

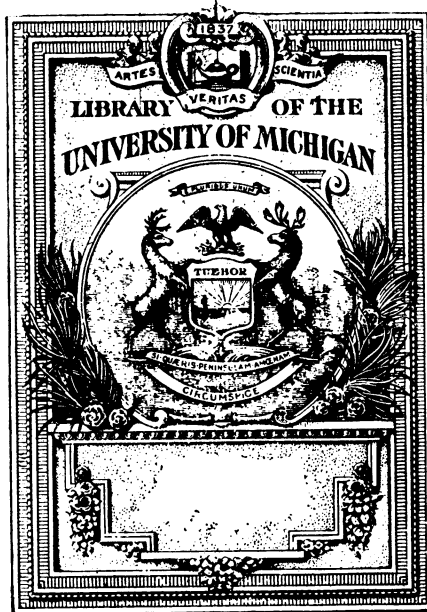
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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY



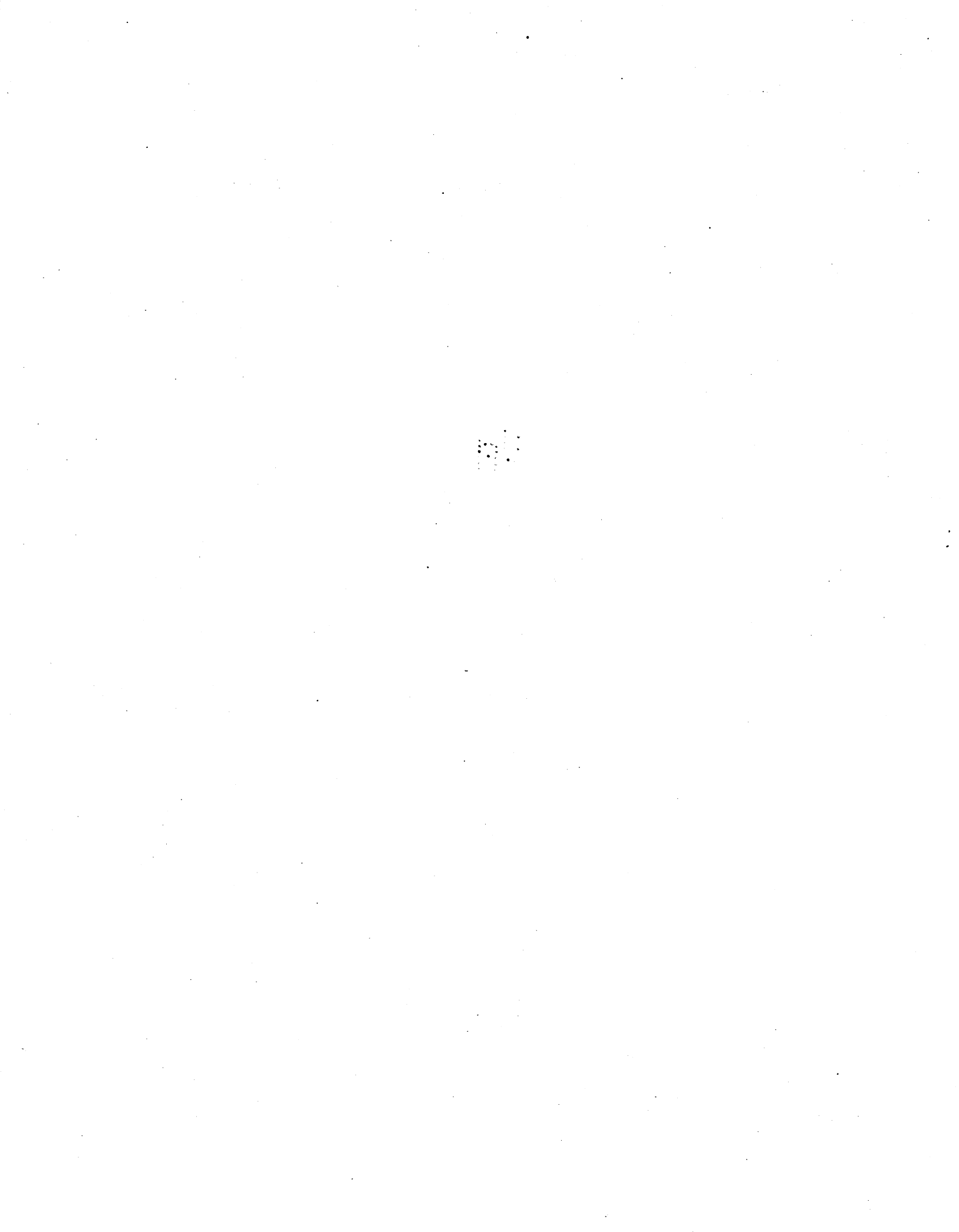
MONTHLY BULLETIN, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1919



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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR JANUARY, 1919

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INTRODUCTION.

The form of our Monthly Bulletin as adopted in 1907 and modified in 1914 will be retained. Unless otherwise stated, by daily rainfall in the Philippines we mean the amount of rainfall for 24 hours beginning 6 a. m. The time used is that of the one hundred and twentieth meridian east of Greenwich.

The following is a list of all the meteorological stations of the Weather Bureau together with the names of the respective observers, who are in a great measure responsible for the accuracy of the observations published in this Bulletin:

SECONDARY STATIONS AND OBSERVERS OF THE WEATHER BUREAU.

Station.	North latitude.		East longitude.		Observer.	Class.
	°	'	°	'		
Jolo	6	03	121	00	Meliton Cedeño	III
Isabela, Basilan	6	42	121	58	Inocencio Rodríguez	IV
Zamboanga	6	54	122	05	Juan Lugod	II
Davao	7	01	125	35	Lamberto Garcia	III
Cotabato	7	13	124	15	Felix Manabat	III
Camp Keithley, Lanao	8	01	124	17	Pio Fajardo	IV
Cagayan, Misamis	8	29	124	38	Juan Hernandez	III
Dapitan	8	40	123	25	Agaton Alingal	IV
Butuan	8	56	125	32	Generoso Copin	III
Mambajao	9	14	124	43	Domingo Arao	IV
Dumaguete	9	18	123	19	Matias Ordiales	III
Yap, W. Carolines	9	29	138	08	Prudencio Z. Urbiztondo	II
Tagbilaran	9	38	123	51	Anacleto Inciong	II
Iwahig	9	44	118	38	Dionisio Crisanto	III
Surigao	9	48	125	29	Ruffino de la Cruz	IF
Maasin	10	08	124	50	Aguedo Espina	III
Cebu	10	18	123	54	Ezequiel Reinoso	I
Iloilo	10	42	122	34	Ricardo A. Luna	I
San Jose Buenavista	10	44	121	55	Teodoro Peñero	III
Cuyo	10	51	121	01	Roman Kabigting	III
Ormoc	11	00	124	36	Severo Bande	III
Guiuan	11	02	125	44	Patricio Yabao	III
Tacloban	11	15	125	00	Jose C. Nevado	II
Capiz	11	35	122	45	Pedro M. Asturias	II
Borongan	11	37	125	26	Godofredo Bacolo	III
Catbalogan	11	47	124	51	Clemente M. Letaba	III
Calbayog	12	04	124	36	Segundo Peñaflorida	II
Masbate	12	22	123	36	Vicente M. Sañano	IV
Romblon	12	35	122	16	Dolorito Contreras	III
Batag	12	40	125	04	Placido A. Edroso	III
Sorsogon	12	55	124	08	Agustin Mendoza	III
Legaspi	13	09	123	45	Bernardino Costa	I
Sumay, Guam	13	24	144	38	William Pimley	III
Calapan	13	25	121	11	Aquilino Nokom	III
Virac	13	35	124	14	Eusebio Talion	III
Naga	13	37	123	11	Eduardo Ontengco	III
Tigaon	13	39	123	29	Crescenciano Martinez	III
Batangas	13	45	121	03	Jose N. Cabrera	III
Lucena	13	56	121	37	Vicente Valderrama	III
Atimonan	14	00	121	55	Pedro Baltasar	I
Ambulong, Tanauan	14	07	121	04	Gregorio Peralta	II
Canlubang, Calamba	14	13	121	07	Nicolas Princena	IV
Paracale	14	17	122	47	Benito Pelaez	II
Santa Cruz, Laguna	14	18	121	25	Doroteo Eusebio	III
Antipolo	14	36	121	10	Valeriano Garcia	IV
Iba	15	20	119	58	Emeterio Mateo	III
San Isidro	15	22	120	53	Bernardo Pecache	II
Tarlac	15	30	120	35	Arsenio T. Magat	IV
Baler	15	40	121	34	Santiago Palmero	IV
Dagupan	16	03	120	20	Jose M. Sison	I
Bolinao	16	24	119	53	Tereso D. Solis	IV
Baguio	16	25	120	36	Pastor P. Daroy	I
San Fernando, La Union	16	37	120	19	Estanislao F. Feraren	III
Echague	16	41	121	39	Marciano Bugas	III
Candon	17	12	120	26	Luis Quismorio	IV
Vigan	17	34	120	23	Francisco Tiangco	II
Tuguegarao	17	36	121	40	Jose C. de Leon	II
Laoag	18	12	120	35	Jose Saez	II
Aparri	18	22	121	38	Manuel Delgado	I
Cape Bojeador	18	31	120	36	Nicolas Aguirre	IV
Santo Domingo, Batanes	20	28	121	59	Fernando Abad	III

The signs and symbols employed in this publication are the following:

Symbol.	Equal to—	Symbol.	Equal to—
Ci.	Cirrus.	o	Overcast.
Ci.-S.	Cirro-stratus.	p	Passing showers of rain.
Ci.-Cu.	Cirro-cumulus.	q	Squally weather.
A.-Cu.	Alto-cumulus.	u	Ugly or threatening.
A.-S.	Alto-stratus.	v	Visibility of distant objects.
S.-Cu.	Strato-cumulus.	w	Wet or heavy dew.
N.	Nimbus.	●	Rain.
Cu.	Cumulus.		Fog or mist.
Cu.-N.	Cumulo-nimbus.	⊥	Dew.
S.	Stratus.	⊕	Solar halo.
Fr.-Cu.	Fracto-cumulus.	⊖	Lunar halo.
Fr.-N.	Fracto-nimbus.	⊕	Lunar corona.
Fr.-S.	Fracto-stratus.	⊖	Solar corona.
S.-cf.	Stratus-cumuliformis.	⊕	Heat lightning.
N.-cf.	Nimbus-cumuliformis.	⊖	Thunderstorm.
M.-Cu.	Mammato-cumulus.	⊕	Thunder without lightning.
b	Bright, clear sky.	⊖	Strong wind.
c	Cloudy weather.	∞	Rainbow.
d	Drizzling, light rain.	∞	Dry mist.
g	Gloomy or stormy-looking weather.		

NOTE.—A small ° or * used as an exponent to the above symbols indicates, respectively, that the intensity of the meteor denoted by the symbols thus affected was small or very great.

INTRODUCCIÓN.

Conservaremos en esta publicación la misma forma adoptada en 1907, y modificada en 1914. Mientras no se diga lo contrario, por lluvia diaria en Filipinas entendemos la cantidad de lluvia en 24 horas empezando a 6 a. m. El tiempo usado es el del meridiano ciento veinte E de Greenwich.

Damos en el texto inglés una lista de todas nuestras estaciones con los nombres respectivos de los observadores, los cuales son en gran parte responsables de las observaciones que se publican en estos boletines.

Los signos y símbolos usados en esta publicación son los siguientes:

Símbolos.	Significado.	Símbolos.	Significado.
Ci.	Cirrus.	o	Cubierto.
Ci.-S.	Cirro-stratus	p	Lluvia pasajera.
Ci.-Cu.	Cirro-cumulus.	q	Achubascado.
A.-Cu.	Alto-cumulus.	u	Tiempo feo o amenazador.
A.-S.	Alto-stratus.	v	Trasparencia del aire.
S.-Cu.	Strato-cumulus.	w	Húmedo.
N.	Nimbus.	●	Lluvia.
Cu.	Cumulus.	☃	Niebla o neblina.
Cu.-N.	Cumulo-nimbus.	☁	Rocío.
S.	Stratus.	☉	Halo solar.
Fr.-Cu.	Fracto-cumulus.	☾	Halo lunar.
Fr.-N.	Fracto-nimbus.	☽	Corona lunar.
Fr.-S.	Fracto-stratus.	☼	Corona solar.
S.-cf.	Stratus-cumuliformis.	☄	Relámpago sin trueno.
N.-cf.	Nimbus-cumuliformis.	☃	Tempestad de trueno.
M.-Cu.	Mammato-cumulus.	☃	Trueno sin relámpago.
b	Despejado.	☃	Viento duro.
c	Nublado.	☃	Arco-iris.
d	Llovizna o lluvia ligera.	∞	Niebla seca.
g	Mal cariz; tiempo cerrado, fosco.		

NOTA.—Un ^o o un ² puestos como exponentes de los signos, indican respectivamente una muy débil o una muy fuerte intensidad en el meteoro que representan.



BULLETIN FOR JANUARY, 1919.

METEOROLOGICAL BULLETIN FOR JANUARY, 1919.

By REV. JOSE CORONAS, S. J.,
Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure of this month in the Philippines is slightly to moderately higher than that of the preceding year and than the normal for January. The highest pressures were observed either on the 6th or on the 19th, while the lowest pressures were recorded on the 11th.

The mean monthly temperature differs very slightly from the normal, although it is slightly to moderately higher than that of January, 1918. The absolute maximum and minimum temperatures for Manila were 32.7° C. on the 26th, and 16.3° C. on the 24th. The extreme temperatures for Baguio were 25.4° C., 11.2° C. on the top of Mirador, and 25.9° C., 7.9° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR JANUARY, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from Jan., 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Jan., 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
Zamboanga	760.54	+2.65		762.18	19	759.21	11	25.9	+0.1		33	6, 26	20.4	17
Yap, W. Carolines	59.97			60.98	6	58.86	9	^a 26.5			^a 33.1	30	22.7	17
Tagbilaran	61.11	+2.84	+1.47	62.95	19	59.25	11	25.1	+ .5	-0.6	32.5	4	17	15
Surigao	61.38	+3.06	+1.91	63.29	19	59.52	11	25.5	+ 1	- .1	30.3	3	19.2	20
Cebu	61.52	+2.95	+1.68	63.39	19	59.59	11	26.3	+ 1	+ .3	31.5	2	21.7	15
Iloilo	61.36	+2.55	+1.54	63.46	19	59.18	11	25.9	+1.7	+ .3	31.4	25	21	27
Tacloban	61.79	+2.84	+1.47	63.75	19	59.69	11	25.7	+1.8	+ .2	33.5	29	19.6	15
Capiz	61.94	+2.34	+1.26	64.02	19	59.61	11	25.8	+1.5	+ .1	31.7	12	20.6	27
Calbayog	62.02	+2.65	+1.48	64.17	19	59.96	11	24.9	+1.3	+ .1	32.2	27	18.1	27
Legaspi	62.50	+2.34	+1.71	64.44	19	60.13	11	^b 26.3		+ .7	^b 31	12	^b 19.9	30
Atimonan	62.88	+1.71	+1.63	64.92	19	60.32	11	25.6	+2.3	+ .4	30.1	12	18.8	30
Ambulong, Tanauan	62.02	+1.88		64.30	6	59.49	11	25.2	+1.8		34.2	31	18.4	31
Paracale	62.95	+1.60		65.65	6	60.30	11	25.3	+1.9		29.9	31	18.9	30
Manila	62.64	+1.91	+1.47	65.01	6	60.12	11	24.3	+1.2	- .5	32.7	26	16.3	24
San Isidro	63.32	+2.17	+1.88	65.73	6	60.74	11	24.9	+1.9	+ .2	33.9	10, 30	15.4	31
Dagupan	61.93	+1.78	+1.08	63.96	19	59.51	11	25.6	+1.4	+ .1	35.6	10	16.3	24
Baguio ^c	639.15	+2.18	+1.18	640.80	6	637.40	11	17.1	+2.4	+ .6	25.4	29	11.2	28
Vigan	762.17	+1.62	+ .97	764.07	19	759.86	11	25.3	+1.1	- .1	32.5	6	18.4	13
Tuguegarao	63.43	+ .05	+ .77	68.08	6	59.92	11	23.4	-2.9	+ .2	33.6	30	15.5	24, 27
Laoag	62.30	+1.34		64.59	6	59.96	11	24.7	+1.8		33.7	14	14.8	23
Aparri	63.86	- .12	+ .91	69.16	6	60.20	11	23.2	+3	+ .3	31.5	9, 10	15.8	26

^a 30 days of observation.

^b 25 days of observation.

^c The barometric readings of this station are not reduced to sea level.

Rainfall.—With only two exceptions, all the stations of the Philippines reported a monthly rainfall below the normal, the differences being particularly great for the stations on the eastern part of the Archipelago. In Manila there were no more than 6.6 mm. of water collected in the rain-gauges during the month, this amount being 19.5 mm. below the normal of January. The total monthly rainfall for Baguio is 2.5 mm., and differs from the normal by — 28.3 mm.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF JANUARY, 1919.

Station.	Total.	Departure from Jan., 1918.	Departure from normal.	Days of rain.	Departure from Jan., 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Jan., 1918.	Departure from normal.	Days of rain.	Departure from Jan., 1918.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	41	-425.3	-77.3	4	-18	16.3	2	Legaspi	65.4	-324.1	-308.8	17	-5	30.9	4
Isabela, Basilan	8.4	-235.5	-71.7	6	-14	5.3	7	Sumay, Guam	40.1	-96.9	-22.8	8	-11	7.6	13
Zamboanga	17.8	-125.4	-41.3	8	-12	5.3	22	Virac	64.1	-219.2	-152.1	13	-6	21.1	4
Davao	28.3	-96	-103.9	9	+2	5.6	21	Naga	20.2	-85	-99.2	8	-12	7.6	3
Cotabato	86.2	-69.3	-5	9	-9	39.4	2	Tigaon	59.9			10		18.5	4
Camp Keithley.								Batangas	18.2	+14.3	-6.8	2	0	10.9	3
Lanao	124.3			17		31	21	Lucena	79.4	+14.6		10	-3	21.1	4
Cagayan, Misamis	45.9	-163.9		3	-19	20.8	21	Atimonan	94.6	-167.7	-132.2	10	-16	34.9	3
Dapitan	97.3	-512.1	-63.5	17	-14	18.8	2	Ambulong, Tanauan	4.8	-25.2		4	-1	2	15
Butuan	153	-412.4	-87.2	25	-3	50	21	Catlubang, Calamba	27.4	+22		10	+8	5.8	5
Mambajao	158.3	-898.6		14	-13	25.2	21	Paracale	199.6	-415.5	-230.6	19	-9	50	5
Dumaguete	27.3	-173		9	-11	10.4	5	Santa Cruz, Laguna	51.8	+36.7	-4.7	13	+6	11.7	3
Yap, W. Carolines	63.6	-198.9	-88.2	20	-9	10.2	16	Marila	6.6	+3.4	-19.5	5	+3	3.6	4
Tagbilaran	41.4	-160.4	-44.3	12	-6	13.3	16	Antipolo	23.4	+19.8		6	+4	8.9	2
Iwahig	15.7	-144.4		1	-12	15.7	16	Iba	0	0	-5.7	0	0	0	5
Surigao	290.6	-898.3	-161	22	-8	60.5	22	San Isidro	2.1	+2.1	-13	2	+2	1.6	0
Maasin	85.5	-688.9	-128.2	5	-18	30.3	24	Tarlac	0	0	-8	0	0	0	5
Cebu	79.2	-144.6	-18	11	-7	64.8	5	Baler	210.6	+202.9	-31.6	15	+13	59.4	5
Iloilo	14.5	-32.8	-39.7	2	-14	9.7	5	Dagupan	1.3	+1.3	-9.2	1	+1	1.3	5
San Jose Buenavista	0	-25.8	-33.5	0	-10	0	0	Bolinao	0	-3.8	-10	0	-3	0	0
Cuyo	0	0	-12.3	0	0	0	0	Baguio	2.5	-1	-28.3	1	-1	2.5	4
Ormoc	36.1	-422.2	-156.2	12	-15	19	24	San Fernando, Union	20.6	+20.6	+11.2	1	+1	20.6	5
Guinan	215.7	-1573.1		23	-7	31.8	24	Echagüe	32.3	+1.5	-21.9	8	-7	13.3	5
Taclóban	123.2	-1261.9	-218.1	17	-13	28.6	24	Candon	0	0	-5.3	0	0	0	0
Capiz	9.7	-206.6	-150.5	8	-18	2.5	20	Vigan	0	-1	-8	0	-1	0	0
Borongan	220.6	-1970.8	-390.3	22	-9	48	1	Tuguegarao	100.6	+96.1	+67.2	3	0	87.1	9
Catbalogan	35.4	-878.5		11	-17	9.4	10	Laog	0	-3.5	-4.2	0	-1	0	0
Calbayog	23.3	-662.5	-171.2	13	-17	6.8	4	Aparri	114.8	-12	-78.5	9	-14	29	5
Masbate	44	-337.5	-127.9	11	-14	11.4	3	Cape Bojeador	0	-6.4		0	-1	0	0
Romblon	21.2	-92.1	-93.9	7	-13	6.9	2	Santo Domingo, Batanes	124.6	-4.4	-111.8	12	-12	22.4	22
Batag	79.6	-756.3		13	-17	13	3								
Sorsogon	214.3	-806.1		18	-11	53.1	3								

DEPRESSIONS AND TYPHOONS.

There were no depression or typhoon near the Philippines during this month. Even in the whole Far East there was none worth mentioning, except on the 10th to 12th when a depression moved eastward from the Eastern Sea; but this should rather be considered as a continental depression.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas es ligera o moderadamente mayor que la del año pasado y que la normal de enero. Las presiones más altas se observaron el día 6 ó el 19, al paso que las más bajas se registraron el 11.

La temperatura media mensual difiere muy ligeramente de la normal, aunque es ligera o moderadamente mayor que la de enero de 1918. Las temperaturas máxima y mínima absolutas de Manila fueron 32.7° C. y 16.3° C. registradas los días 26 y 24, respectivamente. Las temperaturas extremas de Baguio fueron 25.4° C., 11.2° C. en la cumbre del Mirador, y 25.9° C., 7.9° C. en el valle.

Precipitación acuosa.—Con solas dos excepciones, todas las estaciones de Filipinas registraron una lluvia mensual menor que la normal, siendo las diferencias particularmente grandes en las estaciones de la parte oriental del Archipiélago. En Manila no se recogieron en los pluviómetros más de 6.6 mm. de agua durante el mes, cantidad que difiere de la normal de enero en -19.5 mm. La lluvia total del mes en Baguio es 2.5 mm., menor que la normal en 28.3 mm.

DEPRESIONES Y TIFONES.

Durante este mes no hubo depresión o tifón cerca de Filipinas. Aun en todo el Extremo Oriente ninguna hubo en todo el mes que merezca mencionarse, excepto del 10 al 12 en que una depresión se movió hacia el E desde el Mar del Este; pero esta debería considerarse más bien como una depresión continental.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.*

[$\phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.			Evaporation. ^b		
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	In sun. Black bulb in vacuo, 2 p. m.	Free exposure (total).	Shelter (total).
					8 a. m.	2 p. m.	8 a. m.	2 p. m.			8 a. m.	8 a. m.				
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	761.80	25.2	30.6	20.5	26.4	27.7	27.1	27.6	27.8	27.9	82.7	19.6	18.1	35	3.2	2.2
2	61.92	25.7	31.8	22.6	26.7	27.9	27.5	27.6	28	27.9	83.6	20.4	21.2	33.8	2.3	1.5
3	62.22	25	30.8	21.2	26.5	27.8	27.5	27.7	28	28	84.9	19.9	19	35.5	2.3	1.7
4	63.03	25	30	22.5	26.4	28	27.4	27.7	28	27.9	85.2	20.6	21.5	43	1.8	1
5	63.76	25.1	30.4	22.2	26.8	27.9	27.7	27.8	28.1	27.9	84.8	19.8	20.5	37.2	3.8	3.1
6	65.01	24.6	29.9	21.4	26.5	27.7	27.5	27.6	27.9	27.9	76.4	17.3	20	37.9	3.7	2.6
7	63.70	24.8	30.5	20.8	26.3	27.5	27.4	27.7	27.9	27.9	78.2	18	18.5	35.5	3.2	2.2
8	62.64	24.6	29.1	20.5	26	27.3	27.3	27.4	27.9	27.9	82.4	18.8	18.1	37.2	2.6	1.6
9	61.38	24.9	31.2	21.2	26	27.4	27.3	27.5	28	27.9	82.6	19.1	19	51.5	3.9	2
10	60.32	25	31.7	19	26	28.1	27.3	27.6	28	27.8	77	17.8	16.5	51.5	4.4	2.8
11	60.12	24.4	31.9	18.2	25.7	27.8	27.3	27.6	27.8	27.8	80.2	18	15.6	50.5	3.2	2.3
12	60.48	24.5	30	20.3	26.2	28	27.4	27.6	27.9	27.9	84.2	19	18	47.8	2.7	1.9
13	60.98	24.4	31	19	26.2	28.1	27.4	27.6	27.8	27.9	82.4	18.5	16.3	50	3.4	2
14	62.71	23.7	30.3	18.8	26	27.6	27.4	27.5	27.8	27.9	82.4	17.8	16	44.5	3	2.1
15	62.80	24.8	30.8	19	25.8	27.7	27.2	27.6	27.8	27.9	78.7	18.1	16.4	46.5	3.9	2.5
16	63	24.7	30.4	20.8	26.5	27.5	27.3	27.5	27.8	27.9	80.8	18.5	19.2	41.5	2.8	2.1
17	64.05	23.9	31.3	18	25.5	27.8	27.2	27.5	27.8	27.9	77.1	16.7	15.4	48	3.9	2.9
18	64.53	23.6	30.8	17.3	25.4	27.5	27	27.5	27.8	27.9	77.3	16.4	14.4	50.5	4.1	3.4
19	64.77	23.5	30.3	17.9	25.4	27.5	27.1	27.2	27.9	27.8	79	16.9	15.3	37.6	3.7	2.5
20	63.84	24.2	30.2	19	25.5	27.4	26.9	27.2	27.8	27.8	75.1	16.6	17.3	40.4	3.8	2.8
21	63.93	23.8	29.5	20	25.5	27.1	26.8	27.1	27.7	27.8	77	16.8	17.8	48	3	2.3
22	63.73	23	31	17.8	25.2	27.3	26.8	27.3	27.7	27.8	77.3	15.8	15	35	3.7	2.8
23	62.95	23	31	16.4	24.6	27.3	26.6	27	27.7	27.7	71	14.3	13.4	50.1	5.1	3.4
24	62.22	23.5	32	16.3	24.6	27.7	26.6	27	27.6	27.8	73.4	15.4	13.4	52.9	4.6	3.1
25	61.92	24.5	31	18.4	25.1	27.8	26.6	27.1	27.6	27.8	73.2	16.4	15.4	51	4.4	2.7
26	62.55	24.5	32.7	18.3	25.5	28.3	26.8	27.4	27.5	27.8	70.1	15.4	16	52	5.4	3.8
27	62.83	23.8	31.3	17.6	25.4	28.1	26.8	27.3	27.5	27.8	69.6	14.7	14.7	51.2	5.3	3.5
28	62.46	23.5	28.3	17.9	25.5	26.9	26.8	27.1	27.5	27.8	80	17.2	15.3	42.3	2.2	1.6
29	62.26	24.4	30.5	19.6	25.5	27.5	26.8	27.1	27.5	27.8	75.4	16.8	17.3	48.2	4.4	2.9
30	62.31	23.3	31.2	16.6	24.8	27	26.8	27	27.4	27.9	74.2	15.3	13.7	50.2	4.6	2.9
31	61.64	24.3	32.5	16.5	24.5	28.5	26.8	27.3	27.5	28	71.6	15.5	15	53.4	5.8	3.5
Mean Total	762.64	24.3	30.8	19.2	25.7	27.7	27.1	27.4	27.8	27.9	78.4	17.5	16.9	44.8	3.7	2.5
Departure from normal	+ 1.47	- 0.5	+ 0.7	- 1.2							+ 0.3	- 0.6		+ 6.9		77.7

Day.	Wind.				Clouds.			Sun-shine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.	
	Prevailing direction.	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.			On the tower.	In the park.		
						Upper.	Lower.					
		Km.	Km.		0-10.			h. m.	mm.	mm.		
1	NE, WNW	130	15	WNW	4.8		Cu.	E	7 35			☉ a. d° p.
2	NNE, E	113	10	E	6.3		Ci.	E	5 20	0.8	0.8	☉ a. d° p.
3	W quad.	83.5	9	WSW	6.2		Ci.-Cu.	E	4 35	3	4	☉ a. d° p.
4	NE quad.	89.5	12	NE	8.2		A.-Cu.	E	4 20	3.6	3.5	☉ a. d° p.
5	NE quad.	94	11	NE	8.5		Ci.-S.	E	1 50	2		☉ a. d° p.
6	NNE	187.5	24	NE	7.6		Ci.-S.	E	2 45			☉ a.
7	E quad.	141.5	19.5	ESE	7		Ci.-S., A.-Cu.	E	5 25			☉ a.
8	E quad.	140	12	ESE	7.6		Ci.-S. NE	E	2 10			☉ a.
9	ESE	141.5	14	ESE	5.7		Ci.-S.	E	5 05			☉ a.
10	ESE, SE	182.5	15	SE, SSE	.1		Cu.	E	9 20			☉ a.
11	NE, SE	138	13	WSW	.1		Ci.	E	9 25			☉ a.
12	W	151.5	14	W	2.5		Ci.	E	8 25			☉ a.
13	NE, W	133.5	13	W, WNW	1.9		Ci.	E	8 55			☉ a.
14	E quad.	160.5	16	SE	5.1		Ci.	E	7 05			☉ a.
15	E quad.	165.5	16	WNW	5.2		A.-Cu. ENE	E	8 00			☉ a.
16	E	127.5	17	ESE	7.2		A.-Cu.	E	1 35			☉ a.
17	NE	182.5	16	W	2.7		Ci.-S.	E	8 30			☉ a.
18	NE	169.5	16	W	2.6		Ci.-S.	E	9 00			☉ a.
19	NE, ENE	166.5	12.5	ENE	5.6		A.-Cu. ENE	E	6 05			☉ a.
20	E, NNE	162.5	19.5	ENE	5.7		Ci.-S.	E	4 55			☉ a.
21	E quad.	139	17	NW	6.4		Ci.-S.	E	4 40			☉ a.
22	E quad.	159.5	17	ESE	6.2		Ci.-S.	E	5 20			☉ a.
23	NE, E	185	17	SE	.6		Ci.	E	9 20			☉ a.
24	NNE, ESE	193	17.5	ESE	.8		Ci.-S.	E	9 25			☉ a.
25	N quad.	181.5	14	W, ESE	.9		Ci.-S.	E	9 10			☉ a.
26	ENE	209	19	ENE	2.9		Ci.-S.	E	8 40			☉ a.
27	E. NE	160.5	16	ESE	1.6		A.-Cu. E	E	9 20			☉ a.
28	N quad.	131.5	14	NW	8		Ci.-S. E	E	2 40	1.7	1.9	☉ a. p.
29	ESE	208.5	26	ESE	5.7		Ci.-S.	E	7 50			☉ a. p.
30	E quad.	175.5	16	W, WNW	.7		Cu.	E	9 35			☉ a.
31	E quad.	197.5	20	SSE	.7		Cu.	E	10 05			☉ a.
Mean Total		154.9	15.7		4.4				6 40			
Departure from normal		-421			-1.1				+22 05	-19.5		

* All the mean values given in this table are deduced from the hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.

METEOROLOGICAL BULLETIN.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[$\phi=16^{\circ} 25' N$; $\lambda=120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pressure ^b (mean).	Air temperature at Mirador (on the top of the mountain).					Air temperature in the valley (near the city hall).				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation.	
		Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.	Hour.			Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per cent.	mm.	°C.	°C.	mm.	mm.	
1	638.69	18.2	24.5	0.35p.	14.8	12 m. n.	25.9	1.00p.	13.8	10.20p.	60.3	9.4	14	53	8.9	5.4
2	39.25	18.1	24.3	1.00p.	13.5	4.20a.	25.3	11.00a.	12.1	4.10a.	76	11.7	11.8	58.4	4.7	2.3
3	39.46	18.1	23.4	10.20a.	14.7	5.55a.	25.1	11.10a.	12.9	6.40a.	82.2	12.6	13	57.9	3.2	1.9
4	39.82	17.8	24.1	Noon	14.5	6.30a.	25.5	0.20p.	13.1	7.00a.	84.2	12.8	13	59.6	3	1.8
5	40.21	16.8	22.4	11.20a.	14.5	5.40a.	22.9	Noon	13.2	6.40a.	83.5	11.9	13.5	59.8	4.8	2.5
6	40.80	16.5	22.3	0.45p.	13.3	6.10a.	22.7	1.00p.	13	6.40a.	66.8	9.2	12.7	54.1	9.3	4.8
7	40.05	16.6	21.7	0.50p.	13.4	3.10a.	22.5	1.10p.	13.2	4.30a.	69.3	9.6	12.7	50.8	9.6	5
8	39.38	18.1	24.9	2.00p.	14.5	2.40a.	25.5	0.50p.	13.3	3.20a.	69.8	10.5	13.3	55.6	7.4	4.3
9	38.48	17.6	23.8	11.05a.	14.7	3.00a.	24.8	11.00a.	13.5	6.30a.	81.7	12.1	13.5	62.2	3.1	1.9
10	37.65	18.4	24.9	1.00p.	13.6	5.40a.	24.8	10.40a.	13	6.30a.	76.5	11.8	13	57.1	4.4	2.6
11	37.40	18.3	24.3	1.30p.	14.2	6.00a.	25	0.30p.	11.2	6.40a.	70.5	10.7	10	55.9	6.2	3.6
12	37.50	17.5	23.9	1.45p.	13.5	3.45a.	24.5	Noon	10.6	12 m. n.	59	8.9	7.4	55.1	8.2	4.9
13	37.76	17.5	23.9	0.05p.	13.5	0.05a.	25	1.30p.	9.7	1.45a.	51.5	7.6	9.2	54.9	7.3	4.2
14	38.02	16.8	22.9	0.35p.	13.1	4.00a.	24.2	Noon	10.1	6.40a.	70.5	10	10.6	53.2	5.1	2.5
15	39.39	16.6	21.5	10.50a.	14.3	5.10a.	24.1	11.25a.	12.3	-----	85.5	12	13	60	2.6	1.3
16	39.65	16.9	23.1	0.40p.	13.1	6.50a.	24.2	1.55p.	12.4	6.40a.	88.2	11.8	12.5	58.8	2.9	1.5
17	40.40	16.8	23.2	10.35a.	13.2	3.15a.	23.8	11.25a.	11.6	2.55a.	88	11.6	10.8	55.6	4.1	2
18	40.66	16.1	21.6	0.35p.	12.6	5.30a.	22.9	1.40p.	10.5	6.00a.	82.8	11.2	10.3	56.2	2.9	1.5
19	40.54	15.3	21.6	1.00p.	12.6	7.00a.	22.2	0.40p.	11.2	6.00a.	85	11	9.2	56.8	3.3	1.5
20	39.79	15.5	20.4	10.40a.	12.2	3.55a.	23.7	11.00a.	10.7	5.30a.	88	10.8	10.9	54	4	1.9
21	39.91	16.2	22.8	1.00p.	12.2	4.20a.	23.7	11.40a.	10.8	4.55a.	75	10.1	10.6	57	4.5	2.4
22	39.50	16.2	21.8	1.15p.	11.7	6.40a.	22.9	1.30p.	9.9	6.40a.	74.2	10	9.8	56.2	5.4	2.9
23	38.87	16.4	23.3	11.05a.	11.4	6.00a.	25	0.45p.	8.9	6.40a.	60.3	8.3	9.7	55.4	9	4.9
24	38.56	18	24.1	10.20a.	13	1.25a.	25.9	11.15a.	7.9	4.00a.	43	6.6	9	56.2	9	5.1
25	38.55	17.4	23.2	2.25p.	11.8	5.10a.	24.7	11.15a.	9.4	3.40a.	61.7	9.1	6.6	54.9	6.9	4
26	38.87	16.5	22.4	1.25p.	12.4	6.55a.	23	1.30p.	10.7	6.35a.	74.7	10.4	10	53	6	3.2
27	38.91	16.9	22.3	1.00p.	11.3	2.55a.	25.6	1.05p.	8	3.20a.	58.3	8.6	7.7	54.5	7.1	3.7
28	38.72	17.2	24.4	0.05p.	11.2	4.90a.	25.4	0.40p.	8.4	4.45a.	62.2	9.2	8.3	54.6	9.1	4.6
29	38.73	17.4	25.4	Noon	13.2	6.30a.	26	0.50p.	11	6.35a.	74.5	10.9	11.7	55.9	7.2	4.8
30	38.67	17.1	23.8	2.25p.	13.3	6.15a.	25	0.55p.	9.7	6.15a.	69.5	10.1	10.2	54.4	9.3	4.6
31	38.34	17.8	25.3	10.40a.	13.9	12 m. n.	25.4	11.20a.	11.4	3.00a.	56.5	8.2	12.3	56.7	6.5	3.8
Mean	639.15	17.1	23.3	-----	13.2	-----	24.4	-----	11.2	-----	71.4	10.3	11	56.1	6	3.3
Total	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	185	101.4

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. ^d	Total movement.	Maximum hourly velocity.	Direction at the time of maximum velocity.		Form and direction.				
						Upper.	Lower.			
1	E	621.4	58.5	E	0-10	A-Cu.	Cu. SE	h. m.	mm.	☉ a. ≡ p.
2	E	313.1	24.9	E	4.6	Ci.	Cu.-N. SE, W	4 40	-----	☉ a. ≡ p.
3	E	289.6	19	W	4.1	Ci.	Cu. SE	5 30	-----	☉ a. ≡ p.
4	E	341	26.4	E	5.3	Ci.	Cu. SE, E	4 45	2.5	☉ a. ≡ 2 p.
5	E	388.9	24.4	E	7.4	A.-Cu.	cu.-N. E quad.	1 15	-----	☉ a. ≡ p.
6	E	618.3	40.2	E	2.7	A.-Cu.	SSW	5 05	-----	☉ a. ≡ p.
7	E	712.7	46.7	E	7	Ci.	Cu. SE, ESE	7 20	-----	☉ a. ≡ p.
8	E	535.8	32.5	E	3	Ci.	Cu.	8 30	-----	☉ a. ≡ p.
9	E, SW	354.6	28.4	E	4	Ci.	Cu.-N.	5 40	-----	☉ a. ≡ p.
10	E	350	26.9	SW	1.4	Ci.	Cu. SSE, E	6 45	-----	☉ a. ≡ p.
11	E, SW	288.3	24.1	SW	0.4	Ci.	Cu. NW, WNW	8 35	-----	☉ a. ≡ p.
12	NW quad.	*303.3	27.4	W	0	Ci.	Cu. NW	8 15	-----	☉ a. ≡ p.
13	-----	-----	-----	-----	0	Ci.	Cu.	8 25	-----	☉ a. ≡ p.
14	SE, E	343.4	24.7	W	3.6	Ci.	Cu.-N.	6 00	-----	☉ a. ≡ p.
15	E, SE	328.1	24.6	SE	5.1	Ci.	Cu.	3 05	-----	☉ a. ≡ p.
16	E quad.	287.3	20.6	SW, W	3.6	-----	Cu. ESE	5 30	-----	☉ a. ≡ p.
17	E, W	250	25.2	W	3.9	-----	Cu. SE	5 10	-----	☉ a. ≡ p.
18	E quad.	258.3	23	W	4.1	A.-Cu.	Cu. NE	3 40	-----	☉ a. ≡ p.
19	Variable	264.8	22	W	5.6	-----	Cu. S, SE	3 10	-----	☉ a. ≡ p.
20	E	*334.9	25.1	E	4.7	-----	Cu. NE	3 10	-----	☉ a. ≡ p.
21	-----	-----	-----	-----	2.7	Ci.	cu.-N. SE, E, W	2 25	-----	☉ a. ≡ p.
22	E quad.	298.8	23.1	SW	3.7	Ci.	Cu. ESE	7 00	-----	☉ a. ≡ p.
23	E	383.3	25.1	E	0	-----	Cu. SE	6 25	-----	☉ a. ≡ p.
24	E	324	21.9	E	0	Ci.	Cu.	8 55	-----	☉ a. ≡ p.
25	Variable	282.4	22.5	SE	0.6	Ci.	Cu.	9 10	-----	☉ a. ≡ p.
26	SW, E	287.6	19.6	SW	0	Ci.	Cu.	8 10	-----	☉ a. ≡ p.
27	S quad.	274.4	20.3	E	0	Ci.	Cu.	7 45	-----	☉ a. ≡ p.
28	E	520.5	44.3	SE	2	Ci.	Cu.	8 35	-----	☉ a. ≡ p.
29	E, SE	462.8	35.1	SE	2.4	Ci.	Cu.	7 20	-----	☉ a. ≡ p.
30	E	415.2	30.3	E	0	Ci.	Cu. SE	6 55	-----	☉ a. ≡ p.
31	E, SE	389.8	27.6	W	0	Ci.	Cu. NW	8 25	-----	☉ a. ≡ p.
Mean	-----	373.2	28.1	-----	2.4	-----	-----	6 21	-----	-----
Total	-----	-----	-----	-----	-----	-----	-----	196 45	2.5	-----

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
 b The barometric readings of this station are not reduced to sea level.
 c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
 d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.
 e 2 hours missing.
 f 1 hour missing.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, JANUARY, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo	15	16.3														
La Union, Davao ^a	1	1	2.3	2.8	4.6	6.6	3.1	3.8				7.9				
Isabela, Basilan	1	.5			.5		5.3									
Basilan Plantation, Isabela (Basilan) Office ^a							7.6									
Zamboanga				1.5	3		2.3									
Davao	2.3	.8		2.5												
Sirib, Guianga, Davao ^a	3				10.9											
Cotabato	1.5	39.4		5.1	13		.8									
Moncayo, Davao ^a								25.7								
Camp Keithley, Lanao	5.3	19.8	.6		14.7			.6		1.1			0.5			0.3
Cagayan, Misamis		11.4			13.7											
Dapitan		18.8	1.5		8.6	1.3					2.3					6.9
Butuan	7.4	15.8	.3	.3	18.5	2.8	2.3	3		6.4	.6					.8
Mambajao	7.9				9.4		8.9			5.1						9.4
Dumaguete	5.3				10.4	1.5	3									
Yap, Western Carolines	1.6		6.6	4.3	5.6	2.6	1.3	4.1							5.1	10.2
Tagbilaran	2.5	1.8			7.2					6.1	.3					13.3
Iwahig																15.7
Surigao	11	.3	2	.3	10.6	10.7	7.9			17.1		5.6				13.3
Maaasin						8.6	5.6			11.2						
Cebu			3.3		64.8	.4	3.1									2.8
Hacienda Vallehermoso, Oriental Negros ^a		6.4			25.4	14.7	.3									3.3
La Carlota, Occidental Negros ^a	.5				7.9		.3					6.4				
Hacienda San Antonio, Occidental Negros ^a		18.3			12.4											
San Carlos, Occidental Negros ^a	1			17.8	4.8	1						1			.5	
Hacienda Refugio, Occidental Negros ^a			29.2	15.2		4.1										
Iloilo					9.7											4.8
San Jose Buenavista																
Cuyo																
Lucena, Iloilo ^a																
Ormoc	3.8		1.3	.8	3.3	2.8	1.5				.8				.5	
Guiuan	9.4	1.8	1.3	1	28.2	29.5	9.9	1	7.4	7.4		.8			11.9	1.5
Dueñas, Iloilo ^a			2.5				1.5									
Bitagan, Iloilo (Railroad Iloilo to Capiz) ^a	3.6	2		3.8												
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	.5				20.3		.5	.6								7.2
Tacloban	18.1			2.3	17.3	2.8	10	6.6		6.1		12.7			2.8	1
Dumarao, Capiz ^a		5.1		2.5	17.8	5.1										
Dao, Capiz ^a	33	1.3	2.5			5.1	5.1									
Capiz		.5		1.3		1.5	2			.3						
Borongan	48	1.5	2.3	7.6	21.8	5.6	23.1	3.5	1.3	13.7	2.8				5.8	6.4
Catbalogan	3.3		1	3.6			5.6	3		9.4	1	5.1				
Calbayog	2.6	1	6.4	6.8	.8	.5	1.8	1		.5		3.6				
Mashate	4.9	4.6	11.4	3.8	1.5	4.6	2.5								3.6	.3
San Jose Estate, J. Abello D-13, Mindoro ^a																
San Jose Estate, Tamaraw Plantation, Mindoro ^a																
San Jose Estate, San Agustin, Mindoro ^a																
San Jose, Mindoro ^a																
San Jose Estate, Tunnel D-12, Mindoro ^a																
Romblon		6.9		3.8						2						.8
Batag		10.2	13	7.9		9.4	5.3			2						5.6
Sorsogon		44.2	53.1	24.1	25.7	10.9	14.4	2.3								4.8
Legaspi	3.5	2.6	4.3	30.9	.8	2.5	3.8	1.8	1.5							3.1
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a,b}	5.1	10.2	16.8	14	20.3	15.2	11.4									7.6
Sumay, Guam					4.6	3.8	6.3					6.4	7.6			
Calapan																
Virac		8.6	1	21.1	4.8	3.3	3.8	11.9	1.5			13.2			4.1	
Naga	.1	4.3	7.6	5		1.4										
Tigaon		5.6	3	18.5	.5	8.9		8.4	4.6			.5				
Batangas			10.9	7.3												
Lucena			18.3	21.1	1.6	5.1	3.3	18.8						3		
Atimonan			34.9	22.1	2.6	8.6	1.5	3.3								
Ambulong, Tanauan				1.5												
Canlubang, Calamba			4.8	2	5.8	.5		2.3							2	8
Peracale	14.2	3.3		.5	50	49.4	16.7	13.2	.5					1.3	8.1	.8
San a Cruz, Laguna	8.4		11.7	4.1	5.8		.3	4.4	5.1					4.3	2.8	.8
Fort Mills, Corregidor ^{a,c}				2.5	.5										1	8.1
Alabang, Rizal ^a			8.9	3	.8	1		.3								4.6
Lamao, Bataan ^a																2.5
Manila		.8		3.6	.2											
Antipolo		8.9	7	3.8	1.3			1.3								
Bosoboso, Rizal ^a			1.8	.5	5.1											
Montalban, Rizal ^a				21.6	6.6	3.8										
Hacienda Pintong Sapang, San Jose, Bulacan ^a																
Mabayuan, Dam, Olongapo, Zambales ^a			10.9		17.5	3.8	9.7									

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 8 a. m.^c Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, January, 1919—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Iba	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
San Isidro	.5				1.6											
Hacienda Luisita, Comillas, Tarlac ^a																
Hacienda Luisita, San Miguel, Tarlac ^a																
Tarlac																
Baler				5.6	59.4	.8	38.8	27.1	18.3							
Paniqui, Tarlac ^a			.3										14.2	1.3	10.2	
C. L. A. S. Muñoz, Nueva Ecija ^a				1.3												
Dagupan					1.3											
Bolinao																
Baguio				2.5												
San Fernando, Union					20.6											
Echagüe		3.3	2.1	5.1	13.3		4.3							.1		
Sagada, Mountain Province ^a								2								
Bontoc, Mountain Province ^a																
Candon																
Villavieja, Pilar, Abra ^a																
Vigan																
Tuguegarao				3.3					87.1							10.2
Laog																
Aparri		4.8	13.2	28.4	29									4.5	7.1	
Cape Bojeador																
Santo Domingo, Batanes	.5	13	16.5	3.6						4.8			3.8			10.5

^a Voluntary or coöperative station.

Daily rainfall at the stations of the Weather Bureau, January, 1919—Continued.

Station.	Day of month.															Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Jolo																4.1
La Union, Davao ^a		1.8														39.2
Isabela, Basilan					0.8		0.8								0.5	8.4
Basilan Plantation, Isabela (Basilan) Office ^a																7.6
Zamboanga					5.1	5.3		1							1.5	17.8
Davao	5.1			1.5	5.6				2.5							28.3
Sirib, Guianga, Davao ^a								18.8						19.8		52
Cotabato				1		9.4		7.4								86.2
Moncayo, Davao ^a						50.8				9.4						96.6
Camp Keithley, Lanao	3.8	4.3	2		31	12.3	.5	24.9						10.7	1.3	124.3
Cagayan, Misamis					20.8											45.9
Dapitan	7.3	2.5	1.3	7.6	13.5	7.4	6.9	4.3			2.5					37.3
Butuan	2.5	.8		.3	50	22.1	7.4	1.3	.3	.6	1.3	0.5	1.3	3.8	.8	153
Mambajao	13	3.8	10.9	21.3	25.2	24.1	1.3				6.1			6.1	3	158.3
Dumaguete	2.3	1					1.3	2	.5					11.9		27.3
Yap, Western Carolines		1.3	.5		3.6	.5		1.8	2.3			6.1	.5	1.5	3.3	63.6
Tagbilaran	.3				1		2.6	5.9	1	.8				.3		41.4
Iwahig																15.7
Surigao	28.4	.8		16.3	41.3	60.5	13.2	9.7	4.4		6.1		2.5	25.5	3.1	290.6
Maasin							29.8	30.3								85.5
Cebu	1				.1		1	1.9	.3					.5		79.2
Hacienda Vallehermoso, Oriental Negros ^a					16.5			26.7								93.3
La Carlota, Occidental Negros ^a																15.1
Hacienda San Antonio, Occidental Negros ^a																30.7
San Carlos, Occidental Negros ^a							.5									26.6
Hacienda Refugio, Occidental Negros ^a																48.5
Iloilo																14.5
San Jose Buenavista																0
Cuyo																0
Lucena, Iloilo ^a																0
Ormoc	1							19	.5				.8			36.1
Guiuan	5.4	1.3		1		14	17.3	31.8	3.3				9.4	15.5	5.6	215.7
Dueñas, Iloilo ^a								3	11.7							18.7
Bitagan, Iloilo (Railroad Iloilo to Capiz) ^a					2.8											12.2
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a				1		2	2.5	28.6	3.5				4.6	1.3		29.7
Tacloban																123.2
Dumarao, Capiz ^a							2.5	1.3								30.5
Dao, Capiz ^a								1.3								50.8
Capiz				2.5	.3			1.3								9.7
Borongan			.8	1.8	2	6.6	12.7	39.1	5.3					6.4	2.5	220.6
Catbalogan				.8				1.6	1							35.4
Calbayog					.5			1	1.8							28.3
Masbate								4.8	2							44
San Jose, Estate, J. Abello D-13, Mindoro ^a																0
San Jose Estate, Tamaraw Plantation, Mindoro ^a																0
San Jose Estate, San Agustin, Mindoro ^a																0
San Jose, Mindoro ^a																0
San Jose Estate, Tunnel D-12, Mindoro ^a																0
Romblon								2.5	4.6			.6				21.2
Batag			10.4	3	2.8	3.6		2.3			4.1					79.6
Sorsogon			14.5	4.8	.5			.5	6.1		1.5			2.3	1.3	214.3
Legaspi			2.3	.8					2.3	2	1.1	.5		.3	3.3	65.4
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a,b}										3.8	2.5					106.9
Sumay, Guam							3.8					5.1			2.5	40.1
Calapan			7.6						1.8		.5	3.3				26.4
Virac									1		.5	.5		2		64.1
Naga			.8								.5					20.2
Tigaon			8.1								2	.3				59.9
Batangas																18.2
Lucena			1	6.9							.3					79.4
Atimonan			3								1.5					94.6
Ambulong, Tanauan			.8													4.8
Canlubang, Calamba			2.3	.3												27.4
Paracale			11.7	1.3				.5	.3	1.3	2	2.1		.3		199.6
Santa Cruz, Laguna			1.8	2.3												51.8
Fort Mills, Corregidor ^{a,c}																11.9
Alabang, Rizal ^a												1.1				20.7
Lamao, Bataan ^a												3.8				6.3
Manila												1.7				6.6
Antipolo												.5				23.4
Bosoboso, Rizal ^a												.5				7.9
Montalban, Rizal ^a												.5				32.8
Hacienda Pintong Sapang, San Jose, Bulacan ^a											1.8	.5				44.2
Mabayuan, Dam, Olongapo, Zambales ^a																5.1

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 8 a. m.^c Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, January, 1919—Continued.

Station.	Day of month.															Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.		
Iba.....	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
San Isidro.....																	0
Hacienda Luisita, Comillas, Tarlac ^a																	2.1
Hacienda Luisita, San Miguel Tarlac ^a																	0
Tarlac.....																	0
Baler.....	2.5	2	1		6.7							19	3.6				210.6
Paniqui, Tarlac ^a																	0.3
C. L. A. S. Muñoz, Nueva Ecija ^a																	1.3
Dagupan.....																	1.3
Bolinao.....																	0
Baguio.....																	2.5
San Fernando, Union.....																	20.6
Echague.....			1.6	2.5													32.3
Sagada, Mountain Province ^a																	2
Bontoc, Mountain Province ^a																	0
Candon.....																	0
Villavieja, Pilar, Abra ^a																	0
Vigan.....																	0
Tuguegarao.....																	100.6
Laoag.....																	0
Aparri.....			20.4	6.4								1					114.8
Cape Bojeador.....																	0
Santo Domingo, Batanes.....		21.6	12.2			22.4					10.4	5.3					124.6

^a Voluntary or cooperative station.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, JANUARY, 1919.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao. a		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	29.9	22.2	32.9	20.6	29.5	22.8	33.1	20.4	30	21.7	26.8	17	30.3	20.6	29.7	22
2	30	23.7	32.5	23.3	31.7	23.9	33.7	22.2	33.5	23.5	27.9	18	30.3	22.6	31.6	23.3
3	31.9	23.3	34.7	23.1	30.6	23.3	33.9	21.4	31.5	22.4	27.3	18.2	30.9	21.6	33	22.8
4	30	22.7	33.1	21.7	28.6	23.4	32.7	21.8	30.2	22	26.1	17.6	30.8	21	32.6	22.1
5	30.4	24	35.1	22.6	31.5	22.9	32.9	21.6	30.5	21.4	25.9	19	30.8	21.6	31.6	21.3
6	29.2	25.2	33.7	23.1	33	23.3	31.3	21.2	31.3	22.4	25.2	18.9	30.8	20.9	32.9	21.2
7	29.8	21.6	34.6	21.1	28.5	21.8	33.4	21.7	29.2	21.9	26.5	18.6	31	21.6	32.1	22.6
8	29.7	22.3	33.6	21.1	32.8	22	32.2	19.4	30.6	20.4	26.3	14.5	30.4	19.4	32.8	20.8
9	29.6	20.7	32.6	20.6	32	22.8	31.8	19	32.6	20.2	25.8	14	29.5	17.4	33	19.6
10	29	20.6	31.6	19.1	29.5	21.2	31.9	18.5	30	20.6	25	16.5	27.4	20.1	28.6	20.3
11	30.7	20.5	30.6	20.1	28.1	21.5	33.2	20	30.5	21.5	25.9	15.6	29.1	19.3	32.6	20.9
12	30.1	22.3	32.1	20.6	28.1	22.3	32.8	19	31.1	22.8	26.8	18	30.1	21.3	32.7	22
13	29.6	22	33.6	21.1	32	22.8	33.7	18.3	31.8	22.8	26.5	17	30.3	21	33.8	21.3
14	29.4	21.6	33.1	19.6	32.4	21.9	32.1	18	32.7	21	25.6	16	30.7	19.5	32.9	20.6
15	29.9	20.6	33.1	19.9	31.8	21.5	31.9	18	31.7	20.7	25.3	17.7	29.9	19	33.1	17.1
16	29.9	21.3	32.6	19.2	30.5	21.4	33.7	15.4	31.8	18.1	25.4	13	29.4	18.2	29.6	19.4
17	31	20.1	33.6	19.17	32	20.4	35.1	18.8	31.1	19.6	24.8	17.6	30	21.6	29.6	21.7
18	29.7	22.5	32.6	22.6	32.3	22.5	32.2	17.9	29.5	20.7	24.3	18	30.8	21.5	30.4	22.2
19	29.8	23.6	34.6	22.6	31.5	22.5	32.6	20.6	30.5	20.4	24.5	14.5	30.1	18.9	31.4	18.9
20	29.5	23	34.6	20.6	31.5	21.1	32.3	20.2	31.5	21.1	23.8	15.5	31	19.9	31.8	17.5
21	29.4	19.4	32.6	20.6	29.2	21.8	32.7	19.5	30.5	21.2	22.5	18	25.6	22.2	26	22
22	30.1	23	34.6	23.1	32.1	23.4	32.7	20.5	29.8	21.5	23.1	18.8	28.6	22.6	26.9	22
23	29.1	24.2	33.6	22.6	31.9	22	29.9	19.2	30.2	21.6	25.2	18.8	29.8	22.8	30.2	21.9
24	30.5	22.6	34.1	21.1	28.5	22.9	33.8	20	32.6	20.8	26.1	18.6	30	22.4	30.9	22.4
25	30.2	23.4	35.1	21.6	31.5	22.5	34.7	19	31.2	21	26.9	14.6	30.3	19.5	32.5	22.3
26	29.5	20.7	35.1	20.6	33	22.5	33.2	19	30.6	20.5	25.1	17.1	30.4	20	31.7	21.5
27	29.4	23	34.1	22.6	31.5	21.2	32.2	20.4	30.8	20.5	24.6	17	30.4	20.3	33	19.4
28	29.7	25.1	34.7	22.3	32.2	23.2	32	21	29.6	20.6	23.3	18	30.2	22.4	31.9	21.8
29	30.7	21.7	34.1	22.1	32.5	21.2	30.7	20.6	30.8	19.9	26.9	15.1	31.4	19.4	31.4	20
30	29.7	24.5	34.9	23.6	30.7	23.2	32.9	19.1	31.8	21.4	26.6	17.2	29.9	19.8	32.9	21.4
31	30.5	22.2	34.1	22.6	31.6	22.6	32.7	21.4	31.9	23	26.3	18.7	31.4	22.8	32.1	22.6
Mean	29.9	22.4	33.6	21.4	31.1	22.3	32.7	19.8	31	21.2	25.6	17	30.1	20.7	31.5	21.1

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	28.9	23.9	30.7	23.6	32.7	24.5	30.7	21.3	31.1	17.5?	29.5	24.3	31.4	21	30.1	24.1
2	29.4	23.8	30.6	23.5	32.1	24	31.8	22.9	32.5	19.3	29.8	25.2	32	21.5	31.5	24.7
3	29.5	25.5	28.9	25.3	32.2	25	32.2	22.5	32.5	19.9	30.3	25.7	32.9	21	29.9	25
4	28.9	24.8	30.2	24.6	31.8	23.7	32.5	22.2	31.8	19.9	29.7	24.9	32.8	21.6	31	24.4
5	27.6	24.3	30.4	23.8	32	24.5	30.5	21.4	31.6	19.3	28	24.4	32.4	21.5	28.8	22.9
6	29.4	22.8	28.2	22	31.2	23.6	31	21.1	31.4	18.9	29	23.6	33	21	28.6	22.9
7	28.6	23.5	27.5	23.2	31.7	23.5	30.1	22.3	31	20.1	28.6	24.8	32	21.5	28.2	23.8
8	29.1	22.3	28.3	24.7	30.9	23.6	32	20.6	31.1	18.9	29	23.7	31.7	19.6	28.7	23.7
9	28.9	22.1	29.9	22.5	31.2	23.5	30.7	20.3	30.9	18.4	29.5	22.7	31.9	20	30.7	23.6
10	26.4	22.6	30.4	21.8	31.9	23	29.7	21	31.3	16.5	27.3	22.8	30.6	20.5	30.1	23
11	29	21.8	29.4	23.6	32.8	23.4	29.7	20.3	30.3	16.9	29.5	22.3	31.4	20.2	30.5	23.6
12	29.4	22.5	29.3	22.6	32.8	23.3	30.7	21.1	31.6	18.3	29.2	22.7	31.5	19	30.2	23.9
13	29.5	22.3	28.6	22.5	32.4	23	30	20	31.1	17.5	29.4	21.4	31.5	20.2	29.5	23.7
14	28.7	23.6	28.7	23.2	32.7	23	31.3	19.5	30.7	15.9	28	21.6	31.9	18.4	28.9	22.7
15	28.9	21.5	28.4	20.3	32.2	23.9	30	17	30.8	15.3	29.3	20.2	31	18.8	29.8	21.7
16	28	23.6	28.8	21.8	31.2	23.3	26.7	19.6	30.8	15.9	27.8	22.4	31.4	20.8	28.6	22.9
17	25.4	22.4	28.3	23	31.9	22.7	29.2	22.2	30.3	20.3	25.9	22.6	30.4	20.2	28.6	23
18	27.4	22	29.3	22.2	31.7	24.8	31.2	20.1	30.8	18.4	28.1	22.4	32.1	20.8	29.4	23.7
19	29	22.5	29.4	21.9	32.5	23.6	31.1	19.5	31.1	16.2	29.5	21	31	21.3	29.5	23
20	29	21.8	29.7	20.5	32.7	24.3	30.2	18.3	30.4	15.6?	28.1	19.2	29.5	18.2	29.6	21.9
21	24.5	22.4	27.4	24.2	31.5	24.7	27.6	21.2	30.4	16.9	25.6	22.8	29	18.8?	28.6	24.3
22	25.1	21.9	29.3	23.7	31.8	23	30.6	21	31.2	19.8	26	23.1	30	21.2	30.3	23.2
23	28	22.3	29.1	23.5	31.8	23.3	28.2	22.2	30.6	16.5?	27.3	22.6	29.9	20.8	28.1	23.5
24	28.4	24	28	23.3	31.5	24.4	28	22.5	31.6	20.4	28.7	23.5	31.5	21.5	26.7	23.9
25	29.3	24.3	29.4	23.3	32.5	23.4	30.2	21.8	32.1	20.9	29.5	23	31.8	21.5	29.3	23.3
26	28.9	24.5	28	24.3	31.7	23.2	31.1	21.4	31.6	20.6	28	25.1	31.9	21.8	29.6	23.4
27	28.9	24.4	28.4	23.5	32.7	24	31.2	20.8	30.6	15.7	27.8	23.7	32	21	29.2	22.8
28	27.9	22.3	28	24.4	32.4	24	32.2	20.1	32.2	15.5	28	23.5	32.2	21.4	29.5	23.1
29	28.4	23.8	30	23.4	31.8	23.5	31.1	20.3	31.3	15.5?	28.7	24.5	32.6	21	29.4	23.4
30	29.1	22.5	30.4	23	33.1	23	29.5	22.8	31.3	16.2	29.8	22.6	32	22	29.4	22.6
31	28.7	22.8	28.2	23.9	32.9	24.2	29.8	20.3	31.3	15.9	29.1	22.3	32.1	21.9	29.3	24.1
Mean	28.3	23.1	29.1	23.1	32.1	23.7	30.3	20.9	31.2	17.8	28.5	23.1	31.5	20.6	29.4	23.4

* The minimum temperatures of this station seem to be too low of about 1.2 °C.

Maximum and minimum temperatures at the stations of the Weather Bureau, January, 1919—Continued.

Day.	Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.2	23.3	31.7	20.1	30.4	24.6	32.1	19.17	31.5	24.8	31.7	23.2	30.7	23.9	30.4	23.9
2	31	24.2	32.3	22.6	29.7	25.9	31.8	22.8	30.9	23.5	32.4	23.5	30.4	25	30.5	24
3	31	24.2	32.7	21.6	29.1	25.6	32	22.9	30.1	24.2	32	23.1	31.2	24.8	30.1	22.8
4	30.8	23.8	32.7	21.8	28.8	25.3	32.6	21.4	30.2	24.8	32	23	30.6	24.5	30.5	23
5	29.8	23.3	32.7	19.1	30.2	25	31.4	21.8	31	23.8	31	22.5	30.2	23.7	30.1	23.2
6	29.4	22	33.4	21.6	29.3	25.6	31.6	22.7	31.3	23.8	31.8	21.7	29.8	24.6	30.1	23.2
7	30.3	23.7	34.7	20.5	29.3	25.1	31.7	23.5	30.3	22.8	30.7	23.5	30	24.3	29.6	23.7
8	30.2	23.3	32.2	21	29.4	25.5	32	21.4	30.7	23.4	31.7	22.8	30	22.8	30	23
9	30.5	22.9	31.6	19	29.4	24.4	31.8	20.3	31.2	21.9	31	22.2	30.2	21.5	30	21.9
10	30.2	22.6	31.7	19.5	29.3	24.7	31.7	20.6	29.1	23.1	28.6	23	30.5	21.8	28.6	22.8
11	30.9	23.7	31.7	21.1	29.6	25.2	31.6	20.8	31.1	21.7	31.5	22.7	30.8	23.7	30	22.8
12	31.3	23.2	31.7	21.1	29.8	25.2	31.9	20	31.3	21.2	31	22.7	31.7	22.6	30.1	22.4
13	29.9	21.8	31.2	18.5	30.5	24.7	32	19.7	31.1	21.1	31.7	22.4	31	21.9	30	20.5
14	29.4	21.7	31.2	17.3	29.8	24.1	31.8	18.3	30.3	23.1	31.3	19.9	30	21.5	29.8	18.9
15	30.2	21.2	31.2	16.9	30.4	20.7	31.4	17.6	30.4	19.7	31.7	19.6	30.5	20.7	30	18.8
16	29.1	21.3	30.3	18.7	29.4	24.2	30.7	17.97	30.9	22.3	29.5	22.7	30.3	21.9	29.1	21.5
17	29.3	22.9	33	19.9	30	25.7	31.8	21.6	29	24.8	31.1	23.7	30.5	23.4	29.7	22.2
18	29.5	22.7	33.7	19.4	29.3	25.2	32.1	20.4	30.7	23.2	31.8	23	30.5	23.4	30.3	24.7
19	29.3	21.7	31.7	16.7	28.8	24.3	31.8	18.6	29.6	24.4	31.5	21.5	30.4	22.2	30	21
20	29	21.5	33.2	16.7	29.4	24.1	30.9	18.8	30.5	24.4	30	21.4	29.5	22.2	29.5	23.5
21	29.2	22.7	32.2	19	28.7	25	31	20.8	29.9	24	30.3	24.3	30.2	23.5	29.7	24.5
22	28.8	22.2	32.7	20.4	28.7	25	31.8	21.8	30.3	25	31.5	23.4	30.6	23.3	29.5	24
23	27.9	22.4	31.3	19	28.1	24.2	30.2	21.9	29.2	23.1	28.5	22.5	28.8	23.5	28.1	22.5
24	28.7	23.5	32.2	20.9	28.9	25.2	29.5	22.9	28	23.1	27.8	23	30.6	24.2	28	23.7
25	31.4	23.5	32.7	22.6	28.9	25.2	32.7	22	30	22.7	30	22.6	30.8	24.3	30.1	24
26	29.7	21.3	34.7	21.5	28.9	25.4	32.8	22.3	29.9	24.9	30.7	21.2	30.4	22.9	29.6	24.7
27	30.1	21	32.2	18.5	28.6	23.9	32	18.9	30.4	24.4	32.5	20.4	30.4	20.6	30.1	20
28	30.3	22.1	32.9	19	28.9	24.7	32.2	19.4	30.7	23.6	31	21.1	30.9	23.6	30	23.6
29	30.4	21.2	33.7	17.5	29.2	21.2	32.2	20.9	30.4	24.8	33.5	21.3	30.8	21.5	30.3	25
30	30.4	21.7	31.7	19	28.9	23.7	31.6	22	30.6	22.4	32	22.6	30.8	23.2	30.5	25.2
31	30.5	21.9	32.2	18.8	29.4	24.3	32.2	22.9	30.9	23.5	31.8	22.5	29.5	22.5	30.1	24.2
Mean	30	22.5	32.4	19.7	29.3	24.6	31.7	20.8	30.4	23.3	31.1	22.4	30.4	23	29.8	22.9

Day.	Catbalogan.		Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.5	22.3	31.6	22.3	29.6	23	30.4	22.9	29.6	23.2					29.4	24.6
2	30.5	23	29.5	23.6	29.3	25	30.4	24.3	29.3	23.6	29.6				29.6	24.4
3	31.1	21.7	29.8	23.6	29.8	24	30.1	24.6	29.7	23.4	23.2				29.6	24.6
4	30.7	21.7	28.8	22.8	27.6	23.8	29.5	24.2	29.3	22.5	26.8				29	23.8
5	30.5	20.5	30.4	21.8	30	23.8	30	23.4	29.4	23	29				28.6	24.4
6	30.6	23.6	30.8	23.1	29	25.5	30.9	24	28.5	23	28.7				28.2	24.6
7	30.3	24.5	30.1	23.6	30	24	29.8	24.1	28.2	23.2	28.5			30.8	24.3	27.6
8	30.7	21.9	31.9	22.2	30	23.6	29.9	24.2	29.4	24	29.8			30.1	23.8	27.8
9	29.5	20	29.2	21	30	23	30.6	23.2	30	23	30.6			30.3	24.1	29
10	29.5	19	31	20.9	29	22.2	30.5	21	29.9	23	29.6			30.8	20.6	29.4
11	29.7	21	29.1	22.7	30.6	23.2	30.4	21.7	30	23.6	30.5			30.8	22.7	29.2
12	29.9	19.7	29.9	21.6	30.6	23.4	31.1	22.2	31.6	22.6	30.5			31	21.5	28.6
13	29.6	18.9	31.2	19.6	29.6	23.2	30.3	20.3	29.6	23	30.6			30.4	21.1	29.2
14	30.5	17.3	28.1	18.3	29	22	30.5	21.9	30.1	22	29.1			30.4	24	29.4
15	28.8	17.7	28.4	18.7	29.8	22.8	30.5	22.2	30.4	23	29.5			30.8	20.9	28.6
16	30.7	22	30.8	22.7	29.6	22.2	30.6	21.8	29.5	22	29			30.4	23.2	28.4
17	30.2	18.7	30.5	20	30	23.2	30.8	23.8	29.2	23	29.6			21	29.8	23.2
18	31.5	18	31.9	19	29.6	23.6	30.9	23.7	30.1	23	29.5			30.5	24.5	28.4
19	30.6	17.5	30.9	19.8	29.8	22.8	30.4	21.8	29.9	23.3	29.6			30.6	23.5	27.6
20	30.4	18.4	30.3	20.5	30	22.6	29.9	22	28.8	23	29.9			28.4	23.1	29
21	30	21	30	21.6	29.6	24.2	30.5	23.3	27.9	23	28.8			22.5	28.9	24.1
22	30.7	20.7	30.1	20.7	29.8	23.4	30.1	23.4	28.8	22.5	28.6			28.8	23.7	28.2
23	29.7	19.3	30.3	22.4	30	23.8	30.9	22.7	29.8	22.8	29.4			22	29.4	23.9
24	30.8	21.5	30.1	23.4	30.6	24.8	31.3	24	29.1	23.5	29.2			30.3	25.1	28.6
25	30	21.5	31.3	21.7	28.8	23.8	30.4	23.3	28.8	23.6	28.5			29.4	24.8	28.4
26	30.4	22.6	30.3	19.7	29.6	23.6	30.9	23.9	29.1	23	29.5			29.9	24.4	29.4
27	31.5	17.5	32.2	18.1	29.6	22.4	31	21.3	29.9	23.2	29.5			30.6	24.5	29.4
28	31	18	31.1	19.7	29	23	30.8	23.3	29.4	23	30.5			28.3	23.1	28.4
29	31.9	19.7	31.3	19.7	30	22.2	30.6	23.1	29.6	22.9	31.5			30.8	24.6	28
30	30.5	19.4	31	19.4	29.8	22.2	31.3	21	30.2	23	29.5			18.6	29.9	28.8
31	31.8	19.8	30.9	20.6	30	22	30.6	21.2	30	23.2	29.7			30.8	24.4	29.4
Mean	30.5	20.3	30.4	21.1	29.7	23.3	30.5	22.8	29.5	23	29.5	21.8	30.1	23.3	28.8	23.7

Maximum and minimum temperatures at the stations of the Weather Bureau, January, 1919—Continued.

Day.	Calapan.		Virac.		Naga. ^a		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1			30	22	31.5	18.6	30	21.2	32.6	22.2	29.2	22.5	30	27.8	30.2	22.6
2			31.4	21	31	20.2	31.5	20.7	32.2	22.2	29.2	23.1	27.2	24.1	30.4	23.4
3			30.6	21.5	31	21.5	30.4	22.6	31	22.2	28.8	24.1	26.8	23.4	30.2	23.5
4			26.9	21.6	29.1	19	29.1	21.2	30.3	22.6	27.5	23.1	26.8	23.6	29.2	23.3
5			30.5	21.7	32.4	18.8	30.6	20.4	30.8	22.6	28.7	23.1	28.1	24.2	29.3	23
6			30	21.5	29.1	19.1	29.7	21.1	28.8	22.6	27.5	22.5	26	22.7	26.7	22
7			30.2	22	32	20	30.3	22.1	29.2		27.5	22.1	26.6	23.4	27.8	22
8			29.9	22.3	32	19.2	29.5	23.5 ⁵	31.6	22	28.6	21.4	27.8	24.1	28	22
9			31	22.6	31.1	18.8 ⁷	30.4	23	31.3	21.8	29.2	22.4	29.6	21.9	30.7	22.7
10			31.7	19.2	30.6	16	30.4	17.6	31.1	20.9	29.6	20.9	28.9	22.9	31.3	21.3
11			31.3	20	31.5	17	31.2	20	32.1	19.7	30	20.4	28.8	21.4	31.1	20.8
12			31	19.3	33.1	17.9	31.1	18.4	30.8	19.2	30	19.8	30.1	20.9	31.9	20.8
13	30.4	19.5	30	18.9	31.4	17.2	30.7	18.1	30.7	19.5	29.7	19.5	29.2	20.5	32.3	20.9
14	29.5	20	30.4	18.5	31.1	15.9	30.6	17.9	28.4	19	28	20.1	29.3	22.1	29	20.4
15	30.5	21.5	31	19.2	31	16.1	31.3	17.6	32	20.4	30.5	19.9	29.8	22.1	31.2	21.1
16	30.5	23.5	31.5	21.6	33.3	19.5	30.5	20.8	32	22.9	29.6	22.9	29.8	23.2	32.3	23.3
17	29.1	23.4	30.9	19	30.7	15.7	31	17.6	31.3	19.8	29	20	28.2	24.7	30.8	22.3
18	30.5	20.5	30.6	18.5	32.1	14.4	31	17.1	31.3	19	29	19.9	28.1	24.6	30.7	19.9
19	30.1	20.2	31.2	18.6	32.1	13.7	30.2	16.7	30.8	18.3	28.5	20.5	28.1	22.8	30.8	21.4
20	29.5	20	30	20.5	29.2	18.5 ⁷	31.6	19.1	30.5		28.7	20.6	27.6	23.2	27.6	21.5
21	30	23.5	30.6	20.5	29.7	20	30.3	20.4	31	20.4	28.4	20	27.2	24.2	29.4	21.4
22	29.5	22	30.6	20.2	29.1	15.4	29.9	18.7	30.7	19.8	29.2	19	27.8	24	29.9	19.6
23	30.2	21.5	30.9	19.6	29.5	15.4	31	18.2	31	18	28.4	17.6	27.2	24.1	29.9	19.4
24	29.7	22	31.3	20.5	31.3	16.9 ⁷	31.1	17.8	31.8	19.2	29.4	19.6	28.5	24.5	30.9	21
25	29.9	22.5	31.5	21.1	30.5	17.2 ⁷	30.9	18.1	32.8	19.5	29.3	22.4	28.1	24.6	32.2	21.5
26	29.8	24	31	20.5 ⁷	31	17.2	31	18.2	31.8	19.3	28.6	21.4	27.8	24.4	30.2	21.4
27	30	21	31.7	20.4	29.9	16.3	31.1	19.4	31.5	19.3	29.3	19	27.6	24.2	30.3	19.8
28		21.5	29.9	21.7	31.5	18.9	29.7	20.8	31.6	19.7	29.2	22	29.2	23.8	30	20.7
29		22.2	31	21.3	32.6	16.5	30.1	18.1	32	22.2	29.5	20.4	29.9	21	31.7	21.8
30	28.4	19	30.5	18.4	29.9	13	30.1	15.6	32.8	18.8	30.5	19	29.2	18.8	31.9	20.2
31	29.5	19.5	30.5	19	32.1	16	30.5	17.2	32.6	19.5	30	19.9	29.9	21.7	34.2	18.4
Mean	29.8	21.4	30.6	20.4	31	17.4	30.5	19.3	31.2	20.4	29.1	20.9	28.3	23.1	30.3	21.4

Day.	Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31	21.6	28.5	24.8	29.6	22.5	30.6	20.5	32.2	20.4	31.4	20.9	31.1	22	33	20.4
2	31.1	21.2	29.6	24.5	29.6	22.1	31.8	22.6	31.2	21.3	33.4	20.1	33.1	20.9	35.4	18.8
3	31.2	21.4	27	24.5	29.2	23.4	30.8	21.2	32.8	20.4	31.5	20.6	32	22	32.6	21.8
4	30.5	22.1	28.2	23.8	28.2	22.9	30	22.5	30.7	20.4	31.5	22.2	31.2	21.6	33.2	21.6
5	29.2	21.6	29.2	22	29.3	22.6	30.4	22.2	31.2	21.2	30.5	21.5	29.6	21.6	32	21.2
6	28.8	21	24.4	22.4	26.4	22.1	29.9	21.4	29.2	20.6	31.1	22.3	29.5	20.3	32.4	20.8
7	29	21.1	26.9	22.8	27.1	22.4	30.5	20.8	30.2	21.7	31.2	22.2	31	21.5	32.2	20.8
8	28.2	21.4	27.5	23.2	27.5	21.6	29.1	20.5	28.2	20	31.4	20	31.4	20.1	34.4	19.5
9	29	21.2	28.4	23	27.8	22	31.2	21.2	31.1	20	31.2	20.2	29.6	21.3	34.2	
10	30.6	19	28.6	21.7	30.4	19.9	31.7	19	31.7	18.8	30.8	19.6	33.9	19	35	18
11	30.1 ⁷	18.8	29	21.5	31	19.2	31.9	18.2	31.8	17.5	30.4	20.1	33	18.4	34.6	17.4
12	31	18.6	29.8	21.1	31.1	19.6	30	20.3	31.5	17.4	31.1	17.6	32.6	21	35	18
13	31.2	18.2	29.4	20.5	31.3	19.4	31	19	30.2	18.5	30.6	18	32	18	34.4	19.2
14	29	18.4	29	21.2	28.6	19.6	30.3	18.8	30.3	18.3	30.2	16.4	32.4	18.4	33.6	17
15	31.2	19.8	29.8	21	30.8	19.3	30.8	19	32.2	18.5	30.5	19.8	32.1	20	33.4	18.4
16	29	19.9	29.2	23.5	28.8	23	30.4	20.8	28.8	20	31.5	18.8	31.9	19.8	34	18.2
17	30.4	20.5	28.8	23	29.6	18.8	31.3	18	31.9	18.8	31.5	18.9	32.1	18.5	35.4	17.8
18	30.1	17.4	29	22	30.1	18.8	30.8	17.3	32	18	30.7	16.9	31.5	17.7	35	17.6
19	31.2	17.6	28.7	21	30	18.8	30.3	17.9	31.9	17.9	31.4	17.4	32.4	18.2	34.2	17.2
20	29.3	17.5 ⁷	27.5	22	28	21.6	30.2	19	29.7	18.6	31.3	18	30.2	20.4	32.6	18.3
21	30.4	20.5	28.5	24.3	29.3	21.1	29.5	20	30.7	19	31.5	21.1	29.6	19.5	31.2	17.8
22	30.9	17.4	28.8	24	29.6	20.8	31	17.8	30.7	17.7	31.4	18.5	30.9	17.8	34	18.2
23	30.5	16.8	28.5	23.6	29.1	17.3	31	16.4	31.3	17.2	30.9	16.4	30.9	16.6	33.6	16.2
24	30.4	16.9	29.1	23	30.3	18.1	32	16.3	32	17.5	31.4	16.4	32.4	15.8	34	15.2
25	31.4	16.7	28.9	21.1	31.1	19.5	31	18.4	33.4	18	32.3	15.9	33.5	17	34.8	16.4
26	31.6	16.7 ⁷	28.8	24.4	30.3	19.4	32.7	18.3	33.5	18.8	33.4	17	31	18	34.2	16.6
27	32	16.8 ⁷	28.7	24.1	30.1	19.1	31.3	17.6	32.2	16.7	30.5	16.5	32	16.4	33.3	16.2
28	30.4	16.9	28.6	23	30	19.4	28.3	17.9	30.7	17.9	30.8	16	31.2	16.8	33.8	16
29	31.9	16.8 ⁷	29.5	20.9	31	21.6	30.5	19.6	30.8	18.9	30.9	18.2	31	19.5	33.5	18.2
30	32	16.9	29.7	18.9	30.7	18.2	31.2	16.6	32.2	17.7	30.6	18	33.9	17	34.2	16
31	31.9	16.8	29.9	20.3	31.8	19.6	32.5	16.5	33.2	16.9	30.8	14.7	33.5	15.4	34.6	14
Mean	30.5	19	28.6	22.5	29.6	20.4	30.8	19.2	31.3	18.9	31.2	18.7	31.7	19	33.8	18.1

^a The minimum temperatures of this Station seem to be too low of about 1.4°C.

Maximum and minimum temperatures at the stations of the Weather Bureau, January, 1919—Cont.

