.....							.68					

*Daily discharge, in second-feet, at station No. 73 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.1	11.....		0.1	21.....	1.2	1.0
2.....		.1	12.....		.4	22.....	1.2	.7
3.....		.1	13.....	1.2	.8	23.....	1.2	.6
4.....		.1	14.....	.9	1.2	24.....	1.1	1.0
5.....		.1	15.....	.8	3.6	25.....	1.1	.6
6.....		.1	16.....	.7	1.7	26.....	.5	.5
7.....		.1	17.....	.8	2.0	27.....	.2	.5
8.....		.2	18.....	1.0	1.7	28.....	.2	.5
9.....		.2	19.....	1.1	2.1	29.....	.2	.6
10.....		.2	20.....	1.2	2.2	30.....	.2	.6
						31.....		.

*Daily discharge, in second-feet, at station No. 73 at 2,700-foot level, near Hilo, Hawaii,  
for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.	0.4	0.1	1.0	2.0	1.5	-----	0.4	0.1	1.5	0.5	2.0	2.0
2.	.4	.1	1.5	1.8	1.5	-----	.7	.2	2.0	.5	1.5	3.5
3.	.4	.1	1.2	1.6	1.5	-----	1.2	1.5	3.0	.5	3.0	2.5
4.	.4	.1	1.0	3.0	1.5	-----	1.0	.9	4.0	.5	1.0	1.5
5.	.4	.1	.5	1.8	1.8	-----	.8	.7	1.2	.3	1.0	-----
6.	.4	.1	.4	2.2	1.5	-----	.7	.6	1.2	.3	-----	.6
7.	.4	.1	.7	4.0	1.0	-----	.6	.6	1.6	.2	.5	.6
8.	.5	.1	.7	3.5	.5	-----	.4	.5	.8	.1	.6	1.0
9.	.4	.1	.7	3.0	.5	-----	.3	.8	.8	.2	2.2	.8
10.	.3	.1	.6	2.9	.5	-----	.3	.8	.8	.2	4.0	.5
11.	.2	.1	.7	2.4	.5	-----	1.6	.8	.7	.1	3.5	.4
12.	.2	.1	1.8	2.8	.5	-----	1.0	.8	1.1	.6	1.2	.4
13.	.2	.4	3.5	2.3	.5	-----	.6	.8	1.0	.5	1.8	2.0
14.	.2	.1	3.7	.8	.5	-----	1.2	.7	1.0	.7	.7	.3
15.	.1	.1	2.8	1.0	.5	-----	1.0	1.1	.8	.7	.6	.4
16.	.1	.1	1.9	1.0	.5	-----	.9	.5	1.0	.6	2.6	.8
17.	.1	.1	1.0	1.0	.4	-----	.8	.4	.7	1.2	3.4	.5
18.	.1	.1	3.7	1.0	.3	-----	.6	.5	.6	.6	1.8	.6
19.	.1	.1	.6	1.1	.2	-----	.5	.7	.4	1.2	1.3	.8
20.	.1	.5	1.3	1.1	.1	0.3	.4	.4	.4	2.4	1.2	1.8
21.	.1	1.0	.6	1.1	.1	-----	.4	.3	.3	2.5	1.0	.9
22.	.1	2.5	.5	1.1	.1	-----	.4	.3	.4	1.5	1.0	2.0
23.	.1	4.0	.6	1.1	.2	-----	.5	.3	.2	3.5	1.2	3.5
24.	.1	2.5	.6	1.2	.1	-----	.9	.4	.1	1.4	1.0	2.0
25.	.1	1.1	.6	1.4	.1	-----	.3	.3	.1	.6	.6	.6
26.	.1	.6	1.2	1.5	.1	.5	.5	.1	.1	.4	.6	1.2
27.	.1	.5	1.1	1.3	.1	.8	.4	.6	.1	.4	.6	1.0
28.	.1	.5	.5	1.2	.1	.5	.3	.5	.1	.3	1.2	.6
29.	.1	.5	.4	1.0	.1	-----	.4	.1	.1	.3	1.2	.6
30.	.1	-----	.7	1.5	.1	-----	.3	.3	.5	1.9	.6	.5
31.	.1	-----	3.0	-----	.1	-----	.2	-----	-----	1.0	-----	.5

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 73 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second- feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second- feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 13-30.....	0.82	29.50	June.....	0.10	5.95
December.....	.80	48.50	July.....	.63	38.70
1912.			August.....	.55	33.80
January.....	.21	12.90	September.....	.88	52.40
February.....	.55	31.60	October.....	.83	51.00
March.....	1.26	77.50	November.....	1.43	85.10
April.....	1.76	105.00	December.....	1.07	65.80
May.....	.55	33.80	The year.....	.82	594.00

*Discharge measurements at station No. 74 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 21 .....	<i>Feet.</i> 1.78	<i>Sec.-ft.</i> 5.45	Nov. 8 .....	<i>Feet.</i> 2.04	<i>Sec.-ft.</i> 10.7
Sept. 28 .....	1.44	1.48	Dec. 28 .....	2.12	13.6

NOTE.—Bed of stream in exposed bed rock. Section near gage fairly smooth. Permanent. One channel at low stage, two channels at intermediate stages, and one channel at high stages.



Daily gage height, in feet, at station No. 74 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Seltonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						1.40	1.82					
2.			2.28				1.93	1.56		1.76		
3.			2.18	1.96								
4.		1.20	2.10	2.00				2.10		1.82		
5.	1.60	1.20	1.88	2.29	2.02		1.98	1.90	2.40	1.77	2.36	2.00
6.	1.60		1.75	2.16		1.33	1.91		2.00	1.68		1.95
7.	1.60		1.92				1.90	1.80	2.64	1.62	2.02	2.08
8.	1.65	1.18				1.52		1.81	2.20	1.65	2.02	2.30
9.		1.18	1.91				1.88	1.80	2.00		2.18	2.14
10.		1.16	1.91	2.21	1.75			1.81		1.72		2.00
11.	1.50	1.15	1.96	2.40			2.58		1.79	1.70		1.88
12.	1.50	1.14	2.52	2.10	1.64			1.80	2.18	2.00	2.44	1.80
13.	1.50	1.68	2.59	2.09			1.90		1.97	1.73	2.50	1.71
14.	1.48	1.58	2.69	2.08		1.60	2.20	1.94	1.90	1.94	2.18	1.74
15.	1.40	1.44		2.09				2.00	1.77		2.01	1.85
16.	1.38	1.38			1.81	1.40			1.97	2.05	2.67	2.10
17.		1.34	2.47				1.81	1.81	1.89		3.22	1.98
18.			2.66	1.60	1.78				1.80	2.06	2.34	1.90
19.	1.35		1.99	1.61			1.68	1.98	1.78	2.34	2.64	2.10
20.	1.32		2.27	1.64		1.70	1.66			2.82	2.27	2.80
21.	1.31		1.98	1.62				1.78	1.64		2.23	2.05
22.	1.30		1.86	1.63	1.61				1.66	2.55	2.23	2.85
23.	1.30		2.01	1.57				1.62	1.59		2.43	
24.	1.30			1.70	1.72			1.67	1.56	2.62		
25.	1.30	2.20	1.71				1.89	1.65		2.15	2.01	1.85
26.	1.30	1.91	1.99	1.71	1.60	2.08	1.81	1.61	1.50	1.88	1.98	1.92
27.	1.30		1.82	1.70		2.21	1.83	1.94	1.45		1.90	
28.	1.28		1.74	1.74	1.50	2.08	1.80		1.44		2.01	2.12
29.	1.26		1.71				1.75		1.42		2.20	2.19
30.	1.25		1.79				1.68			2.60	1.94	
31.							1.61					

Daily discharge, in second-feet, at station No. 74 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.		3.64	11.		3.08	21.	23.40	9.60
2.		3.36	12.		9.84	22.	22.20	3.50
3.		3.08	13.	14.40	21.00	23.	21.00	3.36
4.		2.80	14.	12.30	35.20	24.	20.10	9.60
5.		3.08	15.	13.50	66.00	25.	19.20	5.80
6.		3.08	16.	14.40	20.40	26.	9.60	2.80
7.		3.08	17.	16.50	22.50	27.	9.20	1.80
8.		4.06	18.	18.60	20.40	28.	7.60	1.80
9.		4.52	19.	60.00	23.40	29.	4.20	5.80
10.		4.06	20.	24.80	26.00	30.	4.06	4.20
						31.		2.80

*Daily discharge, in second-feet, at station No. 74 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.80	0.40	11.00	15.00	5.00	1.10	6.20	2.00	18.00	3.60	25.00	12.00
2.....	2.80	.40	17.00	11.00	6.50	1.00	8.20	2.40	20.00	5.20	25.00	20.00
3.....	2.80	.30	14.00	8.80	5.00	.90	25.00	15.00	30.00	5.70	30.00	11.00
4.....	2.80	.30	12.00	9.60	8.00	.90	18.00	12.00	35.00	6.20	25.00	10.00
5.....	2.80	.30	7.20	18.00	10.00	.80	9.20	7.60	21.00	5.30	20.00	9.60
6.....	2.80	.30	5.00	14.00	8.00	.75	7.80	6.70	9.60	3.90	15.00	8.60
7.....	2.80	.30	8.00	30.00	7.00	1.30	7.60	5.80	30.00	3.10	10.00	12.00
8.....	3.50	.30	7.90	28.00	6.00	2.00	7.40	6.00	15.00	3.50	10.00	18.00
9.....	3.00	.30	7.80	25.00	5.00	2.10	7.20	5.80	9.60	4.00	19.00	13.00
10.....	2.40	.20	7.80	15.00	5.00	2.20	7.00	6.00	7.60	4.50	40.00	9.60
11.....	1.80	.20	8.80	21.00	4.00	2.40	27.00	5.90	5.60	4.20	30.00	7.20
12.....	1.80	.20	25.00	12.00	3.40	2.60	15.00	5.80	14.00	9.60	22.00	5.80
13.....	1.80	3.90	28.00	12.00	4.00	2.70	7.60	7.10	9.00	4.70	24.00	4.40
14.....	1.70	2.60	32.00	12.00	4.60	2.80	15.00	8.40	7.60	8.40	14.00	4.80
15.....	1.10	1.40	29.00	12.00	5.30	2.00	12.00	9.60	5.30	8.00	10.00	6.70
16.....	1.00	1.00	26.00	9.00	6.00	1.10	9.00	5.00	9.00	11.00	31.00	12.00
17.....	.90	.80	23.00	6.00	5.80	1.90	6.00	6.00	7.40	15.00	53.00	9.20
18.....	.90	.70	30.00	2.80	5.50	2.60	5.00	7.60	5.80	11.00	19.00	7.60
19.....	.80	.40	9.40	2.90	5.10	3.40	3.90	9.20	5.50	19.00	30.00	12.00
20.....	.70	1.00	17.00	3.40	4.70	4.20	3.60	6.00	4.40	37.00	14.00	36.00
21.....	.60	20.00	9.20	3.10	3.80	5.50	4.40	5.50	3.40	32.00	16.00	11.00
22.....	.60	40.00	6.90	3.20	2.90	6.80	5.20	4.30	3.60	26.00	16.00	38.00
23.....	.60	56.00	9.80	2.50	3.70	8.10	6.00	3.10	2.70	38.00	22.00	45.00
24.....	.60	30.00	7.10	4.20	4.50	9.40	6.70	3.80	2.40	29.00	16.00	28.00
25.....	.60	15.00	4.40	4.30	3.60	10.70	7.40	3.50	2.10	14.00	10.00	6.70
26.....	.60	7.80	9.40	4.40	2.80	12.00	6.00	2.90	1.80	7.20	9.20	8.00
27.....	.60	6.00	6.20	4.20	2.30	15.00	6.30	8.40	1.40	56.00	7.60	10.00
28.....	.50	5.00	4.80	4.80	1.80	12.00	5.80	8.00	1.40	40.00	10.00	13.00
29.....	.50	5.00	4.40	4.50	1.60	10.00	5.00	7.50	1.20	30.00	15.00	15.00
30.....	.40		5.60	5.00	1.40	8.00	3.90	7.00	2.00	28.00	8.40	10.00
31.....	.40		30.00	-----	1.20	-----	2.90	7.00	-----	25.00	-----	10.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 74 at 2,700-foot level, near Hilo, Hawaii, for 1911-1912.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 13-30.....	17.50	628.00	June.....	4.54	270.00
December.....	10.80	663.00	July.....	8.62	530.00
1912.			August.....	6.48	398.00
January.....	1.52	93.50	September.....	9.71	573.00
February.....	6.90	397.00	October.....	16.10	990.00
March.....	13.70	842.00	November.....	19.90	1,180.00
April.....	10.30	613.00	December.....	13.70	842.00
May.....	4.63	285.00	The year.....	9.66	7,040.00

*Discharge measurements of station No. 75 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 21.....	0.92	0.19	Nov. 8.....	0.99	0.38
Sept. 28.....	.80	-----	Dec. 28.....	1.01	.58

NOTE.—Bed of stream of gravel and small cobbles; probably shifting.



*Daily discharge, in second-feet, at station No. 75 at 2,700-foot level, near Hilo, Hawaii,  
for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....		(a)	0.50	0.70	1.20		0.30	0.10	0.60	0.20	1.50	1.00
2.....		(a)	1.00	.40	1.40		.90	.10	.80	.20	1.00	2.00
3.....		(a)	.50	.10	1.60		2.00	.80	1.00	.20	2.00	1.00
4.....		(a)	.50	.10	2.00		1.30	.60	1.40	.30	1.00	.70
5.....	0.10	(a)	.10	.80	2.80		1.00	.60	.60	.10	.70	.50
6.....	.10	(a)	.10	1.00	2.00		.80	.50	.60	.10	.50	.50
7.....	.10	(a)	.40	2.00	1.50		.50	.50	1.30	.10	.30	.50
8.....	.20	(a)	.40	1.80	.90		.40	.30	.50	.10	.50	.90
9.....		(a)	.30	1.70	.70		.30	.50	.30	.10	2.00	.50
10.....		(a)	.20	1.40	.50		.40	.60		.10	3.00	.60
11.....	.10	(a)	.50	1.00	.30		1.20	.50	.20	.10	2.00	.30
12.....	.10	(a)	.80	1.00	.10		.90	.40	.60	.40	1.00	.30
13.....	.10	0.10	.80	.80	.10		.60	.50	.50	.30	1.20	.30
14.....	.10	(a)	.90	.40	.10	0.10	.90	.50	.40	.50	.60	.30
15.....		(a)	.70	.30	.10		.60	.60	.30	.50	.40	.50
16.....		(a)	.50	.30	.10		.40	.60	.50	.50	1.80	.90
17.....		(a)	.30	.20	.10		.20	.70	.40	.80	2.00	.40
18.....		(a)	1.30	.20	.10		.10	.60	.30	.60	1.20	.50
19.....		(a)	.60	.50	.10		.10	.50	.20	1.00	1.00	1.30
20.....	.20		.90	.60	.10		.10	.30		.90	.90	1.50
21.....		1.50	.60	.80	.10		.10	.10	.10	.90	.70	2.70
22.....		2.50	.40	.80	.10		.10	.10	.10	.90	.60	3.00
23.....		3.00	.60	.90	.20		.10	.10	.10	2.00	1.00	3.00
24.....		2.00	.40	1.00	.20		.20	.10	.10	1.20	.80	2.50
25.....		.50	.10	1.40	.20		.30	.10	.10	.70	.60	.50
26.....	.10		.60	1.80	.10	.10	.60	.10	.10	.50	.50	1.00
27.....	.10		.30	2.20	.10	.50	.40	.40	.10	3.00	.40	.80
28.....	.10		.10	1.50	.10	.10	.20	.30	.10	2.00	.80	.60
29.....		.10		1.00	.10		.10	.20	.10	2.00	.80	.50
30.....			.30	1.20	.10		.10	.10	.20	1.70	.40	.30
31.....			2.00		.10		.10	.20		1.50		.20

*a* Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 75 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	0.74	25.10	June.....	0.20	11.90
December.....	.87	53.00	July.....	.49	30.10
			August.....	.37	22.80
1912.			September.....	.39	23.20
January.....	.08	4.92	October.....	.76	46.70
February.....	.35	20.10	November.....	1.04	61.90
March.....	.54	33.20	December.....	.95	58.40
April.....	.93	55.30			
May.....	.56	34.40	The year.....	.56	403.00

*Discharge measurements at station No. 76 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 21	<i>Feet.</i> 0.85	<i>Sec.-ft.</i> 0.42	Nov. 8	<i>Feet.</i> 0.98	<i>Sec.-ft.</i> 0.98
Sept. 28	.75	.26	Dec. 28	1.01	1.25

NOTE.—Bed of stream of small bowlders and cobbles. Section fairly smooth. Channel permanent. One channel at all stages.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.75	0.88					
2.			1.05				.99	0.86		0.90		
3.			1.02	0.90								
4.		0.55	.94	1.20				.98		.91		
5.	0.80	.55	.82	1.06	1.28		1.01	.92	1.09	.89	1.08	0.92
6.	.80		.81	1.38		.68	.98		1.11	.85		.95
7.	.80		.88				.93	.91	1.18	.83	.94	.99
8.	.84	.55				.70	.88	.88	.99	.84	.98	1.01
9.		.54	.85				.88	.93	.95		1.40	1.00
10.		.54	.85	1.49	.98			.95		.85		.98
11.	.78	.52	.85	1.43			1.10		.91	.82		.94
12.	.78	.52	1.11	1.39	.93			.92	1.01	.95	1.19	.95
13.	.75	.82	1.16	1.20			.92		.99	.92	1.28	.89
14.	.75	.78	1.22	.91		.79	1.04	1.05	.98	.98	1.03	.95
15.	.70	.70		.91				1.05	.95		.96	.99
16.	.68	.68			.82	.70			.95	.92	1.36	1.11
17.		.64	1.05				.99	.88	.89			1.04
18.			1.24	.90	.81				.88	.96	1.23	1.09
19.	.66		.86	.91			.81	.99	.84	1.08	1.20	1.22
20.	.66		.98	.99		.80	.80				1.16	
21.	.66		.81	.98				.85	.82		1.09	1.32
22.	.65		.86	1.01	.80				.84	1.16	1.07	
23.	.65		.86	1.03				.81	.82		1.10	
24.	.65			1.15	.81			.85	.81	1.18		
25.	.64	.95	.82				.89			1.06	.99	.95
26.	.64	.81	1.01	1.21	.79	.90	.91	.78	.80	1.02	.98	
27.	.66		.94	1.21		1.00	.90	.94	.78		.96	
28.	.62		.84	1.15	.78	.90	.88		.75		1.12	
29.	.60		.82				.89		.80		1.12	1.01
30.	.60		.88				.89			1.41	1.00	1.01
31.							.81					

*Daily discharge, in second-feet, at station No. 76 at 2,700-foot level, near Hilo, Hawaii,  
for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.		0.29	11.		0.30	21.	3.50	1.20
2.		.28	12.		.90	22.	3.20	.60
3.		.28	13.		2.30	23.	2.90	.54
4.		.28	14.	1.31	4.18	24.	2.60	1.20
5.		.33	15.	1.42	9.56	25.	2.30	.90
6.		.33	16.	1.20	3.05	26.	1.14	.60
7.		.36	17.	1.42	3.80	27.	.57	.60
8.		.48	18.	1.75	3.05	28.	.57	.60
9.		.57	19.	12.20	4.56	29.	.36	.90
10.		.48	20.	3.65	6.12	30.	.30	.72
						31.		.60

*Daily discharge, in second-feet, at station No. 76 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.30	0.10	1.00	4.00	2.50	0.25	0.55	0.30	3.00	0.70	5.00	4.00
2.....	.30	.10	1.75	1.00	2.50	.25	1.15	.50	4.00	.60	3.00	7.00
3.....	.30	.10	1.40	.60	3.00	.25	4.00	3.00	7.00	.70	8.00	1.00
4.....	.30	.10	.85	3.80	4.00	.20	2.50	1.10	9.00	.65	4.00	3.00
5.....	.30	.10	.35	1.80	4.80	.20	1.30	.75	2.20	.60	2.10	.75
6.....	.30	.10	.35	5.85	4.00	.20	1.10	.70	2.45	.45	1.00	.90
7.....	.30	.10	.55	9.00	3.00	.20	.80	.65	3.20	.40	.85	1.15
8.....	.40	.10	.50	9.00	2.00	.20	.70	.55	1.15	.40	1.10	1.30
9.....	.40	.05	.45	8.00	1.50	.20	.55	.80	.90	.40	1.80	1.20
10.....	.30	.05	.45	8.00	1.10	.20	.50	.90	.80	.45	10.00	1.10
11.....	.30	.05	.45	7.90	1.00	.20	2.30	.80	.65	.35	9.00	.85
12.....	.30	.05	2.40	5.90	.80	.30	1.50	.75	1.30	.90	3.65	.90
13.....	.25	.35	3.20	3.80	.70	.30	.75	1.10	1.15	.75	5.30	.60
14.....	.25	.30	4.20	.65	.60	.30	1.65	1.75	1.10	1.10	1.55	.90
15.....	.20	.20	3.40	.65	.50	.30	1.50	1.75	.90	1.00	.95	1.15
16.....	.20	.20	2.60	1.00	.35	.20	1.30	.60	.90	.75	6.95	2.45
17.....	.20	.15	1.75	2.00	.35	.20	1.15	.55	.60	2.50	8.50	1.65
18.....	.20	.15	4.40	.60	.35	.20	.80	.80	.55	.95	4.35	2.20
19.....	.20	.50	.55	.65	.35	.30	.35	1.15	.40	2.05	3.80	4.20
20.....	.20	2.00	1.10	1.15	.30	.30	.30	.50	.40	2.10	3.20	5.20
21.....	.20	5.00	.35	1.10	.30	.30	.40	.45	.35	2.20	2.20	6.10
22.....	.15	8.00	.55	1.30	.30	.40	.50	.40	.40	3.20	1.95	9.00
23.....	.15	10.00	.55	1.55	.30	.40	.50	.35	.35	9.00	2.30	10.00
24.....	.15	6.00	.45	1.75	.35	.50	.90	.45	.35	3.50	1.60	2.00
25.....	.15	.90	.35	2.00	.30	.50	.60	.35	.30	1.85	1.15	.90
26.....	.15	.35	1.30	4.00	.30	.60	.65	.30	.30	1.40	1.10	3.00
27.....	.20	.30	.85	4.00	.30	1.20	.60	.85	.30	10.00	.95	2.00
28.....	.10	.30	.40	3.05	.35	.60	.55	.80	.25	8.00	2.60	1.50
29.....	.10	.30	.35	1.00	.30	.60	.60	.70	.30	9.00	2.60	1.30
30.....	.10	.55	1.00	.30	.50	.60	.60	.90	8.00	1.20	1.30	1.30
31.....	.10	.80	.30	.30	.30	.35	.70	.70	4.00	.40	.40	1.30

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 76 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	2.37	79.90	June.....	0.34	20.20
December.....	1.61	88.90	July.....	1.00	61.50
1912.			August.....	.80	49.20
January.....	.23	14.10	September.....	1.52	90.40
February.....	1.24	71.30	October.....	2.51	154.00
March.....	1.46	89.80	November.....	3.59	214.00
April.....	3.20	190.00	December.....	2.58	159.00
May.....	1.20	73.80	The year.....	1.64	1,190.00

*Discharge measurements at station No. 77 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 21.....	<i>Feet.</i> 0.65	<i>Sec.-ft.</i> 0.10	Nov. 8.....	<i>Feet.</i> 0.68	<i>Sec.-ft.</i> 0.17
Sept. 28.....	.60	.06	Dec. 28.....	.68	.17

NOTE.—Bed of stream of sand, gravel, and small cobbles; probably slightly shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 77 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.78	1.02					
2.....			1.15				1.13	0.98		0.70		
3.....			1.20	1.22								
4.....		0.50	1.13	1.46				1.10		.66		
5.....	0.71	.50	1.02	1.29	1.70		1.18	1.04	1.21	.65	0.75	0.70
6.....	.71		1.02	1.31		.71	1.15		1.22	.64		.70
7.....	.71		1.15				1.10	.94	1.26	.62	.70	.69
8.....	.74	.49				.71		.90	1.11	.64	.70	.72
9.....		.48	1.19				1.00	.64	.98		.89	.68
10.....		.48	1.18	1.39	1.30			.65		.64		.62
11.....	.70	.46	1.21	1.34			1.20		.74	.62		.61
12.....	.70	.46	1.30	1.35	1.23			.62	.80	.70	.80	.60
13.....	.68	.68	1.44	1.25			1.11		.79	.66	.80	.60
14.....	.68	.60	1.51	1.23		.81	1.19	.64	.78	.70	.74	.61
15.....	.65	.52		1.21				.71	.74		.70	.62
16.....	.65	.51			1.01	.74			.75	.69	.90	.68
17.....		.50	1.14				.99	.62	.72			.60
18.....			1.42	1.20	1.00				.70	.86	.84	.64
19.....	.64		1.24	1.28			.98	.66	.69	.94	.79	.72
20.....	.64		1.28	1.31		.81	.96				.80	
21.....	.64		1.22	1.34				.66	.62		.74	.84
22.....	.64		1.20	1.42	.90				.64	.79	.72	
23.....	.64		1.24	1.44				.61	.62		.76	
24.....	.64			1.50	.91			.65	.62	.78		
25.....	.62	1.15	1.16				1.01	.62		.72	.70	.80
26.....	.62	.99	1.21	1.55	.89	.98	1.03	.60	.62	.68	.70	
27.....	.62		1.16	1.53		1.02	1.02	.65	.62		.69	
28.....	.60		1.12	1.55	.80	.98	1.01		.61		.73	.70
29.....	.56		1.08				1.05		.62		.72	.68
30.....	.55		1.16				.96			.84	.70	
31.....							.98					

*Daily discharge, in second-feet, at station No. 77 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.6	11.....		1.1	21.....	1.5	2.4
2.....		1.5	12.....		2.2	22.....	1.8	1.6
3.....		1.4	13.....		3.3	23.....	2.0	1.6
4.....		1.0	14.....	0.5	4.4	24.....	2.3	2.2
5.....		1.2	15.....	.4	5.3	25.....	2.4	1.9
6.....		1.2	16.....	.4	3.4	26.....	2.3	1.7
7.....		1.3	17.....	.8	3.7	27.....	2.2	1.6
8.....		1.2	18.....	1.3	3.6	28.....	2.3	1.6
9.....		1.2	19.....	3.1	3.9	29.....	2.1	1.9
10.....		1.2	20.....	1.3	4.3	30.....	1.7	1.7
						31.....		1.6

*Daily discharge, in second-feet, at station No. 77 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.20	0.10	2.0	3.0	3.5	0.4	1.7	1.5	3.0	0.4	0.5	2.0
2.....	.20	.10	2.5	3.0	4.0	.4	2.4	1.5	4.0	.2	.5	3.5
3.....	.20	.10	2.8	2.9	4.0	.3	4.0	4.0	5.0	.2	3.0	.5
4.....	.20	.10	2.4	4.4	4.5	.2	3.0	2.2	6.0	.1	1.0	1.0
5.....	.20	.10	1.7	3.3	5.8	.2	2.7	1.8	2.9	.1	.4	.2
6.....	.20	.10	1.7	3.5	5.0	.2	2.5	1.5	2.9	.1	.2	.2
7.....	.20	.10	2.5	5.0	5.0	.2	2.2	1.2	3.2	.1	.2	.2
8.....	.30	.10	2.6	4.5	4.5	.2	1.9	1.0	2.3	.1	.2	.3
9.....	.30	.10	2.7	4.0	4.0	.2	1.6	.1	1.5	.1	1.0	.2
10.....	.20	.10	2.6	3.9	3.4	.3	1.8	.1	1.0	.1	5.0	.1
11.....	.20	.10	2.9	3.6	3.2	.4	2.8	.1	.3	.1	3.0	.1
12.....	.20	.10	3.4	3.7	3.0	.5	2.5	.1	.5	.2	.5	.1
13.....	.20	.20	4.2	3.1	2.5	.6	2.3	.1	.5	.1	.5	.1
14.....	.20	.10	4.7	3.0	2.0	.6	2.7	.1	.4	.2	.3	.1
15.....	.10	.10	3.0	2.9	2.0	.4	2.0	.2	.3	.2	.2	.1
16.....	.10	.10	2.0	2.9	1.7	.3	1.8	.1	.4	.2	1.0	.2
17.....	.10	.10	2.4	2.8	1.6	.3	1.5	.1	.3	1.7	3.0	.1
18.....	.10	.10	4.1	2.8	1.6	.4	1.5	.1	.2	.8	.7	.1
19.....	.10	.20	3.0	3.3	1.4	.5	1.5	.1	.2	1.2	.5	.3
20.....	.10	1.00	3.3	3.5	1.3	.6	1.4	.1	.1	1.0	.5	2.0
21.....	.10	2.00	2.9	3.6	1.2	.7	1.4	.1	.1	1.0	.3	.7
22.....	.10	3.50	2.8	4.1	1.0	.9	1.5	.1	.1	.5	.3	3.0
23.....	.10	5.00	3.0	4.2	1.5	1.0	1.6	.1	.1	3.0	.4	5.0
24.....	.10	3.50	2.8	4.6	1.1	1.2	1.7	.1	.1	.4	.3	3.0
25.....	.10	2.5	2.6	4.8	1.0	1.4	1.7	.1	.1	.3	.2	.5
26.....	.10	1.5	2.9	4.9	1.0	1.5	1.8	.1	.1	.2	.2	1.0
27.....	.10	1.0	2.6	4.8	.8	1.7	1.7	.1	.1	6.0	.2	.3
28.....	.10	1.0	2.3	4.9	.5	1.5	1.7	.2	.1	4.0	.3	.2
29.....	.10	1.0	2.1	3.0	.4	1.6	1.9	.1	.1	2.0	.3	.2
30.....	.10	.....	2.6	3.0	.4	1.6	1.4	.1	.5	.7	.2	.2
31.....	.10	.....	4.0	.....	.3	.....	1.5	.1	.....	.5	.....	.2

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 77 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	1.67	56.40	June.....	0.68	40.50
December.....	2.18	134.00	July.....	1.99	122.00
1912.			August.....	.55	33.80
January.....	.15	9.22	September.....	1.21	72.00
February.....	.83	47.70	October.....	.83	51.00
March.....	2.81	173.00	November.....	.83	49.40
April.....	3.70	220.00	December.....	.83	51.00
May.....	2.36	145.00	Year.....	2.11	1,010.00



*Discharge measurements at station No. 78 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec. ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 21.....	0.88	0.06	Nov. 8.....	0.90	0.14
Sept. 28.....	.80	.05	Dec. 28.....	.90	.14

NOTE.—Bed of stream of sand, gravel, and small cobbles; probably slightly shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 78 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.70	0.88					
2.....			1.00				.97	0.82		0.87		
3.....			1.00	0.98								
4.....		0.61	.92	1.01				.99		.90		
5.....	0.85	.61	.88	.98	1.29		1.00	.96	0.99	.88	0.95	0.91
6.....	.85		.85	.99		.68	.98		1.01	.86		.90
7.....	.85		.91				.92	.91	1.11	.82	.89	.91
8.....	.89	.60				.67		.86	.94	.82	.90	1.05
9.....		.60	.94				.90	.92	.90		1.17	.92
10.....		.60	.92	1.00	.85			.94		.85		.91
11.....	.75	.60	.96	.98			1.21		.88	.82		.90
12.....	.75	.59	1.01	1.02	.80			.90	.94	.94	1.00	.89
13.....	.74	.85	1.12	1.02			.95		.90	.91	1.08	.85
14.....	.74	.80	1.19	.90		.69	.99	.92	.89	.94	1.03	.89
15.....	.74	.74		.91				.94	.84		.90	.92
16.....	.74	.71			.76	.69			.90	.92	1.11	1.00
17.....		.70	.99				.98	.89	.89			.90
18.....			1.22	.90	.88				.88	.96	1.05	.95
19.....	.74		.99	.91			.86	.92	.86	1.01	1.01	1.02
20.....	.74		1.03	.90		.80	.85				1.02	
21.....	.74		.91	.94				.88	.84		.95	1.18
22.....	.72		.91	.95	.81				.86	1.05	.96	
23.....	.71		.94	1.01				.84	.84		1.02	
24.....	.71			1.12	.82			.84	.82	1.04		
25.....	.70	.93	.91				.91	.81		.98	.91	.95
26.....	.70	.80	.96	1.21	.80	.98	.92	.80	.81	.88	.91	
27.....	.68		.91	1.19		1.02	.92	.89	.80		.91	
28.....	.65		.86	1.18	.78	.98	.90		.80		1.00	.90
29.....	.64		.84				.92		.80		1.00	.90
30.....			.90				.88			1.10	.92	
31.....							.84					

*Daily discharge, in second-feet, at station No. 78 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1911.			1911.			1911.		
1.....		0.10	11.....		0.05	21.....	0.74	0.42
2.....		.10	12.....		.38	22.....	.82	.10
3.....		.10	13.....		1.48	23.....	.90	.10
4.....		.10	14.....	0.50	2.80	24.....	.98	.26
5.....		.05	15.....	.42	4.70	25.....	1.14	.10
6.....		.05	16.....	.30	.50	26.....	.10	.10
7.....		.10	17.....	.42	1.75	27.....	.10	.10
8.....		.10	18.....	.66	.50	28.....	.10	.10
9.....		.10	19.....	2.40	1.75	29.....	.10	.26
10.....		.10	20.....	.66	2.70	30.....	.10	.18
						31.....		.10

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1912.												
1.....			0.30	0.20	1.50		0.10	0.05	0.50	0.10	1.00	1.50
2.....			.50	.30	1.50		.40	.05	.60	.10	.50	2.50
3.....			.50	.40	2.00		.70	.80	1.00	.10	2.00	1.80
4.....			.20	.60	2.50		.60	.50	2.00	.10	.50	.70
5.....	0.10		.10	.40	3.10	.50	.30	.50	.10	.30	.10	
6.....	.10		.10	.50	2.50		.40	.20	.60	.10	.20	.10
7.....	.10		.10	2.00	1.00		.20	.10	1.40	.05	.10	.10
8.....	.10		.20	1.50	.50		.10	.10	.30	.05	.10	.90
9.....			.30	1.00	.20		.10	.20	.10	.10	1.90	.20
10.....			.20	.50	.10		.10	.30	.10	.10	3.00	.20
11.....	.05		.30	.40	.10	2.30	.20	.10	.05	2.00	.10	
12.....	.05		.60	.70	.05	1.50	.10	.30	.30	.50	.10	
13.....		0.10	1.50	.70	.05	.30	.20	.10	.10	1.10	.10	
14.....		.05	2.10	.10	.05	.50	.20	.10	.30	.75	.10	
15.....			1.50	.10	.05	.40	.30	.10	.20	.10	.20	
16.....			1.00	.10	.05	.40	.20	.10	.20	1.40	.50	
17.....			.50	.20	.10	.40	.10	.10	.50	2.00	.10	
18.....			2.40	.10	.10	.30	.10	.10	.30	.90	.30	
19.....			.50	.10	.10	.10	.20	.10	.60	.60	.70	
20.....			.75	.10		0.05	.10	.20	.10	.70	1.00	
21.....			.10	.30	.05		.10	.10	.80	.30	2.00	
22.....			.10	.30	.05		.10	.10	.90	.30	2.50	
23.....			.30	.60	.05		.10	.10	1.50	.70	3.00	
24.....			.20	1.50	.05		.10	.10	.05	.80	.40	2.50
25.....		.20	.10	2.00	.05		.10	.05	.05	.40	.10	.30
26.....		.05	.30	2.30	.05	.40	.20	.05	.05	.10	.10	.50
27.....			.10	2.10	.05	.70	.20	.10	.05	3.00	.10	.30
28.....			.10	2.00	.05	.40	.10	.10	.05	2.00	.50	.10
29.....			.10	.50	.05		.20	.05	.05	1.70	.50	.10
30.....			.10	1.00	.05		.10	.05	.25	1.30	.20	.10
31.....			2.50		.05		.10	.10		1.00		.10

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 78 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	0.61	20.80	June.....	0.10	5.95
December.....	.62	38.60	July.....	.35	21.50
1912.			August.....	.17	10.40
January.....	.05	3.07	September.....	.27	16.10
February.....	.20	11.50	October.....	.57	35.00
March.....	.57	35.00	November.....	.76	45.20
April.....	.75	44.60	December.....	.74	45.50
May.....	.52	32.00	The year.....	.42	306.00

*Discharge measurements at station No. 79 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 21.....	0.78	0.28	Nov. 8.....	0.87	0.94
Sept. 29.....	.65	.31	Dec. 28.....	.98	1.36

NOTE.—Bed of stream of sand, gravel, and small cobbles; probably slightly shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 79 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.60	0.82					
2.....			1.12				.92	0.71		0.72		
3.....			1.05	1.12								
4.....		0.50	.95	.95				1.00	.79			
5.....	0.80	.50	.82	1.15	1.35		.98	.89	1.09	.76	1.08	0.90
6.....	.80		.81	1.15		.57	.95		1.10	.74		.90
7.....	.80		.85				.90	.88	1.11	.70	.86	.99
8.....	.81	.51				.59		.85	1.04	.70	.86	.92
9.....		.51	.84				.82	.90	.95		1.39	.92
10.....		.50	.84	1.09	.90			.91		.72		.90
11.....	.80	.50	.81	1.04			1.01		.84	.69		.84
12.....	.80	.50	1.20	1.29	.86			.89	.91	.81	1.26	.83
13.....	.78	.80	1.21	1.01			.95		.89	.78	1.30	.79
14.....	.78	.71	1.25	.90		.65	1.10	.90	.88	.82	1.00	.82
15.....	.70	.64		.89				.98	.85		.90	.92
16.....	.65	.61			.69	.58			.85	.81	1.46	1.01
17.....		.60	1.18				1.00	.81	.81			.92
18.....			1.28	.90	.68				.78	1.01	1.29	.95
19.....	.60		.86	.91			.92	.92	.75	1.12	1.28	1.06
20.....	.60		1.25	.91		.72	.91				1.19	
21.....	.60		.81	.94				.79	.72		1.18	1.20
22.....	.59		.80	1.00	.77				.75	1.25	1.06	
23.....	.58		.83	1.02				.74	.71		1.10	
24.....	.58			1.10	.80			.76	.70	1.30		
25.....	.56	1.00	.85				.84	.75		1.10	.90	1.00
26.....	.56	.83	1.00	1.25	.79	1.01	.95	.70	.64	.98	.86	
27.....	.56		.96	1.25		1.10	.85	.88	.64		.82	
28.....	.54		.84	1.22	.74	1.01	.82		.62		1.05	.96
29.....	.51		.81				.84		.65		1.09	.95
30.....	.50		.88				.78			1.51	.95	
31.....							.75					

*Daily discharge, in second-feet, at station No. 79 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.30	11.....		0.30	21.....	1.40	0.65
2.....		.30	12.....		.55	22.....	1.35	.45
3.....		.30	13.....		.80	23.....	1.35	.40
4.....		.25	14.....	0.63	1.05	24.....	1.35	.60
5.....		.30	15.....	.68	1.40	25.....	1.35	.55
6.....		.30	16.....	.70	.80	26.....	1.10	.45
7.....		.35	17.....	.75	1.00	27.....	.45	.45
8.....		.40	18.....	.80	.80	28.....	.45	.45
9.....		.40	19.....	.75	1.00	29.....	.40	.55
10.....		.40	20.....	1.40	1.40	30.....	.35	.50
						31.....		.45

*Daily discharge, in second-feet, at station No. 79 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.70	0.10	2.00	2.00	2.00	0.20	0.80	0.40	1.20	1.00	3.00	2.50
2.....	.70	.10	1.90	2.00	2.00	.20	1.10	.40	1.50	.50	2.00	3.00
3.....	.70	.10	1.60	1.90	2.00	.20	3.00	2.00	2.00	.70	3.00	1.00
4.....	.70	.10	1.20	1.20	2.00	.20	2.00	1.40	2.50	.70	2.00	2.00
5.....	.70	.10	.80	2.00	2.80	.20	1.30	1.00	1.80	.60	1.70	1.00
6.....	.70	.10	.80	2.00	1.50	.20	1.20	.90	1.80	.50	.90	1.00
7.....	.70	.10	.80	3.50	1.50	.20	1.00	.90	1.80	.40	.90	1.40
8.....	.70	.10	.80	3.00	1.50	.20	.80	.80	1.60	.40	.90	1.10
9.....	.70	.10	.80	2.50	1.00	.20	.80	1.00	1.20	.40	3.00	1.10
10.....	.70	.10	.80	1.80	1.00	.20	.80	1.00	1.00	.50	3.50	1.00
11.....	.70	.10	.70	1.60	1.00	.20	1.40	1.00	.80	.40	3.50	.80
12.....	.70	.10	2.20	2.60	.90	.30	1.30	1.00	1.00	.70	2.40	.80
13.....	.60	.70	2.20	1.40	.80	.30	1.20	1.00	1.00	.60	2.60	.70
14.....	.60	.40	2.40	1.00	.70	.30	1.80	1.00	.90	.80	1.40	.80
15.....	.40	.30	1.00	1.00	.50	.30	1.60	1.30	.80	.80	1.00	1.10
16.....	.30	.20	1.80	1.00	.40	.20	1.50	1.00	.80	.70	3.20	1.40
17.....	.30	.20	2.10	1.50	.40	.20	1.40	.70	.70	2.00	3.00	1.10
18.....	.20	.20	2.50	1.00	.40	.20	1.30	.90	.60	1.40	2.60	1.20
19.....	.20	.80	.90	1.00	.50	.35	1.10	1.10	.50	1.90	2.50	1.60
20.....	.20	1.00	2.40	1.00	.40	.50	1.00	.90	.50	2.00	2.20	2.80
21.....	.20	2.00	.80	1.20	.40	.70	1.10	.70	.50	2.20	2.10	2.20
22.....	.20	3.00	.70	1.40	.60	.90	1.10	.60	.50	2.40	1.60	2.50
23.....	.20	3.50	.80	1.50	1.50	1.00	1.20	.50	.40	3.00	1.80	3.50
24.....	.20	2.50	.80	1.80	.70	1.20	1.50	.60	.40	2.60	1.50	3.50
25.....	.20	1.40	.80	2.00	.70	1.30	.80	.50	.40	1.80	1.00	1.40
26.....	.20	.80	1.40	2.40	.70	1.40	1.20	.40	.30	1.30	.90	2.00
27.....	.20	1.00	1.20	2.40	.60	1.80	.80	.90	.30	3.50	.80	1.50
28.....	.10	1.00	.80	2.30	.50	1.40	.80	.80	.20	3.50	1.60	1.20
29.....	.10	2.00	.80	1.50	.70	1.20	.80	.70	.30	3.50	1.80	1.20
30.....	.10	.....	.90	2.00	.50	1.00	.60	.60	1.20	3.40	1.20	1.00
31.....	.10	.....	2.00	.....	.30	.....	.50	.70	.....	3.00	.....	.80

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 79 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	0.90	30.10	June.....	0.56	33.30
December.....	.58	35.40	July.....	1.19	73.20
1912.			August.....	.86	52.90
January.....	.04	2.46	September.....	.92	54.70
February.....	.77	44.30	October.....	1.52	93.50
March.....	1.31	80.60	November.....	1.99	118.00
April.....	1.78	106.00	December.....	1.55	95.30
May.....	.98	60.30	The year.....	1.15	815.00

*Discharge measurements at station No. 80 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 23.....	0.82	0.35	Nov. 8.....	1.16	1.63
Sept. 29.....	.70	.02	Dec. 28.....	1.29	2.12

NOTE.—Bed of stream of gravel, small cobbles; some bed-rock exposed. Station probably only slightly shifting. One channel.

*Daily gage height, in feet, at station No. 80 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.						0.68	0.95					
2.			1.40				1.06	0.80		0.88		
3.			1.31	1.62								
4.		(a)	1.25	1.52				1.19		.91		
5.	0.90	(a)	1.05	1.38	1.58		1.10	1.10	1.43	.86	1.40	1.25
6.	.90		.82	1.39		.60	1.05		1.44	.84		1.18
7.	.90		.95				1.01	1.01	1.50	.80	1.19	1.20
8.	.94	(a)				.61	.99	.99	1.36	.79	1.18	1.28
9.		(a)	.98				.91	1.02	1.06		1.52	1.26
10.		(a)	.98	1.45	1.10			1.04		.82		1.25
11.	.85	(a)	.99	1.39			.14		1.02	.80		1.16
12.	.85	(a)	1.45	1.11	.99			1.00	1.21	.98	1.58	1.11
13.	.84	0.88	1.52	1.12			1.02		1.19	.94	1.61	1.10
14.	.84	.79	1.55	1.22		.71	1.27	.94	1.18	.96	1.36	1.11
15.	.70			1.29				1.01	1.14		1.23	1.15
16.	.52				.88	.64			1.14	.92	1.72	1.31
17.			1.36				1.18	.90	1.08			1.16
18.			1.59	1.22	.78				1.00	1.18	1.59	1.05
19.	.50		1.01	1.31			.89	1.04	.98	1.30	1.57	1.20
20.	.45		1.40	1.36		.82	.80				1.48	
21.	.45		.96	1.37					.88		1.40	1.40
22.	.44		.91	1.40	.80				.89	1.51	1.40	
23.	.42		.98	1.45				.82	.84		1.52	
24.	.42			1.51	.81			.85	.83	1.58		
25.	.40	1.37	.98				.92	.84		1.32	1.22	1.14
26.	.40	.98	1.22	1.58	.78	1.01	.97	.71	.71	1.16	1.18	
27.	.41		1.17	1.53		1.12	.94	.92	.70		1.11	
28.	.36		.99	1.49	.70	1.01	.91		.69		1.36	1.29
29.	.34		.97				.92		.70		1.40	1.28
30.	.34		1.08				.88			1.71	1.21	
31.							.82					

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 80 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.		1.16	11.		0.60	21.	3.05	1.48
2.		.92	12.		1.28	22.	3.00	1.00
3.		.76	13.		1.96	23.	3.00	1.00
4.		.60	14.	1.88	2.68	24.	2.96	1.48
5.		.64	15.	2.00	3.75	25.	2.96	1.20
6.		.64	16.	2.00	1.88	28.	1.96	1.08
7.		.68	17.	2.20	2.40	27.	1.48	1.00
8.		.80	18.	2.40	1.88	28.	1.48	1.00
9.		.96	19.	5.00	2.52	29.	1.72	1.50
10.		.80	20.	3.05	2.80	30.	1.40	1.08
						31.		1.00

Daily discharge, in second-feet, at station No. 80 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.60	(a)	2.60	3.00	3.00	.05	0.80	0.30	2.50	0.60	2.00	2.00
2.....	.60	(a)	2.00	3.00	3.00	.05	1.25	.30	3.00	.55	2.50	3.00
3.....	.60	(a)	2.25	3.60	2.50	.05	3.00	2.00	3.50	.60	3.00	2.60
4.....	.60	(a)	2.00	3.10	3.00	.05	2.30	1.75	4.00	.65	2.80	2.30
5.....	.60	(a)	1.20	2.50	3.40	.05	1.40	1.40	2.70	.50	2.60	2.00
6.....	.60	(a)	.35	2.55	3.60	.05	1.20	1.20	2.75	.40	2.20	1.70
7.....	.60	(a)	.80	4.00	2.60	.05	1.05	1.05	3.00	.30	1.75	1.80
8.....	.75	(a)	.80	3.80	2.20	.05	.85	.95	2.45	.30	1.70	2.10
9.....	.60	(a)	.90	3.50	1.80	.05	.65	1.10	1.25	.30	3.10	2.05
10.....	.50	(a)	.90	2.90	1.40	.05	.60	1.15	1.20	.35	4.30	2.00
11.....	.45	(a)	.95	2.55	1.20	.05	3.00	1.10	1.10	.30	4.20	1.65
12.....	.45	(a)	2.80	1.45	.95	.05	1.50	1.00	1.85	.90	3.40	1.45
13.....	.40	0.55	3.10	1.50	.85	.05	1.10	1.00	1.75	.75	3.55	1.40
14.....	.40	.30	3.25	1.90	.75	.05	2.10	.95	1.70	.85	2.45	1.45
15.....	.05	.05	3.00	1.15	.65	.10	2.00	1.05	1.55	.80	1.95	1.60
16.....	.05	.05	2.70	1.40	.55	.15	1.80	.80	1.55	.70	4.10	2.25
17.....	.05	.05	2.45	1.65	.40	.20	1.70	.60	1.30	2.00	3.80	1.65
18.....	.05	.05	3.45	1.90	.25	.25	1.20	.90	1.00	1.70	3.45	1.20
19.....	.05	.05	1.04	2.25	.25	.30	.55	1.15	.95	2.20	3.35	1.80
20.....	.05	.20	2.60	2.45	.30	.35	.30	.60	.75	2.20	2.90	3.00
21.....	.05	2.00	.85	2.50	.30	.40	.30	.50	.55	2.20	2.60	2.60
22.....	.05	3.50	.65	2.60	.30	.50	.40	.60	.60	3.05	2.60	3.00
23.....	.05	4.50	.90	2.80	.50	.60	.50	.35	.40	4.30	3.10	4.00
24.....	.05	3.00	.90	3.05	.35	.70	.60	.45	.40	3.40	2.50	3.00
25.....	.05	2.25	.90	3.20	.30	.80	.70	.40	.30	2.60	1.90	1.55
26.....	.05	.90	1.90	3.40	.25	1.05	.90	.10	.10	1.65	1.70	2.00
27.....	.05	.80	1.70	3.15	.15	1.55	.75	.65	.05	4.50	1.45	2.10
28.....	.05	.70	.95	2.95	.05	1.05	.65	.50	.05	4.40	2.45	2.15
29.....	.05	.60	.90	2.80	.05	1.00	.70	.40	.05	4.30	2.60	2.10
30.....	.05	-----	1.30	2.90	.05	.90	.55	.30	.20	4.05	1.85	1.00
31.....	.05	-----	2.50	-----	.05	-----	.35	.50	-----	3.00	-----	1.00

a Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

Monthly discharge at station No. 80 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	2.34	82.30	June.....	0.35	20.80
December.....	1.36	83.50	July.....	1.12	68.90
1912.			August.....	.80	49.20
January.....	.28	17.20	September.....	1.42	84.50
February.....	.67	38.50	October.....	1.75	108.00
March.....	1.68	103.00	November.....	2.73	162.00
April.....	2.65	158.00	December.....	2.05	126.00
May.....	1.10	67.60	The year.....	1.38	1,000.00

*Discharge measurements at station No. 81 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 23.....	0.70	1.83	Nov. 8.....	0.91	3.90
Sept. 29.....	.68	.73	Dec. 28.....	.97	3.93

Bed of stream of sand and gravel with some small cobbles; station shifting. One channel at all stages.