Day.	Baler.		Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echagüe.		Candon.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	29.5	22.2	34.5	22	30	21.9	24.5	14.8	30.5	21	31.1	20.1	31.5	22.5
2	29.8	20.6	31.1	21	29.8	26	24.3	13.5	31	22.6	30.4	18.8	32	23
3	30	24.2	31.6	22.8	29.8	25.7	23.4	14.7	30.8	21.4	28.9	21	32	23
4	29.7	21.7	30.4	22.2	28.3	25.1	24.1	14.5	30.7	22.8	28.6	21	31.6	21.5
5	28.7	21.9	33.2	21.8	31.2	21.4	22.4	14.5	31	22.5	24.4	20.5	31.7	22.5
6	29.5	20.7	32.7	21.8	32.2	22.7	22.3	13.3	29.9	22.6	24.2	18	32	22.5
7	28.6	21	34.2	21.8	30.6	22.4	21.7	13.4	30	19.9	27.4	19	31.7	21.5
8	27.9	22.5	33.1	20.8	32	20.4	24.9	14.5	30	20.6	29.5	19.1	31.5	21.5
9	26.7	21	31.8	20.1	31.3	20.7	23.8	14.7	30.2	20.5	31.2	20.3	31	22
10	29.3	19.3	35.6	20.8	31.5	21.2	24.9	13.6	31.5	20.1	32.7	19.5	32	21
11	29.5	18.4	33.1	20.8	32	21.4	24.3	14.2	30.5	20.2	32.2	17.5	31.5	20.5
12	29.5	18.5	30.5	20.3	29.4	20.4	23.9	13.5	29.9	18.6	30.5	18.8	31.4	20.2
13	30	19	29.5	17.9	28.8	20.5	23.6	13.5	29.5	16.3	30.3	19.3	31.4	18.3
14	28.5	20	33.4	18.9	31	19.4	22.9	13.1	30.4	18.4	28.2	18	31	20
15	29.3	21.2	30.4	20.2	30.5	20.3	21.5	14.3	28.2	19.6	31.7	21	31.5	20.5
16	29.5	21.7	31.9	21	31.2	23	23.1	13.1	30.5	19.5	32.2	19	31	21
17	29.3	19.9	33.4	20	31.5	22.3	23.2	13.2	30.7	19	30.1	18.6	31	22.2
18	28.4	20.2	33.6	19	30.9	20.5	22.4	12.6	29.9	18.4	31.3	17.3	32	21
19	29.3	19.1	32.5	19	30	23.4	21.6	12.6	28.2	19	27.9	17.7	32	22
20	27.7	21	30.9	20.1	30.5	19.4	20.4	12.2	29.1	19.6	26	19	31	21.5
21	26.7	21.7	31.3	21	31	21.5	22.8	12.2	29.3	19	29	18.8	31.4	20.9
22	29	20	32.7	18.8	31.4	20.1	21.8	11.7	29.4	18.1	30.5	18	30.7	19.5
23	28.4	19.7	33.7	20	31.9	19.8	23.3	11.4	29.3	17.1	30.1	16.2	31.6	20
24	28.5	18.5	33.8	16.3	29.9	19.5	24.1	13	31	15.6	31.3	13.8	31.4	20
25	29.2	18.1	32.7	17.8	32.1	18.8	23.2	11.8	30	17.2	30.7	15.1	31.2	18.5
26	30	18.5	33.6	18.9	32.2	19.5	22.4	12.4	31	18.2	29.5	14.8	31.5	18.5
27	29.6	19.9	30.9	19.7	31.7	19.6	22.3	11.3	30.5	18.7	30.5	15.9	30	20
28	29.3	19.7	30.9	17	29.4	20.1	24.4	11.2	31.4	17.5	30.9	17.7	31	20.5
29	28.1	21.7	34.9	20.8	32.2	20.5	25.4	13.2	30.6	18.1	31.7	18.7	31.1	20.6
30	29	17.8	32.2	20.3	29.8	20.2	23.8	13.3	31.1	20.1	32.3	17.3	31.2	21.7
31	28.9	15.8	34.5	17.6	31.3	19.5	25.3	13.9	30.4	17	32.8	16	31.1	20.5
Mean	28.9	20.2	32.6	20	30.8	21.2	23.3	13.2	30.2	19.3	29.9	18.3	31.4	20.9

Day.	Vigan.		Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes. a		Dapitan. a	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.8	22	31	19.7	32.1	19.7	31.2	20	30.8	22.6	27.7	22.4	29.8	22.2
2	30.2	23.1	30.6	20	32.1	23.2	29.6	19.5	27.4	22.8	19	30.4	22.2	22
3	29.7	21.2	29.1	21.6	32.1	22.4	25.1	21.5	24.6	20.6	21.6	19.5	30.2	22.5
4	29.5	20.4	29.8	21.3	32.4	21.3	24.8	21.2	24.6	20.4	21.2	17.2	30.3	24
5	30.8	21.1	26.7	19.9	29.9	18.7	22.8	19.2	23.2	20.2	24.3	20.4	30.4	23.5
6	32.5	24.3	25.6	18.5	31.4	20.6	23.5	18.4	24.2	19.4	24.7	20.4	30.3	24.3
7	31.9	22.9	27.5	19	33.4	17	25.3	18.5	27.6	20.2	24.1	20.4	29.5	24
8	31.3	21	31.1	20.4	31.6	19	30	19.8	29.4	22.2	23.2	20.7	30.4	23.5
9	30.3	21	33.2	20.2	31.1	19.1	31.5	20.4	29.8	23.2	28.9	24.3	30.4	24.4
10	31.8	21.2	32.2	21	31.5	18.1	29.4	19.8	29.8	22	29.4	20	30.7	21.4
11	31.3	20.6	31.6	21.1	30.8	18.4	30.1	18.8	29.4	22.6	27.8	20.8	30.6	23
12	29.3	19.9	31.1	21	30.1	18.3	29.8	21.1	28.4	21.8	26.6	23.3	31.3	23.2
13	30.4	18.4	30.3	18.7	31.1	16.1	29.1	19.6	27.6	21	24.8	20.8	31	22.5
14	30.4	21	26.1	19.3	33.7	17.3	26.7	21.5	26	21.4	25.5	20.8	29	23
15	30.8	20.4	31.8	20.8	32.1	19.1	29	21.3	28.4	21.6	28.2	23.7?	30.4	23.5
16	31.8	20.9	31.1	21.8	33.1	19.3	27.8	21.3	27.8	21.3	24.7	21.8	30.3	21.6
17	31.4	20.9	31	20.9	33	18.4	28.3	20.5	27.8	21.3	27	20.2	28.3	22.7
18	31.9	22.5	31.8	19.3	31.1	18.7	29.1	19	27.8	21.3	25.8	19.4	29	22.1
19	29.9	20	27	19.1	30.8	20	24.5	20	27.8	21.3	22.2	20.2	29.3	22.8
20	30	20	27.5	19.7	31.8	20.1	24.3	19.8	27.8	21.3	21.3	17.3	29.4	21
21	30	20.9	27.5	19	31.5	16.2	26.8	19.2	27.8	21.3	25.3	19.2	26.6	22.3
22	29.6	19.4	31.8	18.4	32.9	15.3	27.8	17.7	28	21.3	24.8	16.2	29.5	23.1
23	31.7	21	31	18.2	30.8	14.8	29.2	16.7	29.1	18.7	26.3	19.4	29.5	22.4
24	29.7	20.5	31.2	15.5	30.1	17.2	29.7	17.1	29.6	20.7	27.8	22.2	28.7	23.4
25	29.6	19.3	31.4	15.8	31	16.2	28.7	18.5	26.9	19.7	26.5	16.4	30	24.4
26	30.6	18.5	33.2	15.8	31.5	15.4	29.6	15.8	28.5	19.3	27	19	30.4	24.5
27	31.6	20.6	31.5	15.5	31.9	16	30.5	16.3	30.8	18.7	27.7	18.2	30	22.8
28	30.1	20.6	29.7	16	32.4	16.6	27.2	17.3	28.3	18.5	27	19	30.4	22.8
29	31.5	20.3	32.7	19	32	17.7	31.1	19.5	31.2	21.6	23	19	29.5	21.6
30	29.9	20.4	33.6	18.6	31.7	17.4	30.3	19.6	28.3	22.3	27.2	19	30.3	22.5
31	30.8	20.2	33	20.4	32.9	18.7	30.3	19.7	28.7	21.1	27.5?	19	29.6	23.1
Mean	30.7	20.8	30.4	19.2	31.7	18.4	28.2	19.3	28	20.9	25.8	20	29.9	22.9

a Received late.



SEISMOLOGICAL BULLETIN FOR JANUARY, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

1, 1^h 36^m 24^{s*} [1, 9^h 36^m 24^s]. **E. Mindanao.** Earthquake of intensity VII. It was very extensive, shaking the whole Island of Mindanao and the Visayan, Samar, Leyte, Cebu and Bohol. The intensity with which it was felt at Butuan and other towns of the northern portion of the Agusan Valley indicates that the epicenter lay either within the valley or near to the Pacific coast at about 9° latitude N. There followed four strong aftershocks of intensity III-IV during the next two hours. It was registered all over the world.

At 6^h 2^m 31^{s*} [14^h 2^m 31^s] occurred a second earthquake of intensity IV-V but of less extension: its origin apparently was located at a greater distance from Butuan and Manila. It was registered at Taihoku, Formosa.

The seismograph of the former station recorded thirty-two shocks during this day; the first occurred at 3^h 46^m (Insular Time) and was in correspondence with earthquake shocks felt at Davao, some 200 kilometers south of Butuan.

2, 22^h 26^m 56^{s*} [3, 6^h 26^m 56^s]. **Butuan (N Mindanao).** Earthquake of intensity II-III of distant origin, likely in the Ocean.

4, 2^h 35^m 24^{s*} [4, 10^h 35^m 24^s]. **NE Mindanao.** Earthquake of intensity IV, felt through the provinces of Surigao and Agusan. It apparently originated not far from the place of origin of the one felt on the first. It repeated with intensity III-IV at 14^h 20^m 18^{s*} [22^h 20^m 18^s].

5, 14^h 20^m [5, 22^h 20^m]. **Davao (SE Mindanao).** Oscillatory earthquake, intensity II-III.

9, 0^h 10^m [9, 8^h 10^m]. **Ambos Camarines (SE Luzon).** Earthquake of intensity III, in the Isarog region.

13, 12^h 0^m 52^{s*} [13, 20^h 0^m 52^s]. **Davao (SE Mindanao).** Oscillatory earthquake of intensity IV, duration 30 seconds.

15, 7^h 30^m [15, 15^h 30^m]. **Davao (SE Mindanao).** Earthquake of intensity III.

15, 13^h 28^m [15, 21^h 28^m]. **Iloilo (SE Panay).** Earthquake shocks of intensity III.

25, 11^h 22^m [25, 19^h 22^m]. **Butuan (N Mindanao).** Oscillatory earthquake, direction N-S, intensity IV, duration 5 seconds.

29, 18^h 48^m [30, 2^h 48^m]. **Ormoc (W Leyte).** Earthquake of intensity VI, duration 15 seconds. It repeated at 20^h 6^m [30, 4^h 6^m] with intensity III. Origin under the sea, some distance from the west coast where exists a local and shallow center.

30, 11^h 29^m [30, 19^h 29^m]. **Butuan (N Mindanao).** Oscillatory earthquake of intensity III, duration 10 seconds.

¹The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

RECORDS OF THE MICROSEISMOGRAPH.

Time: Greenwich mean. Midnight=0h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.62$, $\epsilon=2.726$, $\frac{r}{T_0^2}=0.021$;
 A_E : $T_0=6.03$, $\epsilon=2.378$, $\frac{r}{T_0^2}=0.037$. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
1	1	IIIv	eP L	h. m. s. 1 36 24 37 49				E Mindanao. End overtaken by following earthquake.
2	1	Iv	eP	1 44 36				This quake merged into the preceding quake and F barely visible.
3	1	IIIr	e L?	3 10 50 12 55				End overtaken by following earthquake.
4	1	IIv	eP	3 19 42				End overtaken by following earthquake.
5	1	Iv	eP L M _E	3 39 22 40 47 41 40	11		140	F not certainly indentified among the waves of the precedent quake.
6	1	Ir	e L M _E F	6 02 31 05 20 05 46 7 07	8		55	E Mindanao.
7	1	Iv	e F	9 16 16 31				
8	1	I	e F	16 00 36 17 02				
9	2	Iv	eP F	13 22 20 26				
10	2	Iv	eP F	22 26 56 58				Butuan (N Mindanao).
11	3	Iv	e F	0 04 02 13				
12	3	Iv	eP F	4 05 11 18				
13	3	Iv	eP F	23 20 55 23				
14	4	Iv	eP F	2 35 24 48				NE Mindanao.
15	4	Iv	eP L M _N M _E F	14 20 18 21 38 22 22 23 10 52	6 6	93	42	NE Mindanao.
16	5	Iv	e F	20 23 36 38				
17	6	Ir	e S L M _N M _E F	22 33 12 39 26 43 12 45 00 45 13 23 38	11 9	53	55	
18	9	Ir	e F	19 17 28 20 06				
19	10	Ir	e F	5 02 27 19				
20	11	Ir	e L F	9 40 44 46 02 10 29				
21	12	Iv	eP F	15 36 24 55				
22	13	Iv	eP F	12 00 52 13				Davao (SE Mindanao).
23	17	Iv	eP r	22 27 25 49				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A _N μ	A _E μ	
24	18	I _r	e	<i>h. m. s.</i>				
			S	5 58 54				
			L	6 03 51				
			M _E	08 28				
			M _N	09 34	16		26	
7	02	F		12 06	15		29	
25	18	I _v	eP	21 08 34				
			F	13				
26	19	I _v	eP	12 53 43				
			F	13 04				
27	19	I _v	eP	17 20 38				
			F	24				
28	20	I _v	eP	13 49 44				
			L	51 22				
			M _E	51 25	5		49	
			M _N	51 36	6		51	
			F	14 01				
29	21	I _v	eP	2 26 14				
			F	29				
30	21	I _v	eP	7 23 58				
			F	50				
31	22	I _v	eP	23 32 19				
			L	32 38				
			M _E	32 43	3		99	
			M _N	32 44	3		79	
			F	41				
32	26	I _v	eP	11 17 04				
			F	21				
33	27	I _v	e	4 21 38				
			F	35				
34	27	I _v	eP	5 40 07				
			F	43				
35	27	I _v	eP	21 48 53			F overtaken by following earthquake.	
36	27	I _v	e	21 56 32				
			F	22 09				
37	30	I _v	eP	15 57 54				
			F	16 04				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

1, 1^h 36^m 24^{s*} [1, 9^h 36^m 24^s]. E de Mindanao. Temblor de tierra de intensidad VII. Tuvo grande extensión, sintiéndose en toda la Isla de Mindanao y en las Islas de Leyte, Sámar, Cebu y Bohol. A juzgar por su grande intensidad en Butúan y los demás pueblos de la parte norte del Valle del Agusan su origen se hallaba en dicho valle o tal vez en el Pacífico, muy cerca de la costa hacia los 9° N. Siguiéronse cuatro repeticiones de intensidad III-IV durante las dos horas siguientes. Fué registrado en todo el mundo.

A 6^h 2^m 31^{s*} [14^h 2^m 31^s] ocurrió un segundo temblor de intensidad IV-V pero de poca extensión, cuyo origen se hallaba algo más lejos de Manila y de Butúan. Fué registrado en Taihoku, Formosa.

El sismógrafo Wiechert de esta estación registró treinta y dos pequeños choques durante este día. El primero ocurrió a 3^h 46^m de la madrugada y correspondía a un temblor perceptible en Dávao cerca de 200 kilómetros distante al sur de Butúan.

2, 22^h 26^m 56^{s*} [3, 6^h 26^m 56^s]. Butúan (N de Mindanao). Temblor de tierra de intensidad II-III, de origen lejano, probablemente en el Pacífico.

4, 2^h 35^m 24^{s*} [4, 10^h 35^m 24^s]. NE de Mindanao. Temblor de tierra de intensidad IV sentido en las Provincias de Surigao y Agusan. Su origen se hallaba al parecer cerca del sitio del terremoto del día 1.º. Repitió a 14^h 20^m 18^{s*} [22^h 20^m 18^s] con intensidad III-IV.

5, 14^h 20^m [5, 22^h 20^m]. Dávao (SE de Mindanao). Temblor oscilatorio de intensidad II-III.

9, 0^h 10^m [9, 8^h 10^m]. Ambos Camarines (SE de Luzón). Temblor de tierra de intensidad III en la región del Isarog.

13, 12^h 0^m 52^{s*} [13, 20^h 0^m 52^s]. Dávao (SE de Mindanao). Temblor oscilatorio de intensidad IV, duración 30 segundos.

15, 7^h 30^m [15, 15^h 30^m]. Dávao (SE de Mindanao). Temblor de tierra de intensidad III.

15, 13^h 28^m [15, 21^h 28^m]. Iloílo (SE de Panay). Temblor de tierra de intensidad III.

25, 11^h 22^m [25, 19^h 22^m]. Butúan (N de Mindanao). Temblor oscilatorio, dirección N-S, intensidad IV, duración 5 segundos.

29, 18^h 48^m [30, 2^h 48^m]. Ormoc (W de Leyte). Temblor de tierra de intensidad VI, duración 15 segundos. Repitió a 20^h 6^m [30, 4^h 6^m] con intensidad III. Origen probable en el mar al W, donde existe un centro superficial o de hundimiento.

30, 11^h 29^m [30, 19^h 29^m]. Butúan (N de Mindanao). Temblor oscilatorio de intensidad III, duración 10 segundos.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

RECENT ERUPTIONS OF THE BULUSAN VOLCANO, 1916 AND 1918.

The Bulusan Volcano is the most oriental of Luzon Island, rising on its southeast end, close to "San Bernardino Strait" which separates Luzon from Samar Island. Its approximate geographical position is $12^{\circ} 47' N$, $124^{\circ} 4' E$ and it rises to a height of about 1,500 meters.

No historic records are to be found of any important eruption: for centuries it has been seen as dormant, only at times issuing forth small jets of white steam from numerous vents situated around its breached and nearly filled up crater. Some few and light outbursts with ejection of ashes are reported as occurred in different occasions, 1852, 1889 and 1894.

Far more important were the eruptions which occurred in January 1916 and October 1918; the earth tremors and frequent rumblings and noises, indicated extraordinary awakenings of the dormant volcano. The first began in the early hours of the 18th of January, and during five days numerous small explosions took place, the ejected dust and sand was carried by prevailing northeasters, spreading far out in the southwest direction. After this outbreak the jets of vapor on the top of the mountain and along some radial ravines continued with increased intensity. In October of 1918 these vapor vents took greater proportions, frequent light shocks were felt in the vicinity of the volcano, rumblings and noises being audible from the near towns. Occasionally dust fell, and at night some incandescence was momentarily seen at the head of the wide and deep ravine which opens to the SSW, and seems to be the main outlet of the old crater.

At the end of December incandescent lava began to pour down the said ravine; an occurrence which caused great alarm to the town and barrios of Irosin situated in front of it.

Later on in January, 1919, the shocks and rumblings ceased, but the eruption of vapors and pouring of lava down the ravine continued with the same activity. The southern part of the crater seems to be filled with a recent but solid current of black lava, its front appearing at the head of the ravine. From it apparently proceed black steaming masses of different sizes which frequently drop tumbling down the ravine. During the night red incandescence appears on the top and immediately incandescent masses tumble down sparkling brightly.

At long intervals a current, like a very thick crawling cloud is seen to rush down the ravine in furious effervescence; its yellowish color resembling it to a current of furiously boiling mud: by and by it rises and thins until it catches the prevailing wind and is carried by it dropping the dust of which it seems to be composed and leaving the ground over which passes covered with a dry whitish mantle. These two aspects of the eruption have been depicted as they appear from a distance of about eight kilometers.

As there has not been observed any sudden increase nor any explosive movement in the big throws of white vapor constantly issuing from the crater, it seems that the falling of lava is due to overflowings rather than to explosions. Supports this idea the fact that the various reports or noises heard during the pourings correspond to the exploding and breaking of the masses, while they are tumbling down the ravine. During

the day the ejected materials are seen as black steaming rocks and at night as red sparkling masses.

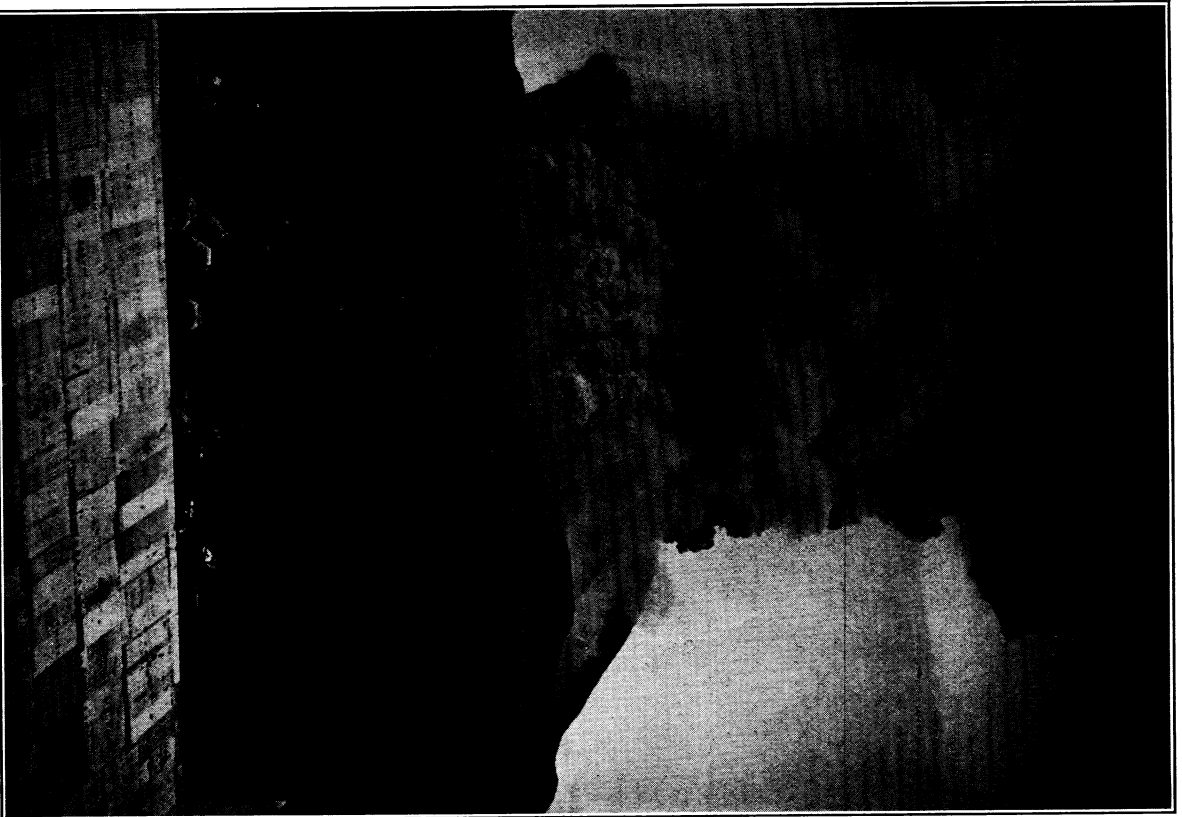
At the time of writing this note, five months after the beginning of the pouring of lava, the eruptions continue but with very different character. The pouring of lava continued without apparent change, but decreasing in quantity until the end of March when it ceased to be visible, although probably it was yet rising and accumulating in the northern part of the crater. At the same time the central vapor jet and those issuing from the western ravine became more powerful.

During the first days of April occurred a small lateral eruption, which opened a craterlet and some cracks on the SSE rim of the crater: the activity of the craterlet lasted but few days.

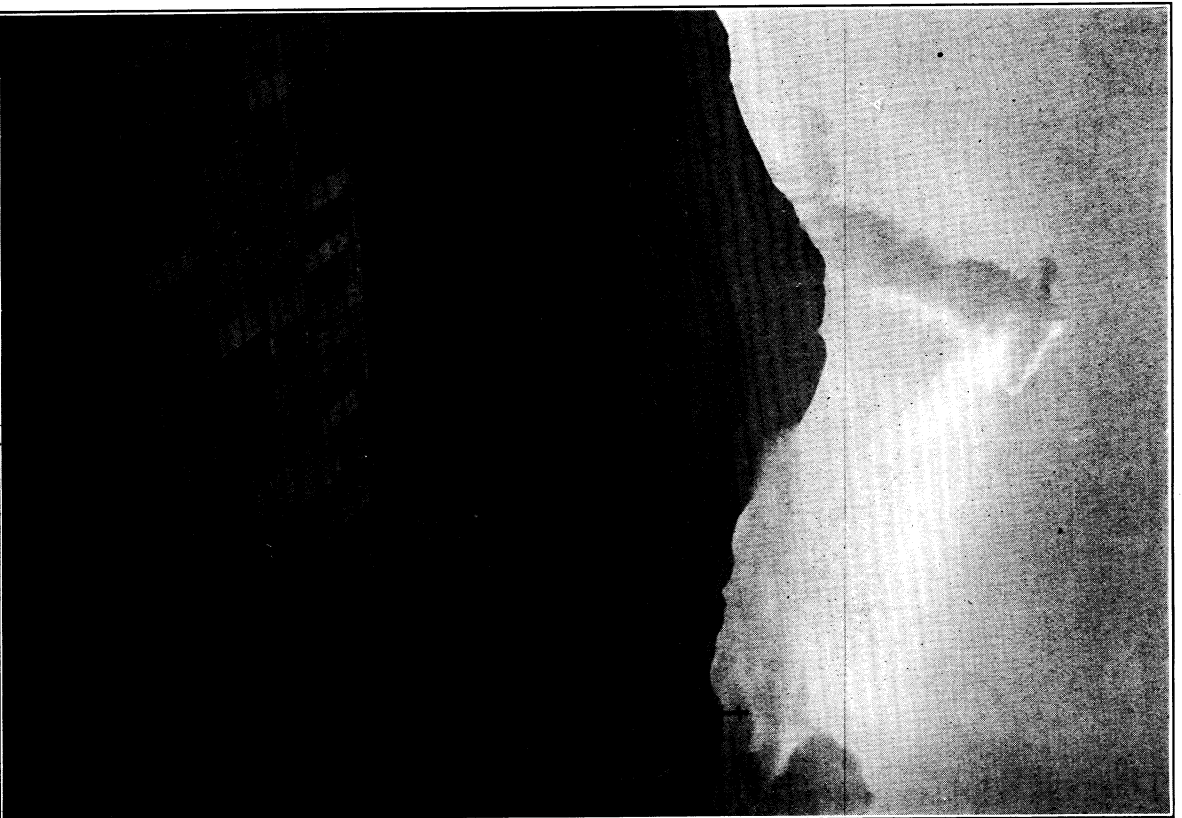
On the 24th of April shortly after 22^h a fearful eruption took place: an immense cloud of vapor and sand rising to a great height. There were not very loud noises and the small quantity of ashes fallen did but little damage to the vegetation, which covers the mountain up to a short distance from the crater. At about 4^h on the 27th occurred two similar but much lesser outbursts.

Finally on the 10th of May at 14^h 40^m the volcano had the most spectacular eruption. A very thick blackish cloud, which at the moment of issuing from the crevasses of the crater resembled foaming mud pouring along the exterior breaches and ravines, raised to a height of more than 2,000 meters. The eruptive force was such that counterbalanced the fresh wind then prevailing and the column kept its verticality to a very great height. The big cloud was slowly carried towards the west, where caused much darkness and dropped a small quantity of ashes. This eruption lasted about thirty minutes; soon after, only some powerful jets of white vapor were seen crowning the volcano. Not a single perceptible earth-shock preceded the outburst: a seismograph placed at a distance of about 8 kilometers recorded only two very light disturbances at the beginning and ten minutes later.

So far the damages caused by the eruptions of the Bulusan have been of no consideration: the vegetation is nearly unaffected to the last third of the mountain, a fact which shows that the eruptive clouds contain a very small proportion of ashes and noxious gasses. The Manila Hemp plantations surrounding the mountain up to its first reaches rather benefited from the small falls of ashes, and the benefit would had been greater had the rains fallen this year more abundantly to wash the leaves and precipitate the volcanic dust.



Eruption of Bulusan Volcano, May 10, 1919, as seen from Irosin, 8 kilometers distant to the South.



Bulusan Volcano steaming, May 12, 1919.

LAS RECIENTES ERUPCIONES DEL VOLCÁN BULUSAN, 1916 Y 1918.

El Volcán Bulusan, el más oriental de los de la Isla de Luzón, está situado en su extremo SE junto al Estrecho de San Bernardino, que separa las Islas de Luzón y de Sámar. Su posición geográfica aproximada es de $12^{\circ} 47' N$ y $124^{\circ} 4' E$ y su altura de unos 1,500 metros.

No existen datos históricos de ninguna erupción importante; durante siglos se le ha considerado como durmiente: solamente algunas veces se vieron salir pequeños penachos de blanco vapor de varias grietas situadas alrededor de su cráter, muy deformado, abierto por varios sitios y casi relleno. Se mencionan además algunas pequeñas erupciones de ceniza y arena que tuvieron lugar por los años 1852, 1889 y 1894.

Más importantes que ninguna de estas son las que ocurrieron en 1916 y 1918: los pequeños temblores de tierra, frecuentes retumbos y ruidos que las precedieron y acompañaron eran ciertamente indicios de extraordinario despertar del volcán. Comenzó la primera en la madrugada del 18 de enero y durante cinco días pequeñas explosiones se repitieron a intervalos más o menos largos, arrojando abundancia de polvo y arena, que llevados por los nordestes fueron a caer a grandes distancias sobre los pueblos y campos del sudoeste del volcán. Al terminar este período explosivo la emisión de vapores de las grietas antes mencionadas y de dos barrancos, que descienden por el W del cráter, continuó con extraordinaria intensidad. En octubre de 1918, los chorros de vapor tomaron proporciones extraordinarias, volvieron a menudear pequeñas sacudidas del suelo en la región del volcán y los pueblos vecinos oyeron otra vez retumbos y ruidos. Llovió en algunas ocasiones algo de ceniza, y de noche se distinguieron momentáneas incandescencias a lo alto del gran barranco que mira al SSW y parece ser el principal desagüe que se origina en el interior del cráter.

A fines de diciembre observóse que por dicho barranco se precipitaban masas de lava candente; cosa que alarmó mucho al pueblo y barrios de Irosin situados al frente de él.

Luego en enero, 1919, los movimientos del suelo y los ruidos cesaron, pero la grande erupción de vapores y los desprendimientos de lava, rodando por el barranco abajo, continuaban con la misma actividad. La parte sur del cráter aparecía cubierta de una potente capa o corriente de lava negra solidificada, cuyo frente asomaba a lo alto de la gran garganta o barranco. De ella parecían desprenderse las masas negras de piedra humeante, que a intervalos frecuentes se despeñaban por el barranco abajo. Durante la noche veíase aparecer incandescencia a lo alto y despeñarse luego rojas piedras que al explotar y romperse despedían brillantes chispas.

A intervalos mucho más largos, veíase de día precipitarse abajo con velocidad vertiginosa, pero siguiendo las sinuosidades del barranco, una como nube densísima y rastrera violentamente agitada; su color amarillento le daba el aspecto de una corriente de lodo en furiosa efervescencia: poco a poco se iba adelgazando y levantando hasta llegar a las corrientes exteriores de aire, las cuales la arrastraban, al mismo tiempo que iba soltando una lluvia de polvo que dejaba blanquecinos los sitios sobre que era llevada. Estos dos aspectos o formas de desprendimientos volcánicos de materia sólida se describen tales como aparecen desde unos 8 kilómetros de distancia.

Puesto que ni antes ni durante ninguna de las dos diferentes emisiones de lava descritas, se nota aumento alguno extraordinario ni movimiento explosivo en los potentes chorros de vapor que coronan el volcán, probablemente los desprendimientos de lava son debidos a rebosamientos más o menos frecuentes y no a proyecciones violentas. Parece apoyar esta suposición el no oírse de día ni de noche otros ruidos que débiles detonaciones, las cuales parecen corresponder al explotar y romperse de las piedras candentes que ruedan por la pendiente del barranco. Según se dijo antes, durante el día se ven claramente piedras negras y humeantes de diferentes tamaños y, durante la noche, masas en incandescencia y chispeantes que ruedan por la pendiente y se dividen en menudos pedazos.

Al escribir esta nota, cinco meses después del comienzo de los desprendimientos de lava, las erupciones se repiten, pero con diversos caracteres: El derrame de lava continuó sin cambio aparente pero disminuyendo, hasta fines de marzo, en que dejó de ser visible, si bien es probable que aún seguía acumulándose en la parte norte del cráter. Al mismo tiempo las fumarolas del centro del cráter y de la brecha del oeste crecieron en intensidad.

A principios de abril ocurrió una erupción lateral que abrió un pequeño cráter y algunas grietas cerca del borde SSE del cráter principal; mas la actividad del diminuto cráter duró muy pocos días.

El 24 de abril poco después de las 22^h tuvo lugar una fuerte erupción en la que se levantó a grande altura una nube inmensa de vapor y arenilla, pero sin grandes detonaciones ni causar daño notable a la vegetación que cubre todavía el volcán hasta muy cerca del cráter. Ocurrieron otras dos de menos intensidad a las 4^h del 27.

Por fin el 10 de mayo a las 14^h 40^m ocurrió la erupción más grande y visible de este volcán. Una nube densísima y negruzca, la cual al momento de salir parecía espumante barro que se derramaba por las grietas exteriores del cráter, se le levantó con moderadas detonaciones a una altura de más de 2,000 metros. A pesar del viento fresco del E conservaba su verticalidad hasta su mayor altura, indicando lo intenso de la fuerza y velocidad eruptiva. Luego el viento reinante la fué arrastrando hacia el W donde produjo grande oscuridad y desprendió una pequeña cantidad de arenilla fina. Esta erupción duró cosa de media hora quedando después el volcán con solos los penachos blancos de los chorros de vapor. No se notaron sacudidas del suelo; un sismógrafo que funcionaba a la distancia de 8 kilómetros registró dos movimientos del suelo uno al comenzar y otro diez minutos después.

Hasta ahora los daños causados por las diferentes erupciones pueden considerarse como nulos; la vegetación continuá intacta hasta el último tercio de la montaña, indicación cierta de que las erupciones constan principalmente de vapor de agua y muy pocos productos sólidos. Las plantaciones de abacá que ocupan la base de la montaña, puede decirse que han salido beneficiadas con las pequeñas caídas de arena y ceniza y lo habrían sido más en épocas de más abundantes lluvias que precipitaran pronto el polvo, dejando lavadas las hojas.

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR FEBRUARY, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1919

BULLETIN FOR FEBRUARY, 1919.

METEOROLOGICAL BULLETIN FOR FEBRUARY, 1919.

By Rev. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month in the Philippines is slightly to moderately higher than that of the preceding year and than the normal of this month. The highest pressures were generally observed on the 5th and 6th, while the lowest were recorded almost without exception on the 22d.

The mean monthly temperature is also slightly to moderately higher than that of the preceding year, and slightly above the February's normal. The absolute maximum and minimum temperatures for Manila were 33.9° C. and 16.7° C., the former having been observed on the 22d, and the latter on the 3d and 4th. The extreme monthly temperatures for Baguio were 26.4° C., 12.1° C. on the top of Mirador, and 26.4° C., 9.5° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR FEBRUARY, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from Feb., 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Feb., 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga	760.33	+1.58	-----	762.23	6	758.19	22	26.1	+0.7	-----	33.1	7, 13	21.9	25
Yap, W. Carolines	60.27			62.60	6	58.01	25	26.6			33.4	25		6
Tagbilaran	60.97	+1.72	+1.09	63.42	6	58.45	22	26	+1	+0.4	33.3	7	18.9	25
Surigao	61.23	+1.80	+1.34	63.67	6	58.95	22	26.2	+1.2	+ 8	30.1	27	22.1	1
Cebu	61.32	+1.84	+1.23	63.81	6	58.88	22	26.8	+1	+ 8	31	2	22.5	2
Iloilo	61.06	+1.45	+1.01	63.47	5	58.32	22	26.7	+1.9	+1	33.2	22	21.7	5
Tacloban	61.64	+1.81	+1.32	64.23	6	59.05	22	26	+1.7	+ 4	34.8	26	20.5	14
Capiz	61.69	+1.48	+ 87	64.34	5	58.89	22	26.4	+1.6	+ 7	32.5	22	21.9	4
Calbayog	61.81	+1.74	+1.39	64.44	6	59.28	22	25.3	+1.5	+ 4	33	24	19.2	26
Legaspi	62.32	+1.60	+1.35	65.25	6	59.53	22	26.4	+1.9	+ 8	31.9	23, 24	21.5	11
Atimonan	62.56	+1.16	+1.25	65.94	6	59.59	22	25.8	+2.3	+ 5	31.2	24	20.4	1
Ambulong, Tanauan	61.67	+1.22	-----	65.07	6	58.71	22	25.4	+1	-----	34.4	24	19	4
Paracale	62.61	+1.14	-----	65.94	6	59.60	22	25.6	+1.9	-----	30.4	24	19.9	4
Manila	62.19	+1.26	+ .94	65.36	6	59.11	22	25.2	+1.3	0	33.9	22	16.7	3, 4
San Isidro	62.89	+1.55	+1.56	66.26	6	59.72	22	25.8	+1.7	+ 6	35.6	23	17	4, 11
Dagupan	61.45	+1.14	+ .69	64.52	6	58.61	22	26.3	+1.4	+ 6	36	12	19	12
Baguio ^a	638.86	+1.52	+1.16	640.98	7	636.81	22	17.4	+2	+ 7	26.4	22	12.1	5
Vigan	761.73	+1.20	+ .88	764.83	6	758.88	22	25.6	+ .6	0	33.5	16	17.2	18
Tuguegarao	62.95	+ .19	+ .93	68.35	5	59.61	21, 22	24.6	+2.8	+ 5	35.9	23	16.6	7
Laosag	61.86	+ .98	-----	64.89	5	59.26	22	24.5	+ .3	-----	34.1	14	14	18
Aparri	63.32	+ .07	+ .72	69.44	5	59.93	21	23.9	+2.3	+ 7	33.8	23	17.2	26

^a The barometric readings of this station are not reduced to sea level.

Rainfall.—With only three or four exceptions, the monthly total rainfall for the Philippines is lower than the normal for February; and only eight stations in Luzon reported a monthly amount of rainfall above that of the preceding year. The total monthly rainfall for Manila is but 0.4 mm. above the normal, while that of Baguio is 5.2 mm. below it.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF FEBRUARY, 1919.

Station.	Total.	Departure from Feb., 1918.		Days of rain.	Departure from Feb., 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Feb., 1918.		Days of rain.	Departure from Feb., 1918.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo	33.4	-81.6	-56.1	5	-12	22.8	23	Sumay, Guam	14	-183	-67.4	3	-9	5.1	6, 15
Isabela, Basilan	29.4	-125.4	-51.9	5	-8	13.7	5	Calapan	41.9	-35.6	-32.6	9	-7	17	19
Zamboanga	25.2	-30.6	-25.9	7	-6	8.1	5	Virac	152.5	+3.6	-64.1	12	-7	54.6	16
Davao	141.3	-97.1	+12.7	10	-2	39.4	18	Naga	14.5	-63.7	-57.8	3	-12	6.6	7
Cotabato	40.6	-105	-40.2	6	-5	13	2	Tigaon	33.6			8		7.9	25
Camp Keithley, Lanao	25.9			13		7.6	2	Batangas	4.6	-7.9	-13.9	3	-2	2.3	5
Cagayan, Misamis	17.8	-106.3		3	-12	7.6	21	Lucena	53.9	-10.3		3	-5	25.2	5
Dapitan ^a	61.2	-306.3	-68.9	12	-10	18.8	2	Atimonan	46.1	-125.8	-68.9	10	-11	21.9	6
Butuan	99.4	-179.6	-97.8	20	-3	16.7	18	Ambulong, Tanauan	6.9	+1		3	-1	4.3	5
Mambajao	100.3	-79.1		8	-4	21.6	2	Canlubang, Calamba	19.7	+10.2		6	-1	9.4	5
Dumaguete	27.2	-230.1		6	-9	10.2	23	Paracale	141.8	-153.6	-119.9	13	-12	30.6	7
Yap, W. Carolines	58.2	-135.6	-117.3	16	-6	10.7	6	Santa Cruz, Laguna	14.9	+2.6	-14.4	5	-1	6.3	7
Tagbilaran	18.2	-24.3	-74.2	5	-4	13.5	11	Manila	10.7	+8.9	+4	1	-1	10.7	8
Iwahig	1.8	-136.5		1	-14	1.8	24	Antipolo	0.3	-13.1		1	-2	0.3	20
Surigao	198.5	-217	-146.6	24	+4	38.9	14	Iba	0	-1.3	-4.9	0	-2	0	0
Maasin	26.2	-171.5	-123.6	2	-6	19.3	18	San Isidro	0	-13	-6.6	0	-2	0	0
Cebu	27.1	-71.4	-37.3	9	-2	9.4	27	Talac	0	-17.8	-9.2	0	-2	0	0
Iloilo	5	-57.6	-37.8	1	-4	5	11	Baler	257.3	+193.7	+110.3	12	+1	76.2	20
San Jose Buenavista	0	-53.2	-21.1	0	-9	0	0	Dagupan	10.7	+9.9	-8.3	1	0	10.7	19
Cuyo	0	-11.3	-17.5	0	-4	0	0	Bolinao	0	0	-9.7	0	0	0	0
Ormoc	12.3	-274.6	-91.9	7	-7	7.6	11	Baguio	12	-40.3	-5.2	3	-3	11.2	8
Guiuan	119.7	-631.6		22	-1	16	2	San Fernando, Union	0	-3.3	-7.3	0	-1	0	0
Tacloban	65.6	-387.8	-145.4	15	-7	13	11	Echague	4.6	-40	-30.9	3	-8	2.8	5
Capiz	10.9	-61.2	-81.7	4	-15	5.6	11	Candon	0	-1.8	-8.1	0	-1	0	0
Borongan	217.5	-696.8	-196.9	22	0	36.6	20	Vigan	0	-5.3	-4.3	0	-2	0	0
Catbalogan	62.9	-376.3		15	-7	16.8	21	Tuguegarao	4.5	-23.6	-14.7	2	-2	2.5	13
Calbayog	26.2	-313.3	-142.1	13	-9	8.4	16	Laog	0	-9.3	-7	0	-6	0	0
Masbate	22.2	-185.1	-109.8	10	-5	8.6	11	Aparri	16.3	-76	-77.1	4	-11	9.4	4
Romblon	41.1	-135.1	-44	10	-10	14.2	26	Cape Bojeador	5.5	-2.4		2	+1	3.5	4
Batag	154.8	-312.5		14	-6	43.7	11	Santo Domingo, Batanes	140.4	+28.6	+22.6	14	-4	24.1	15
Sorsogon	95	-204.9		16	-5	17.2	26								
Legaspi	134.2	-121.6	-142.6	12	-6	47.1	15								

^a 27 days of observation.

DEPRESSIONS AND TYPHOONS.

As is usually the case in February, no depression or typhoon was observed during the month in low latitudes throughout the Far East. In higher latitudes there were several depressions moving generally northeastward to the south of Japan. And, although they were not formed over the Continent, but over the Eastern Sea or over the Pacific, yet they rather belong to the type of Continental depressions, which hardly affect the weather in the Philippines.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas es ligera o moderadamente mayor que la del año pasado y que la normal de febrero. Las presiones más altas se observaron generalmente los días 5 y 6, en tanto que las más bajas se registraron casi sin excepción el día 22.

La temperatura media mensual es asimismo ligera o moderadamente mayor que la del año pasado, y ligeramente mayor que la normal de este mes. Las temperaturas máxima y mínima absolutas de Manila fueron 33.9° C. y 16.7° C., habiéndose observado aquélla el día 22, y ésta los días 3 y 4. Las temperaturas extremas del mes en Baguio fueron 26.4° C., 12.1° C. en la cumbre del Mirador, y 26.4° C., 9.5° C. en el valle.

Precipitación acuosa.—Con solas tres o cuatro excepciones, la lluvia total del mes en Filipinas es menor que la normal de febrero; y sólo ocho estaciones de Luzón registraron una cantidad mensual de lluvia mayor que la del año pasado. La lluvia total del mes en Manila sólo excede a la normal en 0.4 mm., al paso que la de Baguio es menor que ella en 5.2 mm.

DEPRESIONES Y TIFONES.

Como sucede ordinariamente en febrero, ninguna depresión o tifón se observó durante el mes en bajas latitudes en todo el Extremo Oriente. En altas latitudes hubo varias depresiones que se movieron generalmente al NE por el sur de Japón. Y, aun cuando no se formaron en el Continente, sino en el Mar del Este o en el Pacífico, con todo pertenecen más bien al tipo de las depresiones continentales, que apenas ejercen influencia en el tiempo de Filipinas.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.*

[$\phi = 14^{\circ} 34' 41''$ N; $\lambda = 120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. ^b			
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	In sun. Black bulb in vacuo, 2 p. m.	Free exposure (total).	Shelter (total).
					8 a. m.	2 p. m.	8 a. m.	2 p. m.			8 a. m.	8 a. m.				
1	762.01	24.6	32.7	18	25.1	28.4	26.3	27.4	27.5	28	73.8	16.4	15.4	53.3	6.2	3.6
2	62.91	24.1	32.1	18.3	25.3	28.2	26.6	27.4	27.5	28	75.4	16.4	15.3	43	4.5	3
3	63.54	24.3	31.8	16.7	24.8	28.5	26.3	27.2	27.4	27.9	71.9	15.8	13.9	50.2	4.9	3.3
4	64.67	23.4	30.6	16.7	24.7	28.5	26.3	27	27.3	27.9	72.5	15.1	14	50.2	5.3	3.4
5	65.12	24	28.2	19.1	25.7	28.8	26.5	26.7	27.3	28	76.6	16.8	15.5	29	2.4	2
6	65.36	25.3	32.9	20.4	25.2	28.6	26.2	27.2	27.3	28	71.1	16.4	18	53.5	5.8	3.9
7	64.90	25.4	32.4	20.8	25.7	28.4	26.4	27.2	27.3	27.9	71.5	16.7	17.9	51.6	5.5	3.7
8	64.24	24.3	29.2	21.5	26.3	27.7	26.3	27.1	27.4	28	82.8	18.6	19	29.6	1.6	1.5
9	63.71	25.1	32.2	19	25.3	28.2	26.5	27.3	27.5	28	70.4	16.3	16.9	52.7	5.7	3.8
10	63.34	24.2	32	17.1	24.8	27.8	26.3	27	27.3	27.9	69.7	15.1	14.3	53	6.2	4
11	63.44	24.3	32.1	17.4	24.7	28.2	26.2	27	27.3	27.9	68.1	14.9	14.6	51.8	6	4.2
12	62.71	24.4	31.6	18	25	27.5	26.3	27.2	27.3	28	73.3	16.5	15	36.4	4.4	2.9
13	62.21	26.1	31.8	21.8	25.7	27.8	26.4	27	27.3	28	74.8	18.7	19.7	40.8	3.9	2.6
14	62.42	26.2	33	21.1	25.8	28.6	26.6	27.5	27.3	28	70.7	17.5	19	54	5.4	3.7
15	62.89	25.1	32.7	18.2	25.3	28.4	26.5	27.4	27.3	27.9	72.4	16.8	15.4	50.8	5.4	3.4
16	61.92	25.9	32.2	20.6	25.8	28.7	26.6	27.4	27.3	27.8	72.9	17.9	18	51	5.5	3.4
17	60.55	26.1	31.8	21.7	26.5	29.2	27.1	27.7	27.4	28	72.2	18	20	51.2	5.1	3.2
18	60.26	25.6	32.6	21.4	26.8	28.8	27.3	27.8	27.4	27.9	74	17.8	19.5	54.5	4.6	2.8
19	60.87	25.5	32.7	20.4	26.2	28.2	27.1	27.9	27.3	27.9	74.8	17.8	18.7	46.2	5.1	3.2
20	60.47	26.2	33.1	21.1	26.3	29.2	27.2	27.7	27.3	27.9	72.7	18	18.8	49	4.8	3.1
21	59.92	25.9	33.2	20.2	26.2	28.7	27.2	27.7	27.3	27.9	75.5	18.3	17.8	55	5.1	3.2
22	59.11	26.4	33.9	20.7	26.5	29.2	27.3	28	27.5	27.8	73.8	18.4	18.6	50	5.6	3.4
23	59.59	27	33.3	20.7	26.8	29.6	27.8	28.3	27.5	28	71.6	18.5	18.2	52.5	6.4	4
24	60.30	26.6	33	21.3	27.2	29.4	27.7	28.4	27.5	27.9	72.3	18.5	18.5	53.5	5.5	3.4
25	60.50	25.2	30.6	20.8	26.7	28.5	27.7	28.2	27.5	27.9	74.2	17.5	18.3	35.8	3.8	2.8
26	61.46	24.9	30.8	19.7	25.8	28.4	27.3	27.9	27.5	27.9	70	16.1	16.8	42	5.1	3.5
27	61.59	24.8	32.5	18.5	25.5	28.5	27	27.8	27.6	27.9	69.3	15.7	15.7	51	5.8	3.7
28	61.20	24.8	32.4	18.8	25.6	28.8	27.2	27.9	27.7	27.9	69.5	15.8	16	53	5.8	3.9
Mean	762.19	25.2	32	19.6	25.8	28.5	26.8	27.5	27.4	27.9	72.8	17	17.1	48	5	3.3
Total															141.4	92.6
Departure from normal	+0.94	0	+1.2	-0.6							-1.2	-0.5			+8.1	

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.		Miscellaneous.
	Prevailing direction.	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.			On the tower.	In the park.	
						Upper.	Lower.				
1	ESE	194.5	23	ESE	0-10			h. m.	mm.	mm.	
2	NE, SE	162	15.5	SE	1.2			9 30			☉ a.
3	E	182.5	17	WNW	5.5	A.-Cu. ESE	Cu. ESE	5 30			☉ ☽ a.
4	NE	169.5	18	W by N	1.1		Cu. E	9 50			☉ a.
5	E quad.	96.5	14	NE	5		Cu. E	9 55			☉ a.
6	ENE	197	27	ENE	8.7	Ci.-S.	Cu. E	2 05			d° a.
7	E	194	23.5	E	4.8		Cu. E	8 35			
8	ENE, ESE	109	11	ESE	5.7	A.-Cu. ENE	Cu. E	5 20			
9	ESE	241.5	20	ESE, E	8.9	A.-Cu. E	S.-Cu. E	1 55	10.7	10.7	☉ 2 p.
10	NE, ESE	229.5	23	SE	1.3		Cu. E	9 55			☉ a.
11	SE	201.5	19	SE	1.7		Cu. ENE	10 20			☉ a.
12	E quad.	170.5	17.5	SE by E	1.7	A.-Cu., Ci.	Cu. E	9 15			☉ a.
13	W quad.	135	15.5	SE	3.8		Cu. E	8 15			☉ a.
14	ESE	196	23	SE	5.5	Ci.	Cu. E	7 20			☉ a.
15	E quad.	220	26	ESE	4.9	ci.-s., A.-cu.	Cu. E	7 05			☉ ☽ a.
16	N quad.	188	17	WSW	2.9		Cu. E	9 15			☉ a.
17	W quad.	221	16.5	W	2.3	A.-Cu., Ci.	Cu. E	9 00			☉ a.
18	ESE, SE	189.5	20	SE	1.3	A.-Cu., Ci.	Cu. E	10 25			
19	E quad.	185.5	17	SE	4.8	ci.-s., A.-cu.	Cu. E	7 45			
20	ESE, SE	145.5	12.5	ESE	4.7	A.-Cu.	Cu. E	9 25			
21	WSW	182	15	WSW, SW	4.8	A.-Cu.	Cu. E, ESE	6 55			
22	SE	212.5	18.5	SE	1.8	Ci.	Cu. E	10 10			
23	SE, W	202	16.5	SE	2.6	A.-Cu. E	Cu. E	9 15			☉ a.
24	W quad.	193.5	18	WNW	1.2	Ci.	Cu. E	10 30			
25	NE	139.5	16	NE	2	A.-Cu.	Cu. NE	10 25			
26	E quad.	175	17	E	6.7	ci.-s., A.-cu.	Cu. E	4 35			
27	ESE, SE	199	20	ESE	4.2	Ci.	Cu. E	5 55			
28	NE, SE	192	16.5	W	4.6	A.-cu. ENE, E	Cu. E	8 30			☉ a.
					3.8	Ci. NE	Cu. E	9 15			
Mean		183	18.3		3.7			8 05			
Total		5,124						226 30	10.7	10.7	
Departure from normal		-224			-1.2			+30 13	+0.4		

* All the mean values given in this table are deduced from the hourly observations.
 b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.^a

[$\phi=16^{\circ} 25' N$; $\lambda=120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pres- sure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation n.		
		Mean.	Maxi- mum.	Hour.	Mini- mum.	Hour.	Maxi- mum.	Hour.	Mini- mum.			Hour.	Mini- mum on grass.	Maxi- mum in sun. Black bulb in va- cuo. ^c	Free ex- posure (total)	Shel- ter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	638.63	16.9	23.5	1.00p.	12.2	6.40a.	25	11.35a.	10.2	4.40a.	78.2	10.8	11.2	55	4.3	2.4
2	39.46	17.1	23.3	11.00a.	12.6	3.10a.	25.2	11.35a.	9.5	7.00a.	73.2	10.5	8.4	54.8	5.1	2.9
3	39.94	17.1	23.6	1.35p.	13	6.00a.	24.5	0.35p.	9.8	5.35a.	80.3	11.4	9.2	55.5	3.8	2.7
4	40.58	16.8	22	11.25a.	13.1	6.50a.	23.4	2.10p.	11.2	5.45a.	84.7	11.9	11	59.2	4	1.9
5	40.60	15.4	21	1.00p.	12.1	6.50a.	22.6	11.50a.	10.8	5.40a.	70.7	9	11.2	51.3	11	5.9
6	40.97	16.4	23.1	2.40p.	12.9	0.05a.	23.8	2.20p.	12.2	0.05a.	62.8	8.4	12.2	52.2	10.8	5.9
7	40.98	17.1	23.9	11.50a.	13	1.00a.	24.4	11.20a.	11.7	4.25a.	66.7	9.7	12.2	60	7.4	4.1
8	40.62	17.9	24.8	1.00p.	13.4	5.00a.	25.2	1.00p.	11.7	4.25a.	75.3	11.3	11.1	58.1	4.3	2.3
9	40.26	17.1	23.5	0.35p.	14.4	6.20a.	23	0.45p.	13	6.40a.	82.3	11.8	11	58.2	2.8	1.5
10	39.51	15.9	21	11.00a.	13.7	5.10a.	21.3	2.00p.	11.7	5.40a.	88.3	11.9	10.7	59.8	2.8	1.3
11	39.56	17	23.6	1.10p.	12.4	5.00a.	25.7	0.25p.	10.2	6.00a.	72.3	10.2	11	54.7	7	3.8
12	39.13	18	25.3	1.20p.	13	0.40a.	26.2	1.50p.	10.7	3.20a.	64.7	9.7	11.3	55.2	7.4	4
13	39.23	18	24	0.40p.	14.3	5.00a.	24.4	2.00p.	12.3	5.55a.	80.5	12.3	12.8	60.4	3	1.5
14	39.29	17.8	23.6	10.15a.	14.8	6.40a.	24.8	10.05a.	13.4	6.25a.	85.2	12.9	13.4	59.6	4	2.1
15	39.66	17.9	24.4	0.20p.	14.2	6.40a.	25.1	11.05a.	11.5	4.10a.	77	11.6	12.5	58.1	4.6	2.4
16	38.93	17.9	24.9	1.40p.	13.5	4.25a.	25.5	1.20p.	12	4.30a.	71.5	10.7	11.7	55.2	5.1	2.6
17	37.57	16.6	23.9	0.25p.	12.7	7.05a.	24.1	1.35p.	10.8	6.25a.	72.2	10.1	10.7	58.1	5.9	3.2
18	36.98	17.4	24.1	0.30p.	13.2	4.00a.	24.1	1.10p.	10.7	6.00a.	73.2	10.6	10.6	57	4.3	2.3
19	37.71	17.4	24.7	0.40p.	13.3	2.40a.	24.4	1.35p.	11.5	6.30a.	78.8	11.3	11.8	58.9	4	2.1
20	37.52	17.3	23.9	11.30a.	14.4	6.00a.	23.9	10.30a.	12.4	6.30a.	83.3	12	12.4	57.3	3.4	2
21	37.38	17.6	25	0.35p.	13.8	6.30a.	24.9	1.00p.	11.9	6.20a.	81.3	12	11.7	59	5.4	2.8
22	36.81	19.4	26.4	0.55p.	14.1	4.00a.	26.4	0.35p.	11.2	3.55a.	56.3	9.1	10.9	56.6	10.4	5.5
23	37.30	19.1	25.3	0.25p.	14	4.25a.	25.4	1.35p.	10.7	5.40a.	52.3	8.6	11.2	53.3	8.2	4.3
24	37.72	18.5	24.9	0.20p.	14.8	6.50a.	25.2	0.50p.	12.4	6.00a.	71	11.1	10	60	5	2.8
25	37.38	17.8	24.3	11.15a.	13.7	6.35a.	24.9	11.25a.	11.9	6.25a.	72.5	10.7	12.4	59.3	6.8	3.3
26	37.98	17.5	24.7	2.20p.	13.2	5.50a.	24.4	0.35p.	12.2	5.40a.	65.7	9.6	12.8	60.5	6.5	3.7
27	38.19	16.9	23.5	1.05p.	12.4	6.00a.	23.6	2.00p.	10.4	6.00a.	74	10.4	10.4	55.2	5.6	2.9
28	38.17	16.3	22.6	1.20p.	12.8	6.45a.	23.2	0.25p.	10.9	6.55a.	75	10.3	10.7	51.6	4.1	2.2
Mean	638.86	17.4	23.9		13.4		24.4		11.4		73.9	10.7	11.3	57.1	5.6	3
Total															157	84.4

Day.	Wind.				Amount (mean).	Clouds.		Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.
	Prevailing direction. ^d	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.		Form and direction.				
						Upper.	Lower.			
1	E	377.4	Km.	W	0-10.			h. m.	mm.	☁☁☁ a. ☁☁☁ p.
2	SE	296	24.3	W	2			5 40		☁☁☁ a. ☁☁☁ p.
3	E	259.2	22.5	SW	.9			7 30		☁☁☁ a. ☁☁☁ p.
4	Variable	306.3	19.8	SW	4.4			6 10		☁☁☁ a. ☁☁☁ p.
5	E	731.5	21.9	E	.2			8 20		☁☁☁ a. ☁☁☁ p.
6	E	769.1	50.5	E	.3			7 40		☁☁☁ a. ☁☁☁ p.
7	E	542.2	51.3	E	2.4			5 15		☁☁☁ a. ☁☁☁ p.
8	E quad.	348.2	38.6	E	3.9			5 55	11.2	☁☁☁ a. ☁☁☁ p.
9	E	302.2	28	SW	4.7			5 05	.5	☁☁☁ a. ☁☁☁ p.
10	Variable	271.4	23.3	E	5.9			2 55		☁☁☁ a. ☁☁☁ p.
11	E	412.1	20.1	W	2			6 25		☁☁☁ a. ☁☁☁ p.
12	E, SE	419.4	27.9	SW	0			8 25		☁☁☁ a. ☁☁☁ p.
13	W	292.6	26	W	5			4 35		☁☁☁ a. ☁☁☁ p.
14	E quad.	239.6	22	W	4.4			4 15		☁☁☁ a. ☁☁☁ p.
15	E, W	320	20.7	E	3.7			7 10		☁☁☁ a. ☁☁☁ p.
16	W, N	352.5	25.2	W	1			8 00		☁☁☁ a. ☁☁☁ p.
17	W	261.5	38.4	W	2			7 40		☁☁☁ a. ☁☁☁ p.
18	E, W	293.5	25.4	W	2.6			6 15		☁☁☁ a. ☁☁☁ p.
19	E, W	322.3	29	W	3.6			6 25	.3	☁☁☁ a. ☁☁☁ p.
20	SE quad.	289.5	31.6	W	1.9			7 25		☁☁☁ a. ☁☁☁ p.
21	W, SE	292.4	24.6	W	1.9			8 50		☁☁☁ a. ☁☁☁ p.
22	W quad.	352	25.7	W	.9			9 10		☁☁☁ a. ☁☁☁ p.
23	N, W	342.2	30.6	W	5			6 10		☁☁☁ a. ☁☁☁ p.
24	SE, W	251.4	27.6	W	4.1			5 45		☁☁☁ a. ☁☁☁ p.
25	E	340.4	30	E	2.3			7 30		☁☁☁ a. ☁☁☁ p.
26	E	406.9	21.4	W	3			7 40		☁☁☁ a. ☁☁☁ p.
27	E	304.5	30.9	SW	3			5 05		☁☁☁ a. ☁☁☁ p.
28	NE quad.	e226.2	26.6	W	4.3					☁☁☁ a. ☁☁☁ p.
Mean		354.4	28.1		2.7			6 30		
Total		9,922.5						182 10	12	

^a All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
^b The barometric readings of this station are not reduced to sea level.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
^d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.
^e 2 hours missing.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, FEBRUARY, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo				2	2.8											
La Union, Davao ^a			20.3	3.8	2.5		7.6						15.2		1.5	15.2
Isabela, Basilan				11.4	13.7							3				.8
Basilan Plantation, Isabela (Basilan) Office ^a				14.2	13.2							4.3				1.5
Zamboanga			.3	.5	8.1			1			4.1	3.8				
Davao		8.9									2.5	5.6				2.3
Sirib, Guianga, Davao ^a					30.7	2			5.3	7.9	10.7					
Cotabato		13	2													
Moncayo, Davao ^a	7.6		6.4		18.8				3							
Camp Keithley, Lanao	.3	7.6	1	5.6	.8			.8			2.3	.8			1.8	
Cagayan, Misamis		6.4														
Dapitan		18.8	3	15.2					*	3.8	.8					.5
Butuan		1.3	8.4	1	4.8	5.1		4.5	3		1.8	.3	5.6	9.7	2.8	.5
Mambajao			21.6	21.3	14.5	4.6					12.7			8.6	14	
Dumaguete				5.1					2		3.6					
Yap, Western Carolines	3.6	6.3			5.3	10.7	5.4		2	2.6				4.3	1.6	1.8
Tagbilaran		1.6	.1		1				2		13.5					5.9
Iwahig																
Surigao	4.1	24	16.3	8.6	9.2	.6	1.3	3	.3	8.9	1.6	.5		38.9	28.7	
Maasin																
Cebu			6.4		2.5						3.3		3.6			
Hacienda Vallehermoso, Oriental Negros ^a											3					
La Carlota, Occidental Negros ^a															1	.3
Hacienda San Antonio, Occidental Negros ^a																
San Carlos, Occidental Negros ^a			1	.8							2.5	2				
Hacienda Refugio, Occidental Negros ^a																
Iloilo											.5					
San Jose Buenavista																
Cuyo																
Lucena, Iloilo ^a																
Ormoc				.5				.8			3	7.6				
Guiuan	1	16	3.6	2.2	12.5	.8	4.1		2.5	4.3	2	3.8		3.1	12.7	4.8
Dueñas, Iloilo ^a					2.8											
Bitaoan, Iloilo (Railroad Iloilo to Capiz) ^a						4.8		2			2.5					
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a					1.1						2					
Tacloban	.5				3.6	2.1	2.8	6.6		1.5	13				5.3	6.4
Dumarao, Capiz ^a														2.5		
Dao, Capiz ^a						1.3					12.7					
Capiz				1						3.8	5.6					
Borongon	3.3	.8		6.1	23.2	11.4	9.9	1.6	5.6	6.6	10.7	.8		2.8	33.8	10.9
Catbalogan				.3	.8	7.2	1.8	7.1	1.6	.5	8.9				1.6	
Calbayog					1.3	3	1.5		.5	.8	.5		1.5		.5	8.4
Masbate	.3		.3		1	3.8		1.5	.8	2.3	8.6					
San Jose Estate, J. Abello D-13, Mindoro ^a																
San Jose Estate, Tamaraw Plantation, Mindoro ^a																
San Jose Estate, San Agustin, Mindoro ^a																
San Jose, Mindoro ^a																
San Jose Estate, Tunnel D-12, Mindoro ^a																
Romblon			.6		.5			.3			6.6	4.2	2.5	.2		10.2
Batag		1.3		39.1	2.8	5.3			2.5		7.1	43.7	2.8			17.5
Sorsogon					3.3	13.4	2.5	.8	1	7.1	6.6	2.8	1.3	3.8		12.2
Legaspi					4.8	22.3	9.1	.3		5.1	9.7	1.3	2.3			47.1
Sumay, Guam						5.1										5.1
Calapan			8.9		8.9	2.8	.8			.5						1
Virac					6.4	18.1	10.2	1			2	5.5	5.1		28.4	54.6
Naga					4.1	6.6										
Tigaon					4.1	7.1	3.6						1.3		2	
Batangas					2.3	1.3	1									
Lucena					25.2	19.5	9.2									
Atimonan					2.8	21.9	3.3	2.1				3.6	4.1			
Ambulong, Tanauan				1.3	4.3	1.3										
Canlubang, Calamba				1	9.4	2.3	3					1	3			
Paracale	1.5				11.5	26.5	30.6	4.6			2.8	22.7		.5	2.8	
Santa Cruz, Laguna					4.6	2.1	6.3	1.6								
Fort Mills, Corregidor ^{a b}																
Alabang, Rizal ^a								.3								
Lamao, Bataan ^a																
Manila								10.7								
Antipolo																
Bosoboso, Rizal ^a								1.5								
Montalban, Rizal ^a									6.6							
Hacienda Pintong Sapang, San Jose, Bulacan ^a								6.1	7.9							
Mabayuan Dam, Olongapo, Zambales ^a																
Iba																
San Isidro																
Tarlac																
Baler					10.4	2.3	20.3	15.4	3.1			3	5.3	2.6		

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 7 a. m.

* No observation.

Daily rainfall at the stations of the Weather Bureau, February, 1919—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Paniqui, Tarlac ^a	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
C. L. A. S. Muñoz, Nueva Ecija ^a															1.3	mm.
Dagupan																
Bolinao																
Baguio								11.2	.5							
San Fernando, Union																
Echagüe				.3	2.8	1.5										
Sagada, Mountain Province ^a													17.5			
Bontoc, Mountain Province ^a													9.7			
Candon																
Vigan																
Tuguegarao													2.5	2		
Laoag																
Aparri				9.4	6										3.5	
Cape Bojeador			2	3.5												
Santo Domingo, Batanes	2	9.7	12.7	6.4		7.1		19.6	1.5	22.9	5.4		.8	2.6	24.1	

^a Voluntary or coöperative station.

Daily rainfall at the stations of the Weather Bureau, February, 1919—Continued.

Station.	Day of month.												Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo				1		4.8	22.8						33.4
La Union, Davao ^a									10.1				76.2
Isabela, Basilan							.5						29.4
Basilan Plantation, Isabela (Basilan) Office ^a								1.3					34.5
Zamboanga							7.4						25.2
Davao	38.1	39.4		3.6			6.9		1.5				141.3
Sirib, Guianga, Davao ^a	14.2	4.3		13.7					13.7		33		135.5
Cotabato			2			7.6	8.1		7.9				40.6
Moncayo, Davao ^a										8			35.8
Camp Keithley, Lanao			.3			.5	3.3						25.9
Cagayan, Misamis					7.6		3.8						17.8
Dapitan	.8	5.1		5.1	5.8	1.8	.5						61.2
Butuan		16.7		6.9	8.9	1.1	7.1				1	8.9	99.4
Mambajao			3										100.3
Dumaguete	5.3				1		10.2						27.2
Yap, Western Carolines			.3		6.7				0.6	1.8		.5	58.2
Tagbilaran								1.8					18.2
Iwahig													1.8
Surigao	2.3	2.8	2.8	7.7	17.6	1.8	8.6			5	.5	7.9	198.5
Maasin		19.3										6.9	26.2
Cebu		.3	.8				.3				9.4	.5	27.1
Hacienda Vallehermoso, Oriental Negros ^a		2	4.8			1.5							11.3
La Carlota, Occidental Negros ^a					22.1								23.4
Hacienda San Antonio, Occidental Negros ^a											1.5		0
San Carlos, Occidental Negros ^a			2			1.5							11.3
Hacienda Refugio, Occidental Negros ^a													0
Iloilo													0.5
San Jose Buenavista													0
Guyo													0
Lucena, Iloilo ^a													0
Ormoc				2	.3							.8	12.3
Guiuan	6.6	6.7	6.9	9.6	4.8	1.8					6.9	3	119.7
Dueñas, Iloilo ^a													2.8
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a				1.5									10.8
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a													3.1
Tacloban	2.5	1.8	4.3	5.5		1.3					8.4		65.6
Dumarao, Capiz ^a													2.5
Dao, Capiz ^a							5.1				3.6		22.7
Capiz				.5									10.9
Borongan	2.3	1.6	20.1	36.6	3.3	18.3		2.3			5.5		217.5
Catbalogan	.5	5.3	2.3	6.6	16.8						1.6		62.9
Calbayog	5.1					.3	.3				2.5		26.2
Masbate										2.8	.8		22.2
San Jose Estate, J. Abello D-13, Mindoro ^a													0
San Jose Estate, Tamaraw Plantation, Mindoro ^a													0
San Jose Estate, San Agustin, Mindoro ^a													0
San Jose, Mindoro ^a													0
San Jose Estate, Tunnel D-12, Mindoro ^a													0
Romblon									1.8	14.2			41.1
Batag	7.1			8.9							7.6	1.5	154.8
Sorsogon							10.7		5.1	17.2	5.9	1.3	95
Legaspi									7.4		19.5	5.3	134.2
Sumay, Guam											3.8		14
Calapan			17						1	1			41.9
Virac			.3						16.8	4.1			152.5
Naga									3.8				14.5
Tigaon									7.9	3	4.6		33.6
Batangas													4.6
Lucena													53.9
Atimonan	1.5	1.5							2.5	2.8			46.1
Ambulong, Tanauan													6.9
Canlubang, Calamba													19.7
Paracale	.8	8.9	20.8						7.8				141.8
Santa Cruz, Laguna													14.9
Fort Mills, Corregidor ^{a b}													0
Alabang, Rizal ^a													0.3
Lamao, Bataan ^a													0
Manila													10.7
Antipolo				.3									0.3
Bosoboso, Rizal ^a													1.5
Montalban, Rizal ^a							13.5						20.1
Hacienda Pintong Sapang, San Jose, Bulacan ^a													14
Mabayuan Dam, Olongapo, Zambales ^a													0
Iba													0
San Isidro													0
Tarlac													0
Baler	57.1		61.3	76.2							3		257.3
Paniqui, Tarlac ^a													1.3
C. L. A. S. Muñoz, Nueva Ecija ^a													0
Dagupan				10.7									10.7
Bolinao													0
Baguio			.3										12
San Fernando, Union													0
Echague													4.6
Sagada, Mountain Province ^a													17.5
Bontoc, Mountain Province ^a													9.7
Candon													0
Vigan													0
Tuguegarao													4.5
Laoag													0
Aparri								2.8					16.3
Cape Bojeador													5.5
Santo Domingo, Batanes					15.2							10.4	140.4

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 7 a. m.^c 27 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, FEBRUARY, 1919.

Day.	Jolo.		Isabela, Basilan. ^a		Zamboanga.		Davao. ^b		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Dapitan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.9	22.5	33.6	23.1	32.5	23.2	34.7	17.5	31.9	20.9	25.8	19.5	31.4	20.1	28.7	22.2
2	30.6	21.4	34.6	21.7	28.2	22.4	31.5	18.5	29	19.5	25	14.6	29.5	18.9	30.4	24
3	29.5	24.7	33.6	23.1	29.5	23.2	33.2	18.5	32.3	22.4	25.8	19.3	30.3	22.6	30.1	21.6
4	29.6	23.5	33.6	22.1	30.7	22.9	33.2	20.3	30	22.4	22.8	18.5	28.8	22.6	29.8	22.2
5	29.4	23.6	34.1	22.6	32.5	24	30.2	21.1	31.3	22.4	24.9	18.8	31.2	21.1	29.6	22.5
6	31.1	24.1	34.6	21.1	32	22.8	31	18.5	32.2	22.5	27.8	16.2	31.4	21.2	29.7	23.1
7	31.2	22	33.3	22.1	33.1	22.6	32.2	19.3	32	20.6	26.8	13.5	33.6	18.8	31	22.3
8	30.1	22.1	34.6	20.7	30.3	22.3	33.7	21.2	31.2	22.5	24.8	17.1	30.8	22.1		23
9	30.5	22.4	33.6	22.6	31.7	22.8	33.2	21	30.9	21.8	25.4	18.1	31.6	19		
10	32.5	21.9	34.1	21.1	32.5	22.5	34.1	21.5	32.4	22.9	26	18.5	31.4	21.7		
11	29.9	23.1	33.1	22.1	30	22.4	34.7	19.9	31.2	22.4	26.5	17	29.4	21.4	30	23
12	31.4	25.3	33.6	22.6	29.9	23	34.6	19.9	31.7	23.4	26.1	19.1	30.9	20.6	30	23.7
13	30.1	23.5	34.6	21.6	33.1	24.5	32.9	19	33.7	23.1	27.5	17.9	32.5	21.8	30.6	23
14	33.6	22.7	35.6	22.1	31.7	23.3	33.7	18.1	30.2	20.8	28.3	15.6	31.9	18.5	30.7	23
15	28.7	20.9	34.6	20.6	28	22.2	33.9	21	31.2	21.4	27.6	17	30.5	21.6	32	22.9
16	30.2	21.6	33.1	22.1	28	22.8	34.2	20.1	31.5	22.2	27.9	18.3	30.8	22.1	33	22.8
17	30.3	22.7	33.6	22.3	28.4	22.5	34.2	22.1	31.9	22.6	28	15.3	31.6	22.6	33.1	21.8
18	31	22	34.1	22.1	28	22.9	34.7	21.4	32.4	24.2	28.2	17.2	31.4	22.1	31.5	22.6
19	31.2	22.2	33.1	21.9	28	23.2	32.5	20.8	31.2	23.4	26.6	19.5	32.1	22.4	31.5	23.5
20	29.6	22.5	34.9	21.6	29.2	23	33.7	19.4	32.3	23.4	27.4	18.6	31.9	21.8	31.2	23.9
21	31.1	22.2	33.6	21.8	27.5	22.9	33.9	21	32.2	23	27.8	17.9	31.5	22.1	30.4	24.5
22	31.5	24.2	35.8	22.6	31.7	22.9	33.1	20	31.8	23.6	27.9	18	31.4	22.2	31.1	23.9
23	29.7	23.8	36.1	23.1	27.8	24.4	34	20.6	32	22	27.1	17.1	31.1	21.4	31.5	24
24	30.3	23.5	36.6	23.6	32.5	24.2	33.2	22.6	32.5	22	26.6	19	31.5	20.2	31.5	22.8
25	30	20.9	34.6	21.3	30.9	21.9	31.7	21.5	31.7	20.5	25.1	17.6	31.6	19.8	29.7	21.6
26	30.7	22.4	35.6	20.6	28.5	22.7	30.7	23.5	31.2	23.5	25.3	18	30	23.1	30.6	21.8
27	31.1	22.2	32.6	23.6	31.9	23.8	33.1	22.9	32.4	22.2	27.4	15.1	33.6	20.5	31.7	21.8?
28	29.8	21.6	33.1	21.6	28.5	23	33.9	20.6	31.9	21.4	28	15	30.9	20	32.2	23
Mean	30.6	22.7	34.2	22	30.2	23	33.2	20.4	31.6	22.2	26.6	17.4	31.2	21.2	30.9	22.9

Day.	Butuan.		Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.8	20.5	29.3	22.5	29.3	21.5	31.6	23	30.8	19.4	31.5	15.1	29.4	22.1	31	19
2	30.6	20.2	27.3	23.9	30.3	22.7	30.7	24.9	30.5	22	32.1	16.9	27.3	23.1	30.5	21.8
3	32	21.3	29.7	21.9	28.9	22.9	31.8	24.5	30.7	21.9	31.2	16.3	28.1	22.7	31	21.7
4	28	21.9	26	22	28.6	24.2	32.4	24.5	30.9	21.9	32.8	16.9	27	23.2	31.2	23
5	29.6	20.7	28.5	23.5	29.2	23.2	32.3	24.8?	31.7	20.6	31.1	15.9	28.3	23.4	31.4	21.6
6	31.9	19.1	29	22.9	28.2	23.8	30.9	22	32.7	21.5	31.6		29	23.9	31.5	22
7	31.4	20.5	29	21.3	28.4	23.7	30.7	23	33.3	20.6	31.1	17.3	28.8	24.9	31.7	21.8
8	30.1	21.6	29.3	23.9	29.8	23.7	31.2	23.5	31.9	20.2	32.1	16.9	28.5	24.3	32	21.8
9	31.7	20.4	29.6	23.6	29.8	23.6	32	24.4	32.7	19	31.7	17.8	28.9	24.4	33	21.5
10	32	20.8	29.1	23	29.2	23.6	32.2	24.3	30.2	20.4	31.6	16.6	28.9	23.8	31.9	21
11	30.6	22.7	28.4	23.1	29.5	24.7	32.2	24.5	27.8	22.5	32.2	18.1	28.7	23.3	31	21
12	30.1	21.2	29.8	23.4	28.4	23.6	32.8	24.1	32	22.8	31.8	18.3	29.3	24.3	32.2	21.5
13	31.8	21.9	30.1	23.9	29.6	24.3	32.9	23.2	30.8	22.4	31.8	18.5	29.7	23.6	31.5	22
14	33	19.4	29.4	22.5	30.6	24.4	31.4	23.6	31.1	20.5	31.8	17.6	30	22.4	33	20.8
15	30.5	22.2	28.3	23.4	29.9	24.7	32.2	25.1	31.2	22.4	31.1	16.9	29.2	23.6	33.2	21.8
16	32.7	21.4	29.7	21.8	29.4	25	32.4	23.5	30.4	22.9	33.2	18.9?	28.9	23.7	33.8	21.6
17	32.9	23.1	29.8	22.9	30.5	24.4	31.2	23.5	31.7	22.4	33.4	18.1	29.8	23.8	33.3	22
18	32.4	23.7	30	24	29.9	24.4	32.4	23	29.6	23.2	32.6	17.3	29.6	24	32.2	22
19	33.1	22	29	24.8	30.4	24.9	32.2	24	31	21.1	32.4	18.3	29.7	23.8	31.2	22
20	32.1	22.4	28.8	23.9	30	25.4	32.3	23.8	31.4	21.9	32.6	17.3	29.3	22.7	32	21
21	31.6	23	29.4	24.5	30.9	25.9	33	24	31.3	22.9	33.2	17.5?	28.5	24	32	21
22	32.9	22.6	30.1	24.2	29.3	24.4	32.2	23.5	31.9	22.6	32.7	18.4	30	23.9	32.2	21.8
23	29.6	21.9	29.3	25	29.4	25	32	23.6	32.2	22.5	32.7	18.4	27.8	23.4	33	22.5
24	32.7	21.2	30.3	24.1	29.6	24.9	32.8	23.5	32.3	20.9	33.5	17.3	29.8	23.1	33.5	21
25	32.4	19.5	29.8	24.4	29.4	23.4	33.4	24.2	31.5	18.9	32.9	17.9	29.2	23.6	32.1	21
26	29.9	22.4	28.5	23.8	31.2	25.1	32.7	24.1	32.6	21.6	32.1	15.7	28.8	25.7	33.4	20
27	32.9	19.7	30.9	23.6	30	24.3	32.8	24.2	32.2	20.9	31.8	19.4	30.1	24	32	20.4
28	32.1	21.3	29.5	22.5	29.9	25.3	32.9	25	32	23.2	32.6	18.5	28.9	23.1	31.6	21.4
Mean	31.6	21.4	29.2	23.4	29.6	24.2	32.1	23.9	31.4	21.5	32.2	17.5	29	23.6	32.1	21.4

^a The maximum temperatures of this station are not reliable; they seem to be too high.

^b The minimum temperatures of this station from 1 to 23 are not reliable; they are lower of about 1.3°C.

Maximum and minimum temperatures at the stations of the Weather Bureau, February, 1919—Cont.

Day.	Cebu.		Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	29.5	22.9	31	22.7	32.3	19.5	29.6	24.3	31.9	19.6	31	21.7	31.3	22	30.6	22.6
2	31	22.5	30.3	22.4	33.7	18.6	29.8	24.8	32.3	19.4	31.1	24	31.7	21.5	31	22.6
3	29.7	23.4	30.4	23	32.3	21.1	29.6	24.8	32.8	19.8	30.9	23.3	34.3	22.7	30.6	22.8
4	30.1	23.8	29.9	22.7	32.8	20	28.1	24.5	32.8	20.4	30.2	23.3	32.2	22.5	30.1	21.9
5	29.8	23.9	30.7	21.7	33.7	20	28.4	24.7	32	22	29	23.4	30	22.5	30.7	24
6	29	22.8	29.8	22.3	34.2	20	28.8	24.6	32.2	23	31.5	21.8	32	22	30.3	23.1
7	29.1	23.4	30.7	23	35.6	20.5	29.6	24.2	33	21.2	31.6	23.7	33.7	22	30.7	23.2
8	29.9	24.1	30.7	23.3	32.8	19	28.8	24.9	32.4	21.4	31.7	23.3	31.6	23	30.8	23.1
9	29.2	23	30.8	22.8	34.4	18.1	29.4	24.4	32.8	22.4	30.7	23.4	32.6	22	30.7	23.3
10	28.9	23.4	31.2	22.4	31.8	18.6	29.4	24.2	33.2	21	31.5	23.7	30.5	22	30.2	23.1
11	29.2	22.8	29.8	23.3	32.3	21	28.3	24.8	30.7	22.4	31.9	24	29	22.7	29.4	23.2
12	28.8	23.6	31.2	22.9	32.2	24	31.7	25.5	32.7	22.5	31.8	23.5	32.2	23	30.9	23.4
13	29.5	23.2	31.4	23.4	32.2	20.1	29.5	24.6	32.6	22.4	31	23.2	30.5	20.8	31.3	23.5
14	29.9	23.7	31.4	22.8	32.7	19	30.2	25	32	19.2	31.6	21.6	32.7	20.5	31.7	23.6
15	29.7	24.6	30.9	23.7	32.7	19.7	29.1	25.1	31.9	20.5	30.9	23.7	30.6	24.1	30.6	23.8
16	30.3	23.5	32.8	23.7	33.3	23	29.4	25.4	32.4	21.6	30	22.8	33.7	23.1	30.5	24.4
17	30.8	23.6	32	23.2	32.7	22.3	29.8	25.2	32.5	21.6	30.3	22.5	33.5	22	31.1	23.5
18	30.5	24.3	30.5	23.2	31.7	21.4	29.9	25.3	32.2	20.8	30.2	24	32.7	23.5	31.1	23.3
19	29.9	24.5	31.2	23.6	32.1	20	31.2	25.3	32.1	21	30.6	23.5	31	23.6	32.1	24.2
20	30.6	25.1	31.5	24.1	32.4	21	30.4	25.1	32	22	30.2	23.7	27.8	23.8	31.3	24.6
21	30.9	24.6	32.3	23.8	32.2	21.2	31.3	23.8	32.2	21.1	32	23.2	33	22.7	31.7	23.3
22	30.1	25.5	33.2	23.7	32.3	21.4	30.6	25.5	32.1	21.4	31.3	23.9	32.5	23.2	32.5	24.2
23	30.6	24.6	32.5	24.3	32.7	21.2	30.3	25.7	33.6	21.9	31.7	24.2	34.2	23.7	32.2	23.5
24	30.8	25.3	32.3	24.4	33.6	21.5	31	25.6	33.7	23.4	31	24.8	34.2	21.5	31.8	23.6
25	30.2	23.3	30.8	22.6	33.3	18.5	29.8	25.5	33.3	19.4	31.2	24.2	34.2	22.2	31.1	22
26	29.7	23.3	32.2	22.4	33.3	20	28.7	24.8	33.6	19.8	31.3	24.6	34.8	21.4	30	23.5
27	29.7	24	31.8	23	32.7	19.5	29.9	25.1	33.4	21.3	31.2	24	31	22	31.2	24.3
28	30.4	23	31.1	23.7	33.7	21.6	29.9	24.8	31.9	22.3	30	22.9	30.3	22.6	31	24.6
Mean	29.9	23.8	31.2	23.1	32.9	20.4	29.7	24.9	32.5	21.2	31	23.4	32.1	22.4	31	23.4

Day.	Borongan.		Catbalogan.		Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.1	22.8	30.6	19.5	31.9	20.4	30	22.8	30.9	21.9	30	22.7	29.7	21.4	30.4	21.7
2	29.5	21.5	32	20.5	32.7	19.9	30	22.8	30.7	22.5	29.9	23.5	31.4	20	30.4	23.8
3	30.1	23.8	32.5	19	32	20.8	30	22.2	31.3	21.2	29.4	23.2	29.6	20	29.8	24.1
4	29.8	21.8	30.9	18.5	32.2	20.2	29.6	21.5	30.7	22.2	30.5	22.4	30	19	30	23.1
5	28.6	23.6	30.6	19.7	30	22.4	29.6	24.6	31.5	23.4	28.7	21.9	29.1	22.9	30.2	24.6
6	29.6	23	30.1	22.2	30.2	21.9	29	22.5	28.7	22.4	28.4	21.8	28.7	21.9	27.4	23
7	30.3	24.6	31.2	20.5	31.5	21.1	30.6	23.4	30.4	22.6	29	22	30	21.9	28.9	23.7
8	30.3	23.7	31	21.2	29.6	21.5	30.4	23.5	30.5	23.9	29.4	23	29.7	22.9	29.8	24
9	30	24.7	30.8	19.4	31.7	20.5	30.8	23.4	31.5	24.1	29.8	23	29.5	23.4	29.6	24.5
10	29.8	23.7	30.2	19.5	30.2	20.5	29.8	23.2	31.1	23.9	27.4	22.8	29.1	22	29.8	23.8
11	29.4	22.8	29.2	22.5	30.3	21.7	29.4	22.6	30.1	22.9	27.8	22	28.6	22.1	29.8	21.5
12	30.2	22	31.3	22.2	32.2	22.1	30.4	22.4	30	23	29.2	22	30	22.4	30.5	23.1
13	30.3	24.7	30.7	20.6	31.4	21.1	31	23.6	30.1	24.3	28.8	22.8	30	23.4	29.8	24.5
14	30.3	20.6	32.2	18.5	31.1	20.4	31	22.8	31	23.4	29.3	23	29.6	21.8	30.8	24.1
15	28.3	23.9	28.6	21.7	30.5	23.9	30.8	24	31.5	23.4	28.6	23.3	29.9	23	31	23.5
16	29.8	23	30.6	21	32.3	22.4	29.6	24	30.5	23.7	29.5	23	30	23	29.6	23.6
17	29.5	21.9	30.4	21.7	29.2	22.6	29.8	23.6	31.2	22.1	28.5	23.4	30.7	21.4	30.8	21.9
18	30.5	23	29.8	20.8	31.7	20.8	31.2	23.5	31.3	23.2	28.8	23.5	30	23.5	31.1	24.6
19	30.7	23.5	30.8	20.8	32.1	21.4	31	23.4	31.5	23.4	29	23.8	30.6	22	30.8	24.6
20	27.1	23	27.8	21.8	30.1	23.3	30.6	23.8	30.9	23.5	29.3	24.2	29	23.1	30.9	25.4
21	30.2	22	30.7	20.5	31.3	22.4	31.8	24.6	32	22.7	29.7	22.4	31.6	22.8	30.9	25.5
22	30.8	22.6	32.5	21.5	30.8	22	31.6	24.5	32.7	22.7	29.9	24.2	32	23.5	31.6	25.3
23	30.6	23.4	32.2	21.5	31.5	21.4	31.6	23.4	30.8	23.7	30.1	23.7	30	22	31.9	25.1
24	30.4	25.3	32.3	21.2	33	21.4	31.8	24.6	32.4	23.2	29.9	24	31.4	23	31.9	25.1
25	30.4	21	32	18.5	32.5	19.4	31.4	23	32.1	22.9	29.6	22.9	30	21	30.9	24
26	30.6	19.7	32	17.8	31.9	19.2	27.8	23.4	26.8	21.7	28.3	23.4	28	20.9	26.6	22.3
27	29.5	25.5	30.6	23.8	30.1	22.1	29.4	23	31	23.4	28.4	22.6	28	22.5	28.1	23.6
28	30	24.8	30.4	20.6	32.8	22.2	31.4	23	31.6	23.4	29.7	23.8	30.2	22.4	30.7	24.5
Mean	29.9	23.1	30.9	20.6	31.3	21.4	30.4	23.3	30.9	23	29.2	23	29.9	22.1	30.1	23.9

Maximum and minimum temperatures at the stations of the Weather Bureau, February, 1919—Cont.

Day.	Sumay. Guam.		Calapan.		Virac.		Naga. ^a		Tigaon.		Batangas.		Lucena.		Atimonan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	28.6	23.8	30	21.2	30.5	18.9	32.4	16.2	30.9	17.6	32.2	19.4	29.8	20.2	30.1	20.4
2	28.6	23.2	30.1	22.5	30.5	18	32	15.9	30.6	17.3	32.7	20.4	29.8	21.4	31.1	24.2
3	29.2	23.6	30.4	21	30.5	18.6	30.3	13.9	31.5	17.1?	33.2	19.4	29.9	19.9	28.4	24.4
4	29.6	23.8	30.2	19	32.2	17.1	30.1	13.1	31.1	14.4	32	18	30	18.9	28.2	24.5
5	28.8	23.4	29.7	20.9	31.5	18.6	30.3	-----	32.3	20.4	30	18.2	26.7	19.9	26.9	22.1
6	27.8	23.4	28.5	22.5	28.9	21.1	28.9	-----	30.6	21.2	29.2	21	26.5	21.4	25.3	21.9
7	27.6	23.2	29.5	22.6	29	22	29.7	18.3	30	22	30.8	22	27.6	21.6	25.9	22.5
8	30	23.2	30	22.4	30	22.3	33	18	30.2	20.2	32.5	21	30.2	21.6	28.4	21.3
9	29.8	23.4	28.5	22.5	31.5	20.1	31	16.2	31.1	18.3	32	21.4	29	20.5	27.6	24.3
10	29.8	23.8	29.8	23.9	31.2	18.7	31.2	14.5	30.9	17.6	32.5	19.1	29.4	20.4	27.3	24.1
11	30.4	23.6	30	22	31	20.5	30.5	19.4	30.2	19.6	33.2	20.6	29	22.4	27.8	24.3
12	30	23.6	30	22.3	29.9	22.3	31.2	18.3	30.9	21.8	32	23.8	29.2	21.9	27.7	23.2
13	30	24.2	29.2	23	29.9	21.6	33	16.9	29.5	19.6	34.2	22.7	31	22.2	29.5	21.7
14	30	24.6?	29.6	23	31.6	19	33.5	16	31.4	19	33	22.4	31	21.6	30.5	24.4
15	30	24.2	29.4	23.5	32	21	31.5	15.6	31.7	18.2	33.2	21.8	30.1	21.2	28.2	24.6
16	29.4	24	30	22.5	28.9	21.5	31	21.2	30.6	22.1	33	22	30.7	22	29.4	24.8
17	30	24.6	29	22.5	30	20.3	31.4	-----	32.1	19.6	32.2	22.6	30.9	20.6	28.8	25.1
18	30	22	30.5	22.5	30.3	19.3	32.3	16.5	31.2	18.2	34.3	21.7	29.9	20.4	29.9	21.4
19	31.2	23	30.6	24	30.4	20.5	33	16.7	30.7	18.8	34.4	22.4	30.3	21.5	30.1	21.9
20	30	24.6	29.5	21	29.8	22	32.3	17.5	30.4	19.4	33.9	21.5	31.5	21.2	30.4	22.1
21	30	24.6	31.1	21.8	31.4	21	33.1	18.3	31.4	20.9	34	21.3	31.6	22.1	30.6	22
22	31	24	31	21	31.5	20.5	32.7	17	32.1	21.2	34.7	20.4	30.5	21.2	30.5	21.3
23	30.8	23.4	31.5	21.5	31.6	20	33.6	17.9	32	21.4	35.3	22.4	32.3	22.4	30.7	22.1
24	30	24.4	30.5	21.8	31.4	21.4	33.6	17.6	31	21.1	34.4	21.3	31.5	21	31.2	22.1
25	30.8	24.8	31	22	31.2	19	31.9	16.4	32	18.7	33.7	21	31.3	21.5	28.6	23.5
26	30	22.6	28.4	23.1	29.2	21.2	26.6	20.2	30.5	21.1	32.8	21.8	28.5	22.2	26.9	24.4
27	30.2	23.4	29.5	22.6	29.9	21.5?	30.4	-----	31	18.3	34.4	23	29.7	20.4	28.9	24.3
28	27.6	23.6	31	22.5	32.5	20.7?	32.3	-----	31.3	17.6	34.8	21.7	30.6	21.2	29.4	24.2
Mean	29.7	23.7	29.9	22.2	30.7	20.3	31.5	17	31	19.4	33	21.2	29.9	21.2	28.9	23.1

Day.	Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.9	20.2	32	16.9?	29	21	31.3	19.8	32.7	18	32.9	18	31.6	17.8	32.9	18.4
2	32.4	21.5	31.6	16.7?	29	23.5	31.5	21.5	32.1	18.3	32.7	18.6	31.3	18.3	32.9	17.9
3	31.1	20.3	32.4	19	29.7	21	30.8	19.5	31.8	16.7	33.2	17.4	31.5	18.1	31.6	18.4
4	30.2	19	32.5	16.9	29.7	19.9	31	17.2	30.6	16.7	33.3	16.3	31.3	17.5	32.8	17
5	26.7	20.3	28.6	19.9	27.5	22.5	27.7	19.9	28.2	19.1	30.7	19	31.6	19.3	31.2	19.4
6	26.2	20.8	28.8	20.1	24.9	22.3	27.7	21.6	32.9	20.4	31.7	20.6	31.6	21.5	31.1	21.2
7	27.3	21	28.4	20.6	26.2	22.6	27.7	21.6	32.4	20.8	31.5	19.8	31.7	20	32.4	18.3
8	29.9	21.9	31.9	20.7	28	22.4	29.1	21.8	29.2	21.5	31	19.8	32.2	20.9	32.1	22.6
9	30.4	20.9	32	20.4	28.7	23.5	30.6	20.8	32.2	19	33	18.7	32.9	22.1	32.4	20
10	29.7	20.8	32.2	19.5	28.4	23	30	18.1	32	17.1	33.2	17.8	31.6	22	32.6	17.4
11	31.6	21.2	31.6	18.4?	29.2	24.7	30.7	21.1	32.1	17.4	34	16.8	31.5	18	33	17
12	29.4	22.3	30.9	19.4	28	23	30.1	19.9	31.6	18	32.5	18.3	32.1	18.1	32.5	17.6
13	31.9	22.2	31.9	19.5	28.3	22.6	31.6	21.3	31.8	21.8	33.9	18.8	32.2	20.5	33.1	21.8
14	32	22.5	31.8	19.6	29	21.5	31.5	22.4	33	21.1	33.7	21.3	31.8	19.6	31.5	21.8
15	30.9	21.2	31.9	19.4	29.6	23.8	31.1	21.6	32.7	18.2	33.6	19.2	32.4	18	33.1	19.4
16	33.2	20.7	33	19.4	29.7	22.9	32.6	20.6	32.2	20.6	34.3	19.4	32.7	19.4	35.1	20.5
17	32.2	21.5	32.9	19.2	29.2	22	32	20.1	31.8	21.7	33.5	19.7	32	20.2	33.9	20.2
18	29.6	20	32.2	19.4	29	23.5	29.1	20.3	32.6	21.4	33.3	19.7	30.5	18.5	32.8	20.5
19	30.5	21.9	32.3	19.6	28.1	23.3	30.6	20.4	32.7	20.4	32.7	19.7	32.5	19.5	33.5	20.4
20	32	20.6	33.4	19.4	28.1	23.3	32.1	21.9	33.1	21.1	33	20.5	31.5	20	30.9	21.5
21	32.3	19.7	34	19.9	30.2	21.2	33.1	20.5	33.2	20.2	34.9	19	32.1	19.5	35.4	20
22	32.7	20	34.2	20.4	30.2	21.7	33.6	21.2	33.9	20.7	35	20.2	31.9	18.5	35.5	20
23	33.7	21.2	34.4	21.3	30.3	23.2	33.2	21	33.3	20.7	35.5	20.2	32.8	19.5	35.6	22.6
24	34.4	21.1	34.1	20.9	30.4	23.2	32.5	20.7	33	21.3	33.5	19.8	32	19	34.7	21.8
25	31.3	21.9	34	21	30	21.7	30.5	21.6?	30.6	20.8	32.6	19.9	32	19.2	32.5	21.6
26	30.2	22.7	34.1	20.8	26	23.5	28.4	22.7	30.8	19.7	32.5	20	34	21.1	32	19.7
27	32.1	23	33.8	20.3	29.8	24.4	31	22.2	32.5	18.5	34.3	20.3	33.3	19.4	33.4	18.2
28	32.7	21.1	33.6	20.4	30	24	31.4	21.5	32.4	18.8	33.5	18.5	32.1	19.6	33.4	18.9
Mean	31.1	21.1	32.3	19.6	28.8	22.7	30.8	20.8	32	19.6	33.2	19.2	32	19.5	33	19.8

^a The minimum temperatures of this station are not reliable; they are lower of about 1.4°C.

Maximum and minimum temperatures at the stations of the Weather Bureau, February, 1919—Cont.

Day.	Tarlac.		Baler.		Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	35	15.6	29.4	18.4	34.8	19.2	30.2	19.4	23.5	12.2	30.3	17.8	32.8	15
2	34.8	17.4	29.7	18.5	34.1	19.1	32.2	19.5	23.3	12.6	30.9	19.5	32.8	15.6
3	35	16.6	28.2	19.3	35.2	20	33	23.4	23.6	13	31.7	19.4	31.7	19.4
4	35.5	17	29.4	17	32.2	21.2	30	25.2	22	13.1	30.6	21.9	31.3	17.3
5	33.8	19	28.6	21	33.7	21.4	31.4	21	21	12.1	30.4	20.4	25.1	18.4
6	32.5	20	27.1	20.5	34.4	20.4	32	20.7	23.1	12.9	30.1	19	27.7	17.4
7	35	19.6	28	20.7	35.4	19.5	33.8	19	23.9	13	31.2	18.3	30	17.3
8	36.4	21.2	28.5	22.1	32.2	20.4	29.9	20.2	24.8	13.4	30.3	19.6	32.9	17.3
9	35.7	19.2	29	21.2	35	21.2	33.1	20.5	23.5	14.4	30.3	20.3	32.7	18.2
10	36.1	17.6	29.2	19.1	32.9	19.9	32	20	21	13.7	30.5	19.2	32.7	17.8
11	35	16.4	29	18.8	34.5	20.7	31.8	20.1	23.6	12.4	30.4	20.4	32.9	17
12	34.6	17.2	28.9	18.2	36	19	34.8	21	25.3	13	31.9	18.7	32.4	16.8
13	35.5	20.2	29.1	21.1	31.5	21.4	30	21.4	24	14.3	31	19.6	34.5	17.4
14	34.5	19.8	29.6	21.8	31.8	21.7	29.9	23.4	23.6	14.8	31.3	21	32.5	21
15	35.8	18.2	29.3	19.8	34.6	22.5	33.5	21.1	24.4	14.2	31	20.7	33.5	20.4
16	37.4	19.5	29.5	18.9	32.4	21.8	30	24.8	24.9	13.5	31	19.5	32.7	17
17	36.2	20.4	30.1	19.6	29.5	23.4	28.4	24.1	23.9	12.7	30	21.5	31.6	20.2
18	33.6	19.4	28	20.2	33.6	19.4	30.5	23.5	24.1	13.2	30	18	31.5	19.7
19	35	19.4	28.9	21.6	35.6	20.9	32.5	19.6	24.7	13.3	31.2	19.8	32.4	18.7
20	33.5	19.6	27.8	21.7	34	21	33.2	20.3	23.9	14.4	31.5	20.6	32.7	20.5
21	35.2	18.8	30.6	19.8	33.2	21.1	31.8	22.1	25	13.8	31.7	21.1	35.6	17.5
22	36.6	19.4	30.3	21.3	32.2	21.2	29.9	21.7	26.4	14.1	31	18.7	34.3	21.5
23	37.8	19.8	30.6	21.7	34.4	21.3	32.6	20.7	25.3	14	32	19.5	35.7	20.8
24	37.4	20	30.8	22	32.8	22	30.5	21.6	24.9	14.8	31.6	19.4	34.6	20.8
25	35.4	19.5	29.5	19.9	33.5	22	29.6	24.8	24.3	13.7	31.1	20.2	27.7	20.4
26	34.5	18.2	28.8	19.4	35.3	21.2	33.4	23	24.7	13.2	33	22.6	31	18.5
27	34.6	18	29.5	20.5	35.4	21.5	33.2	21.8	23.5	12.4	32	20	33.7	19
28	35	17.6	29.3	19.6	34.5	21.4	33.2	24	22.6	12.8	31.3	21.5	33.1	16.5
Mean	35.3	18.7	29.2	20.1	33.7	20.9	31.7	21.7	23.9	13.4	31	19.9	32.2	18.5

Day.	Candon.		Vigan.		Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.5	19.7	30.8	20.1	33	18.3	32.1	17	30.6	19.5	29.6	20.7	25.3	18.4?
2	32	20.5	30.8	20.1	34	18.5	31.1	18	31.2	18	30.6	20.5	24.2	18.4?
3	31.6	21.5	30.9	20.5	33.9	20.6	32.9	18.6	29	20	28.1	22.2	24.2	17.3
4	31.7	21.5	28.8	20.9	29	19.3	28.1	20.5	24.3	19.2	23.3	20.7	19.8	16
5	32.5	21.6	31.6	19.4	24.6	18.3	30.2	19.8	22.3	18.6	22.3	16.4	20.5	16
6	31.5	20.5	32.3	21.8	28.1	17.2	33.1	16	27	18.9	27.3	18.3	23.2	18.3
7	31.7	20.4	30	20.5	30.2	16.6	32.1	15.7	29.9	17.8	31.2	19.2	26.7	20.2
8	32.2	21.2	31.9	21	34	17.8	32	18.4	32.4	19.2	30.8	22.1	29.4	23.2
9	32.2	21.8	30.2	21	33.1	19.2	33.1	15.3	29.3	19.8	27.3	22.1	25.4	20.4
10	31.5	21	30.2	19.6	31.8	18.8	31.2	16.5	29.8	18.6	26.4	20.5	25.3	20
11	31	23.2	29.7	23	33.1	20	31	17.2	29.5	19.3	28.5	21.5	23.2	18.7
12	31.9	21.1	30.6	23	33.6	19.2	31.2	19.5	31	18.8	30.7	21.3	27.3	21
13	32	21.5	30.9	21	35.1	19.4	31.2	19	32.6	20.1	30.3	21.8	25.8	22.7
14	32.8	22.5	31.3	20.5	32	22.4	34.1	18.6	25.8	22.2	27.3	22.3	27.5	20.7
15	32	23.5	30.7	24.1	33.5	21.9	32.4	19	28.6	21.5	29.4	22.3	24.6	21
16	32.2	21.5	33.5	21.1	33.8	20.4	32.7	19.9	30	21.5	30.2	22.2	26.2?	19
17	31	21	28.3	19.9	31.5	19.7	28.9	17	28.7	20.3	26.6	20.6	23.2	19
18	30.7	18.9	29.8	17.2	31	19.5	32.2	14	28.1	20.9	26.9	20.3	23.2	14.2
19	32	21	31.6	21.3	33	18.9	31.1	15.9	29.2	19.8	29.2	19	24.8	16.4
20	32	21	31.7	20.7	32.6	19.8	32.1	17.7	31	19	31.2	21	25.4	20
21	32.1	23.8	31.7	22.3	35.1	19.6	30.9	21.2	30.2	20.8	29.2	23.3	27.1	22.8
22	32	21.2	30.2	20	34.9	21.2	32.2	18.3	30.4	21.4	28.3	21.3	27.8	20.7
23	32.8	19.5	32	20	35.9	20.7	32.4	16.2	33.8	19.3	31.8	22.5	26.3	18.5
24	32.2	20.7	30.6	19.8	35.5	18.8	32.1	17	31	19.5	30	20.8	27.8	22.2
25	32.5	20.5	31.7	20	28.8	20.8	33.2	18.8	24.6	21	26.5	19.6	26.5	16.4
26	32.1	22.7	32.9	22.3	31.5	17	32.1	15.1	29.4	17.2	29.6	19.7	27	19
27	32.2	21.2	31.3	21.5	34.5	17.1	32	18	31	18.5	31.7	21.4	27.7	18.2
28	32.1	22.6	30.8	21	33.1	20.5	31.9	18.8	31.5	18.5	31.8	20.3	27.7	18?
Mean	31.9	21.3	31	20.8	32.5	19.3	31.8	17.8	29.4	19.6	28.8	20.8	25.4	19.3

SEISMOLOGICAL BULLETIN FOR FEBRUARY, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

- 1, 7^h 46^m [1, 15^h 46^m]. Ormoc (W Leyte). Earthquake shock of intensity II-III.
- 3, 19^h 26^m [4, 5^h 05^m]. Guam (Mariana Islands). Oscillatory earthquake of intensity III-IV.
- 4, 13^h 6^m [4, 21^h 6^m]. Cape Bojeador (NW Luzon). Earthquake of intensity IV-V, duration 8 seconds.
- 8, 13^h 28^m [8, 21^h 28^m]. Vigan (NW Luzon). Earthquake shock of intensity II-III.
- 8, 16^h 4^m [9, 0^h 4^m]. Ormoc (W Leyte). Oscillatory and subsultory earthquake, direction W-E, intensity V, duration 10 seconds. It repeated with intensity III at 14^h 53^m [22^h 53^m].
- 13, 23^h 5^m 18^{s*} [14, 7^h 5^m 18^s]. Eastern Visayas and Mindanao. Very extensive earthquake felt through eastern Mindanao and Visayas and in the SE part of Luzon, which represent an area more than 800 kilometers long. The origin of the disturbance lay in the Philippine Deep, but far off towards the meridian 127° E, near to the 11° N parallel; its intensity did not exceed degree III in any of the Philippine lands where it was felt.
- 15, 10^h 45^m [15, 18^h 45^m]. Camiguin Island (N of Mindanao). Earthquake of intensity III, near origin: recorded at Butuan.
- 17, 3^h 41^m 42^{s*} [17, 11^h 41^m 42^s]. E Mindanao. Earthquake felt lightly at Butuan and other places of eastern Mindanao. The origin lay far off to the east in the Pacific.
- 18, 21^h 5^m [19, 6^h 44^m]. Guam (Mariana Islands). Earthquake of intensity III-IV.
- 22, 17^h 12^m 0^{s*} [23, 1^h 12^m 0^s]. Butuan. (N Mindanao). Oscillatory earthquake, direction E-W, intensity III, duration over 30 seconds. Probable origin towards the east in the Pacific.
- 24, 21^h 26^m [25, 5^h 26^m]. Butuan (N Mindanao). Oscillatory earthquake of intensity III. Foreshock one hour earlier. Local and near origin.

¹The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0=6.62, \epsilon=2.726, \frac{r}{T_0^2}=0.021;$
 $A_E: T_0=6.03, \epsilon=2.373, \frac{r}{T_0^2}=0.037.$ Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.		
						A_N μ	A_E μ			
38	2	Iv	eP	h. m. s.						
			F	2 47 52						
39	2	Iv	eP	7 15 04						
			F	3 01						
40	2	Iv	eP	17 51 56						
			F	18						
41	2	Iv	e	20 49						
			F	21 15						
42	2	Iv	eP	22 21 08						
			F	25						
43	3	Ir	e	2 33 40						
			M _N	38 00					6	21
			M _E	38 03					6	16
44	3	Iv	F	3 04						
			eP	19 56 38						
45	5	Iv	F	20 06						
			eP	15 28 55						
46	5	Ir	(PS)	20 08 34						
			L	16 10						
			M _E	16 18					7	38
			M _N	16 21					7	49
			F	21 04						
47	9	Iv	eP	5 54 18						
			F	6 05						
48	9	Ir	(PS)	12 50 47						
			L	56 27						
			M _N	56 44					6	31
			M _E	57 00					8	14
			F	13 18						
49	9	Ir	eP	15 30 31						
			S	34 38						
			L	36 04						
			M _N	36 16					9	30
			M _E	36 37					8	21
50	12	Iv	F	16 19						
			eP	6 19 45						
51	12	Iu	e	12 49 43						
			L?	13 06 16						
			M _E	13 07 03					19	6
			M _N	14 08 22					19	10
52	12	Iv	F	14 02						
			eP	17 35 07						
53	12	Iu	F	17 42						
			e	20 55 56						
			L?	21 11 04						
54	13	Iv	F	21 51						
			eP	23 05 18						
			L	06 42						
			M _E	07 58					8	27
			M _N	08 00					9	50
55	14	I	F	31						
			e	15 07 00						
56	15	I	F	15 33						
			eP	0 39 04						
57	15	Iv	F	1 03						
			eP	10 40 34						
			F	10 51						

Felt eastern Visayas and Mindanao.

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A _N μ	A _E μ	
58	17	Iv	eP	<i>h. m. s.</i>				Felt at Butuan (N Mindanao).
			L	3 41 42				
			ME	43 56				
			MN	44 15	5		23	
59	17	Ir	eP	4 44 55	6		21	
			F	4 04				
			eP	18 01 17				
			S	04 42				
60	20	Iv	L	06 07				
			MN	06 34	6		23	
			ME	07 12	6		22	
			F	19 09				
61	22	Ir	eP	15 28 54				
			F	32				
62	22	Iv	eP	4 24 29				
			S	29 24				
			L	30 20				
			MN	31 06	9		9	
63	22	Iv	ME	33 04	9		9	
			F	5 42				
			eP	4 52 45				
			F	56				
64	22	Ir	eP	11 38 47				This record merged into the precedent quake.
			F	54				
65	23	Iv	eP	17 12 00				Felt at Butuan (N Mindanao).
			F	34				
66	24	Iv	eP	5 34 02				
			F	46				
67	26	Ir	eP	21 38 00				Felt at Butuan (N Mindanao).
			F	59				
68	28	Iv	e	9 32 28				
			F	10 06				
69	28	Iv	eP	8 34 32				
			F	39				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

- 1, 7^h 46^m [1, 15^h 46^m]. Ormoc (W de Leyte). Temblor de tierra de intensidad II-III.
- 3, 19^h 26^m [4, 5^h 05^m]. Guam (Islas Marianas). Temblor oscilatorio de intensidad III-IV.
- 4, 13^h 6^m [4, 21^h 6^m]. Cabo Bojeador (NW de Luzón). Temblor de tierra de intensidad IV-V, duración 8 segundos.
- 8, 13^h 28^m [8, 21^h 28^m]. Vigan (NW de Luzón). Temblor de tierra de intensidad II-III.
- 8, 16^h 4^m [9, 0^h 4^m]. Ormoc (W de Leyte). Temblor oscilatorio y susultorio, dirección W-E, intensidad V, duración 10 segundos. Repitió con intensidad III a 14^h 53^m [22^h 53^m] del mismo día 9.
- 13, 23^h 5^m 18^{s*} [14, 7^h 5^m 18^s]. Visayas Orientales y Mindanao. Extensísimo temblor de tierra sentido en la parte oriental de Mindanao, Islas Visayas del E y en el extremo SE de Luzón; una zona de más de 800 kilómetros de longitud. Su origen se hallaba en el Pacífico en el Abismo de Filipinas pero lejos del Archipiélago hacia el meridiano 127° E y el paralelo 11° N. Por consiguiente no pasó de intensidad III en ninguna de las regiones de él donde fué perceptible.
- 15, 10^h 45^m [15, 18^h 45^m]. Isla Camiguín (N de Mindanao). Temblor de tierra de intensidad III, de origen muy cercano; registrado en la vecina estación de Butúan.
- 17, 3^h 41^m 42^{s*} [17, 11^h 41^m 42^s]. E de Mindanao. Temblor de tierra sentido débilmente en Butúan y otros sitios de la parte oriental de Mindanao; originado sin duda en el Pacífico a bastante distancia al E de la isla.
- 18, 21^h 5^m [19, 6^h 44^m]. Guam (Islas Marianas). Temblor de tierra de intensidad III-IV.
- 22, 17^h 12^m 0^{s*} [23, 1^h 12^m 0^s]. Butúan (N de Mindanao). Temblor oscilatorio, dirección E-W, intensidad III, duración más de 30 segundos. El origen parece se hallaba algo distante al E en el Pacífico.
- 24, 21^h 26^m [25, 5^h 26^m]. Butúan (N de Mindanao). Temblor oscilatorio de intensidad II-III. Una hora antes ocurrió una sacudida de menor intensidad. El origen de ambos parece era cercano y muy local.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

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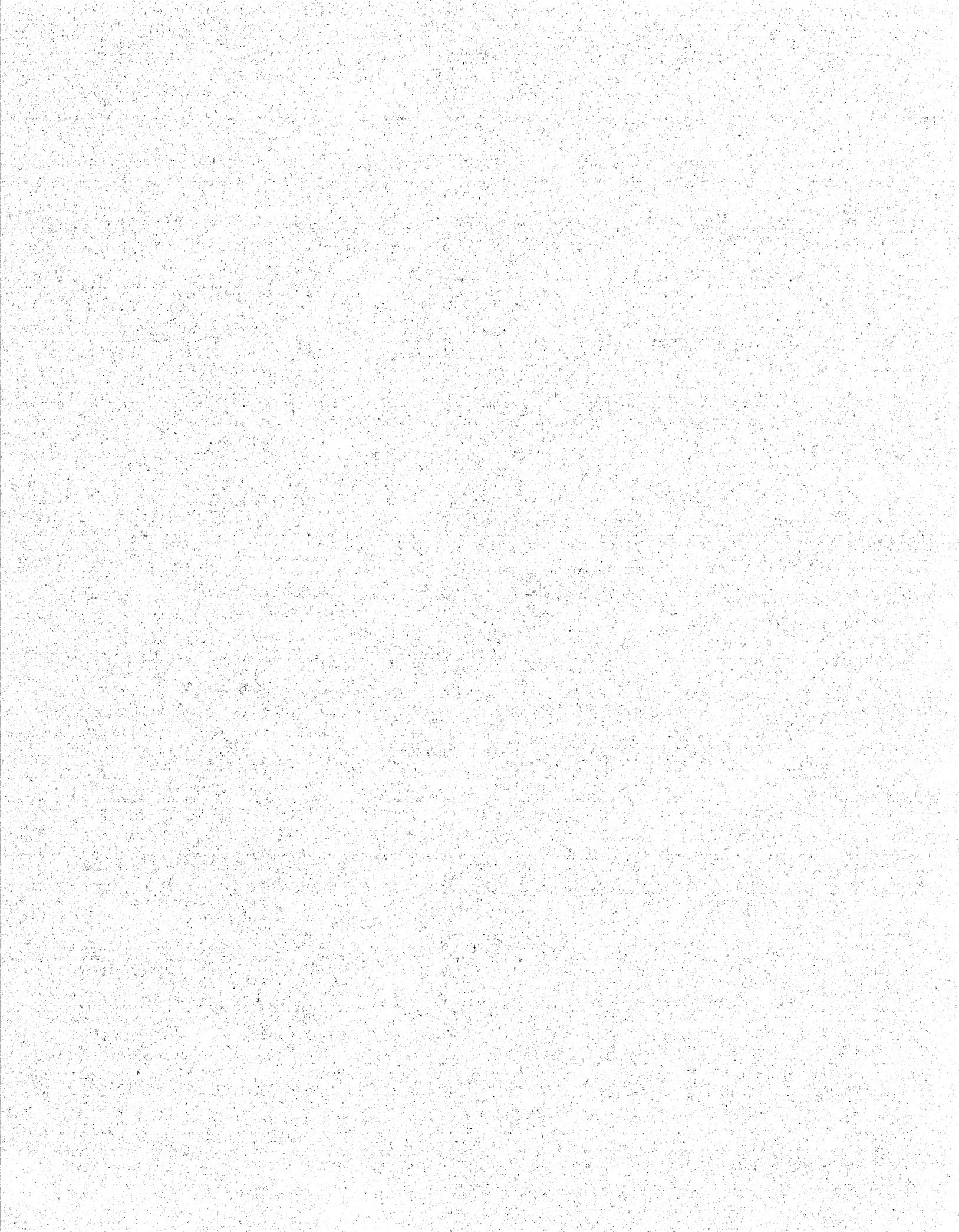
BULLETIN FOR MARCH, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1919



BULLETIN FOR MARCH, 1919.



METEOROLOGICAL BULLETIN FOR MARCH, 1919.

By REV. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month in the Philippines is somewhat higher than that of the preceding year and than the normal of March. The highest pressures were observed on the 19th, and the lowest on the 31st.

The mean monthly temperature is also above the normal of this month and above the monthly mean of the preceding year, particularly in Luzon. The extreme temperatures for Baguio were 27.5° C., 12.2° C. on the top of Mirador, and 27.7° C., 9.2° C. in the valley. The highest and lowest temperatures of the month in Manila were 36.2° C. on the 25th, and 17.1° C. on the 6th. It is to be remarked that only once since 1880 was the maximum temperature for March at Manila higher than that of this year, and that only three times in that period was as high as 36.1° C. or 36.2° C. The highest of the whole period was 36.4° C., recorded on March, 1915. Four stations in Luzon, namely Tuguegarao, Laoag, Dagupan and San Isidro, have reported a maximum monthly temperature as high as, or even higher than, 38° C.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR MARCH, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from March, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from March, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga	759.81	+0.59	-----	761.22	19	758.60	27	26.1	+0.5	-----	33.1	25	22	19
Yap, W. Carolines	59.71	-----	-----	61.43	19	58.56	27,30	26.8	-----	-----	33.8	18	22.1	7,9
Tagbilaran	60.35	+1.03	+0.81	61.51	19	58.71	31	26	+ .7	-0.3	33.2	1	19	8
Surigao	60.74	+1.27	+1.02	62.05	19	59.14	31	25.8	+ .7	-----	31.2	25	20.7	9
Cebu	60.67	+1.09	+ .88	62.01	19	58.97	31	27.3	+1.1	+ .5	32.7	23	23.3	6,22
Iloilo	60.31	+ .76	+ .75	61.48	19	58.59	31	27.3	+1.4	+ .6	34.7	22	22.4	5
Tacloban	61.01	+1.34	+ .76	62.43	19	59.35	31	26.3	+ .9	0	35.2	27	20	6,8
Capiz	60.89	+ .88	+ .64	62.02	19	58.81	31	27	+1.1	+ .4	32.8	24	21.2	22
Calbayog	61.15	+1.26	+ .91	62.53	19	59.33	31	25.6	+ .9	+ .1	33.8	24	19.5	6
Legaspi	61.54	+1.13	+1	62.87	19	59.42	31	26.9	+1.5	+ .3	32.3	28	20.6	22
Atimonan	61.59	+ .78	+ .94	63.10	19	59.08	31	26.8	+2	+ .4	32.8	22	19.8	2
Ambulong, Tanauan.	60.51	+ .58	-----	61.88	19	58.22	31	27.5	+1.5	-----	37.4	25	18.2	5
Paracale	61.70	+ .80	-----	63.04	19	59.16	31	26.4	+1.6	-----	31.8	24	20.3	2,5
Manila	61.06	+ .66	+ .54	62.58	19	58.81	31	26.7	+1.5	+ .1	36.2	25	17.1	6
San Isidro	61.82	+1.14	+1.20	63.22	19	59.52	31	27.4	+2	+ .6	38	23	17.5	6
Dagupan	60.25	+ .50	+ .25	61.94	19	58.32	31	27.9	+1.6	+ .7	38.6	26	20	7,9,18
Baguio ^a	638.36	+ .97	+ .70	639.78	19	636.55	31	18.5	+1.5	+ .6	27.5	27	12.2	2
Vigan	760.57	+ .60	+ .26	762.17	19	758.58	31	27.2	+1	+ .3	36.2	26	20	2
Tuguegarao	61.41	+ .07	+ .39	62.91	19	59.42	31	27.3	+2.7	+1.1	38.8	19,22	17.7	8
Laoag	60.65	+ .59	-----	62.19	19	58.74	31	26.7	+ .4	-----	38.3	26	15.9	3
Aparri	61.51	- .21	+ .19	63.01	3	59.72	31	25.9	+2	+1.1	34.7	23	17.8	1

^a The barometric readings of this station are not reduced to sea level.

Rainfall.—With a few exceptions in southern Mindanao and the western part and the northern coast of Luzon, the total monthly amount of rainfall in the Philippines is below that of March, 1918, and below the normal of this month. No more than 1.9 mm. of water were collected during the month in the rain gauges of Manila Observatory, this amount being 16.6 mm. below the normal for this month.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF MARCH, 1919.

Station.	Total.	Departure from March, 1918.	Departure from normal.	Days of rain.	Departure from March, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from March, 1918.	Departure from normal.	Days of rain.	Departure from March, 1918.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	98	-44.8	+19	13	-3	26.2	21	Sorsogon	148.1	-257.5		20	+6	23.8	9
Isabela, Basilan	128	+36.9	+70	11	-6	22.6	19	Legaspi	74.2	-133.2	-97.6	14	-2	12.2	9
Zamboanga	98.3	+18.4	+62.8	8	-6	74.8	18	Sumay, Guam	25.4	-51.3	-49.7	5	-9	11.4	18
Davao	74.2	-76.2	+68.1	10	-2	27.4	31	Calapan	75.4	-7.6	+2.2	7	-6	33.5	30
Cotabato	125.9	.7	+46.1	14	-1	34.1	2	Nirac	55.3	-144.7	-89.5	17	+2	22.8	11
Camp Keithley, Lanao	69.4			14		20.9	1	Viga	0	-61.1	-62	0	-15	0	0
Cagayan, Misamis	25.4	-26.1		5	-4	13.7	29	Tigaon	69.7			11		24.9	28
Dapitan	11.9	-152.3	-60	14	-3	4.3	15	Batangas	.5	9.9	-6.3	1	-2	.5	9
Butuan	107.5	-119.3	-55.2	18	-2	29.5	17	Lucena	6.2	-22.3		3	-4	4.6	9
Mambajao	32	-281.9		8		20.3	1	Atimonan	7.5	-122.5	-74.4	4	-12	3.6	9
Dumaguete	1	-102.3		1	-11	1	28	Ambulong, Tanauan	1	-10.5		1	-3	1	17
Yap, W. Carolines	61.9	-42.5	-87.6	14	-8	16.3	20	Canlubang, Calamba	1.3	-39.6		2	-7	.8	16
Tagbilaran	64	-19.9	-9	3		23.4	15	Paracale	51.8	-129.6	-136.2	12	-8	16	19
Iwahig	3	92.1		1		3.3	29	Santa Cruz, Laguna	1.8	-24.5	-29.8	1	-8	.8	14
Surigao	112.6	-567.4	-174	17	-5	16.5	12	Manila	1.9	-25.9	-16.6	2	-1	1.5	31
Maasin	17.3	-478.1	-109	2	-3	9.4	26	Antipolo	8.2	-4.9		3	-1	5.6	31
Cebu	4	-102.9	-50.3	5	-3	1.3	17	Iba	8.7	-55.6	-18.8	2	-1	8.4	30
Iloilo	8.1	-22.6	-20.5	3	-7	4.3	15	San Isidro	1.5	-69.4	-13.2	1	-4	1.5	15
San Jose Buenavista	14.8	-31.5	-2.2	3	-6	8.4	31	Tarlac	2.3	-6.8	-15.9	1	-4	2.3	31
Cuyo	1	-23.7	-2.4	1	-5	1	28	Baler	104.3	-179.1	-90.1	12	-5	31	9
Ormoc	21.7	-267.7	-66.7	9	-11	8.1	15	Dagupan	10.4	-41.1	-16.6	2	-1	5.3	31
Guiuan	132.8	-303.7		23	0	25.4	8	Bolinao	24.6	-31.8	+6.9	1	-4	24.6	30
Tacloban	74	-487.5	-76.6	15	-9	17.3	8	San Fernando, Union	29.2	+27.2	+19.5	1	0	29.2	30
Capiz	16.1	-61.2	-12.9	6	-14	5.6	8, 28	Echague	1.3	-159	-46.1	1	-9	1.3	31
Borongan	178.8	-338	-75.1	24	0	31	9	Candon	21.6	+21.6	+10.1	2	+2	18.3	14
Catbalogan	47.6	-194.8		15	-4	8.2	28	Vigan	1.8	-52	-5.8	1	-0	1.8	21
Calbayog	86.5	-342.8	-44.9	16	-3	25.6	19	Tuguegarao	20.3	-25.7	-10.6	2	-2	17.8	31
Masbate	13.3	-114.6	-39.5	8	-5	5.1	8	Laog	0	0	-5.3	0	0	0	0
Romblon	31	-16.5	-17.6	8	-7	19.8	14	Aparri	103.2	+62.3	+44.6	2	-11	54.4	30
Batag	70.1	-247.8		19	+3	11.5	14	Cape Bojeador	.1	+ .1		1	+1	.1	30

DEPRESSIONS AND TYPHOONS.

There was not a single depression or typhoon near the Philippines during this month. And even in the whole Far East there were only several depressions moving eastward across the Eastern Sea and to the south of Japan, which belong rather to the type of depressions generally known as continental depressions.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas es algo mayor que la del mismo mes del año pasado y que su correspondiente normal. Las presiones más altas se observaron el día 19 y las más bajas el 31.

La temperatura media mensual es también mayor que la normal de este mes y que la media mensual del año pasado, especialmente en Luzón. Las temperaturas extremas en Baguio fueron 27.5° C., 12.2° C. en la cumbre del Mirador, y 27.7° C., 9.2° C. en el valle. La máxima y mínima absolutas en Manila fueron 36.2° C. y 17.1°, registradas respectivamente los días 25 y 6. Es de notar que desde 1880 la máxima temperatura de marzo en Manila fué una sola vez mayor que la de este año y tres veces solamente alcanzó a 36.1° C. ó 36.2° C. La mayor temperatura observada en todo el período 1880-1919 fué 36.4° C., registrada en marzo de 1915. Las cuatro estaciones de Luzón, Tuguegarao, Laoag, Dagupan y San Isidro, han acusado una máxima temperatura mensual de 38° C. ó más.

Precipitación acuosa.—Con unas pocas excepciones en el sur de Mindanao y en la parte occidental y costa septentrional de Luzón, la lluvia total del mes en Filipinas es menor que la de marzo, 1918, y que la normal de este mes. La cantidad recogida en los pluviómetros del Observatorio de Manila fué solamente 1.9 mm., cantidad inferior a la normal de este mes en 16.6 mm.

DEPRESIONES Y TIFONES.

No hubo ni una sola depresión o tifón cerca de Filipinas durante el mes. Y aun en todo el Extremo Oriente hubo solamente varias depresiones que se movieron hacia el E a través del Mar del Este y al sur de Japón, las cuales pertenecen más bien al tipo de depresiones generalmente conocidas como depresiones continentales.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.*

[$\phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pres- sure (mean).	Air temperature. ^b			Underground temperature.				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation. ^b			
		Mean.	Maxi- mum.	Mini- mum.	0.25 meter.		0.50 meter.				1.50	2.50	Mini- mum on grass.	Maxi- mum in sun. Black bulb in vacuo. ^c	Free expos- ure (to- tal).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a. m.	8 a. m.				
											°C.	°C.				
1	760.89	25.3	33.5	19.3	26	29.6	27.2	28	27.6	27.9	68.7	15.9	16.3	53.6	6.6	3.9
2	61.04	25.2	33.1	18.8	26.3	29.8	27.3	28.4	27.8	27.9	70.1	16.3	16.2	53.2	6.5	4.2
3	61.87	25.3	32.7	18.6	26.5	28.6	27.4	28	27.7	27.9	68	15.9	15.7	52	5.5	3.9
4	62.13	25.9	34	19.1	25.8	29.8	27.3	28.4	27.6	27.9	66	15.8	16.2	54.7	7.1	4.6
5	61.98	24.9	33	17.6	25.9	29.8	27.3	28.3	27.7	27.9	67.7	15.3	14.5	52.7	6.6	4.1
6	61.67	25.4	33.2	17.1	25.9	29.4	27.4	28.2	27.8	28	64.3	14.9	14	53.6	7.8	5
7	61.50	26.2	34.4	19.9	26.2	30.1	27.4	28.3	27.7	27.9	64.9	15.9	17	55.4	7.4	4.7
8	61.32	26.1	34.5	18.3	26	29.6	27.4	28.2	27.7	27.8	61.2	14.6	15.3	55.6	7.8	5
9	61.14	26.9	34	21	27	29.8	27.8	28.4	27.8	27.9	68.1	17.8	18.5	57.7	6.2	4.3
10	61.33	27.1	33.3	24	27.5	29.8	27.9	28.5	27.8	27.9	68.2	18	22	54	5.5	4.1
11	61.31	27.1	34.7	20.1	26.5	29.8	27.6	28.5	27.8	28	63.7	16.5	16	54.7	7.2	4.6
12	61.74	26.4	33	19.9	26.7	29.7	27.7	28.5	28	28	68.2	17.3	17	56	6	3.6
13	61.43	26.3	34.1	19.9	26.5	29.8	27.6	28.5	27.9	28	66.3	16.5	17.6	53.6	6.7	4.4
14	61.59	26.1	32.6	19.7	26.2	29.4	27.5	28.4	27.8	27.9	67.2	16.6	16.7	53	5.6	3.8
15	61.79	26.1	33.3	19.4	26	29.2	27.4	28.4	27.8	27.9	69.9	17.2	17	52.9	5.8	3.5
16	61.50	26.3	34.6	20	26.8	30.1	27.8	28.7	27.9	28	63.6	15.5	17	55.7	7.6	4.8
17	61.68	25.6	34.2	19	26.4	30.7	27.7	28.7	27.8	28	66.2	15.7	15.7	56.2	7.6	4.6
18	62.13	26.4	34.5	19	26.5	29.5	27.7	28.4	27.8	28	62.3	15.5	15.6	54.7	7.1	4.6
19	62.58	26.9	33.4	20.8	26.7	29.3	27.8	28.4	28	28	68.1	17.6	18.3	51.4	5.7	3.8
20	61.96	26.6	34.1	21.8	26.9	29.8	27.7	28.4	27.9	28	71.4	18.3	19.3	57.5	4.3	3.2
21	60.68	27.9	34.6	21.5	26.8	30.1	27.7	28.6	27.9	28	64.2	17.5	18.7	56.7	7.4	4.8
22	60.19	27.9	35.3	21.7	27	30.7	27.8	28.7	28	28	67	18.1	18.9	54.6	6.8	4.5
23	60.11	28.3	35.8	21.7	28	31.3	28.3	29.2	28.3	28.3	65.6	18.1	19	55.3	6.6	4.3
24	59.79	27.9	34.7	21.7	28.3	31.3	28.6	29.4	28	28	71.9	19.6	19.1	55	6	3.8
25	59.95	28.7	36.2	23	28.4	31.6	28.7	29.8	28	28	65.4	18.4	20.3	55.6	7.8	5.2
26	60.75	27.4	34.5	22	28.5	31.3	28.8	29.4	28.1	28	62.8	16.6	19.4	52.5	7.5	5.2
27	60.13	27.4	34.7	20	27.8	31.2	28.7	29.4	28.1	28	63.9	17	17.2	56	7.4	4.6
28	60.24	27.3	35	20.4	27.7	31	28.6	29.4	28.2	28	67.5	17.8	17.7	55.5	6.8	4.4
29	60.20	27.2	33.8	21.2	27.8	29.6	28.7	29.2	28.3	28	65.9	17.4	18.4	50.2	5.8	4
30	59.39	27.8	34.2	22.2	28.1	30.5	28.9	29.2	28.3	28.1	64	17.5	18.9	56.7	7.4	4.8
31	58.81	27.8	36.1	21.6	28	31.9	28.6	29.5	28.3	28.1	71.1	19.1	19	56.9	5.9	3.6
Mean Total	761.06	26.7	34.2	20.3	26.9	30.1	27.9	28.7	27.9	28	66.6	16.9	17.5	54.6	6.6	4.3
Departure from normal	+0.54	+0.1	+1.7	-1							-4.9	-1.2		+25.3		

Day.	Wind.				Clouds.		Sun- shine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.		
	Prevailing direction.	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.		On the tower.	In the park.			
						Upper.					Lower.	
1	SE	241	24.5	SE by E	1.8	Ci.	Cu.	E	h. m.	mm.	mm.	
2	SE	222.5	22	SE	3	Ci.	Cu.	NE by E	9 55			
3	ENE, ESE	220	24	SE	5.8	Ci.	Cu.	E	9 30			
4	ESE	255.5	25	SE	2.2	Ci.	Cu.	E	6 20			
5	SE	244	24.5	SE	1.7	Ci.	Cu.	E	10 10			
6	SE	250	23	SE	1.4	Ci.	Cu.	E	10 00			
7	SE	255	24	SE	1.8	Ci.	Cu.	E	10 05			
8	E quad.	189	24.5	E	2	Ci.	Cu.	E	10 15			
9	E, ESE	204	19.5	ESE	6.3	Ci.	Cu.	ENE	10 20			
10	SE	244	25	SE	5	A.-Cu.	Cu.	E	5 45			
11	ESE	224	19	WNW	1.8	Ci.	Cu.	E	5 30			
12	NE, SE	204.5	16.5	W, WNW	3.9	A.-Cu.	Cu.	E	10 10			
13	ESE	226.5	22	SE	1.5		Cu.	E	7 10			
14	E	236	24	SE	5	Ci.-S.	Cu.	E	8 35			
15	E quad.	209.5	18.5	WNW	1.3		Cu.	E	5 55			
16	E, ESE	221.5	19	E	1.2		Cu.	E	9 50			
17	SE	252	24.5	SE	3.7	A.-Cu.	Cu.	E	10 05			☉ a.
18	E, ESE	241	24	SE	2.4	Ci.	Cu.	E	6 30			☉ a.
19	E quad.	175.5	16.5	WSW	5.4	Ci.	Cu.	E	9 55			
20	NE, E	183	14	ESE	6.7	Ci.	Cu.	E	6 45			
21	SE	227.5	19	SE	3.2	Ci.	Cu.	E	4 10	0.4	0.5	d p.
22	SE	222	18	SE	2.6	Ci.	Cu.	E	9 25			
23	E quad.	211	19.5	SW	1.2	Ci.	Cu.	E	10 00			
24	W quad.	217	20	WNW	3.3	Ci.	Cu.	E	10 20			
25	ESE	234	18	ESE	8	Ci.	Cu.	E	8 35			
26	ESE, SE	220	16.5	W	2	A.-Cu.	Cu.	E	11 35			
27	ESE	296.5	28	SE by E	1.8		Cu.	E	9 45			
28	NE, SE	237.5	18	SE	2.5	Ci.	Cu.	E	10 30			☽ p.
29	E, ESE	173	21	E	5.1	Ci.	Cu.	E	9 40			
30	ESE	242	22.5	ESE	4.1	Ci.-Cu.	Cu.	E	5 45			
31	E quad.	178.5	17	ESE	4.2	Ci.	Cu.	E	8 55			☉ T ² p.
Mean Total		224.4	21		1.3				8 40			
Departure from normal		+153			-1.3				268 50	-1.9	2.5	

* All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[$\phi=16^{\circ} 25' N$; $\lambda=120^{\circ} 36' E$; barometer above sea, 1,512.6 meters; gravity correction not applied, -1.65 mm.]

Day.	Pressure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation.		
		Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.			Hour.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	637.76	17.8	25.1	0.25p.	13.2	6.35a.	25.7	0.50p.	11.3	1.40a.	65.3	9.6	10.7	56.8	6.9	3.6
2	37.92	16.8	23.9	1.00p.	12.2	6.40a.	25.4	1.20p.	10.4	6.00a.	79.8	11.3	10.7	54.7	4.5	2.4
3	38.68	18.4	25.6	11.30a.	13.3	3.40a.	26.2	0.05p.	9.4	6.20a.	63.2	9.8	8.7	56.7	7.8	4.3
4	38.94	17.6	24.6	10.30a.	12.9	6.00a.	25.9	Noon	10.9	6.10a.	73.3	10.8	11.8	56.2	5.5	3.
5	38.64	17.7	24.2	2.00p.	13.4	6.20a.	24.4	10.25a.	9.2	6.00a.	80.2	11.9	10.5	56.5	4.8	2.3
6	38.50	17.9	24.8	1.50p.	13.2	5.40a.	25	1.45p.	10.4	6.35a.	75.2	11.3	11.2	55.2	8.9	4.4
7	38.47	19.4	26.5	1.30p.	14.9	2.20a.	27.4	0.15p.	11.9	5.50a.	55	9.1	12.7	56.2	6.8	4.5
8	38.43	18.8	25.9	11.00a.	14.4	4.30a.	27.7	Noon	12.3	6.05a.	60.8	9.7	12.6	56.8	8.2	5.2
9	38.59	19.2	26.5	11.20a.	13.9	5.10a.	27.6	11.25a.	11.9	6.30a.	70.3	11.4	12.8	57.9	7.5	4.1
10	38.54	18.1	24.3	1.40p.	15.2	6.00a.	25.2	1.40p.	12.1	6.20a.	83.5	12.8	13.2	56.5	4	2.1
11	38.46	18.6	24.8	0.30p.	14.3	6.00a.	24.9	1.40p.	13	5.20a.	72.8	11.3	13.3	58.5	6	3.1
12	38.96	17.5	24.3	0.15p.	14.2	6.00a.	23.5	1.00p.	13.1	5.10a.	82.7	12.2	13	57	3.3	2.3
13	38.73	17.9	24.3	1.40p.	14.8	6.00a.	25.5	2.20p.	14	6.10a.	82.8	12.6	13.2	59	3.6	2.3
14	38.64	17.9	24.9	0.20p.	14.8	6.00a.	24.8	2.00p.	14	6.25a.	81.5	12.3	13.7	59	3.1	2
15	39.02	18.5	24.5	0.50p.	15	6.00a.	24.5	2.00p.	13.6	6.00a.	83.8	13.2	13.1	60	2.8	1.9
16	38.68	18.2	25.4	1.05p.	15.2	6.25a.	24.9	1.50p.	14	6.20a.	78.5	12.2	12.8	58.4	5.4	3.7
17	38.78	18.8	26.5	1.35p.	14.3	6.00a.	25.5	1.40p.	12.9	6.25a.	66.3	10.2	12.9	57	7.2	4.8
18	39.22	18.7	25.8	2.05p.	13.7	6.00a.	25.5	10.55a.	13	4.90a.	77.3	12.2	11.9	58	5.1	3.5
19	39.78	18.6	25.5	0.50p.	13.8	6.00a.	26.9	0.40p.	12.3	5.30a.	73.7	11.7	11.5	59.7	5.3	3.4
20	39.09	19.6	26.4	1.00p.	15.5	6.00a.	26.4	11.00a.	14.6	6.20a.	69.5	11.3	14.4	61.1	5.6	3.8
21	38.18	18.5	26	1.05p.	15.3	6.00a.	25	3.00p.	14.8	6.00a.	83.2	13.1	13.4	60.6	3.1	1.9
22	37.94	19.3	26.9	0.40p.	15.1	6.00a.	26.9	1.00p.	14.6	6.20a.	81.5	13.4	14.2	59	4	2.4
23	37.79	18.9	26.3	2.00p.	14.8	6.00a.	26.6	1.20p.	14.8	6.25a.	86.2	13.8	14	63.2	3.5	2.2
24	37.74	18.9	25.6	1.25p.	15.4	4.00a.	25	2.00p.	14.6	4.05a.	83	13.4	14.1	61.2	3.9	2.4
25	38.08	19.5	25.5	0.20p.	16	6.45a.	27.4	0.25p.	16.4	4.00a.	85.5	14.4	15.6	58.6	3.5	2.3
26	38.38	20.2	27.2	1.00p.	15.8	12 m. n.	26.9	11.00a.	15	12 m. n.	75.5	12.8	14.4	60.5	6.9	4.8
27	37.78	20	27.5	11.20a.	14.5	4.50a.	27.1	11.35a.	13	5.25a.	56.8	9.2	11.1	58.1	7.9	5.3
28	37.92	19	24.4	11.00a.	14.6	5.30a.	24.9	3.10p.	13.8	4.05a.	80.3	13	12.8	60.8	3.4	1.9
29	37.84	18.8	25.8	1.05p.	14.7	6.25a.	25.4	1.35p.	13.8	5.40a.	81.3	13	12.7	57.2	4	2.2
30	36.98	17.8	25.8	0.50p.	15	9.10p.	25.5	0.55p.	15.1	9.40p.	85.3	12.8	14.5	61	3.2	2.3
31	36.55	17.2	22	1.50p.	14.2	1.35a.	22.4	2.05p.	14.4	1.20a.	88	12.9	14	52.4	1.4	1
Mean	638.36	18.5	25.4		14.4		25.7		13.1		76.2	11.9	12.8	58.2	5.1	3.1
Total															157.1	95.4

Day.	Wind.				Clouds.			Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. ^d	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.				
						Upper.	Lower.			
	Km.	Km.			0-10.			h. m.	mm.	
1		249.6	30?	W	1.1	Ci.	Cu.	7 05		$\Omega \equiv a. \text{CO}_2 \text{ p.}$
2	Variable	293	21.7	SW	3.3	Ci.	Cu., Cu.-N.	7 35		$\Omega_2 \equiv a. \text{CO}_2 \text{ a. p.}$
3	E	356.8	26	SW	7			8 45		$\Omega a. \text{CO}_2 \text{ a. p.}$
4	E	413.6	29.2	E	7	Ci.	Cu. ESE, E	8 25		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ p.}$
5	E SE	300.6	25.7	W	2	Ci.	Cu.	7 10		$\Omega_2 \text{CO}_2 a. \text{CO}_2 \text{ p.}$
6	E quad.	360.5	26.6	SW	1.4	Ci.	Cu.	9 00		$\Omega_2 \equiv a. \text{CO}_2 \text{ a. p. CO}_2 \text{ p.}$
7	E	487.4	32.5	E	6	Ci.	Cu. E	8 15		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ p. CO}_2 \text{ p.}$
8	E	365.5	24.7	W	2.4	Ci.	Cu.	7 00		$\text{CO}_2 a. \text{CO}_2 \text{ p.}$
9	E	478.1	32.7	SW	2.4	Ci.	Cu. SE	8 25		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ p.}$
10	E, W	300.3	21.9	SW	5.9		Cu.-N. SE	4 20		$\Omega \equiv a. \text{CO}_2 \text{ p.}$
11	E, SE	392.3	28.2	W	5.4		Cu. N, E	5 45		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ p.}$
12	W quad.	290.9	24.4	W	5.1		Cu. E	2 45		$\Omega a. \text{CO}_2 \text{ a. p. d}^{\circ} \text{ p.}$
13	W quad.	252.3	25.1	SW	7.3		Cu. WNW, E	3 45		$\Omega \equiv a. \text{CO}_2 \text{ a. p. d}^{\circ} \text{ p.}$
14	E, SE	317.5	31.2	W	6.3		Cu. E	3 15		$\text{CO}_2 a. \text{CO}_2 \text{ p.}$
15	W, SW	244.7	24.4	W	5.3		Cu.-N. N	5 15		$\Omega \text{CO}_2 \equiv a. \text{CO}_2 \text{ d}^{\circ} \text{ p.}$
16	W, E	318.6	28.4	W	3.4		Cu. WNW	5 05		$\Omega a. \text{CO}_2 \text{ a. p.}$
17	E	419.9	33.5	W	0		Cu. SSE	8 45		$\Omega a \text{CO}_2 \text{ a. p. CO}_2 \text{ p.}$
18	E quad.	357.9	28	W	2.4		Cu. SSE, ESE	7 50		$\Omega \equiv a. \text{CO}_2 \text{ a. p.}$
19	W, E	369.6	28.8	W	4		Cu., Cu.-N.	6 15		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ d}^{\circ} \text{ p.}$
20	E, SE	411.8	32.5	W	4.1		Cu. ESE, SW	5 05		$\Omega a. \text{CO}_2 \text{ a. p. CO}_2 \text{ p.}$
21	E, W	361	26	NW, W	5.1	Ci.	Cu. ENE, E	4 50		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ d. p.}$
22	SE, W	348.8	32	W	4.4		Cu. Variable	5 50		$\Omega \equiv \text{CO}_2 a. \text{CO}_2 \text{ CO}_2 \text{ p.}$
23	E, W	348.1	30	W	5.1		Cu. E, ESE	4 55		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ CO}_2 \text{ p.}$
24	SE, E	363.2	24.6	W	4	Ci.	Cu. ESE	5 30		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ CO}_2 \text{ p.}$
25	E, W	364.2	22	SE	4.6		Cu. E	5 10		$\Omega \equiv \text{CO}_2 a. \text{CO}_2 \text{ p.}$
26	E, W	368.8	34.4	W	1.1	Ci.	Cu. ESE	8 20		$\Omega a. \text{CO}_2 \text{ a. p. CO}_2 \text{ p.}$
27	E	328.6	28.5	SW	0		Cu. E	9 15		$\Omega a. \text{CO}_2 \text{ a. p.}$
28	W, SE	293.6	21.4	W	4.6		Cu. E	5 15		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ p.}$
29	W, E	299.9	30.3	W	3.7		Cu. ESE, SE	5 20		$\Omega \text{CO}_2 a. \text{CO}_2 \text{ d. p.}$
30	E	412.6	33	W	7.3	A.-Cu. w, wbyws	Cu.-N SSW, Sbyw	3 55	55.4	$\Omega \text{CO}_2 a. \text{CO}_2 \text{ CO}_2 \text{ p. CO}_2 \text{ p.}$
31	Variable	301.5	24.7	NW	8.1	A.-Cu. SW	Cu.-N. WNW	1 35	25.7	$\text{CO}_2 a. \text{CO}_2 \text{ CO}_2 \text{ p. CO}_2 \text{ p.}$
Mean		346.8	27.8		3.6			6 07		
Total		10,751.2						189 40	81.1	

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
 b The barometric readings of this station are not reduced to sea level.
 c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
 d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.
 e 6 hours missing.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, MARCH, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo		1.5	1	6.4	1.8											
La Union, Davao ^a	7.6	20.4			2.3	25.1										
Isabela, Basilan		11.9	2.3	2.8				0.8								
Basilan Plantation, Isabela (Basilan) Office ^a		12.2	4	2	1.3											
Zamboanga	3.8	4.9	1	.8												
Davao	10.7	1.5		1.8			2.5					6.4				
Sirib, Guianga, Davao ^a		17.7		5.8		17.5										
Cotabato	11.2	34.1	.5	1.5	4.1											24.9
Moncayo, Davao ^a	51.8		8.9		30.7							14.2				
Camp Keithley, Lanao	20.9	3.8		3.3						3.8		1.3				.3
Cagayan, Misamis	7.6											1.3				1.3
Dapitan															4.3	
Butuan	23.9	.8		3	1.8				4.8	.3		1.6		0.8	12.7	17.6
Mambajao	20.3		2							1.3		1.3				
Dumaguete																
Yap, Western Carolines	8.3	1.4	7	10.7	.3				1.3	2.6				.8		1.5
Tagbilaran							8			10.6		9.4			23.4	
Iwahig																
Surigao	4.1		2	.8		7.6			3.8	3.3	14.5	16.5			7.9	11.7
Maasin												7.9				
Cebu												.8			.3	1
Hacienda Vallehermoso, Oriental Negros ^a									21.6		23.6					
La Carlota, Occidental Negros ^a										.8					14	.5
Hacienda San Antonio, Occidental Negros ^a															39.4	
San Carlos, Occidental Negros ^a									1		1.8		0.8		30.5	
Hacienda Refugio, Occidental Negros ^a										3.8	4.6		36.3			
Iloilo																4.3
San Jose Buenavista													.3			6.1
Cuyo																22.6
Lucena, Iloilo ^a																
Ormoc								2.8				4.1			.3	
Guiuan	1					3		25.4	1.3		4.1	2	1	23.6	1.5	7.1
Dueñas, Iloilo ^a												3.6	9.4			
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a										3						
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a																
Tacloban		2.5				1		17.3	5.1		8.4	1.8		5.9		2.5
Dumarao, Capiz ^a										1.5	4.3				5.3	1.3
Dao, Capiz ^a																2.3
Capiz								5.6	3							
Borongon	2.3			2.5				9.1	31	9.1	6.3	2.3	.5	19.8	3.8	10.7
Catbalogan							.8	3.6	1.5		1.5	2.3		4.1	2.3	4.1
Calbayog						.5	.8	.8	9.4			4.1		10.1	.8	.8
Masbate							3	5.1	2.6	.5	.5				1.3	
San Jose Estate, J. Abello D-13, Mindoro ^a																
San Jose Estate, Tamaraw Plantation, Mindoro ^a																
San Jose Estate, San Agustin, Mindoro ^a																
San Jose, Mindoro ^a																
San Jose Estate, Tunnel D-12, Mindoro ^a																

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, March, 1919—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Romblon								2.5	0.2		0.5			19.8		0.5
Batag		1.8						7.6	2.5	5.8	2.5	1.5		11.5		3.8
Sorsogon	1							5.3	23.8	3.8	14	10.4		1.3	2.8	10.9
Legaspi						2		9.9	12.2	8.6	10.7					.8
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a b}							2.5									
Sumay, Guam			5.1				5.1									
Calapan									4.8							
Virac						.5										
Naga						5.1		4.8	8.1	.5	22.8		1	2	.5	
Tigaon								1.5	7.4		.8					
Batangas									.5							
Lucena									4.6							
Atimonan		1.3						2.3	3.6							
Ambulong, Tanauan																
Canlubang, Calamba																.8
Paracale		.8						8.1	2.3		.5			2.5		.5
Santa Cruz, Laguna														.8		
Fort Mills, Corregidor ^{a c}																
Alabang, Rizal ^a																
Lamac, Bataan ^a																
Manila																
Antipolo																
Bosoboso, Rizal ^a																
Montalban, Rizal ^a																
Hacienda Pintong Sapang, San Jose, Bulacan ^a								13								
Mabayuan, Dam, Olongapo, Zam-bales ^a																
Iba																
San Isidro																1.5
Tarlac																
Baler			4.8	2						81	16.2					.2
Paniqui, Tarlac ^a																
C. L. A. S. Muñoz, Nueva Ecija ^a																33.5
Dagupan																
Bolinao																
Baguio																
San Fernando, Union																
Echague																
Sagada, Mountain Province ^a																
Bontoc, Mountain Province ^a																
Candon																
Vigan														18.3		
Tuguegarao																
Laoag																
Aparri																
Cape Bojeador																

^a Voluntary or Coöperative Station.

^b Rain in 24 hours beginning 8 a. m.

^c Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, March, 1919—Continued.

Station.	Day of month.														Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.		31.
Jolo.....	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
La Union, Davao ^a	9.4	4.1	18.3	26.2	0.3											
Isabela, Basilan.....		9.7	5.4													
Basilan Plantation, Isabela (Basilan) Office ^a	20.5	22.6	8.9													
Zamboanga.....	1.3	18.1	14.7	6.4												
Davao.....		74.8	1	10.2												
Sirib Guianga, Davao ^a	5.6	1.8	9.1													
Cotabato.....	6.4	30.5	15.7													
Moncayo, Davao ^a			1.8	12.2	2.5	3										
Camp Keithley, Lanao.....	1.1		8.9			4.3										
Cagayan, Misamis.....			10.9													
Dapitan.....	1.5															
Butuan.....	29.5	.3	.8				2									
Mambajao.....																
Dumaguete.....																
Yap, Western Carolines.....			1	16.3	.8				2.8	7.1						
Tagbilaran.....	3.6									5.7						
Iwahig.....																
Surigao.....	1.8		2.8													
Maasin.....										12.7	16	3.5	1.8	1.8		
Cebu.....	1.3									9.4						
Hacienda Vallehermoso, Oriental Negros ^a										6						
La Carlota, Occidental Negros ^a5					3.8										
Hacienda San Antonio, Occidental Negros ^a																
San Carlos, Occidental Negros ^a									8.1							
Hacienda Refugio, Occidental Negros ^a																
Iloilo.....	.5								5.6							
San Jose Buenavista.....										3.3						
Cuyo.....																
Lucena, Iloilo ^a3	2.3													
Ormoc.....										3.8						
Guiuan.....	1	14.4	1.1	3			3.6	15.7	.5	8	7.4	3.6	1.5	.8	6.4	
Duenas, Iloilo ^a										3.8						
Bitagagan, Iloilo (Railroad Iloilo to Capiz) ^a	1									8.1						
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	2															
Tacloban.....			6.6	.5			2.8		.5	2.8		14.8			1.5	
Dumarao, Capiz ^a	2.5									2.5		3.8				
Dao, Capiz ^a		7.3										11.2		2		
Capiz.....	1.5											5.6			.8	
Borongan.....	5.1	14.7	3.8		4.1	.3	3.3	4.1	2.8	3.3	11.9	11.2	6.6	10.2		
Catbalogan.....	.8	3.3					.8	6.4	.3			8.2			7.6	
Calbayog.....		1.8	25.6	1.5			.3					23.6	.5		4.1	
Masbate.....										5		2.5				
San Jose Estate, J. Abello D-13, Mindoro ^a																
San Jose Estate, Tamaraw Plantation, Mindoro ^a																
San Jose Estate, San Agustin, Mindoro ^a																
San Jose, Mindoro ^a																
San Jose Estate, Tunnel D-12, Mindoro ^a																

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, March, 1919—Continued.

Station.	Day of month.															Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Romblon	3.8									0.5		3.2				31
Batag	1.3	1	2.6		2.3	3.6		7.1	2.3	4.5		3.3	1.3	3.8		70.1
Sorsogon	1.5	6.6	4	18				1.8	22.1	3.3	1.5	1	8.1	6.9		148.1
Legaspi	7.2	5.6	4.8	11.4				0.8	.3				.8	4.1		74.2
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a b}					2.5											5
Sumay, Guam		11.4			2.5									1.3		25.4
Calapan	2.3			23.1								.5		33.5	10.7	75.4
Virac	1.5	2.5	.8			1.3		.3	.8		1.5			1.3	.5	55.3
Naga																0
Tigaon			.5		8.6	22.1	1.8	.8		.3	1	24.9				69.7
Batangas																0.5
Lucena													.3	1.3		6.2
Atimonan														.3		7.5
Ambulong, Tanauan	1															1
Canlubang, Calamba			.5													1.3
Paracale		6.8	16							.6	2.3	3.5		7.9		51.8
Santa Cruz, Laguna																0.8
Fort Mills, Corregidor ^{a c}																0
Alabang, Rizal ^a				2.3												2.3
Lamiao, Bataan ^a																0
Manila				.4											1.5	1.9
Antipolo			.8	1.8												5.6
Bosoboso, Rizal ^a																7.1
Montalban, Rizal ^a																13.5
Hacienda Pintong Sapang, San Jose, Bulacan ^a			4.8													17.8
Mabayuan, Dam, Olongapo, Zambales ^a																0
Iba													.3	8.4		8.7
San Isidro																1.5
Tarlac															2.3	2.3
Baler				12.2	1.8											0
Paniqui, Tarlac ^a									6.4			.5	15.2	8.6	5.4	104.3
C. L. A. S. Muñoz, Nueva Ecija ^a																0
Dagupan																33.5
Bolinao														5.1	5.3	10.4
Baguio														24.6		24.6
San Fernando, Union														55.4	25.7	81.1
Echague														29.2		29.2
Sagada, Mountain Province ^a															1.3	1.3
Bontoc, Mountain Province ^a													2.3	41.4	8.6	52.3
Candon				.5										24.9		25.4
Vigan														3.3		21.6
Tuguegarao					1.8											1.8
Laoag														2.5	17.8	20.3
Aparri																0
Cape Bojeador														54.4	48.8	103.2
														.1		0.1

^a Voluntary or coöperative station. ^b Rain in 24 hours beginning 8 a. m. ^c Rain in 24 hours beginning 7 a. m.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, MARCH, 1919.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao. ^a		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Dapitan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.3	21.4	33.1	20.2	31.7	22.5	31.2	21.6	30.4	23.3	23.6	19.8	28	23	31.2	22.1
2	30.2	23.2	33.6	22.6	28.5	23.7	29.7	23.5	29	23	26.8	19.2	31.2	22.2	31.1	24.1
3	31.5	24.9	34.6	23.1	29	23.7	32.2	23	33.2	23.2	26.2	19.5	32.2	23	31.7	24
4	29.8	22.6	32.8	22.1	30.7	23.5	30.4	23.1	31	23.1	25.3	18.7	31.2	22.9	31	23.3
5	28.8	23.3	33.1	23.1	30	24.5	31	22.5	31.1	23	25	18.5	31.3	23	32	22.6
6	29	22.1	33.6	22.6	28.2	23	32.7	21.9	33.1	22.2	26.8	19.2	32.9	21.6	31.5	23.3
7	30.1	21.1	32.6	22.4	28.9	22.2	33.2	19.2	31.6	21	26	15.6	30.6	20.5	30.5	22.5
8	28.7	21.3	30.6	20.6	27.6	23	33.2	21.9	32.8	23.5	26.7	17.9	32.6	22	31.6	22.4
9	30.4	21.4	32.6	22.6	30	22.4	34.7	20.5	34.2	22.5	27.9	16	32.6	20.8	32.5	21.7
10	30.6	22.1	33.1	22.3	28.6	24.2	34.2	20.5	31.3	22.8	27.9	16.6	32.4	20.8	32	23.7
11	30.6	21.7	33.6	22.6	28.5	24	33.8	21.5	31.6	22.8	26.3	18.9	32.2	21.8	32.4	23
12	31.5	21.6	34.1	22.1	28.7	22.6	33.9	19.5	32	22.1	27.3	18.6	30.8	20.8	32.2	23.3
13	31.8	21.6	34.6	22.6	28.2	22.4	34.3	21.5	32	23.4	25.4	19	31.9	21.6	32.4	24.1
14	31	21.9	33.6	21.6	30.5	23	34	22.5	31.9	23.1	27.8	18.5	31.9	21.6	32.3	23.9
15	31.1	22	32.6	22.6	28.7	23.3	34.1	20.5	32.5	23.8	28.8	17.5	31.5	21.3	32.2	22.8
16	31.6	22.4	36.1	22.5	31	22.6	34.5	21.4	32.1	24.1	28.2	19.6	32.2	23	32.6	24
17	30.3	22.3	34.7	22.6	31.9	23.4	33.5	23.2	33.4	22.8	28	19.7	32	22.6	31.3	24
18	28.4	24.1	33.1	23.1	25.5	22.5	34.3	22.5	31.7	23.6	28.3	19.8	32.2	23.8	31.6	23.3
19	30.7	21.4	32.6	22.1	28	22	28.7	23.5	31.9	23.6	27.6	18.1	31.8	22.4	32.8	23.8
20	30.1	23.8	32.1	22.6	30.1	23.8	32.9	22.5	33	22.9	28.1	17.5	32.9	22.3	33	24.3
21	28.3	22.7	33.1	23.1	28.5	24	33	20.2	33.1	21.5	27.3	19	33.5	21.2	33	21.7
22	30.1	22.4	33.6	22.6	28.7	23	34.2	21.6	33.7	22.5	30.4	15	32.8	20.6	33.2	21.3
23	31	22	32.1	22.1	27.8	22.9	34.9	22.3	32.3	23	29.3	16	32.6	20.6	33.5	20.87
24	30.5	21.8	31.6	22.6	28	22.5	34.7	22.8	32.1	23.7	29.3	17	32.2	21.8	33.4	22.5
25	31.1	22.1	33.6	23.6	33.1	24	34.3	21.9	32.1	24.5	28.6	17.4	32.6	22	33.2	22.3
26	30.6	22.7	32.6	22.1	28.7	23.9	35.6	23	33.9	23.7	28.6	20.2	34.8	22.3	33.3	25.3
27	30.2	22.4	34.6	22.6	29.2	23.2	33.5	23.4	31.2	22.6	27.3	19.4	33.2	23.6	33.5	24.3
28	30.6	23.1	33.1	23.1	29.1	23.5	32.2	22.8	32	22.8	26.8	19	30.5	24.5	32.5	23.8
29	30.2	23.2	33.6	22.4	31.4	23.5	34.3	22.5	32.5	22.4	26.4	19	33	22.2	33	24.3
30	29.6	23.3	35.1	22.1	30.4	24.1	34.2	22.5	30.6	22.2	26.9	19.9	32.4	22.4	32.7	23.8
31	29.4	23.2	32.1	22.7	29.4	23.5	34.5	21.9	33.1	23.2	28.8	19.5	30.9	22.8	32.7	24.3
Mean	30.3	22.4	33.3	22.4	29.3	23.2	33.3	22	32.1	23	27.3	18.4	32	22.1	32.3	23.2

Day.	Butuan.		Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	29.6	23.2	27.3	23.3	30	23.6	33.2	23.1	33.2	23.1	33.6	19.4	27.8	23.8	32.8	22
2	32.7	22.9	29.4	23.8	30.9	24.8	32.2	23	31.2	22.2	32.7	19.6	29	23.8	33	21.6
3	32.5	20.5	29.8	23.5	29.4	26.2	30.7	23	31.4	20.1	32.7	20.4	29.3	22.3	33.1	20.8
4	29.4	23	28.8	22.7	30.8	24.7	30.2	24	30.6	22.2	32.1	18.3	28.3	24.4	33.3	22
5	29.9	21.2	29.3	24.3	29.3	25.3	31.8	23.7	31.9	20	31.5	19.4	28.5	22.2	33.5	22.2
6	34.3	22.3	29.8	22.9	28.9	23.7	32.8	23.5	32.7	20.1	31.6	16.9	29.8	21.2	33	22.1
7	30.1	22.4	28.8	22.9	29.3	24.3	32.3	22.1	29.5	20.8	31.9	16.9	28.6	22.4	32.7	21.2
8	34.2	21.2	30	22	29.2	23.7	32.5	23.5	33	19	31.5	18.7	30.3	20.8	32.6	21.8
9	33.9	21.8	30	21.4	29.2	22.7	33.2	22.1	31.3	21.1	31.9	18.1	30.5	20.7	32.8	21.6
10	29	22.8	30	23.3	29.2	25.4	32.3	22.7	30.6	21.7	33.1	17.4	29.3	22.4	33	22.5
11	33.9	20.3	30.4	23.4	30.3	24.1	32.2	23.6	32.6	19.6	32.8	21.3	28.9	21.6	32.8	20
12	29.6	22.6	27.3	24	30	22.9	33.5	24.5	30.8	21.1	32.1	20.9	26.7	22.5	30	22
13	34.2	21.5	29.5	23.4	29.6	25.1	32.7	24	30.9	22	33.6	19.4	30	22.3	32.9	21.2
14	34.3	22.2	30.1	24.3	29.4	23.8	32.7	23.3	31.4	20.4	32.6	21.5	30.5	22.4	32.9	21
15	32.7	22.9	30.1	24	29.3	25.3	33.2	24	30.2	22.3	32.8	20.3	28.6	22.9	33	22
16	31.2	21.4	29.8	24.5	31.8	23.6	31.6	23.5	30.4	21.7	33.1	20	28.5	22.7	31.8	21.2
17	33.5	23	30.5	24.7	29.6	24.3	32.7	24	30.2	22.4	32.6	20	29	23.3	31.8	22.1
18	32.6	22.4	29.5	24.4	28.8	24.1	33.8	24.6	31.2	21.3	32.6	21.5	30.3	22.8	32.5	22.2
19	32.7	23.3	30.3	25.1	30.8	24.1	33.7	24.4	31.4	21.9	32.3	20.6	30.2	23.9	32.2	22.6
20	33	23	30.9	25.3	29.1	25.7	30.8	23.7	31.8	22.2	33.2	21	30.4	23.5	33	22.8
21	32.6	20.8	30	25.1	28.6	23.5	32.2	23	31.8	20.3	33.5	21.3	30.5	21.8	32.5	21.4
22	34.4	20.7	30	22	29.1	22.5	33.5	23.7	30.2	19.1	33.1	19.2	30.8	21.1	32.8	22
23	34.6	21.3	30.4	22.3	29.2	22.7	33.2	24	30.6	20.1	33.2	19	30.9	22.6	34	22.6
24	32.6	23.2	30.5	24.4	28.6	24.3	32.7	25.2	31.5	22.6	34.2	19.6	30.9	22.3	33	19.6
25	34.1	22	30.4	25	29.8	24.3	33.5	24.6	31.8	20.8	33.6	20.9	31.2	20.9	33	20.8
26	33.9	20.9	30.4	23.9	30.4	24.7	31	24.6	31.7	20.4	33.6	19.8	28	23.3	31	20.8
27	34.3	22.4	31.3	23.4	31.6	24.8	31.8	25.3	31.8	21.9	31.1	20.5	29.3	23.7	32	22
28	30.3	23.9	28.7	24.5	30.6	25.7	32.8	25	30.4	23.9	33.6	20.7	28.8	24.4	31	22.2
29	32.7	22.9	30.4	24.1	32.5	25	32.8	24.2	31.3	22.8	31.1	22.1	29.5	23.8	32.2	21.2
30	34	22.7	31	23.9	29.7	24.7	32.8	23.5	31	21.9	33.1	20.8	30	23.5	32	20.1
31	32.6	22.9	30	24.6	30	24.1	32.9	23	31.7	21.3	33.4	21.6	30.2	23.8	33.8	22.5
Mean	32.6	22.2	29.8	23.6	29.8	24.3	32.5	23.8	31.3	21.3	32.7	19.9	29.5	22.7	32.6	21.7

^a The maximum temperatures of this station seem to be too high.