*Daily gage height, in feet, at station No. 81 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.60	0.88					
2.....			1.20				.97	0.65		0.81		
3.....			1.10	1.16								
4.....		0.32	1.09	1.19				1.08		.81		
5.....	0.70	.31	.81	1.19	1.10		1.00	.96	1.24	.78	1.35	0.90
6.....	.70		.75	1.22		.58	.98		1.25	.69		.90
7.....	.70		.82				.92	.86	1.28	.66	.90	.90
8.....	.72	.31				.60		.85	1.14	.66	.91	.98
9.....		.31	.82				.91	.90	1.00		1.88	.90
10.....		.32	.81	1.20	.88			.91		.71		.86
11.....	.70	.31	.87	1.12			1.11		.96	.69		.81
12.....	.70	.31	1.36	1.14	.79			.89	1.08	.86	1.32	.80
13.....	.70	.70	1.14	1.30			.92		1.04	.82	1.42	.79
14.....	.70	.60	1.08	.98		.69	1.19	.92	1.03	.90	1.05	.81
15.....	.60	.48		.89				.98	.99		.92	.85
16.....	.50	.44			.88	.61			.99	.90	1.75	1.10
17.....		.40	1.22				1.02	.81	.92			1.00
18.....			1.14	.88	.80				.82	1.06	1.38	1.02
19.....	.44		.98	.89			.98	1.01	.80	1.22	1.38	1.18
20.....	.44		1.30	.89		.90	.96				1.33	
21.....	.44		.86	.88					.72		1.20	1.30
22.....	.44		.84	.92	.70				.74	1.42	1.17	
23.....	.44		.88	.94				.70	.71		1.22	
24.....	.44			1.00	.71			.70	.66	1.52		
25.....	.42	1.10	.85				.82	.71		1.24	.95	1.05
26.....	.42	.92	1.10	1.10	.70	1.08	.89	.65	.61	1.08	.91	
27.....	.42		1.03	.99		1.10	.84	.89	.58		.88	
28.....	.38		.82	.96	.68	1.08	.81		.54		1.11	.99
29.....	.35		.78				.82		.58		1.19	1.00
30.....	.35		.86				.76			1.78	1.01	
31.....							.70					

*Daily discharge, in second-feet, at station No. 81 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		2.3	11.....		1.5	21.....		13.4
2.....		2.1	12.....		3.6	22.....		13.2
3.....		1.9	13.....		7.2	23.....		13.2
4.....		1.0	14.....	5.0	11.4	24.....		13.0
5.....		1.3	15.....	12.6	16.0	25.....		13.0
6.....		1.3	16.....	5.2	8.2	26.....	10.0	2.8
7.....		1.3	17.....	8.2	10.6	27.....	3.4	2.7
8.....		1.8	18.....	11.2	8.2	28.....	3.4	2.7
9.....		2.1	19.....	32.0	10.6	29.....	3.3	2.5
10.....		1.8	20.....	13.4	12.2	30.....	2.4	2.5
						31.....		2.5

*Daily discharge, in second-feet, at station No. 81 at 2,700-foot level, near Hilo, Hawaii,  
for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.40	0.10	6.00	10.00	5.00	0.70	3.20	1.20	9.00	3.00	20.00	12.00
2.....	1.40	.10	9.00	9.00	5.50	.70	4.50	1.10	10.00	2.40	19.00	18.00
3.....	1.40	.10	7.00	8.20	5.00	.70	8.00	8.00	16.00	2.40	18.00	10.00
4.....	1.40	.10	6.80	8.80	6.00	.60	6.00	6.60	18.00	2.40	15.00	6.00
5.....	1.40	.10	2.40	8.80	7.00	.60	5.00	4.40	9.80	2.10	12.00	3.40
6.....	1.40	.10	1.80	9.40	6.00	.60	4.70	3.70	10.00	1.30	8.00	3.40
7.....	1.40	.10	2.50	18.00	5.00	.70	3.70	3.00	11.00	1.10	3.40	3.40
8.....	1.60	.10	2.50	17.00	4.00	.70	3.60	2.80	7.80	1.10	3.60	4.70
9.....	1.50	.10	2.50	16.00	4.00	.70	3.60	3.40	5.00	1.30	25.00	3.40
10.....	1.50	.10	2.40	9.00	3.20	.80	5.40	3.60	4.70	1.50	26.00	3.00
11.....	1.40	.10	3.10	7.40	2.70	.90	7.20	3.40	4.40	1.30	25.00	2.40
12.....	1.40	.10	12.00	7.80	2.20	1.00	5.40	3.30	6.60	3.00	11.00	2.30
13.....	1.40	1.40	7.80	11.00	2.40	1.20	3.70	3.50	5.80	2.50	13.00	2.20
14.....	1.40	.70	6.60	4.70	2.70	1.30	8.80	3.70	5.60	3.40	6.00	2.20
15.....	.70	.30	7.50	3.80	3.00	1.00	7.70	4.70	4.80	3.40	3.70	2.80
16.....	.30	.20	8.50	3.30	3.20	.80	6.50	3.60	4.80	3.40	22.00	7.00
17.....	.30	.10	9.40	3.20	2.80	1.00	5.40	2.40	3.70	10.00	24.00	5.00
18.....	.20	.10	7.80	3.20	2.30	1.50	5.00	3.80	2.50	6.20	13.00	5.40
19.....	.20	.10	4.70	3.30	2.00	2.50	4.70	5.20	2.30	9.40	13.00	8.60
20.....	.20	2.00	11.00	3.30	.....	3.40	4.40	2.00	2.00	11.00	12.00	15.00
21.....	.20	14.00	3.00	3.20	1.70	4.00	4.00	1.80	1.60	12.00	9.00	11.00
22.....	.20	20.00	2.70	3.70	1.40	4.00	3.60	1.60	1.80	13.00	8.40	18.00
23.....	.20	26.00	3.20	4.00	1.40	5.00	3.20	1.40	1.50	20.00	9.40	25.00
24.....	.20	18.00	3.00	5.00	1.50	5.00	2.80	1.80	1.10	15.00	7.00	16.00
25.....	.10	7.00	2.80	6.00	1.50	6.00	2.50	1.50	1.00	10.00	4.20	6.00
26.....	.10	3.70	7.00	7.00	1.40	6.60	3.30	1.10	.80	6.60	3.60	9.00
27.....	.10	3.00	5.60	4.80	1.40	7.00	2.70	3.30	.60	26.00	3.20	6.00
28.....	.10	3.00	2.50	4.40	1.30	6.60	2.40	3.00	.50	25.00	7.20	4.80
29.....	.10	3.00	2.10	3.00	1.30	5.00	2.50	2.50	.60	25.00	8.80	5.00
30.....	.10	.....	3.00	4.00	1.00	4.00	1.90	2.00	4.00	22.00	5.20	4.00
31.....	.10	.....	15.00	.....	.80	.....	1.40	3.00	.....	21.00	.....	3.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 81 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	10.30	348	June.....	2.49	148.00
December.....	4.43	252	July.....	4.41	271.00
			August.....	3.11	191.00
1912.			September.....	5.24	312.00
January.....	.75	46.10	October.....	8.64	531.00
February.....	3.58	206.00	November.....	12.00	714.00
March.....	5.52	339.00	December.....	7.36	453.00
April.....	6.99	416.00			
May.....	2.86	176.00	The year.....	5.24	3,800.00

*Discharge measurements at station No. 82 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 23.....	<i>Feet.</i> 0.60	<i>Sec.-ft.</i> 0	Nov. 15.....	<i>Feet.</i> 0.64	<i>Sec.-ft.</i> 0.08
Sept. 29.....	.53	.....	Dec. 28.....	.60	.....

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel.



Daily gage height, in feet, at station No. 82 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.55	0.60					
2.....			0.88				.71	0.61		0.60		
3.....			.85	0.71								
4.....		(a)	.92	.94				.71		.60		
5.....	0.60	(a)	.72	.85	1.20		.75	.68	0.90	.59	0.85	0.72
6.....	.60		.65	.89		.50	.72		.91	.58		.68
7.....	.60		.72				.68	.64	.95	.56	.61	.68
8.....	.65	(a)				.51		.61	.88	.56	.68	.70
9.....		(a)	.73				.62	.70	.79			.70
10.....		(a)	.74	.73	.78			.71		.59		.65
11.....	.60	(a)	.59	.71			.85		.75	.55		.64
12.....	.60	(a)	.76	.76	.75			.69	.85	.68	.80	.61
13.....	.60	0.62	.69	.84			.70		.78	.65	.85	.60
14.....	.60	.61	.58	.71		.60	.78	.72	.76	.69	.70	.62
15.....	.58	.59		.71				.75	.72		.64	.68
16.....	.55	(a)			.88	.56			.72	.70	.96	.76
17.....		(a)	.71				.70	.62	.66			.70
18.....			.59	.75	.73				.60	.74	.88	.71
19.....	.55		.46	.75			.64	.70	.59	.82	.80	.84
20.....	.55		.80	.75		.60	.65				.76	
21.....	.55		.42	.74					.58		.74	1.00
22.....	.54		.41	.80	.60				.59	.90	.74	
23.....	.52		.48	.85				.60	.55		.82	
24.....	.52			.98	.61			.62	.54	.88		
25.....	.51	.80	.76				.64	.61		.81	.65	.75
26.....	.51	.68	.82	1.00	.60	.68	.71	.58	.52	.76	.62	
27.....	.52		.77	.95		.71	.65	.68	.51		.62	
28.....	.45		.62	.89	.58	.68	.61		.51		.79	.62
29.....	.42		.59				.62		.54		.78	.62
30.....	.40		.68				.61			.98	.68	
31.....							.60					

<sup>a</sup> Channel dry.

Monthly discharge at station No. 82 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November.....	<sup>a</sup> 0.10	5.95	June.....	0.03	1.80
December.....	<sup>a</sup> .10	6.15	July.....	.04	2.60
1912.			August.....	.05	2.80
January.....	.01	.60	September.....	.05	3.20
February.....	.01	.80	October.....	.07	4.40
March.....	.09	5.60	November.....	.07	4.20
April.....	.09	5.40	December.....	.06	3.60
May.....	.04	2.40	The year.....	.05	37.40

<sup>a</sup> Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

Discharge measurements at station No. 83 at 2,700-foot level, near Hilo, Hawaii, in 1912.

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 23.....	0.85	0	Nov. 15.....	0.80	0.02
Sept. 29.....	.80		Dec. 28.....	.64	0

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel.

Daily gage height, in feet, at station No. 83 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						0.70	0.85					
2			0.90				.93	0.82		0.82		
3			.96	0.95								
4		(a)	.90	1.08				1.05		.84		
5	0.90	(a)	.81	.99	1.20		1.00	.98	0.88	.82	0.81	0.70
6	.90		.80	1.10		.65	.95		.90	.81		.60
7	.90		.96				.90	.91	.98	.80	.80	.68
8	.91	(a)				.70		.90	.94	.81	.80	.72
9		(a)	.94				.81	.90	.90			.69
10		(a)	.92	1.20	.89			.91		.80		.62
11	.88	(a)	.95	1.10			1.00		.78	.78		.65
12	.88	(a)	.90	1.06	.79			.90	.90	.80	.81	.64
13	.88	0.90	.96	.99			.91		.88	.79	.81	.54
14	.88	.80	1.01	.90		.76	.98	.92	.86	.80	.80	.61
15	.85	.71		.90				.96	.83		.80	.65
16	.84	.66			.88	.69			.84	.81	.84	.70
17		.00	.88				.85	.89	.83			.61
18			1.09	.90	.87				.80	.91	.88	.65
19	.80		.96	.91			.80	.93	.76	.99	.84	.72
20	.80		.98	.91		.74	.79				.81	
21	.80		.95	.94					.75		.81	.81
22	.79		.91	.95	.89				.81	.89	.78	
23	.78		.97	.94				.86	.80		.81	
24	.78			1.01	.90			.89	.80	.82		
25	.76	.90	.94				.82	.88		.81	.70	.90
26	.76	.79	.91	1.10	.88	.81	.90	.82	.80	.80		.69
27	.76		.96	1.00		.90	.84	.91	.80			.69
28	.74		.82	.99	.80	.81	.81		.80			.73
29	.71		.79				.84		.80			.72
30	.70		.88				.82			.84	.70	
31							.81					

a Channel dry.

Monthly discharge at station No. 83 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November.....	00.03	1.78	June.....	0.007	0.40
December.....	a. 05	3.08	July.....	.006	.40
			August.....	.006	.40
1912.			September.....	.010	.60
January.....	.003	.20	October.....	.010	.80
February.....	.003	.20	November.....	.010	.60
March.....	.02	1.00	December.....	.010	.60
April.....	.02	1.00			
May.....	.006	.40	The year.....	.01	6.60

a Estimated.

NOTE.—Mean monthly discharge estimated directly from gage heights and measurements. Discharge for periods for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Discharge measurements at station No. 84 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
Aug. 23.....	<i>Feet.</i> 0.22	<i>Sec.-ft.</i> 0	Nov. 15.....	<i>Feet.</i> 0.34	<i>Sec.-ft.</i> 0.08
Sept. 29.....	.23		Dec. 29.....	.30	.06

NOTE.—Bed of stream of silt, sand, and gravel; shifting. One channel.

*Daily gage height, in feet, at station No. 84 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Billkov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.15	0.25					
2.....			0.35				.34	0.26		0.25		
3.....			.35	0.50								
4.....		(a)	.32	.60				.42		.28		
5.....	0.30	(a)	.30	.58	0.90		.38	.39	0.39	.26	0.38	0.31
6.....	.30		.28	.61		.11	.38		.40	.24		.30
7.....	.30		.35				.30	.31	.44	.22	.31	.30
8.....	.31	(a)				.20		.30	.38	.24	.32	.32
9.....		(a)	.36				.29	.32	.34			.32
10.....		(a)	.35	.70	.60			.34		.25		.31
11.....	.25	(a)	.36	.65			.45		.31	.23		.31
12.....	.25	(a)	.44	.61	.58			.31	.34	.30	.40	.30
13.....	.24	0.30	.46	.51			.31		.31	.28	.42	.30
14.....	.24	.24	.50	.32		.29	.38	.34	.31	.31	.35	.34
15.....	.22	(a)		.40				.36	.29		.34	.39
16.....	.21	(a)			.39	.20			.32	.32	.53	.46
17.....		(a)	.41				.32	.29	.30			.41
18.....			.55	.45	.28				.29	.41	.44	.44
19.....	.18		.40	.51			.32	.32	.28	.49	.40	.55
20.....	.15		.45	.55		.22	.31				.38	
21.....	.15		.32	.61					.25		.38	.68
22.....	.15		.33	.58	.28				.26	.49	.36	
23.....	.12		.36	.61				.25	.25		.38	
24.....	.12			.65	.30			.26	.25	.42		
25.....	.11	.31	.36				.30	.25		.35	.34	.41
26.....	.11	.26	.35	.70	.25	.35	.32	.22	.24	.30	.31	
27.....	.11		.32	.61		.41	.31	.32	.22		.31	
28.....	.09		.30	.61	.20	.35	.29		.22		.38	.30
29.....	(a)		.28				.31		.23		.38	.30
30.....	(a)		.34				.29			.55	.34	
31.....							.28					

<sup>a</sup> Channel dry.

*Daily discharge, in second-feet, at station No. 84 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.05	11.....		0.05	21.....	0.37	0.72
2.....		.05	12.....		.16	22.....	.36	.60
3.....		.05	13.....		.34	23.....	.34	.45
4.....		.05	14.....	0.30	.52	24.....	.33	.63
5.....		.05	15.....	.22	.73	25.....	.32	.60
6.....		.05	16.....	.22	.60	26.....	.28	.60
7.....		.05	17.....	.27	.67	27.....	.05	.52
8.....		.05	18.....	.33	.72	28.....	.05	.52
9.....		.05	19.....	.45	.73	29.....	.05	.60
10.....		.05	20.....	.37	.82	30.....	.05	.57
						31.....		.52

*Daily discharge, in second-feet, at station No. 84 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.			0.10	0.50	0.30		0.05	0.05	0.20	0.10	0.30	0.30
2.			.10	.40	.30		.10	.05	.30	.05	.40	.60
3.			.10	.30	.50		.30	.05	.40	.05	.50	.40
4.			.05	.45	.70		.20	.20	.60	.05	.20	.10
5.	0.05		.05	.40	.90		.15	.15	.15	.05	.15	.05
6.	.05		.05	.45	.80		.15	.10	.15	.05	.10	.05
7.	.05		.10	.70	.60		.05	.05	.20	.05	.05	.05
8.	.05		.10	.65	.50		.05	.05	.15	.05	.05	.05
9.			.10	.65	.50		.05	.05	.10	.05	.05	.05
10.			.10	.60	.45		.10	.10	.10	.05	.10	.05
11.	.05		.10	.50	.40		.20	.10	.05	.05	.15	.05
12.	.05		.20	.45	.40		.10	.05	.10	.05	.15	.05
13.		0.05	.25	.30	.30		.05	.10	.05	.05	.20	.05
14.			.30	.05	.20	0.05	.15	.10	.05	.05	.10	.10
15.			.20	.15	.20		.10	.10	.05	.05	.10	.15
16.			.20	.20	.15		.10	.10	.05	.05	.35	.25
17.			.15	.20	.10		.05	.05	.05	.50	.30	.15
18.			.40	.20	.05		.05	.05	.05	.15	.20	.25
19.			.15	.30	.05		.05	.05	.05	.30	.15	.40
20.			.20	.40	.05		.05	.05	.05	.30	.15	.50
21.			.05	.45	.05		.05	.05	.05	.30	.15	.70
22.			.10	.40	.05		.05	.05	.05	.30	.10	.80
23.			.10	.45	.05		.05	.05	.05	.60	.15	.90
24.			.10	.50	.05		.05	.05	.05	.20	.10	.60
25.			.10	.50	.05		.05	.05	.05	.10	.10	.15
26.			.10	.60	.05	.10	.05	.05	.05	.05	.05	.20
27.			.05	.45	.05	.15	.05	.05	.05	.90	.05	.10
28.			.05	.45	.05	.10	.05	.05	.05	.80	.15	.05
29.			.05	.30	.05		.05	.05	.05	.60	.15	.05
30.			.10	.30	.05		.05	.05	.20	.40	.10	.05
31.			.70		.05		.05	.05		.20		.05

NOTE.—Daily discharge determined from poorly defined rating curve. Discharge for days for which gage heights are missing estimated by means of rainfall diagram prepared from rainfall record at camp near station No. 50.

*Monthly discharge at station No. 84 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912.—Continued.		
November 14-30.	0.28	9.32	June.	0.05	2.98
December.	.39	24.20	July.	.09	5.53
1912.			August.	.07	4.30
January.	.02	1.23	September.	.12	7.14
February.	.05	2.88	October.	.21	12.90
March.	.15	9.22	November.	.16	9.52
April.	.41	24.40	December.	.24	14.80
May.	.26	16.00	The year.	.15	111.00

*Discharge measurements at station No. 85 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>		<i>Feet.</i>	<i>Sec.-ft.</i>
Aug. 23.....	0.75	1.47	Nov. 15.....	0.85	2.96
Sept. 29.....	.72	.38	Dec. 29.....	.80	2.04

NOTE.—Bed of stream of sand and small cobbles; probably slightly shifting. One channel.

*Daily gage height, in feet, at station No. 85 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomlin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.70	0.88					
2.....			1.00				.87	0.72		0.80		
3.....			.95	1.00								
4.....		0.61	.96	1.00				.98		.81		
5.....	0.75	.61	.80	1.02	1.38		.90	.94	0.96	.79	0.96	0.85
6.....	.75		.78	1.16		.70	.88		.98	.76		.80
7.....	.75		.85				.83	.81	1.01	.75	.82	.85
8.....	.80	.65				.71		.80	.94	.75	.84	.98
9.....		.65	.89				.80	.88	.91			.90
10.....		.61	.88	1.18	.98			.89		.74		.88
11.....	.71	.61	.87	1.18			1.07		.88	.71		.75
12.....	.71	.60	.98	1.09	.88			.85	.90	.82	1.01	.80
13.....	.70	.72	1.12	.98			.85		.88	.81	1.08	.79
14.....	.70	.71	1.18	.83		.80	1.02	.88	.86	.85	.91	.81
15.....	.70	.69		.81				.94	.82		.84	.92
16.....	.70	.69			.69	.78			.84	.84	1.18	.95
17.....		.69	.82				.91	.80	.82			.84
18.....			1.20	.90	.87			.80	.98	1.11		.90
19.....	.70		.85	.91			.84	.90	.78	1.04	1.02	1.01
20.....	.70		.85	.91		.80	.86				.96	
21.....	.70		.82	.94					.75		.95	1.11
22.....	.69		.80	.98	.75				.78	1.09	.91	
23.....	.68		.86	.99				.75	.75		.96	
24.....	.68			1.10	.81			.76	.74	1.05		
25.....	.66	.90	.88				.81	.74		.95	.88	.95
26.....	.66	.81	.91	1.25	.79	.80	.82	.71	.72	.84	.84	
27.....	.66		.88	1.18		.90	.82	.80	.72		.82	
28.....	.64		.80	1.12	.78	.80	.79		.71		.95	.88
29.....	.62		.78				.81		.72		.96	.80
30.....	.61		.86				.79			1.21	.85	
31.....							.78					

*Daily discharge, in second-feet, at station No. 85 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		1.04	11.....		1.20	21.....	14.90	3.54
2.....		1.04	12.....		2.46	22.....	14.70	2.10
3.....		1.04	13.....		3.72	23.....	14.50	1.74
4.....		1.04	14.....	3.90	5.60	24.....	14.30	3.00
5.....		1.38	15.....	5.40	13.60	25.....	14.30	2.28
6.....		1.38	16.....	5.40	4.26	26.....	10.10	2.10
7.....		1.20	17.....	5.80	6.20	27.....	2.10	2.10
8.....		1.74	18.....	6.20	4.26	28.....	2.10	2.10
9.....		2.28	19.....	15.90	6.20	29.....	1.92	2.46
10.....		1.74	20.....	14.90	9.22	30.....	1.04	2.10
						31.....		2.10

*Daily discharge, in second-feet, at station No. 85 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.20	0.05	5.00	7.00	7.00	0.40	3.50	1.50	5.00	3.00	8.00	7.00
2.....	1.20	.05	5.80	6.00	8.00	.40	3.35	1.70	6.00	2.10	5.00	12.00
3.....	1.20	.05	4.80	5.80	6.00	.40	6.00	7.00	9.00	2.50	10.00	5.00
4.....	1.20	.05	5.00	5.80	9.00	.40	4.00	5.00	13.00	2.30	6.00	6.00
5.....	1.20	.05	2.10	6.20	14.10	.40	3.90	4.60	5.00	1.90	5.00	3.00
6.....	1.20	.05	1.70	9.20	11.00	.40	3.50	3.00	5.40	1.40	2.00	2.10
7.....	1.20	.05	3.00	14.50	5.00	.50	2.60	2.30	6.00	1.20	2.50	3.00
8.....	2.10	.05	3.50	13.00	5.00	.55	2.20	2.10	4.60	1.20	2.80	5.00
9.....	1.20	.05	3.70	12.00	5.00	.60	2.10	3.50	4.10	1.00	5.00	3.90
10.....	1.20	.05	3.50	9.65	5.00	.60	2.10	3.70	2.80	1.00	14.00	3.50
11.....	.55	.05	3.35	9.65	4.00	.60	7.20	3.30	3.50	.55	12.00	1.20
12.....	.55	.05	5.00	7.70	3.50	.60	5.00	3.00	3.90	2.50	6.00	2.10
13.....	.40	.55	8.30	5.00	3.00	.60	3.00	3.30	3.50	2.30	7.45	1.90
14.....	.40	.55	9.65	2.50	2.00	2.10	6.20	3.50	3.20	3.00	4.10	2.30
15.....	.40	.30	7.00	2.30	1.00	1.90	5.00	4.60	2.50	3.90	2.80	4.25
16.....	.40	.30	4.00	2.50	.30	1.70	4.00	2.00	2.80	2.80	9.65	4.80
17.....	.40	.30	2.50	5.00	.50	1.80	4.10	2.10	2.50	4.00	12.00	2.80
18.....	.40	.30	10.10	3.90	2.35	1.90	3.50	2.50	2.10	5.00	8.10	3.90
19.....	.40	1.00	3.00	4.10	2.00	2.00	2.80	3.90	1.70	6.50	6.20	6.00
20.....	.40	3.50	3.00	4.10	1.00	2.10	3.20	2.80	1.40	6.00	5.00	9.00
21.....	.40	8.00	2.50	4.60	1.00	2.10	2.00	2.00	1.20	6.50	4.80	8.10
22.....	.30	12.00	2.10	5.00	1.20	2.10	3.00	1.20	1.70	7.65	4.10	10.00
23.....	.25	14.50	3.20	5.50	3.00	2.10	4.00	1.20	1.00	9.00	5.00	14.50
24.....	.25	9.00	2.50	7.90	2.30	2.10	3.00	1.40	1.00	6.80	4.20	12.00
25.....	.10	2.90	3.50	10.00	2.00	2.10	2.30	1.00	.80	4.80	3.50	4.80
26.....	.10	2.25	4.10	11.20	1.90	2.10	2.50	.60	.70	2.80	2.80	7.00
27.....	.10	4.00	3.50	9.65	1.80	3.90	2.50	2.10	.70	14.50	2.50	5.00
28.....	.10	4.50	2.19	8.30	1.70	2.10	1.90	4.00	.55	18.00	4.80	3.50
29.....	.10	5.00	1.70	6.00	1.80	2.50	2.30	3.00	.70	11.00	5.00	2.10
30.....	.10	.....	3.20	6.00	1.40	2.50	1.90	2.50	4.00	10.30	3.00	2.00
31.....	.10	.....	10.00	.....	1.00	.....	1.70	3.00	.....	8.00	.....	1.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 85 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	8.85	299	June.....	1.45	86.30
December.....	3.10	192	July.....	3.37	207
1912.			August.....	2.79	172
January.....	.62	38.10	September.....	3.38	201
February.....	2.44	140	October.....	4.76	293
March.....	4.27	263	November.....	5.78	344
April.....	7.00	417	December.....	5.12	315
May.....	3.70	228	The year.....	3.72	2,700

*Discharge measurements at station No. 86 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	Sec.-ft.		Feet.	Sec.-ft.
Aug. 23.....	1.54	2.29	Nov. 15.....	1.69	6.31
Sept. 29.....	1.46	.68	Dec. 29.....	1.68	5.90

NOTE.—Bed of stream of sand and small cobbles; probably slightly shifting. One channel.