Maximum and minimum temperatures at the stations of the Weather Bureau, March, 1919—Continued.

Day.	Cebu.		Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31	24.6	30.1	24	31.7	21	29.3	25.2	33.2	22	31	24	33	24	31.1	24.9
2	31.1	24.4	31.9	23.6	32.2	20.7	29.6	24.9	33.2	22.8	30.9	24.8	33	22	30.3	24.3
3	30.5	24.1	30.8	23.3	32.7	20	30	25.2	34.1	21.4	31.5	24.1	34.5	21.4	32	23.3
4	30.5	23.9	30.9	23.3	31.9	20	30	25.1	33.8	21.4	30.5	25.1	33.8	21	31.3	23.1
5	29.5	23.4	30.9	22.4	31.7	20	30.1	25	34	19.5	31.4	24.6	33.4	21.7	31.4	23
6	30.8	23.3	32.8	22.7	32.6	18.6	30.4	25	33.4	19.5	31.9	21.2	32.2	20	32.3	22.8
7	30.6	24.2	31.2	23.7	32.8	20.1	31.3	25.2	33.8	19.8	30.8	23.7	33.4	21.1	31.9	24.2
8	29.6	24	31	22.5	32.7	21.6	29.9	24.4	33.5	19.9	32.2	23.3	32.7	20	31	22.8
9	30.5	23.5	32.5	23.4	34.4	21.6	30.1	25.2	32.9	20.4	31.8	23.4	31.2	22.8	29.9	24.3
10	29.8	24.9	31.9	24.2	32.7	21.4	32.2	24.4	32.7	22.2	30.6	24	32.2	22.4	31.8	24.1
11	31	23.8	31.3	22.8	32.7	20.2	29.6	25.1	33.5	19.9	32.2	22.9	33.3	21.6	31.5	23.3
12	30.6	25.8	31.3	23.3	33.7	21.1	29.8	24.9	33.4	20.4	31.2	22.6	30	22.5	31.4	22.9
13	31.7	24.1	31.2	24.5	31.3	25	30.4	25.9	33.1	22.6	31.7	22.5	33	23	32.3	24.3
14	30.5	24.6	32.5	23.4	33	19.5	31.3	25.2	32.9	21.3	30.8	23.6	32	22.5	32.4	24.1
15	30.2	24.8	32	24.2	30.8	23	30	25.9	31.8	21.5	31.8	23.7	32	23.5	31.4	25.2
16	31	25.1	30.4	23.7	32.7	23.4	30	26.1	31.7	20.3	30.5	24.8	33.6	22.5	31.6	24.4
17	29.5	24	31.4	23.7	32.8	19.3	29.8	25	32.8	20.4	31.6	23.3	34.3	23.3	30.4	23.5
18	30.9	24.1	32.1	23.8	32.4	22	30.8	25.2	32.8	21.9	31	23.2	32.3	23	32.3	23.4
19	31	25.1	32.9	24	33.3	21.1	30.1	25.2	32.4	21.5	31.8	24.2	31.5	23.2	32.3	24.8
20	31.5	25.2	32.7	24.9	32.8	23.9	32.9	25.9	33.2	23	32.1	25.1	32.2	22	32.7	25.2
21	30.3	24.1	32.3	24.1	32.8	21.4	31.1	24.7	33.1	19.4	32.1	23.3	32.7	21.4	32.6	22.8
22	31.1	23.3	34.7	23.1	33.3	21.8	33.6	24.4	33.1	17.5	31.6	21.6	32.8	20.5	32.2	21.2
23	32.7	23.7	34.3	22.7	32.4	20.5	31.7	22.1	32.1	18.1	30.8	23.4	32	23	32.6	22.2
24	30.5	25.6	33.2	23.7	32.2	21	31.8	23.7	32.8	18.8	31.8	21.4	34.7	21.5	32.8	23
25	31.2	23.6	33.5	23.1	32.7	22.5	31.1	24.6	32.8	18.5	32.2	22.4	32.5	22.4	32.4	21.3
26	31.7	23.9	32.5	23.9	33.1	21.1	30.9	26.2	32.7	19.3	31.4	24.1	31.4	22	32.1	24.6
27	31.9	24.5	32.4	23.7	34.2	24.6	30.4	26.1	32.5	20.9	30.8	25	35.2	22.5	32.5	24.8
28	29.8	25.8	32	24.7	33.2	21.6	30.5	25.9	32.6	23.4	31.7	24.7	30	23.5	32.2	24.8
29	31.2	25.3	31.8	23.7	34.4	23.7	31.9	25.8	34.4	21.9	31.3	24	34.4	23.1	32.4	23.4
30	30.2	25.1	32.4	24.6	33.3	21.5	31.3	26.3	34.1	22.6	31.1	24.5	33.5	24	32.6	24.9
31	31.1	24.8	32.8	24.7	33.7	23.5	33	25.6	33.6	22.3	31.5	24	33	23.2	32	24.7
Mean	30.8	24.4	32.1	23.7	32.8	21.5	30.8	25.1	33.1	20.8	31.4	23.6	32.8	22.3	31.9	23.7

Day.	Borongan.		Catbalogan.		Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.5	25.2	31.7	21.7	30.9	22.4	30	23	31	22.4	29.4	22.1	28.5	22.5	30.4	24.4
2	30.6	22.5	32.5	20.3	33.6	21.1	31.4	22.6	31.9	24	30	23.6	30	21	31.6	21.9
3	30.6	20.5	32.2	18.5	33.7	21.4	31.4	23.8	31.9	23.7	29.8	23.3	30.5	22.4	31.5	25.7
4	30.5	25.3	31	23	32.9	21.4	31.4	23.4	32	24.4	30.2	22	30	22	30.7	24.8
5	30.5	21.6	32.2	18.1	31	19.6	31.8	21.6	31.9	22.9	29.3	23	31.5	19.1	31.2	23.8
6	30.2	19.4	30.3	17.9	30.9	19.5	31.8	23	32	22.1	29.8	22.7	30.5	20.5	31.2	24
7	30.3	24.8	31.9	22.5	32.3	21.8	31.4	24	31.9	24	29.9	22	30	22.5	30.6	25.3
8	30.6	21.5	32.5	20.1	32	21.2	31.4	22.8	31.9	21.3	30.1	23.4	30.5	22.6	31.4	23.8
9	30	24.2	29.5	22.7	31.5	22.9	30	23.2	30.9	23.3	28	23	28	22.9	28.9	24.1
10	30.5	21.7	32.5	21.8	32.2	21.6	31.4	23	31.6	24.2	29.9	22.3	30.5	22	30.6	24.7
11	30.1	22.2	32	19.5	32.2	21.1	31.4	22.6	31.5	21.6	29.4	21.6	29.5	22	28.4	23.5
12	30.6	23.4	29.1	22.8	28.9	23.1	31.6	23.4	32.5	23.9	29.6	22.1	29.6	22.5	30.4	24.2
13	30.5	21.7	31.2	19.9	33	21.8	32.2	24.8	32.7	24.1	30	23.2	30.5	21.8	31.5	24.8
14	30.8	21.5	30.2	19.5	30.6	21.1	31.8	22	32.4	23.3	29.3	22.8	30.1	22.4	31.9	24.5
15	30	22.7	29.2	21.5	29.2	22.2	29.6	22.8	31.6	24.3	29.6	22.4	31	22.8	30.8	24.8
16	30.6	20.2	29.9	18	31.8	20.1	32	23.2	32.3	23.8	29.8	23.8?	30.5	19	31.9	23.3
17	30.6	22.4	32.8	21.9	30.7	22.8	31.6	23.4	30.2	23	29.8	22	29.5	21.9	30.5	22.9
18	30.9	22.7	32.9	21	31.1	21.9	32.6	23.4	31.9	24.4	30	22.5	30.5	22.3	31.3	24.3
19	30.5	23.7	30.4	23	30.7	22.4	32.4	24	32	24.7	30.2	22.8	30.8	22.5	29.9	23.1
20	30.7	23.5	33	21.2	30.2	22.1	32	24.8	32.4	25	30.6	23	31	23.4	30.8	24.9
21	30.6	21	33	19.3	30.2	20.4	32.6	23	33	24.4	30.5	23.9	30.5	22	30.8	24.1
22	30.1	21.3	31.8	19.4	31	20.5	32	22.8	32.4	21.8	29.5	22.4	31.5	18.8	31.5	20.6
23	29.5	22	31.2	21	31.1	21.5	32.6	23.5	33	21.3?	29.1	22.2	32	18.8?	31.6	24
24	30.3	21.2	31	21.5	33.8	22.1	31.8	24.6	33.9	21.4	30.7	22.9	31	22.9	31	24.4
25	30.8	22.3	32.1	23	31.4	22.5	31.8	23.2	33.3	23.4	29.9	23.3	29.7	22	29.8	24.3
26	30.2	21	31	19.3	32.1	19.7	32.6	23.6	32.7	25.2	29.9	23.4	22	31.3	25.5	
27	30.8	22.3	33.3	22	32.8	21.8	30	23.8	32.8	24.2	30.3	23.6	30.5	22.3	31.8	25.1
28	30.6	24	30	21.5	32.4	22.8	33	24.6	33.5	25.2	29.9	24.8	31	23	32.3	24.3
29	31	22.5	32.5	21.1	32.4	21.9	32.4	23.6	32.4	24.5	30	23.5	30.6	23.1	32.1	24.8
30	30.7	23	33.4	23.1	32.1	23.3	32.8	23.6	32.7	24.7	30.6	23.3	30.7	22.6	31.4	24.8
31	30.2	24.7	30	22	31.3	23.4	31.4	24.5	33	25	29.6	22.9	31.5	22.9	31.1	25.3
Mean	30.5	22.5	31.5	20.9	31.6	21.7	31.7	23.4	32.2	23.6	29.8	22.9	30.4	21.9	31	24.2

Maximum and minimum temperatures at the stations of the Weather Bureau, March, 1919—Continued.

Day.	Sumay Guam.		Calapan.		Virac.		Naga. a		Tigaon.		Batangas.		Lucena.		Atimonan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	27.8	24.2	31.6	22.5	30.4	20	31.8	17.9	30.9	17.1	34.4	21.9	31	21.5	29.4	24.2
2	28	24	30.5	21.6	30.9	20.2	31.5	18.8	31.3	18.2	34.4	20.4	30.5	20.4	29.1	19.8
3	28.2	24	31.5	24	31.5	21.1	33.5	19.1	31.4	19.7	34.8	21.9	31.7	21.1	30.6	23.2
4	28.8	24.6	31.5	23.7	31.5	20.5	32.9	16.6	31.1	18.7	34.8	22.5	32.5	21	29.9	22.4
5	30	24.8	30.1	22	31.2	18.8	33	16.1	31.4	16.6	34.1	20.3	31.7	18.6	30.4	20.2
6	30.2	25	29.8	20.7	31.6	19	33.1	16.1	31.8	17.9	34.6	19.8	31.4	19.8	30.2	20.8
7	28.8	24.67	29.5	24.5	31.6	21.1	31.9	19.7	31.4	19.2	34.9	21.7	31.2	21.5	28.9	25.1
8	28.4	23.4	31.5	24	30.9	20.9	34.5	17.4	31.6	18	34.9	21.2	31.5	21.1	28.9	25.1
9	28	22.6	31.5	24.5	29.3	21.5	31.7	21	31.7	20.8	35	22.1	31.5	22.5	28.2	23.3
10	28	23.2	30	24	30.5	21.6	34.3	20.9	30	21.3	34.7	22.4	32	22.1	30.1	23.5
11	28.2	23.8	30.8	21.8	29.7	21.3	29.9	18	30.4	19.2	34.8	22.2	32	21.1	29.4	24.8
12	28.6	23.8	32	23.5	30.7	21.5	33.4	18.6	31.6	19.4	34.9	22.1	32.5	22.2	30.1	24.9
13	287	22.8	32	23.7	31.7	19.9	32.7	17.9	32.7	18.7	34.7	21.6	32.1	22.5	29.8	25.4
14	28.2	23.2	32.2	23.2	31	21.6	32.9	18.3	32.6	18.4	35	21.3	33.9	19.9	31.3	25
15	30	22.8	32.5	22.5	30.9	20.6	33.4	20	32.5	20.3	35.4	21.3	33.5	23	30.4	25.2
16	30.8	23	31.5	20.6	31.4	19	32.5	17.7	32.6	16.3	34.6	20.3	32.1	21.5	28.8	25
17	31.2	24.2	31.5	24	31.3	21.5	32.4	21.1	32.1	20.9	34	21.6	32	22.2	28.4	25
18	29.2	24.4	31	23.6	31	20.6	33.7	20.4	32.1	19.9	35.4	22	33.2	21.2	30.7	25
19	29.2	22.6	31.6	24.5	30.7	21.4	34	19.9	32.9	19.6	35.9	22.6	33.4	22.6	30.9	25
20	29.2	22.6	32.2	24	31.5	22.5	34	21.1	32.2	21.3	34.1	23	32.5	23.2	31.1	23.9
21	29.4	23.4	30.5	23	31	22	33.4	19.1	31.3	21.5	34.1	23.8	31.5	21.5	31.6	22.5
22	29.6	23.4	30.5	22	30.6	20.1	34.6	17.6	31.9	18.1	35	22	32.3	21.5	32.8	21.8
23	30.8	24	29	21	30.4	23.4	34.6	21	31.6	22.8	35.2	21.6	32.5	21.6	32.5	20.8
24	30.8	24.4	31.5	20.5	31	21.5	35.4	22.5	30.8	23.3	35.9	21	32.5	20.9	31.8	22.4
25	30.2	25	31.5	23	30.6	21.3	34	17.6	31.6	17.1	37.2	22.8	35	22.4	30.6	21.8
26	30.6	24.8	32	25.5	32.4	20.4	32.9	18.9	32.4	19.6	35.9	22.2	33	22.6	29.5	25.7
27	30.4	24.6	31.5	25.2	32.3	20.5	34.3	18.7	32.1	19.6	36	22.9	33.5	22.3	29.3	25.5
28	30.6	23.2	33	24	31.8	21.7	33.9	21.1	32.4	21.6	36.2	22.8	35	22.8	30.6	25.8
29	31	24.4	33	24.6	32.3	21.3	34.1	20.5	31.6	20.5	36.4	22.6	34	22.7	31.6	26
30	31	23.4	33	24.1	32.1	22.8	34	20	31.4	19.7	35.4	22.9	32.9	21.6	31.2	25.7
31	30.8	24.4	32.4	22.5	31	21.5	35	19.1	31.3	21.6	36.2	23.7	32.5	23.2	32.2	23.9
Mean	29.5	23.8	31.4	23.2	31.1	21	33.3	19.2	31.7	19.6	35.1	22	32.5	21.7	30.3	23.8

Day.	Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.1	20.6	33.1	19.8	29.6	21.2	31.7	19.5	33.5	19.3	35.4	19	34.5	18	33	18.7
2	32.9	18.5	33.5	19.2	29.6	20.3	31.6	19.9	33.1	18.8	34.6	18.3	32.4	18.2	34	18.6
3	32.3	23.3	33.6	20.9	30.2	24.7	32.5	21.8	32.7	18.6	33.9	19.7	32.8	20.1	32.8	18.3
4	34.5	21.8	33.9	21.4	29.6	22.3	32.1	22.2	34	19.1	34.4	19.5	32.1	16.9	33.2	19.4
5	33.5	18.2	33.7	21	30.2	20.3	31.6	19.6	33	17.6	34.5	20.3	32	17.6	33.5	18.6
6	34	19.9	33.8	20.2	30.3	20.8	33.1	18.8	33.2	17.1	34.2	19.9	32	18.2	34	17.5
7	34.4	23	33.6	20.9	30.4	24.8	32.1	20.8	34.4	19.9	34.8	20.3	32.2	18.1	33.5	18.9
8	31.3	21.2	33.7	20.8	30.4	24	31.1	20.4	34.5	18.3	34.4	19	32.8	20.1	32.9	18
9	32	23	33.2	21.4	29.2	23.6	31.7	22.7	34	21	33.8	21.7	34.5	19.6	33.2	19.5
10	35.6	24.2	34	21.9	30.2	25.2	32.2	23.5	33.3	24	35.2	22.2	34.9	21.6	33.3	21.4
11	33.2	23	33.6	21.6	30	24	32	21.7	34.7	20.1	35	21.1	33.1	20.1	33.6	21.1
12	34.2	22.6	34	21.5	31	22.4	33.5	21.5	33	19.9	35.3	19.5	32.7	20.9	34	20.4
13	34.8	22.8	34.2	21.2	30.4	22.2	32.4	21.3	34.1	19.9	35.8	20	32.1	21.1	34.7	21
14	33.2	22.3	33.8	20.9	30	23.8	32.1	20.5	32.6	19.7	34	20.1	33.3	21.6	34.2	20.6
15	36.9	23.7	34	20.4	30.9	21.8	33.6	20.9	33.3	19.4	34.6	19.7	32.8	19.8	36	19.8
16	34	22.5	34.3	21	30.6	21.6	32.5	20.1	34.6	20	35.7	20	32.4	22.4	34.2	22.4
17	33.4	22.8	34.2	20.7	30.4	24.2	32.1	20.6	34.2	19	36	19.2	33.7	19.7	35	18.6
18	34.3	23	34.6	20.6	30.6	24	32.9	20.4	34.5	19	35.3	20.5	32.9	21	35.1	19.5
19	34	24.9	34.5	20.5	30.1	23	33.2	22.5	33.4	20.8	33.5	20	33.7	19.5	34.9	20.4
20	33.1	23.8	33.9	22.1	30.1	23.5	33	22.8	34.1	21.8	32.8	21.6	33.7	21.4	33.7	22.5
21	35	23.9	34.8	22.3	30.2	22.8	34	22.5	34.6	21.5	35	20.9	33.2	20.9	36	21.9
22	33	21.1	36	21.2	30.5	21.5	35	21.6	35.3	21.7	35.6	20.5	32.5	21.1	36.8	23
23	31.6	19.9	35.9	22.1	30.9	22.6	34.6	22.4	35.8	21.7	36.1	20.9	33.6	21.6	38	24
24	34	21.6	35.5	21.2	31.8	23.9	36.5	21.9	34.7	21.7	36.6	20.3	32.8	20.6	36	22.6
25	37.4	22.9	35.3	21.6	31.2	21	34.3	21.2	36.2	23	37.9	21.5	34.4	22.8	36.8	24.2
26	33.5	24.5	35.4	21.5	31.5	25.3	32.5	21.6	34.5	22	35.5	22.5	34.1	22.9	34	23
27	34.4	23.4	34.9	21.2	31.5	24.6	32.6	21.4	34.7	20	36	21	33	19.9	35.2	19.5
28	35	23.9	35.3	21	29.3	23.6	34.1	21	35	20.4	36.9	20.6	33.1	20.5	36.4	21.7
29	33.9	24.2	34.8	22	31	24.2	32.8	23	33.8	21.2	35.2	20.8	33.4	21.7	34.7	23.4
30	33.1	23.5	35	21.9	31.3	24.3	33	22.5	34.2	22.2	34.6	22	34.3	23.9	34.4	23.2
31	33	23	35.4	21.8	31	23.2	34.4	23	36.1	21.6	36	20.9	32.4	23.4	36.6	23
Mean	33.8	22.5	34.4	21.2	30.5	23.1	32.9	21.4	34.2	20.3	35.1	20.4	33.1	20.5	34.6	20.8

a The minimum temperatures of this Station seem to be too low.

Maximum and minimum temperatures at the stations of the Weather Bureau, March, 1919—Continued.

Day.	Tarlac.		Baler.		Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	34.7	18.5	30	19.4	36	20.5	34.5	23.4	25.1	13.2	32	23	33	18.2
2	35.6	18.5	29.7	19.9	31.6	20.7	30	20.5	23.9	12.2	31.5	19.6	33.3	16.8
3	34.4	17.6	30	18.6	36.7	22.1	34	20.1	25.6	13.3	31.8	19.7	32	16.5
4	35	18.2	28.9	20	35	21.2	33.7	21	24.6	12.9	31.1	20.8	31.8	17.3
5	35.2	17.8	30.7	21	36.5	20.8	33	21	24.2	13.4	32.5	20.5	34.7	17.7
6	35.2	16.5	31	18	35.6	20.5	33.2	22	24.8	13.2	32.8	21	35	16.8
7	35	18.2	30.6	18.7	36.5	20	34.2	22.6	26.5	14.9	32	19.8	35.5	16.6
8	35.6	17.7	30.6	19.5	34.8	20.1	33	22	25.9	14.4	31.7	20.7	34.9	16.4
9	35	18.5	29.3	21	37.1	20	33.7	21.5	26.5	13.9	31.7	20.9	34.8	17.1
10	35.5	19.4	29.3	22.2	33.9	23	34.3	23.5	24.3	15.2	31.8	22.5	35.1	19.2
11	37.2	19.9	30	21.9	36.8	23.5	34.4	24.5	24.8	14.3	33	23.5	34.9	20.3
12	36.6	19.5	28.9	20.5	34.2	23	33.3	23	24.3	14.2	32.5	22.3	35.4	20.2
13	37.3	20.2	30.1	20.2	35.4	23.1	32	24.4	24.3	15.8	32.2	22.7	35.8	21
14	36.5	19.5	30	20.1	37	23.4	34.5	22.7	24.9	14.8	33.5	23	36.1	19.7
15	37.5	19.2	30.4	20	32.1	22.1	30.4	22.5	24.5	15	31.7	21.2	36	19.3
16	37.8	20	30.1	21.5	36	22.8	31.5	25.5	25.4	15.2	32.5	23	35.4	22.1
17	37.2	18.4	30.3	19	37.1	23.1	33.7	20.5	26.5	14.3	33.5	20.8	35.9	19.9
18	37	18.2	30.3	18.8	35.4	20	33.7	21.1	25.8	13.7	32	22.5	36.5	17.4
19	37.6	18.8	31	20.8	33.5	21.2	32.5	22	25.5	13.8	32.2	21.4	37.1	18.6
20	36	19.3	31.7	21	38.3	22.8	35.5	24.2	26.4	15.5	34.9	22.7	37.1	20.6
21	37.5	19.5	30.9	22.4	36.6	22.5	33	22.6	26	15.3	33.3	21.6	37.2	19.6
22	37.7	21.6	31.4	20.6	37.1	23.9	33.6	23	26.9	15.1	34	22.8	38.1	20.9
23	38	19	31.2	23	36.3	24.5	33.2	23	26.3	14.8	34	23.5	38.4	24.1
24	38.4	22	31.7	21.2	35.6	23.7	32.2	23	25.6	15.4	34.1	23.9	36.9	22.2
25	38.6	22.7	31.4	22.3	36.3	24.5	33.4	23.4	25.5	16	33.7	23.9	37.9	23.9
26	37.5	22.4	31.9	23.8	38.6	24.8	36.4	25	27.2	15.8	35.1	25.4	36.5	23.4
27	37.4	19.4	31.2	21.2	38.2	23.1	36.1	23.2	27.5	14.5	34	23	35.6	18.9
28	38	18.8	31.6	21.4	34	23.5	32	24	24.4	14.6	34.6	22.5	36.7	19.6
29	37.4	19	30.8	22	38	23	32	26.5	25.8	14.7	33.9	23.5	37.2	21.4
30	36	19.2	30.4	21.8	38	24	36.2	24.5	25.8	15	34	25.4	36.2	23.6
31	36.6	21.4	31.5	21.3	34	23.1	30.7	23	22	14.2	31.9	22.1	35.6	22.9
Mean	36.6	19.3	30.5	20.7	35.9	22.4	33.4	22.9	25.4	14.4	32.9	22.2	35.6	19.7

Day.	Candon.		Vigan.		Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	32	22.2	31.2	20.6	34.8	18.9	33.1	16.4	31.6	17.8	32.4	20.9
2	32.1	21.8	31.3	20	34.6	18.9	32.4	16.7	29.8	19.4	29.4	22.8
3	33	21.5	33.2	21.8	32.1	18	32.1	15.9	30.6	18.6	33.2	21.2
4	32.1	21.5	31.7	22	34.8	19	32.8	18.5	32.5	20.2	32.5	22.3
5	32.1	21.2	30.7	21.8	35.9	20.2	31.6	20.3	33.2	21.2	31.3	22.5
6	32	22.7	30.8	21.6	36.4	18.9	31.7	19	33.1	20.5	31.9	21.9
7	32	21.5	31.3	22	35.5	19.4	32.2	20.6	32.8	19.5	30.2	21.6
8	32.6	22	31.7	22	36.2	17.7	31.6	19.3	34.6	18.5	30	22
9	32.5	22.5	32.1	22.5	36.4	18.6	33.4	20.2	33.1	20.1	31.8	21.8
10	31.6	22.2	32.2	21.6	36.6	21	33.2	19.8	31.1	21	32	23.2
11	33.1	25.5	32.4	24	34.3	21.5	34.6	22.4	30.9	21.2	30.9	23.7
12	32.6	24	32.1	23.8	37	20.6	33.2	22	32.6	19.3	31	22.6
13	32	23.8	32.9	22.5	36.6	21.9	35.1	21	31.4	20	31.4	22.4
14	32	25.7	32.4	24.6	36.9	21.6	33.1	21.2	33.2	20.6	30.7	22.6
15	32	23.5	31.2	22.5	36.2	20.5	32.3	21.2	31.7	21.6	31	23.7
16	32.6	23	33.8	21.4	37.5	22.9	35.1	18	31.7	20.8	29.2	23
17	32.2	23.6	32.2	24.6	37.1	21.9	33.2	18.8	34.3	19	30.6	22.3
18	32.5	22.9	32.1	22.4	38.4	18.6	33.2	20.3	34.1	20	33.3	23.3
19	32.9	23	31.8	22.2	38.8	20.3	33.2	20	31.6	21.6	31.2	22.6
20	33.2	24.2	33.3	22.6	35.2	20	35.8	17.9	33	20.2	33.7	23.5
21	33.4	25.5	32.3	24	38.4	20.9	34.1	22	33.5	21.7	31.3	25
22	34	24.5	32.8	23	38.8	22.4	33.2	22	33.1	21.3	34	24.1
23	34.4	26.2	33.7	23.9	38.4	23	34.8	22.6	34.7	22.8	33.7	23.5
24	35	25.2	32.5	24.4	38.5	23.6	34.1	23.1	33.3	22.5	32.7	24
25	33.2	26.5	33.2	25	38.4	24	34.5	22.7	33.2	21.2	32.5	23.8
26	33.6	25	36.2	23.4	38	21.4	38.3	20.2	32.1	21.5	34	23.7
27	35	24	32.5	24.5	38	19.2	33	19	34	19.9	34.3	23.3
28	34	24.8	31.8	24.4	38.5	21	32.7	22	32.3	21.2	32	23.8
29	34.2	25.2	33.3	24.5	38.4	22.3	34	20.1	33.2	20	31.9	23.5
30	33.7	25.1	31.8	25	35.4	24.2	34	23.5	31.3	22.5	29.6	23.4
31	33.5	25.4	30.8	24	32.7	23	33	22.5	26.8	21.8	27.5	21.7
Mean	32.9	23.7	32.3	23	36.6	20.8	33.5	20.3	32.4	20.6	31.7	22.9

SEISMOLOGICAL BULLETIN FOR MARCH, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

3, 2^h 36^m 41^{s*} [3, 10^h 36^m 41^s]. **E Mindanao.** Earthquake originated in the Pacific and felt with intensity II-III in some stations of eastern and northern Mindanao. It was also recorded outside of the Philippines.

6, 7^h 22^m 56^{s*} [6, 15^h 22^m 56^s]. **E Mindanao.** Earthquake similar to the preceding one, and apparently originated in the same place.

7, 1^h 12^m 12^{s*} [7, 9^h 12^m 12^s]. **S Mindanao.** Earthquake of intensity III in the Cotabato district. It originated in the Celebes Sea. Two light aftershocks occurred respectively at 8^h 20^m and 10^h 13^m [16^h 20^m, 18^h 13^m]: the seismograph at Butuan recorded also five minor disturbances, all originated in the said sea.

7, 12^h 56^m [7, 20^h 56^m]. **Catbalogan (W Samar).** Earthquake shock of intensity III.

8, 11^h 0^m [8, 19^h 0^m]. **Antique (W Panay).** Earthquake shock of intensity II-III, short duration.

11, 4^h 43^m [11, 12^h 43^m]. **Cotabato (SW Mindanao).** Earthquake of intensity III; recorded at Butuan.

11, 8^h 33^m 31^{s*} [11, 16^h 33^m 31^s]. **N Mindanao.** Earthquake felt with intensity III in the Camiguin Island and recorded also at Butuan: its epicenter probably lay within the Island of Mindanao, W of the Agusan Valley.

15, 14^h 8^m 8^{s*} [15, 22^h 8^m 8^s]. **N Luzon.** Earthquake of intensity IV, felt through the provinces of Ilocos Norte, Apayao and Cagayan.

16, 7^h 35^m 14^{s*} [16, 15^h 35^m 14^s]. **E Mindanao and Visayas.** Extensive earthquake, originated in the Pacific and felt through central and eastern Mindanao and the islands of Samar and Leyte. Its intensity was variable at different stations, depending very likely on the nature of the soil: so it reached intensity V in the Agusan alluvials at Butuan, intensity IV in the volcanics of Davao and III in some other places of eastern Mindanao. It was recorded throughout the world.

During the first thirty minutes after the earthquake occurred for light perceptible aftershocks: the seismographs of Butuan and Camiguin Island recorded forty instrumental disturbances up 15^h 4^m 55^{s*} [23^h 4^m 55^s]. At that hour a second earthquake was felt, recorded also throughout the world. The number of instrumental disturbances recorded during the 17th reached thirty-eight, with seven perceptible shocks. On the 18th twenty instrumental disturbances were recorded with only one perceptible shock: on the 19th the number of instrumental disturbances fell to nine with one perceptible shock. On the 20th only a light shock occurred at 20^h 43^m [21, 4^h 43^m] followed by two instrumental aftershocks.

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

21, 1^h 3^m 2^{s*} [21, 9^h 3^m 2^s]. **Southern Luzon and Visayas.** Extensive earthquake felt through the southern and southeastern part of Luzon and the islands of Mindoro, Marinduque, Romblon, Panay, and Masbate. Its meizoseismic area extended itself from Marinduque northwards, across the isthmus of Tayabas, to the Baler Bay, nearly along the meridian 122° E and following the direction of one of the main seismotectonic lines of the Archipelago. ⁽¹⁾ In the island of Marinduque it reached intensity VII, while the isoseismal V-VI embraced the northeast portion of Mindoro, the whole provinces of Tayabas and Laguna and the eastern part of those of Batangas, Rizal, Bulacan and Nueva Ecija. The total area shaken had an approximate extension of 500 kilometers in the E-W and more than 700 kilometers in the N-S direction.

The seismographs of the observatory recorded but four light aftershocks: the main earthquake seems to have been recorded only in the stations of the Far East.

21, 17^h 22^m 58^{s*} [22, 1^h 22^m 58^s]. **E Mindanao and Visayas.** Earthquake of intensity IV, felt through eastern Mindanao and the islands of Samar and Leyte. The epicenter probably lay near to the NE end of Mindanao.

22, 1^h 40^m [22, 9^h 40^m]. **Legaspi (SE Luzon).** Oscillatory earthquake, direction NE-SW, intensity III, duration 8 seconds.

23, 22^h 53^m 2^{s*} [24, 6^h 53^m 2^s]. **NE Mindanao and Visayas.** Earthquake of intensity IV, originated in the Philippine Deep, E of Samar. It was felt in Samar, Leyte, Cebu, Bohol and NE Mindanao.

25, 14^h 23^m 4^{s*} [25, 22^h 23^m 4^s]. **Cotabato (SW Mindanao).** Earthquake felt with intensity III in the central part of the Cotabato district. The origin of the disturbance lay towards the south in the Celebes Sea.

25, 18^h 45^m [26, 2^h 45^m]. **Antique (W Panay).** Oscillatory earthquake, direction W-E, intensity III, duration 5 seconds.

29, 2^h 23^m 29^{s*} [29, 10^h 23^m 29^s]. **Atimonan (E Luzon).** Earthquake shock of intensity II-III.

¹The Relation of Seismic Disturbances in the Philippines to the Geologic Structure. *The Phil. Journal of Science*, Vol. VIII, Sec. A, p. 220.

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.62$, $\epsilon=2.726$, $\frac{r}{T_0^2}=0.021$;
 A_E : $T_0=6.03$, $\epsilon=2.378$, $\frac{r}{T_0^2}=0.037$. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
69	1	I _r	eP	<i>h. m. s.</i>				
			S	13 40 21				
			L	44 33				
			M _E	46 30				
			M _N	46 51	8		58	
F	47 18	8	107					
				15 07				
70	2	I _u	e	3 46 33				
			F	6 27				
71	2	I _u	e	12 05 00				
			F	14 32				
72	2	I _v	e	17 11				
			F	23				
73	3	I _r	eP	2 36 41				
			L	39 10				
			F	3 11				Felt in some stations of eastern and northern Mindanao.
74	6	I _r	(PS)	3 18 12				
			L	21 22				
			M _N	21 39	6	59		
			M _E	21 54	7		55	
			F	4 07				
75	6	I _r	(PS)	7 22 56				
			L	24 44				
			M _E	26 00	8		29	
			M _N	26 26	8	38		
			F	8 03				Felt at Butuan (N Mindanao) and Mambajao (Camiguin Island).
76	7	I _r	eP	1 12 12				
			L	14 04				
			F	33				Felt at Cotabato (SW Mindanao).
77	8	I _r	eP	18 15 05				
			F	31				
78	9	I _u	e	3 36 44				
			F	6 18				
79	10	I _r	eP	19 23 32				
			F	53				
80	10	I _r	eP	21 23 03				
			S	25 40				
			L	26 28				
			M _E	26 57	6		56	
			M _N	27 09	6	156		
			F	22 56				
81	11	I _v	eP	8 33 31				
			F	46				Felt at Mambajao (Camiguin Island).
82	13	I _r	eP	14 22 14				
			L?	26 40				
			M _E	26 51	6		26	
			M _N	27 04	7	29		
			F	51				
83	14	I _v	eP	7 51 10				
			F	54				
84	15	I _v	eP	14 08 08				
			F	16				Northern Luzon.
85	16	II _r	eP	7 35 14				
			S	37 10				
			L	37 48				
			M _E	39 23	9		479	
			M _N	39 30	10	950		
			F	9 51				
86	16	I _r	eP	15 04 55				
			S	07 32				
			L	08 19				
			M _E	09 06	8		230	
			M _N	09 17	9	264		
			F	16 33				
87	17	I _v	eP	3 18 52				
			F	25				Felt at Butuan (N Mindanao).

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.	
						A _N μ	A _E μ		
88	17	I _r	e F	<i>h. m. s.</i> 3 32 51				Felt at Butuan (N Mindanao).	
89	18	I _v	eP F	14 53 25 58					
90	21	III _d	iP F	1 03 02 3 09				Felt through the southern and southeastern part of Luzon and in the islands of Mindoro, Marinduque, Romblon, Panay and Masbate. L and maxima lost by the force of the shock.	
91	21	I _v	eP	6 03 38				F overtaken by following earthquake.	
92	21	I _v	eP F	6 07 17 14					
93	21	I _v	eP F	7 42 47 52					
94	21	I _v	eP F	13 02 42 11					
95	21	I _r	e F	16 09 12 17 02					
96	21	I _v	eP L M _E M _N	17 22 58 24 25 25 40 26 08		6 7		144 221	Felt eastern Mindanao, Samar and Leyte Islands. End overtaken by following earthquake.
97	21	II _r	e? F	17 34 45 18 58					
98	21	II _v	eP L M _N M _E F	19 04 05 04 24 04 50 05 04 20		5 5		232 219	
99	22	I _v	e F	13 04 49 17					
100	22	I	e F	16 25 52					
101	22	I _v	eP F	16 28 20 31					This record merged into the preceding quake.
102	23	I _v	eP F	2 12 17 18					
103	23	I _v	eP S L M _E M _N F	22 53 02 54 08 55 00 55 23 55 24 23 55		6 6		77 86	Felt in Samar, Leyte, Cebu, Bohol islands and NE Mindanao.
104	25	I _v	e F	14 23 04 52					Felt at Cotabato (SW Mindanao).
105	26	I	e F	13 38 14 06					
106	29	II _r	eP L	1 34 42 39 00					F overtaken by following earthquake.
107	29	I _v	eP F	2 23 29 32					Antimonan (E Luzon).
108	30	II _r	eP S L M _N M _E F	10 44 37 48 22 49 54 50 18 50 35 12 06		6 7		50 34	
109	31	I _v	e F	13 33 20 49					
110	31	I _v	eP F	19 18 04 21					

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

3, 2^h 36^m 41^{s*} [3, 10^h 36^m 41^s]. E de Mindanao. Temblor de tierra de origen algo lejano en el Pacífico; sentido con intensidad II-III en algunas estaciones del E y N de Mindanao. Registrado fuera de Filipinas.

6, 7^h 22^m 56^{s*} [6, 15^h 22^m 56^s]. E de Mindanao. Temblor de tierra semejante al precedente y originado al parecer hacia el mismo punto en el Pacífico.

7, 1^h 12^m 12^{s*} [7, 9^h 12^m 12^s]. S de Mindanao. Temblor de tierra sentido con intensidad III en la provincia de Cotabato. Originado en el Mar de Célebes. Hubo dos repeticiones más ligeras, sentidas en Cotabato a 8^h 20^m y 10^h 13^m [16^h 20^m, 18^h 13^m]. El sismógrafo de Butúan registró además otros cinco choques: todos al parecer tenían su origen en el Mar de Célebes.

7, 12^h 56^m [7, 20^h 56^m]. Catbalogan (W de Sámar). Temblor de tierra de intensidad III.

8, 11^h 0^m [8, 19^h 0^m]. Antique (W de Panay). Temblor de tierra de intensidad II-III, duración muy corta.

11, 4^h 43^m [11, 12^h 43^m]. Cotabato (SW de Mindanao). Temblor de tierra de intensidad III; registrado en Butúan.

11, 8^h 33^m 31^{s*} [11, 16^h 33^m 31^s]. N de Mindanao. Temblor de tierra, sentido con intensidad III en la Isla de Camiguín y registrado también en Butúan; su epicentro se hallaba probablemente en la Isla de Mindanao al W del Valle del Agusan.

15, 14^h 8^m 8^{s*} [15, 22^h 8^m 8^s]. N de Luzón. Temblor de tierra de intensidad IV sentido en las provincias de Ilocos Norte, Apayao y Cagayán.

16, 7^h 35^m 14^{s*} [16, 15^h 35^m 14^s]. E de Mindanao y Visayas. Temblor de tierra de grande extensión, originado en el Pacífico y sentido en toda la parte oriental y central de Mindanao y en las Islas de Sámar y Leyte, con intensidad variable, dependiendo al parecer de las condiciones del suelo: así fué de intensidad V, en los aluviones del Agusan de las cercanías de Butúan; de intensidad IV en los terrenos volcánicos de Dávao y de III en otros sitios del E de Mindanao. Registrado en todo el mundo.

Siguió una serie de cuatro choques muy ligeros durante la primera media hora después del terremoto; además los sismógrafos de Butúan y de la Isla de Camiguín registraron 40 choques instrumentales hasta las 15^h 4^m 55^{s*} [23^h 4^m 55^s]. A esta hora ocurrió un segundo terremoto, registrado también en todo el mundo, al cual sucedieron 38 choques instrumentales y 7 perceptibles durante el día 17. El 18 se registraron 20 choques instrumentales con uno perceptible. El 19 ya no se registraron más que 9, mientras que el día 20 fué ya normal, con solo un temblor perceptible a 20^h 43^m [21, 4^h 43^m] y dos repeticiones.

21, 1^h 3^m 2^{s*} [21, 9^h 3^m 2^s]. S de Luzon y Visayas. Extenso temblor de tierra sentido en toda la parte sur y sureste de Luzón y en las Islas de Mindoro, Marinduque, Romblón, Panay y Masbate. El área meizosísmica se prolongaba desde Marinduque hacia el N, por el istmo de Tayabas, hasta la Bahía de Baler, próximamente a lo largo del meridiano 122° E, y al parecer coincidiendo con una línea sismotectónica de las más importantes de Filipinas.⁽²⁾ Desarrolló su mayor intensidad VII en la Isla de Marinduque y sus cercanías. La isosisma V-VI encerraba la parte NE de Mindoro, las

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² The Relation of Seismic Disturbances in the Philippines to the Geologic Structure. *The Phil. Journal of Science*, Vol. VIII, Sec. A, p. 220.

Provincias de Tayabas y Laguna y la parte oriental de las de Batangas, Rizal, Bulacán y Nueva Écija. Fué perceptible en un área total que se extendía unos 500 kilómetros de E a W y más de 700 de N a S. Los sismógrafos de Manila registraron cuatro repeticiones de muy poca importancia. Fuera del Archipiélago sólo parece que fué registrado en las estaciones del Extremo Oriente.

21, 17^h 22^m 58^{s*} [22, 1^h 22^m 58^s]. E de Mindanao y Visayas. Temblor de intensidad IV sentido en la parte E de Mindanao y en las Islas de Sámar y Leyte. El epicentro parece se hallaba cerca de la parte NE de Mindanao.

22, 1^h 40^m [22, 9^h 40^m]. Legaspi (SE de Luzón). Temblor oscilatorio, dirección NE-SW, intensidad III, duración 8 segundos.

23, 22^h 53^m 2^{s*} [24, 6^h 53^m 2^s]. NE de Mindanao y Visayas. Temblor de tierra de intensidad IV, originado en el Abismo de Filipinas al E de Sámar. Sintióse en las Islas Visayas de Sámar, Leyte, Bohol y Cebú y en la parte NE de Mindanao.

25, 14^h 23^m 4^{s*} [25, 22^h 23^m 4^s]. Cotabato (SW de Mindanao). Temblor de tierra de intensidad III en la parte central del distrito. Su origen se hallaba al parecer hacia el sur en el Mar de Célebes.

25, 18^h 45^m [26, 2^h 45^m]. Antique (W de Panay). Temblor oscilatorio, dirección W-E, intensidad III, duración 5 segundos.

29, 2^h 23^m 29^{s*} [29, 10^h 23^m 29^s]. Atimonan (E de Luzón). Temblor de tierra de intensidad II-III.

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JAN 20 1920

THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR APRIL, 1919.

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1919

BULLETIN FOR APRIL, 1919.

METEOROLOGICAL BULLETIN FOR APRIL, 1919.

By Rev. JOSÉ CORONAS, S. J.,
Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month in the Philippines has been almost without exception somewhat higher than that of the preceding year and than the April's normal. The highest pressures were generally observed on the 20th, and the lowest on the 9th or 10th.

The mean monthly temperature is also above the normal and above that of April, 1918, in practically all the stations of the Philippines. The monthly absolute maximum and minimum temperatures for Manila were 37.7° C. and 19.8° C.: they were registered on the 16th and 17th, respectively. The extreme temperatures for Baguio were 26.9° C., 15.1° C. on the top of Mirador, and 27.0° C., 14.6° C. in the valley.

Only once since 1880 has the absolute maximum temperature of Manila for the month of April been higher than this year, namely in 1915, when the April's maximum temperature was as high as 38.0° C. During this period of thirty years only seven times has the maximum Manila temperature for April been higher than 37° C.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR APRIL, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from April, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from April, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga	758.81	+0.53	-----	760	24	757.23	9	26.3	+0.5	-----	32.3	15	21.5	4
Yap, W. Carolines	59.19	-----	-----	60.01	5	58.31	17	27.4	-----	-----	34.5	17,28	23.5	22
Tagbilaran	59.07	+ .90	+0.29	60.26	6	57.27	9	27	+1.1	0	34.1	20	19.9	5
Surigao	59.47	+1.16	+ .54	60.69	20	57.49	9	26.5	+ .7	-0.1	32.2	3	21.4	4
Cebu	59.43	+ .95	+ .51	60.74	20	57.76	9	28.2	+ .6	+ .5	32.5	8	23.7	5,6
Iloilo	58.98	+ .62	+ .26	60.20	20	57.44	9,10	28.7	+1.6	+ .8	35.3	11	23.2	24
Tacloban	59.78	+1.33	+ .50	61.14	20	58.31	9	27.3	+1	+ .2	35.2	7	21	5
Capiz	59.30	+ .58	0	60.70	20	57.82	10	28.4	+1.3	+ .8	35.4	15	22.9	5
Calbayog	59.81	+1.13	+ .48	61.20	20	58.43	10	26.2	+ .7	0	33.7	20	20.6	5
Legaspi	60.01	+ .96	+ .53	61.55	20	58.58	10	28.3	+1.4	+ .7	33.3	28	23.4	1
Atimonan	59.83	+ .47	+ .35	61.50	20	58.31	10	27.8	+1.2	+ .1	33.7	12	22.5	13
Ambulong, Tanauan	58.96	+ .51	-----	59.98	6	57.37	10	29.2	+1.6	-----	37.3	22	22.2	15
Paracale	59.99	+ .49	-----	61.88	20	58.39	10	27.8	+1.3	-----	33.1	15	23	2,6,13
Manila	59.36	+ .40	0	60.95	20	57.81	10	29	+2.1	+ .9	37.7	16	19.8	17
San Isidro	59.96	+ .82	+ .58	61.29	20	58.47	28	29.3	+1.7	+ .9	38.6	28	20.4	21
Dagupan	58.55	+ .29	- .25	59.92	20	57.02	10	29.4	+1.7	+ .9	38.4	30	22.6	21
Baguio ^a	637.61	+ .84	+ .44	638.94	20	636.59	10	19.5	+1.4	+ .7	26.9	18,21	15.1	3
Vigan	758.95	+ .42	- .14	760.31	24	757.63	12	29.1	+1.5	+ .8	35.7	19	23.1	4
Tuguegarao ^b	59.53	+ .11	+ .01	60.97	2	57.78	10	28.7	+1.5	+ .8	39.8	26	21.1	21
Laog	59.07	+ .57	-----	60.24	23	57.59	11	28.5	+ .7	-----	38.1	19	20	1
Aparri	59.61	- .04	- .12	61.55	2	58.06	28	27.6	+1.4	+1	37.8	28	21.5	14,24

^a The barometric readings of this station are not reduced to sea level. ^b 26 days of observation. ^c 25 days of observation.

Rainfall.—With a few exceptions, there was a lack of rain reported this month by our stations throughout the Philippines, the total monthly rainfall being in almost all of them below that of the preceding year and also below the normal for April. The amount of rain collected in the rain-gauges of Manila Observatory was only 0.9 mm., while the normal for this month is 33.5 mm. The total monthly rainfall for Baguio differs from the April's normal by —39.4 mm.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF APRIL, 1919.

Station.	Total.	Departure from April, 1918.	Departure from normal.	Days of rain.	Departure from April, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from April, 1918.	Departure from normal.	Days of rain.	Departure from April, 1918.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.	mm.		mm.	mm.	mm.	mm.		mm.	mm.
Jolo	113.5	-126.1	-9.4	11	-2	72.1	15	Sumay, Guam	3.1	-84.2	-39.1	2	-9	1.8	1
Zamboanga	53.1	-45.2	+12.3	9	-6	50.8	30	Calapan	45.9	-58	-58.5	11	-0	13.2	22
Davao	138.6	-.6	-21.1	8	-5	78.7	8	Virac ^a	30.7	-98	-89.6	7	-7	19.8	9
Cotabato	129.9	-146.4	-30.7	10	-8	37.8	15	Naga	27.6	-16.3	-68.9	5	-3	18.3	10
Camp Keithley, Lanao	89.2			14		36.3	29	Tigaon	23.6			10		5.6	9
Cagayan, Misamis	18.6	-36.1		3	-5	8.9	29	Batangas	39.6	+25.4	+9.9	1	-1	39.6	2
Butuan	147.5	-98.5	+13.6	15	-5	62.3	14	Lucena	27.4	-11.6		2	-4	23.6	2
Mambajao	13	-5.6		2	-1	7.4	14	Atimonan	122.2	+86.1	+30.2	7	+1	48.5	2
Dumaguete	6.1	-20		2	-5	4.8	29	Ambulong, Tanauan	18	-31.9		3	-2	15.7	2
Yap, W. Carolines	62	-260.4	-67.6	14	-12	27.2	6	Canlubang, Calamba	0	-47.5		0	-8	0	0
Tagbilaran	11.4	-161.8	-156.4	5	-6	5.6	29	Paracale	8.6	-123.7	-83.8	5	-10	4.4	8
Iwahig	19.5	-39.9		7	-3	5.6	29	Santa Cruz, Laguna	17.7	-56.9	-22.4	4	-5	8.9	2
Surigao	175.3	-40.4	-64.3	16	-6	49	28	Manila	.9	-9.3	-32.6	1	-2	.9	9
Maasin	29.2	+22.6	-34.5	1	0	29.2	28	Antipolo	15.7	+13.7		1	-1	15.7	2
Cebu	5.3	-30.2	-27.8	4	-4	3.1	13	Iba	0	-27.9	-43.8	0	-6	0	0
Iloilo	88.8	+36.1	+48.2	5	-2	71.6	23	San Isidro	42.1	+41.5	+2.6	5	+3	15.7	2
San Jose Buenavista	73.1	-47.8	+17.9	10	+1	37.6	23	Tarlac	14.9	+12.8	-48.7	5	+3	5.3	4
Cuyo	0	-79.3	-21.8	0	-4	0	0	Baler	228.3	-68.1	-51.6	12	-5	109.5	2
Ormoc	41.2	-113.4	-34.5	7	-16	15.2	8	Dagupan	101.7	-158.7	+14.9	6	-5	57.6	8
Guiuan	193.4	-46.6		22	+1	48.5	29	Bolinao	56.3	+55.3	+28.3	5	+4	28	10
Tacloban	67.7	-67.7	-61.1	10	-11	13.5	28	Baguio	76.4	-43.2	-39.4	9	0	37.4	11
Capiz	6.6	-68.3	-42.2	4	-3	2.5	25	San Fernando, Union	19.6	+17.8	+3.4	4	+3	10.7	11
Borongan	229.6	-76.1	-2.4	19	-2	58.4	29	Echague	210.3	+200.1	+129.5	8	+3	108	5
Cathalogan	37.4	-132.9		10	-9	16.2	9	Candon	0	0	-13.8	0	0	0	0
Calbayog	103.8	-61.1	-11.5	15	-5	34.3	9	Vigan	0	-.8	-19.4	0	-1	0	0
Masbate	1.6	-15.4	-33.1	3	-3	.8	16	Tuguegarao ^a	50.2	-17.3	-21.2	4	+1	31.7	11
Romblon	15	-46.3	-42.4	2	-4	14.5	23	Laog	0	0	-9.4	0	0	0	0
Batag	133	-52.2		11	-4	62.5	10	Aparri	14.8	+7	-22.8	3	-1	11.7	11
Sorsogon	80.5	+20.8		11	+2	13.4	9	Cape Bojeador	0	0		0	0	0	0
Legaspi	44.6	-29.6	-97.4	11	-5	14.1	8	Santo Domingo, Batanes	33.1	+23.6	-74.6	10	+4	12.7	11

^a 26 days of observation.

DEPRESSIONS AND TYPHOONS.

With the exception of the Continental depressions that moved northeastward or eastward across Japan or the Loochoos and the Bonins, there was not a single depression or typhoon worth mentioning this month in the Far East. Only a low-pressure area of very little importance was noticed on the 8th and 9th moving westward across the Island of Mindanao.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas ha sido casi sin excepción algo mayor que la del año pasado y que la normal de abril. Las presiones más altas se observaron generalmente el día 20, y las más bajas el 9 ó 10.

La temperatura media mensual es también mayor que la normal, y que la media de abril de 1918, prácticamente en todas las estaciones del Archipiélago. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 37.7° C. y 19.8° C., las cuales se registraron los días 16 y 17, respectivamente. Las temperaturas extremas de Baguio fueron 26.9° C., 15.1° C. en la cumbre del Mirador, y 27.0° C., 14.6° C. en el valle.

Sólo una vez desde 1880 la temperatura máxima absoluta de Manila del mes de abril ha sido mayor que la de este año, es decir en 1915, cuando la máxima temperatura de abril llegó a la altura de 38.0° C. Durante este período de treinta años sólo siete veces ha sido la temperatura máxima de Manila del mes de abril mayor de 37° C.

Precipitación acuosa.—Salvas raras excepciones, hubo este mes escasez de lluvia en nuestras estaciones de Filipinas, siendo en casi todas ellas el total de lluvia de este mes menor que el del año pasado y menor también que la normal de abril. La cantidad de lluvia recogida en los pluviómetros del Observatorio de Manila fué sólo 0.9 mm., al paso que la normal de este mes es 33.5 mm. La lluvia total del mes en Baguio difiere de la normal en -39.4 mm.

DEPRESIONES Y TIFONES.

Exceptuando las depresiones continentales que se movieron al NE o E a través del Japón o de Loochoos y de Boníns, puede decirse que no hubo este mes en el Extremo Oriente ni una sola depresión o tifón que merezca mencionarse. Sólo un área de baja presión de muy poca importancia se observó los días 8 y 9 moviéndose al W a través de la Isla de Mindanao.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[$\phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.			Evaporation. ^b		
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.								
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	759.66	28	34.5	22.8	28.5	31.5	29	29	29.8	28.5	75.4	20.7	21.1	53.9	6.3	3.7
2	60.50	28.3	34.2	24	28.6	32.2	29.3	30	28.3	28.2	74.4	20.9	21.8	54	5.5	3.2
3	59.52	28.9	35.8	24.4	29.5	32.7	29.6	30.7	28.4	28.2	70.2	20.3	22.2	55.7	6.5	3.9
4	59.37	28.5	34.5	23.8	29.8	31.8	29.8	30.5	28.5	28.2	70.2	20	21.6	52.8	6	4.1
5	60.09	28.8	35.7	23.3	29.5	32.8	29.7	30.7	28.6	28.2	69	20	21.3	54.5	6.8	4.1
6	60.52	28.9	35.2	24.5	29.8	33.2	30	30.8	28.7	28.2	69.1	20	23.5	56.3	6.6	4.3
7	59.86	28.4	35.1	23.7	30.2	32.3	30.3	30.8	28.8	28.2	66.8	18.9	21.2	55.1	6.2	4
8	58.80	28.8	35.1	23.7	30.3	32.6	30.3	31	29	28.3	65	18.8	21	54.9	6.9	4.4
9	58.26	27.6	35	22.2	30.2	32.7	30.3	31	29	28.3	74.2	20.1	19.7	54.6	4.4	3
10	57.81	29.8	37.2	23.7	29.8	33.5	30.2	31.3	29.1	28.3	67.1	20	21.7	56	7.5	4.9
11	58.13	28.7	34.2	24.5	30.3	32.3	30.3	31	29.2	28.3	74.4	21.5	22.7	55.7	4.6	2.9
12	57.94	29.7	37	24.1	30	33.2	30.2	31.2	29.2	28.3	68.8	20.6	22.6	56.5	7.5	4.8
13	58.28	29.8	36.8	23.7	30.6	34.8	30.5	31.5	29.3	28.3	59.7	17.7	20.8	56	9	5.9
14	58.83	29	36.7	22.3	30.3	34	30.4	31.5	29.3	28.3	64.5	15.7	19.3	54.7	7.5	5.4
15	59.32	29.8	37.5	23	30.4	34	30.6	31.8	29.3	28.3	63.6	19.2	20.5	56.2	8.4	5.4
16	59.43	29.8	37.7	23.7	30.8	33.8	30.9	31.8	29.3	28.3	60.5	18.4	23.6	56.3	8	5.2
17	59.08	28.4	36.5	19.8	30.3	33	30.8	31.5	29.7	28.5	59.7	16.7	16.3	55.7	7.9	5
18	58.84	29.6	37.2	24	31	33.8	30.8	32	29.5	28.4	66.2	19.9	21.5	56.2	9.1	4.9
19	60.03	29.5	36.7	23.3	31.5	34.7	31.2	32.1	29.7	28.5	62.7	18.6	21	56.8	8.8	5.6
20	60.95	28.8	35.9	21.9	31.3	34.2	31.3	32.2	29.5	28.4	57.4	16.3	18.5	54.2	10	6.1
21	60.67	29	36.2	21.1	31.3	34.5	31.4	32.4	29.6	28.5	56.5	16.1	17.7	55.4	10	6.4
22	59.98	29	37.2	21.5	31.7	34.5	31.5	32.5	29.7	28.5	62.4	18.1	18.5	55.8	9	5.3
23	60.37	28.7	36.1	21.8	31.7	34.2	31.6	32.4	29.7	28.5	65.1	18.6	19	55.7	7.6	4.7
24	60.64	28.7	36.1	22.1	31.5	34	31.4	32.3	29.8	28.5	62.8	17.9	19.3	55	8.5	5.8
25	60.21	29.2	37.2	21.9	31.2	34.3	31.5	32.4	30	28.7	59.9	17.3	19	56	8.8	5.8
26	59.43	29.3	35.8	22.6	30.7	33.7	31.3	32	30	28.6	62.7	18.5	19.5	55.5	8.1	4.8
27	58.47	29.4	36.7	22.8	31.6	33.7	31.6	32.2	30.3	28.5	60.8	17.9	20.1	54.7	8.7	6.1
28	58.18	29.3	36	22.5	31.5	34.2	31.6	32.2	30	28.6	64.5	19.2	19.5	54.7	7.7	5.1
29	58.69	29.3	36.8	23.7	31.2	33.8	31.5	32.3	30	28.7	66	19.5	21.3	54.8	7.8	5
30	58.99	28.9	36.7	22.1	30.6	33.5	31.3	32	30.2	28.8	64	18.6	19.6	55.5	8.3	5.6
Mean	759.36	29	36.1	23	30.5	33.4	30.7	31.5	29.3	28.4	65.5	19	20.5	55.3	7.6	4.8
Total															228	144.6
Departure from normal	0	+0.9	+2.1	+0.3							-4.3	-0.4			+40.2	

Day.	Wind.				Clouds.				Sun-shine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.	
	Prevailing direction.	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.		Upper.		Lower.	On the tower.		In the park.
						0-10.							
1	E quad.	158.5	17.5	W	2.8	Ci.		Cu.	SE	h. m.	mm.	mm.	
2	WSW	191	18	WSW	4.2	Ci.		Cu.	E	9 45			
3	SE	158.5	13	SE	5.7	A.-Cu.	E	Cu.	NNW	6 15			□ ◊ p.
4	ESE, SE	193.5	18	W	6	Ci.	W quad.	Cu.	E	6 55			
5	ESE, WNW	245	20	SW	3	Ci.		Cu.	ESE	10 20			◊ p.
6	E quad.	166.5	14	W	5.8	A.-Cu.	E by N	Cu.	E	7 15			
7	E quad.	202.5	16	WNW	4.9	A.-Cu.	Ci.	Cu.	ESE	7 35			◊ p.
8	SE	216	21	W by S	4.5	A.-Cu.	NE	Cu.	ESE	8 05			◊ a. ◊ p.
9	E quad.	146	15	WNW	5.7	Ci.		Cu.	E	6 25	0.9	1	◊ p.
10	SE	197	22	SE	4.2	A.-Cu.	ESE	Cu.	E	8 15			◊ p.
11	W	143.5	19	WNW	7.2	A.-Cu.	E	Cu.	E	4 40			
12	ESE	186.5	19	SE	3.6	Ci.		Cu.	E	9 35			
13	SE	239	20	SE	1.8	A.-Cu.		Cu.	E	10 50			
14	SE	198	17	W	1.3	A.-Cu.		Cu.	E	10 40			
15	SE	188	17.5	WSW	1.4	Ci.-S.		Cu.	E	11 05			
16	SE	237	22	W	2.5	Ci., A.-Cu.		Cu.	E	10 35			
17	ESE, SE	226.5	22	W	2.2			Cu.	E	11 15			
18	SE	220.5	21	SE	3.2	A.-Cu.	NE	Cu.	E	10 15			
19	SE	202.5	23.5	SE	3.2	Ci.		Cu.	E	10 10			
20	ESE, SE	252	26.5	SSE	1.4	Ci.		Cu.	E	11 20			
21	ESE, SE	272.5	26	SE	1.5	Ci.		Cu.	E	11 30			
22	SE	218.5	22.5	SSE	2.2	Ci.	WSW	Cu.	E	11 15			
23	WNW, ESE	204.5	22	WNW	2.4	Ci., A.-Cu.		Cu.	E	9 55			◊ p.
24	SE	223	20.5	SE	2.9	Ci.		Cu.	E	11 05			
25	ESE	230.5	26	ESE	3.9	Ci.		Cu.	E	9 05			
26	SE	215.5	18.5	SE	3.1	Ci.		Cu.	E	10 30			
27	SE	198.5	15	SE by S	2.2	Ci.		Cu.	E	11 45			
28	NE, SE	231	20	WNW, W	2.2	Ci.		Cu.	E	11 10			
29	E quad.	232.5	24	SE by S	2.9	A.-Cu.		Cu.	E	9 55			
30	ESE	245	24	ESE	3.1	Ci.		Cu.	E	10 40			
Mean		208	20		3.4					9 32			
Total		6,239.5								285 55	0.9	1	
Departure from normal		-606			-0.7					+24 16	-32.6		

^a All the mean values given in this table are deduced from hourly observations.

^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.

^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[$\phi = 16^{\circ} 25' N$; $\lambda = 120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pres- sure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation.		
		Mean.	Maxi- mum.	Hour.	Mini- mum.	Hour.	Maxi- mum.	Hour.	Mini- mum.			Hour.	Mini- mum on grass.	Maxi- mum in sun. Black bulb in vac- uo. ^c	Free ex- posure (total)	Shel- ter (total)
	mm.	°C.	°C.	Hour.	°C.	Hour.	°C.	Hour.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	637.37	18.2	25.1	1.05p.	15.4	3.55a.	24.5	1.05p.	15.4	3.45a.	87.2	13.6	13.9	59.5	2.1	1.1
2	38.16	19.7	26.2	1.30p.	16.1	2.20a.	25.4	1.20p.	16.3	5.10a.	81.2	13.6	14.5	60.1	3.4	1.8
3	37.50	18.4	25.1	0.35p.	15.1	4.40a.	25.4	0.45p.	15.3	3.00a.	88.7	13.9	14.2	59.5	2.2	1.2
4	37.25	18.8	24.5	0.50p.	15.2	6.00a.	24.5	1.05p.	15.3	6.10a.	85.3	13.7	14.7	59.7	2.1	1.1
5	37.98	18.5	25.5	0.40p.	15.8	5.40a.	25.4	0.55p.	15.6	5.30a.	89.8	14.1	15	62	2.2	1.6
6	38.18	19	24.4	0.05p.	16.6	5.40a.	24.4	0.35p.	16.3	4.20a.	88.7	14.5	15.6	58.4	2.2	1.5
7	37.72	19.4	25.6	1.10p.	15.9	6.20a.	25.8	1.30p.	16.3	6.00a.	82.7	13.8	15.1	63.4	3.5	2.4
8	37.07	19.3	25.4	0.05p.	16.5	6.20a.	24.9	2.20p.	16.8	3.30a.	89.5	14.9	15.5	61.4	2.1	1.4
9	36.83	19.9	24.9	2.00p.	16.7	6.00a.	26	3.15p.	17.3	5.40a.	85.7	14.7	15.7	58	3.2	2.2
10	36.59	20.1	26.8	11.00a.	16.3	6.00a.	26.2	11.55a.	16.8	5.25a.	80	13.9	14.5	60.2	3.1	2.3
11	36.70	19.1	25.1	10.35a.	16.7	8.10p.	25.2	10.00a.	17	11.30p.	86.3	14.1	15.4	58.4	2.1	1.3
12	36.62	19.4	24.3	11.50a.	16.4	2.00a.	24.9	11.00a.	16.3	3.35a.	88.2	14.8	15.8	60.7	2	1.4
13	36.73	19.2	24.4	10.10a.	16.4	5.20a.	25	10.50a.	16.6	6.00a.	83	13.6	15.6	56	3.7	2
14	37.15	19.4	25.3	1.30p.	16	6.00a.	25.1	0.55p.	15	5.55a.	85.7	14.3	14	60	2.8	1.5
15	37.76	19.8	26.1	1.30p.	15.7	5.20a.	25.4	2.00p.	16.1	5.10a.	84	14.4	14.9	63	3.6	2
16	37.90	19.5	25.4	0.40p.	16.6	6.00a.	24.8	9.55a.	15.9	5.55a.	82.7	14	15.2	59.8	3.4	2.5
17	37.48	19.6	25.3	2.00p.	16.4	5.35a.	24.6	0.40p.	15.8	6.00a.	74.2	12.6	14.7	59.5	5.3	3.4
18	37.33	20.2	26.9	0.50p.	16.2	5.20a.	25.6	11.00a.	15	5.50a.	68.8	12	14.2	61	5.5	3.6
19	38.47	20.1	26	0.45p.	16.3	6.00a.	26.5	Noon	15.5	4.55a.	77.3	13.2	14.7	60.3	4.9	2.9
20	38.94	20.4	26.6	0.25p.	16.1	5.55a.	26.8	11.40a.	14.9	5.40a.	67.5	11.8	13.2	57.8	7.1	4.3
21	38.56	20.4	26.9	2.25p.	16.4	5.55a.	27	0.50p.	15	5.30a.	60	10.4	12.7	56	8	4.7
22	38.04	20.5	26.8	1.00p.	15.8	5.05a.	26.9	11.25a.	14.6	5.00a.	65.3	11.4	13.8	57.2	6	3.9
23	38.59	19	25.3	0.40p.	16.1	5.20a.	24.3	0.40p.	15.1	5.00a.	81.7	13.4	13.8	59.9	4	2.1
24	38.62	18.7	25.3	1.35p.	15.6	4.15a.	24.5	1.25p.	14.6	5.40a.	79.3	12.2	13.8	61.6	3.4	2.1
25	38.32	18.7	24.8	0.05p.	16.2	5.55a.	24	0.15p.	14.6	5.00a.	80.8	13	14.7	59	2.9	1.9
26	37.75	19.4	25.4	0.05p.	15.4	4.40a.	24.7	0.10p.	14.6	4.25a.	81.3	13.6	13.2	61.4	3.2	1.9
27	37.05	19.4	25.6	0.05p.	16.5	6.00a.	25.5	0.20p.	16.2	5.55a.	86	14.4	15.4	61.1	2.8	1.6
28	36.84	20	26.7	2.05p.	16.5	4.05a.	26.4	3.10p.	16.6	4.45a.	84.3	14.6	15.2	60.6	2.7	1.7
29	37.20	20.7	26.8	1.10p.	17.2	5.10a.	26.3	10.10a.	17.3	5.05a.	83.2	14.9	15.5	60.3	2.7	1.8
30	37.47	20.6	25.6	0.25p.	16.5	5.05a.	26.3	10.05a.	16.6	5.40a.	83.5	15	15	58.1	3.3	2.4
Mean	637.61	19.5	25.6		16.1		25.4		15.8		81.4	13.6	14.6	59.8	3.5	2.2
Total															105.5	65.6

Day.	Wind.					Clouds.		Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.	
	Prevailing direction. ^d	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.	Amount (mean). 0-10.	Form and direction.					
						Upper.	Lower.				
1	W	224	22.2	W	7.7	0-10.	Ci.	Cu. Variable	h. m.	mm.	d2 ≡ < p.
2	W quad.	286.3	27.6	W	6.4		Ci.	Cu. SSE	3 15		< p.
3	W, E	307.9	22.5	W	6		Ci.	Cu. ESE, NE	6 20		< p.
4	W, E	255.6	21.7	W	6.6		Ci.	Cu.-N. E	4 15	11.7	d2 a. ≡ 2 ● < p.
5	Variable	329.5	28.8	W	6		Ci.	Cu. E	3 10	.5	d2 a. p. ≡ 2 < p.
6	W, SE	270.7	23.1	W	6.9		Ci.	Cu.-N. ESE	3 45		d2 a. ≡ 2 d < p.
7	E, W	332.6	27.7	W	5.7		Ci.	Cu. SE	4 05		d2 a. ≡ 2 d < p.
8	SW quad.	261.1	23.1	W	6.1		Ci.	Cu. W	5 55		< p.
9	E, W	282.1	23.1	W	7.7		Ci.	Cu. ESE	4 35		d2 a. ≡ d < p.
10	E	369.1	27.7	E	5.6		Ci.	Cu. ESE	4 00		< p.
11	E	307.3	22.7	E	7		Ci.	Cu. SE	4 55	10.2	< p.
12	SE, E	333	20.1	E	5.9		Ci.	Cu. SE, SSE	3 50	37.4	d2 a. ≡ 2 < p.
13	SE, E	349.3	22	W	5.7		Ci.	Cu. SE, SSE	4 35	12.7	d2 a. ≡ 2 < p.
14	E quad.	290.1	22	W	3.6		Ci.	Cu.-N. W	4 20	.8	d2 a. ≡ 2 < p.
15	E, W	355.5	28.2	W	6.4		Ci.	Cu. NE	5 25	.3	< a. d2 p.
16	E quad.	373.5	22.8	W	5.3		Ci.	Cu. SSE	5 15		d2 a. ≡ 2 a. ≡ 2 < p.
17	E, W	372.9	27.7	W	3.1		Ci.	Cu. E	4 55		d2 a. ≡ 2 a. ≡ 2 < p.
18	E, W	361.1	30.9	W	2.4		Ci.	Cu. NE	6 40		< p.
19	E, W	271.6	26.4	W	2		Ci.	Cu. SE	9 00		< p.
20	E, W	286.6	29.2	W	0		Ci.	Cu. SE	6 45		< p.
21	E, W	303.7	27.7	W	.3		Ci.	Cu. SE	10 00		< p.
22	E quad.	352	31.2	W	1.7		Ci.	Cu. SE	9 25		< p.
23	Variable	296.7	25.1	SW	5.9		Ci.	Cu. E	9 20		< p.
24	E, W	325	27.1	W	5.3		Ci.	Cu. E	3 30		< p.
25	W, E	307.4	27.6	W	3.7		Ci.	Cu. ENE	4 40?	.8	d2 a. d2 p.
26	E quad.	280.6	24.7	W	4.4		Ci.	Cu.-N ENE, NNE	2 55		< p.
27	SW quad.	309.3	25.2	SW	5.3		Ci.	Cu. SE	4 40		< p.
28	W, E	291.6	29.3	SW	7.1		Ci.	Cu. Variable	4 35		< p.
29	W, E	249.4	23.9	W	7		Ci.	Cu. NE quad.	5 05	2	< p.
30	E	289	23.5	W	2.7		Ci.	Cu. SSE, SE	7 05		< p.
Mean		307.5	25.5		5				5 22		
Total		9,224.5							160 45	76.4	

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
 b The barometric readings of this station are not reduced to sea level.
 c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
 d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, APRIL, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo	14.5			.5	.8				.8				10.7		72.1	
Port Lebak, Cotabato						15.5		6.1	1					51.1	1.5	
La Union, Davao ^a								45.2	10.7				4.3	33		
Basilan Plantation, Isabela (Basilan) Kabumbatan ^a						2										
Basilan Plantation, Isabela (Basilan) Office ^a	18.3								4.1					4.3	30.8	
Malamaui ^b						.8								11.9		
Cuabo, Davao								7.9	3				4.3	25.6		
Zamboanga									.3							
Fort Pikit, Cotabato								21.1						4.6		
Davao								78.7	4.3				3.8	39.6	1.3	
Sirib, Guianga, Davao ^a							34.3	7.6					8.1	63.5		
Cotabato		13.7						18.8						36.3	37.8	
Bual, Cotabato		0.5						3.8	2.5				1	91		
Naga-Naga, Zamboanga	6.1	6.9				3			125.5	1.3	11.4		1	25.6		
Malabang, Lanao								5.8	2	4.6	5.3		.8	57.7	5.1	
Moncayo, Davao ^a						50.8	31.7							25.4	5.6	
Camp Keithley, Lanao								5.2	3.1		.5		.5	29.2		
Cagayan, Misamis									1.3					8.4		
Butuan								30.5					9.9	62.3	4.6	
Mambajao								5.6						7.4		
Dumaguete								1.3								
Yap, Western Carolines			.3		2.3	27.2	5.8	10.4			1.8					1.5
Tagbilaran								2.1					.5	2.1		
Iwahig	1.5									4.6				3		
Surigao		.5			.3	.3		9.7				12.7	48.1	10.4	1.5	
Maasin																
Cebu								.6					.3	3.1		
Hacienda Vallehermoso, Oriental Negros ^a									1.3							
La Carlota, Occidental Negros ^a	25.1	.5												21.3	.5	
Hacienda San Antonio, Occidental Negros ^a									8.6				1.3			
San Carlos, Occidental Negros ^a																
Hacienda Refugio, Occidental Negros ^a																
Iloilo								9.1	2.3				3.3			
San Jose Buenavista	.3	5.4						.5	.5					17.1		
Cuyo								4.1					1.5			
Lucena, Iloilo ^a								15.2	7.4							
Ormoc								40.9	.5	3	.5		2.8	1.3	11.9	.8
Guiuan		2.8		3.3	.3								9.7			
Dueñas, Iloilo ^a		14														
Bitagan, Iloilo (Railroad Iloilo to Capiz) ^a									1.8							
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a								14	8.7	4.3			6.1			
Tacloban			7.4													
Dumarao, Capiz ^a									1	3						
Dao, Capiz ^a									1.3							
Capiz								27.2	15.5	17.3	3.3		.3			4.6
Borongan			5.3		4.1			4.6	16.2	7.1						.5
Catbalogan			.3					9.4	34.3	7.4	1					.8
Calbayog		10.9	2.8			.8			.3							.8
Masbate																
San Jose Estate, J. Abello D-13, Mindoro ^a																
San Jose Estate, Tamaraw Plantation, Mindoro ^a																
San Jose Estate, San Agustin, Mindoro ^a	42.4								2							
San Jose, Mindoro ^a	1.3	11.2							1.5					1.5	11.7	
San Jose Estate, Tunnel D-12, Mindoro ^a	13.5	48.3		1.5										1	.8	
Romblon																

^a Voluntary or coöperative station.^b This station was opened on the 4th.

Daily rainfall at the stations of the Weather Bureau, April, 1919—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
Jolo	mm. 1	mm. 11.2	mm. 1.3	mm. .3	mm. 4.8	mm. 1.5	mm. 17.8	mm. .3	mm.	mm.	mm. 16	mm. 50.8	mm. 3.3	mm.	mm. 113.5
Port Lebak, Cotabato				17.3	4.8	6.1	17.8				1	10.9	1		171.2
La Union, Davao ^a															127.7
Basilan Plantation, Isabela (Basilan) Kabumbatan ^a				8.9			42.7					52.8	8.4		139.4
Basilan Plantation, Isabela (Basilan) Office ^a						20.3			49		2.5		9.7	10.2	149.2
Malamaui									24.9				20.1		b56.9
Cuabo, Davao				.3		.3		13.7			15.7	2			73.6
Zamboanga										2				50.8	53.1
Fort Pikit, Cotabato							16.5	3.8			18.5	1.3	3		66.1
Davao						7.1	1.3	2.5							138.6
Sirib, Guianga, Davao ^a											15.2	8.6			137.3
Cotabato					1.3		5.6	1.5	8.1			3.8	3		129.9
Bual, Cotabato					5.3		11.4	20.3	3.3		18.8	1	11.7	1	171.6
Naga-Naga, Zamboanga					41.9	7.1	.3	7.1	.3		23.6		2		262.4
Malabang, Lanao		50.8		.5	2.8	30.5	.5					6.1	17.8		190.3
Moncayo, Davao ^a											38.1		41.9		193.5
Camp Keithley, Lanao	.3				4.1	4.4	1.5	1.5			1	1.1	36.2	.5	89.2
Cagayan, Misamis													8.9		18.6
Butuan			26.6	.5	1.5	1.1	.3	.5		1.3	2.3	1.3	1.8	3	147.5
Mambajao															13
Dumaguete													4.8		6.1
Yap, Western Carolines	1.3			.3	4.6	.3		1.5	4.4	.3					62
Tagbilaran							1.1						5.6		11.4
Iwahig	2							1.3					5.6	1.5	19.5
Surigao					24.6	2.8	.3	.8		1.8	10.4	49	2.1		175.3
Maasin												29.2			29.2
Cebu													1.3		5.3
Hacienda Vallehermoso, Oriental Negros ^a												1.8			3.1
La Carlota, Occidental Negros ^a							1		.5			1	7.1		57
Hacienda San Antonio, Occidental Negros ^a															0
San Carlos, Occidental Negros ^a															9.9
Hacienda Refugio, Occidental Negros ^a															0
Iloilo							71.6						2.5		88.8
San Jose Buenavista			2.5				37.6	.3				5.6	3.3		73.1
Cuyo															0
Lucena, Iloilo ^a															5.6
Ormoc						7.9	3.8				1.3	2	3.6		41.2
Guiuan	7.9		5.3	1.3	14.2	1	1.3	6.1	6.9		.8	32	48.5		193.4
Dueñas, Iloilo ^a															23.7
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a								1.8							3.6
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a							45.2		.8				1.8		67.9
Tacloban	1.5	5.1	9.1			8.2	5.9					13.5	4		67.7
Dumarao, Capiz ^a							20.3								20.3
Dao, Capiz ^a		6.9	1.3				2.5								14.7
Capiz	1.3					1.5			2.5						6.6
Borongan	.3		1.5		4.1	26.6	10.4	12.2	1.6		.8	31.5	58.4	4.6	229.6
Catbalogan	3.6	1.5				3			.3				3		37.4
Calbayog	1.6	2.3	10.7			3.3	7.6					10.4	5		103.8
Masbate	.5														1.6
San Jose Estate, J. Abello D-13, Mindoro ^a															0
San Jose Estate, Tamaraw Plantation, Mindoro ^a															0
San Jose Estate, San Agustin, Mindoro ^a															44.4
San Jose, Mindoro ^a															27.2
San Jose Estate, Tunnel D-12, Mindoro ^a															65.1
Romblon				.5			14.5								15

^a Voluntary or coöperative station.

^b 27 days of observation.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, APRIL, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Batag							3.3	32.3	62.5	9.7	0.5					2
Sorsogon			3.3				1	11.2	13.4	5.3						
Legaspi		.8				1.8	.8	14.1	2.4	1.3						
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a b}														.3		
Sumay, Guam	1.8														1.3	
Calapan								.5	.8	.5			1			
Virac							.5	3	19.8	1.1		1.5				
Naga	.5							4.6	5.6	18.3	3.9		.5			
Tigaon		3.6	5.3					1.5	5.6	1		1.3	.5	.8		
Batangas		39.6														
Lucena		23.6														
Atimonan		48.5	5.8	.3					3.8							
Ambulong, Tanauan		15.7							18.1		17					
Canlubang, Calamba											.8					
Paracale								4.4	1.3		2.3					
Santa Cruz, Laguna	5.3	8.9		1.5							2					
Fort Mills, Corregidor ^{a c}				.3	.3	.8										
Alabang, Rizal ^a	2.5					1										
Lamao, Bataan ^a			2.5			2						22.6				
Manila									.9							
Antipolo		15.7														
Bosoboso, Rizal ^a		33														
Montalban, Rizal ^a		36.3			3.6						3.3				3.3	
Hacienda Pintong Sapang, San Jose, Bulacan ^a	17.3	.8			13					2.8						
Mabayuan, Dam, Olongapo, Zambales ^a					4.1	.8					8.9	.3				
Iba																
San Isidro	10.9	15.7	.5								14.5					5
Tarlac	1		1.5	5.3	2						5.1					
Baler	4.8	109.5	10.1	20.3	25.4	8.4			12.4	3	28.2	.8			5.3	
Paniqui, Tarlac ^a	1.8		3			43.7	14			15.2						
C. L. A. S. Muñoz, Nueva Ecija ^a		35.3				5.8					7.1					
Dagupan	.8			2				57.6		16.5		6.8				
Bolinao							25.4			28	18	1.3		1.3		
Baguio			11.7	.5						10.2	37.4	12.7	.8	.3		
San Fernando, Union										1	10.7		6.4			
Echagüe	17.3	13.7	6.1	1.5	108	27.4		1			35.3					
Sagada, Mountain Province ^a		.5						2	6.4	5.8	25.4	18.5	8.4	2	14.5	8.4
Bontoc, Mountain Province ^a	1	9.4	27.9			1	.8	9.1	8.6	2.8	17	7.9	1.5		7.1	3
Candon																
Vigan																
Tuguegarao			9.4			1					31.7				8.1	
Laoag																
Aparri	1			2.1							11.7					
Cape Bojeador																
Santo Domingo, Batanes	1.1		.3		4.6	.1	5.1		.8		12.7	.5		2.8		

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 8 a. m.^c Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, April, 1919—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Batag	3.6	2.3	10.7		3.3				2.8						133
Sorsogon	11.2	5.3	3.8					9.7	5.3				11		80.5
Legaspi	2.8	10.9	7.4			1.8						.5			44.6
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a b}										2.3					2.6
Sumay, Guam															3.1
Calapan		2.3				13.2	1		8.9			3.8	11.4	2.5	45.9
Virac	3							(*)	(*)	(*)	(*)				^d 30.7
Naga										.3					27.6
Tigaon	1						3								23.6
Batangas															39.6
Lucena															27.4
Atimonan		16.5							16						122.2
Ambulong, Tanauan										1.5					18
Canlubang, Calamba															0
Paracale	3								.3						8.6
Santa Cruz, Laguna															17.7
Fort Mills, Corregidor ^{a c}		3.8													5.2
Alabang, Rizal ^a															3.5
Lamiao, Bataan ^a															27.1
Manila															0.9
Antipolo															15.7
Bosoboso, Rizal ^a															33
Montalban, Rizal ^a										2.3					48.8
Hacienda Pintong Sapang, San Jose, Bulacan ^a										1.8					35.7
Mabayuan, Dam, Olongapo, Zambales ^a							.8								14.9
Iba															0
San Isidro															42.1
Tarlac															14.9
Baler															228.3
Paniqui, Tarlac ^a															77.7
C. L. A. S. Muñoz, Nueva Ecija ^a															48.2
Dagupan															101.7
Bolinao							.3								56.3
Baguio								.8					2		76.4
San Fernando, Union						1.5									19.6
Echague															210.3
Sagada, Mountain Province ^a	5.1		21.8				6.9			20.6	3.8				150.1
Bontoc, Mountain Province ^a										46	8.9	.8			152.8
Candon															0
Vigan															0
Tuguegarao											(*)	(*)	(*)	(*)	^d 50.2
Laocag															0
Aparri															14.8
Cape Bojeador															0
Santo Domingo, Batanes								5.1							33.1

(*) No observation. ^a Voluntary or cooperative station. ^b Rain in 24 hours beginning 8 a. m. ^c Rain in 24 hours beginning 7 a. m. ^d 26 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, APRIL, 1919.

Day.	Jolo.		Malamawi, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.7	22.8			29.2	23.9	34.7	21.6	32.6	23.8	29	19	32.6	21.6	35.5	22.2
2	30.1	23.1			28.6	23.7	34.3	21	33	23.2	28.8	18.1	32.8	21.8	34.4	22
3	30.4	22.6			28.9	22.1	33.2	20.6	33	23.2	30.6	15.8	32.1	21.4	35.1	22.7
4	30.6	21.6	32	20.97	28.1	21.5	33.7	18.7	33.4	23	28.9	17.2	31.8	21.3	35.4	20.5
5	31.4	22.1	30.1	23.5	28.2	22.8	35	20.1	34.1	22.5		15.5	31.9	20.1	35.4	21.3
6	30.8	20.8	32.1	23.5	28.4	22.4	35	20.5	33.5	21.1	30.6	16.7	31.6	21.6	34.9	20.8
7	30.7	20.9	33	22.9	32.2	22	35.2	22.2	33.1	23.2	30.2	17	32.8	21.8	30.7	21.8
8	31.2	21.6	32.2	23	28.9	22.7	35	23.5	32	22	26.9	16.6	31.6	20.4	33.4	22.8
9	30	24.4	29.3	23.4	27.4	24.4	31.5	23.8	32	23.5	26.7	20.7	32.2	24.2	32.1	23.3
10	31.6	23.2	33.7	23.2	30	23.4	33.7	23.5	35.4	23.9	30.6	18.8	33.2	23.4	34.9	23.4
11	32.1	23.2	32.9	24.1	30.1	24	34.5	22.9	36.4	23.9	31.3	20	33.2	23.5	35.4	23.6
12	32	22.9	33.7	24.5	29.2	23.6	34	22.1	35.3	23.2	29.9	17.6	33.2	21.8	35.6	22.9
13	30.4	22.9	30	24.2	29.5	24.5	34.2	22.5	32.6	22.4	29.7	16.6	32.8	22	32	23.4
14	30.1	22.7	32.5	24	29.6	25	32.2	24	34.7	24.1	27.8	20.5	32.6	24.1	27	23.1
15	29.8	24.2	31.2	23.9	32.3	24.8	33.7	22.2	35.2	22.6	29.8	19.5	32	23	34.1	22
16	30.5	23.1	31.6	23.9	28.2	23.1	34.2	21.5	34.1	23.1	28.1	18.5	33.2	22.5	33.4	22.2
17	29.1	22.4	31.1	24.3	30.3	23.2	33.9	21.5	34.2	22.4	29.6	17.4	33.5	21.5	34.7	22.7
18	30.1	22.6	32.1	24	28.4	23.1	33.9	22.5	35.3	23.4	29.5	17.7	33.2	22	34.7	21.6
19	31	21.1	31.4	24	28.3	22.9	34.6	22.6	35	24.4	29.5	18	33.6	21.5	34.5	22.8
20	31	22.4	33.3	24	29.1	24	33.7	23.3	35.4	24.4	28.9	18.8	34	22.6	35.9	22.4
21	30.5	23.5	32.7	24.1	31	24.5	32.7	21.5	36	22.6	28.2	18	33.9	21.9	31.9	21.8
22	30.9	23	33.3	24	29	24	34.7	22.5	32.7	22	27.5	18.3	32.5	22.4	31.8	22.6
23	30.7	22.7	32.1	23	28.6	23.3	33.6	23	33.7	23.1	28.6	19.9	32.8	22.3	31.6	23.3
24	30	22.1	32.2	23.2	28.5	23.4	34.6	21.8	33.2	22.1	28.6	17.5	33.6	22.5	33.7	22.9
25	30.8	22	32.1	24.8	28.1	23.5	33.9	22.8	34.8	22.7	28.2	18	34.2	22.9	33.1	22.9
26	31.1	22.7	32.3	24	28.6	24	33.2	21.9	34.3	23.6	29.6	18	33.2	23	34.1	22.1
27	31.3	21.5	31.6	23.8	29.2	23.9	34	24	34.1	23.8	28.5	19.6	33.3	24.3	33.9	23.7
28	31.5	23.4	29.6	24.9	28.3	24.8	31.5	22	33.2	22.6	26.1	19.5	31.6	24	27.6	22.8
29	31.4	22.8	32.1	23.1	30.7	23.8	33.7	22.2	34.2	23.8	28.8	19.5	33.6	23.6	29.6	23.6
30	30.6	23.7	29.5	24.2	32.2	24.5	34.5	21	34.7	22.4	29.1	18.3	33.3	22	35.1	22.7
Mean	30.8	22.6	31.8	23.7	29.3	23.6	33.9	22.1	34	23.1	29	18.2	32.8	22.4	33.3	22.5

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.8	24.4	29.8	24.7	33.3	25	30.6	22.4	33.4	22	31	22.6	34	23	30.4	26.4
2	29.9	24.3	30	24.1	33.1	24	31.7	21.1	34.5	21.7	30.8	22.6	34.1	23.6	31	24.6
3	30.8	23	29.8	23.1	32.7	23.7	31.4	20.8	33.6	21.9	32.2	22.6	34	23.9	30.5	24.8
4	30.3	23.4	28.4	23.5	33.7	25	30.8	20.3	33.6	21.5	31.2	21.4	34.5	21	31.5	24
5	30.8	24.4	30.8	22.3	33.3	24	31.2	19.9	34	21.5	31	22.4	34	22	31	23.7
6	30.9	23.9	29.4	23.3	30.7	24.2	31.9	20.4	34.5	20.3	30.8	22.2	34.4	22.5	31	23.7
7	31	23.9	29	24.3	31.4	24	32	21.6	33.7	20.7	30.1	22.5	34.6	22.6	31.5	25
8	30.3	25.5	32.7	23.3	32.2	24.3	32.5	20.6	34.1	21.6	27.6	23.4	31	21	32.5	24.6
9	33.1	24.3	31.8	25.3	31.4	24.2	33.6	23	32.7	20.7	31.7	25.3	33	22.7	31.4	25.4
10	33.4	24.9	30.8	26.3	32.2	24.2	32.9	22.6	31.4	23.3	30.8	24	33.2	24.6	31.1	25.2
11	31.5	23.8	30.9	24.7	32.5	24.7	33.1	22.9	33.1	23.5	30.7	24	32.8	24	32	25.9
12	31.4	24.5	32	26.3	33.1	25	33.4	22.2	34.6	21.5	31.2	25.1	34.4	24.2	31.5	25.2
13	30.4	25.6	29.6	25.4	33.2	25	32.9	23.7	33.5	21.5	30	24.1	33.5	23	30.8	24.9
14	27.7	23.9	30.4	25.5	32.7	25.1	30.8	23.5	33.9	21.9	27.8	23.7	32	24	32.1	25.2
15	30.8	23.8	30.4	25.3	33.2	24.6	33.6	22.5	34.1	22.3	30.6	23.3	33.8	24.1	31.5	25.2
16	31	22.5	30.9	24.7	32.7	24.2	32.8	22.2	34.2	22.7	31.2	23.6	34	22.6	31.2	25.2
17	31.9	24.4	31.4	26.3	34.5	24.6	33.1	22	32.8	21.5	32.1	24.2	33.6	22.4	31.8	25.7
18	30.9	23.1	28.8	24.1	34.4	25	32.8	23.4	34.1	20.8	31.8	22.3	34.5	22.6	31.8	25.2
19	30.9	24.3	30	24.3	33.8	24.5	33.3	22.4	34.1	20.5	31.4	24.2	34	23.8	31.4	25.6
20	31.3	25.5	30.4	27.3	33.4	25	34.1	22.4	34.9	21.9	31.8	23.4	34.4	24	31.5	26
21	30.9	25.9	30.4	26	33.2	24.2	33.7	22.2	34.1	22.1	29.4	23.7	33.5	23	31.5	25.5
22	29.8	24.8	29.8	26.5	32.2	23.5	32.5	23.1	34.5	20.7	29.6	23.3	31.5	23	31.5	25.7
23	30.8	25.4	30	26.4	33.9	25	33.4	22.6	34.5	21.2	30.5	24	34.1	23.4	31.8	25.8
24	31.3	25.4	30.3	25.9	33.2	24.97	33.5	22.8	34.4	21.6	30.7	23.4	34.5	22.8	31.4	25.9
25	31	25	29.9	25.3	33.7	23.6	32.9	22.4	34.1	21.7	30.9	23.5	34	22.4	31.1	25.8
26	30.9	24.3	29.4	26.3	33	24	33.1	23.1	33.9	22.3	31.4	23.2	34.9	22.6	31.7	25.5
27	30.5	26	30.6	26.3	33.3	24.5	33.4	23.1	34.5	21.2	31.3	24.9	35	23	31.1	26.2
28	27.7	25.4	31.8	24.9	34.5	25.2	32	23.5	35.5	22.3	25	23.7	33	19	30	26.6
29	30.9	25.4	29.4	26.3	33.3	25	32.4	23.4	34.6	22.5	30.5	23.7	33.2	21.4	30.9	25.4
30	31.8	23.4	30.2	25.3	33.7	24.7	33.4	22.8	33.6	23.4	30.4	23.2	34	23	31.2	25.1
Mean	30.8	24.5	30.3	25.1	33	24.5	32.6	22.3	34	21.7	30.5	23.4	33.7	22.8	31.3	25.3

Maximum and minimum temperatures at the stations of the Weather Bureau, April, 1919—Continued.

Day.	Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1.....	33.9	25	32.7	23.9	32.1	25.1	33.3	21.4	31.2	23.6	32.5	23.2	33.4	25	31.3	21
2.....	33.8	24.5	32.2	24	31.3	24.6	32.9	20	32.5	21.6	33.3	23.5	32.5	24.2	30.9	20.5
3.....	32.6	23.7	32.8	21.8	33	26.1	32	20.4	31.6	23.1	33.3	22.6	33.9	23.1	30.6	22
4.....	33.6	24.5	33.3	22.7	32.7	24.7	31	19.4	32.2	21	32.3	21.5	33.6	24.3	31	20.5
5.....	35.2	24.1	34.1	22.5	31.8	24.1	33	19.1	32	22.8	33.3	21	32.8	22.9	31.1	22.1
6.....	34.5	24.1	33.7	21.6	32.7	23.8	32.5	19.2	32.5	22.7	33.3	22.9	33.2	23.4	30.8	22
7.....	32.6	25.1	34.2	22.8	32.6	25.3	32.6	20	32	22.8	35.2	23	33.8	24.6	30.9	20.7
8.....	33.5	24.3	34.2	20	31.1	25.4	33	22.3	31.4	25.5	32.8	23.5	32.7	24.7	31.7	23
9.....	31.9	24.2	35.7	25.1	30.5	27	32.8	23	30.7	24.9	31.5	24.2	31.4	25.7	30.2	24.9
10.....	33.6	24.1	34.6	22.7	34	25.5	33	22.6	30.4	25.4	33.2	25	32.7	24.6	31.3	25.2
11.....	35.3	25.7	34.3	23.6	32.8	25.3	34.4	23	32.4	24.6	33	24	34.8	25.9	31.3	24
12.....	34.5	25.3	35.7	24.6	34.9	26.5	34.4	22	31.9	25.4	33	23.4	34.2	24.2	31.5	25.9
13.....	33	24.6	34.7	21.5	35.4	25.2	34.6	21.9	31.9	25.6	35	22.2	33.2	24.6	31.4	25.8
14.....	34	24.6	33.7	24	33.7	26.2	34.8	22.6	32	24.5	34.5	23.1	34.2	25.9	31.8	23.2
15.....	33.2	26.3	32.8	23.5	33.7	26	34.2	21.9	32.5	25.3	33.5	23.5	35.4	26.1	31.3	24.5
16.....	33.5	24.8	33.2	22.5	33.3	26	34.4	20.8	32.2	23.9	34.4	23	34.5	25.3	31.3	22.6
17.....	33.6	25.1	34.1	22.4	31.7	26.4	35	21.2	33.4	24.1	33.2	23.9	33.9	25.6	31.2	23.5
18.....	33.5	25	34.2	23.1	34.2	26.7	33.6	22.4	33.5	23	34	24.1	35	25.8	31.6	22.3
19.....	34	26	33.7	23.2	32.4	24.8	33.6	21.8	33	23.6	34	23.5	34.5	26.3	31	22.9
20.....	33.2	26	34.2	23.4	34.2	26.8	35	22.2	32.4	25.3	33.7	23.8	34.4	25.9	31.9	25.5
21.....	32.5	25.4	34.5	22.7	32.5	26.8	35.1	21.8	32.3	25.6	34.8	23.5	34.2	25.2	31.4	23
22.....	33.4	25	33.9	22.2	32.3	26.6	34.7	21.6	31.6	23.5	29.7	24	33.6	23.9	31.1	23.5
23.....	33	25.7	34.4	23.7	32.5	26.6	31.6	21.9	32.9	25.1	31.5	23.5	34.5	25	31.5	23
24.....	32.3	23.2	33	22.4	33.7	25	32.9	22.3	32.8	23.2	33.5	22.2	34.3	25.5	31.5	21.9
25.....	32.8	25.3	33.3	22.2	33.4	25.6	32.9	21.8	32.3	24.6	34	23.2	34.5	25.3	31.3	23.4
26.....	32.7	25	33.4	23.4	33.6	26.6	34	21.6	32.6	22.5	32.7	23.5	34	25.2	31.5	22.4
27.....	34.8	24.6	34.4	22.8	32.9	26	34	21.6	32.6	23.8	33.7	23	34.4	24.6	31.6	22.7
28.....	31.7	25.3	33.5	22.8	34.3	25	34.2	22.2	32.2	24.8	31.6	22.8	34	25.3	32.1	23.9
29.....	33.2	24.5	33.2	23.6	33.2	26.9	33.2	22	27.5	22.5	29	22.4	34.7	25.3	26.6	22.1
30.....	32.3	24.6	33.3	23.4	33.8	26.3	33.9	21	32.6	21	33.1	23	34.4	26.1	31	22.3
Mean.....	33.4	24.9	33.8	22.9	33	25.8	33.6	21.5	32	23.8	33.1	23.2	33.9	25	31.1	23

Day.	Catbalogan.		Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1.....	32.4	21.6	31.2	22.6	32.6	24	33.5	23.3	30.8	23.4	32.1	22.7	31.8	23.4	30.8	24.8
2.....	31.7	23.2	31.4	21.1	33.4	24	33.9	23.2	31.2	23.4	32	22.8	31.8	25.5	31.4	23.4
3.....	30.8	22.3	30.8	21.7	33.6	24.5	34.4	24.1	31.3	23.6	32.5	22.7	31.8	25.1	31.2	23.4
4.....	32.3	20.5	30.8	21.4	32.6	24.2	35	23.7	31.2	23	31.7	21.7	31.3	23.8	31	23.6
5.....	32.7	22.5	30.8	20.6	32.6	23.8	33.9	23.9	30.8	22.6	32.5	21.5	32	25.1	31	24.8
6.....	32.6	21.2	31.6	22.3	34.6	24.8	32.9	22.6	31	23.3	32.7	22.5	32.5	25.5	31.4	24.6
7.....	32.8	20.5	32	22.3	33.6	24.8	33.9	24	31.8	23	32.4	22.9	31.8	24.9	32	24.4
8.....	31.7	21.4	31.5	22.3	32.6	23.6	33.8	24.5	31.8	23.6	32.4	22.4	32.7	25.2	31.4	24.6
9.....	29	24.5	27.5	23.6	32.8	26	33.9	25.2	28.4	23.6	30.7	24.4	31.3	24.6	31.1	24.4
10.....	32.5	24	30.2	23.4	33.4	24.8	33.9	26	30	23.8	31.8	23.4	31.6	25.5	30.4	24.6
11.....	33.2	23.4	32	22.5	33.4	25.5	33.5	25.3	29.5	23.6	32.2	23.4	31.8	26	32	24.2
12.....	33.8	22	32	21.6	33.6	25	33.4	25.3	30.1	24.6	32.2	22.7	32.2	26.2	32	24.6
13.....	33.2	20.7	32.4	21.7	34	25.5	32.9	24.3	30.3	24.5	31.9	22.1	32	26.3	32	24.6
14.....	33.7	24.3	32.4	22.4	33.6	25.6	35.3	24.9	31.9	24.9	32.3	22.1	32.5	26	31	24.6
15.....	32.7	21.7	33.1	22.9	34	25.6	35.9	25	31.8	24.2	32.7	24.7	32.7	26.9	31	24.6
16.....	34.5	21.2	32.3	21.4	34	25	34.5	23.9	30.8	23.9	32.5	22.1	32.3	25.5	32	24.6
17.....	33.2	23	32	23.3	33.4	25.2	34.8	25.4	30.4	24.3	31.5	22.1	32.6	26.2	31.4	24.8
18.....	32.5	23	31.3	23.5	34.4	25.8	35.9	25.7	30.7	24.6	32.2	23	32.6	26.2	32	22.6
19.....	33.5	21.3	32.2	22.6	33.8	25.6	34.4	25.3	29.7	24.7	29.5	24.8	31.1	24.4	32	23
20.....	33.8	24.1	33.7	23.8	34	25.2	34.4	26	30.6	25	32	22.1	32.5	26	31.6	23.6
21.....	33.2	20.8	33	21.9	34	24.6	33.5	25.9	31.3	24.6	31.5	22.1	32.6	26	32	23.2
22.....	32.3	20.8	31.2	21.7	34	24.5	34.2	24.9	30.7	24.3	32	22.2	31.8	24.6	32	25.4
23.....	32.7	22	31.6	22.5	34.4	25	34.9	25.9	31.3	25	33.2	22.4	32.5	25.7	31.8	25.2
24.....	33.1	21	31.6	21.6	34	25.4	33.5	23.4	31.4	24.8	31.6	23	33	26.3	31.6	25.2
25.....	34.1	21.3	31.8	22.7	34	25.4	33.9	25.7	31.2	23.9	31.7	23	32.3	26.2	31.8	25.2
26.....	34.1	24	31.8	22.2	34.6	25.5	34.9	25.2	30.8	24.4	32.5	23	32.1	26	31.6	25.6
27.....	33.5	24	31.9	22.3	34.8	25.2	35.1	24.8	31.3	24.8	32.7	23.5	32.9	26.7	32	24.6
28.....	33.5	22.5	32.5	22	34.8	25.2	35.6	25.2	31.2	24.7	32.8	23.6	33.3	26.3	32.4	23.4
29.....	30	21.5	30.1	22.3	33.8	25.2	35	24.2	32.3	23.9	32.2	23.3	32.4	26.1	32.4	24.4
30.....	34.5	20.8	31.7	21.2	33.8	25.4	34.5	26.1	31.8	23.7	32	22.4	32.6	26.5	31.2	24
Mean.....	32.8	22.2	31.6	22.2	33.7	25	34.3	24.8	30.9	24.1	32.1	22.9	32.2	25.6	31.6	24.3

Maximum and minimum temperatures at the stations of the Weather Bureau, April, 1919—Continued.

Day.	Calapan.		Virac.		Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong-Tanauan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.3	22	31.8	23.6	36.4	21.7	32.3	21.6	36.7	22.5	32.8	22.5	31.6	22.9	34.9	22.4
2	33.3	22.5	31.8	23.3	34.4	20.8	32.6	21.5	35.6	23.2	32	23	30.6	23.2	36	23
3	31	23.2	31	21	34.1	20.5	31.8	21.6	33.3	22.7	33	23.5	30.1	23.6	33	23.4
4	28.5	23.5	31.6	21.3	35.5	20.4	31.6	21.4	33.7	23.8	32.7	24.4	31.8	23.7	33	23.9
5	34.5	23.6	31.5	21.5	35.5	20.6	31	20.4	35	23.3	31.8	24.1	32.1	23.5	33.7	23.7
6	33.5	22.5	31.7	21.3	35.6	20.1	32.6	21.3	35.6	23.1	32.2	23.6	32.4	23	32.4	24.4
7	34.1	24	31.7	21.9	35.1	21.8	32.9	22	35	22.9	33.6	23.5	32.2	23.1	35.2	24.2
8	34.1	24.2	33.1	21.5	34	19.9	33.6	19.9	35	22.3	34	22.6	31.7	23.8	36	23.8
9	34	24.1	31.8	24	34.4	22.6	33	22.7	34.4	24.3	32	24.5	31.6	23	35.7	25.6
10	34	25.5	31.6	24.2	34.1	22.6	32.1	23.3	36.2	25.3	33.4	24.7	33.3	24.1	36.7	25.9
11	33.5	24	31.5	24	35	23.4	32.2	24.2	35.6	24.9	33.5	24.5	30.8	24.4	31.2	25.9
12	33	24.5	31.9	24.3	35.4	21.8	32.8	23.3	35.8	24.4	33	24.1	33.7	23.7	36.5	24.9
13	33	22.5	32	22.2	36	20.6	32.8	22	35.4	24.6	32.6	23.2	33.4	22.5	35.2	25
14	33.9	22.5	32.3	21.5	35.5	20.3	32.6	23.6	36.5	23.7	33.6	23.9	32.5	23.6	36.2	23.8
15	34	23	32	22	37	22	32.9	23.4	35.8	24	32.5	23.5	32.5	24.1	35	22.2
16	35	22.6	32.9	20.1	35.2	19.3	33.2	21.8	36.5	24.2	34.5	24.1	31.9	24.2	36.7	22.8
17	33.4	24.5	32.7	22	34.4	20	33.3	19.7	36.4	22.9	33.7	22.8	32.6	23.6	37	23
18	34	24.5	32.7	21.6	36.2	22.2	33.7	21.6	35.8	25.2	32.5	24.6	33.3	24.1	36.3	24
19	34.9	24.5	32.6	21.4	35.5	20.6	33.1	21.6	36.5	24.8	35	24.8	32.5	26.5	37	25.2
20	33.5	25	32.9	21	36.5	21.1	33.4	21.1	37.6	24.2	34.5	24.2	30.9	26.8	36.3	23.7
21	33	24.6	33.5	21.1	34.9	20.2	33.1	19.3	37.7	24.6	34.5	23	31.8	26.4	36	25
22	34.5	22.5	33.2	21.3	35.1	20.5	33.5	21.4	36.8	23.5	34.5	24.5	32.2	23.5	37.3	22.8
23	34.5	22.5		21.7	35.8	21.1	34.4	20.4	36.5	24.7	33.4	24.7	32.8	25.3	37.2	25.3
24	34.5	23.5			35.6	20.6	33.7	21.4	35.7	23.5	33.6	23.5	32.7	23.3	35.6	24.4
25	36.2	25.9			35.5	21.1	33.4	21.3	37.3	23.5	34.3	22.7	32.8	23.9	36	25.2
26	34	23.9			36	19.7	33.8	20.8	36.5	24	33	22.7	32.1	23.1	34.4	24
27	33.5	23.4			35.9	19.7	33.7	21.4	36.1	23.7	33.1	24.4	32.3	23.2	36.1	23
28	35.5	23.5	33	21.3	37.7	21	34.2	21.1	36.8	25.2	33	23.3	32.6	24.3	34.2	23.7
29	35	23	33.4	21.5	35.5	22.8	33.6	21.9	36.7	23.8	33.4	24.5	32.7	24	36	24
30	34.1	24.4	33.5	22.2	35.9	21.4	33.4	21.7	36.7	26.5	34.6	25.4	33.4	24.3	36	25.7
Mean	33.7	23.7	32.3	22	35.5	21	33	21.6	35	24	33.4	23.8	32.2	24	35.4	24.1

Day.	Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro		Tarlac.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	35.2	21	31.1	23.3	34.8	22.2	34.5	22.8	36.6	21.7	32.6	21.4	37.4	24.2	37.2	21.6
2	36.6	21.4	31.2	23	35.1	23	34.2	24	34.2	23	33.6	22.4	34.9	23.4	38.5	23
3	35.6	21.5	31.6	23.6	33.6	23.5	35.8	24.4	34.9	22.8	33	23.9	34.4	24	36.6	22.6
4	34.2	21.6	31.9	23.2	31.6	23	34.5	23.8	34.5	22	33.4	24	34.8	24	36.4	22.4
5	36.4	22.1	31.7	23.4	34.1	23.2	35.7	23.3	35.2	22.2	33.5	23.2	37	24.4	36.8	24
6	36.9	23	31.8	23	33.7	23.9	35.2	24.5	34.6	23.7	33.4	25.2	36.6	24.9	37	24
7	36.2	22.6	32	23.8	34.6	22.8	35.1	23.7	34.4	21.8	34.2	24.9	35.4	24.7	37.4	24
8	35.6	22.2	32.3	24.2	34.1	23.2	35.1	23.7	36.6	23.2	34.1	24.3	35.6	24.4	38	24.2
9	35.4	22.9	32.2	24.8	34.1	23.7	35	22.2	36.1	22	33.3	24.4	37.4	24.4	38	23.2
10	36.8	23	32.8	25	35.9	24.7	37.2	23.7	36.7	23	35.2	23.5	35.9	24.4	37	23.2
11	34.2	23.1	32.4	24.7	33.6	24.1	34.2	24.5	34.7	23.2		23.7	34	23.6	37	22.7
12	35.8	22.9	32.4	24	35.9	24	37	24.1	36.9	22.8		24.5	35.6	23.4	36	23.2
13	36.2	23.1	32.2	23	35.7	24.3	36.8	23.7	37.5	22.5		23.5	36.1	23	36.6	22.5
14	36.9	22.6	32.5	23.5	35.1	23.9	36.7	22.3	37.2	21.6		23	37.1	22.6	37	22.4
15	37	22.9	33.1	24	35.7	23.8	37.5	23	37.4	21.6		22.5	37	24.1	38	22.4
16	37.1	22.9	32.4	23.3	35.1	23.7	37.7	23.7	38.5	23.3	34.3	25	37	25.7	38.2	21
17	37.2	23	32.4	23.9	35.5	21.1	36.5	19.8	36.8	21.2	35.1	22.4	36.9	21.2	38.2	20.2
18	37	22.7	32.7	25	35.4	23.5	37.2	24	37.5	22.9	34.2	21.5	36.5	22.7	37.4	22.2
19	36.5	22.9	32.7	24.5	34.8	23.3	36.7	22.3	38.3	22.5	34.2	26.5	36.5	23.1	38	22.8
20	36	22.6	33	26	34.2	22.9	35.9	21.9	37.5	22.1	35	24.5	36	20.8	37.6	20.5
21	36.1	22.4	32.4	24.4	34.2	23.6	36.2	21.1	37.3	23.2	36	23.4	36	20.4	38.2	19
22	36.3	22.6	32.8	23.4	35.1	23.2	37.2	21.5	37.5	21.1	35.2	21	37.6	21.4	38.4	19.5
23	36.8	22.5	32.9	24	35.3	23.9	36.1	21.8	37.7	21.8	35.1	23	37.1	22.6	38.6	19.8
24	36.5	22.4	32.8	24	35.3	22.4	36.1	22.1	38	23	34.9	25.1	36.5	22.8	38.2	20.6
25	36.4	22.7	32.6	24.1	34.9	22.5	37.2	21.9	37.6	21.4	36	24.1	36.5	22.6	38.4	21.2
26	36.7	22.6	32.8	24.2	35.7	23.5	35.8	22.6	37.3	22	34.2	24.4	37	22.9	39.2	21.4
27	36.5	22.5	33	23.7	35.6	22.7	36.7	22.8	37.6	21.7	34.3	24.5	37.9	23.8	39.6	22
28	37.2	22.4	33	24	36.1	24.1	36	22.5	36.3	22.2	34.2	24	38.6	23.8	39.8	22.5
29	37	22.5	32.8	23.6	35.6	22.6	36.8	23.7	39.6	22.4	34.5	24.6	37.6	23.4	39.8	22
30	37.1	22.6	32.7	23.8	35.2	23.3	36.7	22.1	39.3	22.2	37.5	23.6	37	23.1	40	22.2
Mean	36.3	22.5	32.4	23.9	34.9	23.3	36.1	23	36.8	22.3	34.4	23.7	36.5	23.4	37.9	22.1

Maximum and minimum temperatures at the stations of the Weather Bureau, April, 1919—Continued.

Day.	Baler.		Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.9	21.3	34.5	23.4	31.8	22.8	25.1	15.4	32.2	23.4	34.9	23.4	33.5	23.1
2	30.9	23.4	33.6	24.1	31.5	24.2	26.2	16.1	35.9	23.7	33.5	23.2	34.4	24.4
3	30.4	23.1	37	23.5	31.4	23	25.1	15.1	32.8	23.7	35	22.2	33.6	24.2
4	30.9	22.4	37.2	24	34.3	23.7	24.5	15.2	32.9	22.8	35.4	22.1	34	24
5	32	23.1	36	23.6	32.8	25	25.5	15.8	34	24.3	35.6	22.8	34.6	26
6	31.3	23.5	36.5	24.5	32.8	24.7	24.4	16.6	33.3	24.5	34.4	22.6	34.4	25.1
7	31.3	22.9	36.5	24.9	33		25.6	15.9	34.7	25.6	34.9	22.7	35	25.4
8	31.3	22.4	36.5	25.1	32.8	24.4	25.4	16.5	33.4	24.8	35.9	22.4	34.8	25.2
9	32.1	21.6	34.8	24.4	31.8	25.1	24.9	16.7	33.8	24.9	36.1	23.1	34.8	24.7
10	31.3	23.3	37.4	23.8	36.2	25.3	26.8	16.3	33.9	24.4	36.1	22.8	34.9	25
11	31.3	22.6	35.3	23.7	32	24.2	25.1	16.7	33.2	24.3	31.9	24.4	35.2	26.4
12	31	23.7	36.6	23.6	34	24.2	24.3	16.4	36.4	23	33.4	22.8	34.9	25.9
13	31.7	21.7	36.5	23.8	34	25.2	24.4	16.4	34.9	23.7	35.2	22.2	34.4	26.3
14	31.6	21.8	35.6	24.5	34	24.2	25.3	16	35	25	35.4	21.2	35	26
15	32.1	23.5	36.5	24.4	33.5	24.3	26.1	15.7	35.3	24.2	36.3	22.8	35	24.9
16	32	24	36.8	25.4	33.4	25.5	25.4	16.6	34.6	24.9	36.2	24	35	25.7
17	31.8	20.1	36.8	23.5	33.2	25.3	25.3	16.4	35.5	24.2	36.4	20.5	34	25.3
18	33.1	21.1	37.6	23.7	35.7	26.2	26.9	16.2	35.6	22.6	36.3	20.5	34.5	25.5
19	32.3	21.7	37.8	25.3	34.5	27.8	26	16.3	35.4	24.3	36.8	21.5	35.4	26.4
20	32.1	20.4	37.5	23.6	35.3	26	26.6	16.1	36.9	25.2	36.3	19.1	34.4	25.2
21	32.1	19.8	37.1	22.6	35.8	25	26.9	16.4	36.8	24	36.4	19	33	25.9
22	32.3	19.7	37.7	22.8	33.8	24	26.8	15.8	35.8	24	37.2	19.4	34.6	27
23	32.7	20.3	35.4	24.4	32.8	24.4	25.3	16.1	34.6	24.7	37	20.5	34	27.4
24	32.6	20.7	37.5	25	35.3	26	25.3	15.6	34.9	23.6	36.4	21.5	33.5	26.2
25	32.5	21.4	37.8	24.8	33	26.2	24.8	16.2	36.6	24	37	20.6	34.8	26.2
26	33.5	20.9	35.2	23.4	33.3	24.2	25.4	15.4	34.2	24.3	37.2	21	34.9	27.4
27	33	22	37.5	25.1	35	25.5	25.6	16.5	36	25.5	37.4	23.3	34.5	27.2
28	34.4	22	36.8	25.3	34.5	25.4	26.7	16.5	36.1	26.3	37.7	22	35.5	28.4
29	33.5	22.1	37.8	25.9	33.4	27.8	26.8	17.2	36	25.3	38	25	35	27.2
30	33.8	21.9	38.4	25	36	26.8	25.6	16	37	26	38.2	21.5	35.5	27.8
Mean	32.1	21.9	36.6	24.2	33.7	25	25.6	16.1	34.9	24.4	36	22	34.6	25.8

Day.	Vigan.		Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.8	23.4	34.9	22.8	33.9	20	30.3	22.4	32.9	22.3	26.1	20.2
2	33.3	23.5	35.1	23.4	34.8	22	30	23.1	30.6	22.9	26.6	21.5
3	33.1	25	37.1	23.9	33.2	21.8	32.3	23.3	32.4	23.1	29.3	21.6
4	32.7	23.1	34.4	24.5	34.8	21	31.7	23.5	31	24	26.1	21.2
5	33.2	25.5	35.6	22.6	33.1	23.1	33.5	22.6	31.6	23.3	27.5	22.2
6	32.8	23.7	36.5	24.4	34.4	21.3	32.2	23.3	30.7	23.7	25.4	22
7	33.5	26.2	36.5	23.8	33.2	22.6	31	22.8	33	23.7	29.2	22.6
8	32.7	24.6	38.3	25	33.6	22.5	32.8	22.6	33.3	23.9	31.2	23.9
9	33	24	37.8	25.8	33.8	21.8	35.2	23.8	32.3	24	31.9	24.9
10	33.6	24.1	38.3	25	34.1	22	34.8	24.4	33.1	24	30.8	23.8
11	34.2	24.5	32.6	24.1	36.9	22.3	33.3	22.5	32.1	24.4	29.2	23.6
12	34.4	25	34.3	23.5	34.6	23	32.2	22.9	34.4	23.8	28.5	23.3
13	34.8	26.1	32.2	23.5	34.6	23.3	34.7	23.5	33.8	25.9	31	25
14	34.3	25.9		23.5	35	23.3	36.1	21.5	35.6	23.6	31.7	23.8
15	34.3	25.5	38.5	23.3	34.4	23	34	22.4	34.5	24.4	32	24.7
16	33.4	24.8	37.2	23.6	35.3	22.3	34.2	23.3	34.9	24.9	31.9	23.7
17	33.7	25.3	39	24.3	34.9	21.9	35.1	23.5	33.3	24.7	31.4	23.9
18	34.7	24.3	38	22.8	35.1	21.8	34.4	23.5	34.6	24.9	31	24
19	35.7	24.9	39	24.4	38.1	21.9	34.6	25.1	34.7	24.8	32	22.7
20	33.9	25.3	39	23.5	36.6	23.5	33.7	24.8	33.7	25.3	31.3	22.2
21	33.9	26.1	38.3	21.1	34.8	22.3	35.7	23.1	33.4	24.7	31.7	25
22	33.6	25.4	39.2	21.4	34.8	22.6	34.6	22.5	35	25.3	31.9	25.2
23	32.8	24.9	38.3	23.6	34.2	22.7	33.6	24	32.8	25	32.4	22
24	34	25	39	23.4	35	20.6	33.6	21.5	34.7	24.4	31.1	22
25	34.1	25.4	38.6	24	34.5	22.9	35.6	22	33.5	24.7	32	24.2
26	33.5	26	39.8	23.7	34.2	23.7	35	23.3	35.5	25.3	31.3	24.1
27	34.2	25.1			35	21.5	34.2	23.5	33.3	24.3	31	23
28	35	27			35.9	25	37.8	23.5	35.2	24.6	32.8	23.6
29	33.3	26.2			35.2	24.6	34.5	24	33.3	25.3	31.7	23.8
30	34.8	26.6			35.8	25.9	36.5	24.3	35.2	25.1	32.5	25.4
Mean	33.8	25.1	37.1	23.6	34.8	22.5	33.9	23.2	33.5	24.3	30.4	23.3



SEISMOLOGICAL BULLETIN FOR APRIL, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

3, 2^h 52^m [3, 10^h 52^m]. Camarines (SE Luzon). Earthquake of intensity III, felt in the central portion of the province corresponding to the Isarog region. Light repetition at 6^h 7^m [14^h 7^m].

8, 15^h 59^m 0^{s*} [8, 23^h 59^m 0^s]. Butuan (N Mindanao). Oscillatory earthquake of intensity III-IV. Its origin probably lay in the Philippine Deep of the Pacific.

12, 12^h 14^m 12^{s*} [12, 20^h 14^m 12^s]. Paracale (SE Luzon). Earthquake of intensity III, duration 15 seconds.

16, 16^h 42^m 24^{s*} [17, 0^h 42^m 24^s]. E Mindanao. Earthquake of intensity V, felt through the eastern half of the island. It originated to the E in the Pacific, not far from the coast. Recorded in the Far East.

21, 13^h 48^m 34^{s*} [21, 21^h 48^m 34^s]. Camarines (SE Luzon). Earthquake of intensity V, with subterraneous rumbling. It repeated ten minutes later with less intensity. The shaken area corresponded to the Isarog region, where shocks of small extension occur very frequently.

23, 17^h 20^m [24, 1^h 20^m]. Catbalogan (W Samar). Earthquake of intensity III, duration 4 seconds.

28, 1^h 57^m [28, 9^h 57^m]. Baguio (W Luzon). Earthquake shocks of intensity III, duration 6 seconds.

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N: T₀=6.62, ϵ =2.726, $\frac{r}{T_0^2}$ =0.021; A_E: T₀=6.03, ϵ =2.378, $\frac{r}{T_0^2}$ =0.037. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.														
						A _N μ	A _E μ															
111	2	IIv	eP L MN ME	h. m. s. 0 40 30	----- ----- 4 6	----- ----- 96 -----	----- ----- 71 -----	F overtaken by following earthquake.														
									112	2	I	e F	0 44 10 2 04	----- ----- -----	----- ----- -----							
																113	3	Iv	eP F	17 16 48 20	----- -----	----- -----
115	8	Iv	eP F	15 59 00 16 11	----- -----	----- -----	Felt at Butuan (N Mindanao).															
								116	12	Iv	eP F	0 21 23 45	----- -----	----- -----								

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A _N μ	A _E μ	
117	12	Iv	eP F	h. 12	m. 14	s. 12			Felt at Paracale (SE Luzon).	
118	14	Iv	eP F	15 16	56 12	44				
119	15	Iv	eP F	19 20	55 02	10				
120	15	Iu	eP F	21 21	29 39	34				
121	16	IIv	eP L M _E M _N F	16 16 18	42 44 44	24 10 22 38	6 6	171 150	Felt through the eastern half of Mindanao Island.	
122	17	Iv	eP F	9 10	30 19	36				
123	17	Iu	eP S L M _E M _N F	11 11 14	33 43 54	42 30 25 20 12 28	16 15	17 21		
124	17	Iu	e M _E M _N F	21 22 23	12 59 03	26 16 41	23 21	7 6		
125	21	Iv	eP F	9 9	49 58	25				
126	21	Iv	eP F	11 13	47 37	00				
127	21	Iv	eP F	13 13	48 59	34			Felt at Naga and Tigaon (SE Luzon).	
128	22	IIr	eP S L M _E M _N F	2 2 4	50 54 56	03 20 35 30 34 37	11 11	33 84		
129	22	Iv	eP F	4 5	41 04	44				
130	23	Ir	e F	8 9	24 11	00				
131	24	I	e F	17 17	16 47	22				
132	27	III _d	iP F	0 2	22 07	44			Tablas Island. L and Maxima lost by the force of the shock.	
133	27	Iv	eP F	1 1	18 23	24			This record merged into the precedent quake.	
134	27	II	e F	2 3	42 43	30				
135	27	Iv	eP F	12 12	17 31	00				
136	28	IIv	eP L M _E M _N	5 5 11 11	10 10 11 11	22 54 11 35	5 6	147 121	Tablas Island. End overtaken by following earthquake.	
137	28	IIv	eP L M _E M _N F	5 5 6	28 28 29 29	01 32 16 22 02	7 5	192 193	Tablas Island.	
138	28	Iv	eP F	15 15	06 19	49				
139	28	Iv	eP F	15 15	25 35	31				
140	28	Iv	eP F	17 17	15 24	36				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.			
						A _N μ	A _E μ				
141	28	Iv	eP F	<i>h. m. s.</i> 19 48 05 54				Tablas Island.			
142	28	Iv	eP F	22 12 00 17							
143	29	Iv	eP F	2 11 54 17							
144	29	Iv	eP F	4 21 55 28							
145	29	Iv	eP F	6 04 16 14							
146	29	Iv	eP	8 47 45				F overtaken by following earthquake.			
147	29	Iv	eP F	8 52 31 9 06							
148	29	Iv	eP F	10 16 00 29							
149	29	Iv	eP F	11 57 30 12 06							
150	29	IIv	eP	13 09 02				End overtaken by following earthquake.			
151	29	Iv	eP F	13 22 53 31							
152	29	Iv	eP F	15 37 51 44							
153	30	III _a	eP iE iE iN iN iN iE S iE iE iN iE iE iN iN iN L M _E 1 M _N 1 M _E 2 M _N 2 M _N 3 M _E 3 M _N 4 M _E 4 C F	7 28 42 30 18 31 25 31 26 31 48 33 19 35 05 38 17 39 13 40 04 40 06 41 45 43 43 44 14 45 07 47 24 53 24 57 06 59 17 8 01 16 01 54 06 58 09 37 13 38 21 32 11 06 28 58		5 6 6 6 6 6 10 10 9 10 11 10 10 10 11 15 11 14 15 16 14 16 15 15					Felt at Mambajao and Butuan (N Mindanao).
154	30	Iv	eP F	12 03 57 16							

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

3, 2^h 52^m [3, 10^h 52^m]. Camarines (SE de Luzón). Temblor de tierra de intensidad III, sentido en la parte central de la provincia que corresponde a la región del Isarog. Repitió con menos intensidad a 6^h 7^m [14^h 7^m].

8, 15^h 59^m 0^{s*} [8, 23^h 59^m 0^s]. Butúan (N de Mindanao). Temblor de tierra oscilatorio, de intensidad III-IV. Su origen se hallaba probablemente hacia el Océano Pacífico en el Abismo de Filipinas.

12, 12^h 14^m 12^{s*} [12, 20^h 14^m 12^s]. Paracale (SE de Luzón). Temblor de tierra de intensidad III, duración 15 segundos.

16, 16^h 42^m 24^{s*} [17, 0^h 42^m 24^s]. E de Mindanao. Temblor de tierra de intensidad V, sentido en toda la mitad oriental de la Isla de Mindanao. Su origen se hallaba al E en el Pacífico no lejos de la costa. Fué registrado en todo el Extremo Oriente.

21, 13^h 48^m 34^{s*} [21, 21^h 48^m 34^s]. Camarines (SE de Luzón). Temblor de tierra de intensidad V acompañado de ruido subterráneo. Repitió 10 minutos más tarde con menor intensidad. El área afectada fué la región del monte Isarog, donde son frecuentes los temblores de poca extensión, del carácter de hundimiento.

23, 17^h 20^m [24, 1^h 20^m]. Catbalogan (W de Sámar). Temblor de tierra de intensidad III, duración 4 segundos.

28, 1^h 57^m [28, 9^h 57^m]. Baguio (W de Luzón). Temblor de tierra de intensidad III, duración 6 segundos.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

EARTHQUAKES IN TABLAS ISLAND.

On the 27th at 0^h 22^m 44^s * [27, 8^h 22^m 44^s] the people of the towns of SW Tablas and NW Panay were startled by violent shocks which caused considerable damage. The ground continued trembling with varying intensity the whole day 27th, and not so strongly but with alarming frequency the 28th and 29th; on the 30th the number of shocks fell considerably. After that date only some few light shocks were daily felt; on the 17th and 19th of May two stronger caused again some panic among the people.

The towns of Tablas where greater damages were caused by the shocks are Odiongo, Looc and Santa Fe, all located to the west or rather southwest portion of the island. From Carabao Island, S of Tablas, some landslides were reported; the shocks retained also an unusual intensity through NW Panay and generally on the whole island.

Mr. Mateo Menez of Odiongo sent the following report of the first shock occurred on the 27th: "It was Sunday morning when the people were beginning to stir up for the day's activities. Some were in the market place bargaining; some on the plaza and streets enjoying the cool morning breeze. A thunder-like sound burst, followed by earth-shocks which caused all bustling people to fall and lay on the ground in prostrated positions. Some that chanced to be near some posts and trees managed themselves to hold on them. The rocking of buildings and trees; the falling of the walls of some houses and the old church made a very confusing noise. Strong concrete buildings were partly damaged. The ground in different parts of the locality cracked and the water in many places sprang from the cracks. Some of the ground cracks are so large and deep that a carabao can be easily buried in them." From the other towns above mentioned similar effects, as those described by M. Menez, were reported by different correspondents.

Among the ignorant people it was rumored that the shocks had some connexion with the recent eruptions of Bulusan Volcano, situated some 200 kilometers away to the east, and there existed not little fear lest some volcano would spring out or the island suddenly sink beneath the sea. These shocks were certainly of geological character as it can be inferred from their great extension and the depth of their origin. Detonative noises are current phenomena in such earthquakes, being produced by the vibrations of the earth, but their audibility depends chiefly on the local composition of the soil.

The extension of the meizoseismic area of the first and strongest earthquake hardly measured a hundred kilometers in the N-S direction, comprising a little more than the southern half of Tablas Island, the group of Carabao Island and perhaps the NW end or peninsula of Panay. In the E-W direction it extended itself certainly much less, having the form of an ellipse prolonged in the direction of the meridian. But the total shaken area, according to the observations at hand seems to have been unusually large and irregular, extending itself abnormally in the direction of the Sulu Sea. Northwards the shock was felt as far as southern and southeastern Luzon, while southeastwards the perceptible waves reached southern Negros, and southwestwards Puerto Princesa, in Palawan Island. Consequently if southern Tablas is taken as a center the shaken area had a radius of about 400 kilometers southwards and only half such extension to the north. Outside of the Archipelago the disturbance was recorded in the Observatories of the Far East and probably also in some of Europe and America, but

at the time of writing this note the records of April had not yet been received. Such distances only by disturbances of geologic character and deep origin are usually reached.

The Island of Tablas seems more apt than other parts of the Philippines to be disturbed by similar shakings, because along its western coast runs one of the main seismotectonic lines which cross the Archipelago. This line probably runs from Batanes Islands, in the north, to the Jolo Archipelago, in the south; along it frequently occur strong and extensive earthquakes, which at times shake W Mindanao, and in other occasions E Luzon or Babuyanes and Batanes Islands. There exist good reasons to believe that the earthquake which occurred on the 21st of last March, and shook severely Marinduque Island and Tayabas Province, was a forerunner or at least it had some connexion with these of Tablas Island. It certainly originated on the same line; had also great extension within the Archipelago and was recorded in the remotest stations of the Far East, leaving not any doubt about its geologic character.

It would be tedious to record here the principal earthquakes of a similar character which originated along the same line, during the last twenty-five years; they are so numerous that it must be considered as very lucky that to the present their centers had remained relatively far from Tablas Island. None of the regions previously affected by such earthquakes has so far sustained any irreparable cataclysm, consequently it is to be expected that no such thing will happen to Tablas Island, although it will be exposed to shocks more or less severe, like other regions placed close to the same line of least resistance.

LOS TERREMOTOS DE LA ISLA DE TABLAS.

El día 27 a 0^h 22^m 44^{s*} [27, 8^h 22^m 44^s] los habitantes de los pueblos del SW de la Isla de Tablas y de la parte NW de Panay fueron sorprendidos por un terremoto destructor que causó bastantes ruinas. La tierra continuó luego temblando con mucha frecuencia y varia intensidad todo el 27, el 28 y 29; el 30 amainaron las sacudidas y después ya no se repitieron sino raras veces al día y con poca intensidad; en dos ocasiones sin embargo su fuerza volvió a causar zozobra y esto fué el 17 y el 19 de mayo.

Los pueblos que sufrieron mayores daños son los de Odiongo, Looc y Santa Fé situados todos al W o mejor al SW de la Isla de Tablas. También se ha dicho que hubo desprendimientos en la Isla de Carabao situada al S; además consta que en la parte NW de la Isla de Panay tuvo el terremoto una intensidad extraordinaria y que dió mucho que temer, conservando también grande energía en toda la Isla de Panay.

El Sr. Mateo Menez de Odiongo hace del terremoto principal del día 27 la siguiente descripción: "Era la mañana de un domingo y la gente comenzaba a moverse para los quehaceres del día. Muchos estaban en el mercado ocupados en sus compras, otros en la plaza y en las calles disfrutando de la brisa matinal. Un estampido semejante a un trueno y violentas sacudidas derribaron al suelo la mayor parte de la gente en movimiento, caídos unos y postrados instintivamente otros para no caerse; los que por casualidad hallaron a mano algún árbol o poste se agarraron a ellos. Los vaivenes de los edificios y de los árboles y el derrumbarse de los muros de algunas casas y de la vieja iglesia producían un ruido ensordecedor. Algunas construcciones de cemento armado quedaron también con daños parciales. La tierra se agrietó en diferentes partes de la población, con salida de agua de las grietas; algunas de éstas eran tan anchas y profundas que pudiera enterrarse en ellas un carabao." De los otros pueblos citados se recibieron noticias, respecto del carácter y efectos del terremoto, semejantes a las dadas por el Sr. Menez.

La opinión del vulgo era que estos terremotos tenían alguna conexión con las erupciones del Volcán Bulusan, situado a más de 200 kilómetros de distancia, temiendo no apareciese un volcán en la isla o se hundiese repentinamente. Mas el terremoto era ciertamente de carácter geológico o tectónico como lo demuestran su grande extensión y la profundidad de su origen. Los ruidos, a veces semejantes al trueno y también a explosiones, se consideran como efecto natural de las vibraciones producidas en el terreno y así su audibilidad y naturaleza depende de la composición local de las capas terrestres.

La extensión del área meizosísmica no parece llegase a tener 100 kilómetros en dirección N-S, comprendiendo algo más de la mitad meridional de la Isla de Tablas, la Isla Carabao y tal vez el extremo o península NW de Panay. En el rumbo E-W era sin duda muy limitada, afectando por consiguiente la forma de una elipse muy prolongada en la dirección N-S. Con todo la extensión total del terremoto fué extraordinariamente grande e irregular, prolongándose desmesuradamente en dirección al Mar de Joló. Por los datos existentes se ve que mientras hacia el N y NE solamente llegó a ser perceptible en la parte meridional y sudeste de Luzón, por la parte sur y sudoeste del epicentro tuvo grande intensidad en toda la Isla de Panay y fué perceptible en Negros y Puerto Princesa; por manera que tomando como centro la parte sur de Tablas el área conmovida

tenía un radio de hasta 400 kilómetros por el S y SW y casi la mitad por el N y NE. Fuera del Archipiélago registráronlo los sismógrafos de todo el Extremo Oriente y quizá también algunos de Europa y América, de donde al tiempo de escribir esta nota no han llegado aún observaciones. A tales distancias únicamente los terremotos de carácter geológico y de muy profundo origen suelen registrarse.

La Isla de Tablas está tanto o tal vez más expuesta a terremotos geológicos que otras muchas partes de Filipinas; frente a su costa occidental y no lejos de ella corre una de las líneas sismotectónicas más importantes del Archipiélago, la cual se extiende desde las Islas Batanes hasta el Archipiélago de Joló. A lo largo de esta línea se originan con frecuencia terremotos intensos que afectan unas veces la parte W de Mindanao, otras el E de Luzón y otras las Babuyanes y Batanes. Todo hace creer que el terremoto del 21 de marzo último, sentido con mucha intensidad en Marinduque y en la Provincia de Tayabas, debe considerarse como precursor o por lo menos íntimamente relacionado con los de la Isla de Tablas. Originado en la misma línea pero más al N, tuvo también grande extensión dentro del Archipiélago y sus ondas se registraron en todo el Extremo Oriente, no permitiendo esto dudar de su carácter geológico.

Largo sería enumerar siquiera los principales terremotos de semejante carácter originados a lo largo de la mencionada línea durante los últimos veinticinco años; por una coincidencia feliz sus epicentros habían hasta ahora quedado algo lejos de la Isla de Tablas. Como ninguna de las regiones afectadas por dichos terremotos ha sufrido cataclismos o hundimientos irreparables, tampoco es de temer suceda a la región de Tablas, aunque, a semejanza de otros sitios de la misma línea de menor resistencia, por fuerza estará expuesta de tiempo en tiempo a terremotos de mayor o menor importancia.

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WEATHER BUREAU

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BULLETIN FOR MAY, 1919

PREPARED UNDER THE DIRECTION OF
REV. JOSÉ ALGUÉ, S. J.
DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1919

BULLETIN FOR MAY, 1919.



METEOROLOGICAL BULLETIN FOR MAY, 1919.

BY REV. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month in the Philippines differs very little both from that of last year and from the normal of May. The highest pressures of the month were reported by all the stations on the 5th, while the lowest pressure were generally observed on the 28th and 29th in Mindanao, the Visayas, central and southern Luzon, and on the 18th in northern Luzon.

The mean monthly temperature is slightly above the normal, and above the monthly mean of the preceding year, in all our stations with the exception of those in the northernmost part of Luzon. The highest and lowest monthly temperatures for Manila were 37.7° C. and 21.1° C.: they were registered on the 12th and 1st, respectively. The extreme temperatures for Baguio were 27.3° C., 15.2° C. on the top of Mirador, and 27.1° C., 14.8° C. in the valley.

Only three times since 1880 had Manila Observatory recorded in May a maximum temperature higher than that of this year: it was in May, 1889, 1912 and 1915. And only three times more during the same period of 40 years, namely in May, 1891, 1906 and 1914, had the maximum May temperature of Manila been higher than 37.5° C.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR MAY, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from May, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from May, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga	758.19	+0.05		759.25	25	757.19	29	26.7	+0.6		31.8	2	22.9	2
Yap, W. Carolines	58.32			59.48	5	57.67	11	27.8			34.3	7	23.2	4
Tagbilaran	58.05	+ .15	-0.13	59.44	5	56.77	29	28.1	+1.4	+0.5	34.7	27	22	8
Surigao	58.32	+ .23	- .08	59.82	5	57.11	29	27.3	+ .9	+ .3	33.1	29	22.9	26, 27
Cebu	58.34	+ .11	+ .07	59.90	5	57.08	29	29	+ .9	+ .8	33.8	25	22.4	31
Iloilo	58.04	+ .15	- .03	59.30	5	56.82	29	28.7	+ .8	+ .7	34.9	10	23.8	11
Tacloban	58.58	+ .13	+ .11	60.30	5	57.33	16	28.5	+1.6	+ .7	36.3	4	22.8	26
Capiz	58.09	+ .01	- .31	59.92	5	56.67	29	28.9	+ .8	+ .9	35.9	18	24.2	16
Calbayog	58.55	+ .21	+ .09	60.42	5	57.17	27	27.3	+1.3	+ .5	34.5	21	21.4	1
Legaspi	58.53	+ .11	+ .13	60.79	5	56.85	27	29	+ .8	+ .8	35	25	24.3	23
Atimonan	58.35	- .04	+ .07	60.65	5	56.54	28	28.7	+ .8	+ .5	35.2	18	23.9	11
Ambulong, Tanauan	57.61	- .06		59.63	5	56.07	28	29.1	+ .4		37.5	2	23	
Paracale ^a	58.02					56.54	18	28.2					23.5	1, 15
Manila	58.09	- .08	- .25	60.17	5	56.48	27, 28	29.1	+1	+ .7	37.7	12, 13	21.1	1
San Isidro	58.41	+ .04	+ .13	60.83	5	56.60	28	29.2	+ .7	+ .8	38.1	18	21.7	1
Dagupan	57.29	- .14	- .47	59.18	5	55.57	18	29.3	+ .4	+ .8	39	7	23.2	13
Baguio ^b	636.67	+ .14	+ .19	638.52	5	635.12	28	19.2	+ .3	+ .4	27.3	1	15.2	10
Vigan	757.59	- .10	- .44	759.68	5	755.64	18	29.2	0	+ .5	36.2	13	23.6	21
Laosag	57.81	+ .17		60.14	5	55.82	18	28.3	- .3		37.5	3	22.2	17
Aparri	58.27	+ .13	+ .11	61.30	3	55.96	18	27.4	- .8	- .1	37.6	1	21.5	12, 14

^a 23 days of observation only.

^b The barometric readings of this station are not reduced to sea level.

Rainfall.—There was still a lack of rain during this month in the Philippines, but more particularly in Mindanao, the Visayas and the southern part of Luzon, and during the first ten days of the month. Although in Manila there was no rain at all from the

1st to the 12th of the month, yet the thundershowers which visited the city several times after the 12th caused the total monthly rainfall to be 61 mm. above that of the preceding year, and 38.7 mm. above the May's normal. The rain in Baguio was even more abundant than in Manila, the monthly total being 230.0 mm. greater than that of May, 1918, and 31.1 mm. greater than the normal of this month.

DAILY RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF MAY, 1919.

Station.	Total.	Departure from May, 1918.	Departure from normal.	Days of rain.	Departure from May, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from May, 1918.	Departure from normal.	Days of rain.	Departure from May, 1918.	Greatest rainfall in a single day.	Day.	
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.		
Jolo	149.2	+ 37.9	- 46	18	+ 4	53.8	12	Sumay, Guam	25.4	- 76.2	- 78.4	4	- 2	10.2	26	
Malamai, Zamboanga	132.6	- 23.8	- 17.2	10	- 5	17	30	Calapan	49.7	- 191.1	- 109.5	11	- 2	16	9	
Zamboanga	61	- 23.8	- 17.2	10	- 5	17	31	Virac	119.8	- 26.3	- 26.5	19	0	39.6	20	
Davao	282.8	- 76	+ 42.8	12	- 6	88.9	16	Naga	111.8	+ 50.5	- 8.8	9	+ 4	30.2	23	
Cotabato	214.4	+ 64.7	- 5.1	15	- 3	37.8	13	Tigaon	87.2	+ 25.3	- 65.2	8	+ 4	48.5	23	
Camp Keithley, Lanao	299.8	- 131.2	- 63.6	- 23.4	15	- 4	26.2	21	Lucena	29.3	- 27.1	- 2.1	7	+ 3	10.4	23
Butuan	131.2	- 63.6	- 23.4	15	- 4	26.2	21	Atimoman	71.5	- 21.1	- 91	10	+ 3	24.6	14	
Mambajao	81.6	- 28.9	- 8	+ 3	62	29	29	Ambulong, Tanauan	33.8	- 71.5	- 6	+ 3	13	22		
Dumaguete	100.1	- 101	- 4	- 7	93.7	29	29	Canlubang, Calamba	266.2	+ 161.4	- 15	+ 7	57.1	11		
Yap, W. Carolines	197.3	+ 103.8	- 84.3	20	- 3	58.4	31	Paracale	118.1	- 105.3	- 53.8	8	- 2	46.5	28	
Tagbilaran	51.9	- 1.6	- 48.7	6	+ 6	24.1	29	Santa Cruz, Laguna	130.3	+ 26.5	- 5.8	9	0	56.9	28	
Iwahig	160.1	+ 32.1	- 14	+ 1	75.9	5	23	Manila	144.3	+ 61	+ 38.7	9	+ 4	44.4	27	
Surigao	87.5	- 137.5	- 49.4	13	- 1	22.4	14	Antipolo	204.7	+ 113.2	- 10	- 2	59.2	21		
Maasin	41.4	+ 6.8	- 88	2	- 1	21.6	23	Iba	137.5	- 51	- 88.3	9	+ 1	52.1	18	
Cebu	113.3	+ 15.3	+ 13	8	0	37.6	30	San Isidro	143.6	+ 27.1	- 41.4	12	+ 1	59	29	
Iloilo	78.8	+ 18.1	- 79.8	13	+ 2	36.3	11	Tarlac	104.2	- 37.5	- 71	13	+ 5	38.1	24	
San Jose Buenavista	63.5	- 162.5	- 104.7	12	+ 8	30.5	27	Baler	274.6	+ 130	- 2.2	21	- 10	60.7	22	
Cuyo	143.5	- 42.5	- 22	17	+ 6	26.4	23	Dagupan	142.1	+ 90.2	- 104.5	11	- 2	51.3	13	
Ormoc	6.3	- 50.3	- 76.7	6	- 6	2.8	29	Bolinao	87.9	- 25.3	- 84	12	+ 2	18.5	19	
Guiuan	142.7	- 124.6	- 18	1	50.2	30	30	Baguio	440.2	+ 230	+ 31.1	27	+ 13	44.9	28	
Tacloban	92.6	- 11.5	- 58.9	6	- 12	60	30	San Fernando	195.9	+ 74.1	+ 2.7	13	+ 7	87.9	29	
Capiz	103.7	- 27.3	- 71.6	9	- 2	17.3	27	Union	306.5	+ 251.5	+ 138.5	17	+ 10	67.1	22	
Borongan	83.6	- 74.8	- 132.4	17	- 2	20.8	30	Echague	103.8	- 17.3	- 92.8	11	+ 2	48	19	
Catbalogan	36.9	- 58.7	- 11	- 4	15.5	10	10	Candon	85.9	- 10.3	- 46.2	9	+ 6	31.6	20	
Calbayog	75.5	- 85.6	- 79.9	10	- 8	19.3	27	Vigan	101.8	+ 33	- 92.9	15	+ 10	26.4	18	
Masbate	97.9	+ 85.5	+ 17.6	9	+ 4	43.2	18	Laoag	148.4	+ 93.7	+ 38.6	19	+ 13	37.6	15	
Romblon	46.6	- 31.5	- 75.4	7	- 3	20.3	29	Aparri	119.8	+ 49.9	- 13	+ 10	38.4	24		
Batag	12.3	- 98.1	- 9	4	3	4	4	Cape Bojeador	119.8	+ 49.9	- 13	+ 10	38.4	24		
Sorsogon	32.8	- 157.5	- 8	- 10.7	4	5	5	Santo Domingo, Batanes	381.9	+ 354.8	+ 136.8	15	+ 6	125.3	28	
Legaspi	80.3	+ 49.8	- 51.7	10	- 1	27.7	5									

DEPRESSIONS AND TYPHOONS.

There was no depression or typhoon during this month near the Philippines: and even in the whole Far East there were only some depressions, which belong rather to the type of Continental depressions and were formed above 25° latitude, either in the Eastern Sea or between the Bonins and the Loochoos, and moved eastward or northeastward to the south of Japan.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas difiere muy poco de la del año pasado y de la normal de mayo. Las presiones más altas del mes se registraron en todas las estaciones el día 5, mientras que las más bajas se observaron generalmente los días 28 y 29 en Mindanao, Visayas y en el centro y sur de Luzón, y el 18 en norte de Luzón.

La temperatura media mensual es ligeramente mayor que la normal, y mayor que la media de mayo del año pasado en todas nuestras estaciones a excepción de las de la parte más septentrional de Luzón. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 37.7° C. y 21.1° C., las cuales se registraron los días 12 y 1, respectivamente. Las temperaturas extremas de Baguio fueron 27.3° C., 15.2° C. en la cumbre del Mirador, y 27.1° C., 14.8° C. en el valle.

Solo tres veces desde 1880 ha registrado el Observatorio de Manila una temperatura máxima mayor que la de este año, y fué en mayo de 1889, 1912 y 1915. Y solo tres veces más durante el mismo período de 40 años, a saber, en mayo de 1891, 1906 y 1914, la temperatura máxima de Manila en mayo ha sido mayor de 37.5° C.

Precipitación acuosa.—Se sintió aún escasez de lluvia durante este mes en Filipinas, pero más particularmente en Mindanao, Visayas y en la parte meridional de Luzón, y durante los diez primeros días del mes. En Manila, aunque no hubo lluvia alguna desde el día 1 hasta el 12 del mes, con todo, debido a los chubascos de turbonada que varias veces se repitieron después del día 12, la lluvia total de este mes es mayor que la del año pasado en 61 mm., y que la normal de mayo en 38.7 mm. La lluvia en Baguio fué aún más abundante que en Manila, siendo la cantidad total del mes mayor en 230.0 mm. que la de mayo de 1918, y en 31.1 mm. que la normal de este mes.

DEPRESIONES Y TIFONES.

Durante este mes no hubo depresión o tifón cerca de Filipinas, y aún en todo el Extremo Oriente sólo hubo algunas depresiones que pertenecen más bien al tipo de las depresiones continentales y que se formaron en latitudes más altas de 25° , bien en el Mar del Este, bien entre las Islas Bonins y Loochoos, y se movieron hacia el E o NE por el S de Japón.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[$\Phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. ^b			
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a.m.	8 a.m.				
					°C.		°C.				°C.	°C.				
1	758.96	29.4	37.4	21.1	30.5	33.8	31.2	32	30.3	28.8	58.5	16.8	18	55.2	10.4	6.8
2	59.15	29.6	36.6	23	31.7	34.2	31.5	32.3	30.4	28.8	62.8	18.9	20.2	56.4	8.5	5.5
3	59.35	28.8	36.8	22.8	31.3	33	31.5	32.3	30.3	28.8	61.9	17.7	19.6	54.6	8.2	5.2
4	59.41	29	36.6	22.8	31.5	33.2	31.4	32	30.4	28.8	63.5	18.5	20.3	53.5	7.6	5
5	60.17	29.3	37.4	23.2	31	33.7	31.3	32	30.5	28.9	63.7	18.6	20.3	56.8	8.3	5.6
6	59.96	29.6	36.4	23.4	30.8	32.9	31.2	31.8	30.2	28.8	63.2	19.1	21.1	57.5	7.5	4.9
7	59.07	30.1	37.6	23.7	31	34	31.2	32	30.2	28.8	61.6	18.7	21.1	55.5	10	6.2
8	58.71	29.6	36.7	22.9	30.8	33.5	31.3	32	30.4	29.1	61.4	18.4	21	55	9.5	6
9	58.82	30	37	23.6	31.3	33.6	31.5	32.2	30.5	29.2	62	19	21.3	54	8.6	5.6
10	58.18	29.8	37.4	24	31.5	34	31.6	32.4	30.4	29	63.7	19.4	21.4	57.2	7.6	5.1
11	57.72	29.5	36.1	24	32	34.5	31.9	32.7	30.6	29.2	69.1	20.7	21.5	55.1	7.4	4.6
12	57.66	29.4	37.7	25.3	32	35	32.2	33.2	30.5	29.2	71.9	21.3	23.7	56.9	6.5	4.8
13	57.83	29.5	37.7	22.7	32.8	35.7	32.6	33.3	30.6	29.2	70.5	21	24	56.4	5.7	4
14	57.76	28.2	35	22.8	31	33.3	31.8	32.5	30.3	28.9	78.9	22	21.6	55.9	5.2	3.2
15	57.19	28.8	34.5	24.6	31.6	33.7	32	32.6	30.4	29	76	22	23.2	54	6.4	3.4
16	56.84	29.7	34.9	24.9	32.2	34	32.3	32.7	30.5	29	74.5	22.8	23.2	54.7	6.7	4.2
17	56.86	29.9	35.2	25.5	32.6	33.5	32.6	33	30.6	29.1	74.6	23.1	23.9	53	6.2	3.8
18	56.62	29.9	35.2	25	32.8	34.6	32.8	33.2	30.6	29.2	74	22.9	23.3	53.7	6.4	3.8
19	57.16	28.7	36	24.6	32.8	34.3	32.8	33.3	30.7	29.2	80.9	23.1	24	54.5	2.7	2.5
20	58	28.9	34.3	24.9	31.3	33.5	32.3	32.7	30.7	29.2	80.3	23.4	24	54.1	4.5	2.8
21	58.87	29.1	36.2	23.8	32	34.2	32.4	32.8	31	29.3	79	23.1	24.6	55.5	4.8	3
22	58.56	28.1	35.2	24.3	31.5	33.5	32.2	32.8	30.8	29.2	81.6	22.8	22.8	56.5	3.7	2.6
23	58.30	29	34	25.2	31.5	33.1	32.1	32.5	30.8	29.3	79.5	23.4	24.4	53.1	4	2.7
24	58.23	28.5	34.5	25.4	31.7	33.4	32.1	32.5	31	29.3	82.3	23.5	24	53.7	3.1	2
25	58.29	28.5	33.2	24.8	31.1	32.8	31.8	32.3	30.9	29.4	81.8	23.4	23.6	52	3.6	2.3
26	57.39	29.3	33.8	25.2	31	32.4	31.7	32.2	31	29.3	78.8	23.5	23.6	54	4.6	2.9
27	56.48	28.6	33.3	24.5	31.6	33.3	31.8	32.4	31	29.4	82.3	23.6	24	55.5	3.9	2.5
28	56.48	27.7	33.1	24.5	31.3	32.5	31.8	32.2	31	29.4	86.3	23.5	23.6	52	3	1.8
29	57.04	27.3	35	24.6	30.7	32.1	31.6	31.9	31	29.4	86.9	23.1	23.6	54.4	.8	1
30	57.40	29	34.4	24.2	30.7	32.4	31.5	31.7	31	29.4	77.7	22.7	22.8	54	4.7	3
31	58.27	28.9	34.4	25.6	31.2	32.4	31.7	31.9	31.2	29.5	76.9	22.4	24.1	55.7	4.3	2.7
Mean Total	758.09	29.1	35.6	24.1	31.5	33.6	31.9	32.4	30.6	29.1	73.1	21.4	22.6	54.9	5.9	3.9
Departure from normal	-0.25	+0.7	+1.9	+0.2							-2.8	-0.2		+29.3		

Day.	Prevailing direction.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.
		Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Form and direction.		On the tower.	In the park.				
					Upper.					Lower.		
					h. m.					mm.	mm.	
1	E, SE	249	22	SE	0-10	Ci.	Cu.	h. m. 11 40	mm.			
2	SE	235	22	SE	1	Ci.	Cu.	10 20			☉☉☉ p.	
3	NE, E	236	33	NE	6	Ci.	Cu.	7 20			☉☉☉ p.	
4	E quad.	200.5	23	ENE	3.9	Ci.	Cu.	9 35			☉☉☉ p.	
5	E quad.	219.5	21	E by S	4	Ci.	Cu.	10 25			☉☉☉ p.	
6	E quad.	178	18	ENE	4.3	Ci.	Cu.	10 10			☉☉☉ p.	
7	SE	246.5	22	SE	3	Ci.	Cu.	10 30			☉☉☉ p.	
8	SE	248	24	SE	4.8	Ci.	Cu.	9 25			☉☉☉ p.	
9	SE	195.5	17	SE	4.2	Ci.	Cu.	10 00			☉☉☉ p.	
10	ESE	219	19	SE	6.8	Ci.	Cu.	ESE 6 45			☉☉☉ p.	
11	E quad.	234	25	WSW	5.8	Ci.	Cu.	E 9 05			☉☉☉ p.	
12	SE quad.	141	24.5	WSW	6	Ci.	Cu.	E 6 50			☉☉☉ p.	
13	E quad.	207	20	ESE	5.8	A.-Cu., Ci.-S.	Cu.	ESE 7 00	38.1	42.7	☉☉☉ p.	
14	W quad.	183.5	15.5	WNW	7.2	Ci.	Cu.	E 7 30			d a.	
15	WSW, W	186.5	22	WSW	4.5	Ci.	Cu.	E 9 00				
16	WSW	203	22	SW	5.6	Ci.-Cu.	Cu.	E 9 40				
17	W quad.	276	30	WSW	4.1	Ci.-Cu.	Cu.	E 9 20			☉☉☉ p.	
18	WSW	284	31.5	WSW	4.7	Ci.	Cu.	W, SSW 9 10			☉☉☉ p.	
19	SE	194	23	SW	7.5	Ci.	Cu.-N.	SSE 4 50	10.7	11.7	☉☉☉ p.	
20	SE, WSW	205	22	WSW	8.3	A.-Cu.	Cu.	SSE 3 20	3	.5	d a. ☉☉☉ p.	
21	E, WSW	205.5	29	SW by W	5.5	Ci.-Cu.	Cu.	E 10 00	13.7	13.7	☉☉☉ p.	
22	NE	139.5	14.5	ENE	5.8	Ci., Ci.-S.	Cu.	E 6 50	3	.5	☉☉☉ p.	
23	W	121.5	13	WSW	6.3	Ci.-S.	Cu.	E 5 30			☉☉☉ p.	
24	W, WSW	125	16	WSW	6.3	A.-Cu.	Cu.	E 5 45	11.7	12.7	☉☉☉ p.	
25	W quad.	106.5	19	WSW	8.7	Ci.-S.	Cu.	ESE, E 2 50			☉☉☉ p.	
26	W, SW	139.5	18	WSW	6.6	Ci.-S.	Cu.	E 6 25			☉☉☉ p.	
27	SW, WSW	209.5	21	SW by W	7.7	Ci.-S.	Cu.	E 5 50	44.4	43.9	☉☉☉ p.	
28	E, WSW	153	16.5	WNW	6.8	Ci.	Cu.-N. sw.	SSW 6 35	20.3	20.3	d a. ☉☉☉ p.	
29	NE	121	10.5	SSW	7.9	A.-Cu. E, ENE	Cu.	N. SE 3 35	4.8	4.6	☉☉☉ p.	
30	SE, ESE	159.5	19.5	ESE	6.4	A.-Cu.	Cu., Cu.-N.	E 6 25			☉☉☉ p.	
31	SE	179	17	SE	8.3	Ci.-S.	Cu.	ESE 3 35			☉☉☉ p.	
Mean Total		193.6	21		5.7			7 35	144.3	150.6		
Departure from normal		-897.8			0			+4 45	+38.7			

^a All the mean values given in this table are deduced from hourly observations.

^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.

^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.^a

[$\phi=16^{\circ} 25' N$; $\lambda=120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Air temperature at Mirador (on the top of the mountain).					Air temperature in the valley (near the city hall).					Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation.	
	Pressure (mean). ^b	Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.	Hour.			Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total)	Shelter (total)
	mm.	°C.	°C.		°C.	°C.		°C.	°C.		Per ct.	mm	°C.	°C.	mm.	mm.
1	637.39	20.6	27.3	2.15p.	16.4	5.50a.	27.1	11.50a.	15.3	5.40a.	75.5	13.1	14	57.6	5	3.3
2	37.67	19.7	26.3	1.10p.	16.4	4.20a.	25.6	0.35p.	15.1	5.00a.	83.5	14.2	13	60.8	3.7	2
3	37.46	19.7	25.8	10.25a.	15.9	5.55a.	25.7	10.55a.	15.2	5.00a.	73.8	12.5	14.8	60.3	5.9	3.2
4	37.63	19.5	25.9	10.25a.	15.7	2.30a.	26.3	10.40a.	14.8	4.35a.	76.2	12.6	13.7	60.7	4.9	3
5	38.52	20.2	26.4	10.40a.	16	5.30a.	26	3.10p.	15.4	5.55a.	73.7	12.8	15	59.6	6.6	4.6
6	38.38	20.3	26.3	10.05a.	16.1	5.25a.	25.9	2.05p.	16.5	5.35a.	72	12.5	14.3	59.8	4.7	3.5
7	37.69	20.7	26.7	2.00p.	15.9	5.50a.	26.2	2.20p.	14.8	4.30a.	66.3	11.6	14.2	59.2	6.5	4.2
8	37.34	20.2	26.2	1.10p.	16.4	5.50a.	26.2	2.40p.	15.7	5.30a.	77.2	13.5	15.4	59	4.3	2.8
9	37.39	20.1	26.3	2.00p.	16.4	5.45a.	25.6	11.00a.	16.1	5.40a.	78	13.4	15.2	62	3.9	2.9
10	36.80	19.1	25.2	0.30p.	15.2	3.30p.	24	10.05a.	16.1	4.40a.	85.3	14	15.5	63.7	2.4	1.3
11	36.16	18	22.9	1.55p.	16	5.55a.	23.9	1.30p.	15.8	0.05a.	92.7	14.2	14.4	60	1.9	1
12	36.20	18.6	23.2	10.00a.	16.1	2.35a.	23.5	10.15a.	15.6	5.55a.	84.5	13.4	13.7	57.5	2	1.3
13	36.43	18.7	24.3	0.20p.	16	8.45p.	24.5	1.20p.	16.1	5.35a.	89.8	14.4	15	58.1	2.5	1.5
14	36.17	18.8	24.8	11.55a.	16.2	4.55a.	24.4	2.00p.	16.3	5.10a.	84.2	13.6	15	63.8	1.9	1.2
15	35.94	18.6	24.8	0.20p.	16	5.30a.	24.8	1.20p.	15.1	5.40a.	88.5	14	14	58.2	2.7	1.4
16	35.58	18.6	24.1	10.40a.	16.3	6.00a.	23.7	2.00p.	15.6	4.30a.	89.7	14.2	13.2	63.8	2	1.2
17	35.59	19.2	24.9	1.25p.	16.4	7.30p.	24.6	11.55a.	15.4	5.55a.	86.7	14.2	14.6	61.1	2	1.9
18	35.29	19.1	24.5	2.15p.	16.2	1.35a.	24.9	2.55p.	15.2	5.40a.	83.3	13.6	13.9	60.5	2.9	1.5
19	35.90	18.3	22	11.20a.	16.4	7.55p.	22.5	1.20p.	17.2	1.20a.	89.2	13.9	15.8	54.7	3.5	1.7
20	36.44	19.1	23.3	2.00p.	16.5	0.05a.	23.6	1.55p.	17.1	0.45a.	80.3	13.1	15.7	60.3	3	1.8
21	37.29	20	25.5	11.55a.	16.7	2.00a.	25.9	Noon	16.6	2.00a.	87.2	15.1	15	61.8	2.7	2
22	37.27	19	25.3	0.40p.	16.8	6.00a.	25.9	Noon	16.9	4.15a.	91.2	14.9	15.7	63	1.2	.7
23	37.09	18.9	24	11.20a.	16.8	5.50a.	24.4	9.40a.	15.8	5.35a.	90.7	14.9	14.5	60.7	.8	.6
24	36.87	18.9	25	0.25p.	16.4	5.20a.	25.1	0.25p.	16.1	4.05a.	86.2	14	14	58.2	2.3	1.3
25	36.90	19.3	23.2	9.25a.	16.8	5.55a.	23.9	1.30p.	16.1	4.40a.	89.8	15	14.4	56.6	1	.6
26	36.21	19.6	24.3	Noon	16.8	5.00a.	24.9	0.40p.	16.2	5.00a.	86	14.6	14.2	60.9	1.8	.8
27	35.34	18.8	24.1	10.35a.	16.9	5.00a.	23.9	11.30a.	16.8	2.05a.	93.2	15.1	15.7	60.2	.9	.8
28	35.12	18	21.8	9.05a.	16.8	5.20a.	22.9	10.20a.	16.3	5.35a.	88.5	13.6	15.2	55.8	1	.7
29	35.65	18.2	24.6	Noon	16.8	5.25a.	24.5	0.25p.	16.6	0.40a.	90.2	14	15.8	63.3	2.1	1.2
30	36.18	18.8	24.8	0.20p.	17.1	6.00a.	24.9	0.05p.	17.1	5.55a.	83.8	13.4	16	59.8	4.4	2.6
31	36.87	19.9	25	1.50p.	16.8	4.50a.	25	1.25p.	16.9	5.40a.	78	13.3	15.5	59.8	3.8	2.1
Mean	636.67	19.2	24.8		16.4		24.8		16		83.7	13.8	14.7	60	3	1.9
Total															94.3	58.7

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. ^d	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.	Upper.			
		Km.	Km.		0-10.			h. m.	mm.	
1	E, W	267.4	26	SW	0.3	Ci.	Cu. ESE	9 35		☉ a.
2	W, E	321.6	27.4	W	5	Ci.	Cu. SE	5 35	0.8	☉ a. d ² ≡ ☐ p.
3	E	423.5	26.6	W	5	Ci.	Cu.-N. ESE	6 05		
4	E	385.4	22.7	E	5	Ci.	Cu.	6 20	1.3	☉ a. ≡ ☐ p.
5	E	447.6	29.3	W	3.7	Ci.	Cu. ESE	5 30		☐ ☐ ☐ p.
6	E, W	433.8	34	E	4.1	Ci.	Cu. SSE	6 10	1.5	☉ ☐ p.
7	E, W	396.8	31.4	SW	1.3	Ci.	Cu. SE, ENE	9 55		
8	E	426.6	28.5	W	3.9	Ci.	Cu. SE	6 15	5.1	☉ ☐ ☐ p.
9	SE, W	450.2	27.9	SE	4.6	Ci.	Cu.-N. ENE	6 15	10.5	☉ ☐ ☐ p.
10	E	298.1	27.9	E	5.3	Ci.	Cu. NE	4 45	39.5	☉ ☐ ☐ p.
11	E, W	296	27.4	SW	9.6	Ci.-S.	Cu.-N. SW	2 00	43.2	d a. ☐ ☐ p.
12	E	278.8	19.3	W	5.6	Ci.	Cu. SSE	4 20	31	☉ a. ☐ ☐ p.
13	E	257.6	21.1	W	6.7	Ci.	Cu. SSE	3 00	26.5	☐ ☐ p.
14	W	349.6	27.1	W	7.3	Ci.	Cu.-N SE	2 55	35.3	☐ ☐ p.
15	W	341.5	31.1	W	4.6	Ci.	Cu. W	7 00	2.3	☐ ☐ p.
16	W quad.	299.4	30.9	W	5.9	Ci.	Cu.-N. SW	4 25	2.3	☐ ☐ p.
17	W	373.8	37.6	W	5.6	Ci.	Cu.-N. SW, wsw	6 10	9.9	☐ ☐ p.
18	W	320.6	30.1	SW	5.4	Ci.	Cu. SW	5 25	11.6	☐ ☐ p.
19	SE quad.	376.9	22.5	SW	8.6	Ci.	Cu.	1 35	22.4	☐ p.
20	SW quad.	303	25.9	SE	8	A.-Cu.	Cu.-N. SW	4 20	5.9	d a. ☐ ☐ p.
21	Variable	329.3	28.5	W	6.4	Ci.	Cu. SW		5.1	☐ ☐ p.
22	Variable	221.6	21.5	W	5.7	Ci.	Cu. NNE	3 35?	37.3	☐ ☐ p.
23	NW quad.	235.3	17.7	W	6.3	Ci.	Cu.-N. NW		16.7	☐ ☐ p.
24	W, NW	274	19.9	SW	4.9	Ci.	Cu.	6 00	16.2	☐ ☐ p.
25	W	288.4	23.3	W	6	Ci.	Cu.	3 10	7.9	d a. ☐ ☐ p.
26	W quad.	279.5	29	NW	5.1	A.-Cu. NW	Cu. WNW	6 25	38.9	☐ a. ☐ a. p. ☐ ☐ p.
27	W, NW	207.2	17.4	W	7.1	Ci.	Cu.-N. NW, W	3 35	7.2	☐ a. ☐ ☐ p.
28	SE quad.	225.8	16.1	SE	8	Ci. WNW	Cu. WSW	1 05	44.9	☐ a. ☐ a. p. ☐ ☐ p.
29	SE	415.7	30.6	SE	6.7	Ci. NE	Cu. SE, SSE	3 30	14.3	☐ ☐ p.
30	E	370	26.9	SE, E	6	A.-Cu. NW	Cu. E	5 00	1.1	☐ ☐ p.
31	E, SE	277.8	18.2	E	6.3	Ci.	Cu. ESE	5 30	1.5	☐ ☐ p.
Mean		326.5	25.9		5.6			5 01		
Total		10,122.8							440.2	

^a All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
^b The barometric readings of this station are not reduced to sea level.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
^d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, MAY, 1919.