Daily gage height, in feet, at station No. 86 at 2,700-foot level, near Hilo, Hawaii, for 1912.

[Bomin, Billikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1						1.38	1.59					
2			1.82				1.69	1.50		1.60		
3			1.75	1.70								
4		1.28	1.70	1.70				1.74		1.59		
5	1.52	1.28		1.80	2.29		1.71	1.68	1.84	1.55	1.78	1.70
6	1.52		1.58	1.90		1.30	1.68		1.75	1.54		1.68
7	1.52		1.75				1.65	1.59	1.95	1.51	1.68	1.70
8	1.52	1.25				1.50		1.54	1.72	1.50	1.69	1.88
9		1.25	1.71				1.60	1.60	1.69			1.70
10		1.24	1.71	2.30	1.80			1.65		1.54		1.65
11	1.45	1.24	1.77	2.78			1.90		1.66	1.52		1.59
12	1.45	1.22	1.85	1.89	1.79			1.60	1.70	1.64	1.90	1.53
13	1.44	1.50		1.80			1.61		1.64	1.59	1.91	1.48
14	1.44	1.48		1.70		1.60	1.80	1.68	1.62	1.61	1.74	1.48
15	1.42	1.40		1.71				1.78	1.61		1.70	1.53
16	1.41	1.36			1.71	1.45			1.68	1.62	2.08	1.72
17		1.32	1.78				1.68	1.59	1.64			1.59
18				1.83	1.87				1.60	1.72	1.89	1.61
19	1.40		1.85	1.96			1.56	1.72	1.58	1.82	1.92	1.72
20	1.40		1.90	1.95		1.50	1.52				1.78	
21	1.40		1.84	1.96					1.55		1.76	1.85
22	1.38		1.78	2.04	1.52				1.56	1.95	1.76	
23	1.38		1.86	2.05				1.54	1.52		1.75	
24	1.38			2.15	1.60			1.55	1.51	1.98		
25	1.36	1.65	1.66				1.61	1.54		1.72	1.70	1.69
26	1.36	1.51	1.71	2.15	1.50	1.58	1.60	1.50	1.50	1.68	1.68	
27	1.36		1.66	2.08		1.71	1.62	1.71	1.49		1.65	
28	1.35		1.59	1.90	1.40	1.58	1.59		1.48		1.78	1.72
29	1.34		1.56				1.51		1.46		1.80	1.69
30	1.34						1.51			2.01	1.70	
31			2.01				1.50					

Daily discharge, in second-feet, at station No. 86 at 2,700-foot level, near Hilo, Hawaii, for 1911.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1		3.22	11		2.28	21	10.80	6.00
2		2.50	12		14.80	22	11.20	2.50
3		2.28	13		31.60	23	11.60	2.50
4		1.84	14	6.60	48.00	24	12.00	.10
5		1.84	15	14.60	81.20	25	12.00	.10
6		1.84	16	12.00	32.40	26	7.88	.10
7		1.82	17	11.60	38.00	27	5.10	.10
8		3.46	18	10.80	36.00	28	5.10	.10
9		4.26	19	30.00	40.00	29	5.25	.10
10		3.46	20	10.80	45.20	30	4.26	.10
						31		.10

Daily discharge, in second-feet, at station No. 86 at 2,700-foot level, near Hilo, Hawaii, for 1912.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.60	(a)	6.00	15.00	20.00	0.10	3.60	1.00	15.00	4.40	20.00	15.00
2	1.60	(a)	10.00	10.00	20.00		5.00	1.40	20.00	3.70	25.00	25.00
3	1.60	(a)	8.20	6.60	25.00		10.00	15.00	30.00	3.40	30.00	10.00
4	1.60	(a)	6.60	6.60	25.00		8.50	7.20	40.00	3.00	12.00	15.00
5	1.60	(a)	5.00	10.00	30.00		6.80	5.60	11.00	2.50	7.90	6.60
6	1.60	(a)	3.50	14.00	30.00		5.40	4.50	8.20	1.80	6.00	5.40
7	1.60	(a)	8.20	35.00	15.00		5.10	3.00	15.00	1.50	5.60	6.60
8	1.60	(a)	7.50	35.00	13.00	1.40	4.00	1.80	6.90	1.40	5.70	13.00
9	1.25	(a)	6.80	30.00	11.00		3.70	3.70	5.70	1.60	8.00	6.60
10	1.95	(a)	6.80	30.00	10.00		4.00	5.10	5.00	1.80	40.00	5.10
11	.60	(a)	7.70	49.00	10.00		14.00	4.40	4.50	1.60	30.00	3.00
12	.60	(a)	12.00	14.00	10.00		8.00	3.70	6.60	4.30	14.00	1.70
13	.30	1.40	20.00	10.00	9.00		3.80	4.60	4.30	3.00	14.00	.80
14	.30	1.20	15.00	6.60	8.00	3.70	10.00	5.60	4.00	3.80	7.20	.80
15	.20	.10	10.00	6.80	7.00		8.00	8.70	3.80	3.90	6.60	1.70

*Daily discharge, in second-feet, at station No. 86 at 2,700-foot level, near Hilo, Hawaii, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
16.....	0.10	0.10	9.00	8.00	6.80	0.60	6.50	3.00	5.60	4.00	20.00	6.90
17.....	.10	.10	7.90	9.00	8.50	.....	5.40	3.00	4.30	15.00	30.00	3.00
18.....	.10	.10	15.00	11.00	12.00	.....	4.00	4.80	3.70	6.90	13.00	3.80
19.....	.10	.10	12.00	15.00	15.00	.....	2.60	6.90	2.90	10.00	14.00	7.00
20.....	.10	2.00	14.00	15.00	10.00	1.40	1.60	2.00	2.70	10.00	8.70	15.00
21.....	.10	20.00	11.00	15.00	5.00	.....	2.00	2.00	2.50	12.00	8.40	12.00
22.....	.10	40.00	7.90	18.00	1.60	.....	2.00	2.00	2.60	15.00	8.40	20.00
23.....	.10	50.00	12.00	19.00	10.00	.....	2.00	1.80	1.60	30.00	8.20	35.00
24.....	.10	30.00	9.00	23.00	3.70	.....	4.00	2.50	1.50	16.00	7.40	20.00
25.....	.10	5.10	5.20	23.00	2.50	.....	3.80	1.80	1.40	7.00	6.60	5.70
26.....	.10	1.50	6.80	23.00	1.40	2.90	3.70	1.40	1.40	5.40	5.40	8.00
27.....	.10	2.00	5.20	20.00	1.00	6.80	4.00	6.80	.90	50.00	5.10	7.50
28.....	.05	3.00	3.60	14.00	.10	2.90	2.40	6.00	.80	40.00	8.70	7.00
29.....	.05	3.00	2.10	12.00	.10	.....	1.50	5.00	.70	30.00	10.00	5.70
30.....	.05	.....	17.00	15.00	.10	.....	1.50	4.00	5.00	17.00	6.60	3.00
31.....	.05	.....	25.00	.....	.10	.....	1.40	3.00	.....	15.00	.....	3.00

*Monthly discharge at station No. 86 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	10.70	359	June.....	1.00	59.5
December.....	13.10	808	July.....	4.78	294.0
1912.			August.....	4.24	261.0
January.....	.63	38.7	September.....	7.25	481.0
February.....	5.51	317.0	October.....	10.50	646.0
March.....	9.55	587.0	November.....	13.10	780.0
April.....	17.30	1,030.0	December.....	9.00	553.0
May.....	10.40	640.0	The year.....	7.76	5,640

<sup>a</sup> Channel dry.

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Discharge measurements at station No. 86A at 2,700-foot level, near Hilo, Hawaii, in 1912.*

Date.	Hydrographer.	Gage height.	Discharge.
Aug. 23	E. O. Christiansen.....	Feet.	Sec.-ft.
Dec. 29	do.....	0.31	0

NOTE.—Bed of stream of sand and silt; shifting. One channel.

*Daily gage height, in feet, at station No. 86A at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Fataeff and Crevotapoff, observers.]

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....			11.....		0.30	21.....	0.36	0.35
2.....			12.....		.30	22.....	.34	.....
3.....			13.....		.30	23.....	.38	.....
4.....			14.....		.30	24.....	.....	.....
5.....		0.35	15.....		.30	25.....	.34	.40
6.....		.32	16.....		.30	26.....	.32	.....
7.....		.30	17.....		.30	27.....	.32	.....
8.....		.31	18.....	0.40	.30	28.....	.....	.32
9.....		.31	19.....	.41	.31	29.....	.38	.31
10.....		.30	20.....	.38	.....	30.....	.35	.....
						31.....	.....	.....



*Discharge measurements at station No. 87 at 2,700-foot level, near Hilo, Hawaii, in 1912.*

[E. O. Christiansen, hydrographer.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
Aug. 23.....	<i>Feet.</i> 1.05	<i>Sec.-ft.</i> 1.08	Nov. 15.....	<i>Feet.</i> 1.18	<i>Sec.-ft.</i> 1.74
Sept. 29.....	.83	.44	Dec. 29.....	1.21	1.96

NOTE.—Bed of stream of gravel and cobbles, with some small bowlders; probably permanent. One channel.

*Daily gage height, in feet, at station No. 87 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Bomin, Bilikov, Goorko, Belayeff, Selitonott, and Kuznetsoff, observers.]

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....						0.90	1.15					
2.....			1.60				1.13	0.98		1.15		
3.....			1.50	1.50								
4.....		0.55	1.46	1.55				1.54		1.12		
5.....	1.00	.54	1.12	1.55	1.68		1.28	1.41	1.52	1.05	1.36	1.18
6.....	1.00		1.10	1.58		.88	1.22		1.44	1.02		1.12
7.....	1.00		1.28				1.20	1.15	1.74	.98	1.11	1.18
8.....	1.02	.54				.90		1.10	1.55	.96	1.20	1.32
9.....		.52	1.25				1.12	1.15	1.38			1.30
10.....		.52	1.25	1.50	1.10			1.16		1.01		1.15
11.....	.90	.52	1.29	1.45			1.71		1.32	.98		1.10
12.....	.90	.51	1.55	1.21	1.09			1.15	1.41	1.20	1.59	1.08
13.....	.88	1.10	1.61	1.18			1.43		1.35	1.14	1.60	.99
14.....	.88	.98	1.68	1.24		1.10	1.60	1.30	1.32	1.21	1.40	1.11
15.....	.82	.82		1.25				1.41	1.21		1.19	1.24
16.....	.81	.76			1.00	1.05			1.26	1.24	1.71	1.38
17.....		.71	1.50				1.42	1.10	1.18			1.22
18.....			1.76	1.19	1.09				1.15	1.51	1.69	1.12
19.....	.80		1.35	1.20			1.30	1.36	1.12	1.61	1.61	1.34
20.....	.80		1.60	1.20		1.20	1.29				1.45	
21.....	.80		1.32	1.19					.96		1.44	1.41
22.....	.79		1.30	1.33	1.00				.99	1.72	1.21	
23.....	.78		1.35	1.39				.95	.95		1.42	
24.....	.78			1.58	1.11			.96	.92	1.70		
25.....	.76	1.21	1.18				1.24	.94		1.35	1.20	1.50
26.....	.76	.99	1.41	1.55	1.00	1.31	1.22	.93	.89	1.21	1.15	
27.....	.78		1.40	1.49		1.41	1.25	1.34	.86		1.11	
28.....	.74		1.37	1.38	.98	1.31	1.11		.85		1.44	1.22
29.....	.75		1.36				1.09		.84		1.48	1.20
30.....	.74		1.87				1.05			1.78	1.21	
31.....							1.02					

*Daily discharge, in second-feet, at station No. 87 at 2,700-foot level, near Hilo, Hawaii, for 1911.*

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1.....		0.81	11.....		0.84	21.....	5.96	1.10
2.....		.75	12.....		2.04	22.....	5.83	.84
3.....		.75	13.....		4.10	23.....	5.70	.75
4.....		.75	14.....	3.05	7.00	24.....	5.58	5.46
5.....		.87	15.....	4.98	14.70	25.....	5.58	5.10
6.....		.87	16.....	4.30	4.50	26.....	2.78	4.50
7.....		.84	17.....	4.50	5.96	27.....	1.42	4.50
8.....		.90	18.....	4.74	4.74	28.....	1.42	4.50
9.....	1.10		19.....	16.60	6.48	29.....	.90	5.10
10.....	.90		20.....	5.96	10.80	30.....	4.74	
						31.....		4.50

*Daily discharge, in second-feet, at station No. 87 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.90	0.20	3.00	8.00	3.00	0.60	1.60	0.80	3.50	1.20	6.00	4.00
2.....	.90	.10	5.70	6.00	2.00	.60	1.50	.85	4.00	1.60	7.00	7.00
3.....	.90	.10	4.50	4.50	4.00	.60	5.00	8.00	6.00	1.50	8.00	5.00
4.....	.90	.05	4.10	4.50	5.00	.60	4.00	5.00	7.00	1.40	6.00	3.00
5.....	.90	.05	1.40	4.50	6.75	.60	2.45	3.60	4.75	1.10	3.15	1.80
6.....	.90	.05	1.30	5.50	5.00	.55	2.05	2.60	3.90	1.00	2.20	1.40
7.....	.90	.05	2.45	8.00	4.00	.60	1.90	1.60	7.55	.85	1.35	1.80
8.....	1.00	.05	2.35	7.00	3.00	.60	1.60	1.30	5.10	.80	1.90	2.80
9.....	.80	.05	2.25	6.00	2.00	.70	1.40	1.60	3.30	.90	3.00	2.60
10.....	.80	.05	2.25	4.50	1.30	.80	1.20	1.65	3.00	.95	9.00	1.60
11.....	.60	.05	2.55	4.00	1.30	.90	7.15	1.60	2.80	.85	8.00	1.30
12.....	.60	.05	5.10	1.95	1.25	1.00	5.40	1.60	3.60	1.90	5.60	1.20
13.....	.55	1.30	5.85	1.80	1.10	1.20	3.80	2.10	3.05	1.55	5.70	.85
14.....	.55	.85	6.70	2.20	1.00	1.30	5.70	2.60	2.80	1.95	3.50	1.35
15.....	.45	.45	4.00	2.25	1.00	1.20	5.00	3.60	1.95	2.10	1.85	2.20
16.....	.40	.30	4.00	2.10	.90	1.10	4.30	2.40	2.30	2.20	7.15	3.30
17.....	.40	.20	4.50	2.00	1.10	1.30	3.70	1.30	1.75	3.40	8.00	2.05
18.....	.40	.10	7.85	1.85	1.25	1.50	3.10	2.20	1.60	4.60	6.85	1.40
19.....	.40	.10	3.05	1.90	1.10	1.70	2.60	3.15	1.40	5.85	7.00	2.95
20.....	.40	1.00	5.70	1.90	1.00	1.90	2.55	2.50	1.10	6.00	4.00	4.00
21.....	.40	5.00	2.80	1.85	.90	2.00	2.40	2.00	.80	6.00	3.90	3.60
22.....	.40	7.00	2.60	2.85	.90	2.20	2.40	1.50	.85	7.30	1.95	4.00
23.....	.35	8.00	3.05	3.40	1.20	2.30	2.30	.75	.75	10.00	3.70	7.00
24.....	.35	6.00	2.40	5.50	1.35	2.40	2.30	.80	.65	7.00	2.80	6.00
25.....	.30	2.00	1.80	5.00	1.10	2.50	2.20	.70	.60	3.05	1.90	4.50
26.....	.30	1.85	3.60	4.50	.90	2.70	2.05	.70	.60	1.95	1.60	5.00
27.....	.35	1.80	3.50	4.40	.90	3.60	2.25	2.95	.50	10.00	1.40	3.00
28.....	.30	1.70	3.25	3.30	.85	2.70	1.35	2.00	.50	10.00	3.90	2.05
29.....	.30	1.60	3.15	3.00	.80	2.40	1.25	1.80	.50	10.00	4.30	1.90
30.....	.30	.90	9.50	3.00	.80	2.00	1.10	1.50	.80	8.10	1.95	1.00
31.....	.30	.....	10.00	.....	.70	.....	1.00	2.00	.....	6.00	.....	1.00

NOTE.—Daily discharge determined from rating curve fairly well defined except for flood stages. Discharge for days for which gage heights are missing estimated from diagram prepared from record of daily rainfall at the camp near station No. 50.

*Monthly discharge at station No. 87 at 2,700-foot level, near Hilo, Hawaii, for 1911-12.*

Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).	Month.	Mean discharge in second-feet.	Run-off (total in acre-feet).
1911.			1912—Continued.		
November 14-30.....	4.72	159	June.....	1.47	87.5
December.....	3.56	220	July.....	2.79	172
1912.			August.....	2.15	132
January.....	.56	34.40	September.....	2.57	153
February.....	1.38	79.40	October.....	3.91	240
March.....	4.01	247	November.....	4.42	263
April.....	3.91	233	December.....	2.97	180
May.....	1.85	114	The year.....	2.66	1,940.0

*Monthly discharge at stations Nos. 1-18 and 25-87 at 2,700-foot level, near Hilo, Hawaii, for 1912.*

[Drainage area, about 75 square miles.]

Month	Discharge in second-feet.		Run-off.	
	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January.....	30.25	0.403	0.46	1,790
February.....	248.95	3.320	3.58	14,300
March.....	258.81	3.450	3.98	15,900
April.....	435.17	5.800	6.47	25,900
May.....	182.20	2.430	2.80	11,200
June.....	61.72	.823	.92	3,640
July.....	146.54	1.950	2.25	9,020
August.....	97.19	1.300	1.50	6,970
September.....	254.05	3.390	3.78	15,100
October.....	401.44	5.350	6.17	24,100
November.....	474.07	6.320	7.05	28,300
December.....	385.17	5.140	5.93	23,700
The year.....	247.15	3.300	44.89	179,000

NOTE.—The above table gives the combined discharge in second-feet and run-off in acre-feet for the 81 stations at the 2,700-foot level above Hilo, Hawaii.

#### HAMAKUA GROUP OF STREAMS.

##### KAWAINUI RIVER, NEAR WAIPIO, HAWAII.

**Location.**—One hundred feet above intake of New Hamakua ditch and  $6\frac{1}{2}$  miles southwest of Kukuihaele.

**Records available.**—July 20, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 5 p. m.; datum unchanged.

**Channel.**—Practically permanent.

**Discharge measurements.**—Made by wading at low water and from footbridge 10 feet below gage during high water.

**Accuracy.**—No discharge rating has yet been obtained.

**Cooperation.**—Station maintained in cooperation with Hawaiian Irrigation Co.

*Daily gage height, in feet, of Kawainui River near Waipio, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	1.30	0.80	2.30	2.60	2.10	1.45	2.00	1.60	0.90	2.30	2.00	3.65
2.....	1.25	.80	2.60	2.30	2.20	1.40	1.90	1.65	2.10	2.20	1.40	2.05
3.....	1.20	1.40	2.40	3.30	2.20	1.30	1.85	1.65	2.55	1.95	1.05	1.90
4.....	1.20	1.95	2.20	2.90	2.35	1.15	2.05	1.40	2.70	1.15	.95	1.70
5.....	1.20	1.00	2.15	2.40	2.20	1.00	2.00	1.25	2.05	.95	.80	1.50
6.....	1.20	.85	2.05	2.35	2.20	1.00	2.05	1.20	2.05	.80	.80	1.40
7.....	1.68	.80	2.20	2.80	1.90	1.25	2.45	2.05	2.00	.80	.80	1.35
8.....	2.30	.80	1.95	2.90	1.85	1.55	2.05	1.75	2.05	.80	.80	1.95
9.....	1.70	.80	2.00	2.50	1.80	2.25	2.00	2.15	1.80	.80	2.40	2.99
10.....	1.35	.80	2.25	2.50	1.80	2.35	1.95	2.25	1.30	.80	3.60	2.05
11.....	1.20	.82	2.55	2.10	1.70	2.15	2.00	1.95	1.05	.80	2.10	1.60
12.....	1.20	.80	2.45	2.20	1.70	2.20	1.95	2.50	.90	.80	2.40	1.30
13.....	1.28	1.45	2.15	2.15	1.70	2.10	2.20	2.15	.92	.80	2.40	1.20
14.....	1.10	.99	1.90	2.10	1.70	2.05	2.15	2.30	.90	.80	1.95	1.00
15.....	1.00	.80	1.85	2.25	1.60	1.95	1.95	2.45	1.90	.80	1.80	1.00
16.....	1.00	.80	1.70	2.05	1.80	2.35	1.95	2.15	.95	.80	3.20	1.90
17.....	1.00	.80	2.15	2.15	1.90	2.20	2.00	1.80	.85	.80	3.15	.90
18.....	1.00	.80	2.30	1.95	1.90	1.95	2.00	2.20	.80	.80	2.90	.95
19.....	1.00	2.05	2.15	1.90	1.85	2.15	1.90	1.95	.80	.80	2.55	1.20
20.....	1.00	2.95	2.20	2.22	1.80	2.10	1.90	1.60	.80	.80	2.00	1.45

*Daily gage height, in feet, of Kawainui River near Waipio, Hawaii, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
21.....	1.00	4.05	2.15	2.00	1.80	2.00	1.90	1.40	0.80	0.80	1.90	1.85
22.....	.95	2.30	1.95	2.05	1.70	1.90	1.95	1.15	.80	.95	1.95	1.70
23.....	.95	1.70	2.25	1.95	1.65	2.20	2.05	1.00	.80	2.30	2.20	2.10
24.....	.95	1.80	2.00	2.45	1.90	2.15	2.25	.90	.80	2.35	1.90	2.00
25.....	.95	1.85	2.25	2.15	1.65	1.95	2.00	.90	.80	.95	1.70	1.90
26.....	.90	1.70	2.35	2.30	2.00	2.15	1.95	1.45	.80	1.70	1.70	2.05
27.....	.90	1.40	2.10	2.35	2.15	2.00	1.90	1.95	.80	2.50	1.80	1.60
28.....	.90	2.80	1.85	2.00	2.00	1.85	1.80	1.20	.80	2.25	1.70	1.65
29.....	.80	2.35	1.80	1.95	2.10	2.00	1.75	.95	.80	2.05	2.05	1.80
30.....	.80	.....	3.85	1.90	1.85	2.05	1.70	.90	1.70	1.95	2.20	1.45
31.....	.80	.....	3.70	.....	1.75	.....	1.70	.90	.....	2.25	.....	1.35

**WAIPIO RIVER BELOW KOIAWE STREAM, NEAR WAIPIO, HAWAII.**

**Location.**—About 50 feet below junction of Koiawe and Waipio Rivers, and about 5 miles southwest of Kukuihaele.

**Records available.**—July 20, 1911, to December 31, 1912.

**Gage.**—Vertical staff; datum unchanged.

**Channel.**—Probably slightly shifting.

**Discharge measurements.**—Made by wading at low water and from footbridge at gage during high water.

**Accuracy.**—No discharge rating has yet been obtained.

**Cooperation.**—Station maintained in cooperation with the Hawaiian Irrigation Co.

*Daily gage height, in feet, of Waipio River below Koiawe Stream, near Waipio, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.95	0.85	1.70	2.25	1.10	0.95	0.90	0.90	0.85	1.10	1.10	3.60
2.....	.90	.85	3.00	2.30	2.30	.95	.90	.90	1.50	1.40	1.00	1.40
3.....	.90	.90	2.60	4.20	1.60	.90	.88	.90	3.00	1.20	.95	1.00
4.....	.90	.90	1.70	5.10	3.20	.90	1.60	.90	4.10	.95	.92	.95
5.....	.90	.85	1.40	2.30	1.90	.90	2.20	.90	.95	.90	.90	.92
6.....	.90	.85	1.50	2.80	2.00	.88	2.60	.90	.90	.90	.90	.90
7.....	1.40	.85	1.80	4.10	1.20	.88	3.80	.90	.95	.85	.90	.90
8.....	2.60	.85	1.10	4.20	2.40	1.05	1.40	1.45	.85	.82	.90	1.20
9.....	1.05	.85	.90	3.40	1.50	2.20	1.80	2.70	.90	.82	5.50	1.15
10.....	.95	.85	1.70	3.90	1.20	4.30	.90	2.00	.85	.82	4.50	1.05
11.....	.90	.85	2.50	2.40	1.00	3.50	2.10	1.30	.85	.82	1.60	1.00
12.....	.90	.85	3.50	2.40	.95	2.50	1.05	1.00	.90	.82	6.00	.95
13.....	.90	2.50	2.80	2.50	.95	1.90	4.50	1.05	.90	.85	2.50	.90
14.....	.90	1.00	1.50	1.90	.90	1.50	1.50	.95	.92	.82	1.30	.90
15.....	.85	.95	1.10	2.50	.90	1.30	1.05	1.50	.90	.82	.90	.90
16.....	.85	.90	.95	1.30	.90	3.00	1.60	.92	1.20	.82	4.30	.90
17.....	.85	.90	2.40	2.30	1.00	2.20	1.40	.92	.92	.82	3.50	.90
18.....	.85	.90	2.90	1.25	.95	1.40	1.05	3.70	.90	.82	4.50	.90
19.....	.85	2.10	1.15	1.05	1.25	1.30	.95	1.20	.85	.85	2.00	.90
20.....	.85	4.10	2.50	2.40	1.35	1.15	.90	.95	.90	.82	3.00	.90
21.....	.85	5.50	1.80	1.90	2.10	1.20	.90	.92	.90	.82	1.50	.90
22.....	.85	1.70	1.10	1.35	1.00	1.05	.90	.90	.85	.82	1.00	.90
23.....	.85	.95	2.40	1.25	.95	.95	.90	.85	.85	2.20	1.00	1.10
24.....	.90	.90	1.40	2.70	1.60	1.90	2.80	.82	.85	2.70	1.00	1.05
25.....	.85	.90	2.30	1.40	1.25	1.05	1.10	.82	.82	1.20	.95	1.10
26.....	.85	.90	2.90	3.60	1.40	2.60	1.00	3.80	.85	1.60	.95	1.25
27.....	.85	2.80	1.05	2.40	1.60	1.60	.90	3.00	.82	2.70	.92	1.05
28.....	.85	3.60	1.00	1.35	1.80	1.20	.90	.95	.82	1.30	.90	1.00
29.....	.85	2.40	.95	1.25	1.35	1.00	.90	.42	.82	1.40	.90	.95
30.....	.85	.....	4.50	1.20	1.25	1.30	.90	.90	1.50	1.20	1.10	.92
31.....	.85	.....	4.00	.....	1.00	.....	.90	.85	.....	3.50	.....	.92