Station.	Day of month.															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Jolo.....	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Port Lebak, Cotabato	16.5		1.3	3.3	2	2.3	19.3	3.6	15.7	7.9	7.4	53.8	5.1	0.5		1.8
La Union, Davao ^a			.5			2.5	6.4					28.7	76.2			
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a		10.4		1.5						19.3		31.5	46.2			
Basilan Plantation, Isabela, Basilan, Office ^a								6.4				30	35.1		3	
Parang-Lalap, Isabela, Basilan ^a					3.8							8.9				10.9
Latuan, Isabela, Basilan ^a					8.9				8.9							
Malamau, Zamboanga					2.3				4.6			.8	.5		17.8	
Cuabo, Davao																8.4
Zamboanga					7.1		1.5								1.3	
Fort Pikit, Cotabato		25.4	.8		.5		1.8			2.8						
Davao								4.8	2		5.1					
Sirib Guianga, Davao ^a				21.1		3.8		9.1							46.2	88.9
Cotabato			7.9		10.9	10.9					8.9		37.8	26.9	21.3	36.1
Bual, Cotabato			10.9	7.9	4.8								4.8		10.9	.5
Naga-Naga, Zamboanga						1.3			3	5.8	7.6		3	27.7		.8
Malabang, Lanao					61			11.7	21.6				33	34.8		
Malangas, Zamboanga ^a		27.7			24.6	2.3			.5					1.1		61
Lumbatan, Lanao ^a	2.5				3	4.3	1.3			3	2.8	1.3	8.9			
Ganassi, Lanao		6.9		.3	3.3	5.1	.3	91.2	9.4		47	6.1	14.2	14.7		6.4
Moncayo, Davao ^a				21.6		24.1										
Mailag Agricultural School, Bukidnon					.3	7.1	.3	.8				.3		.5	19	
Camp Keithley, Lanao					8.1	5.8	20.8				14.2		1.5	12.4	3.8	.5
Pantar, Lanao ^a					37.1	3.3	36.9				30.7					
Sumilao, Agusan			3			4.8		1							.3	.3
Diklom, Bukidnon ^a						13.2		1.3								2
Butuan			1.3	.8		8.4		17.5				1		17		
Manbajao						1.3		1.3								2.8
Dumaguete																
Hacienda San Jose, Tanhai, Bais, (Sur) Oriental Negros ^a																
Palanas, Bais, (Centro) Oriental Negros ^a																
Hacienda Tamogon, Bais, (Norte) Oriental Negros ^a																
Yap, Western Carolines	6.9	.8	19	.8	1			1.3			2.8	.3		27.4	11.6	
Tagbilaran					10.7	.3										
Iwahig	.1				75.9	5.9	.3							2		
Surigao		9.4	4.6	7.6	2.3	21.4	.8	3			6.1			22.4	.3	
Maasin																
Cebu											20.3					
Hacienda Vallehermoso, Oriental Negros ^a						15.2										
La Carlota, Occidental Negros ^a							13				85.1	7.9	2	28.7	34.8	5.3
Hacienda San Antonio, Occidental Negros ^a																
San Carlos, Occidental Negros ^a				.3												
Hacienda Refugio, Occidental Negros ^a										52.1						
Iloilo										9.1						
San Jose Buenavista											36.3	8.1	2.8			
Cuyo								8		12.5	.5					.3
Lucena, Iloilo ^a										4.1	1	5.6	17.3	1.5		
Ormoc											5.1					
Guiuan	.8		7.6	10.4	16.8	3.3	1.3	.5	1.5	.5						1.3
Dueñas, Iloilo ^a											45.7	1.3	2.5			
Bitagan, Iloilo (Railroad Iloilo to Capiz) ^a								.5			7.1				22.1	1.3
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a											46	17.3	1.8			
Tacloban				4.1	5.8	6.9										
Dumarao, Capiz ^a										12.7				2.5		25.4
Dao, Capiz ^a										15.2	1.8			32		
Capiz									4.3							
Borongan	.3			20.3	5.1	6.4	2.8	.8	1.3	10.9						
Catbalogan				1	1		.3				3	2	3.3			
Calbayog			1.3		13.5		2	5.1	7.9	15.5	.5					12.9
Masbate			.5	1.3	2											

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, May, 1919—Continued.

Station.	Day of month.																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
San Jose Estate, J. Abello D-13, Mindoro ^a	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
San Jose Estate, Tamaraw Plantation, Mindoro ^a																	
San Jose Estate, San Agustin, Mindoro ^a										27.9							
San Jose, Mindoro ^a										2.5							
San Jose Estate, Tunnel D-12, Mindoro ^a											2.3		10.7	6.6			
Romblon							0.5					0.3					
Batag		0.3	1	3	2.1	1.3	1.3			1.8							
Sorsogon			3.6	10.7	5.6	6.1	2	0.8	3								
Legaspi			3.8	5.1	27.7	2.8	9.7	9.1	.5								
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a b}			10.2			5.1		5.1									
Sumay, Guam	5.1	7.6															
Calapan			.8		.8				16	4.6							
Virac	.5			12.7	2.3	4.1	.8	.8	2.3	3.3	1.8						
Naga					4.4					24.7	17.8	27.5					
Tigaon						5.1											
Batangas																	
Lucena									5.6		1.3						
Atimonan														24.6		0.5	
Ambulong, Tanauan										1.5							
Canlubang, Calamba											57.1	2.5		5.3		6.6	
Paracale			2.8								7.1			.5		21.1	
Santa Cruz, Laguna			1.3								.5	16.7					
Fort Mills, Corregidor ^{a c}											4.6	22.1	5.1	3.6		1.3	
Alabang, Rizal ^a																	
Lamao, Bataan ^a																	
Munila													38.1				
Antipolo			1.5										9.1				
Bosoboso, Rizal ^a											19			1.3			
Montalban, Rizal ^a				.8									8.9	4.8	4.6		
Hacienda Pintong Sapang, San Jose, Bulacan ^a									19	2.5		40.6	25.7				
Mabayuan Dam, Olongapo, Zambales ^a											1.3		7.1				
Pampanga Sugar Mills, Del Carmen, Floridablanca ^a		2.5								19.3	5.3		1	20.8		3.1	
Iba								.3					5.1				
San Isidro						.3					3.3	1.8	5.1	7.6		2.8	
Tarlac										16	2	8					
Baler		1.3			5.1	18.3		.5	1.8	.5	19.3		19	4.8	.5	19.6	
Paniqui, Tarlac ^a									61								
C. L. A. S. Muñoz, Nueva Ecija ^a		1.5										1.8	6.6	3	2.5		
Dagupan									.5			1	51.3				
Bolinao		.8		1.3							4.4	13.5	8.2	2		16.8	
Baguio						1.5		5.1	10.5	39.5	43.2	31	26.5	35.3	2.3	2.3	
San Fernando, Union			.3						13.1			37.1	.9				
Echague		3.8									8.9			5.6	52.3	35.1	
Sagada, Mountain Province ^a		3.8					23.4	2			18.8	5.8	1	40.6	14	1	
Bontoc, Mountain Province ^a			1.3					4.1			5.6	68.6	3.6	13	5.6		
Candon											17.8	3	2			.8	
Vigan										3.6				8.6			
Laoag						7.9						3	1.5			.2	
Aparri		2.8	20.3	11.2								11.9	2	1.3	.8	37.6	
Cape Bojeador		3.8	5.1													.5	
Santo Domingo, Batanes		1.3			53.6										34.3	8.3	
																	77.2

^a Voluntary or cooperative station.

^b Rain in 24 hours beginning 8 a. m.

^c Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, May, 1919—Continued.

Station.	Day of month.															Total	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.		
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
San Jose Estate, J. Abello D-13, Mindoro ^a			19.6			45.2				19.3	71.6		9.4	2		167.1	
San Jose Estate, Tamaraw Plantation, Mindoro ^a				24.6		51.6					16	45.7	9.4			147.3	
San Jose Estate, San Agustin, Mindoro ^a			34.5	9.1		23.4					31.7					126.6	
San Jose, Mindoro ^a			23.1	1		23.1		2.8			51.1		39.4	4.6		147.6	
San Jose Estate, Tunnel D-12, Mindoro ^a			23.1			30.7		1.5			3.8		4.3	2		85	
Romblon			14.5						1.8			8.9	20.3	1	.3	46.6	
Batag														1	.5	12.3	
Sorsogon				1												32.8	
Legaspi											13.7		.5		7.4	80.3	
San Miguel Estate, San Miguel Islands, Tabaco, Albay ^{a b}												10.2		17.8		48.4	
Sumay, Guam										10.2	2.5					25.4	
Calapan		2	5.1	5.6		5						.3		4.1	9.9	49.7	
Virac	7.4	2	1.8	39.6		1.5				5.3			20.1	6.9	1.3	119.8	
Naga			1		5.1			30.2	.3							111.8	
Tigaon		3.8	7.1	.3							48.5	.3	5.8	16.3		87.2	
Batangas			2	6.4				10.4				2.8		4.6	2.3	29.3	
Lucena			24.1	10.5						9.4		8.6	9.7	2.3		71.5	
Atimonan			3							4.8		.3	3.6	8.1	.8	63.8	
Ambulong, Tanauan			5.1			13		9.9	2	17.8	4.8					33.8	
Canlubang, Calamba	22.4		20.8	30.5	27.9			9.7	10.5	22.1	34.6	2	9.4	4.8		266.2	
Paracale		.5	10.9	3.3					3.6	4	11.7	46.5		6.1		118.1	
Santa Cruz, Laguna			9.9		31.5						10.7	56.9	2	8		130.3	
Fort Mills Corregidor ^{a c}			2	1.5							4.1	5.3	7.9	2.8		28.7	
Alabang, Rizal ^a	8.9	15.2	21.6		53.3								16.5			147.1	
Lamao, Bataan ^a			10.7	1.8					2.3	2	1.8	4.1	1.8	.3		24.8	
Manila			10.7	.3	13.7	.3		11.7			44.4	20.3	4.8			144.3	
Antipolo			2.8	.3	59.2	45.2		6.6			9.1	55.4	15.5			204.7	
Bosoboso, Rizal ^a		2.5	14	50.8	33	45.2	22.9	40.6	45.7	33	45.7	17.3	31.2	5.8	1	308.5	
Montalban, Rizal ^a	.8			8.1	41.1	56.1	7.6		4.1	5.8						198	
Hacienda Pintong Sapang, San Jose, Bulacan ^a			4.8		40.1			30.5		7.6			29.2			200	
Mabayuan Dam, Olongapo, Zambales ^a	.8	1	11.9	1				1				2.6	15.2	9.7		51.6	
Pampanga Sugar Mills, Del Carmen, Florida Blanca ^a			6.6	1.3				.3		6.9		.8	3	4.3	4.3	79.8	
Iba		52.1	17.5	6.1						7.9		1	2.3	34.3	11.9	137.5	
San Isidro			8.1			49.8			3.8		1	59				143.6	
Tarlac		7.1	14	4.6	1.5			38.1	3.6	1.3		2.5	1.3		11.4	104.2	
Baler	10.4		18.3		19.6	60.7		9.9			6.4	6.1	11.9	33		274.6	
Paniqui, Tarlac ^a						53.3		7.4		38.6	15.5		20.8			61	
C. L. A. S. Muñoz, Nueva Ecija ^a		6.4				21.1		7.9		.5		4.6	17	3.6		154.7	
Dagupan	2.3		32.3							1.3		7.9	2.8	1	7.4	142.1	
Bolinao			18.5	4.1						3	5	1.3	87.9	18	1.5	87.9	
Baguio	9.9	11.6	22.4	5.9	5.1	37.3	16.7	16.2	7.9	38.9	7.2	44.9	14.3	1.1	1.5	440.2	
San Fernando, Union	7.6		24.1	.6						3	5	1.3	87.9	18	1.5	195.9	
Echague	9.1	.3	1.5		30.5	67.1		8.4	32.8	.8	42.7	2.5	4.6	.5		306.5	
Sagada, Mountain Province ^a	39.3	11.2	15.5	3	1.8	2.5			1.5	40.4	9.7	44.9	4.8	7.6	5.8	299.4	
Bontoc, Mountain Province ^a	3.3	5.6	10.9					.3			2	13.5	6.9	11.9	3.8	8	161.6
Candon	5.1	2	48	3.3								5.8	5.6	9.4	1.8		103.8
Vigan	4.5	11.7	15.2	31.6				.5	5.6								85.9
Laoag	9.8	26.4	18.3	6.3		.3	1.3	.3	1	10.9	.3	14.3					101.8
Aparri	1.8	26.7	1.3	4.8	1.8	2.8		2			4.3	.5	7.6				148.4
Cape Bojeador	1.8	10.2	13.4	.3			11.4	38.4	16.3	10.2	1.8						119.8
Santo Domingo, Batanes	5.1	32	2			3.8	2.8	14.3			12.2	125.3	2.8		6.9		381.9

^a Voluntary or cooperative station. ^b Rain in 24 hours beginning 8 a. m. ^c Rain in 24 hours beginning 7 a. m.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, MAY, 1919.

Day.	Jolo.		Malamaui, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.3	22.8	31.4	23.4	29.7	23.8	34.1	22.9	35.2	22.9	28.4	18	33.8	22.1	34.4	22.8
2	31	22.6	32.1	24.4	31.8	22.9	33.4	20.3	35.3	22.8	27.4	17.5	34.2	22.4	33.8	21
3	30.7	22.4	32.2	24.5	29	23.5	34.2	23.1	34.8	23.1	28.3	20	34.1	23.4	32.4	21.2
4	31	22.4	32.9	24.3	29	24.1	35.7	21.1	34.8	22.6	28.1	19.5	33.1	22.6	32.9	21.9
5	31.1	22.1	32.4	24.5	31.2	23.6	35.1	21.8	35.8	23.2	28.5	19.4	34.6	22.8	35.1	23.1
6	29.6	22.8	32.6	24	29.7	23.4	34.2	22	35.3	23	28.4	17.6	33.6	23	32	23.5
7	31.1	22.6	32.7	24.4	28.9	23.2	31.9	24.5	34.7	24.5	27.2	20	33.2	24.8	34.6	23.5
8	30	22.6	32.7	24.6	29.2	23.6	34.2	21.8	35.2	23.6	26.9	18.3	33.4	23.5	35.5	22.7
9	29.9	22.2	32.6	24.7	29.1	24.2	34	22.8	34.8	23.6	27.3	19.1	33.5	23.6	34.4	23.1
10	31.1	22.8	32.8	24.4	29.4	23.5	35.2	22.2	34.4	24.3	28.1	18.1	32.9	23.4	36.2	23
11	30.5	22.8	32.5	24.4	29.5	23.3	34.5	22.6	34	23.6	28.6	19.5	33.8	23.9	34.7	23.4
12	31.4	23	32.4	24	30.5	23.5	34.7	23.1	35.1	24	29.3	20	32.8	24.8	34.6	23.7
13	30.9	22.7	31.1	23.6	29.2	24	35.6	22.8	35.2	24.2	29	19.7	33.8	23.6	34.8	23.1
14	30.6	23.2	32.4	24.4	29.6	25.4	30.2	23.9	33.4	24.3	27.9	19.9	34.3	24.2	33.1	23.1
15	31.2	23.2	32.8	24.1	30.6	24.4	33.7	22.7	33.2	23.4	28.8	19		24.8	35.4	22.8
16	31	22	32.9	24.4	29.1	24.2	33.3	23.5	34.1	23.9	28.9	19.7			33.9	23.5
17	31	23.9	31.5	24.9	28.8	24.4	33.5	23.6	33.7	24	28.6	20.3			35.5	24.3
18	30.8	22.7	32.9	24.9	31.1	23.7	34.3	24.6	34.1	23.5	29	19.5			35	24.4
19	31.1	22.2	31.8	24.4	31.2	24.5	34.1	24.5	35.3	24	28.4	20.8			35.6	24.4
20	30.2	23.5	31.5	24.1	31.1	24.6	32.5	24.5	31.8	23.9	26.8	20.9			34	24.4
21	30.5	23.5	32.1	24.4	29.2	24	33.2	24	35.9	23.6	28.1	20.3			34	23.7
22	29.8	23.3	30.4	24.6	28.9	24.8	32.6	23	34.4	23.6	29.1	19.3			34.7	22.9
23	30	23.5	28.4	24	28.6	24.3	32.8	23.5	34.7	24	28.6	20.7			32.8	23.9
24	30.5	23.6	30.7	23.9	28.7	23.4	32.3	23.5	33.4	23.7	27.3	20			34.2	23.8
25	30.2	23.5	31.6	25	29.4	23.7	33.2	24	32.5	23.9	28.7	21.4			35.6	23.5
26	30.8	23.2	32.3	24.1	29.5	23.3	32.6	24	33.8	24	28.8	19.5			35.6	23.5
27	30.6	23.9	32.1	24.1	29.5	23.8	32.3	23.5	33.3	24	28.3	20			34.3	23.6
28	30.6	23.4	31	24	30.2	24	31.2	23.6	32.5	23.5	27.8	20.6			35.7	23.4
29	30.8	24.4	31.4	24.3	29.5	24	33	23.1	32.7	23	27.3	20.1			33.6	22.9
30	30.8	23.5	29.5	24.9	29.4	24	32.5	23.9	33.4	23.1	28.2	21			33.7	23.9
31	30.7	22.9	30.6	24.5	29	23.5	33.9	23.3	34.1	23.5	27.6	19.1			34.3	23.4
Mean	30.6	23	31.8	24.3	29.7	23.9	33.5	23.2	34.2	23.6	28.2	19.6			34.4	23.3

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.9	25	30.4	26.6	33.7	24	33.5	22.9	33.5	23.2	31.6	24.9	34.4	21.2	31.4	24.9
2	31.3	23.6	29.4	25.7	33.2	24	33.9	22.4	34.5	21.9	29.5	23.2	34.4	22	31.4	25.5
3	30.4	25.9	30	25.7	33.5	24.7	32.3	22.1	34.1	21.5	28.9	23.3	33.8	22.6	31.9	25.2
4	31.1	24.5	30.1	25.3	33.4	23.2	33.7	22.7	34.3	21.9	30.3	23.1	34.4	22.8	32.5	26
5	31.4	24.8	30.4	26.7	32.7	24.8	31.3	23.9	33.4	23.2	30.8	24	34.6	22.6	31.5	26.4
6	31.1	25.8	29.9	26.9	33.9	24.7	32	23.1	32.5	23.1	30.2	24.3	31	22.5	31	25.6
7	31	25.3	30.2	26.7	34.3	25.6	33	24	32.6	23.3	31.5	23.6	34	22	32.6	26.5
8	30.7	25.1	30.4	24.9	34.2	25.1	32.8	22	33.9	22.6	31.2	23.6	34	22.8	32	26
9	31.3	25	29.9	24.9	34.2	25	33.3	22.6	33.6	22.9	31.5	23.7	34.1	20.6?	32.5	25.6
10	31.5	24.1	31.4	25.7	32.2	26	32.5	22.8	34.1	22.9	31.8	23.7	32.8	24.5	32	26
11	31.4	25.9	30.3	25.8	33.9	25	33.4	23.2	32.9	22.4	31.7	24.1	32.5	24.2	33.1	26.9
12	31.8	24	31.8	24.7	34.1	24.8	32.6	24	33.8	22.1	31.5	24.3	32.6	24.8	33.3	23.4
13	31.7	26.2	30.9	24.3	34.2	25.2	33.7	24.1	33.6	21.6	32	23.5	32.2	25.6	32.5	26.5
14	31.4	23.9	30.9	25.9	33.2	25	33.8	24.5	34.6	22.5	30.5	24.6	34.2	24	32.5	26.9
15	31.4	23.9	31.4	25.7	30.2	24.3	32.7	24.3	34.9	21.8	30.5	24.2	34.2	24.2	32	26.4
16	31.8	24.6	31.4	24.9	30.8	24.1	33.9	24.4	35.1	22.2	31.3	24.4	34.1	24.8	31.5	27.5
17	31.8	25.1	32	25.7	32.1	24.5	33.3	25.2	34.6	22.6	32.1	24.9	33.7	24	33.5	26.5
18	32.6	25	31.4	25.6	33.3	25	33.4	24.4	35.1	23.2	31.7	24.6	34.2	25	31.5	27.4
19	33.4	25.1	32.3	24.9	32.4	24.6	33.5	25.7	34.6	23.3	31.9	24.9	34.5	25	32.1	26.2
20	34.1	25	32	25.7	32.2	24.5	32.6	25.6	33.3	24.1	31.4	24.8	33.4	25.3	33.1	23.6
21	31.4	25.9	31	25.8	33.2	26	33.4	24.7	33.5	23.9	32.2	24.7	33.3	24.6	33	26.6
22	31.6	24.3	30.4	26	33	25.2	32.8	23.4	35.3	22.9	31.9	24.4	33	23.6	33.1	26.3
23	31.7	24.7	32.4	25.3	33.2	25.8	32.4	25.2	33.1	24.1	32	25.1	33	25	32.4	27
24	33.1	24.9	31.1	25.3	33.2	24.5	32.5	24.8	35.1	22.9	32.2	24.5	32.5	25.2	31.5	26.5
25	33.5	24	32	25.2	33	25.2	33.4	24.5	34.8	23.4	32.1	23.9	33.3	24.4	33.8	26.5
26	31.8	23.5	32.8	24.7	33.9	24.8	34.6	24.7	33.8	22.6	31.8	22.9	33.5	23.5	33.7	26.6
27	33.8	23.4	32.6	24.4	33.2	25.2	34.7	24.5	33.6	23.1	32.6	22.9	33	24.2	32.7	27.4
28	32.9	24.4	32.1	24.4	32.8	25.3	32.9	25.3	32.4	23.6	31.7	24.3	34	24.6	32.9	24.4
29	31.9	23.6	31.6	25.9	33.7	25	33.2	23.8	33.6	23.1	33.1	24	34.1	24.2	32.7	25.2
30	31.4	23.9	29.8	23.2	28.7	24	32.7	24.4	31.5	23.3	30.8	24.5	34	24.3	32.5	24.5
31	30.9	23.9	30.3	24.6	28.9	24	31.8	22.9	32.3	23.1	32.5	24.1	34.1	24.3	33.5	22.4
Mean	31.8	24.7	31.1	25.4	32.9	24.8	33.1	23.9	33.8	22.8	31.4	24.1	33.6	23.8	32.4	25.9

Maximum and minimum temperatures at the stations of the Weather Bureau, May, 1919—Continued.

Day.	Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
1	33	25.5	33.8	23.2	34.6	25	34	20	32.5	21.2	33.3	23	33.9	24.9	31.4	22.2
2	34.1	25.1	34.8	22.4	34	26.9	34.2	20.8	32.1	21.7	34.5	23.1	34.6	25.2	31.8	23
3	31.9	24.8	35.5	22.8	33.6	27.4	35	21.4	32	25.4	35	23.5	34	25.7	32	24.3
4	33.4	25.5	35.2	22.4	32.8	27	33.2	21.8	32.2	24.5	36.3	24	35	26.2	32	23.9
5	32.7	26.3	35	24	33	27.5	33.9	23.5	32.8	23.5	33	24.3	35.2	26.6	31.6	24.3
6	32.7	25.9	34.7	22.7	33	27.3	33	22.4	32.8	24.2	33.7	23.9	35.3	26.4	31.9	25.9
7	33.2	26.2	35.2	23.7	33.2	27.3	32.8	23.4	33	24	33.5	23.6	34.7	26.2	31.8	25.7
8	33.5	25.9	34.3	23.7	32.9	26.8	34	23	33.2	23.4	33.8	23.8	35.2	26.3	31.3	23.8
9	34.6	25.9	34.2	23.5	33.7	25.6	34.8	21.5	33.2	23.5	33.8	22.9	34.8	25.8	32	23.5
10	34.9	26	32.9	24	32.8	25.6	34.9	22	32.7	24.1	34	24	33.5	24.8	31.6	23.3
11	33.6	23.8	33.1	23	31.1	25.5	33.7	22.4	31.8	24	34	24.5	34.4	25.5	32	23.2
12	33.2	24.6	33.2	25.1	32.6	24.6	34	22.4	31.3	22.8	34.6	23.7	34.2	24.7	32	23.5
13	34.1	25.2	33.1	24.5	32.2	25.2	34	22.4	34	22.8	34.6	25	34.6	25.2	32.4	25.2
14	33.3	25.7	32.7	24.5	32.6	25.5	33.4	22.4	34.2	23	34.5	24.7	35.4	26	32.6	23.6
15	33	25.1	34.2	24.1	34.6	25.1	34.1	23	32.6	33.2	35.8	24.5	34.6	25	32.5	23.3
16	33.6	24.7	33.8	24	33.7	25.1	34.8	23.6	31.3	23.4	34.5	24.4	35.6	24.2	32.2	24.3
17	34.8	25.4	34.2	24.9	34.7	25.2	34.9	24	31.2	24	35	25.1	34.5	25.9	33	23.8
18	32.2	25.4	32.8	24.6	31.9	25.5	34.6	24	32.2	23.8	34.6	26.5	35.9	25	33.2	24.1
19	32.2	25.2	32.8	24.5	32.3	25.7	33.6	24.3	32.4	26.2	35.4	25.5	34	24.6	32.5	24.2
20	31.4	24.7	31.7	24.2	31	25.3	33.6	23.6	31.2	24.4	34	26	35.5	25	31.7	24.2
21	34.3	25.8	33.2	25.1	32.3	25.1	34.4	23.3	32.7	24.1	34.5	25.2	34.5	25.5	32.3	25
22	34.5	26.1	34.7	25.4	33.6	27.5	33.5	21	32.8	24	34.8	24.5	35.2	26.9	31.8	23.3
23	32.7	24.9	32.8	25	32.4	25.3	33	22.9	30.6	24.1	32.7	25.5	35	26	32.3	24.5
24	31.8	24.3	32.7	24	31.2	25.2	33.4	22.9	31.4	23.2	33.8	26.1	33.1	25.3	32.3	23.7
25	31.9	25.7	34.2	24.5	32.2	25.6	34.1	22.9	31.8	23.8	35	24.4	34.3	25.2	32.8	23.5
26	31.8	24.9	33.7	23.6	32.2	26.1	34.1	22.8	31	23.7	34.5	22.8	34.9	25	32.2	23.4
27	32.4	26.3	32.8	24.7	31.2	25.5	34.3	23.6	31.7	24	34	23.5	35.1	24.4	32.9	23.3
28	31.3	25.2	32.1	24.1	30.8	25.1	33.6	24.8	31.9	24.7	34.5	25.5	34.8	25.1	33.2	23.5
29	33.5	25.6	32.3	24.1	32	25.5	35.9	21.8	33.6	24.8	34.8	24.5	34	25.6	33.3	23
30	32.7	24.9	32.2	25.4	30.5	25.5	36	23.1	32.4	23.7	32.4	24	33	25	32.3	23.7
31	30.8	25	30.4	24.6	31	25.1	33	24.5	33.5	24.6	33.5	23.5	32	25	32.6	24.5
Mean	33	25.3	33.5	24.1	32.6	25.8	34.1	22.8	32.3	23.8	34.3	24.4	34.5	25.4	32.2	23.9

Day.	Catbalogan.		Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
1	34.6	21.4	32.5	21.4	34.4	24.5	34.6	26	31.8	24.9	33	22	32.7	26.1	31.4	25
2	35	21	32.7	21.8	34.6	25.8	35.2	25.3	32.2	24.2	32.8	22.6	33.2	26.9	30.4	24
3	34	21	33.6	22.5	34.6	25.2	34.3	26.4	31.9	24.7	32.5	22	33.5	26.4	31	24.6
4	35.3	22	33.9	22.4	34.8	25.2	34.7	26.7	32.4	24.8	31.7	23.9	33	26	29.4	24.8
5	33.5	23.6	32.8	23.8	33.6	25	35	27.2	31.7	25.2	32	23	31.8	24.8	30.6	25
6	34.8	22.8	32.1	23.2	33.8	25.2	35.1	27	32.4	25.2	31.8	24	32.6	26.1	30.8	25.2
7	35	23	31.9	23.1	34.6	25.8	34.5	26.6	32.4	25.7	32.3	24.4	32.4	25.8	32	25.2
8	35	22.5	31.4	22.9	34.8	25.6	34.9	25.4	32.1	24.7	32.8	23.4	32.8	26.3		25
9	33.6	22	31.6	22	34.8	25	34.8	26.6	32.3	25.4	32.7	23	32.6	25.8	30.6	24.2
10	32.2	21.9	31.6	22.4	35.2	25.5	34.8	26	31.9	24.4	33	23.5	32.9	26.5	31.2	25.2
11	33.6	22.3	32.2	22.2	34	25.6	34.5	24.3	32.4	24	34	23.5	33.4	24.6	30.4	25.4
12	33.5	22.6	32.4	23.3	35	25.6	32.5	25.1	32.3	24.8	34	24	33.7	25	30.6	25.4
13	33.3	24.5	34.2	23.2	35	26.4	34.8	25.2	32.7	24.8	34	24.5	33.8	25.1	31.8	25.2
14	33.7	22.3	34.2	23.3	34.8	26.5	34.5	25.3	32.5	24.9	33.5	23.5	33.9	25.8	31.6	25.4
15	32.8	22.7	33.3	23.5	33.8	25.8	35	24.8	33	24.5	33.7	23.4	34.4	24.4	30	25.4
16	34	24.5	33.8	23.5	35.4	26	34.7	24.6	33.5	25	34.6	24.5	34.2	25	31.4	23.8
17	34.1	24.7	32.2	23.7	36.5	26.4	34.9	24.8	32.9	24.8	35.5	24	34.6	25.3	32.4	25
18	34.5	25.3	33.1	24.6	36.6	25.2	35.4	25	33.7	24.2	34.6	23	34.9	24.6	32.4	25.4
19	34.7	25.2	33.2	24.6	32.8	25.6	35.4	26.2	33.7	25.2	35.1	23.2	34.6	24.9	32.2	25.8
20	33.9	24.3	33.4	24.4	32.6	26.5	33.1	24.3	32.4	25.2	34.5	24.8	34.1	26.2	32.6	24
21	33.7	24.3	34.5	23.4	33.8	26.2	33.5	25.2	33.2	25	34.6	24.8	34.4	25.1	32.6	25.4
22	34.5	22	34.3	21.8	36	26.2	36	25.4	32.4	23.4	34.5	24	34.6	26.9	32.6	25.4
23	33	24.4	33.2	24.5	33.2	25.8	36	24.4	32.6	24.5	35	24	34.3	24.3	32	25.4
24	33.6	23.3	32.2	23.4	33.4	26.6	34.4	25.7	33.1	24.4	34	24	34.3	24.4	32	25.6
25	33.8	22.9	33	23.6	34.6	25.8	34	25.1	34.1	24.6	35.5	24.3	35	25.9	32.4	24.2
26	33.9	23.5	32.7	23.4	34.6	26.2	36.3	24.7	32.6	24	35	24.1	34.7	24.9	32.6	25.6
27	33.7	23.6	32.9	24	34	25.5	35.9	27.1	34.4	24.4	34.5	24.2	33.8	25.1	32	25.4
28	33.3	24.5	31.1	24.2	33.6	26.6	34.8	27.2	33.9	24.8	34.7	24.5	32.9	25.2		25.4
29	35.5	24.2	32.7	23	33	26.4	34.4	25.7	33.2	24.2	35.2	24.2	34.3	25	32.2	25.8
30	33.7	24.8	32.8	23.9	32.4	25	33.1	24.7	32.6	25	35	24.7	33.8	26.6	33	25.8
31	33.2	24.7	31.7	24.9	33	25.5	32.5	24.2	32.2	23.5	34.5	24.2	33.3	26.2	32.6	25.6
Mean	34	23.3	32.8	23.3	34.3	25.7	34.6	25.6	32.7	24.7	33.9	23.8	33.7	25.5	31.6	25.1

Maximum and minimum temperatures at the stations of the Weather Bureau, May, 1919—Continued.

Day.	Calapan.		Virac.		Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong-Tanauan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.4	28	32.7	22.1	35.5	19.5	33.9	21.8	36.3	24.8	34	24.9	32.6	25.4	36	25.1
2	34.1	22.5	33.2	22	37.2	20.5	33.7	22.6	36.7	23.8	35	24.5	33.1	27.3	37.5	23.5
3	36.5	25	34.3	21.8	35.6	20.6	35	19.5	37.1	23	35	24.1	31.2	26.8	35	25.7
4	37	25.6	34.3	23	35	21.4	34.7	21.1	37.7	23.8	35	24	31	27	37	26.2
5	35.5	26	32.5	24.1	35.5	21.7	33.8	22	37	26.2	35	24	33.1	26.8	36	25.4
6	35.6	25	32.5	24.3	34.2	21	33.8	22.8	37.9	25.8	35.2	24.9	33.1	27.1	36.2	26
7	35.1	26	32.7	22.8	35.8	21.7	34.1	21.4	37.1	25.5	34.6	24.7	33.1	26.8	36.1	26
8	35.5	27.5	33.2	22	35.9	21.8	34.9	21.2	36.8	25.4	34	24.5	33.1	25.2	37.2	25.3
9	35.5	24.6	32.5	23	36.4	22.1	33.9	22.4	36.5	26	33.1	24.7	33.2	24.8	37	26
10	33.5	23.2	33.6	24.2	33.4	21.7	34.3	22.3	34.9	25.3	32.5	24.5	34.1	25	32.3	24.5
11	35	23	32.9	24.1	34.2	21.5	34.2	22.7	36.3	24.2	32.8	23	33.6	23.9	34.4	23
12	34.5	24	32.5	24.4	36.6	23	34.9	23.2	37.5	24.6	33.7	24.5	33.8	24.5	34.5	23.7
13	35.5	23.5	33.1	24.2	36	22.2	34.4	23.5	37.2	23.6	33.5	24.6	33.8	24	35.4	24.5
14	35	23.5	33.1	23.3	36.5	23	34.6	22.9	37.3	24.4	33.4	24.6	32.7	24.1	35.4	25.4
15	35.5	24	32.8	23.5	36.9	22.8	35.4	22.1	35.7	25	33.4	23.6	33.8	24.1	35.3	25.5
16	35	24	33.1	23.2	36.5	23.8	34.4	22.7	36.5	24.1	33.4	24	32.1	24.7	36	24.9
17	36	24	32.7	23.1	36.6	22.7	34.9	22.9	36.4	24.8	33.3	24.6	34.2	24.9	36.2	24.6
18	36.1	24	33.5	23.3	36.6	22.7	35.2	22.8	36.4	24.8	33.5	24	35.2	25	37.1	24.5
19	34.5	24	33.4	25.5	37.5	24.6	34.9	22.6	37.6	25.2	33.6	24.5	34.8	25.4	34	25.1
20	35.4	24.1	32.5	23.7	35	23.9	33.6	22.9	34.9	25	32.3	24.4	34.2	24.3	35	24
21	35	24	32.9	23.5	35.6	24.5	32.9	23.4	34.4	24.5	33	24	34.5	24.7	34.7	24.5
22	36.5	24	32.5	23.3	36.6	23.8	34.8	22.4	36.7	25.3	33.5	25.4	34.3	25	36.3	25
23	36	24.5	32.7	25	37.6	21.5	34.3	21.6	36	25.2	33.7	24.6	34.7	24.4	34.7	24.7
24	36.3	24.5	32.6	24.9	35.7	23.5	34.9	22.1	36.2	25	33.8	23.9	34.8	24.4	33.3	24.6
25	34.5	24	31.9	24.8	36	24	35.1	23.2	34.9	25.3	34.8	24.1	33.5	26	31.4	25.3
26	36.8	24	32.6	24.9	36.5	23.6	35.3	22.7	34.9	24.5	33.8	23.6	33.3	25	32.1	24.8
27	34.5	24.5	33	24.5	34.8	24.7	33.5	23.6	34.9	25.4	33.8	23.7	33.3	24.9	32.2	25
28	34.6	24.2	32.3	24.5	35.7	24.2	32.9	22.9	36.3	26.1	33.7	24.4	34	24.5	34.2	24
29	34	23.5	33.1	25	36.1	23.8	33.8	23	35.5	24.9	33.9	24.8	31.8	25.1	33	25
30	33.1	24	32.6	24.8	37	23.5	32.9	23.4	34.2	24.4	33.7	24.8	33.2	24.6	35.8	24.3
31	32.5	24	32	24.1	33.5	23.3	31.4	23.5	32.4	25.1	33.7	24.4	31.3	25	36	24.9
Mean	35.1	24.2	32.9	23.8	35.9	22.7	34.2	22.5	36.1	24.9	33.8	24.3	33.4	25.2	35.1	24.9

Day.	Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	37	22.4	32.8	23.5	35.4	22.5	37.4	21.1	37.6	22.2	36.4	24.6	35.9	21.7	33.2	20.7
2	37.2	22.2	33.2	24	35.6	23.3	36.6	23	39.2	22.3	35	22.5	37.7	23.4	33.6	20.6
3	36	22.4	33.3	25	34	22.6	36.8	22.8	38.1	22.4	39?	24.6	36.2	23.8	39.2	21.6
4	36.4	22.3	34.8	24.2	34.6	23.4	36.6	22.8	38.2	22.8	35.8	23.6	36	23.9	39	21.8
5	36.5	22.4	34.8	24.2	34.8	24.2	37.4	23.2	36.7	22.8	36.1	24.4	35.5	23.5	37.4	22.4
6	36.8	23	34.5	25.1	34.5	25.1	36.4	23.4	37.5	22.8	36.4	25.4	35.8	23.9	38.2	22.2
7	37	23.4	35.1	23.8	35.1	23.8	37.6	23.7	37.6	23	37	25	36.9	23.4	39	22.2
8	36.9	23.1	35.2	23.9	35.2	23.9	36.7	22.9	38.8	22.9	36	25.2	37.5	23.6	39.2	22.6
9	37.1	23.4	36.2	23.9	36.2	23.9	37.2	23.6	37.2	23.1	35.2	24.6	36.6	24.5	39.5	22.4
10	36.9	23.2	36.5	24.6	36.5	24.6	37.4	24	37.9	22.8	34.3	25.3	37.6	25	39	22.4
11	36.6	23.4	35.7	23.6	35.7	23.6	36.1	24	38.2	22.7	34	25.1	37.5	23.7	37.2	21.8
12	36.9	22.9	36.1	24	36.1	24	37.7	25.3	37.2	23.8	34	23.6	35.5	24.9	33.8	23.2
13	36.7	23	33.6	25.7	35.5	24.5	37.7	22.7	36.7	23.3	34	24	37	24.2	39	23.5
14	36.6	22.8	34.2	24.9	35.4	24.1	35	22.8	36.5	22.2	33.5	24.7	36.1	23.5	36.6	23.2
15	36	23	34.2	23.5	36.1	23.5	34.5	24.6	36.3	24.1	33.8	24.1	37.2	23.5	38	22.8
16	36.3	23.4	33.6	24.6	36.4	24.1	34.9	24.9	37.5	24	34	23.6	37.2	24	37.2	22.8
17	36.8	23.1	33.2	24.5	36.7	23.7	35.2	25.5	37.5	24	33.8	23.1	37.9	23.9	37	22.6
18	36.6	23	34.2	24.8	37.2	24.1	35.2	25	37.2	23.7	34.5	24.5	38.1	24.2	37.5	22.4
19	36.5	23.2	34.5	25.1	36.6	24.7	36	24.6	36	24.7	32.9	24.2	36.6	25	34.8	22.2
20	35.1	23	33	25.3	36	24.5	34.3	24.9	36.2	24	30.2	24	35.6	24.4	33.8	22.6
21	35.2	23.1	34.1	25.2	37.1	24.4	36.2	23.8	37.9	24.1	32.5	24.5	37.2	25.7	36.6	22.6
22	36	23.2	33.4	25	35.2	24.6	34	25.2	35.1	23	34.1	24.8	37.7	23.6	37	22.8
23	36.3	23.6	33.5	23.8	36.2	24.6	34	25.2	35.8	23.6	33.8	24.6	35.6	24.4	38.4	23.2
24	36.2	23.7	34.4	24	35.4	25.1	34.5	25.4	34.8	24.5	34.2	24	36	24.6	38.6	23.2
25	34.2	23.8	33.5	25.4	35	24.7	33.2	24.8	33.8	23.8	34.4	24.5	35.7	25.4	37	23.6
26	34.9	23	34	25	35	25	33.8	25.2	35.4	24.1	33	23.8	35.7	25	35.2	23.6
27	33	24	32.8	24.6	34.6	24.6	33.3	24.5	33.1	23.5	32	24.5	36.6	25	36.5	23.8
28	34	23.2	32.7	24.5	34.3	24.1	33.1	24.5	35.4	23.5	31.7	24.4	35	25.2	34.4	23.6
29	34.8	23.1	32.9	24.5	33.6	23.7	35	24.6	33.2	23	33	24.8	35	24	35.6	23.4
30	33.8	23.4	33.2	25.1	32.5	24.6	34.4	24.2	34.4	22.9	34.2	25	33	23.3	35.8	23.4
31	33.4	23.8	30.5	25.5	33.2	24.6	34.4	25.6	33.3	23.9	32.6	24	33.1	24.5	34.8	23
Mean	35.9	23.1	33.4	24.7	35.4	24.1	35.6	24.1	36.5	23.3	34.2	24.4	36.3	24.2	37.3	22.7

Maximum and minimum temperatures at the stations of the Weather Bureau, May, 1919—Continued.

Day.	Baler.		Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.5	20.3	38.1	24.1	36.2	25.4	27.3	16.4	37	24.8	37.5	21.4	35.8	27.2	34.3	26.6
2	33.9	21.4	38.1	24.8	34.8	28.2	26.3	16.4	35.6	25.8	37.5	21.9	35.7	27.6	33.9	25.9
3	33.5	22.5	37.6	25.9	35.5	26.2	25.8	15.9	35.1	24.3	36.9	23.5	35.2	26.9	35.6	24.5
4	33.7	23.1	34.7	24.1	34.5	24.2	25.9	15.7	35.5	24.1	34.9	23.2	34	26.5	34.7	26.9
5	33.5	23.6	38.6	24.9	36.5	23.4	26.4	16	35.6	23.5	36.9	22	35.4	26.2	34.7	26.7
6	32.6	24.5	38.7	24.8	37.7	24.8	26.3	16.1	36.4	24.1	37.2	22.3	35.8	25.9	34.8	26
7	32.7	22.1	39	25.8	37.5	24.5	26.7	15.9	37	24.1	38.3	21.9	35.5	26.2	34.2	25.7
8	33.3	22.5	38.1	25.5	35	25.5	26.2	16.4	37.5	25.5	38.1	22.5	35.4	25.5	34.6	25
9	32.7	22.8	38.7	25.3	35.5	25.2	26.3	16.4	36.5	25	38.1	22.7	35.1	25.2	34	24.5
10	33.5	23.7	38.2	25.2	35.5	25.2	25.2	15.2	35.4	23.5	38	22.6	35.2	26.5	34.7	25.4
11	34.1	22.6	36.5	24.1	33.5	26.6	22.9	16	35.6	25.4	38.1	23	35.1	26.3	34.5	24.9
12	31.5	23.4	37.3	24.8	34.5	25.1	23.2	16.1	36	23.7	36.7	23	34	25.8	34.7	25.1
13	32.3	23.4	38	23.2	35.3	25	24.3	16	34.9	23.6	36.3	22.6	33.2	25.5	36.2	24.3
14	32.8	23.3	35.8	23.9	32.6	24.7	24.8	16.2	35	23.8	38.4	23.5	33.9	25.7	33.7	24.7
15	35.1	23.1	34.7	23.6	32.6	25.2	24.8	16	34.5	23.9	36.5	22.3	35	26	34.5	25.7
16	33	23.7	36.1	24.8	32	25.3	24.1	16.3	34.5	24.5	34.9	22.5	34.8	26.5	34.8	25.5
17	34	23	35.3	24.3	34	25.4	24.9	16.4	36.2	25	35.1	21.2	34.4	26.5	34.5	24.4
18	33.6	22.8	36.5	24.8	34.5	25	24.5	16.2	34.9	25	36.5	22.8	33.7	25.5	33.8	24.4
19	34.7	23	34.5	24.8	31.5	25.5	22	16.4	33.1	26.2	36.5	22.4	30	26	27	24.1
20	33.6	23.3	34.6	24.3	32.5	24.3	23.3	16.5	34.5	24.6	35.4	23.9	34	24.8	33.6	24.4
21	34.2	23.5	35.9	25.1	34.8	25.2	25.5	16.7	35	25	36.2	24.5	33	26.5	33.6	23.9
22	33.7	24	34.5	25.4	32.8	26.2	25.3	16.8	34.4	25.2	34	22.2	33.5	26.6	35	25.9
23	33.5	23.5	34.1	24.4	32.6	26	24	16.8	34.5	25.2	34.8	22.8	34.5	26	33.8	25.9
24	34.6	23.3	34.1	25.2	33	25.4	25	16.4	35	24.8	35.4	23.4	34.5	26	34.8	25.6
25	34.8	23.2	33.6	26.1	31.8	26.4	23.2	16.8	34.5	24.9	34	23.1	32.2	26.8	31.2	25.7
26	33.4	24	34.4	25.4	32.8	25	24.3	16.8	34.5	24.5	34.7	22.9	34.8	26.5	33.3	25.5
27	33.5	23.5	34.5	25.9	33	26.2	24.1	16.9	34.2	25.2	33.8	23.5	33.5	26.5	33.2	25.5
28	33.2	23.2	33.5	25.1	32.8	25.5	21.8	16.8	32.8	25	33.6	22.7	29.5	26.5	33.2	25.1
29	32.6	23	36	24.1	33.6	25.5	24.6	16.8	34.3	24.5	34.8	23.9	33	24.8	32.8	25.2
30	32.3	23.3	35.5	24	35.3	25.5	24.8	17.1	33.7	24	33.4	23.5	33	26.3	33.8	25.5
31	30.3	23.3	35.5	25.8	35.3	25.5	25	16.8	33.7	24.2	32.6	22.9	33.9	25.6	33.1	25.6
Mean	33.3	23.1	36.2	24.8	34.2	25.4	24.8	16.4	35.1	24.6	36	22.8	34.1	26.1	33.9	25.3

Day.	Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	34.9	23.1	37.6	22.5	32.6	24.8	32.8	24.2
2	36.6	23.8	35	25.2	33.6	26.1	31.8	22.5
3	37.5	24.7	28.8	23.3	29.7	21.7	24.7	21.7
4	36.1	23	28.8	23.3	31.4	23.5	29.2	22
5	35.1	22.9	32.8	22.7	36.3	24.1	27.1	23.2
6	35.5	23	32.8	23	31.2	25.3	31.1	25.5
7	34.1	23.1	35.5	24	33.1	26	31.5	25.7
8	34.2	22.3	35.2	24.1	34.4	24.6	32.4	26.2
9	35.2	22.8	35.5	23.7	34.2	24.1	31.7	24.9
10	34.9	23.8	36.4	24.1	34.6	25.8	32.6	26
11	35.1	23	34.6	24	33.4	26.4	32.5	26
12	35.2	22.6	34.8	21.5	34.2	26	32.3	25.6
13	37	24.1	33.6	23	36.5	25.9	33.2	23.3
14	35.7	23.3	35.1	21.5	36.1	25.6	32	23.4
15	36.7	24.5	33.5	23.3	34.3	24.5	29.9	23.3
16	36.7	23.8	32.8	23.2	35.7	24.3	28.9	24
17	35.2	22.2	33.6	23.3	32.6	24	29	23.4
18	35.7	23	34.3	22.3	31.5	23.8	29.8	24.4
19	27	23.1	27.8	23	26.3	23.1	30	23.5
20	34.2	23.3	33.8	24	31.9	24.1	31.1	26
21	34.1	24.5	34.8	24	33.1	25.1	32.1	26.7
22	34.9	26	34.1	23.7	35.6	25.6	31.8	26.2
23	34.2	25.2	33.6	23.1	33.1	25.4	30.5	24.2
24	34.4	24.5	33.8	24.2	31.8	24.6	29	24
25	33.2	25	32.5	23.4	31.3	24.4	30.3	24.5
26	34.4	25.3	34.2	23	30.4	24.4	30.8	25.2
27	34.2	24.5	31.5	23.4	32.2	24.5	29.6	23.8
28	32.7	24.6	33.8	23.3	31.7	24.7	30.6	24.7
29	34.1	23.5	33.5	23.1	32.7	25.3	31.1	23.7
30	34.5	24.5	33.6	22.5	34.3	25.9	31.9	24.3
31	35.2	24.7	33.8	24.3	34.8	25.4	32.3	25.1
Mean	34.8	23.8	33.6	23.3	33.1	24.8	30.8	24.4

SEISMOLOGICAL BULLETIN FOR MAY, 1919.

By REV. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

4, 22^h 1^m 49^{s*} [5, 6^h 1^m 49^s]. **N Luzon and Batanes.** Extensive earthquake of intensity IV-V. Its epicenter apparently lay in the vicinity of Balintang Channel: the greater intensity experienced at Aparri, NE Luzon, than at Santo Domingo, Batan Island, seems to be due to local conditions of the soil. In Batanes Islands there was felt an aftershock on the 5th at 14^h 15^m [22^h 15^m] and a second light shock on the 6th at 12^h 45^m [20^h 45^m] not noticed in northern Luzon, nor recorded at the Observatory.

5, 12^h 25^m [5, 20^h 25^m]. **Irosin (SE Luzon).** Earthquake of intensity V in the region around Bulusan Volcano. The very local character of this sharp and long earthquake, felt only close to the volcano, places the shock among the actual indications of activity of the said volcano.²

6, 19^h 48^m 27^{s*} [7, 3^h 48^m 27^s]. **Butuan (N Mindanao).** Earthquake of intensity II-III. The origin lay far away in the Pacific Ocean: it was recorded through the Far East and in the American Observatories.

15, 18^h 30^m [16, 2^h 30^m]. **Masbate Island.** Earthquake of intensity IV, duration 8 seconds. It was also felt in the western part of Sorsogon Province.

21, 23^h 46^m 19^{s*} [22, 7^h 46^m 19^s]. **E Mindanao.** Earthquake shocks felt with intensity III around Davao Gulf and only II-III through the Agusan Valley. Its origin seems to have been off the SE coast of Mindanao.

24, 5^h 45^m 28^{s*} [24, 13^h 45^m 28^s]. **Camiguin Island. (N of Mindanao).** Earthquake of intensity III, recorded also at Butuan. The epicenter lay probably in the sea W of Camiguin.

25, 11^h 39^m 21^{s*} [25, 19^h 39^m 21^s]. **Samar and Leyte.** Extensive earthquake felt with intensity IV-V through SE Samar, and III in the rest of this island, the Island of Leyte and SE Luzon. Origin in the Philippine Deep.

31, 0^h 19^m 55^{s*} [31, 8^h 19^m 55^s]. **Baguio (W Luzon).** Oscillatory earthquake, intensity III, short duration: originated probably to the NE within the Mountain Province.

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight-0^h), insular time being added in brackets for the convenience of Philippine readers.

² See Bulletin of January, 1919.

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.62$, $\epsilon=2.726$, $\frac{r}{T_0^2}=0.021$;
 A_E : $T_0=6.03$, $\epsilon=2.378$, $\frac{r}{T_0^2}=0.037$. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
155	1	Ir	e	h. m. s.				
			L	1 26 07				
			F	2 30 08				
156	1	I	e	5 19 30				
			F	6 52				
157	1	Iv	eP	13 13 01				
			F	20				
158	1	Ir	e	15 32 36				
			F	16 38				
159	1	Ir	e	21 29				
			F	22 26				
160	2	Iu	e	2 18 53				
			F	4 11				
161	3	IIr	eP	0 58 40				
			S	1 04 00				
			L	07 24				
			M _E	07 39	8		308	
			M _N	07 44	9	159		
162	4	Iv	F	4 04				
			eP	22 01 49				
			L	03 06				
			M _E	03 23	4		60	
163	4	Ir	M _N	03 34	5	64		
			F	28				
			e	22 53 28				
164	6	I	F	23 32				
			e	4 21 10				
165	6	IIIr	e	5 10				
			S?	19 48 27				
166	7	Ir	L?	54 48				
			M _{E1}	58 18				
			M _{N1}	58 25	8		627	
			M _{N2}	58 49	11	583		
			M _{E2}	20 01 08	13	1,036		
			C	01 28	11		760	
			F	23 03 47				
167	7	Ir	C	23 08 45				
			F	45				
168	7	I	e	5 21 00				
			F	6 57 57				
169	7	Iv	F	7 38				
			e	9 25 27				
170	8	I	F	10 04				
			eP	12 16 38				
171	8	I	F	20				
			e	5 52 09				
172	8	I	F	6 22				
			e	10 19 57				
173	9	Iv	F	10 55				
			e	19 07 53				
174	10	Iv	F	19 39				
			e	1 44 32				
175	11	Iv	F	2 03				
			e	13 05 47				
176	11	Iv	F	13 05 21				
			eP	9 26 26				
177	11	Iv	F	9 30				
			eP	13 50 31				
178	11	Iv	F	14 07				
			eP	14 07				

Felt at Aparri (NE Luzon) and Santo Domingo (Batanes Islands).

Felt very feeble at Butuan (N Mindanao).

End overtaken by following earthquake.

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A _N μ	A _E μ	
177	13	I	e F	<i>h. m. s.</i> 14 36 15 20				
178	15	Iv	e F	6 42 7 12				
179	16	IIv	eP S L M _N F	1 02 13 03 51 04 20 06 00 2 08	9	80		
180	16	I	eP F	21 06 37				
181	18	Iv	eP F	7 13 42 18				
182	19	I	e F	4 01 06 5 04				
183	21	Iv	eP F	4 49 37 52				
184	21 22	I	e F	23 46 19 0 04				Felt very feeble at Davao and Butuan (Mindanao Island).
185	22	I	e F	12 03 55				
186	23	I	e F	6 20 28 7 28				
187	23	Iv	eP F	12 54 56 57				
188	23	Iv	eP F	19 19 44 27				
189	24	Iv	(PS) L M _N M _E F	5 45 28 47 27 49 24 49 30 6 16	10 7	23 18		Felt at Mambajao (N Mindanao).
190	25	Iv	eP F	11 39 21 46				Felt at Catbalogan and Guiuan (Samar Island), Tacloban (NE Leyte) and Irosin (SE Luzon).
191	25	Iv	eP F	14 05 30 09				
192	25	Iv	eP F	22 49 26 52				
193	26	Iv	eP F	14 40 13 46				
194	26	Iv	eP F	16 08 04 10				
195	27	Iv	eP F	17 36 38 18 15				
196	28	Iv	eP F	14 35 17 38				
197	29	Iv	eP F	3 33 01 37				
198	29	r	eP S L M _N M _E F	11 05 25 10 42 12 37 14 28 14 44 12 18	10 13	26 28		
199	30	Iv	eP F	4 25 53 29				
200	31	IIv	eP L F	0 19 55 20 27 38				Felt at Baguio. (W Luzon).
201	31	Iv	eP F	16 08 08 31				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

4, 22^h 1^m 49^{s*} [5, 6^h 1^m 49^s]. N de Luzón y Batanes. Extenso temblor de tierra de intensidad IV-V. Su epicentro parece se hallaba cerca del Canal de Balintang; el haberse sentido con más intensidad en Aparri, NE de Luzón, que en Santo Domingo de Batanes puede ser efecto de las condiciones locales. En Batanes se percibió una repetición a 14^h 15^m [22^h 15^m] del 5 y otro temblorcillo a 12^h 45^m [20^h 45^m] del 6 no sentidos al N de Luzón ni registrados en Manila.

5, 12^h 25^m [5, 20^h 25^m]. Irosin (SE de Luzón). Temblor de tierra de intensidad V en la región del volcán Bulusan. Su carácter local, puesto que solo se sintió en las cercanías del volcán, indica que debe considerarse como una de las manifestaciones de la presente actividad de dicho volcán.²

6, 19^h 48^m 27^{s*} [7, 3^h 48^m 27^s]. Butúan (N de Mindanao). Temblor de tierra de intensidad II-III. El origen se hallaba muy lejos en el Pacífico y fué registrado en todo el Extremo Oriente y en América.

15, 18^h 30^m [16, 2^h 30^m]. Isla de Masbate. Temblor de intensidad IV, duración 8 segundos. Sintióse también en la parte W de la Provincia de Sorsogón.

21, 23^h 46^m 19^{s*} [22, 7^h 46^m 19^s]. E de Mindanao. Temblor de tierra sentido con intensidad III en el seno de Dávao y solo II-III en el Valle del Agusan; originado algo lejos en el Pacífico al E de Dávao.

24, 5^h 45^m 28^{s*} [24, 13^h 45^m 28^s]. Camiguín (N de Mindanao). Temblor de tierra de intensidad III. Registrado también en Butúan; su epicentro se hallaba en el mar, probablemente al W de la Isla de Camiguín.

25, 11^h 39^m 21^{s*} [25, 19^h 39^m 21^s]. Sámar y Leyte. Extenso temblor de tierra sentido con intensidad IV-V en la parte SE de Sámar y III en el resto de la Isla, en Leyte y en el extremo SE de Luzón. El epicentro se hallaba en el Abismo de Filipinas en el Pacífico.

31, 0^h 19^m 55^{s*} [31, 8^h 19^m 55^s]. Baguio (W de Luzón). Temblor oscilatorio, intensidad III, duración corta; el origen se hallaba probablemente hacia el NE, dentro de la Provincia Montañosa.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² Véase el Boletín de enero, 1919.

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR JUNE, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1919

BULLETIN FOR JUNE, 1919.



METEOROLOGICAL BULLETIN FOR JUNE, 1919.

BY REV. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month is slightly below the June's normal. The highest pressures were generally observed on the 22nd or 29th, while the lowest were recorded on the 30th in Mindanao and the southern Visayas, and on the 9th and 10th in the northern Visayas and Luzon.

The mean monthly temperature is slightly above that of the preceding year, but almost identical with the normal of June. The absolute maximum and minimum temperatures for Manila were 35.0° C. and 22.9° C.: they were registered on the 1st and 3rd, respectively. The extreme temperatures for Baguio were 25.4° C., 15.7° C. on the top of Mirador, and 26.0° C., 15.1° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR JUNE, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from June, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from June, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
Zamboanga	758.58	+0.16	mm.	760.12	22	757.10	3	26.5	+0.5	°C.	30.5	27,28	21.7	11
Yap, W. Carolines	^a 57.97	-----	-----	^a 59.27	13	^a 55.26	29	^b 27.3	-----	-----	-----	-----	-----	-----
Tagbilaran	57.94	+ .17	-0.08	59.24	22	56.31	30	27.5	+1.2	+0.1	33.6	21	22.8	8
Surigao	57.89	+ .18	- .19	59.02	22	55.91	30	27.1	+ .7	- .1	33	14	23	24
Cebu	58.04	+ .22	- .03	59.23	22	56.32	30	28.2	+ .9	+ .4	33.4	28	22.9	7
Iloilo	57.88	+ .27	- .01	59.20	22	56.27	9	27.6	+ .9	+ .2	33.6	3	21.9	26
Tacloban	57.91	+ .34	- .29	59.07	28	56.05	8	27.4	+ .9	+0	35.1	5	22.5	21
Capiz	57.58	+ .17	- .47	58.87	22	55.47	9	27.7	+1	+ .2	34.9	5	23.3	21,23
Calbayog	57.86	+ .29	- .30	59.13	22	55.51	9	27	+1.3	+ .3	32.4	1	22.8	3,7,9
Legaspi	57.54	+ .14	- .36	59.04	28	53.27	9	28	+1	+ .1	34.5	17	23.6	9
Atimonan	57.19	+ .01	- .46	58.99	29	53.61	9	28.2	+1.3	+ .3	34.6	5	23.2	27
Ambulong, Tanauan	56.88	+ .19	-----	58.93	29	53.15	10	27.9	+ .4	-----	36.1	1	23	11,30
Paracale	57.21	+ .04	-----	59.05	7	53.80	9	28	+1	-----	35.2	17,24	23.7	19
Manila	57.20	+ .10	- .67	59.11	29	52.48	10	27.6	+ .4	- .3	35	1	22.9	3
San Isidro	57.27	+ .01	- .50	59.33	29	53.48	10	27.6	+ .1	- .1	36.2	3	22.4	29
Dagupan	56.22	- .02	- .96	58.43	29	52.21	10	27.9	+ .1	- .1	37	6	22.6	20
Baguio ^c	635.52	+ .23	- .46	637.39	7	632.14	11	18.5	0	- .3	25.4	6	15.7	19,23
Vigan	756.16	- .07	-1.15	758.92	29	751.87	11	28.9	+1	+ .8	35.2	1	23.2	8
Laoag	56.29	+ .20	-----	58.99	29	52.12	10	28.3	+1.1	-----	37.5	10	23.5	26,27
Aparri	56.42	+ .19	- .71	59.01	29	53.24	12	29	+ .5	+ .9	37	12,13	23.3	19

^a 26 days of observation. ^b 21 days of observation. ^c The barometric readings of this station are not reduced to sea level.

Rainfall.—In the great majority of our stations the total rainfall for this month is greater than that of June, 1918, and in a good number of them it is greater also than the normal of this month. In the northern part of Luzon, however, there was rather a lack of rain, almost all the stations giving a monthly total below that of June, 1918, and below the normal. Thus the monthly rainfall for Baguio was only 300.9 mm., an amount which differs from the normal of June by — 90.1 mm. The total rainfall for Manila is 41.0 mm. above that of the preceding year, and 31.0 mm. above the normal.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF JUNE, 1919.

Station.	Total.	Departure from June, 1918.	Departure from normal.	Days of rain.	Departure from June, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from June, 1918.	Departure from normal.	Days of rain.	Departure from June, 1918.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	224.6	+ 66.5	+ 18.2	16	+1	47	29	Legaspi	258.5	-251.3	+ 50.8	17	-3	92.5	26
Malamani	214.1			8		61.7	29	Sumay, Guam	183.8	+ 6.6	+ 45.6	9	-8	68.6	29
Zamboanga	83.7	- 53	- 18.5	13	-6	15.2	29	Calapan	275.9	- 61	+ 30.2	12	-9	106.5	9
Davao	181	- 9.2	- 67.6	15	+2	63.8	2	Virac	223.4	-236.1	- 13.8	14	-6	51.3	24
Cotabato	319.6	-124.7	+ 49.3	21	0	78.5	30	Naga	310.2	-120.4	+107.20	20	-2	86.9	26
Camp Keithley, Lanao	271.4	- 77.5		27	-1	47.7	4	Batangas	343.5	- 14.2	+180.4	12	-1	207.3	9
Butuan	180.8	+ 16.3	+ 13.6	23	-4	41.4	7	Lucena	266.5	+ 22.3		12	-5	136.7	9
Mambajao	184.8	-134.7		12	-2	78.7	7	Atimonan	331.1	+ 31.4	+142.9	16	-2	175.9	9
Dumaguete	108.8	- 72.2		9	-3	35.3	5	Ambulong, Tanauan	256.3	- 64.4		14	-2	87.6	10
Yap, W. Carolines ^a	112.5			19		18.5	30	Canlubang, Calamba	384.4	+123.8		16	0	197.4	10
Tagbilaran	120.7	-110.1	- 42.3	19	0	31.8	8	Paracale	203.3	-212.5	- 11.4	19	-1	52.5	30
Iwahig	109.5	-209.8		18	-3	32.8	21	Santa Cruz, Laguna	238.7	- 50.6	+ 39.1	19	-2	106.2	9
Surigao	123.4	- 58.3	- 2.9	15	-2	23.9	7	Manila	265.7	+ 41	+ 31	21	+4	182.6	10
Maasin	430.3	+203.3	+255.9	11	+3	86.1	8	Antipolo	339.2	- 75.2		19	+2	127.8	10
Cebu	125.7	-177.3	- 54.4	19	-4	22.1	7	Iba	799.3	+250.9	+317.1	22	-4	272.9	10
Iloilo	233.4	-172.8	- 4.8	19	0	87.7	9	San Isidro	220.5	- 73.8	+ 18.8	21	+5	63.2	10
San Jose Buenavista	535.2	+ 31.7	+176.4	21	-7	150.3	9	Tarlac	321.4	+155.4	+ 97.5	23	+3	57.2	10
Cuyo	409.9	+ 53	+117.7	26	+3	72.2	7	Baler	188.4	+ 4.5	- 91.2	15	-5	49.3	10
Ormoc	332.9	- 55.7	+124.7	19	-5	108.2	7	Dagupan	225.6	-165.9	- 72.4	21	-1	54.9	6
Guiuan	336.8	+ 44.8		14	-7	98.3	7	Bolinao	325.5	- 86.8	- 59.4	23	+1	58.4	19
Tacloban	250.6	- 1.8	+ 47.3	13	-8	105.3	8	Baguio	309.1	-425.3	- 90.1	29	+3	49	20
Capiz	128.4	- 33	-142.5	15	-6	24.2	8	San Fernando, Union b	170.5						
Borongan	326.5	+ 94.7	+ 66.8	18	-2	117.6	8	Echague	139.2	+ 75.3	+ 36.1	13	+5	50.8	3
Catbalogan	562.1	+144.1		18	-3	315.4	8	Candon	247.8	-271.6	- 65.8	16	-3	120.9	30
Calbayog	369.5	- 52.4	+151.1	21	-4	169.7	8	Vigan	201.4	-377.9	- 94.6	15	-7	66.3	20
Maabate	302.1	- 80.2	+156.1	14	0	205.2	8	Laosag	295.9	-412.3	- 3.9	18	-3	65	20
Romblon	413.4	+ 74.3	+183.2	19	-5	147.6	10	Aparri	63.8	-287.2	- 65.7	12	+2	23.1	26
Batag	245.4	-143.2		15	-3	96.7	8	Cape Bojeador	185.2	- 86.9		13	+2	70.6	27
Sorsogon	333.8	- 84.9		12	-8	165	8	Santo Domingo, Batanes	32.4	-118.5	-120.9	9	-2	19.8	12

^a 26 days of observation only.

^b 27 days of observation.

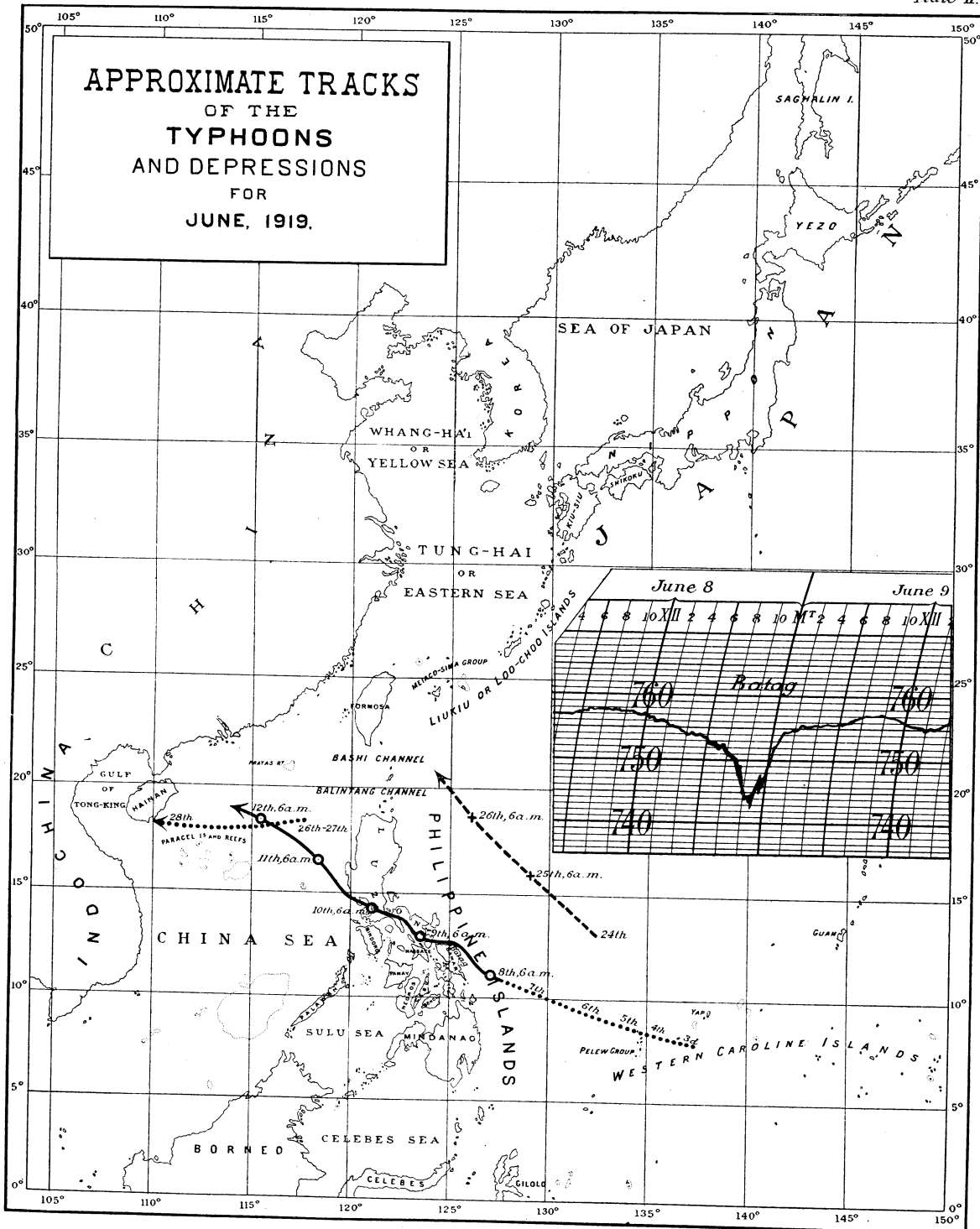
DEPRESSIONS AND TYPHOONS.

Only one typhoon crossed the Philippine Islands during this month. We shall presently say a few words on its track. Besides this, there was another depression or typhoon of little importance which moved NW over the Pacific to the east of Luzon, on the 24th to 26th, and filled up probably to the east of Balintang Channel. Simultaneously another depression seems to have formed over the China Sea on the 26th, moving probably westward north of Paracels, and filling up on the 28th near Hainan.

The "Vicentica" typhoon.—We call this typhoon the *Vicentica* typhoon because it caused the complete wreck of a small steamer bearing this name, off the western coast of Sorsogon. Although the observations from Yap gave slight indications of a depression or typhoon to the south and southwest on the 3rd and 4th, yet the track of this typhoon can be given only as probable up to the 8th when it began to influence clearly the barometers of the Philippines. The center of the typhoon was situated at 6 a. m. of that day to the E of Samar, in about 127° longitude E and 11° latitude N moving WNW.

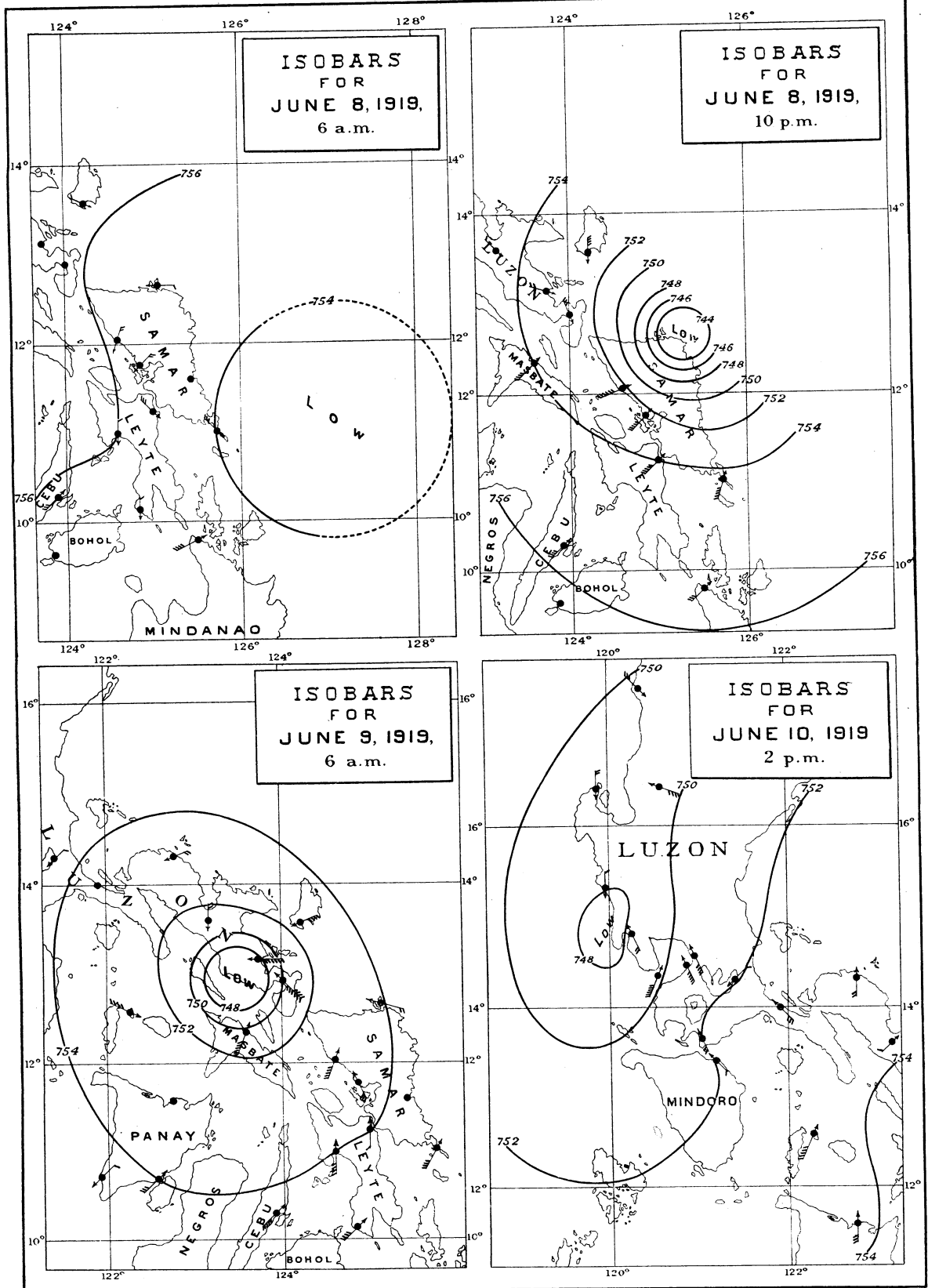
This typhoon was rather a small typhoon and changed its direction three or four times while in or near the Philippines. On the 8th it inclined northward moving NW in the afternoon of that day until 10 p. m., when it began to move almost due west. From 6 a. m. until 2 p. m. of the 9th it moved again northwestward; then it took an WNW direction until 2 p. m. of the 10th, when it moved for the third time northwestward in the China Sea west of Luzon.

The typhoon was quite intense when it traversed the province of Sorsogon in the early morning of the 29th; but it decreased in intensity later, so that there were hardly any destructive effects in Manila or in Cavite, although the cyclonic center passed a very few miles from both places. The lowest barometric minima recorded during this typhoon were those of Batag and Sorsogon. That of Batag was 742.5 mm. at 10.50 p. m. of the 8th. The minimum of Sorsogon was 741.22 mm. or possibly lower. We say that



ISOBARS FOR THE TYPHOON OF JUNE, 1919.

Plate III.



N.B.-The barometric readings have been reduced to standard gravity.

it was possibly lower, because no observation was made from 2 to 3.30 a. m. when the above mentioned reading was taken with winds blowing with hurricane force from ENE.

Other less important barometric minima were as follows: Atimonan, 747 mm., 10th, 1 a. m.; Naga, 747.6 mm., 9th, noon; Legaspi, 748.6 mm., 8th, 3.15 a. m.; Manila, 749.3 mm., 10th, 9 a. m.

The following are the typhoon warnings sent by Manila Observatory on this typhoon:

June 8, 11.50 a. m.: There is a small depression or typhoon to the east of the Visayas; its actual direction cannot yet be ascertained.

June 8, 5.45 p. m.: The Pacific typhoon is situated this afternoon near Samar moving probably NW or NNW.

June 9, 8.30 a. m.: The typhoon seems to have inclined westward since yesterday evening. Its center was probably situated at 6 a. m. to-day in the neighborhood of southeastern Luzon.

June 9, 6 p. m.: The typhoon seems to be situated this afternoon over the southernmost part of Luzon to the southeast of Atimonan; it has been moving since 6 a. m. W by N.

June 10, 6 a. m.: The small typhoon is probably situated at present about 40 miles to the SE of Manila, crossing the southern part of Laguna Province moving W by N or WNW.

June 10, 8 a. m.: The typhoon is probably situated in the neighborhood of Laguna Province and may pass near Manila this morning.

June 10, 9.30 a. m.: It seems that the small typhoon has just passed between Cavite and Manila. Its center appears to be somewhat deformed and its track may be inclining again northward.

June 10, 11.30 a. m.: The small typhoon is now in the Manila Bay moving apparently NW by W or WNW, it having inclined again somewhat to the N since yesterday.

June 11, 11.50 a. m.: The small typhoon seemed to be situated at 6 a. m. to-day in the China Sea about 100 miles to the west of Bolinao; it has probably inclined somewhat more to the north since yesterday afternoon.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes es ligeramente menor que la normal de junio. Las presiones más altas se observaron generalmente el día 22 o el 29, mientras que las más bajas se registraron el día 30 en Mindanao y en el S de Visayas, y los días 9 y 10 en el N de Visayas y en Luzón.

La temperatura media de este mes es ligeramente mayor que la del año pasado, pero casi igual a la normal de junio. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 35.0° C. y 22.9° C., las cuales se registraron los días 1 y 3, respectivamente. Las temperaturas extremas de Baguio fueron 25.4° C., 15.7° C. en la cumbre del Mirador, y 26.0° C., 15.1° C. en el valle.

Precipitación acuosa.—En la gran mayoría de nuestras estaciones la lluvia total de este mes supera a la de junio de 1918, y en buen número de ellas supera también a la normal de este mes. En la parte septentrional de Luzón, sin embargo, hubo más bien escasez de lluvia, habiendo registrado casi todas las estaciones un total mensual menor que el de junio de 1918, y menor también que la normal de este mes. Así la lluvia total del mes en Baguio fué sólo 300.9 mm., cantidad que difiere de la normal de junio en — 90.1 mm. La lluvia total del mes en Manila es mayor que la del año pasado en 41.0 mm., y mayor también que la normal en 31.0 mm.

DEPRESIONES Y TIFONES.

Durante este mes un solo tifón cruzó las Islas Filipinas. En los siguientes párrafos diremos unas cuantas palabras sobre su trayectoria. Además de este tifón, hubo una depresión o tifón de poca importancia que se movió al NW en el Pacífico al E de Luzón del 24 al 26, y se deshizo probablemente al E del Canal de Balintang. Simultáneamente parece haberse formado otra depresión en el Mar de China el día 26, moviéndose probablemente al W por el N de Paracels, y deshaciéndose el día 28 cerca de Hainán.

El tifón del "Vicentica."—Llamamos a este tifón el tifón del *Vicentica*, por haber causado el total naufragio de un pequeño barco de este nombre, cerca de la costa occidental de Sorsogón. Aunque las observaciones de Yap dan ligeras indicaciones sobre una depresión o tifón situado al S o SW de dicha estación los días 3 y 4, con todo, sólo puede darse como probable la trayectoria de este tifón hasta el día 8 en que empezó a influir claramente en los barómetros de Filipinas. El centro de este tifón se hallaba a las 6 a. m. de dicho día al E de Sámar, en los alrededores de 127° longitud E y 11° latitud N, moviéndose al WNW.

Este fué más bien un tifón de pequeñas dimensiones y cambió su trayectoria tres o cuatro veces mientras se hallaba en, o cerca de, Filipinas. El día 8 se inclinó al N, moviéndose al NW la tarde de aquel día hasta 10 p. m., cuando empezó a dirigirse casi directamente al W. Desde 6 a. m. hasta 2 p. m. del día 9 se movió de nuevo al NW; luego se dirigió al WNW hasta 2 p. m. del día 10, cuando por tercera vez se movió al NW en el Mar de China al W de Luzón.

El tifón era bastante intenso mientras atravesaba la Provincia de Sorsogón la madrugada del día 9; pero disminuyó luego en intensidad, y así apenas produjo efectos destructores en Manila o en Cavite, aun cuando el centro ciclónico pasó a muy pocas millas de ambos lugares. Las mínimas barométricas más bajas registradas durante el paso de este tifón fueron las de Batag y Sorsogón. La de Batag fué 742.5 mm. y tuvo lugar a las 10.50 p. m. del día 8. La mínima barométrica de Sorsogón fué 741.22 mm., y probablemente aún más baja. Decimos que probablemente fué aún más baja, porque ninguna observación se hizo desde 2 hasta 3.30 a. m. en que se tomó la lectura arriba mencionada con vientos que soplaban con fuerza huracanada del ENE.

Otras mínimas barométricas de menos importancia son como siguen: Atimonan,

747 mm., a 1 a. m. del día 10; Naga, 747.6 mm., a mediodía del 9; Legaspi, 748.6 mm., a 3.15 a. m. del 8; Manila, 749.3 mm. a 9 a. m. del día 10.

Sobre este temporal el Observatorio de Manila expidió los siguientes avisos de tifón:

Junio 8, 11.50 a. m.: Existe una pequeña depresión o tifón al E de Visayas; su dirección actual no se puede aún precisar.

Junio 8, 5.45 p. m.: El tifón del Pacífico se halla esta tarde cerca de Sámar, moviéndose probablemente al NW o NNW.

Junio 9, 8.30 a. m.: El tifón parece haberse inclinado hacia el W desde ayer noche. Su centro se hallaba probablemente a las 6 a. m. de hoy en los alrededores del SE de Luzón.

Junio 9, 6 p. m.: El tifón parece hallarse esta tarde en el extremo S de Luzón al SE de Atimonan; se ha movido desde 6 a. m. al W $\frac{1}{4}$ NW.

Junio 10, 6 a. m.: El pequeño tifón se halla probablemente a unas 40 millas al SE de Manila, atravesando la parte meridional de la Provincia de La Laguna, moviéndose al W $\frac{1}{4}$ NW o WNW.