**WAIPIO RIVER BELOW WAIMA STREAM, NEAR WAIPIO, HAWAII.**

**Location.**—About 400 feet below junction of Waima Stream and Waipio River, and about 4 miles southwest of Kukuihaele.

**Records available.**—July 20, 1911, to December 31, 1912.

**Gage.**—Vertical staff; read once daily, at 7 a. m.; datum unchanged.

**Channel.**—Probably slightly shifting.

**Discharge measurements.**—Made by wading at low water and from footbridge 100 feet above gage at high water.

**Accuracy.**—No discharge rating has yet been obtained.

**Cooperation.**—Station maintained in cooperation with the Hawaiian Irrigation Co.

*Daily gage height, in feet, of Waipio River below Waima Stream, near Waipio, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	0.50	0.50	0.85	1.15	0.55	0.50	0.50	0.48	0.48	0.55	0.65	1.90
2.....	.50	.50	1.60	1.10	1.20	.50	.50	.50	.70	.80	.50	1.20
3.....	.50	.50	1.30	3.30	1.00	.50	.50	.50	1.60	.65	.50	.55
4.....	.50	.50	.80	4.30	1.70	.50	.78	.50	2.90	.50	.50	.50
5.....	.50	.50	.70	1.20	.90	.50	1.25	.50	.60	.50	.50	.50
6.....	.50	.50	.75	1.55	1.00	.50	1.35	.50	.50	.48	.48	.50
7.....	.75	.50	1.00	3.15	.60	.50	2.40	.50	1.00	.48	.48	.50
8.....	1.25	.50	.70	3.30	1.25	.62	.72	.50	.50	.48	.48	.70
9.....	.60	.45	.50	1.85	1.00	1.10	.85	1.35	.50	.48	4.10	.55
10.....	.50	.45	.85	2.50	.62	3.40	.50	1.05	.48	.48	3.00	.70
11.....	.50	.45	1.30	1.25	.52	2.20	1.25	.52	.48	.48	1.20	.50
12.....	.50	.45	1.90	1.00	.50	1.30	.85	.80	.48	.48	4.70	.50
13.....	.50	1.30	1.25	1.20	.52	.80	3.55	.62	.48	.48	1.40	.48
14.....	.50	.55	.80	.70	.50	.75	.85	.55	.48	.50	.60	.48
15.....	.50	.45	.55	1.20	.50	.60	.52	.80	.48	.50	.50	.48
16.....	.50	.45	.50	.65	.50	1.60	.85	.50	.60	.50	2.80	.48
17.....	.50	.45	1.25	.90	.55	1.20	.75	.50	.50	.50	2.00	.48
18.....	.50	.45	1.50	.65	.50	.60	.55	2.00	.50	.48	2.90	.48
19.....	.50	1.10	.60	.60	.60	.95	.50	.70	.48	.60	1.35	.48
20.....	.50	3.25	1.30	1.25	.70	.60	.50	.52	.48	.50	.80	.48
21.....	.50	4.45	.95	.95	1.15	.65	.50	.50	.48	.48	.75	.48
22.....	.50	.90	.55	.70	.52	.50	.50	.50	.48	.48	.62	.50
23.....	.50	.50	1.10	.70	.50	.50	.50	.48	.48	1.10	.70	1.10
24.....	.50	.50	.75	1.45	.85	.90	1.30	.48	.48	1.45	.52	.60
25.....	.50	.50	1.15	.70	.60	.50	.50	.48	.48	.50	.50	.55
26.....	.50	.50	1.55	2.30	.75	1.35	.50	2.00	.48	.85	.50	.62
27.....	.50	1.55	.60	1.30	.92	.65	.50	1.75	.48	1.45	.50	.50
28.....	.50	2.55	.50	.80	.95	.50	.50	.55	.48	.65	.48	.48
29.....	.50	1.60	.50	.60	.70	.50	.50	.50	.48	.75	.58	.50
30.....	.50	.....	3.70	.60	.60	.60	.48	.50	.80	.52	.70	.48
31.....	.50	.....	3.25	.....	.50	.....	.48	.....	.....	1.80	.....	.48

**NEW HAMAKUA DITCH AT WAIMA STREAM, NEAR WAIPIO, HAWAII.**

**Location.**—In the Waima Branch of Waipio Gulch, and about 8 miles west of Kukuihaele, Hawaii. Gage set in flume crossing Waima Stream.

**Records available.**—May 1 to December 31, 1912.

**Gage.**—Vertical staff; read twice daily, at 6 a. m. and 5 p. m.

**Channel.**—Smooth and regular (in ditch flume).

The following discharge measurement was made by C. H. Pierce:

February 6, 1912: Gage height, 35.5 inches; discharge, 56.2 second-feet.

*Daily gage height, in feet, of New Hamakua ditch at Waima Stream, near Waipio, Hawaii, for 1912.*

Day.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	4.30	4.11	4.19	3.78	3.70	4.52	4.14	4.20
2.....	4.30	4.02	4.16	3.94	4.28	4.55	3.81	3.65
3.....	4.30	3.96	4.10	4.20	5.30	4.30	3.71	4.09
4.....	4.30	3.91	4.16	3.90	5.20	3.94	3.69	4.00
5.....	4.30	3.86	4.30	3.80	4.81	3.75	3.80	3.92
6.....	4.30	3.85	4.30	3.78	4.38	3.65	3.75	3.85
7.....	4.30	3.95	4.41	4.16	4.68	3.61	3.65	4.18
8.....	4.30	4.30	4.58	4.10	4.30	3.60	3.86	4.20
9.....	4.30	4.30	4.70	4.75	4.34	3.59	4.15	4.15
10.....	4.30	4.20	4.39	4.85	4.00	3.58	4.20	4.18
11.....	4.28	4.20	4.45	4.28	3.88	3.58	4.20	3.98
12.....	4.25	4.20	4.65	4.71	3.82	3.59	4.20	3.86
13.....	4.30	4.20	4.55	5.00	3.80	3.66	4.20	3.79
14.....	4.25	4.20	4.70	4.72	3.95	4.76	4.20	3.75
15.....	4.19	4.20	4.40	5.06	3.94	3.89	4.10	3.72
16.....	4.21	4.20	4.45	4.32	4.59	3.69	4.20	3.69
17.....	4.28	4.20	4.50	4.20	4.15	3.69	4.20	3.66
18.....	4.26	4.20	4.48	4.60	3.85	3.75	4.20	3.72
19.....	4.30	4.20	4.15	4.65	3.79	4.61	4.20	3.69
20.....	4.30	4.20	4.02	4.05	4.06	3.72	4.20	4.08
21.....	4.30	4.20	3.98	3.92	4.48	3.62	4.20	3.78
22.....	4.24	4.16	4.28	2.82	3.94	3.75	4.20	4.00
23.....	4.12	4.10	4.30	3.78	3.78	5.20	4.20	4.20
24.....	4.24	4.20	4.50	3.72	3.71	5.30	4.16	4.20
25.....	4.28	4.21	4.16	3.70	3.66	4.10	4.12	4.04
26.....	4.22	4.20	4.10	4.40	3.65	4.60	4.06	4.20
27.....	4.30	4.30	4.05	4.48	3.68	5.30	4.14	3.98
28.....	4.30	4.21	3.94	4.58	3.62	4.20	4.01	3.88
29.....	4.26	4.15	3.91	3.96	3.60	4.20	4.18	4.10
30.....	4.30	4.26	3.82	3.80	4.25	4.20	4.10	3.99
31.....	4.22	.....	3.79	.....	.....	4.20	3.95	3.95

#### NEW HAMAKUA DITCH AT MAIN WEIR, NEAR KUKUIHAELE, HAWAII.

**Location.**—Near head of ditch about 500 feet south of office of Hawaiian Irrigation Co. (Ltd.), at Kukuihaele. This ditch diverts all run-off from the headwaters of the Wapio Basin below the upper Hamakua ditch.

**Records available.**—July 18, 1910, to December 31, 1912.

**Gage.**—Automatic clock register; datum unchanged.

**Discharge.**—Measured by weir consisting of six 5-foot panels, sharp crested, and with a good stilling basin above. Discharge measurements made in ditch below weir have checked weir discharge to within 2 per cent.

**Cooperation.**—The records for this weir have been furnished the Geological Survey by the Hawaiian Irrigation Co. (Ltd.).

*Daily discharge, in million gallons, of New Hamakua ditch at main weir, near Kukuihaele, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	35.6	29.6	38.6	38.8	38.7	36.2	37.0	31.0	31.1	41.6	34.5	33.9
2.....	34.6	29.3	38.8	38.7	38.7	36.2	36.8	32.5	39.3	40.4	33.0	35.4
3.....	33.9	30.0	38.7	38.9	38.9	35.7	35.7	34.9	47.3	39.2	31.3	34.2
4.....	33.3	35.3	38.6	39.0	39.0	35.0	35.3	31.7	48.9	34.4	31.3	34.0
5.....	32.9	32.1	38.6	38.9	38.7	34.5	37.8	30.4	45.8	31.5	32.1	34.2
6.....	32.4	30.9	38.8	39.1	38.8	34.2	37.8	30.0	41.8	30.1	31.7	34.2
7.....	34.3	30.5	38.6	39.0	36.2	34.8	37.7	33.6	44.5	29.5	30.7	34.6
8.....	37.6	30.0	38.6	39.0	36.6	35.4	42.2	39.3	41.6	29.1	32.3	34.2
9.....	37.6	29.9	38.8	38.9	36.3	35.2	42.9	42.0	41.1	29.0	35.1	34.6
10.....	35.0	29.6	38.8	38.3	36.3	35.2	40.8	44.5	36.1	29.0	34.8	34.5

*Daily discharge, in million gallons, of New Hamakua ditch at main weir, near Kukuihaele, Hawaii, for 1912—Continued.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
11.....	33.3	29.8	38.9	38.8	36.4	35.3	39.9	38.5	35.1	28.8	34.8	33.8
12.....	32.6	30.1	38.7	38.5	36.4	35.5	42.2	43.0	34.0	29.5	34.8	32.5
13.....	32.2	36.5	38.8	38.5	36.2	34.0	41.6	45.6	33.0	29.5	34.8	32.3
14.....	32.0	35.5	38.7	38.8	36.3	34.8	41.9	43.8	33.8	36.3	34.8	32.3
15.....	31.8	31.6	38.7	38.8	36.2	35.1	40.8	46.6	34.6	33.0	34.4	32.3
16.....	31.4	30.5	37.8	38.7	36.5	34.8	38.4	39.0	32.5	30.1	34.2	31.7
17.....	31.1	30.2	37.8	38.9	36.5	35.8	38.4	36.8	37.2	29.5	34.2	30.1
18.....	31.0	29.8	37.9	41.9	36.3	34.8	39.0	39.4	33.4	30.1	33.8	31.7
19.....	30.8	35.4	37.9	38.6	36.2	35.0	36.5	43.4	32.3	38.7	33.8	31.7
20.....	30.6	38.3	37.9	38.8	36.1	35.2	34.8	35.9	34.8	31.1	33.6	34.0
21.....	30.5	37.9	38.2	38.7	36.2	34.8	34.1	34.0	36.9	29.5	34.2	31.7
22.....	30.5	37.8	38.0	38.5	36.1	34.8	36.8	32.2	34.2	32.0	34.0	34.2
23.....	30.3	38.3	38.2	38.7	36.1	34.8	37.8	31.1	31.7	49.1	33.8	34.5
24.....	31.0	38.6	38.4	38.9	36.3	35.4	41.2	30.2	31.1	50.7	34.2	34.9
25.....	30.7	38.9	38.6	39.0	36.1	36.4	37.2	30.5	29.9	37.4	34.2	34.9
26.....	30.2	38.6	38.5	38.9	36.4	36.1	36.1	36.5	29.9	39.8	34.2	34.9
27.....	30.0	38.8	38.7	38.9	36.6	36.9	35.4	40.9	29.9	50.6	33.6	34.2
28.....	29.9	38.4	38.6	38.6	36.6	36.7	33.8	43.6	29.5	34.9	33.8	33.0
29.....	29.8	38.4	37.4	38.8	36.3	36.0	33.2	34.3	29.3	35.3	34.2	34.5
30.....	29.6	.....	39.1	38.8	36.2	37.5	32.0	33.2	34.6	35.1	34.2	34.2
31.....	29.7	.....	39.3	.....	36.4	.....	31.1	32.5	.....	34.9	.....	34.2

NOTE.—The weir record includes the total flow of the ditch exclusive of water sent over the wasteway a few hundred feet above when it is not needed.

*Monthly discharge of New Hamakua ditch at main weir, near Kukuihaele, Hawaii, for 1912.*

Month.	Mean discharge in million gallons.	Run-off (total in million gallons).	Month.	Mean discharge in million gallons.	Run-off (total in million gallons).
January.....	32.1	996	August.....	36.8	1,140
February.....	33.8	981	September.....	35.8	1,080
March.....	38.5	1,190	October.....	34.8	1,080
April.....	38.9	1,170	November.....	33.7	1,010
May.....	36.8	1,140	December.....	33.6	1,040
June.....	35.4	1,060			
July.....	37.6	1,170	The year.....	35.7	13,100

#### KOHALA GROUP OF STREAMS.

##### KOHALA DITCH NEAR KOHALA, HAWAII.

**Location.**—The Kohala Ditch Co. maintains three weirs, which measure the discharge carried by Kohala ditch. This ditch picks up and delivers to the plantations on the north coast of Hawaii all the run-off at low and medium stages between the Honokane Gulch and the northwest point of the island below the 2,000-foot contour. The Kehena ditch collects most of the water above the 2,000-foot contour.

The Awini weir is in the east branch of Honokanenui Gulch at an elevation of 1,880 feet, and is on the southeast side of the gulch.

The Niulii weir is about  $3\frac{1}{2}$  miles south of Niulii, Kohala District, at an elevation of 1,000 feet, and is about 5 miles below the Awini weir.

The Hawi weir is about  $1\frac{1}{2}$  miles south of the Hawi Mill near the lower end of the ditch.

**Records available.**—Daily records of the flow of the Kohala ditch at the Awini and Niulii weirs have been kept by the Kohala Ditch Co. since July 1, 1907. No daily record has been kept of the flow at the Hawi weir, which is used mainly as a check on deliveries of water between Niulii and Hawi. The Niulii weir measures the amount of water shown by the Awini weir, and also the inflow from the Honokanenui. The record for the Honokanenui is arrived at by subtracting the flow at the Awini weir from the flow at the Niulii weir.

**Gages.**—Vertical staffs graduated to hundredths and set in at the weirs.

**Discharge measurements.**—Each weir consists of three 5-foot panels with end contractions, sharp-beveled steel crest, and very slight velocity of approach.

*Daily discharge, in million gallons, of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1907.*

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.90	10.50	5.16	16.90	19.50	10.50	16.....	0.89	21.90	8.82	11.50	11.50	.....
2.....	4.77	6.59	4.77	15.70	16.30	9.29	17.....	.....	15.20	4.77	21.90	10.50	.....
3.....	15.70	4.03	3.32	12.50	21.90	8.36	18.....	2.66	10.50	5.76	21.90	9.29	.....
4.....	4.39	20.70	5.16	12.00	21.90	8.36	19.....	20.70	12.50	3.67	21.90	8.82	.....
5.....	4.03	19.50	2.99	21.90	19.50	7.90	20.....	11.00	12.50	12.00	21.90	12.50	.....
6.....	4.03	12.50	4.39	21.90	16.90	12.50	21.....	20.70	16.30	10.50	21.90	12.00	.....
7.....	9.29	19.50	10.50	21.90	12.50	10.50	22.....	20.70	14.60	21.90	21.90	14.60	.....
8.....	2.99	18.30	4.03	20.70	10.50	9.29	23.....	18.90	9.29	21.90	20.70	20.10	.....
9.....	.89	20.70	2.99	16.90	21.90	8.36	24.....	16.90	4.39	20.70	16.90	20.70	.....
10.....	.17	20.70	7.02	20.10	16.90	6.59	25.....	10.50	7.46	16.90	11.00	15.20	.....
11.....	.....	20.70	5.76	18.90	11.50	6.59	26.....	6.59	21.90	13.00	9.76	14.60	.....
12.....	.....	18.90	9.76	14.10	11.50	5.16	27.....	8.36	20.70	20.70	16.30	16.90	12.50
13.....	13.60	14.60	10.50	9.76	10.50	11.50	28.....	19.50	20.70	20.70	21.90	21.90	16.90
14.....	14.10	20.70	3.32	11.50	9.29	16.90	29.....	15.70	18.90	17.40	17.40	15.20	21.90
15.....	4.77	20.70	7.46	18.30	13.00	12.50	30.....	11.00	11.50	13.60	15.70	12.00	21.90
							31.....	4.77	7.46	.....	18.90	.....	21.90

*Daily discharge, in million gallons, of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1908.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	20.70	16.90	2.99	5.76	5.76	12.50	18.30	20.70	20.70	13.60	6.59	20.70
2.....	20.70	16.90	4.77	12.50	8.36	10.50	20.70	20.70	20.70	12.50	6.17	20.70
3.....	20.70	20.70	4.03	18.30	9.29	9.29	20.70	19.50	19.50	11.50	5.76	20.70
4.....	15.70	18.30	4.03	18.30	19.50	11.50	20.70	18.30	18.30	9.29	4.77	19.50
5.....	13.00	20.70	3.67	14.60	18.30	13.60	20.70	18.30	16.90	8.36	5.16	18.30
6.....	11.50	20.70	7.46	11.50	20.70	15.70	19.50	20.70	15.70	13.60	20.70	20.70
7.....	10.50	20.70	16.90	7.46	20.70	14.60	19.50	20.70	14.10	15.70	19.50	20.70
8.....	8.82	20.70	12.50	10.50	20.70	13.60	15.70	20.70	13.60	14.60	19.50	20.70
9.....	7.90	20.70	7.46	15.20	20.70	16.90	16.90	19.50	13.00	13.60	15.70	20.70
10.....	7.02	15.70	5.76	15.70	20.70	15.70	20.70	18.30	15.70	12.50	13.60	20.70
11.....	6.59	12.50	4.77	16.90	20.70	15.70	19.50	18.30	20.70	11.00	10.50	19.50
12.....	6.17	9.29	4.03	18.30	18.30	18.30	18.30	16.90	20.70	9.29	9.76	18.30
13.....	5.76	8.82	3.32	20.70	14.60	18.30	16.90	18.30	19.50	7.46	8.82	15.70
14.....	5.76	8.36	3.32	20.70	13.60	20.70	20.70	20.70	18.30	7.46	7.46	14.60
15.....	21.90	11.50	3.32	20.70	12.50	20.70	19.50	20.70	18.30	20.70	5.16	14.10
16.....	20.70	10.50	7.46	20.70	11.50	20.70	18.30	20.70	19.50	20.70	5.16	13.60
17.....	15.70	11.50	11.00	20.70	15.70	19.50	16.90	19.50	18.30	19.50	4.77	20.70
18.....	12.50	10.50	6.59	20.70	15.70	18.30	18.30	19.50	20.70	20.70	5.76	20.70
19.....	12.50	9.29	6.59	20.70	16.90	20.70	20.70	16.90	20.70	18.30	9.29	20.70
20.....	15.70	8.82	5.76	20.70	15.70	20.70	19.50	15.70	20.70	15.70	19.50	20.70
21.....	12.50	8.82	4.77	20.70	14.60	20.70	18.30	13.60	20.70	20.70	13.60	20.70
22.....	9.76	7.46	4.77	18.30	13.60	20.70	18.30	12.50	19.50	19.50	11.00	19.50
23.....	7.46	6.59	3.67	16.90	16.90	20.70	15.70	13.60	18.30	18.30	8.82	18.30
24.....	6.59	5.16	3.67	14.60	15.70	20.70	15.70	18.30	16.90	16.90	8.36	16.90
25.....	6.17	4.77	3.32	11.50	18.30	20.70	20.70	20.70	15.70	15.70	15.20	20.70
26.....	5.76	4.03	3.32	10.50	18.30	19.50	20.70	20.70	15.70	14.60	16.90	20.70
27.....	7.46	4.03	2.66	7.46	18.30	18.30	20.70	20.70	14.60	13.60	20.70	19.50
28.....	7.02	3.67	2.66	6.59	16.90	16.90	20.70	19.50	16.10	12.00	20.70	18.30
29.....	12.50	3.67	2.05	6.59	16.90	14.60	20.70	18.30	15.70	11.50	20.70	16.90
30.....	20.70	.....	2.05	5.76	15.70	15.70	20.70	20.70	14.60	10.50	20.70	15.70
31.....	21.90	.....	2.05	.....	14.60	.....	20.70	20.70	.....	7.46	.....	14.60



*Daily discharge, in million gallons, of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1909.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	14.10	20.70	20.7	16.30	4.77	13.60	16.30	19.50	5.16	8.82	7.02	3.32
2.....	14.10	19.50	20.7	15.70	4.39	11.50	13.60	18.30	5.16	10.90	4.77	2.99
3.....	13.60	18.30	20.7	20.70	4.03	9.29	12.00	15.70	4.03	13.60	8.36	2.66
4.....	13.60	16.90	20.7	20.70	16.90	8.36	8.82	14.60	3.66	11.50	8.36	2.66
5.....	13.60	15.70	20.7	20.70	20.70	7.46	5.76	13.60	2.99	11.00	8.36	2.05
6.....	12.50	20.70	20.7	20.70	20.70	6.59	4.77	12.50	2.99	10.50	7.46	2.05
7.....	11.50	19.50	20.7	20.70	19.50	15.70	9.29	11.50	2.35	9.29	5.16	1.77
8.....	10.50	18.30	19.5	19.50	18.30	14.60	20.70	12.50	2.35	7.46	7.46	1.50
9.....	9.29	15.70	18.3	18.90	16.90	13.60	19.50	11.50	2.35	6.59	9.76	1.50
10.....	8.36	14.60	18.3	18.30	16.90	11.50	16.90	10.40	2.05	4.03	9.76	1.50
11.....	7.46	13.60	20.7	16.90	15.70	9.29	15.70	9.76	2.05	3.32	9.29	1.50
12.....	6.59	20.70	20.7	16.30	14.60	8.36	20.70	9.29	4.39	6.59	8.36	1.50
13.....	5.76	19.50	19.5	16.30	14.10	7.46	20.70	8.82	8.82	10.50	12.00	1.50
14.....	4.77	18.30	18.3	15.70	20.70	20.70	20.70	8.36	19.50	9.29	12.00	1.50
15.....	4.03	16.90	18.3	15.20	19.50	18.30	20.70	8.36	13.60	6.17	9.76	1.24
16.....	3.67	15.70	20.7	14.60	18.30	16.90	20.70	7.90	8.82	5.16	8.36	1.24
17.....	3.32	20.70	20.7	14.10	16.90	15.70	20.70	7.90	6.17	4.77	7.02	3.32
18.....	2.99	20.70	20.7	13.60	15.70	14.60	20.70	7.46	14.60	3.32	5.16	20.70
19.....	2.99	19.50	20.7	13.10	14.60	12.50	20.70	7.02	20.70	3.32	5.16	20.70
20.....	2.99	18.30	20.7	12.00	14.60	10.50	20.70	6.59	14.10	3.32	4.77	20.70
21.....	2.99	18.30	20.7	11.00	14.10	8.36	20.70	5.76	10.50	2.66	4.03	20.70
22.....	2.99	20.70	20.7	9.76	13.60	6.59	20.70	5.16	6.17	7.46	3.32	20.70
23.....	20.70	20.70	20.7	8.82	12.50	5.76	20.70	4.39	8.82	14.60	3.32	20.70
24.....	20.70	20.70	20.7	8.36	10.50	14.10	18.30	5.76	15.70	14.10	2.66	15.20
25.....	20.70	20.70	20.7	7.90	8.36	12.50	20.70	7.02	15.70	11.00	2.66	11.50
26.....	20.70	20.70	20.7	7.46	20.70	10.50	20.70	6.59	14.60	7.46	9.26	20.70
27.....	20.70	20.70	20.7	6.59	20.70	9.76	20.70	5.16	21.90	4.77	7.46	15.20
28.....	20.70	20.70	20.7	6.17	20.70	8.82	20.70	8.36	14.60	4.03	4.77	12.50
29.....	19.50	.....	19.5	5.76	20.70	7.02	20.70	12.50	13.60	4.03	3.32	12.00
30.....	19.50	.....	18.3	5.76	19.50	8.36	20.70	11.00	12.00	3.67	2.66	9.76
31.....	20.70	.....	16.9	.....	18.30	.....	20.70	7.46	.....	5.76	.....	8.36

*Daily discharge, in million gallons, of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1910.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	6.59	18.30	8.36	19.50	20.70	18.30	14.10	15.70	8.36	19.50	5.16	21.90
2.....	6.17	19.50	15.20	17.40	19.50	17.40	14.60	15.70	7.46	19.50	4.77	21.90
3.....	6.17	18.30	16.90	16.90	18.90	16.30	14.60	20.70	6.17	11.50	4.77	20.70
4.....	6.17	16.90	16.30	13.60	18.30	14.60	20.70	19.50	5.76	10.50	4.02	20.70
5.....	7.90	15.20	16.30	12.50	19.50	18.90	20.70	19.50	4.39	7.90	3.67	20.70
6.....	15.70	14.60	13.60	16.30	18.90	18.30	20.70	17.40	3.67	11.00	4.03	20.70
7.....	11.50	13.60	12.50	14.60	20.70	17.40	20.70	20.70	2.99	11.00	2.66	20.70
8.....	9.29	13.60	12.50	16.90	20.70	19.50	20.70	20.70	2.66	20.70	2.66	20.10
9.....	8.82	12.50	11.50	16.30	19.50	19.50	20.70	19.50	2.35	20.70	2.66	18.30
10.....	11.50	12.00	9.29	14.60	19.50	18.30	20.70	19.50	2.05	19.50	2.05	16.90
11.....	12.50	11.50	7.46	13.60	18.90	16.30	20.70	18.90	2.05	18.30	2.99	12.50
12.....	13.60	12.50	6.59	12.50	18.30	15.70	20.70	18.90	2.05	11.50	2.99	12.50
13.....	19.50	15.70	6.17	10.50	16.90	20.70	19.50	20.70	2.05	11.00	2.05	12.00
14.....	19.50	13.60	5.76	9.29	15.70	19.50	19.50	20.70	2.05	7.90	2.05	10.50
15.....	18.30	12.50	4.77	9.29	14.60	20.70	20.70	19.50	2.05	6.59	2.05	10.50
16.....	17.40	11.50	4.03	14.60	19.50	20.70	20.70	16.30	5.76	6.59	1.77	9.76
17.....	18.30	11.50	3.67	20.70	18.90	20.70	19.50	12.50	5.76	6.59	5.16	8.82
18.....	20.70	11.00	3.32	20.70	16.90	20.70	16.90	8.36	5.16	6.17	20.70	8.82
19.....	19.50	10.50	3.32	20.70	18.30	20.70	15.70	7.90	4.39	4.39	20.70	7.90
20.....	18.30	9.29	16.90	19.50	16.90	18.30	15.20	20.70	3.32	4.39	15.20	6.59
21.....	18.30	10.50	18.30	16.30	14.60	16.90	14.60	20.70	2.66	4.03	15.20	6.17
22.....	18.30	15.70	18.30	13.60	11.50	18.30	14.10	20.70	2.66	10.50	15.20	6.17
23.....	18.30	15.70	16.90	10.50	8.36	19.50	12.50	20.70	2.05	11.00	21.90	6.17
24.....	18.30	13.00	15.70	12.50	6.59	18.30	12.50	19.50	2.05	8.36	20.70	6.17
25.....	18.30	11.50	16.90	10.50	5.52	16.30	20.70	17.40	2.05	7.46	15.70	8.82
26.....	18.30	9.76	18.30	8.36	4.77	15.20	20.70	16.30	2.05	5.16	11.00	7.46
27.....	18.30	8.36	16.90	7.02	4.39	14.60	19.50	15.20	2.05	4.39	9.76	7.46
28.....	18.30	7.90	14.60	7.46	4.03	14.60	16.90	13.60	2.05	4.77	9.29	7.46
29.....	18.30	.....	14.60	8.36	4.03	14.60	15.70	12.50	1.50	20.10	20.70	7.46
30.....	18.30	.....	16.90	8.36	4.03	14.10	15.70	11.50	4.03	10.50	20.70	6.17
31.....	18.30	.....	20.70	.....	9.76	.....	15.20	10.50	.....	7.46	.....	6.17

*Daily discharge, in million gallons, of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1911.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	15.70	21.90	15.70	18.30	19.50	7.5	20.70	4.77	18.3	18.30	5.16	10.50
2.....	20.70	21.90	12.50	17.40	18.30	16.9	20.70	4.77	18.3	18.30	4.77	9.29
3.....	18.90	21.90	12.50	18.30	16.90	18.3	20.70	4.03	18.3	18.30	4.77	8.36
4.....	20.70	21.90	12.00	16.90	16.90	18.3	20.70	3.67	20.7	20.70	7.46	7.46
5.....	20.70	21.90	12.00	14.60	16.90	18.3	20.70	3.67	19.5	19.50	8.82	7.46
6.....	19.50	21.90	11.50	14.60	16.90	19.5	20.70	3.21	18.3	18.90	9.29	7.46
7.....	16.90	21.90	11.50	14.10	19.50	20.7	20.70	3.21	20.7	18.30	10.50	7.90
8.....	13.00	21.90	10.50	14.10	16.90	20.7	20.70	3.21	20.7	16.90	12.50	8.36
9.....	13.00	21.90	9.76	13.60	20.70	20.7	20.70	5.76	19.5	16.90	10.50	8.36
10.....	13.00	21.90	11.50	12.50	20.70	20.7	20.70	4.77	19.5	15.70	9.29	7.46
11.....	13.00	21.90	11.50	12.50	20.70	20.7	20.70	4.77	20.7	15.70	10.50	7.46
12.....	13.00	20.70	10.50	12.00	18.30	20.7	20.70	4.77	20.7	15.70	10.50	5.76
13.....	12.50	20.70	10.50	11.50	16.90	20.7	20.70	9.76	19.5	14.60	9.29	13.60
14.....	12.50	19.50	9.29	10.50	18.30	20.7	20.70	9.76	18.3	13.60	10.50	20.70
15.....	12.50	18.90	8.36	9.29	20.70	20.7	20.70	9.76	20.7	13.60	12.50	20.70
16.....	13.60	18.30	8.36	9.29	20.70	20.7	20.70	9.76	20.7	13.60	10.50	20.70
17.....	14.60	18.30	7.90	20.70	20.70	20.7	19.50	10.50	20.7	12.50	20.70	20.70
18.....	14.60	16.90	20.70	20.70	20.70	20.7	19.50	10.50	20.7	11.50	20.70	20.70
19.....	12.50	16.30	19.50	20.70	19.50	20.7	16.90	10.50	20.7	9.76	20.70	20.70
20.....	10.50	16.30	16.90	20.70	19.50	20.7	16.90	12.50	20.7	9.76	20.70	20.70
21.....	10.50	15.70	16.90	20.70	19.50	20.7	15.70	12.50	20.7	9.29	20.70	20.70
22.....	9.76	14.60	15.20	20.70	18.30	20.7	14.60	12.50	20.7	9.29	19.50	20.70
23.....	9.76	13.00	13.60	20.70	15.70	20.7	11.50	13.00	20.7	7.90	18.30	19.50
24.....	12.50	12.50	13.60	20.70	12.50	20.7	11.50	13.50	20.7	7.90	18.30	12.50
25.....	14.60	11.00	12.00	20.70	10.50	20.7	10.50	13.50	20.7	7.46	18.30	11.00
26.....	19.50	9.76	12.00	20.70	9.29	20.7	8.36	13.50	20.7	6.59	16.90	9.29
27.....	19.50	12.50	10.50	20.70	8.36	20.7	7.46	13.50	20.7	6.17	15.20	8.82
28.....	20.70	20.70	9.76	19.50	8.36	20.7	6.59	13.50	20.7	5.76	15.20	8.82
29.....	19.50	-----	8.36	18.30	7.46	20.7	5.76	14.10	20.7	5.76	15.70	8.82
30.....	19.50	-----	7.02	16.90	7.46	20.7	5.76	14.10	20.7	6.59	15.70	8.82
31.....	19.50	-----	20.70	-----	7.46	-----	5.76	14.10	-----	6.59	-----	9.76

*Daily discharge, in million gallons, of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	7.46	1.50	20.70	20.70	15.70	9.29	12.50	2.99	5.16	11.00	12.00	20.70
2.....	6.59	1.50	20.70	20.70	20.70	9.29	13.00	2.99	15.70	9.76	12.00	18.30
3.....	5.76	2.66	20.70	20.70	20.70	7.90	14.10	3.32	20.70	9.29	9.76	15.20
4.....	4.77	5.16	20.70	20.70	20.70	7.02	13.00	3.32	20.70	9.76	8.36	11.00
5.....	4.39	3.32	19.50	20.70	19.50	6.17	13.00	2.99	16.90	7.90	9.29	10.50
6.....	4.03	2.05	19.50	20.70	19.50	5.16	18.90	2.99	15.70	5.76	8.36	8.82
7.....	4.03	1.77	19.50	20.70	16.90	5.16	20.70	2.99	15.70	4.03	8.36	12.50
8.....	12.00	1.50	18.30	20.70	16.90	7.90	20.70	2.99	15.70	2.99	7.46	16.90
9.....	11.50	1.50	18.30	20.70	16.90	12.50	18.30	16.90	15.70	2.99	10.50	15.70
10.....	10.50	1.48	18.30	20.70	16.90	20.70	16.30	16.90	12.50	2.99	20.70	12.50
11.....	8.36	2.99	18.30	20.70	14.60	20.70	14.10	15.70	11.50	2.99	20.70	10.50
12.....	6.59	3.32	20.70	20.70	13.60	20.70	11.50	15.70	12.50	2.99	20.70	8.36
13.....	6.17	9.29	20.70	20.70	13.60	18.30	11.50	16.90	10.50	2.66	20.70	8.82
14.....	4.77	10.50	20.70	19.50	12.50	16.90	13.60	16.90	8.36	7.90	20.70	8.82
15.....	4.77	7.46	19.50	19.50	10.50	16.90	11.50	15.70	9.29	7.90	20.70	8.82
16.....	4.03	5.16	19.50	19.50	9.76	20.70	9.76	13.00	12.00	6.59	20.70	8.36
17.....	4.03	3.67	18.30	19.50	10.50	20.70	8.82	10.50	9.29	5.16	20.70	7.90
18.....	4.03	3.32	20.70	19.50	10.50	16.90	8.82	9.29	9.29	4.77	20.70	8.82
19.....	3.32	4.03	20.70	19.50	10.50	19.50	7.90	11.50	9.29	7.46	20.70	8.36
20.....	2.66	10.50	20.70	19.50	9.76	16.90	7.90	7.90	10.50	7.46	20.70	11.00
21.....	2.66	20.70	20.70	18.30	12.50	15.20	7.90	7.02	10.50	7.46	20.70	9.29
22.....	2.05	20.70	20.70	18.30	10.50	14.10	7.90	5.16	10.50	5.76	19.50	9.29
23.....	2.05	18.30	19.50	18.30	8.82	14.10	8.82	5.16	8.36	16.90	18.30	9.29
24.....	2.05	17.40	19.50	18.30	8.82	15.70	11.00	3.32	5.76	16.90	13.00	20.70
25.....	3.32	17.40	19.50	18.30	9.29	14.10	9.29	3.32	5.76	19.50	12.50	20.70
26.....	2.66	17.40	20.70	18.30	10.50	14.10	8.36	2.66	5.76	20.70	11.50	20.70
27.....	2.05	20.70	20.70	18.30	15.70	12.50	8.36	4.39	3.32	20.70	11.00	18.90
28.....	1.77	20.70	20.70	18.30	15.70	11.50	7.90	9.29	2.66	20.70	11.00	12.50
29.....	1.77	20.70	19.50	18.30	12.50	12.50	7.90	7.02	2.66	16.90	11.50	15.70
30.....	1.77	-----	20.70	18.30	10.50	14.10	7.02	6.59	7.02	12.50	11.50	12.00
31.....	1.50	-----	20.70	-----	10.50	-----	6.17	5.16	-----	12.00	-----	12.50

NOTE.—This weir measures discharge in flowing streams when combined flow is less than 20 million gallons (except for seepage gains or losses).

*Monthly discharge of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1907-1912.*

Month.	Discharge in mfillion gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
1907.				
July.....	20.70	0.17	9.84	276
August.....	21.90	4.03	15.30	474
September.....	21.90	2.99	9.98	299
October.....	21.90	9.76	17.60	545
November.....	21.90	8.82	15.00	449
December.....	21.90	5.16	13.00	239
The period.....			13.40	2,280
1908.				
January.....	21.90	5.76	12.20	378
February.....	20.70	3.67	11.80	341
March.....	16.90	2.05	5.18	161
April.....	20.70	5.76	14.90	450
May.....	20.70	5.76	16.10	500
June.....	20.70	9.29	17.20	516
July.....	20.70	15.70	19.20	595
August.....	20.70	12.50	18.80	588
September.....	20.70	13.00	17.80	533
October.....	20.70	7.46	14.10	437
November.....	20.70	4.77	12.00	360
December.....	20.70	13.60	18.80	584
The year.....	21.90	2.05	15.00	5,390
1909.				
January.....	20.70	2.99	11.50	356
February.....	20.70	13.60	18.80	527
March.....	20.70	16.90	20.10	622
April.....	20.70	5.76	13.90	418
May.....	20.70	4.03	15.70	487
June.....	20.70	5.76	11.30	338
July.....	20.70	4.77	17.90	555
August.....	19.50	4.39	9.70	301
September.....	21.90	2.05	9.31	279
October.....	14.60	2.66	7.39	229
November.....	12.09	2.66	6.73	202
December.....	20.70	1.24	8.49	263
The year.....	21.90	1.24	12.50	4,620
1910.				
January.....	20.70	6.17	15.10	469
February.....	19.50	7.90	13.10	367
March.....	20.70	3.32	12.30	383
April.....	20.70	7.02	10.40	413
May.....	20.70	4.03	14.50	449
June.....	20.70	14.10	17.80	535
July.....	20.70	12.50	17.90	555
August.....	20.70	7.90	17.20	532
September.....	8.36	1.50	3.45	104
October.....	20.70	4.03	10.60	329
November.....	21.90	1.77	9.08	272
December.....	21.90	6.17	12.20	378
The year.....	21.90	1.50	13.10	4,790
1911.				
January.....	20.70	9.76	15.30	475
February.....	21.90	9.76	18.40	515
March.....	20.70	7.02	12.30	383
April.....	20.70	9.29	16.70	502
May.....	20.70	7.46	16.30	504
June.....	20.70	7.50	19.80	596
July.....	20.70	5.76	16.40	507
August.....	14.10	3.21	9.08	281
September.....	20.70	13.30	20.10	604
October.....	20.70	5.76	12.60	391
November.....	20.70	4.77	13.40	403
December.....	20.70	5.76	12.70	393
The year.....	21.90	3.21	15.20	5,550

*Monthly discharge of Kohala ditch at Awini weir, near Kohala, Hawaii, for 1907-1912—  
Continued.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
1912.				
January.....	12.00	1.50	4.63	143
February.....	20.70	1.48	8.85	257
March.....	20.70	18.30	20.00	619
April.....	20.70	18.30	19.60	589
May.....	20.70	8.82	13.70	426
June.....	20.70	5.16	13.90	417
July.....	20.70	6.17	11.50	357
August.....	16.90	2.66	8.08	251
September.....	20.70	2.66	10.60	319
October.....	20.70	2.66	9.43	292
November.....	20.70	7.46	15.10	454
December.....	20.70	7.90	12.70	393
The year.....	20.70	1.48	12.30	4,520

*Daily discharge, in million gallons, of Kohala ditch at Honokane weir, near Kohala,  
Hawaii, for 1907.*

Day.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	13.20	10.60	18.40	6.74	4.13	13.10
2.....	12.50	14.50	18.80	7.87	7.31	14.30
3.....	5.41	17.10	20.30	11.10	1.68	15.00
4.....	16.70	.48	18.40	11.60	1.68	13.60
5.....	15.50	1.67	20.60	1.68	4.13	14.00
6.....	17.10	8.63	19.20	1.68	6.74	11.10
7.....	11.90	1.67	13.10	1.68	11.10	11.50
8.....	16.60	2.85	19.60	2.94	13.10	12.70
9.....	13.00	.48	20.60	6.74	1.68	12.80
10.....	12.40	.48	16.60	3.54	6.74	11.40
11.....	11.90	.48	17.80	4.72	12.10	10.60
12.....	21.10	2.26	13.80	9.51	12.10	11.30
13.....	7.58	6.50	13.10	13.80	13.10	12.10
14.....	7.05	.48	20.30	12.10	14.30	6.74
15.....	11.70	.48	16.10	5.31	10.60	11.10
16.....	11.60	-----	14.80	12.10	12.10	15.70
17.....	11.90	5.96	14.80	1.68	13.10	13.20
18.....	13.10	10.60	13.00	1.68	11.90	11.90
19.....	.48	8.63	15.10	1.68	12.30	11.90
20.....	10.20	8.63	11.60	1.68	11.10	11.20
21.....	.48	4.85	13.10	1.68	11.60	11.20
22.....	.48	6.50	1.68	1.68	8.97	11.20
23.....	2.26	11.90	1.68	2.94	3.54	11.20
24.....	4.28	16.70	2.94	6.74	2.94	11.20
25.....	10.60	13.70	6.74	12.60	8.42	13.90
26.....	14.50	-----	10.60	13.80	8.97	12.50
27.....	12.80	.48	2.94	7.31	6.74	11.10
28.....	1.67	.48	2.94	1.68	1.68	6.74
29.....	5.41	2.26	6.17	6.17	8.42	1.68
30.....	10.20	9.65	10.00	7.87	11.60	1.68
31.....	16.40	13.70	-----	4.72	-----	1.68

*Daily discharge, in million gallons, of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1908.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	2.94	6.74	9.55	17.00	10.70	11.10	6.99	4.62	4.62	11.70	12.20	4.62
2.....	2.94	6.74	9.16	11.10	10.40	13.10	4.62	4.26	4.62	12.80	10.30	4.62
3.....	2.94	2.94	9.90	5.31	12.70	13.50	4.62	5.82	5.82	13.80	9.98	4.62
4.....	7.87	5.31	9.90	5.31	4.13	12.10	4.62	6.99	6.99	16.00	9.87	5.82
5.....	10.60	2.94	10.30	8.97	5.31	10.00	4.62	6.99	8.43	16.90	10.60	6.99
6.....	12.10	2.94	13.70	12.10	2.94	7.87	5.82	4.62	9.55	11.70	4.62	4.62
7.....	13.10	2.94	6.74	15.30	2.94	8.97	5.82	4.62	11.20	9.55	5.82	4.62
8.....	14.80	2.94	8.63	13.10	2.94	10.00	9.55	4.62	11.70	10.60	5.82	4.62
9.....	15.70	2.94	11.30	8.42	2.94	6.74	8.43	5.82	12.30	11.70	9.55	4.62
10.....	16.60	7.87	9.98	7.87	2.94	7.87	4.62	6.99	9.55	11.90	11.70	4.62
11.....	11.40	11.10	9.87	6.74	2.94	7.87	5.82	6.99	4.62	10.20	9.85	5.82
12.....	10.30	14.30	9.90	5.31	5.31	5.31	6.99	8.43	4.62	10.30	9.78	6.99
13.....	10.70	14.80	9.21	2.94	8.97	5.31	8.43	6.99	5.82	10.50	7.66	9.55
14.....	10.70	12.00	9.21	2.94	10.00	2.94	4.62	4.62	6.99	10.50	9.02	10.60
15.....	1.68	12.10	9.90	2.94	11.10	2.94	5.82	4.62	6.99	4.62	9.48	11.20
16.....	2.94	13.10	12.10	2.94	12.10	2.94	6.99	4.62	5.82	4.62	9.48	11.70
17.....	7.87	12.10	11.00	2.94	7.87	4.13	8.43	5.82	6.99	5.82	9.87	4.62
18.....	11.10	13.10	9.89	2.94	7.87	5.31	6.99	6.99	4.62	4.62	10.70	4.62
19.....	11.10	11.90	9.14	2.94	6.74	2.94	4.62	8.43	4.62	6.99	11.90	4.62
20.....	7.87	12.30	8.88	2.94	7.87	2.94	5.82	9.55	4.62	9.55	5.82	4.62
21.....	11.10	10.70	9.16	2.94	8.97	2.94	6.99	11.70	4.62	4.62	10.00	4.62
22.....	13.80	11.30	9.16	5.31	10.00	2.94	6.99	12.80	5.82	5.82	9.35	5.82
23.....	13.70	11.40	8.86	6.74	6.74	2.94	9.55	11.70	6.99	6.99	9.18	6.99
24.....	12.20	10.60	8.86	8.97	7.87	2.94	9.55	6.99	8.43	8.43	9.64	8.43
25.....	11.80	9.87	9.21	12.10	5.31	2.94	4.62	4.62	9.55	9.55	10.10	4.62
26.....	12.20	9.90	9.21	12.30	5.31	4.43	4.62	4.62	9.55	10.60	8.43	4.62
27.....	10.50	9.20	8.52	11.30	5.31	5.31	4.62	4.62	10.60	11.70	4.62	5.82
28.....	10.20	9.56	8.52	10.60	6.74	6.74	4.62	5.82	8.43	11.60	4.62	6.99
29.....	4.72	9.56	8.48	9.14	6.74	8.97	4.62	6.99	9.55	9.65	4.62	8.43
30.....	2.94	.....	8.48	10.70	7.87	7.87	4.62	4.62	10.60	9.85	4.62	9.55
31.....	1.68	.....	8.48	.....	8.97	.....	4.62	4.62	.....	9.77	.....	10.60

*Daily discharge, in million gallons, of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1909.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	11.20	4.62	4.62	8.99	13.20	5.99	12.00	8.85	10.60	10.70	12.50	9.21
2.....	11.20	5.82	4.62	9.55	12.10	7.28	10.90	10.00	10.60	11.80	11.00	9.55
3.....	11.70	6.99	4.62	4.62	12.50	7.94	10.80	12.60	9.90	14.80	15.20	9.19
4.....	11.70	8.43	4.62	4.62	6.74	10.40	9.18	13.70	9.56	12.10	15.20	9.19
5.....	11.70	9.55	4.62	4.62	4.62	11.30	9.98	14.80	9.55	11.80	14.40	8.48
6.....	12.80	4.62	4.62	4.62	4.62	12.20	9.87	15.80	9.55	10.60	10.50	8.48
7.....	13.80	5.82	4.62	4.62	5.82	9.55	11.90	16.80	9.51	11.90	10.60	8.12
8.....	13.10	6.99	5.82	5.82	6.99	10.60	10.30	15.80	9.51	9.77	13.70	7.76
9.....	11.90	9.55	6.99	6.41	8.43	8.39	11.50	16.80	10.20	9.89	14.70	7.76
10.....	12.80	10.60	6.99	6.99	8.43	8.06	14.10	17.80	10.50	9.20	14.70	7.76
11.....	12.90	11.70	4.62	8.43	9.55	9.48	15.30	13.80	11.90	9.21	15.20	7.76
12.....	13.00	4.62	4.62	8.99	10.60	9.64	10.30	14.30	10.30	12.20	11.20	7.76
13.....	13.80	5.82	5.82	8.99	11.20	17.80	10.30	13.10	14.80	13.10	16.30	7.76
14.....	14.00	6.99	6.99	9.55	4.62	4.62	7.65	13.60	21.30	10.30	16.30	7.76
15.....	13.20	8.43	6.99	10.10	5.82	6.99	7.65	13.60	15.60	10.30	14.70	7.40
16.....	13.60	9.55	4.62	10.60	6.99	8.43	7.65	13.20	10.70	9.48	12.00	7.40
17.....	12.40	4.62	4.62	11.20	8.43	9.55	7.65	13.20	10.30	9.16	10.20	9.21
18.....	12.70	4.62	4.62	11.70	9.55	10.60	7.65	13.70	20.10	9.21	10.60	12.20
19.....	12.70	5.82	4.62	12.30	10.60	12.80	7.65	11.70	36.30	9.21	9.48	14.10
20.....	12.70	6.99	4.62	13.30	10.60	14.80	7.65	9.89	14.20	9.90	9.16	12.20
21.....	12.70	6.99	4.62	14.30	11.20	12.80	7.65	10.70	14.80	9.19	9.20	16.10
22.....	12.70	4.62	4.62	15.50	11.70	13.00	7.65	9.48	9.56	12.10	9.21	46.20
23.....	4.62	4.62	4.62	16.50	10.30	11.50	7.65	9.54	13.10	16.40	9.21	14.10
24.....	4.62	4.62	4.62	16.90	11.50	11.20	10.00	13.00	15.30	14.20	9.87	13.10
25.....	4.62	4.62	4.62	16.50	13.60	12.80	7.65	12.50	15.30	13.50	9.87	10.50
26.....	4.62	4.62	4.62	14.50	4.62	13.10	7.65	11.40	45.00	12.10	11.90	12.20
27.....	4.62	4.62	4.62	13.70	4.62	13.00	7.65	10.60	14.60	11.70	10.50	13.10
28.....	4.62	4.62	4.62	11.10	4.62	9.18	7.65	15.20	16.40	11.70	9.87	11.10
29.....	5.82	.....	5.82	10.70	4.62	8.72	7.65	11.90	14.80	10.60	9.21	11.60
30.....	5.82	.....	6.99	10.70	5.82	10.40	7.65	11.00	11.60	10.30	9.19	9.78
31.....	4.62	.....	8.43	.....	6.99	.....	7.65	9.02	.....	9.98	.....	10.40