Junio 10, 8 a. m.: El tifón se halla probablemente en los alrededores de la Provincia de La Laguna y es posible que pase cerca de Manila esta mañana.

Junio 10, 9.30 a. m.: Parece que el pequeño tifón acaba de pasar entre Cavite y Manila. Su centro aparece algo deformado y es posible que su trayectoria se esté inclinando de nuevo hacia el N.

Junio 10, 11.30 a. m.: El pequeño tifón se halla ahora en la bahía de Manila, moviéndose aparentemente al NW $\frac{1}{4}$ W o WNW, habiéndose inclinado ligeramente de nuevo al N desde ayer.

Junio 11, 11.50 a. m.: El pequeño tifón se hallaba probablemente a las 6 a. m. de hoy en el Mar China a unas 100 millas al W de Bolinao; parece que se ha inclinado algo más al N desde ayer tarde.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[$\phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. ^b			
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a.m.	8 a.m.				
1	758.43	28.8	35	25.2	30.8	32.5	31.5	31.9	31	29.5	75.6	22.1	23.3	53.4	4.3	3
2	57.54	28.3	33.9	24.7	30.5	32.5	31.5	31.9	30.9	29.5	78.1	22.1	22.3	54.3	3.5	2.3
3	57.15	27.9	34.6	22.9	30.8	32.8	31.6	32	30.9	29.5	78.5	21.6	22.1	55.7	3.6	2.3
4	57.06	28.6	34.1	23	30.7	32.4	31.5	31.9	31	29.5	77	22	20.9	52	4.8	3
5	57.98	29	34.7	25.6	31.5	33.3	31.7	32.5	31.1	29.6	78.6	22.9	24	55.1	3.9	2.4
6	58.44	28.7	34.6	25.1	31.2	33.2	31.8	32.2	31	29.5	80.7	23.3	23.8	53	3.9	2.4
7	58.63	28.8	34.2	25.1	31.5	33.5	31.8	32.8	31	29.5	78.7	22.8	24	53.5	3.8	2.3
8	57.90	27.5	32.6	25.2	31.3	33.2	32.2	32.3	31	29.5	83.1	22.4	23.5	50.8	2	1.8
9	55.32	26.3	28.8	24.6	30.3	30.8	31.5	31.7	30.8	29.4	89.1	22.6	23.7	36.2	.6	1.2
10	52.48	24.8	26	23.6	29	26.6	31	29	30.8	29.4	94.6	22	23.8	30.5	0	.3
11	55.08	25.2	27.6	23.3	27	27.7	28.6	28.7	30.6	29.5	92.7	22	22.8	38.6	.6	.6
12	55.52	27.5	31.4	24.2	28.2	29.2	28.7	28.9	30.8	29.5	84	22.8	23.4	50.6	2.7	1.8
13	56.26	28	33.2	23.9	28.8	30.1	28.9	29.4	30.7	29.5	82.4	22.9	22.4	54.7	3.9	2.3
14	56.62	28.2	32	24.5	29.4	30.5	29.6	29.7	30.5	29.5	80.4	22.8	23.1	50.7	3.9	2.7
15	57.35	27.8	31.7	25.5	29.5	30.8	29.7	30.1	30.5	29.5	82.5	22.8	24.1	54	3	2.1
16	58.15	27.4	30.6	25.1	29.5	30.7	30	30.2	30.5	29.5	82.4	22.2	24	51.7	3.2	2
17	58.03	28.1	32.2	24.2	30	31.2	30.2	30.6	30.6	29.7	81.5	22.9	22.6	52	4.1	2.6
18	57.51	27.8	32.5	24.8	30.3	31.8	30.5	30.7	30.7	29.8	81.7	22.5	23.3	53.1	3.6	2.2
19	56.88	27.3	31.7	24.8	30.4	32	30.6	31	30.3	29.6	84.9	22.7	24	50.6	2.7	1.7
20	57.21	27.2	30.5	24.5	30	31.2	30.6	30.8	30.3	29.5	83.5	22.2	23.5	46.2	2.9	1.9
21	58.25	27.8	31.5	23.8	29.8	31.6	30.5	31	30.5	29.7	78.5	21.6	22.5	50.2	4.5	2.9
22	58.67	27.7	32.1	24.3	30.5	31.8	30.7	31	30.5	29.7	81.4	22.2	23.6	53	3.6	2.2
23	58.26	28.5	32.3	24.5	30.2	32.2	30.7	31.2	30.4	29.7	80.7	23.2	23	52	4.9	2.7
24	57.87	28.6	32.2	25.2	31.2	32.2	31.2	31.3	30.5	29.7	81.3	23.6	24	54.8	4.3	2.4
25	56.77	28	31.1	25	30.7	32.2	31	31.4	30.5	29.7	81.9	22.8	24.1	52	4.1	2.3
26	55.58	25.8	29	24.4	30.5	30.1	31.1	30.5	30.5	29.6	89.2	22	23.9	41.2	.5	.9
27	56.50	27.5	32.8	23.3	29.6	31.5	30.6	31	30.5	29.6	81.3	22	22.2	54.4	3	2.1
28	58.67	28.4	33.9	23.4	30.2	32.2	30.7	31.1	30.6	29.8	77.1	21.9	22	54.3	4.4	2.7
29	59.11	27.3	32.6	23.6	30.6	31.8	30.9	31.3	30.5	29.6	84.1	22.5	22.8	51.3	2.9	2.2
30	56.86	26.5	31.4	23.3	30.5	31.5	31	31.3	30.6	29.7	86	22	21.6	54.5	2.4	1.7
Mean	757.20	27.6	32	24.4	30.2	31.4	30.7	31	30.7	29.6	82.4	22.4	23.1	50.5	3.2	2.1
Total														95.6		63
Departure from normal	-0.67	-0.3	-0.5	+0.5							+1.5	+0.1			-14.9	

Day.	Wind.				Amount (mean).	Clouds.				Sunshine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.
	Prevailing direction.	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.					On the tower.	In the park.	
						Upper.	Lower.	h. m.	mm.				
1	ESE	144.5	17	ESE	5.8	A.-Cu.	SE	Cu.	E	4	50		
2	NNE, NE	114	15.5	NE	7.1	Ci.-S.		Cu.	E by N	3	50		T p.
3	NE quad.	172.5	26	NNW	3.7	Ci.-S., A.-Cu.		Cu.	ENE	8	20	17.3	18.3
4	W quad.	176.5	19	SW	2.8	Ci.		Cu.		10	05		
5	SW quad.	192.5	19	SW	4.9	Ci.		Cu.	ESE	7	55	4.8	5.1
6	NE	123	12	WNW, W	4.8	Ci.		Cu.	E	8	00		
7	E quad.	129.5	12	WNW	6.6	A.-Cu., Ci.-Cu.	E	Cu.	ESE	8	00	.3	.5
8	NE quad.	128	12	ESE	8.4	A.-Cu.	ESE	Cu.	E	2	30	5.1	4.6
9	NNW	202	19.5	NNW	10	Ci.-S.		N.	NNE	0	00	9.2	8.4
10	SE	512	42.5	NW by N	10			N.	variable	0	00	182.6	208.2
11	SE, SSE	168	14	S	10	Ci.-S.		S.-Cu.	SW	0	00	10	9.9
12	SE, WSW	175	17	SSW, S	7.4	Ci.-S.	NNW	Cu.	SSW	1	35		
13	S quad.	188	30	SW	6.8	Ci., A.-Cu.		Cu.	SSE, S	7	35		
14	SW quad.	271.5	28	WSW	5.7	Cu.		Cu.	WSW	7	10	1.8	2
15	SW	323.5	33.5	SW	8.1	Ci.	S.	cu., cu.-n.sw		5	20	2	2.4
16	WNW	217.5	38	WSW	8.6	Ci.-S.		Cu.	WSW	3	15		.1
17	SW	337.5	32	WSW	4.2	Ci.-Cu.		Cu.	WSW	8	50	1.3	1.5
18	WSW	257	30	WSW	6.7	A.-Cu.	W	Cu.	WSW	7	05	1.7	1.8
19	SW	269	32.5	WSW	6.1	A.-Cu.	W	Cu.	SW	5	45	2.3	2.4
20	SW	224	22	SW	9.1	A.-Cu.	W	N., Cu.	WSW	0	45	.3	.1
21	WSW	366	27	WSW	3.8	A.-Cu.	W	Cu.	SW	8	10	5.2	5.6
22	E, SW	275	35	WSW	6.5	A.-Cu. W.	WNW	Cu.	WSW	7	50	.3	.4
23	WSW	382	30	WSW	5.4	Ci.		Cu.	W	7	20		
24	SW	381	28	WSW	5.5	Ci.	E	Cu.	WSW	8	00	3.6	3.6
25	WSW	387.5	29	SW	6.9	Ci.	ENE	Cu.	W	7	35	.8	.8
26	SW	290.5	33	SW	9.9	Ci.-S.		Cu.-N.	WSW	0	00	7.6	8.1
27	SE	194	20.5	WSW	5.8	A.-Cu.	S	Cu.	SSW	7	05	2.9	4.1
28	E quad.	199	18.5	W by S	2.8	Ci.		Cu.	ESE	9	50	2	2.3
29	W quad.	184	23	ENE	4.5	A.-Cu.	E	Cu.	E	7	30	4.6	5.2
30	N quad.	157	20.5	NW	6.2	Ci., Ci.-S.		Cu.	N	4	50		
Mean		238	24.5		6.5					5	38		
Total		7,141.5								189	00	265.7	295.4
Departure from normal		+409			-0.5					-1	51	+31	

^a All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.^a

[$\phi=16^{\circ} 25' N$; $\lambda=120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pres- sure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation.		
		Mean.	Maxi- mum.	Hour.	Mini- mum.	Hour.	Maxi- mum.	Hour.	Mini- mum.			Hour.	Mini- mum on grass.	Maxi- mum in sun. Black bulb in va- cuo. ^c	Free ex- posure (total)	Shel- ter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	637.18	19.9	25.3	2.00p.	16.7	4.00a.	26	1.25p.	16.7	5.45a.	86	14.7	14.6	3.1	2.2	
2	36.31	18.9	24.3	0.40p.	17	5.50a.	24.9	11.00a.	16.9	4.10a.	90.5	14.7	15.8	1.4	1	
3	35.89	18.6	24.4	0.50p.	16.7	4.00a.	24.1	0.20p.	16.6	5.30a.	91.8	14.6	15.4	56.1	1.3	
4	35.71	19.1	24.6	0.25p.	16.6	5.30a.	24.3	0.20p.	15.8	5.20a.	85.5	14	14.2	57.8	2.3	
5	36.54	20	25.1	0.40p.	16.9	2.25a.	24.9	10.50a.	16.7	5.40a.	87.2	15.1	15	61.7	1.9	
6	37.16	20.4	25.4	2.50p.	16.8	2.30a.	25.5	11.20a.	17.2	4.00a.	88.5	15.6	15.3	59.5	2.2	
7	37.39	19.1	23.3	0.05p.	17.6	6.00a.	24.4	1.40p.	17.1	3.40a.	92.3	15.2	15.7	59.8	.8	
8	36.50	19	22.9	1.05p.	16.4	5.30a.	24.8	10.10a.	16.2	5.55a.	92.2	15	14.2	57.7	.9	
9	34.48	19.6	22.9	10.30a.	17	5.10a.	23.8	10.25a.	16.2	5.25a.	85.5	14.5	14.5	54.9	1.9	
10	32.46	19.2	23	11.55a.	16	12m.n.	24.4	1.05p.	16.8	12 m.n.	85.7	14	16	54.1	4.6	
11	32.14	17	17.9	1.10p.	16	0.05a.	19	11.20a.	16.8	0.05a.	97.7	14.1	16	30.8	0	
12	33.63	17.9	20.9	1.50p.	16.4	6.00a.	21.9	2.00p.	16.7	5.30a.	91.8	14	16.3	50.2	1.5	
13	34.51	18.7	22.4	1.45p.	16.8	5.50a.	23.4	2.35p.	17.1	6.00a.	90.3	14.4	16.3	54.9	2.5	
14	34.56	18.5	21.3	11.00a.	16.8	5.30a.	21.8	11.00a.	17.3	4.50a.	93.7	14.8	16.3	56.1	.6	
15	35.28	18	22	11.30a.	16.3	11.20p.	22.6	11.20a.	16.1	11.20p.	96	14.7	16.5	53.8	.4	
16	35.93	17.2	19.7	11.20a.	16	9.20p.	20.8	11.05a.	16.8	9.20p.	95.8	14	15.2	45.5	.8	
17	36.03	18.1	23.6	2.20p.	15.8	2.40a.	23.6	2.00p.	16.3	2.40a.	90.7	13.9	14	54.5	1.4	
18	35.65	17.7	22.8	11.00a.	15.8	10.10p.	22.9	10.55a.	15.3	4.20a.	94.8	14.3	13.6	61.4	.4	
19	35.18	17.9	23.3	9.05a.	15.7	2.35a.	23.4	0.50p.	15.5	5.50a.	93.8	14.3	14.6	59	1	
20	35.22	17.8	22.2	8.20a.	16.1	1.50a.	23.3	9.05a.	15.6	4.50a.	94.3	14.3	14.3	55	.8	
21	35.95	18.7	23	2.05p.	15.9	4.30a.	23.4	0.55p.	16	5.00a.	87.5	14	15.2	58	2.3	
22	36.71	18.2	23.2	0.20p.	15.8	2.40a.	23.4	0.25p.	15.5	5.30a.	90.2	14.1	13.8	57.7	1.5	
23	36.46	18.2	22.8	11.30a.	15.7	5.00a.	23	0.30p.	15.1	2.40a.	91.7	14.2	13.6	56	1.3	
24	36.21	18.2	23.7	0.25p.	15.8	6.00a.	23.2	2.20p.	15.5	5.05a.	89.7	13.9	13.8	61	1.6	
25	35.13	18	22.8	11.15a.	16.2	2.20a.	23.4	10.10a.	15.9	4.35a.	93.3	14.4	15	59	1.2	
26	33.66	18	23.1	0.55p.	16	4.20a.	23.4	0.40p.	15.6	4.30a.	94.3	14.4	14.7	57.2	.9	
27	34.29	17.8	21.4	1.55p.	16.1	6.00a.	22.9	2.00p.	16.7	5.00a.	91.5	13.8	15.7	53.4	3.3	
28	36.71	19	24	3.05p.	15.9	1.10a.	24.4	-----	15.9	4.20a.	83	13.4	15	54.7	4.6	
29	37.33	18.6	24.9	1.55p.	16.7	6.00a.	25	1.55p.	17.4	6.00a.	91.2	14.6	15.7	60.9	1.4	
30	35.42	18.5	23.8	0.20p.	16.2	5.40a.	24.5	1.00p.	16.6	6.25a.	90.8	14.4	15.2	60.1	1.3	
Mean	635.52	18.5	23	-----	16.3	-----	23.5	-----	16.3	-----	90.9	14.4	15	55.9	1.6	
Total	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	49.2	28

Day.	Wind.				Clouds.		Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.	
	Prevailing direction. ^d	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.	Form and direction.					
					Upper.	Lower.				
		Km.	Km.		Amount (mean).					
1	E	355.5	22.2	SE, W	0-10.	Ci.	Cu. SE quad.	h. m.	mm.	≡ 2 1/4 0 0 0 0 p.
2	E quad.	281.1	20.3	SW	6.9	Ci.	Cu., N.	4 10	1.6	≡ 2 1/4 0 0 0 0 p.
3	W quad.	222.5	23.9	W	6.9	Ci.	Cu.-N. E	3 45	19.2	≡ 2 1/4 0 0 0 0 p.
4	W	243.6	24.4	W	6.1	A.-Cu.	Cu. S, WSW	4 55	-----	d 0 1/4 0 0 0 0 p.
5	W	262.5	22.7	W	6.6	Ci.	Cu. E, SE	4 10	11.9	0 a. ≡ 1 1/4 0 0 0 0 p.
6	E, W	224.5	19.9	W	5.1	Ci.	Cu.-N. S	6 00	5	≡ 1 1/4 d p.
7	W, E	246.7	19	W	9.3	-----	Cu.-N.	1 55	25.9	≡ 2 a. 1 1/4 0 0 p.
8	E quad.	264.8	20.4	W	6.9	-----	Cu.-N.	1 50	3.1	≡ 2 1/4 0 0 0 0 p.
9	W	250.7	20.1	W	6.3	Ci.	Cu.-N. ENE, NE	2 55	12.5	d 0 a. 0 1/4 0 0 p.
10	E	639.4	63.3	SE	8.1	Ci.-S.	Cu.-N. ESE	1 25	15.3	d 1/4 0 a. 0 0 0 0 p.
11	SE	622.1	57.9	SE	10	-----	Cu.-N. SSE	0 00	17.2	1/4 0 a. ≡ 2 a. p. d ² p.
12	SE	448.9	22	NE	8.7	A.-Cu.	Cu.-N. S	1 05	5.4	0 0 a. p. 0 0 0 0 p.
13	SE	481	29.8	E	5.6	Ci.	Cu.-N. SSE	5 25	5.5	d a. 0 1/4 0 0 p.
14	SE	382.8	24.9	E	7.7	Ci.	Cu.-N. SSE, SW	2 40	4.6	d 0 a. 0 1/4 0 0 p.
15	S quad.	429.4	35.7	SW	10	-----	N.	2 00	5.2	0 0 a. 0 1/4 0 0 p.
16	SW quad.	413.2	41.2	SW	9.7	Ci.-S.	N.	0 00	9	0 0 a. ≡ 2 d ² p.
17	W, SW	402	31.2	SW	7	Ci.	Cu.-N. WSW	2 40	14	0 0 a. ≡ 2 p.
18	W	321.6	32.8	W	9.9	A.-Cu.	Cu.-N. wsw, sw	1 50	29.7	0 0 a. p. 1 1/4 0 0 p.
19	NW quad.	295.6	24.6	W	5.9	Ci.	Cu. ENE	4 40	7.5	d a. ≡ 2 1/4 0 0 p.
20	Variable	218.6	23.6	W	6.9	A.-Cu.	Cu.-N.	2 25	49	≡ 2 p.
21	SE quad.	322.8	36.8	SW	5.7	-----	Cu. SSE	4 55	12.5	≡ 2 p.
22	W	364.6	30.6	W	5.3	Ci.	Cu. SW	5 20	5.1	≡ 2 p.
23	W	414.9	27.7	W	7.1	Ci.	N.	3 15	1.3	d 0 a. 0 0 0 0 p.
24	W	341.7	26.2	W	6.4	Ci.	Cu. WSW	4 35	4.1	≡ 2 p.
25	SW quad.	308.1	25.1	W	7.1	Ci.	Cu.-N. SE	3 10	1.3	≡ 2 a. p. 0 0 p.
26	SE, W	227.1	20.3	W	7.4	Ci.	Cu.-N. NNE	1 55	5.4	≡ 2 a. p. 0 0 p.
27	SE	549.5	36.5	SE	7.6	Ci.-S	Cu.-N. SE	3 45	5	≡ 2 d 0 a. 1/4 0 0 0 0 p.
28	SE	401.8	35.2	SE	1.7	Ci.	Cu. SSE, S	8 40	2.3	0 0 p.
29	Variable	274.9	31.1	W	7.9	-----	Cu. N, ENE	4 15	8.4	≡ 2 a. ≡ 2 1/4 0 0 0 0 p.
30	W quad.	246.6	23.6	W	6.6	Ci.	Cu.-N. ENE, WNW	5 05	20.2	≡ 2 1/4 p.
Mean	-----	348.6	29.1	-----	7	-----	-----	3 28	-----	-----
Total	-----	10,458.5	-----	-----	-----	-----	-----	104 00	309.1	-----

^a All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
^b The barometric readings of this station are not reduced to sea level.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
^d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, JUNE, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Jolo	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Port Lebak, Cotabato	10.7	11.2	25.4	15.7	2.8	0.3	4.1	21.8	13	16.3	32	0.3	82.8	6.1	9.1	
La Union, Davao ^a	8.8	2.3	15	7.6	1	14.2	18.1	3.3	2.8	14.2	33.5	98.6	12.4			
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a		11.2	5.3		5.8		1.5	31.7	5.6	2						
Basilan Plantation, Isabela, Basilan, Office ^a			21.1	6.9		5.3	4.6	5.6	41.4		2.5					
Parang-Lalap, Isabela, Basilan ^a	1		2.5	6.1		46.8			25.4		6.4					
Latuan, Isabela, Basilan ^a	.8		4.1	5.1		48			16.8	1.8	.5					
Malamau, Zamboanga			18.8			27.9			24.9							
Cuabo, Davao		5	4.8	14.2		2.8	7.6		15.2	13.5	9.7		5.1	10.2	7.9	
Zamboanga		9.9	3.3	1			8.3		12.2		8.4				.3	
Fort Pikit, Cotabato		3.3	8.6	9.1		7.1	5.3		9.9	1	.5	23.4			44.4	
Davao	4.3	63.8	1.8	1.8					5.1	2.5	2.8		6.1	3.6	4.6	
Strib Guianga, Davao ^a								30.7	1.5						31.5	
Cotabato	21.3	26.7		25.9	7.6	4.1	10.7	25.4	29.8			16.8			9.7	
Bual, Cotabato	10.9	33.5	128.3				58.2	6.4	3			1.5			9.1	
Naga-Naga, Zamboanga	1	5.6	4.8	1.8	2.5	8	37.1	14.7	8	21.6	17.5	42.7	5.1		2.8	
Malabang, Lanao	1	33.5		10.7	8.9	8	147.1	68.6	50.3	2.6	14.7	50.8			60.9	
Malangas, Zamboanga ^a	2.5	16.5	1.8	19	7.9	1.5	80	16.5	19.1	60.2	3.9	28.4			7.1	16.3
Lumbatan, Lanao ^a	.3	50.8	4.1	25.4	36.3	10.2		6.4	27.9		3.8	1	19		2.5	
Ganassi, Lanao	4.3	6.4	33.6	6.1	74.9	4.1	12	22.4	45.2	3.8	2.8	6.9	.5		6.6	1.3
Moncayo, Davao ^a		39.4			9.4	19	47		7.6		19				6.4	10.2
Camp Kalaw, Moncayo, Davao		32.5	3			14.5	28.4		6.9			17.8	3.6		2.5	11.2
Mailag Agricultural School, Bukidnon	.3		45.5	7.1	11.7	2.5	25.4		8		2.5	5.1	3.6	30	57.9	.5
Camp Keithley, Lanao	12.2	40.9	12	47.7	34.8	1.8	3.3	3.6	17.8	1.5		4	3.8	15.9	4.8	.1
Pantar, Lanao ^a		3.3	12.7			1	19		3.5		15				6.4	
Veruela, Agusan	5.6	5.1		7.6	9.4	24.2	6.1		2		13	13.2	20.1	5.1	17	
Sumilao, Agusan	20.6	3	19.6	25.4	18.8	27.9	9.1		2.5	24.9	5.1	7.1	2.6	3.3	4.1	
Diklom, Bukidnon ^a		1	18.3	4.6	6.1	12.7	10.2			1.5	15.7	23.1		1.5	1.5	
Talacogon, Agusan	3.6		6.1	17	13.5	15.2	13.7	.3	15	17.8	3.6	8.1		33.8		
Butuan	4.4	17.5	.6	12.4	2.1	3.6	41.4	1.5	33	3	8	3.8		1	.5	
Mambajao				1.8		4.6	78.7		12.9		4.8	8	3.3			
Dumaguete		17.5			35.3	17.5		3.6	7.1		4.8	4.3				
Hacienda San Jose, Tanhai, Bais, (Sur) Oriental Negros ^a					22.9	7.6		7.6	25.4	10.2						50.8
Palanas, Bais, (Centro) Oriental Negros ^a				5.1	53.3											5.1
Hacienda Tamogon, Bais, (Norte) Oriental Negros ^a			7.6				73.7		8.9	24.1	59.7					
Yap, Western Carolines	7.4	.3	12.2	13.9	14.5	.3	8.1	5.8	1	5.4		4.3	.5		(*)	(*)
Tagbilaran		3.3	1		20.1	11.3	31.8	.3	3.8	.5	.3	1	.2			
Iwahig				1.5		.5	5.8	4.3	3	4.1	18.3	.3	.3	.8		
Surigao	23.4	.8		.5	.3	3.4	23.9	23.2			3.8	1.5				
Biaong Cui's Farm, Barili, Cebu	.8		9.1		27.7	6.1	9.1	7.9	15	1						
Maasin		12.2			16.5	15.2	62.5	86.1							.8	1.8
Cebu				2.8	6.1	2.3	22.1	11.2		18.8	5.3					
Hacienda Vallehermoso, Oriental Negros ^a							8.9		31.2							
La Carlota, Occidental Negros ^a		7.4	9.4		3.8	23.9	6.6	16.8	39.9	1	1.8	1	4.3		1.3	
Hacienda San Antonio, Occidental Negros ^a					30.5				35.6							
Hacienda San Carlos, Occidental Negros ^a			39.6	2.5	4.3	26.4	5.6	12.4	1.5	.8						
Hacienda Refugio, Occidental Negros ^a			7.6		5.8	34.8	10.7	9.1								
Murcia, Occidental Negros					4.3	19.6	10.4	15.2	68.6	1.8						8.1
Iloilo			9.1		4.3	3.1	15.2	35	87.7	2.5	10.3	1.8	1.3	1.3	.3	8.6
San Jose Buenavista					27.9	6.3	31.8	150.3	33.5	20.1	22.4	.3	3.6	1.3	1.6	
Cuyo				1	46.8	3.3	72.2	3.8	9.7	16.8	16.5	6.3	3.8	3.6	4.6	.5
Lucena, Iloilo ^a				5.1	22.9			57.1	81.3	19						
Cadiz, Occidental Negros	21.1				1.5	9.1	36.1	26.4	1			9.9				
Ormoc		2.3			60	13.5	39.6	108.2	1.8	3.3		.3				
Guiuan		3.3	25.7	1.3	12.2	52.3	98.3	87.3								
Dueñas, Iloilo ^a				9.1		6.6		15.5	33.5	12.7	7.4		18.3			
Bitagan, Iloilo (Railroad Iloilo to Capiz) ^a				23.6		18.3		14	20.1	3.8	4.1					14.2
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a			30.2		2.3	4.1	10.9	44.2	82	7.2	8.6	2.3	1.6	.5	3.8	2
Tacloban					1.5	29.2	37.2	105.3					7.6			
Dumarao, Capiz ^a						26.7	3.8	11.4	14	8.4				22.9	13	36.1
Dao, Capiz ^a		9.9				48	30.5	61.4	13.5	9.4			1.5			
Capiz						3.3	8.9	24.2	13.7	2.8		8.6	7.1	3	9.4	
Borongan	2.8			4.8	1.5	4.3	46.2	117.6							23.1	11.2
Catbalogan	2		.3	2.3	31.7	29.2	23.9	315.4	1.3			24.9				
Calbayog	14.5		6.1			51.6	7.7	169.7	17.2	1	2.8				1.3	
Masbate							8.9	205.2	27.5	2.5			1.5			4.1
San Jose Estate, J. Abello D-13, Mindoro ^a			1.8			3.8	11.7	21.1	72.4	119.3	57.4	59.2	17.7	33	66.5	5.8
San Jose Estate, Tamarao Plantation, Mindoro ^a						4.6	8.9	9.9	50.8	79.3	70.6	65.3	11.6	40.1	54.6	4.6
San Jose Estate, San Agustin, Mindoro ^a							3.3	6.4	70.6	51	55.6	35.1	36.8	40.9	51.6	
San Jose, Mindoro ^a		2.5		3		4.1	2.3	18.8	74.9	57.1	60	58.9	35.3	6.4	75.4	2
San Jose Estate, Tunnel D 12, Mindoro ^a		33				3.3	10.2	10.9	60.5	107.4	66.6	70.8	28.7	24.1	32	6.1

^a Voluntary or cooperative stations.

* No observation.

Daily rainfall at the stations of the Weather Bureau, June, 1919—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
Jolo.						0.8				1.3					mm.
Port Lebak, Cotabato	29.7				1.	16.8	25.1	16.8	11.9			17	3	40.1	mm.
La Union, Davao ^a	.8	24.4	25.9	2	.5	49.8			2		17.8				mm.
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a						1.8	35.6		20.1		10.9	9.7	50.3	37.8	mm.
Basilan Plantation, Isabela, Basilan, Office ^a							3.8	31.7		20.8			18	41.4	mm.
Parang-Lalap, Isabela, Basilan ^a	.5					.5	5.1	11.4		38.9	14	1	7.6	30.2	mm.
Latuan, Isabela, Basilan ^a	.3					.5	2.5	17.2		20.8	19.6	.3	2.3	40.9	mm.
Malamau, Zamboanga								23.1		6.9		3.6	61.7	47.2	mm.
Cuabo, Davao	43.9				18.3			19	18	8.6		2.5	4.6	206.4	mm.
Zamboanga						1.5	9.1		2			.8	15.2	11.7	mm.
Fort Pikit, Cotabato.	5.3			4.1		.5	17.3	5.8	1.8		4.6	15.2	7.4	4.6	mm.
Davao.	15.7						11.7	5.6			35.1		16.5		mm.
Sirib Guianga, Davao ^a	11.2	26.9					9.4						39.9		mm.
Cotabato	20.8	3.8	1.8		7.1	6.6	2.5	2.8	14.7			1.5	1.5	78.5	mm.
Bual, Cotabato	7.4		.3			9.1	29.5	14.5	13.7		6.4	.8	4.3	4.1	mm.
Naga-Naga, Zamboanga	16	.8				18.8	10.2		17.8	36.3					mm.
Malabang, Lanao	61	86.4	25.9			3	.5	35.6		10.4	2.3	3.3		3	mm.
Malangas, Zamboanga ^a	4.1	8.9	8.9		2.3	9.4	12.4	22.1	19.3	4.6		.3		2.3	mm.
Lumbatan, Lanao ^a					.5	.8	3.8	6.1			2.5	3.8		40.1	mm.
Ganassi, Lanao		.3		.5		8.1	.8	3.3	13.7	1.3	2.5	3.8		.8	mm.
Moncayo, Davao ^a	7.1		4.6	33.3	3.3	9.4						12.7			mm.
Camp Kalaw, Moncayo Davao	8.9		5.1	5.1	.8		13	1.5		2.5					mm.
Mailag Agricultural School, Bukidnon	10.4		2.5	27.9	9.9	8.4	5.6	11.7	6.9	3	6.6	25.9	10.9	7.6	mm.
Camp Keithley, Lanao	.3			.3	16	27.9	1.3	3.6	9.6	2.4	4.8	1.5	2.1	1	mm.
Pantar, Lanao ^a					27.2	19	2.3	14	10.1		7.1		5.8	1.8	mm.
Veruela, Agusan.	15.7		2.5	43.2	1		11.4	.5		40.4	1.8	2	1.8	1	mm.
Sumilao, Agusan	1.5		.3	7.9	5.3	1	17.5	25.4	7.4	2	38.4	.3	35.3	24.2	mm.
Diklom, Bukidnon ^a			3.3		10.7		1	22.1	15.5		5.8	12.7		4.3	mm.
Talacogon, Agusan			5.1	8.6			1	8.1	3	104.1	.8	2.3	.5		mm.
Butuan			2	.8		6.9	.8	32.5	2.5		.8		8.6	.3	mm.
Mambajao	(*)		12.4	2.5				9.4	20.8					32.8	mm.
Dumaguete								13.4	8.6				1.5		mm.
Hacienda San Jose, Tanhai, Bais (Sur)		35.6	7.6				137.2	205.7						20.3	mm.
Oriental Negros ^a															mm.
Palanas, Bais (Centro) Oriental Negros ^a	15.2	43.2	40.6	38.1		5.1		2.5		76.2			101.6	61	mm.
Hacienda Tamogon, Bais (Norte) Oriental Negros ^a		11.9								27.9				50.8	mm.
Yap, Western Carolines	(*)	(*)				3.8	1.8	2			1.5	1	10.2	18.5	mm.
Tagbilaran			.8	.3			18.4	4.9	9.2			2.8	2.2	8.5	mm.
Iwahig				9.1	32.8	6.3				6.6	5.1	4.8	2.3	3.6	mm.
Surigao			1.8	13.2			11		5.6				.3	10.7	mm.
Biaong Cui's Farm, Barile, Cebu			3.8					1			5.3	6.1		1.8	mm.
Maasin	16.5	59.9						24.9	20.8				69.8	45.9	mm.
Cebu		15.2	4.6			.8		9.7	2.3	.5	.5	8.1	.3	12.5	mm.
Hacienda Vallehermoso, Oriental Negros ^a									19				14.7		mm.
La Carlota, Occidental Negros ^a		.5	7.9		2.5	1.5		8.1	1.3	10.9		3	2.3		mm.
Hacienda San Antonio, Occidental Negros ^a														25.4	mm.
Hacienda San Carlos, Occidental Negros ^a	.3	1.8		1			1.5	1.5	.5		3.6		9.9	6.4	mm.
Hacienda Refugio, Occidental Negros ^a				5.3				20.3	3.8	10.2			6.1	7.4	mm.
Murcia, Occidental Negros			6.9	.5	.3	.8	.3	.5		9.2		5.3	6.9	1.1	mm.
Iloilo		.8		.3				19	11.2				1.3	20.3	mm.
San Jose Buenavista.		.8	72.1	.3		1	1.8	27.2	60	39.4	1			32.5	mm.
Cuyo	3	22.6	26.9	27.9	.8	7.9	5.3	25.7	52.6	10.4	30.5		2.3	5.1	mm.
Lucena, Iloilo ^a												4.6		185.4	mm.
Cadiz, Occidental Negros	1		.8					.3	1			4.6	5.1	117.9	mm.
Ormoc		.3	22.6	3.8				4.6	23.7	.8		.3	34.8	12.2	mm.
Guiuan		.8	21.1				.8	10.4	2	20.3	1			336.8	mm.
Dueñas, Iloilo ^a		2.8	4.6					20.6		10.7		6.6	16.3		mm.
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a	26.2	7.9				1.8		39.9	.8	10.7			24.4		mm.
Lapus, Iloilo, (Railroad Iloilo to Capiz) ^a			3.3						12.2	9.7			2.6	16.5	mm.
Tacloban		9.4	13					8.9	2.8		14.7	1	17.5	2.5	mm.
Dumarao, Capiz ^a	7.4				6.4	4.6	7.1				6.4		20.3		mm.
Dao, Capiz ^a	12.7	51.1	20.6		1					2			18.8		mm.
Capiz			4.8		3.5					3.8		1.3	12.7	21.3	mm.
Borongon	4.3	18.8	12.4				11.9	48.8	5.6	6.6	2.5	.3		3.8	mm.
Catbalogan		.3	31.8	13.2				15.2	11.9			10.2	14	34	mm.
Calbayog		2.8	6.8	.5	14	.3	.8	.8	38.9	3.3		4.5	21.3	3.6	mm.
Masbate		.5	2.8		1			14.3	6.3	23.9			2.8	40.9	mm.
San Jose Estate, J. Abello D-13, Mindoro ^a	9.1	14.5	16	35.9	8.6	6.6	5.6	19.3	58.9	25.6	19.6		10.7		mm.
San Jose Estate, Tamaraw Plantation Mindoro ^a	5.6	5.3	10.4	30.2	5.8			6.9	56.6	7.4	29.4		14.5	2	mm.
San Jose Estate, San Agustin, Mindoro ^a	11.4	10.2	30	40.9	7.4	1.3	1.8	10.2	54.4	7.6	9.4		16.5	13.2	mm.
San Jose, Mindoro ^a	14	38.1	9.9	24.2	.5	3		31.5	50.6	38.6	8.4		9.7	2.5	mm.
San Jose, Estate, Tunnel D-12, Mindoro ^a		6.6	1.5	27	2.8	2.3		26.7	39.9	48.3	20.6		7.9	3	mm.

* No observation.

^a Voluntary or cooperative station.

^b 26 days of observation.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, JUNE, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Romblon	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Batac	7.9		5.1		4.3	3.3	18.8	96.7	18.3				14.5			
Irosin, Sorsogon							33	208.3	26.4	.5	.5	.3				
Sorsogon	13						3.3	8.4	165.8	40.4	4.1					
Legaspi	4.8						9.4	3.6	46.7	42.2	1	2.1	.3			
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a b}		38.9			12.7					7.6	8.1		1.3			
Sumay, Guam							6.4					3.8				
Calapan	20.6	4.6				18.3	31.2	13.2	106.5	39.6	8.1					
Virac	2.1			22.9		9.4	5.1	21.6	1.5							
Naga	23.9	.3		5.3	.2		20.9	24.1	44.8	11	10.2	.8	4.6	2.3		
Tigaon ^d									28	3.6	1.8					
Batangas			1.3		12.7			13.7	207.3	39.3	6.1	11.4				
Lucena					17.8	8.6	2.8	17.8	136.7	47.2	12.2	.3				
Atimonan		.3			.5	52.3	19.8	35.1	175.9	15.8	11.7			2.3	0.3	.3
Ambulong, Tanauan				19.8	5.8	1	16.3	11.2	59.5	37.6	26.4		3			
Canlubang, Calamba					5.1		3.8	6.6	40.4	197.4	8.6		1.5			.5
Paracale	.3	6.1				10.2	4.5	39.4	7.4	9.9	5.9	.5				2.6
Santa Cruz, Laguna	1				2.8	1.8	2	6.1	106.2	48.2	2			2	.8	2.8
Fort Mills, Corregidor ^{a c}			11.7	10.2	3.8	4.6		.5	21.8	314.2	20.4	3	6.1	8.4	11.9	10
Alabang, Rizal ^a					27.9			3.3	11.4	63.5	12.7				3.8	
Lamao, Bataan ^a			22.9	14	6.4		11.2		28.2	165.6	19.8	6.9		13.7	21.3	5.1
Manila			17.3		4.8				5.1	9.2	182.6			1.8		
Antipolo			29.2		1.5				28.4	11.9	127.8		4.1	5.4	.8	2.5
Bosoboso, Rizal ^a			49.5	33	3				49.8	12.7	50.8		4.8	1.3	1.5	
Montalban, Rizal ^a	.8			9.1			24.1	2	9.9	11.2	10.7		6.6	15.7		5.3
Hacienda Pintong-Sapang, San Jose, Bulacan ^a						11.4	6.4	10.4	16.3	135.3	10.4			5.8		
Mabayuan Dam, Olongapo, Zambales ^a		6.9	6.4			.8	2.8	.8	20	330.8	81	46.5	16.2	46.7	17.5	65.5
Pampanga Sugar Mills, Del Carmen, Floridablanca ^a						30.7		1	7.6	165.1	16.5		8.9	.3	5.8	9.7
Iba		1.1					2.3	5.3	9.7	272.9	61.5	26.2	34.6	49.1	62.4	71.7
San Isidro			8.1		17.3	.8	.3		14.5	63.2	2.6			1	1.5	10.5
Tarlac		2.5	6.9		16.5	7.1		28.4	5.6	57.2	8.1			.8	2.5	10.7
Baler	5.8		.5	25.9		1.8		5.3	33	49.3	26.4	4.1	5.1			
Paniqui, Tarlac ^a		27.9	38.6			9.1		15.2	9.1	37.8		15.2		11.4		
C. L. A. S. Muñoz, Nueva Ecija ^a		3.3	12.7	7.4	20.3		15.2	48.3	22.9	21.3	1.8	1		22.4	20.8	13.7
Dagupan	14.2	30.5			54.9			2.8	1	11.1	8.7	1.3	8.1	2	6.6	.5
Bolinao	5.6	5.6	5.1		1.5	1.8	25.7	23.1	.8	12.8	20.6	2		10.4	20.6	7.8
Baguio	10.9	1.6	19.2		11.9	.5	25.9	3.1	12.5	15.3	17.2	5.4	5.5	4.6	5.2	9
San Fernando, Union	3.8		.3		.5	2.3		*	*	*	.8	.5	2	27.9	11.9	2.3
Echague			50.8				5.7			5.6	6.9					
Sagada, Mountain Province ^a	26.9	14.7	16.5	9.4	1.5	15.5	2		2.5	1.3	.8			12.2	2.8	3
Bontoc, Mountain Province ^a	13.7	.3	53.6	2.5	35.8	6.4	26.9		2.5	1.5					2.5	1.3
Candon		23.6	3						8.9	8.4				1	8.6	2.5
Vigan			11.7		11.4				35.3	7.9			4.8	4.6	8.9	3
Tuguegarao ^e															24.9	
Laog		7.4	8.7	15.4	.6			12.6			18.4	15.4	27.4	.3	1.4	
Aparri									1		.3	1.3	5.6	.3	2	
Cape Bojeador				.9	.3			24.9			9.6	3.6	15.2	19.6		3.1
Santo Domingo, Batanes	.9								1.8	1.3		19.8	.1			

* No observation. ^a Voluntary or cooperative station. ^b Rain in 24 hours beginning 8 a. m. ^c Rain 24 hours beginning 7 a. m. ^d This station was temporary closed from 5th to 8th. ^e This station was temporary closed from 1st to 12th.

Daily rainfall at the stations of the Weather Bureau, April, 1919—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
Romblon			0.6			5.4		1.8	0.5	16	0.4	0.3	15.7	0.8	413.4
Batag			7.6					9.9	17.3	1.6			9.9	34	245.4
Irosin, Sorsogon	0.8	0.3	16.6	21.4				38.4	35	5.6		4.1		5.4	396.6
Sorsogon			14.3	3.6				9.7	32.1	36.8		2.3			333.8
Legaspi		1	2.5	2.3	6.1				37.1	92.5		3	3.3	3.3	258.5
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a,b}							16.5								85.1
Sumay, Guam			9.7			22.9	5.6					52.8	68.6	14	183.8
Calapan		3.8								8.9			20.1	1	275.9
Virac		30.5	17.2				14.2	51.3	22.2	8.4			8.4	8.6	223.4
Naga			15.3	1.8				2.8	18.2	86.9		18.8	4.8	13.2	310.2
Tigaon			20.3	3	.5				7.4	83.9		5.1		21.1	172
Batangas			1.8						16.8	10.7			20.6	1.8	343.5
Lucena			6.4							2.5	9.1			5.1	266.5
Atimonan							1.8	5	3.3	10.7				.5	331.1
Ambulong, Tanauan		1	14						4.1	4.6			2		256.3
Canlubang, Calamba	24.1	10.6	1	70.3						1.5	1		10.2	1.8	384.4
Paracale		21.1	7.1	6				1.3	10.4	4	1.5		18	52.5	203.3
Santa Cruz, Laguna			6.6	4.3				5.1	4	24.7		2.5		9.7	238.7
Fort Mills, Corregidor ^{a,c}	2	27.5	8.2		2.5			15.2	2.3	50.3		21.6	16.5		566.6
Alabang, Rizal ^a	4.6	8.4	8.9	1.3								16.5	19		181.3
Lamao, Bataan ^a	1.3	12.2		8.4	16	2.6				6.1				6.6	368.3
Manila	1.3	1.7	2.3	3	5.2	.3		3.6	.8	7.6	2.9	2	4.6		265.7
Antipolo		1	6.6	12.7				1	1.8	22.9		42.7	12.7	13.7	339.2
Bosoboso, Rizal ^a		3	47	1.3	3		3	26.4	2.5	50.8		1.5	1.8	50.5	403
Montalban, Rizal ^a		.5	7.6	15.7	4.8	15	.5	.5	.8	.8	30.5			9.9	273.7
Hacienda Pintong-Sapang, San Jose, Bulacan ^a	5.1				10.7	1.3		3		12			36.9		262.3
Mabayuan Dam, Olongapo, Zambales ^a	18	13.2	11.9	6.1	15.2	3.1	1.3	2	17.5	21	11.1	3	20.1	11.5	794.2
Pampanga Sugar Mills, Del Carmen, Florida blanca ^a	1.5	8.7				2.3					15.7		5.8	10.7	290.3
Iba	60.9	32	12.2	32.7	18.5		1.3	4.4	1.8	23.9	4.4		10.4		799.3
San Isidro	9.6	4.6	4.1	6.9	1.5	1.3	18.3			.3		3	51.8	2	220.5
Tarlac	4.6		52.1	3.8		32.3	6.9	21.3	20.3	12.7	.8	11.4	8.1		321.4
Baler				8.6						.2	8.4	3.8	10.2		188.4
Paniqui, Tarlac ^a								15.2			9.1		21.6		210.2
C. L. A. S. Muñoz, Nueva Ecija ^a		20.6	23.4	11.4				21.1		45.7			5.6		338.9
Dagupan	9.4	5.6	11.4	20.9	24.9	1.3		1.5		6.4			2.5		225.6
Bolinao	3.6	48	58.4	27.4		.5				28	2.5		6.1	7.6	325.5
Baguio	14	29.7	7.5	49	12.5	5.1	1.3	4.1	1.3	5.4	.5	2.3	8.4	20.2	309.1
San Fernando, Union	2.5	.3	31.5	3.6		1.3	3.8	14.5	15.7	26.9			3.3	14.8	170.5
Echague	3.6	4.1		6.6	24.1	18	2.5	1.5	1	8.8					139.2
Sagada, Mountain Province ^a	3	8.6	23.1	6.6	8.9	10.4	1.3		4.1	9.1		3			185
Bontoc, Mountain Province ^a		1.5	31	10.7	23.1	9.9			1.8	3					228
Candon	7.1			3.8	2	1.5	2.5		11.9	29.7		12.4		120.9	247.8
Vigan	4.6		1	66.3	10.7		.3		30	3.6					201.4
Tuguegarao						34.8	1			9.4					170.1
Laoag	1.3		2	65	12.5		3.3		5.1	41.2	57.9				295.9
Aparri	2.3	2.5		2.3						23.1	4.8		18.3		63.8
Cape Bojeador				23.9	7.4				2.8	3.3	70.6				185.2
Santo Domingo, Batanes					1.9					2.3	2.8				32.4

^a Voluntary or coöperative station. ^b Rain in 24 hours beginning 8 a. m. ^c Rain 24 hours beginning 7 a. m. ^d 22 days of observation. ^e 26 days of observation. ^f 18 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, JUNE, 1919.

Day.	Jolo.		Malamawi, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Butuan.		Mambajao.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.9	21.8	31.7	24.8	29.8	23.3	32.7	23.9	34.2	23.6	28.6	18.8	34.7	23.4	31.3	26.4
2	30.2	23	31.5	24.4	29.2	24.4	32.9	23.5	33.5	23.6	28.1	19.6	34.9	23.9	31.3	26
3	28.5	23.5	29.5	24.6	29	24	33	23.8	31.2	22.7	26.8	20.4	33.6	23.5	31.4	24.9
4	30.3	22.8	30.7	24.4	29.2	23.8	33.1	23.5	32.5	23.6	28.8	18.9	34	23.8	31.9	24.4
5	29.5	23	31.5	23.4	30.2	23.2	32.8	22.9	31.9	23.6	26.6	20	32.4	23.5	31.4	24.4
6	30.4	22.7	32.4	24.1	29.6	24	28.2	22.8	32.7	24	26.8	20.1	30	23.3	28.6	25
7	30.5	23	30.6	23.9	29	23.2	32.8	24	32.5	24	26.6	20	30.2	23.9	33	23.9
8	30.6	23.6	31.2	22.9	30	23.4	30.9	23	32.5	23.2	25.4	20.3	29.2	23.4	28.4	23.2
9	30.6	23.7	31.4	24.4	29.5	24.8	33.2	23	31.5	23.5	25.9	21.5	31.9	23.4	32.1	24.3
10	28.8	23.5	31.4	24	29.8	24.5	32.6	22.8	32.7	23.1	27.3	20.9	31.6	23	31.9	26.4
11	28	22.3	31.3	22.1	28.6	21.7	32.2	22.9	31.2	22.5	27	21	32.8	23.1	32.5	24.7
12	29.3	25.3	30	23.5	29.7	23.5	32	24.4	32.5	23.2	27.2	19.5	31.9	22.7	30.9	23.9
13	30.8	22	30.8	22.1	29.5	22.5	33	22.9	32.2	22.7	27.7	21	33.9	23.3	32.9	25.3
14	31.5	24.1	31.8	23.4	29.6	24.4	34.2	24.4	34.1	23.4	28.5	19	34.1	22.8	33.4	23
15	32.5	24.5	31.7	23	29.3	23.5	31.2	24.4	33.2	23.8	28.3	21	34.2	22.9	34	25.1
16	32.1	24	32.4	24	29.8	23.8	30.7	23	33.1	23.1	28.9	19.5	34.9	22	33.4	25.1
17	32.3	24.2	31.1	24.1	29.8	24.4	30.7	21.4	33.2	22.4	28.4	20	34.2	23.2	32.9	25.3
18	32.3	24.2	31.1	24	29	24.2	28.7	21.9	32.1	22.6	27.3	18.9	30	22.9	31.5	24.5
19	32.1	24.2	32.4	22.1	29	23.5	29.6	22.5	33.2	23	27.8	19.2	32.7	23.3	33.4	25.5
20	32	23.3	33.1	23.5	29.6	23.2	31.7	23	32	22.7	27.1	20.5	32.8	23.2	31.2	23.9
21	31.8	24.7	32.8	23.3	29.9	24	31	23.8	32.3	23.2	27.8	20	33.1	22.1	33.4	24.4
22	31.8	22.3	30.9	23.4	29	24.2	30.7	23.4	33.3	23	28.6	19	32	23.1	32.8	25.8
23	31.3	23.5	32.2	24	29.2	23.6	29.7	21.9	31.7	22.2	28.6	18.5	33.7	22.4	32.1	25.4
24	30.1	25.2	30.8	20.4	29.6	22.2	29.3	22.1	32	22.2	26.6	20	26.6	22.9	30.6	24.6
25	32.1	24.4	30.5	22	29.2	23.2	29.2	22.5	32.2	21.7	26.3	17.8	30.1	21.7	29.9	23.1
26	31.7	25.1	30.9	23.5	29.2	23	30.6	23	32.1	22	27.1	18.6	33	22.6	31.7	24
27	32.2	24.3	31.9	24.7	30.5	24.1	30.8	23.5	34.4	23.2	27.8	20	34	22.8	30.9	23.7
28	31.5	23.5	31	23.4	30.5	24	30.9	22	32.5	23.2	28.6	19.5	34.8	23	31.5	23.9
29	29.7	23	31.2	22.4	29.4	23	31.2	22.9	32.6	23.1	26	19.8	33.9	22.8	32.1	25.4
30	28.6	22.2	28.8	22.2	28.2	22.8	30	21.8	31.9	22	25.8	19	29.1	22.5	29	23.8
Mean	30.8	23.6	31.3	23.4	29.5	23.6	31.3	23	32.6	23	27.4	19.7	32.5	23	31.7	24.6

Day.	Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.6	24.7	32.7	25	33.5	23.5	32.6	22.3	31.3	24.6	34	25	31.9	26	33	24.1
2	30.9	26	32.7	23.5	32.1	24.4	33.2	23.1	31.2	24.3	33.8	24.6	32.5	26.6	33.3	26.5
3	31	24.3	32.4	25	32.6	24.5	33.6	22.7	31.8	24.2	34	24.4	31.8	26.5	33.6	25.4
4	31.4	24.7	31.6	24	32.2	24.3	34.5	23.2	32	24.2	33.5	24	32.4	26.2	33.5	24.3
5	32.5	24.5	28.2	24.5	31.2	24.6	34.1	21.9	30.4	25	33	24.8	32.3	24.2	31.9	24.4
6	30.1	23.8	31	24.4	31.2	24.5	34.6	22.6	28.3	24.2	32.6	23.8	31.6	25	32	24.5
7	30.8	24.7	33.2	24.6	31.3	22.9	31.3	23.1	29.7	24	32.6	24	32.5	22.9	33.3	23.2
8	29.6	24.1	32.2	24.6	28.2	22.8	32.7	22	27.7	24.3	27	23.8	28.1	25	30.4	23.6
9	30.1	24.3	31.2	24	31.2	25.2	30.9	21.9	31.2	25.6	31.4	24.2	29.7	25	29.4	24.1
10	30.4	24.5	30.4	24.6?	31.6	25.4	29.1	23.7	31.7	24.6	31	24.4	29.9	24.3	27.3	23.4
11	32.1	25.3	31	24.9?	31.2	25	28.6	23.6	32.6	24.6	31.2	25.4	29.7	27.3	29.7	24.6
12	30.6	25.1	31.6	25	31.3	25.1	29.8	22.9	31.4	24.2	32	24.4	30.5	27.2	31.3	25
13	30.6	23.7	31.4	24.6	31.4	24	32.1	23.2	31.4	23.5	32.5	24.6	31.2	26	29.9	25.5
14	32.2	23.5	24.6	24.6	31.8	24.4	32.3	22.8	33	24.1	32.2	24.4	31.1	25.9	31.2	25
15	32.3	24.3	24.6	24.6	33.2	24.1	35.1	22.9	32.1	23.9	34	24.5	31.8	25.5	31.8	25
16	32	24.5	24.6	24.6	33	24.8	33.2	22.1	32.2	24.5	32.4	24.5	31.7	26.1	31.3	25
17	32.1	24.2	24.6	24.6	32.5	24.4	33.2	21.4	31.2	24.1	33	24.6	32.4	25.3	31.6	25.2
18	31.3	23.1	24.6	24.6	32.7	24.1	34.1	22.1	30.3	24.1	31.5	23.9	31.1	26.4	31.5	25.2
19	32.4	24.2	24.6	24.6	32.2	24.1	32.6	22.9	32	24.2	31	23.5	29.9	24.9	31.5	24.3
20	31.8	24.1	24.6	24.6	31	24.1	32.6	22.5	30.3	24.7	33.2	23.8	30.1	23.7	30.8	25.5
21	32.4	23.7	24.6	24.6	33.6	22.9	32.3	22.7	31.5	24.2	33	24.2	31.2	25.1	31.5	24.8
22	31.5	23.8	24.6	24.6	33.3	25.8	31.1	21.1	30.9	26.3	33	24.2	31.5	25.9	32.5	25.5
23	32.4	24.7	24.6	24.6	33.2	24.2	32.6	22.2	31.3	23.3	32.8	24.2	32.2	25.4	32.3	23.4
24	31.5	24.7	31.7	25.6	31.1	24	34.2	22.5	27.6	23	32	24	30.5	24.1	31.8	23.8
25	30.7	24.3	31.2	24.8	32.1	23.5	30.6	23.2	33.5	23.9	30.4	23.2	29.5	25	30.7	25.9
26	29.8	23.4	31.3	24.1	31.6	23.9	30.9	22.9	31.4	24.1	30.2	23	29	25	28.3	21.9
27	30.7	24	31.2	23.5	31.3	24.4	28.5	22.2	32.2	24.2	32.2	24	32.5	25.2	30.7	24.5
28	30.8	24	30.9	25	32.1	23.8	31.6	21.8	32.5	23.8	33	23.9	33.4	25.8	33.5	24
29	30.8	24.3	31.3	24.5	32.3	23.3	33.2	20.9	31.6	24.1	31	24	31.4	24.4	31.4	24
30	30.8	23.1	32.3	24	30.7	23.4	32.2	22.2	28.6	24.1	30.7	22.8	30.6	24.5	32.2	23.4
Mean	31.2	24.3	31.5	24.5	31.9	24.2	32.2	22.5	30.9	24.3	32.1	24.1	31.1	25.3	31.4	24.5

Maximum and minimum temperatures at the stations of the Weather Bureau, June, 1919—Continued.

Day.	San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.6	23.6	33	25.2	34.2	22.5	33.8	25.2	33.7	24.3	33.7	25	32.6	24.3	32.4	23
2	33.7	24	33.8	25.6	34.8	23	33.4	24	34	24.5	33.9	26.4	32.9	24.4	33	21.7
3	33.3	24	33.1	26.8	34.6	23.1	32.3	24.2	32.8	25	33.6	26.2	32.7	23.6	33.5	23.3
4	33.4	23.5	32.8	25.1	34.2	22.8	33.8	24.7	34	24.5	33.6	25.3	32.7	23.9	32.3	22.9
5	33.3	25	31.3	25.4	33.4	23.2	30.9	24.1	35.1	24.1	34.9	24.8	32.1	23.6	32.1	23.3
6	32.5	24.1	32.3	23.9	32.8	22.9	31.2	24.8	31.6	24	33.7	24.8	32.3	24.3	30.5	23.5
7	32.4	23.1	30.4	23.7	32	22.9	32.5	24	31.5	23.7	33.9	24.4	33.1	23.8	31.3	22.5
8	31.6	24.2	31.5	23.6	28.9	23.3	27.8	23.2	25.7	22.7	31.2	24.3	26	23.9	26	23.5
9	28.3	23.1	29.2	25.5	30.7	23.3	30.3	23.4	32	23	29.5	23.8	32.6	22.5	32	23.8
10	27.7	23.5	28.7	25.5	31.2	25.3	30.6	27	32.6	24.2	26.8	24.2	33.6	23.2	33	25
11	28.7	24.7	28.8	26	32.7	25	31.3	26.7	32	24	30.5	24.8	33	24.6	32.5	25.5
12	30	24.4	29.2	25.1	32.8	26.5	31.7	27.3	32.6	24.2	34	25.3	33.4	23.7	32.7	24.2
13	31.1	24.6	30.1	26.4	32.9	26.4	31.3	27.4	33.2	24.2	33.4	24.8	35	23.9	33.5	24.9
14	31.7	23.1	30.6	24.7	33.3	23.7	30.8	27.2	33.1	22.8	33.4	24.8	35	24	33.2	23
15	31.7	23.6	31	25.6	33.4	23.8	31.2	25.1	34.1	24.2	34	25	34	23.9	32.7	24.2
16	32.1	23.6	31.4	27.6	34.2	24.6	31.2	25	35	24	34.7	24.8	33.4	23	32.7	23.8
17	32.2	24.3	31.4	25.3	34.2	23.7	30.9	24.7	34.8	23.2	33.8	25.6	32.8	23.5	32.6	23.6
18	32	23.6	30.8	24.6	33.8	23.4	31.3	23.7	30.8	23	33.9	24.7	32.1	22.7	32.5	23.5
19	31.7	23.5	30	23.3	32.9	23.9	30.1	24	31.2	23	32.6	24.7	30	23.7	30.6	24.1
20	31.2	22.4	29.7	22.9	31.3	23.4	31.1	23.5	31.5	22.7	30.7	24.3	33.4	22.5	30.8	23.2
21	31.2	23	31.3	23.2	33.5	22.3	31.1	25	34	22.5	34.7	23.3	32.2	23.2	32	23
22	31.9	23.6	31.2	25.2	33.6	23.4	31.8	24.5	33.2	23.5	33.7	23.8	33.1	23.6	32	24.3
23	32.2	23	31.8	23.5	33.3	23.9	31.4	26.3	33.8	23.5	33.7	23.3	32.5	22.6	32	24.4
24	31.8	23	31.8	23.8	31.5	23.4	29.7	24.6	31.2	23.1	33.8	24.5	32.7	23.5	31.7	24
25	29.6	22.2	29.3	23	29.6	23.9	28.4	24.5	26.9	23.5	30.1	24.9	27	22.8	27.2	23.5
26	26.7	22.5	28	23.6	30.6	22.9	30.7	25.5	30	22.6	29.2	24.1	29.6	23.4	29.7	23.2
27	31.2	23.1	30.1	24.7	33.6	24.7	32	24.5	33.5	23.5	34	24.6	32.6	22.9	32.7	24.2
28	32.2	23.1	32	23.1	34.2	23	32.8	23.6	34	24.5	33.3	23.6	32.5	23.8	32	23.2
29	31	23.2	32.1	24.9	32	23.6	33	24.3	32	24.3	31	25.2	32.6	23.2	30.8	22.5
30	31.7	23.5	31.7	25.6	30.2	23	29.5	25	29	23.5	30.6	25.5	28.6	23.5	30.8	22.5
Mean	31.3	23.5	30.9	24.7	32.7	23.7	31.3	24.9	32.3	23.7	32.6	24.7	32.2	23.5	31.7	23.6

Day.	Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.4	23.3	33.6	26.2	34.5	25.9	33.6	25.1	33.6	23.1	34	26.4	32	25.2	34	23.9
2	32.3	23.2	33.8	26.6	35.6	27.7	32.9	25.3	33.5	23.1	33.6	25.5	32.8	25.6	34	24.2
3	32.2	22.8	33.6	26.4	36	26.2	33.5	24.3	33.8	23	34.1	24.4	32.4	25.8	34.5	24
4	31.7	23.2	34.6	25.8	34	24.9	33.7	24.4	34.5	23	34.1	24.3	32.6	25.8	35	24.1
5	31.9	23.9	34.4	26.2	34.4	24.6	33.4	25.4	35	24	34.4	24.8	33	25.6	34.5	24.5
6	32.1	23.8	34	26.2	35.4	25.2	31.9	24.8	33.7	23.5	33.4	24.8	32.6	25	34.9	24
7	32.2	22.8	34.6	26.2	35	25	33.6	24.8	34.3	24	33.5	25.4	32	25	34	23.5
8	25.2	23.6	30.6	23.6	32.7	25.2	31.7	23.9	23	23	29.4	25.4	32	24.4	33.5	23.5
9	30.3	22.8	29.4	23	29.4	24.1	31.3	22.2	23.7	23.7	27.8	23.6	32.4	25.4	31.5	22.8
10	30.4	25.4	28.4	25.5	27.8	24.1	32.6	23.5	23.3	22.4	27.6	24.9	32	24.6	27	23
11	31.7	25.7	31.4	25.5	28.5	24.6	31.9	24.6	31.7	24	30.8	25.2	32.6	24.4	28	23
12	32.2	24.8	31.6	26.6	31.4	24.7	34.7	25.3	32.7	25.3	32.8	25.2	33.6	25.8	31.7	23.5
13	32	25.5	32.4	26.6	31.8	25.7	31.9	24.4	33.1	25.1	33.4	24.8	33.4	26	33.6	24
14	31.9	24.1	32.6	25.2	32.4	25.6	31.5	23.5	32.5	24.1	33.6	24	32.4	25	33.1	24.5
15	31.8	23.7	33.4	26.6	32.4	25.1	31.5	23.8	32.5	24.5	33.5	25.6	33	24.6	33.5	24
16	31.5	24.6	32.8	26	32.9	26.1	32.9	23.9	33.3	24	34.1	25.5	33	24.6	32.6	24
17	31.6	24.1	32.6	26.8	32.9	26.7	32.3	24.5	32.7	24.8	34.5	25.3	33	24.4	34	22.9
18	31.5	23.3	33	25.2	32.9	26.2	32.5	23.9	32.5	23.5	33.4	24.1	33	24.6	33.5	23.5
19	30.1	24.1	32.4	26	33.4	25.2	29.8	23.8	32.5	23	31.4	24.7	33	25.4	31.8	22.5
20	30.6	23.9	30.6	24.2	30.3	25.8	29.8	23.2	29.4	22.4	29.6	24.1	33	25.4	31	23
21	31.1	23.9	31.8	24.8	32.9	25.3	31.6	23.9	31.5	23.8	32.6	24.6	33	24.6	33.1	23.5
22	31.1	25.6	32.8	25.6	32.9	25.1	32.4	24.1	32.1	23.3	33.6	25.6	33.4	26	33.7	24.5
23	30.9	23.9	31.8	26.8	33.8	24.3	33.2	24	32.5	23.8	33.9	25.2	31.8	26.2	33.8	23.5
24	30.9	23.9	33.8	26.6	33.9	25.3	32.2	23.7	32	24	34.2	26.2	32	25.2	33.5	23
25	27.6	24.7	29	24.5	32.5	25.4	26.5	23.5	28.5	23.1	30.1	24.2	32.2	26	32.2	23.5
26	28	24.8	27.8	23.2	28.4	24.1	29.8	23.3	26.9	22.4	26.3	24	30.2	26	31.7	24.5
27	32	24.4	32.8	25.2	32.9	24.8	32.1	23.8	33	23.8	33.3	24.3	32.4	26.2	34	24
28	31.1	23.6	32.8	24.5	32.9	23.7	32	24.3	33.5	22.5	33	23.7	31.4	24	33	23
29	32.1	22.9	32.6	26.2	32.7	24.1	32.3	24.2	33	23.5	33.4	24.4	30.4	24	33	23
30	28.2	23.6	31	25.6	32.5	24.4	27.3	24.9	30.5	23	30.5	24	30.4	23.4	33	23
Mean	31	24	32.2	25.6	32.6	25.2	31.9	24.1	32.1	23.6	32.3	24.8	32.4	25.2	32.9	23.6

Maximum and minimum temperatures at the stations of the Weather Bureau, June, 1919—Continued.

Date.	Virac.		Naga.		Tigaon.		Batangas		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33	24.5	35.6	21.8	33.4	22	35.5	25.1	33.8	25.2	32.7	25	36.1	25.8	34.2	24.1
2	33.5	24	34.4	22.4	33.6	24?	36.3	26.1	33.5	25	32.9	25.1	36	26.2	34.6	24
3	32.5	23.8	35.4	21.2			35.4	24.4	33.3	24.5	32.9	27.6	34.5	25.4	34.8	23.6
4	33	24	36.5	22			35.4	23.8	32.7	24.7	33.6	24.5	35.2	25	35.2	23.2
5	32.5	24.1	35.6	22.6			36.2	23	33.7	24.4	34.6	24	33.2	24.5	35.3	23.1
6	33.4	24	34.5	23.3			35.2	22.8	32.7	24.6	33.8	25.5	33.2	24.2	35.2	23.5
7	33.5	24	34.2	23.2			35	25.2	32.8	24.2	32.1	24.2	33.2	24.8	35.4	23.7
8	30	24.2	30.8	23.1			27.8	24.3	31.4	24.6	31.3	24.8	34.8	23.4	35.7	23.9
9	29.5	24	26.6	25	26.4	23.4	27.4	24.2		23.5	28.4	24.4	26.5	23.2	28	23.6
10	29.9	24.6	27	23.7	25.6?	23.4	26	23.3	28	23.9	27	24	25.3	23.3	26.2	22.6
11	32	25.1	31.2	24.2	30.4	23.5	27.4	23.5	27.5	24	27.8	24.9	26.3	23	27.3	22.7
12	32.6	24.5	31.6	24.3	32.6	23.9	32	23.5	30.4	23.9	32	25.1	29.9	23.8	31.3	23.1
13	32.9	24	33.7	24.5	33.4	24	33.1	24.2	30.7	25.2	33.1	27	31.3	24.7	32.2	23.5
14	32.6	24.4	33.1	24.1	32.8	23.5	33.9	23.8	30.7	24	32.8	24.8	31.1	24.4	33.6	23
15	34.6	24.7	33.2	23.1	32.4	22.9	32.6	24.6	32.2	23.4	33.2	24	30	25	33.8	23.6
16	35.6	24	33.5	24.3	32.4	23.9	32.5	24.7	32.5	24.5	33.6	24.6	30.6	24.9	33	23.6
17	36.2	24.4	34.1	24.3	33.3	23.5	33.4	24.6	32	23.1	33.7	24.5	32.5	24.2	32.4	22.3
18	34.9	24.2	34.4	24	32.8	22.4	33	24.4	32	23.8	33.8	23.8	32	25.2	31.6	22.8
19	32	24	33.3	23.4	30.4	22.5	32.2	23.8	31.5	22	32.6	23.5	31	24.7	31.9	22.6
20	33.1	23.4	30.7	23.6	30.4	22.9	32.2	24.3	29.9	22.1	30.6	23.3	30.3	24.6	32.1	22.3
21	34.9	23.5	33.2	23.2	32.6	24.3	33.2	23.3	32.3	22.6	34	23.5	31.5	24.3	32.2	22.1
22	35.3	24.5	33.5	23.9	33.7	24.1	33.4	23.8	33.6	24.5	32.7	24	31.6	25.2	33.1	22.3
23	35.9	24.2	34.2	24	33.9	24.8	33.7	25.4	33.5	22.5	33.3	23.9	32.3	23.6	33.2	22.6
24	34.8	24.3	34.3	24	33.7	23.3	33.9	24.2	33.6	22.8	32.6	23.5	32.2	25	33.5	23.2
25	33	23.3	33.4	23.5	33.8	22	31.7	24.7	32.4	24	33.4	24	31.4	26	32	23.4
26	28.6	23.7	26	23.5	31.4	22.4	29.4	23.9	29	24.5	29.4	24.4	29	25.9	30.4	23.2
27	31.8	23.6	33.5	24	32.1	22.9	32.5	23.9	30.3	23	32.2	23.2	33.1	24.8	33.2	22.8
28	32.7	25	35.4	23.6	33.3	21.5	33.8	23.5	32.2	25.1	34	24.2	34.4	25.2	34	22.6
29	32.1	23.7	33.4	22.4	33.4	20.9	32.2	23.5	32.3	23.1	33.2	24.2	36	24.8	33.8	23.1
30	31.5	23.6	30.7	23.7	32.4	22.1	31.8	23.4	31.1	21.6	31.4	24	33	23	31.1	22.3
Mean	32.9	24.1	32.9	23.5	32.3	22.9	32.6	24.1	31.8	23.8	32.3	24.4	31.9	24.6	32.7	23.1

Date.	Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.6	24.4	33.4	25.2	35	25.2	35	23.8	33	24.2	36	24.9	36	24.2	32.7	23.2
2	32.7	25	33.7	24.6	33.9	24.7	33	23.4	33.6	24.6	34.5	24	36.6	22.8	32.7	23.9
3	32.8	24.3	33.6	24.2	34.6	22.9	33.4	22.6	32.9	24.9	36.2	23.5	36.6	22.8	32.9	22.9
4	33.2	24	34.8	23.7	34.1	23	34.4	22	32.1	25	34.9	24	35.5	23.4	33.7	22.7
5	33.6	24.4	35.1	24.5	34.7	25.6	34.9	24.4	32.5	24.5	35.9	25	36.8	23.5	32.9	24.3
6	33.4	25.2	34.6	24.5	34.6	25.1	34.3	23.5	32.8	24.6	35.5	24.8	35.8	23.2	33	24.1
7	32.9	25.1	33.8	23.3	34.2	25.1	33.5	23.5	33.2	24.6	32.9	24.4	35	24.2	32.5	24.2
8	29.6	24.8	33.1	24.4	32.6	25.2	33.4	23.4	32.6	25.5	34.6	24.4	36.4	23.4	32.9	23.9
9	30.5	25.2	27.3	23.4	28.8	24.6	27.7	23	32.2	24	32.4	24.6	34	23	32.4	23.7
10	28.4	24.5	25.8	23.1	26	23.6	24.5	22.3	31.8	24.7	27.6	23.5		23.4	30	24.4
11	30	25	27.5	23.6	27.6	23.3	27	22.5	27	23.4	27.3	23.6	27.5	22.4	29.6	23.5
12	30.5	24.6	33.9	23	31.4	24.2	33	22.1	31	23	31.4	23.7	29.6	23	33	23.1
13	33	24.6	33.7	24.7	33.2	23.9	33.6	23	30.8	24.4	32.8	24.4	32.6	23	33.7	23
14	33.4	24.9	33.8	23.5	32	24.5	31.5	22.8	30	24.8	32.2	24.6	33.2	23.2	34.1	23.2
15	34.1	26.5	32.8	23.5	31.7	25.5	30.9	23	29.2	24.8	31.9	25	32	23.8	34.3	24.3
16	34.4	25	31.1	24.2	30.6	25.1	29.5	23.7	32.1	23.8	29.6	24.6	30	23.2	34.2	23.5
17	35.2	24.4	33.1	23.4	32.2	24.2	31.6	23	29	23.4	32	24.5	32.2	22.4	34.7	23.4
18	32.6	24.1	33.1	23.6	32.5	24.8	32.2	24.4	29.2	24.2	32	24.4	33.2	22.4	35.6	23.3
19	32.9	23.7	32.6	23.2	31.7	24.8	31.8	23.6	31	23.6	33.1	23.4	35.8	22.6	33.4	23.2
20	31.8	24.8	31.4	22.8	30.5	24.5	28.8	22.6	30.1	23.8	30.7	23.6	32.6	22	33.3	22.8
21	33.4	24.7	33.1	22.2	31.5	23.8	31.2	22	30	23.5	31.4	23	32.8	22.4	34.3	23.5
22	33.6	24.8	32.8	23.3	32.1	24.3	31.2	22	31.2	23.5	33.2	24	34	22.4	34.9	24
23	34.4	25.8	32.9	23.4	32.3	24.5	31.5	23	31	24	33.4	23	33.4	22.6	35.3	24.6
24	35.2	24.6	32.6	23.7	32.2	25.2	31.2	24	31.6	24.4	32.5	24	34	22.8	35.7	24.6
25	33.7	24.8	32.1	24.3	31.1	25	30.2	23.8	29.6	24	32.9	24.4	32	22.4	35.6	24.9
26	30	24.9	29.3	24.1	29	24.4	27	23	29.4	23.8	30.4	24.6	32.5	22	33.2	24.9
27	33.2	24.5	33.1	22.6	32.8	23.3	32.7	21.3	30.8	23.6	32.9	24	31.6	22.6	34.9	23.1
28	33.5	24	33.8	23.1	33.9	23.4	34.2	22.2	32	24.4	34.4	23.4	34.2	22	34.2	22.8
29	32.2	24.5	33.3	23.4	32.6	23.6	33	22.2	31.6	23.2	34.8	22.4	35.8	22.2	33	23.7
30	31.7	24.8	32.1	23.7	31.4	23.3	31.7	21.6	31.6	23.6	32.9	23.5	35.2	22.4	34.5	22.4
Mean	32.6	24.7	32.4	23.7	32	24.4	31.6	22.9	31.2	24.1	32.7	24	33.7	22.9	33.6	23.6

Maximum and minimum temperatures at the stations of the Weather Bureau, June, 1919—Continued.

Date.	Dagupan.		Bolinao		Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.		Tuguegarao.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	36.5	24.2	35.3	25.3	25.3	16.7	34	24.7	35.4	24.4	32.9	25.7	35.2	25.6		
2	35.6	24	33.7	23.8	24.3	17	33.8	24.3	35.6	22.9	33	26.4	34.2	25.2		
3	34.1	24.1	32.7	23.8	24.4	16.7	33.6	24.6	35	24.2	32	25.4	34.5	24.7		
4	35.4	24.4	33.8	25.8	24.6	16.6	34.3	24.9	34.6	23	33	25.1	34.3	25.1		
5	36.2	25.4	34.1	25.5	25.1	16.9	35	24.9	35.7	24	33.5	26.4	34.7	24.3		
6	37	23.8	34.7	25.7	25.4	16.8	35.3	25	35.7	24.3	34.9	26.2	34.6	24.4		
7	35.4	24.4	34	26	23.3	17.6			36	24.5	34	26.5	34.4	25.9		
8	35	24.9	33	24.8	22.9	16.4			35.5	23.4	34.2	26.8	34.9	23.2		
9	33.4	24.5	32.7	22.7	22.9	17			32.5	24.4	32.9	25.5	33.5	24.7		
10	33.9	24	33.1	26.6	23	16			33.1	24.1	32.2	26.4	33.7	25.9		
11	28.8	23.9	27.8	24.8	17.9	16	31.3	24	28.9	23.4	32.6	27	34.4	26.7		
12	32.6	24	32.4	23.8	20.9	16.4	34.1	25.4	35.5	23.5	35.5	26.9	33.3	25.9		
13	34	25.2	33	25.1	22.4	16.8	35.5	27	36.2	23.6	34.2	26.7	33.4	26.5	37.6	25.5
14	33	25	31.8	25.5	21.3	16.8	33.6	25.9	35.9	24.1	33.7	26.8	32.6	25.5	37.1	25.6
15	32.5	25	31	24.8	22	16.3	33.2	25.3	36.3	24.5	30	26.5	32.4	25.5	37.2	23.2
16	31.3	25	28.4	24.7	19.7	16	30.5	25.5	36.3	22.4	31	25.6	30	25.6	36.2	23.3
17	31.7	24.3	31.1	24	23.6	15.8	32.5	24.5	36.6	22	31	24.2	31.8	24.9	36.8	24.9
18	32.7	24.8	31.8	25.1	22.8	15.8	33.5	23	36.5	22.8	32.1	24.9	33	25.5	38	24.9
19	33.5	23.5	32.6	24.2	23.3	15.7	33.9	23.5	35.5	22.3	32.5	24.9	34.1	25	37.9	24.3
20	33.1	22.6	32	23.9	22.2	16.1	32.8	23.8	35.1	24	32.1	25.9	32.5	24.3	35.2	25.1
21	32.7	23.3	32.8	24	23	15.9	33.1	24	37	23.5	32.9	25.2	32	24	38	25.1
22	33.5	23.8	32.5	24.4	23.2	15.8	34	23.8	35.3	24	32.6	25	32.5	24.5	38.2	23
23	33.1	23.8	33.3	24.4	22.8	15.7	33.9	24	34.4	22.1	33.2	25.2	33	25.2	35	22.8
24	34	24.5	33.2	24.8	23.7	15.8	34	25	33.9	22.5	33	26.5	33.4	25.8	35.4	24
25	33.5	24.7	33	24.7	22.8	16.2	33.5	25	35.7	24	32.2	26.6	33	24.7	35.2	24.5
26	32.8	24.1	32.1	24.7	23.1	16	33	24	33.6	24.6	32.5	24.6	32.5	24.2	32	25
27	33.5	24	32.5	24.5	21.4	16.1	34	24	34.4	23.7	33.4	25	33.5	23.7	35	24.5
28	35.4	24.6	34.2	24.9	24	15.9	34.3	26	35.6	23.4	33.7	25.8	34.5	25.2	36.8	24.8
29	33.3	24.6	32.8	24.7	24.9	16.7	33.3	25.5	35.6	23	33.4	26.5	33.3	24	37.4	26.3
30	32.3	24.4	31.5	25.3	23.8	16.2	33.5	24.7	34.5	24	33.1	26.5	33.1	25	36.6	24.8
Mean	33.7	24.3	32.6	24.7	23	16.3	33.6	24.7	35.1	23.6	32.9	25.9	33.4	25	36.4	24.5

Date.	Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	34.4	24.5	34.8	24.3	34.7	26.5	32.2	25.4
2	34.6	25	35.1	24.3	34.1	25.8	32.4	25.8
3	33.8	24.3	34.7	24	34.5	26	32.1	26.1
4	34	24.1	35.8	23.9	35.4	25.8	33.3	23.5
5	34	24.7	36.7	24	35.8	26.9	33.2	25.2
6	35.6	24.6	36.2	23.8	36	24.4	33.4	24.7
7	34.7	24.5	35.6	25.1	34.5	26.5	32.7	27.5
8	35.2	25.4	36	24.5	33.5	26.1	33	26.8
9	34.3	25	33.8	24.5	34	25.4	33.6	24.5
10	37.5	25.8	35.9	24.5	34.5	26	32.6	26.4
11	33.8	25.1	32.4	24.8	33.4	25.7	32.8	26
12	33.8	24.3	37	24.6	32	24.6	33	26.1
13	33.4	24.5	36.7	24.3	31.6	25	32.5	23.6
14	33.7	25.5	36	24.3	31.1	25.4	32.8	25.6
15	33.7	25.3	36	24.6	31	24.7	31.9	26.6
16	32.8	24.5	36.3	23.5	29.8	25.6	32.3	25.6
17	32.5	24.2	35.8	24.3	30.8	25.3	33.1	26
18	33.8	24.1	37	23.6	31.6	26.1	33.2	27
19	33.9	24.3	35.3	23.3	33.1	25.6	32	26.6
20	33.7	23.6	35.6	24.8	33.6	25.7	33.4	24.6
21	33.4	23.8	34.6	24.2	31.4	24	33.2	25.2
22	33.2	23.9	36.2	24.5	30.4	23.9	31	25.7
23	33.5	24.2	36.6	23.5	31.1	26	32	25.5
24	33.4	25	36.2	24.8	31.4	25.6	31.4	26.1
25	33.8	24.5	36	24.5	31.2	25.4	32.8	26.1
26	33.2	23.5	33.7	24	33.7	25	33	24.5
27	33.4	23.5	35.1	24.2	32.6	24	32.5	26.2
28	34.3	23.8	35.8	24.2	31.6	23.1	33.5	24.6
29	33.7	24	34.6	25.5	32.6	22.8	32.4	26.2
30	33.3	24.6	33	24.2	32.1	25.5	32	23.7
Mean	33.9	24.5	35.5	24.3	32.8	25.3	32.6	25.6

SEISMOLOGICAL BULLETIN FOR JUNE, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

4, 6^h 0^m [4, 14 0^m]. **Port Lebak** (SW Mindanao). Earthquake shock of intensity IV.
4, 11^h 10^m 56^{s*} [4, 19^h 10^m 56^s]. **Cape Bojeador** (NW Luzon). Earthquake of intensity III-IV. Lesser aftershock at 13^h 40^m (21^h 40^m).

5, 17^h 51^m 40^{s*} [6, 1^h 51^m 40^s]. **W Mindanao**. Earthquake of intensity V-VI, originated in the Celebes Sea between Zamboanga and Cotabato. It was felt through the districts of Zamboanga, Lanao and Cotabato facing to the Illana, Dumanquilas and Sibuguey bays.

13, 8^h 55^m 29^{s*} [13, 16^h 55^m 29^s]. **SE Luzon, Samar and Leyte**. Extensive earthquake felt in the provinces of Camarines, Albay, Sorsogon, Catanduanes and the islands of Samar and Leyte. Its intensity did not exceed grade IV; the epicenter seems to have been in the Pacific, NE of San Bernardino Strait.

13, 17^h 30^m [14, 1^h 30^m]. **Ambos Camarines** (SE Luzon). Earthquake of intensity III felt only in the Isarog region.

14, 20^h 51^m [15, 4^h 51^m]. **Butuan** (N Mindanao). Oscillatory earthquake, direction NE-SW, intensity III, duration 8 seconds.

15, 14^h 37^m 32^{s*} [15, 22^h 37^m 32^s]. **W Mindanao**. Extensive earthquake originated in the Celebes Sea, very likely close to the epicenter of the shocks occurred on the 5th. It also shook with intensity IV-V the same portions of Zamboanga, Lanao and Cotabato districts.

20, 13^h 25^m 12^{s*} [20, 21^h 25^m 12^s]. **Aparri** (NE Luzon). Oscillatory earthquake, direction E-W, intensity IV, duration 7 seconds.

21, 11^h 06^m 35^{s*} [21, 19^h 06^m 35^s]. **Leyte Island**. Earthquake of intensity III, felt also in northern Cebu. The epicenter was S of Masbate Island.

22, 7^h 30^m [22, 15^h 30^m]. **Ormoc** (W Leyte). Oscillatory earthquake, direction W-E, intensity III, duration 11 seconds.