*Daily discharge, in million gallons, of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1910.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	9.14	10.00	16.10	8.85	7.65	10.00	17.60	16.00	12.80	12.30	10.60	9.82
2.....	8.47	8.85	15.80	10.90	8.85	10.90	17.10	16.00	10.50	12.30	9.87	9.82
3.....	8.47	10.00	14.10	11.50	9.44	12.00	17.10	11.10	11.80	12.10	9.87	11.10
4.....	8.47	11.50	12.00	14.80	10.00	13.70	11.10	12.30	9.98	12.30	9.20	11.10
5.....	11.60	13.10	12.00	15.80	8.85	9.44	11.10	12.30	11.30	10.10	8.86	11.10
6.....	15.30	13.70	14.80	12.00	9.44	10.00	11.10	14.30	11.00	10.20	9.90	11.10
7.....	10.50	14.80	15.80	13.70	7.65	10.90	11.10	11.10	11.70	10.20	9.19	11.10
8.....	11.10	14.80	15.80	11.50	7.65	8.85	11.10	11.10	12.00	14.10	9.19	11.70
9.....	8.41	15.80	12.10	12.00	8.85	8.85	11.10	12.30	12.30	14.10	9.19	13.40
10.....	12.10	12.40	12.70	13.70	8.85	10.00	11.10	12.30	12.60	15.30	9.13	14.90
11.....	11.90	12.10	14.50	14.80	9.44	12.00	11.10	12.90	12.60	16.50	10.20	13.60
12.....	14.80	11.90	13.70	15.80	10.00	12.60	11.10	12.90	11.90	12.10	10.20	13.60
13.....	15.30	19.00	13.40	13.90	11.50	7.65	12.30	11.10	11.20	11.00	9.80	14.10
14.....	15.30	14.80	13.00	14.30	12.60	8.85	12.30	11.10	11.20	8.58	9.13	13.10
15.....	12.70	12.80	12.50	14.30	13.70	7.65	11.10	12.30	12.60	9.14	9.13	13.10
16.....	13.60	13.00	12.50	13.70	8.85	7.65	11.10	15.40	12.20	9.14	8.12	13.00
17.....	14.60	13.00	12.80	14.10	9.44	7.65	12.30	11.90	10.70	9.14	12.10	13.10
18.....	20.10	12.60	12.40	14.10	11.50	7.65	14.90	10.40	10.60	7.76	14.10	12.30
19.....	15.30	12.30	12.40	8.54	10.00	7.65	16.00	11.60	10.30	8.14	11.10	12.40
20.....	16.50	13.50	17.90	8.85	11.50	10.00	16.60	22.20	9.21	8.14	14.90	11.40
21.....	16.50	13.10	16.50	12.00	7.32	11.50	17.10	22.20	9.19	14.00	14.90	11.10
22.....	12.70	12.60	16.50	10.90	10.50	10.00	17.60	14.20	9.19	11.50	14.90	11.10
23.....	12.70	12.60	37.90	11.50	13.60	8.85	19.20	11.10	9.13	11.80	20.90	11.10
24.....	11.80	15.30	19.00	11.90	15.40	10.00	19.20	12.30	9.13	10.40	20.10	11.10
25.....	10.00	13.00	17.90	14.80	15.60	12.00	11.10	14.30	9.13	9.77	16.00	11.52
26.....	10.00	13.80	16.50	22.60	15.60	13.10	11.10	15.40	9.13	10.60	12.60	12.10
27.....	10.00	15.20	17.90	15.80	15.90	13.70	12.30	16.60	9.13	8.83	13.00	12.10
28.....	10.00	15.70	20.10	15.30	15.50	13.70	14.90	18.20	9.13	11.00	11.90	12.10
29.....	10.00	.....	20.10	15.20	14.00	13.70	16.00	11.90	9.03	12.80	22.20	12.10
30.....	10.00	.....	12.30	16.10	14.70	14.20	16.00	11.30	12.50	11.50	18.10	11.80
31.....	10.00	.....	7.65	.....	9.78	.....	16.60	12.30	.....	10.50	.....	11.80

*Daily discharge, in million gallons, of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1911.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	16.0	9.82	16.00	13.4	12.3	21.7	11.1	11.7	13.4	13.40	11.30	13.90
2.....	11.1	9.82	11.90	14.3	13.4	19.9	11.1	11.7	13.4	13.40	11.00	14.30
3.....	12.9	9.82	11.90	13.4	14.9	18.5	11.1	11.7	13.4	13.40	11.00	13.60
4.....	11.1	9.82	12.40	14.9	14.9	13.4	11.1	11.0	11.1	11.10	10.50	12.90
5.....	11.1	9.82	12.40	17.2	14.9	13.4	11.1	10.3	12.3	12.30	13.10	12.90
6.....	12.3	9.82	12.10	17.2	14.9	12.3	11.1	10.6	13.4	12.90	14.30	12.90
7.....	14.9	9.82	12.10	17.6	12.3	11.1	11.1	10.6	11.1	13.40	13.90	14.00
8.....	18.7	9.82	12.30	17.6	14.9	11.1	11.1	10.6	11.1	14.90	13.60	13.80
9.....	18.7	9.82	11.40	13.9	11.1	11.1	11.1	11.5	12.3	14.90	13.90	12.80
10.....	18.7	9.82	13.00	11.9	11.1	11.1	11.1	11.7	12.3	16.00	14.30	12.90
11.....	18.7	9.82	13.00	11.9	11.1	11.1	11.1	11.0	11.1	16.00	13.90	12.90
12.....	18.7	11.10	13.10	12.4	13.4	11.1	11.1	12.5	11.1	16.00	13.10	9.98
13.....	19.2	11.10	11.50	13.0	14.9	11.1	11.1	13.0	12.3	17.10	13.50	10.90
14.....	19.2	12.30	10.30	12.3	13.4	11.1	11.1	13.0	13.4	18.20	13.90	11.10
15.....	19.2	12.90	10.40	11.1	11.1	11.1	11.1	13.0	11.1	18.20	13.60	11.10
16.....	18.2	13.40	10.40	12.7	11.1	11.1	11.1	13.0	11.1	18.20	13.90	11.10
17.....	17.1	13.40	10.10	18.1	11.1	11.1	12.3	13.1	11.1	13.60	11.10	11.10
18.....	17.1	14.90	11.10	18.1	11.1	11.1	12.3	13.1	11.1	13.00	11.10	11.10
19.....	19.2	15.50	12.30	18.1	12.3	11.1	14.9	13.1	11.1	10.60	11.10	11.10
20.....	14.8	15.50	14.90	18.1	12.3	11.1	14.9	12.8	11.1	10.60	11.10	11.10
21.....	13.1	16.00	14.90	18.1	12.3	11.1	16.0	11.9	11.1	11.10	11.10	11.10
22.....	13.0	17.10	16.60	18.1	13.4	11.1	17.1	11.9	11.1	11.10	12.30	11.10
23.....	22.0	18.70	18.20	18.1	16.0	11.1	13.8	11.4	11.1	10.10	13.40	12.30
24.....	19.2	19.20	18.20	16.9	15.8	11.1	13.8	11.7	11.1	10.10	13.40	12.80
25.....	17.1	20.80	19.70	11.1	13.1	11.1	13.9	11.7	11.1	10.50	13.40	11.80
26.....	12.3	22.00	13.30	11.1	13.5	11.1	14.4	11.7	11.1	9.89	9.28	12.70
27.....	12.3	19.20	12.30	11.1	13.6	11.1	14.5	11.7	11.1	10.30	10.10	12.30
28.....	11.1	11.10	9.78	12.3	12.8	11.1	14.5	11.7	11.1	9.98	10.10	13.10
29.....	12.3	.....	9.64	13.4	13.7	11.1	13.8	12.0	11.1	9.98	10.40	14.00
30.....	12.3	.....	10.20	14.9	13.7	11.1	13.8	12.0	11.1	9.89	10.40	14.00
31.....	12.3	.....	18.10	.....	13.7	.....	13.8	12.0	.....	9.89	.....	14.70

*Daily discharge, in million gallons, of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1912.*

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1.....	14.50	9.69	11.10	11.10	16.00	12.70	11.10	10.20	10.60	14.30	13.30	11.10
2.....	13.70	9.69	11.10	11.10	11.10	12.70	11.40	10.90	16.00	13.00	12.40	13.40
3.....	13.80	13.10	11.10	11.10	11.10	11.60	12.00	11.30	11.10	12.70	12.20	16.60
4.....	14.00	14.30	11.10	11.10	11.10	10.20	12.30	11.30	11.10	13.80	10.40	12.60
5.....	14.40	15.40	12.30	11.10	12.30	10.30	12.30	10.90	14.90	11.60	11.10	12.30
6.....	12.50	11.90	12.30	11.10	12.30	10.60	12.90	10.90	16.00	9.98	10.40	12.30
7.....	12.50	10.80	12.30	11.10	14.90	10.60	11.10	10.90	16.00	9.90	10.40	12.80
8.....	12.40	10.40	13.40	11.10	14.90	12.40	11.10	10.90	16.00	9.54	10.50	14.90
9.....	13.00	9.69	13.40	11.10	14.90	13.60	13.40	14.90	16.00	9.54	12.30	16.00
10.....	11.50	9.70	13.40	11.10	14.90	11.10	15.40	14.90	11.90	9.54	11.10	12.80
11.....	11.20	9.55	13.40	11.10	17.10	11.10	12.00	16.00	11.30	9.54	11.10	12.30
12.....	11.40	9.90	11.10	11.10	18.20	11.10	12.10	16.00	11.90	9.54	11.10	11.20
13.....	11.10	13.50	11.10	11.10	18.20	13.40	12.10	14.90	11.50	9.19	11.10	11.50
14.....	11.00	13.10	11.10	12.30	12.80	14.90	12.60	14.90	11.20	11.60	11.10	11.50
15.....	11.00	10.50	12.30	12.30	11.50	14.90	13.00	16.00	11.10	11.60	11.10	11.50
16.....	9.90	10.60	12.30	12.30	11.40	11.10	13.00	12.30	14.10	10.60	11.10	11.20
17.....	9.90	10.30	13.40	12.30	13.90	11.10	12.30	11.50	12.70	9.48	11.10	10.90
18.....	9.90	9.90	11.10	12.30	13.90	14.90	12.30	11.10	10.30	9.16	11.10	12.30
19.....	9.90	12.50	11.10	12.30	13.90	12.30	10.90	12.10	11.10	10.50	11.10	11.20
20.....	9.87	13.10	11.10	12.30	13.80	14.90	10.90	10.10	10.60	10.50	11.10	12.60
21.....	9.87	30.80	11.10	13.40	19.20	16.60	10.90	10.20	11.50	10.50	11.10	12.70
22.....	9.80	30.80	11.10	13.40	13.90	17.60	10.90	10.60	10.60	9.98	12.30	12.70
23.....	9.80	18.50	12.30	13.40	11.50	17.60	11.50	10.60	10.40	14.90	13.40	12.70
24.....	9.80	14.30	12.30	13.40	11.50	16.00	12.60	9.90	9.98	14.90	13.10	11.10
25.....	13.20	14.30	12.30	13.40	13.50	17.60	13.50	9.90	9.98	12.30	12.80	11.10
26.....	12.00	14.30	11.10	13.40	13.90	17.60	10.40	9.87	9.98	11.10	13.00	11.10
27.....	11.20	16.10	11.10	13.40	16.00	13.60	10.40	10.30	9.21	11.10	12.60	12.90
28.....	10.80	26.50	11.10	13.40	16.00	12.10	10.10	12.70	9.19	11.10	12.60	12.80
29.....	10.80	26.50	12.30	13.40	13.60	10.30	10.10	11.00	9.19	14.90	13.00	16.00
30.....	10.10	-----	11.10	13.40	14.80	11.20	9.46	10.60	10.20	13.60	13.00	12.40
31.....	9.69	-----	11.10	-----	13.90	-----	9.56	10.60	-----	13.30	-----	12.80

NOTE.—The Niuli weir measures the discharge of the Honokane Stream, east and west branches, and also flow over Awini weir when the combined discharge is not over 30 million gallons (except for seepage gains or losses).

*Monthly discharge of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1907.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
July.....	21.10	0.48	10.30	320
August.....	17.10	.48	6.30	183
September.....	20.60	1.68	13.20	395
October.....	13.80	1.68	6.03	187
November.....	14.30	1.68	8.46	254
December.....	15.70	1.68	11.00	339
The period.....	-----	-----	9.22	1,680

*Monthly discharge of Kohala ditch at Honokane weir, near Kohala, Hawaii, for 1908-1912.*

Month.	Discharge in million gallons.			Run-off (total in million gallons).
	Maximum.	Minimum.	Mean.	
1908.				
January.....	16.60	1.68	9.36	290
February.....	14.80	2.94	9.08	263
March.....	13.70	6.74	9.52	295
April.....	17.00	2.94	7.67	230
May.....	12.70	2.94	7.05	219
June.....	13.50	2.94	6.39	192
July.....	9.55	4.62	6.12	190
August.....	12.80	4.62	6.51	202
September.....	12.30	4.62	7.49	225
October.....	16.90	4.62	9.77	303
November.....	12.20	4.62	8.64	259
December.....	11.70	4.62	6.47	201
The year.....	17.00	1.68	7.84	2,870
1909.				
January.....	14.00	4.62	10.40	322
February.....	11.70	4.62	6.65	186
March.....	8.43	4.62	5.24	162
April.....	16.90	4.62	10.20	306
May.....	13.60	4.62	8.42	261
June.....	17.80	4.62	10.40	312
July.....	15.30	7.65	9.24	286
August.....	17.80	8.85	12.80	397
September.....	45.00	9.51	14.50	435
October.....	16.40	9.16	11.20	346
November.....	16.30	9.16	11.90	356
December.....	46.20	7.40	11.20	347
The year.....	46.20	4.62	10.20	3,720
1910.				
January.....	20.10	8.41	11.70	362
February.....	19.00	8.85	13.30	371
March.....	20.10	7.65	14.80	459
April.....	22.60	8.54	13.40	403
May.....	15.90	7.32	11.10	344
June.....	14.20	7.65	10.50	315
July.....	19.20	11.10	13.80	429
August.....	22.20	10.40	13.60	420
September.....	12.80	9.03	10.80	325
October.....	16.50	7.76	10.80	356
November.....	22.20	8.12	12.30	368
December.....	14.90	9.82	12.00	373
The year.....	22.60	7.32	12.30	4,500
1911.				
January.....	22.00	11.10	15.60	484
February.....	22.00	9.82	12.80	372
March.....	19.70	9.64	13.00	404
April.....	18.10	11.10	14.70	442
May.....	16.00	11.10	13.20	408
June.....	21.70	11.10	12.20	366
July.....	17.10	11.10	12.60	391
August.....	13.10	10.30	11.90	369
September.....	13.40	11.10	11.60	349
October.....	18.20	9.89	12.90	400
November.....	14.30	9.28	12.20	367
December.....	14.70	9.98	12.40	385
The year.....	22.00	9.28	13.00	4,740
1912.				
January.....	14.50	9.69	11.40	355
February.....	30.80	9.55	14.50	420
March.....	13.40	11.10	11.80	366
April.....	13.40	11.10	12.10	364
May.....	19.20	11.10	14.10	436
June.....	17.60	10.20	13.20	396
July.....	15.40	9.46	11.70	364
August.....	16.00	9.87	11.90	368
September.....	16.00	9.19	11.90	356
October.....	14.90	9.16	11.40	353
November.....	13.40	11.10	11.70	352
December.....	16.60	11.10	12.60	389
The year.....	30.80	9.19	12.30	4,520



## MISCELLANEOUS MEASUREMENTS.

*Miscellaneous measurements on Hawaii in 1912.*

Date.	Stream.	Locality.	Dis-charge.
			<i>Sec.-ft.</i>
Oct. 11	Pohakumanaka.....	Near Hilo.....	2.18
Dec. 5	do.....	Near Hilo, just above railroad culvert.....	6.80
July 15	Pukihæ.....	Near Hilo, upper end railroad culvert.....	33.20
Oct. 11	do.....	Near Hilo, 40 feet above railroad culvert.....	9.36
Dec. 5	do.....	Near Hilo, just above railroad culvert.....	25.30
July 15	Pohakumanaka.....	do.....	33.90
Sept. 18	Honolii.....	Just below mouth of Kikola Stream, government road, near Hilo.	64.20
18	Mailli River.....	40 feet above concrete highway bridge, government road, near Hilo.	17.20
18	Kikola.....	30 feet above concrete highway bridge, government road, near Hilo.	2.71
18	Kumunuiakæa.....	Government road, near Hilo.....	21.50
19	Kapue River.....	do.....	16.57
19	Kapue flume.....	do.....	5.30
19	Kaieie.....	do.....	4.61
19	Aleamæi.....	do.....	11.80
19	Kalooa.....	do.....	3.46
19	Tributary of Hanawai.....	do.....	.33
Oct. 9	Kapeha.....	Near Pepeekeo.....	No flow.
9	Makea.....	Near Honomu.....	3.87
9	Makoewai.....	do.....	4.06
12	Kapahehe.....	do.....	8.43
10	Hanawai.....	Near Papaikou.....	8.25
10	Onomea.....	do.....	4.16
9	Honomu.....	Honomu.....	5.35
10	Waiaama.....	Near Pepeekeo.....	6.57
10	Pepeekeo.....	do.....	.28
Feb. 8	Waimanu.....	Waimanu.....	65.40
Dec. 14	No. 1.....	About 1,400 feet elevation, near Hilo.....	17.40
Sept. 5	Linoli Springs.....	Near Ponolu.....	8.38
21	Weir, Hilo Electric Light Co.	Wailuku River, near Hilo.....	10.90
Oct. 19	Tailrace, Hilo Electric Light Co.	Hilo.....	25.00

## RAIN GAGING.

The yearly rainfall of the Hawaiian Islands is extremely variable, ranging from a few inches at several low-level leeward localities to more than 400 inches, usually at elevations above 2,000 feet and on the windward sides of the islands. Valleys lying on the same sides of the islands and within a few miles of each other may have a variation in mean annual precipitation of several hundred per cent. The rainfall may also vary greatly at different elevations in the same valley. As a rule, the zone of heaviest precipitation is on the windward sides of the islands, at elevations 2,000 to 3,000 feet above sea level.

Generally the daily rain gages maintained by the United States Weather Bureau are located at low levels. Lack of funds and the absence of inhabitants at high-level localities have prevented the maintenance of Weather Bureau stations at high levels, although daily records for a number of places, are furnished that bureau by occupants and caretakers of mountain houses, ranches, etc. The data furnished by the Weather Bureau are, therefore, generally of little value in their relation to stream run-off.

When high levels are accessible and, in so far as funds are available, high-level rain gages, which are read monthly or bimonthly, have

been established by the Geological Survey and valuable records have been obtained. To accurately determine the precipitation of the Territory would require the installation of many more gages and the construction of many miles of trails.

Acknowledgment for cooperation in furnishing rainfall data is due to the following: Kauai—E. A. Knudsen, Kekaha Sugar Co., Makee Sugar Co., Hawaiian Sugar Co., Koloa Plantation, Grove Farm Plantation, W. F. Sanborn, of Princeville ranch, and A. Menefoglio, of Kauai Electric Co.; Oahu—E. E. Miller and F. Meyer; Maui—George Gibb, E. Brecht, H. B. Penhallow, David Fleming, Honolua ranch, Hawaiian Commercial & Sugar Co., S. E. Hubbard, and E. Brecht; Hawaii—Hawaii Mill Co., P. W. P. Bluett, James Henderson, George F. Whittemore, W. S. May, and C. F. Clark.

The following tables show the precipitation at stations maintained by the Geological Survey and give precipitation data furnished from private sources which are not included in United States Weather Bureau records, to which those interested in further data are referred:

## Precipitation at rainfall stations maintained during 1912.

## KAUAI.

Station.	Elevation above sea level (feet).	Precipitation in inches.												
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Aakukui, near Lihue.....	350	2.19	2.70	7.82	2.76	2.33	2.04	4.58	3.21	2.07	3.81	3.31	6.39	43.21
Camp No. 2, Hanapepe drainage basin.....	250	2.00	1.15	.35	.48	.57	.37	.61	.16	.33	.82	.49	1.89	9.22
Camp No. 7, Mesa, east of Waimea River near its mouth.....	150	1.24	.74	.00	.00	.23	.00	.44	.00	.00	1.34	.00	2.10	6.09
Hanahanpuni, Waialua drainage basin.....	911	3.20	2.40	8.40	10.20	8.00	7.80	12.80	6.00	5.20	10.00	6.20	10.00	96.37
Hanapepe, one-half mile below Hanapepe Falls.....	530	4.69	4.25	6.42	8.45	8.48	5.36	6.80	9.33	6.10	9.82	6.40	20.27	96.37
Hiloa-Manawaloapuna divide.....	2,080	6.14	7.80	14.50	14.00	18.80	11.00	21.10	19.70	11.80	19.20	10.80	34.40	189.24
Hukupo, mountain side northwest of Waimea drainage basin.....	3,750	.35	.31	.13	.26	.08	1.26	.08	.50	.33	.05	.00	1.21	5.16
Kahana, Kahana-Makunene drainage basin.....	3,750													a 73.07
Keanakua, Waialeale drainage basin.....	4,450													a 80.32
Kilohana, Waialeale-Waimea drainage basin.....	4,023													a 189.80
Kokee, Waimea drainage basin.....	3,550													a 47.55
Kohua ridge, Waimea drainage basin.....	3,950													a 77.80
Lehuamakanui, Waimea drainage basin.....	2,032													a 112.90
Makaweli, on mesa between Waimea and Hanapepe Rivers.....	3,100	1.58	.87	.09	.30	.80	.39	.42	.34	.42	.38	.23	1.83	7.65
Upper Mohihi Crossing, Waimea drainage basin.....	3,500													a 74.40
North Waialua.....	1,200													(c)
Olokele drainage basin, Maika.....	2,100	4.97	4.73	6.79	10.10	10.20	6.41	10.41	9.76	6.85	10.05	6.44	25.82	112.53
Olokele drainage basin, at tunnel No. 12, Makai.....	1,310	4.31	4.30	3.00	5.08	6.77	4.57	7.10	6.87	5.12	7.19	5.00	24.76	84.07
Pali trail, Waimea drainage basin.....	850	.34	.20	.13	.29	.07	.94	.35	.51	.60	.11	1.28	4.82	4.82
Parkahana, Waimea drainage basin.....	3,723	5.40	10.40	10.80	4.70	3.00	2.00	4.00	4.60	.20	13.20	10.30	10.30	68.60
Penuala, Kapahi-North Waialua drainage basins.....	3,130													c 220.50
Ponakupili, Kapahi-Anahola drainage basin.....	2,589													a 88.70
Pueo, Anahola drainage basin.....	2,748													a 121.50
Puu Lua, Waimea drainage basin.....	3,500	5.40	4.20	1.60	3.40	1.00	2.00	2.40	1.40	1.00	.60	1.80	5.80	30.60
Waialeale.....	3,400													a 58.00
Waialeale.....	3,600													a 66.91
Waialeale, Waialeale drainage basin.....	5,080													a 399.30
Waialeale, Waialeale drainage basin.....	600	4.20	3.80	11.20	9.00	7.00	4.60	4.40	6.40	5.00	8.40	5.80	12.20	82.00
Waialeale, Waialeale drainage basin.....	700	3.72	9.55	21.95	17.40	14.19	2.02	8.25	11.80	11.77	6.58	16.46	15.74	139.43
Waialeale, Waialeale drainage basin.....	1,123	5.12	4.98	11.47	9.30	7.22	4.66	11.25	8.64	4.03	13.78	6.68	16.84	103.44
Waialeale, power house.....	1,125	4.96	6.96	10.30	7.88	6.15	2.26	7.42	6.74	4.19	6.79	7.19	18.81	88.85
Waialeale, ridge.....	1,900	5.09	6.61	19.57	15.43	11.46	8.08	20.05	12.52	7.07	14.40	11.97	23.52	155.82
Kekaha Intake.....	525													(d)

a Gage read irregularly; monthly distribution not known.

b Record started July 26; 46 inches in August, September, and October; gage visited Jan. 19, 1913, and found overflowing.

c Gage read irregularly; monthly distribution not known; Dec. 29, 1911, to Feb. 15, 1912, a 56-inch gage overflowed.

d Record started Mar. 8; gage read irregularly.

Precipitation at rainfall stations maintained during 1912—Continued.

## OAHU.

Station.	Elevation above sea level (feet).	Precipitation in inches.												
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Kohala-Mount.....	3,100													(a) 99.0
Wahiawa-Waihole Ridge.....	2,100													(a) 99.0
Makaha Valley.....	1,300								1.53	0.81	3.35	5.35	3.93	(a) 99.0
Pali-Niuanu Valley.....	1,200													(a) 99.0
Luakaha weir, Niuanu Valley.....	800	3.4	11.0	17.3	14.3	9.3	4.6	10.7	11.0	5.5	16.4	12.0	17.9	133.0
Palolo Valley.....	600	1.54	4.32	6.92	4.31	3.87	1.67	2.15	3.66	1.97	8.18	9.42	4.55	52.6

## MAUI.

Anaëa.....	4,250	0.98	14.52	12.72	15.06	1.40	1.13	1.95	1.89	4.96	9.78	9.68	6.63	80.70
Camp Olinde.....	4,100	1.40	9.82	7.51	7.90	5.34	.51	.83	(b)	3.53	3.34	5.52	3.18	43.93
Honokawai Gulch.....	1,500	2.20	(c)	13.00	16.14	5.60	4.57	3.87	2.90	3.80	9.38	9.40	7.20	78.06
Iao Cave.....	1,720													a105.71
Iao Stream.....	850													a27.44
Iao Tableland.....	1,500													a101.09
Keakeo.....	3,000	.24	3.63	.00	.00	.00	.00	.00	.00	.38	.02	.00	1.00	3.87
Kula Cornwell ranch.....	3,400	1.66	1.90	.00	2.97	.00	.00	.00	.00	.50	.75	.00	1.10	8.53
Kula Wainolu.....	2,500	1.60	1.20	.00	1.20	.00	.00	.00	.00	.25	.50	.00	1.50	6.25
Kula Wainuli.....	4,500	1.77	2.40	.00	1.75	.00	.00	.00	.00	.25	.50	.00	1.10	7.17
Olawalu Gulch.....	7,000	12.80	9.00	7.00	8.60	2.00	2.00	1.00	1.20	2.80	3.40	8.40	8.00	66.20
Puukukui.....	5,000	4.08	.00	60.00	92.00	29.00	25.00	28.00	30.00	36.00	30.00	23.30	17.20	374.50
Puukukui Slope.....	2,500	1.30	.00	13.00	27.00	7.50	7.00	5.50	6.50	8.50	15.00	7.80	6.70	106.00
Puohakanae.....	4,300	3.60	46.32	53.52	42.96	7.32	12.48	12.72	11.40	14.00	26.60	38.80	11.02	251.34
Wahee tunnels.....	1,500													a134.20
Waikamoi.....	4,250	2.96	29.74	31.02	35.74	7.51	9.25	11.70	12.52	13.17	27.19	34.31	24.35	239.46
Waikamoi.....	1,500													a51.03
Camp 7, Hawaiian Commercial & Sugar Co.....	800	1.14	15	.15	.71	.00	.00	.00	.00	.00	.34	.12	.00	2.06
Hona Kawai power house.....	1,200	1.42	7.16	4.52	4.32	2.12	1.43	.70	.77	.00	9.32	3.02	1.98	30.76
Honokahau.....	1,800	2.78	11.62	21.00	22.48	5.24	1.33	12.45	5.79	4.25	12.55	13.35	9.20	123.60
Honokahau.....	1,000	1.68	4.64	7.03	4.48	3.83	2.04	3.02	1.70	2.27	5.19	3.57	4.53	216.42
Keane.....	2,000	2.63	19.18	21.38	29.17	11.83	9.58	10.76	11.01	9.17	21.00	23.38	40.38	216.46
Kaunoe.....	2,000	6.08	1.28	9.54	9.54	8.81	8.05	26	3.08	1.49	5.03	2.04	8.13	27.06
Kaunoe.....	2,600	2.66	10.08	12.37	13.85	6.26	5.22	7.33	7.14	2.54	12.79	12.79	22.25	102.86
Kaunoe.....	1,100	3.14	15.12	16.63	22.70	8.35	5.63	7.33	7.14	5.34	15.81	14.83	27.72	149.78
Old plantation office.....	1,100	(c)	(c)	(c)	1.38	.44	.53	1.20	1.13	.19	1.21	1.33	2.04	9.47

Olowalu.....	10	2.65	1.69	.00	1.92	.00	.00	.00	.00	.00	.84	.15	.75	8.00
H. B. Penhallor's house.....	380	.03	3.17	1.88	3.11	.00	.33	1.16	.00	.10	.75	1.24	1.15	12.84
Punene.....	70	.42	1.93	.52	.74	.00	.00	.00	.24	.06	.30	1.31	1.12	6.76
Spreckelsville.....	50	.52	2.56	.52	1.50	.00	.00	.38	.26	.40	1.00	2.23	2.10	11.40
Waiehu.....	375	.15	2.54	1.66	2.74	.58	.10	1.12	.72	.22	.16	2.09	2.10	15.18
Waikapu.....	600	.16	2.56	.93	1.57	.00	.00	.73	.05	.00	.48	1.93	2.54	10.95
W. S. Co. office.....	175	.05	2.79	1.40	2.61	.07	.27	.94	.32	.11	.80	1.37	1.17	11.80
<b>HAWAII.</b>														
Hilo Breakwater.....	15	0.93	11.50	10.00	13.20	5.90	5.86	4.74	3.94	6.20	15.70	12.30	17.80	108.67
Hilo, Waianuenue Street.....	50	0.6	17.0	14.6	14.2	7.3	8.1	7.3	9.2	8.7	21.9	14.4	17.2	140.50
Slope of Mauna Kea, back of Hilo.....	1,000	1.0	18.0	(C)	19.0	8.7	8.9	10.8	7.8	11.4	24.4	17.6	19.8	227.60
Do.....	1,500	1.2	22.2	28.8	27.8	11.0	10.2	15.5	13.0	17.7	28.8	29.8	21.6	275.30
Do.....	2,000	1.8	25.2	33.0	33.2	12.6	11.3	17.4	13.4	22.6	42.2	32.4	30.2	282.11
Do.....	2,700	1.74	25.60	23.86	33.20	11.30	14.00	16.40	11.81	27.22	43.40	35.97	37.61	241.70
Do.....	3,000	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	a179.80
Do.....	3,500	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	a158.00
Do.....	4,000	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	a157.70
Do.....	4,500	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	a139.80
Do.....	5,000	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	138.02
Hawaii Mill Co.'s office near Hilo.....	1,850	0.76	18.32	17.84	17.88	8.04	8.40	10.15	6.88	11.78	19.46	19.21	19.60	116.65
Pihonua, near Hilo.....	1,000	0.64	22.40	35.20	33.20	15.10	13.30	15.10	10.20	(f)	15.83	14.84	17.45	140.83
Waikae mill, near Hilo.....	1,040	0.75	12.31	11.51	13.35	7.29	5.08	3.61	3.29	7.34	6.02	18.23	6.63	130.83
Lower Kawaimii in Waipio Valley, near Kukuhaele.....	4,080	1.81	33.12	24.64	23.28	10.94	8.95	8.64	9.32	8.05	20.47	31.51	15.21	280.21
Upper Kawaimii in Waipio Valley, near Kukuhaele.....	1,000	4.06	30.97	12.27	49.25	21.75	18.42	13.55	16.90	10.85	3.24	12.73	3.89	94.61
Lower Koaawe in Kohala.....	3,200	1.26	10.66	14.32	16.44	6.60	6.32	6.37	6.46	5.82	5.87	16.57	6.18	135.01
Upper Koaawe in Kohala.....	3,400	2.05	14.91	21.61	22.61	10.21	9.36	9.93	8.32	7.19	2.55	17.55	3.95	103.58
Kaunimii in Kohala.....	1,400	1.47	12.21	(f)	11.24	3.73	3.49	1.93	1.21	3.50	4.47	13.74	5.36	103.38
Lower Alakahi in Waipio Valley, Kukuhaele.....	1,930	2.51	17.53	16.86	16.86	3.97	3.65	6.35	6.76	3.06	3.89	17.83	3.79	65.30
Hawaiian Irrigation Co.'s weir, Kukuhaele.....	4,200	1.80	8.30	8.71	18.35	7.57	1.87	3.77	7.72	4.94	9.82	18.76	10.46	8.44
Honokaue, East.....	3,000	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	10.68
Honokaue, Middle.....	3,000	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do
Honokaue, West.....	3,800	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do	Do

g Established Mar. 18.

e Receiver stopped with leaves and overflowed.

f Abandoned.

c No record.

a Established Oct. 1.

b Lost.

c Gage read irregularly; monthly distribution not known.



# INDEX.

A.	Page.		Page.
Accuracy of discharge measurements, degree of.....	24	Eleele, Kauai, Wahiua Stream at.....	98
Acre-foot, definition of.....	17	Equivalents, list of.....	18
Ah Lo flume, Kaneohe, Oahu, Waikalua ditch at.....	128	Everett ditch (Maui). See Palolo ditch.	
Akulikuli Spring near Kapaa, Kauai.....	84		
Aleamai Stream near Hilo, Hawaii.....	381	F.	
Alo division weir, near Huelo, Maui, Koolau ditch at.....	209	Field data, accuracy and reliability of.....	24
Alo Stream near Huelo, Maui.....	168-169	Field methods of measuring stream flow.....	11-16
Altitude of islands.....	30		
Anahola ditch at Kiokala, near Kealia, Kauai.....	89-90	G.	
Anahola River at Kiokala, near Kealia, Kauai.....	88-89	Gage, automatic, description of.....	16
near Kealia, Kauai.....	87-88	Gage heights, table of, explanation of.....	22-23
Anahola River basin (Kauai), measurements in.....	87-90	Gaging stations, classes of.....	11, 15, 19-20
Area of islands.....	30	lists of.....	25-29
Authority for investigations.....	9	Geography, description of.....	29-33
Awini weir, near Kohala, Hawaii, Kohala ditch at.....	372-376	Goo, E. E., work of.....	25
		Goo, R. M. S., work of.....	25
B.			
Bailey, C. T., work of.....	25	H.	
Book, H. L., work of.....	25	Haiku ditch at Peahi weir, near Huelo, Maui.....	208
Bridge station, definition of.....	15	Haipuaena Stream near Huelo, Maui.....	164-166
		Hakenanahu Stream at Lihue, Kauai.....	98
C.		Halehaku Stream at Lihue, Kauai.....	98
Cable station, definition of.....	15	near Huelo, Maui.....	194-195
Center ditch near Huelo, Maui.....	186-188	Halehaku Stream (North Fork) at Waimea, Kauai.....	98
Center ditch region, Maui, measurements in.....	186-188	Halehaku weir, near Huelo, Maui, New Hamakua ditch at.....	199
China ditch near Hanalei, Kauai.....	92-93	Halekua Stream near Waimea, Kauai.....	50
Christiansen, E. O., work of.....	25	Halona Stream in Upper Waiahole Valley, Oahu.....	128
Climate, character of.....	33	Halona Stream (North Fork) in Upper Waiahole Valley, Oahu.....	128
College of Hawaii, near Honolulu, Oahu, Manoa Stream at.....	108	Hamakua ditch region, Maui, measurements in.....	188-208
Cooperation with Hawaii.....	10	Hamakua group of streams, Hawaii, measurements on.....	367-371
Current meters, use of.....	13-15	Hamakuapoko, Maui, Kaluanui ditch near.....	205-206
		Hanalei, Kauai, China ditch near.....	92-93
D.		Hanalei River near.....	91-92
Definitions of terms.....	16-17	Kaua ditch at.....	98
Discharge, definition of.....	16	Kiaiakua ditch at.....	98
field methods of measuring.....	11-16	Kiaiakua stream at.....	98
office methods of computing.....	19-22	Kuna ditch near.....	93-95
Discharge measurements, accuracy of.....	24	Hanalei River basin (Kauai), measurements in.....	91-95
tables of, explanation of.....	22, 23-24	Hanamaulu ditch near Lihue, Kauai.....	70-71
Dort, J. C., work of.....	25	Hanamaulu River at Kapala, near Lihue, Kauai.....	64-66
Dort, S. W., work of.....	25	Hanamaulu River basin (Kauai), measurements in.....	64-66
		Hanapepe ditch near Eleele, Kauai (at Hanapepe Falls).....	57-58
E.		near Eleele, Kauai (at Koula).....	59-60
East Maui, miscellaneous measurements on..	209	seepage from.....	99
Eleele, Kauai, Eleele ditch at.....	98	near Hanapepe, Kauai.....	60-61
Hanapepe ditch at and near.....	57-60	near Makaueli, Kauai, at Hanapepe weir.....	98
seepage from.....	99		





	Page.		Page.
Iao Stream basin (Maui), measurements in.	137-140	Kaneha ditch near Kealia, Kauai.	86-87
Iao Stream near Wailuku, Maui.	137-139	Kaneohe, Oahu, Kepo ditch at.	128
Investigations, authority for.	9	Old Waikalua ditch at.	128
scope of.	10-11	rice-mill ditch at.	128
Irwins flume, Kailua Valley, Oahu, Makawao ditch at.	128	Waikalua ditch at.	128
		waste ditch at.	128
K.		Kapaa, Kauai, Akulikuli Spring near.	84
Kaapaa, Kauai, Kaehulua Stream near.	80-81	Kapaa River near.	82-84
Kaehulua Stream (North Fork) near.	79-80	Konohiki stream near.	113-114
Kaehulua Stream (South Fork) near.	81-82	Kuehulua stream near.	80-81
Kaapua Falls (Kauai), Kalihiwai River near.	98	Kuehulua stream (North Fork) near.	79-80
Kaehulua Stream at Kuhinoa weir, near Kapaa, Kauai.	80-81	Kuehulua stream (South Fork) near.	81-82
Kaehulua Stream basin (Kauai), measurements in.	79-82	Kapaa River at Kapahi, near Kapaa, Kauai.	82-84
Kaehulua Stream (North Fork) at Kainahola weir, near Kapaa, Kauai.	79-90	Kapaa River basin (Kauai), measurements in.	82-87
Kaehulua Stream (South Fork) at Wainamumu weir, near Kapaa, Kauai.	81-82	Kapahehe Stream near Honoumuli, Hawaii.	381
Kahakuloa, near Waihee, Maui, Kahakuloa Stream at.	129-130	Kapahi, near Kapaa, Kauai, Kapaa River at.	82-84
near Wailuku, Maui, Kahakuloa Stream above.	162	Kapahi ditch at.	85-86
Kahakuloa Stream basin (Maui), measurements in.	129-130	Kapaia, near Lihue, Kauai, Hanamaulu River at.	64-66
Kahanaiki Stream in Kailua Valley, Oahu.	128	Kapaia Stream (East Branch), Kauai, below county road.	98
Stream near Waimanalo, Oahu.	121	Kapeha Stream near Pepeekeo, Hawaii.	381
Kahiliholo Stream at Kilauea, Kauai.	98	Kapue flume near Hilo, Hawaii.	381
Kahoma ditch near Lahaina, Maui.	156-157	Kapue River near Hilo, Hawaii.	381
Kahoma Stream basin (Maui), measurements in.	155-157	Kauaula ditch near Lahaina, Maui.	152-154
Kahoma Stream near Lahaina, Maui.	155	Kauaula Stream basin (Maui), measurements in.	151-154
Kahuawai Spring near Honolulu, Oahu.	110-111, 128	Kauaula Stream near Lahaina, Maui.	151-152
near Honolulu, Oahu, Pauoa Stream below.	109	Kaua ditch at Hanalei, Kauai.	98
Kaieie Stream near Hilo, Hawaii.	381	Kauai, ditch seepage and losses on.	99-100
Kailua Stream near Huelo, Maui.	189	gaging station on.	25-26
near Waimanalo, Oahu.	122	miscellaneous measurements on.	98
near Wong Leong ditch, Kailua Valley, Oahu.	128	pumped water on.	99
Kailua Valley, box flume ditch in.	128	Kauaikanana Stream near Waimea, Kauai.	98
Kahanaiki Stream in.	128	Kawaikoi Stream near Waimea, Kauai.	35-37
Makawao ditch in.	128	Kawainui River at Pepeekeo, near Hilo, Hawaii.	215-216
Kaimi Stream near Waimanalo, Oahu.	124	near Waipio, Hawaii.	367-368
Kainahola weir, near Kapaa, Kauai, Kaehulua Stream (North Fork) at.	79-80	Kawi Stream near Lihue, Kauai.	75-76
Kaiwiki, near Hilo, Hawaii, Honoluli River at.	213-215	Keahua Stream near Lihue, Kauai.	75
Kalihiwai ditch at Kilauea, Kauai.	98	Kealia, Kauai, Anahola ditch near.	89-90
Kalihiwai River, Kauai, above mouth.	98	Anahola River near.	87-88
near Kaapua Falls.	98	Kaneha ditch near.	86-87
Kilauea, Kauai.	90	Keanae, Maui, Koolau ditch near.	162-164
Kalihiwai River (West Branch), Kauai, above confluence.	98	Kekaha ditch near Waimoa, Kauai.	40-45
Kalihiwai River basin, Kauai, measurements in.	90	Kennedy, H. H., work of.	25
Kalooa Stream near Hilo, Hawaii.	381	Kepo ditch at Kaneohe, Oahu.	128
Kaluanui ditch at Puuomalei, near Hamakua, Maui.	205-206	Kiaiakua ditch at Hanalei, Kauai.	98
Kamakalepo Stream near Waimanalo, Oahu.	123	Kiaiakua Stream at Hanalei, Kauai.	98
Kamenehune ditch near Waimea, Kauai.	47-48	Kikola Stream near Hilo, Hawaii.	381
Kamooloa ditch at Lihue, Kauai.	98	near Hilo, Hawaii, Honoluli River below.	381
Kanaha ditch near Lihue, Kauai.	76-77	Kilauea, Kauai, Kahiliholo Stream at.	98
		Kalihiwai ditch at.	98
		Kalihiwai River near.	90
		Kilauea River at.	98
		Molooa Stream at.	98
		Papaa Stream at.	98
		Poakuma Stream at.	98
		Waialele ditch at.	98
		Kiokala, Anahola ditch at.	89-90
		Anahola River at.	87-89
		Kohala ditch at Honokane weir, near Kohala, Hawaii.	376-380
		near Kohala, Hawaii.	371-380
		near Kohala, Hawaii (at Awini weir).	372-376



	Page.
North Waiehu Stream near Wailuku, Maui.	135-136
No. 1 Stream near Hilo, Hawaii.	381
Nuuanu Stream at Honolulu, Oahu.	111-113
Nuuanu Stream basin (Oahu), measurements in.	111-116
Nuuanu Valley, near Honolulu, Oahu, Luakaha weir in.	115-116
Lulumaho ditch in.	113-114
O.	
Oahu, artesian wells on.	128-129
gaging stations on.	26-27
miscellaneous measurements on.	128
precipitation on.	384
Office methods of computing stream flow.	13-22
Old Hamakua ditch at Opana weir, near Huelo, Maui.	204-205
Old Waikalua ditch at Kaneohe, Oahu.	128
Olawalu, Maui, Olowalu ditch No. 1, near.	147-149
Ukumehame Stream near.	146-147
Olokele ditch near Makaweli, Kauai.	50-52
near Waimea, Kauai.	52-53
Olowalu ditch No. 1, near Olowalu, Maui.	147-149
Olowalu Stream basin (Maui), measurements in.	147-149
Omuu Stream at Koloa, Kauai.	98
Onomea Stream near Papaikou, Hawaii.	381
Oopuola Stream near Huelo, Maui.	171-172
Opana ditch near Huelo, Maui.	196-197
Opana Stream near Huelo, Maui.	136
Opana weir, near Huelo, Maui, Lowrie ditch at.	207
Old Hamakua ditch at.	204-205
P.	
Palolo (Everett) ditch near Waikapu, Maui.	144-146
Palolo Stream basin (Oahu), measurements in.	100-105
Papaa Stream at Kilauea, Kauai.	98
Papaikou, Hawaii, Hanawai Stream near.	381
Onomea Stream near.	381
Pauoa Stream below Kahuwai Spring, near Honolulu, Oahu.	109
Pauoa Valley, Oahu, Kahuwai Spring in.	128
Peahi weir, near Huelo, Maui, Haiku ditch at.	208
Pepeekeo, Hawaii, Kapeha Stream near.	381
Kawainui River at.	215-216
Pepeekeo Stream near.	381
Walaama Stream near.	381
Pierce, C. H., work of.	25
Piihonua, near Hilo, Hawaii, stations at.	216-218
Poakumu Stream at Kilauea, Kauai.	98
Poeloelo Stream at Koloa, Kauai.	98
Pohakea Stream near Waimanalo, Oahu.	122-123
Pohakunanaka River near Hilo, Hawaii.	381
Ponolu, Hawaii, Linoli Springs near.	381
Poowaiomahaihai ditch near Waimea, Kauai.	53-54
Precipitation, records of.	383-385
Puhi Stream near Lihue, Kauai.	98
Pukele Stream, near Honolulu, Oahu, Wai- omoa Stream above.	102-104
Pukele Stream at or near Mahoe Springs, near Honolulu, Oahu.	104-105, 128
Pukihae Stream near Hilo, Hawaii.	381
Puohakamoa Stream near Huelo, Maui.	166-167

	Page.
Puomalei, near Hamakuapoko, Maui, Kalu- anui ditch at.	205-206
R.	
Rain gaging in Hawaiian Islands.	381-385
Run-off, definition of.	17
field methods of measuring.	11-16
office methods of computing.	19-22
terms used in expressing.	16
S.	
Scope of investigations.	10-11
Second-foot, definition of.	16-17
South Waiehu ditch near Wailuku, Maui.	162
South Waiehu Stream near Wailuku, Maui.	136-137
Spreckels ditch (West Maui) near Waihee, Maui.	134-135
Spreckels ditch (East Maui) near Huelo, Maui.	172-186
Spreckels ditch region (East Maui), measure- ments in.	164-186
Stations, records at, on Hawaii Island.	212-381
records at, on Kauai Island.	34-100
on Maui Island.	129-211
on Oahu Island.	100-129
Stewart, J. B., work of.	25
Stone Dam ditch, near Kilauea, Kauai, seep- age and loss from.	99
Stream measurement, accuracy of.	24
field methods of.	11-16
office methods of computing.	13-22
T.	
Tables, explanation of.	22-24
Terms, definitions of.	16-17
U.	
Uhu Iole Stream, below falls, Kauai.	98
near Lihue, Kauai.	73-74
Ukumehame Stream basin (Maui), measure- ments in.	146-147
Ukumehame Stream near Olowalu, Maui.	146-147
Upper Waiahole Valley, Oahu, Halona Stream in.	128
Halona Stream (North Fork) in.	128
Uwau Stream in.	128
Wahi Stream in.	123
Waianu Stream in.	128
Uwau Stream in Upper Waiahole Valley, Oahu.	128
V.	
Velocity-area measurements, methods of making.	12-16
W.	
Wahiaua Stream at Elele, Kauai.	98
Walaama Stream near Pepeekeo, Hawaii.	381
Waiahole Stream at Manianiaula, near Wai- kane, Oahu.	117-119
at Waiahole, near Waikane, Oahu.	119-121
Waiahole Stream basin (Oahu), measure- ments in.	116-127

	Page.		Page.
Waiahole Valley, Oahu, McCandless ditch in.....	128	Wailuku, Maui, South Waiehu Stream near	136-137
<i>See also</i> Upper Waiahole Valley.		Waiehe canal near.....	134-135
Waiakeali Stream near Waimea, Kauai.....	37-38	Wailuku River near Hilo, Hawaii.....	212-213
Waialae road, near Honolulu, Oahu, Manoa Stream at.....	108-109	Hilo Electric Light Co. weir at.....	381
Waialae Stream near Waimea, Kauai.....	39-40	Waimanalo, Oahu, Kahanaiki Stream near..	121
Waianu Stream in Upper Waiahole Valley, Oahu.....	128	Kailua Stream near.....	122
Waiehu Falls, near Lihue, Kauai, Wailua River (South Fork) above.....	66-68	Kaimi Stream near.....	124
Waiehu Stream basin (Maui), measurements in.....	135-137	Kamakalepo Stream near.....	123
<i>See also</i> North Waiehu Stream; South Waiehu Stream.		Makawao ditch near.....	125
Waihee, Maui, Kahakulua Stream near....	129-130	Makawao Stream near.....	124-125
Spreckels ditch (West Maui) near....	134-135	Pohakea Stream near.....	122-123
Waihee canal near.....	132-133	pump ditch near.....	127-128
Waihee Stream.....	130-132	Waimanalo ditch near.....	123-127
Waihee canal near Wailuku, Maui.....	134-135	Wong Leong ditch near.....	125-126
Waihee Stream basin (Maui), measurements in.....	130-135	Waimanu, Hawaii, Waimanu Stream near..	381
Waihi Stream in Upper Waiahole Valley, Oahu.....	128	Waimea, Kauai, Halehaku Stream (North Fork) at.....	98
Waihina canal, Kauai, seepage and loss from.	99	Halekua Stream near.....	50
Waibohonu Stream at Koloa, Kauai.....	98	Kamenehue ditch near.....	47-48
Waikalua ditch at Ah Lo flume, Kaneohe, Oahu.....	128	Kauaikanana Stream near.....	98
at Kaneohe, Oahu.....	128	Kawaikoi Stream near.....	35-37
<i>See also</i> Old Waikalua ditch.		Kekaha ditch near.....	40-45
Waikamoi Stream near Huelo, Maui.....	169-171	Makaweli River near.....	48-50
Waikane, Oahu, Waikane Stream near....	116-117	Mohihi Stream near.....	38-39
Waiahole Stream near (at Manianiaula) (at Waiahole).....	117-119	Olokele ditch near.....	52-53
Waikane Stream basin (Oahu), measurements in.....	116-117	Poowaiomahaihai ditch near.....	53-54
Waikane Stream near Waikane, Oahu.....	116-117	Waiakeali Stream near.....	37-38
Waikapu, Maui, Palolo (Everett) ditch near.....	144-146	Waialae Stream near.....	38-39
South Side Waikapu ditch near.....	142-144	Waimea ditch near.....	45-47
Waikapu Stream near.....	141-142	Waimea River at or near.....	34-35, 98
Waikapu Stream basin (Maui), measurements in.....	141-146	Waimea River basin (Kauai), measurements in.....	34-48
Wailua River (North Fork) above mouth of East Branch.....	98	Wainamuaumu weir, near Kapaa, Kauai, Kaehulua Stream (South Fork) at.....	81-82
near Lihue, Kauai.....	71-73	Wainiha, Kauai, Lumahai River near.....	95
Wailua River (North Fork, East Branch of) near Lihue, Kauai.....	74	Wainiha canal near.....	97-98
Wailua River (South Fork) above Waiehu Falls, near Lihue, Kauai.....	66-68	Wainiha River near.....	95-97
Wailua River basin (Kauai), measurements in.....	66-67	Waiomao Stream above Pukele Stream, near Honolulu, Oahu.....	102-104
Wailuku, Maui, Iao Stream near.....	137-139	near Honolulu, Oahu.....	100-102
Kahakulua Stream near.....	162	Waipio, Hawaii, Kawainui River near.....	367-368
Maniania ditch near.....	139-140	New Hamakua ditch near.....	369-370
North Waiehu Stream near.....	135-136	Waipio River near (below Koiawe).....	368
South Waiehu ditch near.....	132	(below Waima).....	369
		Waiuli ditch at Kilauea, Kauai.....	98
		near Kilauea, Kauai, seepage and loss from.....	99
		Weir measurements, advantages and disadvantages of.....	11-12
		West Maui, miscellaneous measurements on.	162
		White, G. R., work of.....	25
		Wilcox ditch near Koloa, Kauai.....	98
		Wong Leong ditch, Kailua Valley, Oahu, Kailu Stream near.....	128
		Wong Leong ditch near Waimanalo, Oahu.	125-126
		Wood, B. D., work of.....	25
		Work, division of.....	24-25