22, 16^h 18^m 4^{s*} [23, 0^h 18^m 4^s]. **W Luzon**. Earthquake of intensity III, reported only from Dagupan and Cape Bojeador. Its epicenter lay in the China Sea some distance from the Luzon coasts. Due to the distance of the center, the slowness of the waves did not awake the people of the two provinces along the coast, between Dagupan and Cape Bojeador, nearer to the origin of the shock.

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h) insular time being added in brackets for the convenience of the Philippine readers.

24, 19^h 36^m [25, 3^h 36^m]. Zamboanga (W Mindanao). Oscillatory earthquake, direction NE-SW, intensity III, duration 5 seconds. Recorded at Butuan by a seismograph.

• 30, 21^h 23^m 41^{s*} [July 1, 5^h 23^m 41^s]. Panay and Negros Islands. Earthquake shock of intensity III, felt in the Provinces of Iloilo and Negros Occidental. The epicenter lay in the strait, S of Guimaras Island.

From Tablas Island, where a very alarming seismic period began last April, some few shocks were reported: they occurred on the 17th and 19th at about 15^h; on the 28th at 21^h and on the 30th in the afternoon.¹

SEISMIC PERIOD OF ILOCOS SUR.

This short period began on the 20th of June, reached its maximum and ended on the 25th with a succession of shocks which greatly alarmed the people of Vigan and the towns, south of this city.

The first shock of the series occurred on the 20th at 12^h 46^m 44^{s*} [I. T.]. It shook the Ilocos Sur Province with intensity III-IV. The earth vibrations seem to have propagated themselves very irregularly through the neighboring provinces, it depending on the geological conditions of the soil; thus while the shock was fairly perceptible at Sagada, Bontoc, east of the epicenter, and at Aparri far away to the NE, many other nearer stations did not report any disturbance. Similar irregularity was noticed with other shocks of the series.

On the 21st at 6^h 50^m 01^{s*} occurred a second shock of minor intensity felt only within the Province of Ilocos Sur. The seismographs at Manila and Baguio had recorded also another light shock from the same origin at 5^h 33^m 37^{s*}.

During the days 22nd, 23rd and 24th no perceptible shock occurred, but the seismographs of Baguio recorded two small disturbances probably originated at Ilocos.

Early on the 25th, the strain accumulated possibly during several years reached its utmost. At 2^h 35^m 21^{s*} an earthquake of intensity VI-VII startled the inhabitants of Vigan and the towns of the vicinity and of the southern part of the province. During long fifteen seconds they were afraid lest the stone buildings with tile roofs, peculiar of the city of Vigan, would fall yielding to the terrible shocks. Fortunately only few roofs were damaged and some walls cracked.

The meizoseismic area of this earthquake comprised the region of Vigan and the southern coastal region to a distance of about 50 kilometers, but its extension inland or eastwards was very small. Yet the shocks were fairly felt through the whole island north of the 16.5° parallel.

A circumstance which greatly alarmed the people was a succession of shocks not so strong as the first but sufficiently perceptible to fear a worse earthquake. These repetitions occurred at 3^h 37^m 19^{s*}, 3^h 53^m 27^{s*}, 5^h 8^m 32^{s*} and 7^h 18^m 38^{s*}. After this last shock as if the strain would have been sufficiently released the disturbance ended so completely that not a single of the numerous shocks recorded the following days to the end of the month by the seismographs of Manila and Baguio could be traced to the Ilocos center. Outside of the Archipelago only the principal shock after two o'clock was recorded at Formosa and Batavia.

This seismic period can be considered as a confirmation of the statement made in 1909 about the existence of a local and shallow seismic center along the coast of Ilocos Sur, extending roughly from Vigan to Candon, which might be called the Abra gap center. The configuration of the Abra gap, as well as the previous northerly course of the river, and the character of the western cordillera show that there exist much faulting and give an idea of great ancient convulsions, which have yet an echo in the lesser

¹ See Bulletin for April 1919.

shocks of the present time. It seems very likely that the western cordillera by reason of faulting in the Abra gap and along the Abra river form a nearly independent tectonic block extending southwards about a hundred kilometers the more or less unstable condition of which give rise to frequent tectonic shocks of rockfall character. In the Bulletin for May, 1909, in a review of the Ilocos shocks the conclusion was reached of the existence of a seismic epicenter along or very near to the coast of Ilocos Sur, approximately located between 17° and 17.5° N. Lat. This region nearly coincides with the meizoseismic area of the last seismic period and of other similar series of shocks occurred in Ilocos. It seems that the main fault where start the vibrations which propagate to this zone lies under the sea, not distant from the coast. In the map accompanying the article "The relation of seismic disturbances in the Philippines to the geologic structure"¹ is given its approximate position.

¹The Philippine Journal of Science Vol. VIII, No. 4, Sec. A.

RECORDS OF THE MICROSEISMOGRAPH.

[T : Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N: T₀=6.62, ε=2.726, $\frac{r}{T_0^2}$ =0.021; A_E: T₀=6.03, ε=2.378, $\frac{r}{T_0^2}$ =0.037. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A _N μ	A _E μ	
202	1	II _r	(PS)	<i>h. m. s.</i>				
			L	6 54 02				
			M _N 1	56 22				
			M _E 1	56 32	5	657		
			M _E 2	56 37	6		425	
			M _N 2	57 07	6		397	
203	1	I _v	F	59 04	7	331		
			F	7 45				
204	4	I _v	eP	14 56 56				
			F	15 19				
205	4	I _v	eP	11 10 56				Felt at Cabo Bojeador (NW Luzon).
			F	13				
206	5	I _v	eP	19 32 45				
			F	37				
207	5	I _v	eP	2 04 29				Felt at Zamboanga and Cotabato (Mindanao Island).
			F	22				
208	7	I _v	eP	17 51 40				
			L	53 22				
			M _E	54 01	15		14	
			M _N	54 19	17	14		
209	7	I _v	F	18 23				
			eP	6 47 00				
			L	47 15				
			M _E	47 17	3		222	
210	10	I _v	M _N	47 26	3	110		
			F	52				
			eP	8 28 55				
			F	32				
211	10	I _v	eP	2 13 10				
			F	15				
212	10	I	eP	14 37 15				
			L	37 31				
			M _E	37 33	3		151	
			M _N	37 44	3	98		
213	11	I _v	F	42				
			e	20 19 17				
214	11	I	F	44				
			e	6 17 28				
215	11	I _v	eP	14 27 29				
			F	30				
216	12	I	e	19 58 43				
			F	20 24				
217	13	I _v	(PS)	8 55 29				Felt in southeastern Luzon and the Islands of Samar and Leyte.
			L	56 15				
			M _N	57 12	6	66		
			M _E	57 24	7		45	
218	13	I _v	F	9 07				
			eP	17 39 06				
219	13	I _v	F	42				
			(PS)	14 37 32				Felt at Zamboanga and Cotabato (Mindanao Island).
220	15	I _r	L	39 22				
			M _E	39 45	13		30	
			M _N	40 44	12	21		
			F	15 06				
221	15	I _v	e	20 05 42				
			F	18				
222	15	I _v	eP	20 32 14				
			F	35				
223	16	I _v	eP	5 13 41				
			F	17				
224	18	I	e	3 16 45				
			F	35				

Records of the microseismograph—Continued.

$A_N: T_0=6.25, \epsilon=2.566, \frac{r}{T_0^2}=0.053; A_E: T_0=6.18, \epsilon=1.909, \frac{r}{T_0^2}=0.042.$

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
223	20	Iv	eP F	<i>h. m. s.</i> 4 46 44 52				Felt at Vigan and Aparri (N Luzon).
224	20	Iv	eP F	13 25 12 35				Felt at Aparri (NE Luzon).
225	20	Iv	eP F	21 33 37 40				
226	20	IIv	eP F	22 50 01 23 01				Felt at Vigan (NW Luzon).
227	21	Iv	eP F	4 07 36 12				
228	21	Iv	eP F	6 20 25 23				
229	21	Iv	eP F	8 03 52 07				
230	21	Iv	eP F	11 06 35 14				Felt at Tacloban (NE Leyte) and at Tuburan (NW Cebu).
231	22	Iv	eP F	16 08 04 13				Felt at Cabo Bojeador (NW Luzon) and at Daguapan (W Luzon).
232	24	IIIv	eP L M _{N1} M _{E1} M _{E2} M _{N2} F	18 35 21 35 56 37 39 37 41 40 18 41 36 19 11		4 5 7 6	1,231 1,067 1,143 1,282	N Luzon.
233	24	Iv	eP F	19 37 19 49				N Luzon.
234	24	Iv	eP F	19 53 27 20 06				
235	24	Iv	eP F	21 08 32 21				N Luzon.
236	24	IIv	eP F	23 18 38 56				N Luzon.
237	25	Iv	eP L M _N M _E F	16 58 14 58 26 58 28 58 29 17 05		4 4	135 185	
238	27	Iv	eP F	9 44 29 48				
239	28	Ir	e F	4 45 29 5 37				
240	28	Ir	e F	10 33 52 11 09				
241	28	Iv	eP F	16 06 02 08				
242	29 30	I	e F	23 34 29 1 22				
243	30	Iv	eP F	4 21 58 24				
244	30	I	e F	7 39 07 8 47				
245	30	Iv	eP F	13 03 26 24				
246	30	Iv	eP F	21 23 41 35				Felt at Iloilo (E Panay) and in Negros Occidental.

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

4, 6^h 0^m [4, 14^h 0^m]. Port Lebak (SW de Mindanao). Temblor de tierra de intensidad IV.

4, 11^h 10^m 56^{s*} [4, 19^h 10^m 56^s]. Cabo Bojeador (NW de Luzón). Temblor de tierra de intensidad III-IV. Repitió a 13^h 40^m [21^h 40^m] con menos intensidad.

5, 17^h 51^m 40^{s*} [6, 1^h 51^m 40^s]. W de Mindanao. Temblor de tierra de intensidad V-VI originado en el Mar de Célebes entre Zamboanga y Cotabato, sentido en todas las costas de las bahías Illana, Dumanquilas y Sibuguey y en Lanao.

13, 8^h 55^m 29^{s*} [13, 16^h 55^m 29^s]. SE de Luzón, Sámar y Leyte. Extenso temblor de tierra sentido en las Provincias de Camarines, Albay, Sorsogón y Catanduanes y en las Islas de Sámar y Leyte. Su intensidad no pasó del grado IV; el epicentro parece se hallaba en el Pacífico al NE del Estrecho de San Bernardino.

13, 17^h 30^m [14, 1^h 30^m]. Ambos Camarines (SE de Luzón). Temblor de tierra de intensidad III, sentido solamente en la región del monte Isarog.

14, 20^h 51^m [15, 4^h 51^m]. Butúan (N de Mindanao). Temblor oscilatorio, dirección NE-SW, intensidad III, duración 8 segundos.

15, 14^h 37^m 32^{s*} [15, 22^h 37^m 32^s]. W de Mindanao. Extenso temblor de tierra originado en el Mar de Célebes, aparentemente cerca del epicentro del temblor del día 5. Sacudió con intensidad IV-V las mismas porciones de los distritos de Zamboanga, Lanao y Cotabato.

20, 13^h 25^m 12^{s*} [20, 21^h 25^m 12^s]. Aparri (NE de Luzón). Temblor oscilatorio, dirección E-W, intensidad IV, duración 7 segundos.

21, 11^h 6^m 35^{s*} [21, 19^h 6^m 35^s]. Isla de Leyte. Temblor de tierra de intensidad III; sentido también en la parte N de la Isla de Cebú. Seguramente el epicentro se hallaba al S de la Isla de Masbate.

22, 7^h 30^m [22, 15^h 30^m]. Ormoc (W de Leyte). Temblor oscilatorio, dirección W-E, intensidad III-IV, duración 11 segundos.

22, 16^h 18^m 4^{s*} [23, 0^h 18^m 4^s]. W de Luzón. Temblor de tierra de intensidad III, notificado solamente de Dagupan y de Cabo Bojeador. Su epicentro se hallaba en el Mar de la China, algo distante de las costas occidentales de Luzón. Debido a esto los movimientos tendrían un carácter ondulatorio lento, y así no consiguieron despertar a las gentes de las dos provincias situadas entre los puntos citados y a menor distancia del epicentro, en las cuales por fuerza hubo de ser igualmente perceptible.

24, 19^h 36^m [25, 3^h 36^m]. Zamboanga (W de Mindanao). Temblor oscilatorio, dirección NE-SW, intensidad III, duración 6 segundos. Registrado por el sismógrafo de Butúan.

30, 21^h 23^m 41^{s*} [Julio 1, 5^h 23^m 41^s]. Islas de Panay y Negros. Temblor de tierra de intensidad III, sentido en la Provincia de Iloilo y en la de Negros Occidental. El epicentro se hallaba en el estrecho que las separa, al S de la Isla de Guimarás.

De la Isla de Tablas, cuyo período sísmico comenzó en abril, se sabe que ocurrieron pequeños temblores, el 17 y 19 hacia las 15^h, el 28 a las 21^h y el 30 por la tarde.²

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² Véase "Bulletin for April, 1919."

PERÍODO SÍSMICO DE ILOCOS SUR.

Este corto período comenzó el 20 de Junio, llegó a su máximo y terminó el día 25 con una serie de choques que alarmaron mucho la población de Vigan y las situadas al sur a lo largo de la costa.

El primer temblor perteneciente a este período ocurrió a 12^h 46^m 44^{s*} [T. I.] del día 20. Fué perceptible en toda la Provincia de Ilocos Sur con intensidad III-IV; los movimientos se propagaron con mucha irregularidad en las provincias vecinas, el ser o no ser perceptible dependiendo más bien de las condiciones locales del terreno que de la distancia; así este primer choque y otros de la serie solo parece haberse percibido bien en Bontoc, situado al E del epicentro hacia el interior de la isla, y en Aparri muy distante al NE.

A 6^h 50^m 1^{s*} del 21 sobrevino otro de mucha menor intensidad y perceptible tan sólo en Ilocos. Los sismógrafos de Manila y de Baguio habían registrado otro choque muy débil procedente del mismo epicentro a 5^h 33^m 37^{s*}.

Los días siguientes 22, 23 y 24 no ocurrió temblor alguno perceptible, pero los sismógrafos de Baguio registraron dos sacudidas instrumentales de origen algo lejano las cuales parecen corresponder al epicentro de Ilocos.

Llegó el 25 y con él una como explosión de la tensión acumulada tal vez durante muchos años. A 2^h 35^m 21^{s*} un temblor de intensidad VI-VII sobresaltó a los habitantes de la capital, Vigan, y de los demás pueblos del sur de la provincia. Durante unos quince segundos estuvieron temiendo no se viniesen al suelo los muchos edificios de mampostería con tejado de teja, peculiares de la ciudad de Vigan, cediendo a las terribles sacudidas. Por fortuna solo resultaron dañados algunos tejados y con grietas los muros. El área meizosísmica comprendía la región de Vigan y los pueblos del sur en una extensión de poco menos de 50 kilómetros, a lo largo de la costa, y mucho menos en dirección al E, hacia el interior de la isla. El área total donde fué perceptible comprendía toda la isla al norte del paralelo 16.5°.

Lo que hizo este período temeroso fué la rapidez con que se fueron luego sucediendo nuevos temblores o réplicas del primero, menos intensas pero lo bastante para hacer temer no sobreviniese algún terremoto de peores consecuencias; dichas repeticiones ocurrieron a 3^h 37^m 19^{s*}, 3^h 53^m 27^{s*}, 5^h 8^m 32^{s*} y 7^h 18^m 38^{s*}. A esta serie siguió la calma más completa, de tal manera que ni los sismógrafos de Manila ni los de Baguio registraron ya en todo el resto del día 25 y del mes, choque alguno instrumental procedente del centro de Ilocos. Únicamente el temblor de las 2 de la madrugada fué registrado fuera de Filipinas, en Formosa y Batavia.

Este período sísmico confirma la afirmación hecha en 1909 de que en Ilocos Sur existe un epicentro algo superficial, que parece extenderse desde el N de Vigan hasta Candón, epicentro que podríamos llamar del corte del Abra. Nadie duda que la configuración del terreno del estrecho del río Abra y de la cordillera occidental que lo encauza en dirección al norte revelan fallas importantes y convulsiones antiguas, que naturalmente pueden tener eco todavía en nuestros tiempos. La cordillera y costa occidental desde la salida del Abra hasta unos 100 kilómetros hacia el sur parece formar un bloque tectónico en equilibrio poco estable donde con alguna frecuencia se desarrollan temblores geológicos sí, pero de la clase llamada de hundimiento, pues suelen tener siempre poca extensión. En el Boletín mensual de mayo de 1909, se hizo un estudio de los temblores de Ilocos Sur y sacóse como conclusión la existencia de un epicentro a lo largo o muy cerca de la costa de Ilocos Sur, al parecer entre los 17° y 17.5° de latitud. Precisamente ésta es el área aproximada donde los temblores del último período y de otros ocurridos en diversas ocasiones desarrollaron su mayor intensidad. Parece con todo que la falla primaria de donde parten los movimientos que se comunican a la expresada zona está debajo del mar poco distante de la costa. Puede verse indicada en el mapa sísmico que acompaña el artículo "Relación entre los temblores de Filipinas y su estructura geológica."¹

¹ The Philippine Journal of Science, Vol. VIII, No. 4, Sec. A.

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR JULY, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1920

BULLETIN FOR JULY, 1919.

METEOROLOGICAL BULLETIN FOR JULY, 1919.

By Rev. JOSÉ CORONAS, S. J.,
Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure of this month for the Philippines does not differ much from the July's normal, although in a great majority of our stations it is higher than that of the preceding year. The highest pressures were generally observed on the 7th or 8th, and the lowest on the 30th or 31st.

The mean monthly temperatures are almost identical with the normal of this month in practically all our stations. The extreme temperatures of the month for Manila were 33.9° C., 20.8, and they were registered on the 12th and 2nd, respectively. The highest and lowest monthly temperatures for Baguio were 25.2° C., 12.9° C. on the top of Mirador, and 24.9° C., 13.5° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR JULY, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from July, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from July, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga.....	758.26	-0.57	-----	760.35	7	756.06	30	26.1	-0.6	-----	30.5	17	21.8	28
Yap, W. Carolines.....	57.71	-----	-----	60.67	2	55.46	30	26.7	-----	-----	32.2	14	23.1	17
Tagbilaran.....	57.64	-.17	-0.04	60.14	7	54.92	30	26.8	-1	-0.5	33.1	31	22.4	7
Surigao.....	57.49	-.05	-.08	60.15	7	54.36	30	27	-.9	-.4	32.9	31	22.4	14
Cebu.....	57.67	-.01	+.09	60.28	7	54.48	30	27.6	-.4	+.2	33.7	8	22.5	5
Iloilo.....	57.65	-.05	+.19	60.32	7	54.79	30	27	-.1	+.2	34.4	9	22	2,5
Tacloban.....	57.56	+.38	+.02	60.40	7	54.19	30	27	-.5	-.3	36	16	22.5	3,8,14
Capiz.....	57.30	+.11	-.09	60.22	7	53.76	30	27.2	-.2	+.1	35.8	30	22.7	2
Calbayog.....	57.48	+.27	-.01	60.49	7	53.89	30	26.7	-.8	-.3	32.6	13	21.7	9
Legaspi.....	57.26	+.56	+.29	60.33	4	53.28	27	27.1	-.3	-.2	34.3	15	22.6	6
Atimonan.....	57.12	+.86	+.40	60.25	8	53.04	30	27.6	-.1	+.2	35.5	15,17	22.8	3
Ambulong, Tanauan.....	56.64	+.54	-----	59.69	7	52.56	30	27.2	+.2	-----	35.6	13	21.8	2,3
Paracale.....	57.04	+.87	-----	60.26	8	52.35	30	27	-.8	-----	34.3	16	23.2	4
Manila.....	57.15	+.67	-.06	60.19	7,8	53.14	30	26.6	-.3	-.4	33.9	12,13	20.8	2
San Isidro.....	57.18	+.57	+.31	60.32	8	52.92	31	26.6	+.3	+.1	35	17	20.8	10
Dagupan.....	56.14	+.71	-.11	59.40	8	51.83	31	27.2	+.5	+.2	36	19	22	3
Baguio ^a	635.19	+.84	+.37	638.13	8	630.92	31	18.1	+.8	+.1	25.2	12	12.9	3
Vigan.....	756.18	+1.05	-.02	759.90	8	751.23	31	27.8	+1	+.6	34.6	19	21	3
Tuguegarao.....	56.36	+1.51	+.37	60.28	8	50.27	31	27.7	0	-.1	37.4	12	21.5	2,3
Laog.....	56.29	+1.30	-----	59.95	8	50.76	31	27.1	+.6	-----	35.2	20	22	3
Aparri.....	56.45	+1.77	+.53	60.36	8	49.23	2	27.6	-.5	-.1	36	12	21.5	2

^a The barometric readings of this station are not reduced to sea level.

Rainfall.—In the Visayas and Mindanao the total rainfall for this month was generally greater than last year but smaller than the normal for July, while in the southern part of Luzon, including the provinces around Manila, it was not only greater than last year, but in the majority of the stations it was also above the normal of this month. In central and northern Luzon the monthly rainfall was below that of July, 1918, and below the normal. The total amount of rainfall for Manila this month is 188.2 mm. above that of the preceding year, and 399.3 mm. above the normal, while that of Baguio is 1,364.2 mm. below that of July, 1918, and 185.5 mm. below the normal.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF JULY, 1919.

Station.	Total.	Departure from July, 1918.			Days of rain.	Departure from July, 1918.			Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from July, 1918.			Days of rain.	Departure from July, 1918.			Greatest rainfall in a single day.	Day.
		mm.	mm.	mm.		mm.	mm.	mm.					mm.	mm.	mm.		mm.	mm.	mm.		
Jolo.....	170.3	+157.4	+ 6.6	17	+13	50.1	8	17	13	8	Calapan	307	+ 186.9	+ 72.7	17	+ 4	76.9	20			
Malamaui.....	147.2	— 11	— 29.3	15	— 7	18.3	26	15	26	26	Virac.....	192.8	+ 168.5	— 45.1	19	+11	35.1	1			
Zamboanga.....	75.3	+142.9	— 3	11	+ 4	21.4	1	11	1	1	Naga.....	251.5	+ 144.9	+ 10.4	17	+ 7	69.8	1			
Davao.....	193.3	+ 11	— 82.8	17	+ 8	50.8	9	17	9	9	Tigaon.....	238.8	— 26.1	—	19	+ 2	71.6	1			
Cotabato.....	191.3	+ 309.5	—	25	+13	32.8	4	25	4	4	Batangas.....	241	—	— 16.9	16	—	63.5	27			
Camp Keithley, Lanao.....	389.2	+ 74.2	— 20.6	12	+ 7	22.4	20	12	20	20	Lucena.....	131.9	+ 56.2	—	14	+ 3	57.7	29			
Butuan.....	101.3	+ 56.8	—	18	+ 7	63.9	4	18	4	4	Atimonan.....	228.3	+ 160.4	+ 10.2	16	+ 5	56.7	29			
Dumaguete.....	424.9	+ 72	+ 30.2	23	+ 5	57.1	17	23	17	17	Ambulong, Tanauan.....	444	+ 195.3	—	17	— 4	92.2	2			
Yap, W. Carolines.....	189.7	+ 149.9	— 68	17	+13	47.5	17	17	17	17	Canlubang, Calamba.....	435.9	+ 261.4	—	17	— 4	228.5	29			
Tagbilaran.....	177.1	+ 39.5	—	22	+ 8	32.5	17	22	17	17	Paracale.....	254.8	+ 152.8	— 31.5	16	+ 7	51.2	1			
Iwahig.....	223.5	+ 59.7	— 27	9	0	44.4	14, 26	9	14, 26	14, 26	408.1	+ 210.1	+ 145.2	20	+ 3	114	29				
Surigao.....	276	+ 238.4	+ 129	17	+ 9	71.2	22	17	22	22	Manila.....	810.1	+ 188.2	+ 399.3	20	—	593.5	29			
Maasin.....	222.6	+ 252.4	+ 144.9	18	+ 10	88.4	2	18	2	2	Antipolo.....	920.4	+ 205.6	—	22	—	3269.5	29			
Cebu.....	318.9	+ 58.3	— 53.9	23	+ 2	83.9	2	23	2	2	Iba.....	836.1	— 180.1	— 143	21	—	718.6	28			
Iloilo.....	370.4	+ 37.5	— 11.5	26	+ 5	87.8	26	26	26	26	San Isidro.....	282.2	— 325.9	—	21	— 8	80.3	28			
San Jose Buenavista.....	554.9	+ 147.7	— 30.5	24	+ 6	43.9	16	24	16	16	Tarlac.....	494.1	— 45.3	+ 16.7	22	—	6	29			
Cuyo.....	354.3	+ 158.3	— 74.4	17	+ 8	47	5	17	5	5	Baler.....	543.6	+ 329.3	+ 235.6	21	+ 8	112.7	22			
Ormoc.....	208.8	+ 71.5	—	17	+ 10	19.8	22	17	22	22	Dagupan.....	411.9	+ 492.4	— 139.5	19	— 10	139	30			
Guiuan.....	135.9	+ 132.6	+ 6.5	13	+ 2	53.6	21	13	21	21	Baguio.....	837.9	— 1,364.2	— 185.5	26	—	4214.1	30			
Tacloban.....	180.6	+ 54.1	— 181.5	20	+ 10	39.6	22	20	22	22	San Fernando, Union.....	416.6	+ 545	— 174.7	16	— 13	162.8	30			
Capiz.....	136.1	+ 101.6	— 38.3	13	+ 7	56.1	22	13	22	22	Echague.....	241.6	+ 102.7	+ 36.3	16	+ 2	42.3	2			
Borongan.....	150.9	+ 98.6	—	18	+ 10	46.7	1	18	1	1	Candon.....	592.3	— 838.9	—	14	— 13	164.3	2			
Catbalogan.....	217.6	+ 36.1	— 83.3	22	+ 12	18.9	22	22	22	22	Vigan.....	604.6	— 640.6	— 79.6	14	— 12	163.9	2			
Calbayog.....	127.2	+ 27.7	— 49.7	15	+ 5	49	2	15	2	2	Tuguegarao.....	277.2	+ 144.5	+ 56.9	10	—	451.3	2			
Masbate.....	136	+ 164.9	— 48	23	+ 12	41.9	20	23	20	20	Laoag.....	647.9	+ 646.1	— 39.1	15	— 10	391.7	2			
Romblon.....	220.6	+ 194.3	—	15	+ 12	42.9	19	15	19	19	Aparri.....	224.1	+ 44.1	+ 52.3	15	—	0 101.5	2			
Batag.....	207.7	—	—	20	—	33.2	20	20	20	20	Cape Bojeador.....	498.9	— 158.6	—	13	—	932.1	2			
Sorsogon.....	372.2	+ 145.8	+ 22.7	18	+ 6	52.5	1	18	6	1	Santo Domingo, Bata- nes.....	165.7	—	— 117.6	17	—	72.7	2			
Legaspi.....	259.2	— 482.1	— 145.9	22	+ 4	29.5	1	22	4	1											
Sumay, Guam.....	198.4	—	—	22	+ 4	29.5	1	22	4	1											

DEPRESSIONS AND TYPHOONS.

Only one typhoon traversed the Philippines at the beginning of this month across the Batanes Islands, although two other distant typhoons, one on the China Sea, the other on the Pacific, influenced considerably on the weather in the Archipelago, particularly in Luzon, during the last week. As these last typhoons belong partly to July, partly to August, and as they caused rains in the western part of Luzon, which were just the beginning of the largest rainy period ever recorded in Manila, we prefer to leave their tracks and the corresponding discussion of same for our monthly Bulletin of next month.

Besides the three typhoons mentioned, there were two other depressions observed in higher latitudes in the Far East. They did not influence the weather of the Philippines, but moved northward, one near the Bonins on the 12th to 15th, and the other between the Loochoos and the Bonins on the 15th to 18th.

The typhoon of the Batanes Islands and southern Formosa.—This typhoon appeared on the 27th and 28th of June as forming over the Western Carolines to the SSW of Guam and E of Yap, in about 10° latitude N and near 143° longitude E. It moved WNW until July 1, when it inclined northward taking a NW direction toward the Batanes Islands and southern Formosa.

The following warnings were given out by Manila Observatory from June 28 to July 2.

June 28, 11.50 a. m.: A new typhoon seems to be forming since yesterday near or over the Western Carolines to the southwest of Guam.

June 29, 2 p. m.: The typhoon of the Western Carolines was probably situated at 2 p. m. near 139° longitude E and 12° latitude N moving WNW.

June 30, 4 p. m.: The typhoon was probably situated at 6 a. m. to-day about 500 miles to the east of San Bernardino Strait or of southern Luzon moving apparently to WNW.

July 1, 11.50 a. m.: The typhoon seems to be situated this morning about 300 miles to the east of central Luzon moving probably WNW.

July 2, 10.45 a. m.: The typhoon was situated at 6 a. m. to-day between 18° and 19° latitude N, between 123° and 124° longitude E moving probably NW at present, it having inclined northward since yesterday.

The center of the typhoon passed close to the south of Santo Domingo, Batanes Islands, at 10.30 p. m. of the 2nd, the barometer having fallen there to 743.3 mm. In the early morning of the 3rd it passed close to the south of Formosa, and finally it entered China to the north of Swatow late in the evening of the same day. It is to be remarked, however, that on July 3, during practically the whole day, a secondary cyclonic center was observed over the northern part of Formosa.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas no difiere mucho de la normal de julio, aunque en una gran mayoría de nuestras estaciones es mayor que la del año pasado. Las presiones más altas se observaron generalmente el día 7 u 8, y las más bajas el 30 ó 31.

La temperatura media mensual es casi idéntica a la normal de este mes prácticamente en todas nuestras estaciones. Las temperaturas extremas del mes en Manila fueron 33.9° C. y 20.8° C., las cuales se registraron los días 12 y 2, respectivamente. Las temperaturas máxima y mínima del mes en Baguio fueron 25.2° C., 12.9° C. en la cumbre del Mirador, y 24.9° C., 13.5° C. en el valle.

Precipitación acuosa.—En Visayas y Mindanao la lluvia total de este mes fué generalmente mayor que la del año pasado, pero menor que lo normal de julio, mientras que en la parte meridional de Luzón, incluyendo las provincias cerca de Manila, no sólo fué mayor que la del año pasado sino que en la mayoría de las estaciones fué también mayor que la normal de este mes. En el centro y norte de Luzón la lluvia mensual fué menor que la de julio de 1918, y menor también que la normal. La cantidad total de lluvia en Manila durante este mes es mayor que la del año pasado en 188.2 mm., y mayor que la normal en 399.3 mm., al paso que la de Baguio es menor que la de julio de 1918 en 1,364.2 mm., y menor que la normal en 185.5 mm.

DEPRESIONES Y TIFONES.

Un solo tifón cruzó las Filipinas a principios de este mes a través de las Islas Batanes, aunque otros dos tifones lejanos, uno en el Mar de China y otro en el Pacífico, influyeron notablemente en el tiempo del Archipiélago, sobre todo de Luzón, durante la última semana de este mes. Como estos últimos tifones pertenecen parte a julio y parte a agosto, y como produjeron lluvias en la parte occidental de Luzón, que fueron precisamente el principio del período lluvioso más notable registrado hasta el presente en Manila, preferimos dejar sus trayectorias y el correspondiente estudio de las mismas para nuestro Boletín del próximo mes.

Además de los tres tifones ya mencionados, hubo otras dos depresiones observadas en más altas latitudes en el Extremo Oriente. Dichas depresiones no influyeron en el tiempo de Filipinas, sino que se movieron al N, una cerca de Boníns los días 12 al 15, y la otra entre Loochoos y Boníns los días 15 al 18.

El tifón de las Islas Batanes y sur de Formosa.—Este tifón apareció los días 27 y 28 de junio como formándose en las Carolinas Occidentales al SSW de Guam y E de Yap, en los alrededores de 10° latitud N y cerca de 143° longitud E. Se movió al WNW hasta el 1.º de julio, en que se inclinó al N moviéndose al NW en dirección a las Islas Batanes y sur de Formosa.

Los siguientes avisos de tifón fueron expedidos por el Observatorio de Manila desde el 28 de junio hasta el 2 de julio:

Junio 28, 11.50 a. m.: Un nuevo tifón parece estarse formando desde ayer en, o cerca de, las Carolinas Occidentales al SW de Guam.

Junio 29, 2 p. m.: El tifón de las Carolinas Occidentales se hallaba probablemente a las 2 p. m. cerca de 139° longitud E y 12° latitud N, moviéndose al WNW.

Junio 30, 4 p. m.: El tifón se hallaba probablemente a las 6 a. m. de hoy a unas 500 millas al E del Estrecho de San Bernardino o del sur de Luzón, moviéndose aparentemente al WNW.

Julio 1, 11.50 a. m.: El tifón parece hallarse esta mañana a unas 300 millas al E del centro de Luzón, moviéndose probablemente al WNW.

Julio 1, 11.50 a. m.: El tifón parece hallarse a 6 a. m. de hoy entre 18° y 19° latitud N, entre 123° y 124° longitud E, moviéndose probablemente por ahora al NW, habiéndose inclinado al N desde ayer.

El centro del tifón pasó cerca por el sur de Santo Domingo, Islas Batanes, a las 10.30 p. m. del día 2, habiendo bajado el barómetro de dicha estación a 743.3 mm. En la madrugada del día 3 el tifón pasó cerca por el sur de Formosa, y finalmente penetró en China por el norte de Swatow la noche del mismo día. Es de notar, sin embargo, que el 3 de julio, prácticamente durante todo el día, se observó un centro ciclónico secundario en la parte septentrional de Formosa.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[Φ=14° 34' 41" N; λ=120° 58' 33" E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pres- sure (mean).	Air temperature. ^b			Underground temperature.				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.			Evaporation. ^b		
		Mean.	Maxi- mum.	Mini- mum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Mini- mum on grass.	Maxi- mum in sun. Black bulb in vacuo. ^c	Free expo- sure (to- tal).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a. m.	8 a. m.				
		mm.	°C.	°C.	°C.	°C.	°C.	°C.			°C.	°C.	Per ct.	mm.	°C.	°C.
1	754.23	26.9	31.2	23.4	29.7	31.5	30.7	31.1	30.5	29.5	83	21.7	22.7	51	2.6	1.7
2	55.53	23.5	25.8	20.8	28.7	29.5	30.3	30.6	30.6	29.6	93.7	20.2	22	29	0	.5
3	59.04	24	27.2	21.5	27.5	28.2	29.2	29.3	30.6	29.6	91.1	20.2	20.2	39.4	.8	.8
4	59.98	26.9	32.2	22.5	27.9	30.3	29	29.5	30.6	29.6	80	20.8	21	51.8	3.6	2.3
5	59.64	27.3	32.1	22.8	29	31	29.5	29.9	30.5	29.5	81.4	21.7	21	51	3.1	2
6	59.45	26.1	31.5	22.9	29.4	30.7	29.8	30.1	30.4	29.6	85.1	21.2	21	51.2	2.2	1.5
7	60.19	26.6	32.2	22.8	29.3	31.3	29.8	30.3	30.4	29.7	83.4	21.3	21.5	51.5	2.8	1.7
8	60.19	26.6	32.2	22.9	29.5	31.1	29.9	30.5	30.3	29.7	83.6	21.4	21.1	52.2	2.7	1.7
9	59.44	26.7	32.5	23.4	29.6	31.2	30.1	30.5	30.3	29.7	84	21.8	21.8	51.5	2.8	1.8
10	58.38	27.6	33.3	21.7	29.3	31.3	30	30.5	30.3	29.7	76.9	20.7	20.5	52	4.4	2.4
11	58.66	28.3	32.9	24.2	30.1	32.3	30.3	30.9	30.3	29.7	81.2	23	22.4	52.6	3.8	2.5
12	59.30	28	33.9	24.4	30.4	32	30.6	31	30.3	29.7	82.6	22.9	22.6	53	3.5	2.1
13	59.04	28.6	33.9	24.7	30.4	32.3	30.9	31.1	30.3	29.8	80.2	23.1	23.1	52.5	2.8	1.7
14	58.62	28.2	33.3	23.7	30.6	32.3	31	31.3	30.5	29.7	80.2	22.5	23.5	52.9	3.6	2.3
15	57.72	27.6	32.8	23	30.8	32.5	31	31.3	30.5	29.8	81.6	22.1	22.1	51.5	3.9	2.5
16	57.58	27.8	33.5	23.8	30.6	32.2	31.1	31.3	30.5	29.8	80.7	22.1	22.3	52.2	4.2	2.5
17	58.32	27.3	33.1	23.1	31.4	32.1	31.1	31.5	30.4	29.8	81.6	21.7	22.6	53	3.4	2.2
18	57.97	26.7	31.8	22.8	30.5	31.5	30.8	31.2	30.3	29.7	84.4	21.7	21.8	52.2	2.5	1.7
19	57.13	27.1	32	23.2	30	31.5	30.8	31.2	30.4	29.8	83.3	22	21.1	53	2.4	1.7
20	56.88	25.3	28.4	23.3	29.9	30	30.7	30.7	30.5	29.7	91	21.8	21.8	40	.5	.6
21	56.20	27.3	31.7	23.5	29.5	31	30.5	30.7	30.6	29.8	83.5	22.4	21.6	50.4	2.1	1.4
22	56.24	26.1	29.7	24	29.7	30.2	30.5	30.5	30.6	29.7	89.8	22.6	22.5	45.6	.7	.8
23	56.14	25.8	29.7	24.2	29.4	30	30.5	30.4	30.5	29.7	91	22.4	23	49	.8	.7
24	55.49	26.1	31.1	23.8	29.2	29.7	30	30.1	30.4	29.8	90.3	22.5	22.6	49	.7	.9
25	56.11	26.8	30.7	24	29.4	30.1	30	30.1	30.6	29.7	85.8	22.4	22.9	48.6	1.7	1.5
26	55.51	26.8	30.6	24.5	29.3	30.5	30	30.2	30.5	29.7	84.6	22	23.9	47.9	2	1.5
27	54.02	25.2	27.9	23.6	29.5	29.9	30.1	30.2	30.4	29.7	91	21.7	23.4	38	0	.7
28	54.10	24.6	26.4	23.6	28.4	28	29.5	29.2	30.4	29.7	95	21.9	23.3	26	0	.4
29	54.04	24.1	26.3	23.2	26.1	25.7	27.3	27	30.2	29.5	96.7	21.5	22.9	25.4	0	.2
30	53.14	26.4	29.1	23.6	25.7	26.6	27.2	27.3	29.5	29.5	90.2	23	23.1	46.5	1.3	1.3
31	53.36	27.4	31	23.9	26.5	27.3	27.3	27.2	28.6	29.5	84.1	22.8	23.2	51.9	2.1	2
Mean	757.15	26.6	31	23.3	29.3	30.4	30	30.2	30.3	29.7	85.5	21.9	22.2	47.5	2.2	1.5
Total															67	47.6
Departure from normal	-0.06	-0.4	0	-0.4							+0.5	-0.5			-6.6	

Day.	Wind.				Clouds.				Sun- shine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.
	Prevailing direction.	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.		h. m.		mm.	mm.	
						Upper.	Lower.					
						On the tower.	In the park.					
1	W quad.	188.5	18	WNW	9.6	Ci.-S.	Cu. N	2 05	70.4	71.6	☁ ☉ p.	
2	E quad.	240.5	34	WSW	10	-----	N. WSW	0 00	48.5	53.1	☉ a. p. ☉ p.	
3	SE	180	14	SSW	10	Ci.-S.	S.-Cu. WSW	7 00	4.8	4.6	☉ a. ☉ p.	
4	Variable.	137.5	13	WNW	6.8	A.-Cu. E	Cu. E	7 00				
5	NE quad.	98	13	ESE	5.7	Ci.-S.	Cu. E	6 40				
6	N quad.	124.5	14	WNW	7.5	A.-cu. E by N	Cu. E	4 20	7.1	7.2	☉ a. ☁ ☉ p.	
7	NE quad.	108.5	13.5	WNW	7.5	A.-Cu. E	Cu. N by E	7 10		.3	☁ ☉ p.	
8	NE	104	11.5	WNW	5.1	Ci.	Cu. E	6 30			☁ ☉ p.	
9	NE quad.	116	13	N	5.4	A.-Cu. E	Cu. ESE	6 35			☁ ☉ p.	
10	SW quad.	145.5	15	SW	3.4	Ci.	Cu. E	8 40			☁ ☉ p.	
11	SSW	178	16	SW, SSW	5.2	Ci.-S.	Cu. NW	8 05			☁ ☉ p.	
12	E	131	13	W, WNW	5.4	Ci.-S.	Cu. E	7 55			☁ ☉ p.	
13	SW quad.	143.5	13	SW	3.4	Ci.	Cu. E	9 15	.1	.1	☁ ☉ p.	
14	NE	162	26	NE	4.8	A.-Cu. NW	Cu. NNE	7 40		.3	☁ ☉ p.	
15	SW, W	181	19	SW	3.7	Ci.	Cu. E	9 25	13.5	14.5	☁ ☉ p.	
16	NE	195	18	WNW	5.3	Ci.	Cu. NW	7 20			☁ ☉ p.	
17	W quad.	175	21.5	NNE	7.8	Ci.-S.	Cu. NE	5 50	13.7	15.2	☁ ☉ p.	
18	NE	95	12	WNW	7.3	Ci.	Cu. ESE	4 35			☁ ☉ p.	
19	NE	112	13	W, WSW	6.7	Ci., Ci.-S.	Cu. E	6 15	2.8	2.8	☁ ☉ p.	
20	NE quad.	64	7.5	NNE	9.8	Ci.-S. NE by E	N., Cu.-N. NNE	0 05	4.8	5.1	☉ a. d p.	
21	NE	98	7.5	E	7.9	Ci.	Cu. E, ENE	7 05	7.4	7.4	☉ p.	
22	NE	83	8	NE	9.3	Ci.-S.	Cu. E	0 00	.3	.9	☉ p.	
23	W	89.5	13	NW	9.2	Ci.	Fr.-N., N. E	1 40	34.9	34	☉ a. ☁ ☉ p.	
24	SE	94.5	13	SSW	9.5	Ci.-S. WNW	Cu. S	2 25	5.8	6.6	☉ a. ☁ ☉ p.	
25	SE	172	14	SE	9.3	Ci.-S.	Cu. ESE, SSE	0 10	2.2	2.3	☉ a. ☁ ☉ p.	
26	SW quad.	150.5	18	SE	9.8	Ci.-S.	Cu. SW	0 25	1.9	2.1	☉ a. ☁ ☉ p.	
27	SSW	266.5	30	WSW	10	Ci.-S.	N. SW	0 00	51	55.5	☉ a. ☁ ☉ p.	
28	NE, SW	193	19	SW	10	-----	N. SW	0 00	195.2	200.4	☉ a. p. ☁ ☉ p.	
29	NW quad.	190	28	NW	10	-----	N. WSW	0 00	293.5	310.6	☉ a. p. ☁ ☉ p.	
30	SW, WSW	454.5	39	WSW	9.8	Ci.-S.	N.-cf. W	1 05	36.7	43.9	☉ a. p. ☁ ☉ p.	
31	SW	518.5	40	SW	7.8	Ci.-S.	Cu. WSW	4 25	15.5	16.8	☉ a. p.	
Mean		167.4	17.7		7.5			4 17				
Total		5,189.5						132 40	810.1	855.3		
Departure from normal		-3,059.2			-0.3			-9 41	+399.3			

^a All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[$\phi=16^{\circ} 25' N$; $\lambda=120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Air temperature at Mirador (on the top of the mountain).					Air temperature in the valley (near the city hall).					Relative humidity (mean).	Vapor pressure (mean).	Radiation.			Evaporation.	
	Pressure ^b (mean).	Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.	Hour.			Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).	
																	mm.
1	633.01	18	22.4	1.00p.	15.5	10.50p.	23.9	0.50p.	15.7	4.55a.	92.7	14.3	14.2	55.7	0	0	
2	32.14	15.3	16.4	11.00a.	13.5	5.55p.	17.2	0.05a.	13.7	5.45p.	97.8	12.6	14.9	21.7	0	0	
3	35.14	16.5	19.4	1.00p.	12.9	2.20a.	20.2	1.10p.	13.7	2.40a.	88.8	12.3	12.9	42.8	5.1	1.6	
4	37.49	17.4	22.3	0.40p.	14.9	5.40a.	22.5	0.50p.	15.6	5.30a.	81.3	12	14.5	56.8	3.3	1.6	
5	37.68	18.7	23.6	3.00p.	15.3	5.10a.	24	3.25p.	13.5	4.40a.	77.5	12.5	12.8	53.3	4	2.3	
6	37.37	17.8	23.4	0.45p.	14.7	9.40p.	24.4	1.10p.	14.4	10.50p.	82.8	12.6	12.9	58.8	2.8	1.8	
7	37.92	17.9	21.2	9.05a.	15.7	6.00a.	21.7	3.20p.	14.9	5.20a.	90.7	13.8	13.3	54.2	1.5	1.2	
8	38.13	19	23.5	0.30p.	15.5	5.50a.	23.9	2.00p.	15.2	6.00a.	85	13.8	13.8	57.5	2.3	1.2	
9	37.58	18.6	24.5	1.30p.	16.3	5.50a.	24.5	1.00p.	15.2	5.00a.	89.3	14.2	13.5	60.9	1.6	1.1	
10	36.60	18.6	22.8	11.30a.	15.9	2.00a.	22.9	1.35p.	15	5.20a.	80.3	12.9	13.6	59.6	2.8	1.5	
11	36.91	18.8	24.5	1.40p.	15.7	5.20a.	24.4	1.55p.	14.1	4.20a.	83.8	13.6	13.5	58.4	2.5	1.3	
12	37.60	19.7	25.2	2.00p.	16.6	6.00a.	24.9	10.20a.	16.4	6.00a.	87.2	14.9	15	57.1	2.1	1.3	
13	37.47	18.7	23.5	1.00p.	16	5.50a.	24	10.20a.	15.2	5.50a.	89.2	14.4	14.6	59.6	1.5	1.2	
14	37.03	19.1	24.6	1.50p.	15.9	4.55a.	24.9	1.05p.	15.8	5.10a.	83	13.7	14.1	60	3.3	1.9	
15	36.15	18.7	23.8	1.50p.	16.6	4.55a.	24.2	0.05p.	15.4	5.15a.	81.7	13.1	15.2	59.6	2.7	1.8	
16	36.04	19.1	24.3	2.20p.	16.8	5.30a.	24.4	2.25p.	16	4.25a.	85.2	14	14.9	59.1	2.5	1.3	
17	36.42	18.7	24.2	1.40p.	16.8	5.20a.	24	1.50p.	16.4	6.00a.	85.2	13.7	15.6	60	2	1.3	
18	36.18	17.8	23.3	1.05p.	16.4	5.25a.	24.4	0.55p.	16.2	5.20a.	91.2	13.8	15.4	56.7	1.3	.9	
19	35.80	18.7	23.8	10.05a.	16.3	6.00a.	23.5	10.40a.	16	5.00a.	86.7	14	15	59.8	1.8	1.2	
20	35.24	18.4	23.2	9.10a.	16.4	6.00a.	23.4	9.05a.	15.9	6.00a.	82.5	12.9	14.9	53.1	3.4	2.2	
21	35	19.3	24	11.05a.	16.2	4.05a.	24.8	11.55a.	15.4	6.00a.	85.3	14.2	14.3	56.9	2.3	1.2	
22	34.76	18	23.3	11.05a.	16.3	6.00a.	24.9	11.25a.	16	4.55a.	88.7	13.7	14.9	59.8	1.3	1.1	
23	34.36	17.9	23.3	1.25p.	16.1	2.10a.	23.8	1.50p.	16.8	2.55a.	89.5	13.6	15.6	59.1	3	1.8	
24	33.42	17.4	21.3	0.30p.	16.1	2.25a.	21.9	0.25p.	16.2	5.00a.	96.2	14.3	15.2	51.7	.1	0	
25	33.83	17.2	20.2	0.55p.	16.3	4.10a.	21.4	1.00p.	16.9	4.00a.	98	14.3	16.4	52.8	0	0	
26	33.46	17.7	20.1	2.40p.	16.4	4.55a.	21.2	3.55p.	16.9	4.20a.	95.2	14.3	16.4	43.8	1.2	.5	
27	32	18	22.8	0.55p.	16.6	4.20a.	23.9	1.00p.	17.1	4.00a.	95.2	14.6	16.4	56.9	1.3	.6	
28	32.11	17.9	20.9	10.25a.	16.2	5.35a.	20.9	3.50p.	16.2	5.30a.	94.7	14.4	16.3	53.3	.6	.2	
29	31.97	17.3	19.3	Noon	16.4	3.00a.	20.5	11.45a.	16.9	3.05a.	97.5	14.3	16.4	41.3	.2	.1	
30	31.20	17.1	17.9	1.10p.	15.8	5.00p.	18.5	1.10p.	16.4	5.05p.	99.5	14.5	18	25.4	0	0	
31	30.92	17.3	17.8	9.25a.	16.4	9.00p.	18.5	2.30p.	17.1	6.00a.	98.7	14.5	16.1	35.8	0	0	
Mean	635.19	18.1	22.3		15.9		22.8		15.7		89	13.7	14.9	53	1.8	1	
Total															56.5	32.2	

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. ^d	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.				
						Upper.	Lower.			
1	W	367.1	28.5	NW	9.9	Ci.-S.	Cu.-N. NNW	2 05	36	≡ 2 p.
2	W	1,171.5	68.6	W	10		N.	0 00	187.8	≡ 2 p. a. p.
3	SW	635.8	49.3	W	9.9	Ci.-S.	Cu.-N. SW	0 00	12.2	≡ 2 p. a. p.
4	S quad.	426.1	35.7	W	8.3	Ci.-S.	Cu.-N. S	3 05	17.5	≡ 2 p. a. p.
5	E, SW	259.3	21.1	W	6.7	A.-Cu. E	Cu.-N. wsw, SSE	5 15		≡ 2 p. a. p.
6	W, NE	284.6	27.4	W	5.7	Ci.	Cu. E	4 45	24.2	≡ 2 p. a. p.
7	W quad.	232.6	16.7	E	8.4	A.-Cu. NE	Cu.-N. Variable	0 50	14	≡ 2 p. a. p.
8	E quad.	269.2	21.5	W	5.7	A.-Cu. WSW	Cu.-N.	5 45		≡ 2 p. a. p.
9	NW quad.	292.2	28.8	NW	6.6		Cu.-N. NNW, wsw	4 15	39.9	≡ 2 p. a. p.
10	W	247.8	21.5	W	5.1	Ci.	Cu. SE	2 10		d° p.
11	W	261.3	24.3	W	3.9	Ci.-S.	Cu.-N. W	7 25		≡ 2 p. a. p.
12	E quad.	253.1	22	NW	5.9	Ci.-Ci.-S.	Cu. N	5 35	2.9	≡ 2 p. a. p.
13	W quad.	261.6	23.6	W	5.6	Ci.	Cu.	3 40	2.1	≡ 2 p. a. p.
14	Variable	324.1	21.7	SW	4.9	Ci.-Ci.-S.	Cu.-N. w, NNW	5 40	24.6	≡ 2 p. a. p.
15	W, NE	330.7	27.2	W	5.3	Ci.	Cu. Variable	6 35	3.3	≡ 2 p. a. p.
16	SE, W	292.7	23.1	W	5.9	Ci.	Cu.-N. Variable	3 55		≡ 2 p. a. p.
17	E quad.	303.9	25.2	W	7.1	Ci.	Cu.-N. NE	3 35	37.6	≡ 2 p. a. p.
18	E, W	329.1	22.2	W	6.7	Ci.	Cu.-N. S	2 50	19.3	≡ 2 p. a. p.
19	Variable	228.5	23.3	W	6.9	Ci.-Ci.-S.	Cu. NW, E	3 55	.5	≡ 2 p. a. p.
20	E	336.3	29.6	E	6.6	Ci.	Cu. W	3 40	1.8	≡ 2 p. a. p.
21	E	223.6	18.5	E	6.1	Ci. NNW, NE	Cu. E	4 45	1.6	≡ 2 p. a. p.
22	E quad.	312.3	25.1	NW	7.4	Ci.-Ci.-Cu. E	Cu.-N. SE, ESE	1 05	39.4	≡ 2 p. a. p.
23	E	503	38.6	E	8	A.-Cu. E	Cu.-N. SE	2 15	4.6	≡ 2 p. a. p.
24	W, E	310.1	34.9	E	10	Ci.-S.	N. SE	0 10	24.9	≡ 2 p. a. p.
25	SE	544.7	35.7	SE, E	9.9	A.-Cu.	N.	1 00	18.6	≡ 2 p. a. p.
26	SE, E	608.4	37.3	SE	9.3	Ci.-S.	Cu.-N. S	0 15	4	≡ 2 p. a. p.
27	E, SE	332.6	33	SE	9	A.-Cu. SSE	Cu.-N. ESE, SW	2 35	25.4	≡ 2 p. a. p.
28	SE quad.	226.2	30.6	SW	9.9	Ci.-S.	Cu.-N. SSW	1 10	3.6	≡ 2 p. a. p.
29	W	574.8	43.8	W	10		Cu.-N.	0 00	50.3	≡ 2 p. a. p.
30	SW	1,419.5	75.4	SW	10		N.	0 00	214.1	≡ 2 p. a. p.
31	SW	1,585.9	85.3	SW	10		N.	0 00	27.7	≡ 2 p. a. p.
Mean		443.2	32.9		7.6			2 51		
Total		13,738.6						88 15	837.9	

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
^b The barometric readings of this station are not reduced to sea level.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
^d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, JULY, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Jolo	2.3				15.7											
Lais, Malita, Davao	4.3			6.1				2.8	50.1	22.9	6.4	3.1	12.5		3.5	20.9
Port Lebak, Cotabato	70.6			5.6	6.1											1.5
La Union, Davao ^a									4.6			2				
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a				14.5		19	5.8	1.8	25.9	13.2	1.5	2.3	9.4	6.9	3.8	
Basilan Plantation, Isabela, Basilan, Office ^a																
Parang-Lalap, Isabela, Basilan ^a	30.5				15.2		21.6	19	29.2	31.7	21.1		9.1	27		25.4
Latuan, Isabela, Basilan ^a	36.9				21.1		29.9	6.4	7.4	2.5	2		19.6	54.6	7.7	8.1
Malamaui, Zamboanga	40.4				17.8		17.8	3.6	6	1.6	7.1		14.7	13.5	2.3	5.6
Cuabo, Davao	6.9			10.4		7.9			14.5	10.2	6.9		10.2	7.8	6.6	7.4
Zamboanga		2.5		22.1					1.6				2.5		16.2	3.3
Fort Pikit, Cotabato	21.4				4.6	3		5	6.3	1.8			2.3			
Davao	4.6			2	.5	9.4	1.8	15.5	31.7	2.8			10.4			
Sirib, Guianga, Davao ^a	6.9			6.6	2.8		6.4		50.8							
Bual, Cotabato	10.9			8.9			5.8	9.4							24.1	11.4
Cotabato	1.8			7.6			.5	6.9								
Naga-Naga, Zamboanga	11.2			32.8	1.3		5.3	17	13.7	8.6			14.2			1
Malabang, Lanao	10.7	14.3	5.6	7.1	12.7		1.8	2.3				6.9	13			
Malangas, Zamboanga ^a	25.4			8.9	2.5			.5				26.9	40.6	7.6	7.6	3.6
Lumbatan, Lanao ^a	8.6	25.9	5.8		17.5	19.6	13	14	19			6.1		25.2	2.3	3.3
Ganassi, Lanao	56.1		2.5				.8	8	3.8			5.1	22.9	10.2	5.1	10.4
Moncayo, Davao ^a	19.6			7.9	.3		1.5	3.3	6.1	9.9	1		6.4	.3		13.7
Camp Kalaw, Moncayo, Davao	7.9			10.7		27.9				9.9						30.5
Mailag Agricultural School, Bukidnon	12.4	.3		6.9	1.3	49	3.6		9.1	24.7	10.2	.5	50.8		8.4	49.5
Camp Keithley, Lanao	39.6			47.3	17	3.8	6.2	1.3	4.6	18.3	14.5	4.1	14.7		.8	8.9
Pantar, Lanao ^a	46.5			21.3	9.7	8.4	5.9	7.6	8.9	9.7	2.5	18.3	17.8	7.6	35.6	43.2
Veruela, Agusan	1.8			11.7	.8				.5	2.8			11.7	16.5		8.1
Sumilao, Agusan	23.6	.3		3.8	4.4		8.6		4.1	31.3	1.8	10.2	5	45.8	.5	6.4
Diklom, Bukidnon ^a	12.7			1.5	45.5		1.5	6.1	.5	5.8			2	.5	.8	7.6
Talacogon, Agusan	.5			4.6			1.5	1	3				7.6	2.5	27.4	8.6
Butuan	13.7			7.9	19.8											
Dumaguete	13.7			63.9				3	1	7.4			2.8	8.7		
Hacienda San Jose, Tanhai, Bais (Sur), Oriental Negros ^a		15.2	7.6		53.3											24.6
Palanas, Bais (Centro), Oriental Negros ^a		12.7		50.8				25.4		.3		1.5				25.4
Hacienda Tamogon, Bais (Norte), Oriental Negros ^a		8.1	2.5		8.9	5.1										
Yap, Western Carolines	2.5	28	6.6			31.2						5.8	19.4	7.9	1.8	16.5
Tagbilaran	2			12.4	9.7					2.2			.5	4.1	3.6	10.9
Iwahig	7.6	24.7	17.8	.3		1.3					.5		14.5	13	.3	.1
Dalaguete, Cebu	10.4			8.4			8.6	4.8	40.4	2.8			6.1		4.6	1.5
Surigao	11.4			34.3				20.8					37.3			.8
Central Palma, Ilog, Occidental Negros	15.5	.8	.8	7.7	10.2	42.6					2.3	1.8	15.5	2.8	19.8	2
Hacienda Naval, Himamaylan, Occidental Negros	20.1	1.6	.6	8.4	12.2	33.5			13.7	1.8	1.8	8.6	19.8	16.5	.8	
Biaong Cui's Farm, Barili, Cebu	3			61.2	27.2			18.8				1.3	1.5		1	
Maasin														44.4		
Isabela, Occidental Negros	33.8	8.4	1.8	9.4	55.9	16			30.9	10.7	23.4	.3	12.2	14.5	16	
Hacienda Tanolo, Hinigaran, Occidental Negros	10.4	.8		7.1	14.3	11.7	.3		.3		1.8		2.8	4.6	.8	
Cebu	16	88.4		15					11.7	20.3			1.3	4.9		
La Castellana, Occidental Negros	62.5	3	1.1	9.9	13	13	.3			30.5	6.4	7.6	7.9	7.1	6.1	
Hacienda Vallehermoso, Oriental Negros ^a	39.4												52.1	34.3		
Hacienda Canlaon, La Castellana, Occidental Negros	80	1.5		17.8	39.9	7.1	1	.8	9.9	2.8	59.7		4.1	26.4	50.3	
Central Azucarera, La Carlota, Occidental Negros	20.8	3.3		12.9	17.3	6.4		17.3	12.2	.8	55.6	29.7	3.1	4.6		
La Carlota, Occidental Negros ^a	33.5	4.3	.3	9.4	15.5	6.1		19.3	13	2.5	51.8	1.3	22.1	1.3	1.8	
Valladolid, Occidental Negros	1	11.7		15.5	13.7	6.4		1.8			9.1		.8	4.3		32.3
Hacienda San Antonio, Occidental Negros ^a									22.9							21.6
Hacienda San Carlos, Occidental Negros ^a				17.5	.3	3.3		4.6		.3			21.8		44.4	5.8
Hacienda Refugio, Occidental Negros ^a									20.8				8.6			38.1
Santa Cecilia, Ma-Ao sugar central, Bago, Occidental Negros	5.8	6.9	5.6	6.1	4.8	5.3			10.9	14.3	4.9	.3	11.9	4.3		
Murcia, Occidental Negros	2.8	17	57.9	24.9	9.7	3.3		11.4	.8	4.6	46.8	27.2	47.8	24.4	4.6	
Iloilo	8.1	83.9		9.4	37.3	.5					.8			11.4		.5
Tuburan, Cebu	.5			15.2		3	.5		.3	2		25.7	2.5	.5		7.9
Concepcion, Talisay, Occidental Negros		21.6	15.5	23.1	5.6	4.6		1.8	7.6	.8	8.6	.5	7.6	10.6		
San Jose Buenavista	86.4	77.7	4.8	2	14.8	5.6	.3	.3	16		1.3	12.7	1.1	3.9	.3	
Silay, Occidental Negros		67.3	3.8	23.6	1.5	1.3			1					9.4		
Cuyo	35.5	22.1	7.9					9.7	3		2	23.4	1	13.2	2.5	43.9
Lucena, Iloilo ^a	58.4	40.7		3	49.5								13	56.2		
Victorias, Occidental Negros	.5	97.2		6.4		.5		8.6	2.3		2		4.1			
Cadiz, Occidental Negros		11	2.5	7.4	.8			2	7.6			2				.3
Hacienda Bilbao, Manapia, Occidental Negros		68.4	8.9	6.6			14		4.1	3.6						
Ormoc	20.3	11.4		6.6	47			11.2	.8		8.6	7.1	4.8			
Guituan				6.9				1.5			2.8		19.3	10.2		
Bogo, Cebu	4.5			29.5			1		20.3	.8	2	19	7.9	.8		30.2
Dueñas, Iloilo ^a		20.8		19.6	16	7.6			7.4				17.8			
Bitogon, Iloilo (Railroad Iloilo to Capiz) ^a		15		15.5		34.3			3				15.7	13.7	4.1	

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, July, 1919—Continued.

Station.	Day of month.														Total.		
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.		31.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Jolo		21.3			0.5	0.3	0.8		0.3	4.1						170.3	
Lais, Malita, Davao	15.5	35.6	5.8	0.5	2	7.1	3	7.6	.8		1.3	12.2				111.7	
Port Lebak, Cotabato		5.6		10.9		8.1	12.2		18.8	24.4	27.4	25.4				238.5	
La Union, Davao ^a	12.7	25.4	23.4	8.4	14.3	7.4		42.2	.8							180.7	
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a	7.6		5.1	26.4		15.2		3.3	6.6	6.9						175.2	
Basilan Plantation, Isabela, Basilan, Office ^a	11.4	5.6		8.1	26.4		12.5		2.5	2.5		14.2				313	
Parang-Lalap, Isabela, Basilan ^a	6.4			12.7	17.3		5.6	12.4	1.5	2.3		3.5				257.9	
Latuan, Isabela, Basilan ^a	3.8				13		5.6	7.4	.8	9.9		1.8				172.7	
Malamaui, Zamboanga					11.4		9.1	16		18.3	3.6					147.2	
Cuabo, Davao	3.8	21.8	26.2	7.6	28.4		14.7	.8	10.2							162.5	
Zamboanga			3.8		16.5		1.3		3.3	2.5		4.1				75.3	
Fort Pikit, Cotabato	3.3	3			2			17		.8						155.9	
Davao	29.2		15.5	3	18.3	31.2	22.6									198.3	
Sirih, Guianga, Davao ^a	81	16.5	5.3	10.7	114.3	4.1	5.6	14	1.3							323.3	
Bual, Cotabato	3.8	22.6	1.5	.5	26.4	1	3.8	3.8	.3	2.8		6.1				126.9	
Cotabato		3.3	1.3	1	25.9		15.2	.8		21.3	4.3	21.8				191.3	
Naga-Naga, Zamboanga	.3	8.1	30	3	57.9	2.6	22.6	5.1	11.9	22.9	21					319.1	
Malabang, Lanao			13	18.3	22.4	28.4			12.2	39.1	10.9	2.5				206.7	
Malangas, Zamboanga ^a	1	22.4	8.6	5.3	49	40.9	9.9	12.7			12.7					316.7	
Lumbatan, Lanao ^a	7.6	7.6	10.2	50.8	2.3	2.6	6.6	.8	.3	10.4	5.8	10.1				181.8	
Ganassi, Lanao	1.5		5.8	3.8	8.4	10.2	4.8	6.1	.8	2	11.7					161.6	
Moncayo, Davao ^a					7.9	2.5	8.9	15.7			5.1		3.8			142.5	
Camp Kalaw, Moncayo, Davao	19.3	1.5	2.8	1	7.4	1.8	9.1	17.8				7.6				142.4	
Mailag Agricultural School, Bukidnon	6.9	7.6	10.2	39.9	21.6	14	16	5.1	25.9	1.3	.5	7.6				385.3	
Camp Keithley, Lanao	58.2	.3	.3	68.7	3.3	2.3	42.9	1.5	3.4	4.8	9.5	6.4				383.2	
Pantar, Lanao ^a	12.7	50.8	63.5	35.5	10.2	15.2	1.3	17	3	13.5	3.3					469	
Veruela, Agusan	10.4	1.3	4.3	7.1	39.1	76.2	13	3.3	10.4			1.8				220.8	
Sumilao, Agusan	.5	.3	2.8	36.1	34.5	11.2	65		13	3.6		3.5				311.8	
Diklom, Bukidnon ^a	23.1		8.9	74.2	70.6	2.8	50.1	1.3	19.6	5.3	8.4					348.8	
Talacogon, Agusan	11.2	1.5	16.8	18		76.7	81.8	.8	.5	1.3		.8				274.7	
Butuan		.8	4.4	22.4		20.3	3.8	6.6	.5			.3				101.3	
Dumaguete	3.6		1.5	10.4	27.7	1.3	2.3	.8	1.5	13.7	23.6	2.8				189.7	
Hacienda San Jose, Tanhal, Bais (Sur), Oriental Negros ^a				2		7.1	1.5	1		15.7	5.6					133.6	
Palanas, Bais (Centro), Oriental Negros ^a				6.4	24.4	73.7	10.9			71.1	76.2	25.4				404.2	
Hacienda Tamogon, Bais (Norte), Oriental Negros ^a	21.6			20.3	17.8	21.6	6.4	2.5		2.5	20.3	10.2				127.5	
Yap, Western Carolines	57.1			31.2	3.6	22.6	26.9	11.2	15.4	55.8	6.7	4.3		5	46	424.9	
Tagbilaran	47.5	2.4	33.3	13	25.9	1.8			5.9	1.6	.3					177.1	
Iwahig	32.5	.5	4.6	17.8	13.3	15	13.7	10.5	15.5	1.5	9.4	9.1				223.5	
Dalaguete, Cebu	12.1	3.3	38.6	1.3	1.8	.5	1.8	4.1		7.3	2.1	.8				161.3	
Surigao	13.4	26.4	8.6	32.5	.5	71.2	8.4	4.1	3	4.1	1.5	1.5				276	
Central Palma, Ilog, Occidental Negros	3.8	4.3	2.3	1.8	4.1	4.3	8.4	2.5	16	12.7	30.5	20.3				233.8	
Hacienda Naval, Himamaylan, Occidental Negros	.5	.8	20.3	1	13.7	43.2	15.2	8.1	26.4	32.2	16.5	24.4				341.7	
Biaong Cui's Farm, Barili, Cebu Maasin	3.8			1	11.2	1		1		3.6	10.7	2.5				148.8	
Isabela, Occidental Negros		29.2	5.6		14.7	6.9	39.3	31.5		44.4		6.6				222.6	
Hacienda Tanolo, Hinigaran, Occidental Negros	.3	3.6	23.6	49	18.2	50	9.2	12.7	4.6	33.3	28.4	26.2				492.4	
Cebu	81.5	.5	5.8	1.1	9.9	13.7	22.6	21.3		.8	3.6	.5				286.2	
La Castellana, Occidental Negros	30.7	7.9	72.4	12.7	7.4	20.3	36.3	6.1	17.3	40.7	37.6	77.4				318.9	
Hacienda Vallehermoso, Oriental Negros ^a			43.2	8.9	10.4	4.6	2.3	2.8	.8	3.8		1				535.2	
Hacienda Canlaon, La Castellana, Occidental Negros	3	38.3	15.7	3.6	13.2	3	49.2	3.9	10.9	89.2	37.1	66.8				203.6	
Central Azucarera, La Carlota, Occidental Negros	3.3	14.8	2	5.1	4.6	6.4	41.9	5.6	32.2	67.3	32	54.6	1.3			635.2	
La Carlota, Occidental Negros ^a	14.2	73.4	5.6	1.3	20.6	7.1	40.1	9.1	35.3	68.3	45.7	54.1	1.3			455.1	
Valladolid, Occidental Negros	43.2			6.9		11.4	27.7	32.8	50.8	29.2	33.5	43.4				558.3	
Hacienda San Antonio, Occidental Negros ^a		10.2							54.6					25.4		376.5	
Hacienda San Carlos, Occidental Negros ^a	3.3		52.8	3.3	17.5	.8				10.2	13.2					134.7	
Hacienda Refugio, Occidental Negros ^a	26.2		34.8	7.4	7.6	35.6		9.4		2.8	8.1					199.1	
Sta. Cecilia, Ma-Ao Sugar Central, Bago, Occidental Negros	1	2.1		37.8	5.6	5.8	22.1	14.8	48	17.5	43.2	50.8	.5			221.5	
Murcia Occidental Negros	2			16.2	2.8	1.8	25.1	33.8	17.5	23.4	38.4	41.1	10.9			330.3	
Iloilo	5.8	9.1	3	1.3	13.7	31.2	2.8	40.9	23.6	11.4	8.9	26.4	20.6	15.7	4.1	501.2	
Tuburan, Cebu	20.1	8.1			31.5	11.2					2.8	2.5				370.4	
Concepcion, Talisay, Occidental Negros			1.3	11.4	.3	.8	21.1	19.1	8.6	13.2	30.2	16.3	10.9		5	134.3	
San Jose Buenavista	46.5		2	1.8	16.5	27.9	41.4	14.3	43.7	37.8	13	31.5	1.3			241.6	
Silay, Occidental Negros	3.3		3.3	2.3	9.4	3.8	3.3	8.4	13.5	1.3	12.7	22.9	10.7	4.3		554.9	
Cuyo	4.1	21.6		12.2	25.7	32.3	2.3	34.6	8.1	13.2	21.3	3.8	7.9			213.9	
Lucena, Iloilo ^a				17.8	55.9	5.6	5.1	5.1								354.3	
Victorias, Occidental Negros	10.2	1.3	56.6	3.8	4.3	7.6	9.9	3.8		.5	4.5	22.6	18			310.3	
Cadiz, Occidental Negros		5.6	3.3	51.1	23.6	3						4.6				264.7	
Hacienda Bilbao, Manapla, Occidental Negros		4.8			8.1	16.1	4.1					2.3	20.3	9.4	3	124.8	
Ormoc	3.8	6.4		1.3		23.9	40.1	14.2		.8		.5				171	
Guiuan	5.8	8.9	19.6	12.9	2.3	19.8	3.6		8.6	4.6	4					208.8	
Bogo, Cebu	.6	3.4		11	10.2	8.4	2				.8					135.9	
Dueñas, Iloilo		3.3		9.7	38.1								10.9			156.8	
Bitagan, Iloilo (Railroad Iloilo to Capiz) ^a				8.1	3.8	13.2	2.3	2.3		2.5	3.8	7.1				151.2	
																	144.4

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, July, 1919.—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	65.5	56.4		10.4	27.9	2.8							1.8			3.8
Tacloban	5.3	1.8			22.6			1.8					2.6			15.2
Dumarao, Capiz ^a		5.1		52.1	8.2	36.1					22.9				12.7	5.1
Dao, Capiz ^a	.5	8.1		49.3	1	6.9		2.8	5.8	5.1	20.8	1.3	.8		.8	41.1
Capiz	8.7	5.8		.3	.3			3.8	23.6	.8		2				
Borongan	1.8			6.4	.8			1.8								
Catbalogan	46.7	5.6		20.8	12.1			3	1		18.3		9.1			
Calbayog	3.5	7.1		10.6	5.6			8.9	4.3	.3	1	4.6	.8	1.8		17.3
Masbate	1.1			6.9		1.8	2.6			.3					4.3	2
San Jose Estate, J. Abello D-13, Mindoro ^a	87.8	9.1	31.7		2	8.6		6.6		9.7		4.6		8.9		
San Jose Estate, Tamaraw Plantation, Mindoro ^a	52.8	14	36		24.4		11.7							7.6		
San Jose Estate, San Agustin, Mindoro ^a	54.1	4.3	24.1		3	30.5				.8				1.8		
San Jose, Mindoro ^a	70.3	10.7	37		6.4	5.3				4.9		2.3	8.9	21.1		1.3
San Jose Estate, Tunnel D-12, Mindoro ^a	73.4	19.1	36		5.1			1.5	.8	21.6	46.5	4.1	4.6	1.3		33
Romblon	4.3	41.9	7.2		5.8			.3	8.9	3.3	4	12.2	.3	2.8		1.3
Batag	2.3			10.7	4.1				1.5				8.1		9.2	
Irosin, Sorsogon	2.6	2.8	.3		.8	4.1		6.4	.5							
Sorsogon	49	40.6		10.9	3.3			4.6		4.1		5.1				9.1
Legaspi	52.5	11.2	.5	4.5	.5			3.1							28.9	7.6
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a,b}							2.3			7.4	10.2		20.3	10.2		
Sumay, Guam	29.5	3		5.1	6.9		2.5	7.1	6.9					13.2		10.2
Calapan	2.3	18	25.9				33.3	.8								
Virac	35.1	5.1	.8		13.5	1.8							7.1	10.9		1
Naga	69.8	9.4	2.3	26.4		.3						5.3				2
Tigaon	71.6	18.1	57.4	1	1.1	.3	1			8.4					12.4	
Batangas	11.9	15.5	15.7						1.5				1.8			
Lucena	2.8		1.3					1.5		3						
Atimonan	2.1		7.1				.5							.8		
Ambulong, Tanauan	9.4	93.2	61.2		7.6		.5	1						2.3		
Canlubang, Calamba	8.1	86.4	22.1			4.1	1.5		9.1	1.5	.5					
Paracale	51.2	8.1	46.2				.3									
Santa Cruz, Laguna	9.7	46	37.6				.5		.8			3.6				
Fort Mills, Corregidor ^{a,c}	8.1	188	18.5			3		5.1								
Alabang, Rizal ^a	71.1	68.6	19	2.5		2.5	1.3									
Lamiao, Bataan ^a	2.3	183.3	14.3				7.1	28.2								
Munila	70.4	48.5	4.8										.1		5.6	13.5
Antipolo	65.3	78.2	21.5			16	.8	35.6								1.8
Bosoboso, Rizal ^a	39.1	50.8	23.9			17	8.9	35.6	5.6			3				
Montalban, Rizal ^a	9.9	16	34	5.1			27.9	.5	15.7		8.9		13.2	.8		
Hacienda Pintong Sapang, San Jose del Monte, Bulacan ^a	19	28.2	2.3			16.3		14.5	34			6.9				
Mabayuan Dam, Olongapo, Zambales ^a	8.1	29.9	88.6	.5		7.9	.5		1					.3		
Pampanga Sugar Mills, Del Carmen, Pampanga ^a	5.8	11.5	40.7			9.9				.8			2.3	16		1
Iba	7.9	37.6	34.8	2.9		8.1	.8						1	17.4		
San Isidro	5.8	17.3	7.9	1.5		15.2			.8					3.3		
Hacienda Luisita, Comillas, Tarlac ^a	1.8	4.6	21.6	1.8		41.9			40.4			3.8			3	
Hacienda Luisita, San Miguel, Tarlac ^a	1.3	5.3	21.6	2.5		41.1			39.9			4.3			2.5	
Tarlac	1.5	5.6	21.8	3		40.6			39.4			3.6			1.8	
Baler	15.7	8.9		.5		4.8	2		3						36.3	35.3
Paniqui, Tarlac ^a	27.9		21.3		8.9											
C. L. A. S. Muñoz, Nueva Ecija ^a	9.2	11.2				41.9	8.6		20.1							
Dagupan	8.9	34.8	13	5.3		6.1			.8							
Bolinao	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Baguio	36	187.8	12.2	17.5		24.2	14		39.9			2.9	2.1	24.6	3.3	
San Fernando, Union	26.9	77	15.2	.9		1.3										
Echague	17.2	42.3				17.5	1.3					6.4				
Sagada, Mountain Province ^a	38.1	141.7	3.6	8.1	10.1	12.2	23.1	4.1	1.5			2.8	2			1
Bontoc, Mountain Province ^a	11.2	44.4	2.3	2.3	17.3	10.9	16.8	5.6	1		1	10.7	3.8	6.4	1	6.1
Candon	45.7	164.3				3.8										
Vigan	8.7	163.9	25.4		2.3											
Tuguegarao	39.7	151.3														
Laog	13	391.7	21.6		1.8											
Aparri	33.3	101.5		17.5		.3	1									
Cape Bojeador		392.1	11.4	1						.5						
Santo Domingo, Batanes	9.9	72.7	4.8				12.2						1.3			

* No observation.

^a Voluntary or coöperative station.^b Rain in 24 hours beginning 8 a. m.^c Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, July, 1919.—Continued.

Station.	Day of month.															Total
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	22.3	3.8	5.9	2.3	28.9	3.3	22.9	24.1	8.1	17.6	15.5	29.2	10.4	20	5.8	388.7
Tacloban	7.3				53.6	18.8	27.1	20.1		3.1	1.3					180.6
Dumarao, Capiz ^a						6.4	13			4.6	14					180.2
Dao, Capiz ^a	10.2	.5		12.7	1.8	30.5	11.5		.3			4.1				215.9
Capiz	.5	1.8	3.6	6.4	16.7	39.6	2.1	3	12.7	.8	1.6	2				136.1
Borongan		2.3	12.7	2.3	4.6	56.1	19.6	25.4		15.8	1.8					150.9
Catbalogan	10.2	9.7	3	1	21.6	6.4	8.4		1.3	36.1	3.3					217.6
Calbayog		1.8	3.3	.5	4.3	18.9	16.8			5.9	8.1	1	.8			127.2
Masbate			1		1.3	49	40.3	13.7	3.3		3.3	5.1				136
San Jose Estate, J. Abello, D-13, Mindoro ^a	24.4	34	19	4.5	18.3	13.2	9.1	63.5	31.2	34	21.8	9.9	4.6		9.4	465.9
San Jose Estate, Tamaraw Plantation, Mindoro ^a		31.2	23.6		2.5		13.7	61	30.5	34.3	31.2	3.8		11.4	50.8	440.5
San Jose Estate, San Agustin, Mindoro ^a	12.7	22.8		19.6	19.8	31.3	22.1	39.4	48.2	27.9	16.5	4.6			19.1	402.6
San Jose, Mindoro ^a	1.6	16.5	1.5	26.2	10.2	9.9	15.7	43.2	28.7	36.3	19	6.4	1.3		29.7	414.4
San Jose Estate, Tunnel D-12, Mindoro ^a	10.2	26.4	3.3	38.3	6.1	18.3	21.6	42.4	33.6	36.6	28	11.7	3.5	.8	12.5	540.3
Romblon			40.7	28.4	11.7	10.2	6.6	13.5	16.3	3.9	5.6	2.8	26.5		4.8	220.6
Batag	14.3	.5	39.9	2.3	37.1	4.5	47.7	3.1	.3	2	1.5	2.3	.3	.3		207.7
Irosin, Sorsogon	5.1	9.4	33.2	5.6	9.1	.8	11.4	.3			15.8	14.7	63.3	16.8		182.8
Sorsogon			27.9	1.8	30	2	15	7.4			8.9	4.8	51.3	1.3		372.2
Legaspi																259.2
San Miguel Estate, San Miguel Island, Tabaco, Albay ^{a,b}		5.1	14.2	27.4	25.7	7.6		22.4	25.1	2	3.6	1.5				179.9
Sumay, Guam			8.9	2.5		10.2	12.7	26.6	9.4	2.5	5.1	6.4	11.9	6.3	6.4	198.4
Calapan			7.6	76.9	25.6	26.4	.5	26.2	6.1	1.3	22	12.2	20.9	1		307
Virac	16.2		15.5	12.7	12.4	8.4	2.5	33.3		1	6.1	8.6	.8			192.8
Naga			.3	3.8	6.1	3.8	44.9	47.5	.3		14.9	10.1	4.3			251.5
Tigaon			13.2	1.3	10.4	1.5	14.2	1.3			9.1	13.9	.8	1.8		238.8
Batangas		13.5	6.6		28.7	35.6		2	.5		63.5	12	20.3	8.6	3.3	241
Lucena			2.8	5.1	1			4.6	15.2	5.6	25.4	6.1	57.7	2.5		131.9
Atimonan			2	10.9	4.5	22.9	31.6	52.1	.5		15.5	10	56.7	7.3	2.8	228.3
Ambulong, Tanauan		13.2				21.6	26	7.6		.3	57.9	20.3	91.6	23.9	6.4	444
Canlubang, Calamba			1.8	3.5		13.9		3.6		1.5	66	74.9	128.5	8.9		435.9
Paracale		.3	4.6	14.2	39.3	16.2	1.8	4.1			19.5	9.1	29.5	7.9	2.5	254.8
Santa Cruz, Laguna		3.3	2.8	7.6	1.3	5.6	.3	24.9	4.1	.8	55.1	55.1	114	27.9	7.1	408.1
Fort Mills, Corregidor ^{a,c}			6.4		.5	9.7	.5	61.4	16.8	30	100.6	196.9	190.2	23.6	15	874.3
Alabang, Rical ^a	2		6.1	3.6		22.9	33.5	23.4			61	107.7	240	12.7		677.9
Lamao, Bataan ^a			2			66.3	11.2	36.4	19.5	32	35.9	198.9	332.3	32.3	36.3	1,131.2
Manila	13.7		2.8	4.8	7.4	.3	34.9	5.8	2.2	1.9	51	195.2	293.5	36.7	15.5	810.1
Antipolo	61.7	1.3	5.1	8.6	7.6	9.9	20.3	4.8		3.8	52.3	196.1	269.5	39.6	15	920.4
Bosoboso, Rizal ^a	4.1	4.3	3.6	10.9	.8	14.2	2	6.9		4.3	47	50.87	50.87	38.1	19.8	441.57
Montalban, Rizal ^a		28.7	18.5	2	9.9		7.1	8.1	1.5	6.1	5.1	31.7	154.9	141.7	168.2	715.5
Hacienda Pintong Sapang, San Jose del Monte, Bulacan ^a	47.2	5.3	7.6	15		11.9	19	2.8	5.3	18	49.5	163.8	106.2	74.9	12.4	660.1
Mabayuan Dam, Olongapo, Zambales ^a			7.6	.8	.5		23.4	90.4	96	68.4	204.3	297.8	199.6	115.3	73.7	1,314.6
Pampanga Sugar Mills, Del Carmen, Pampanga ^a	2.3		2				8.1	15.2	22.1	.5	91.2	237.8	82	103.7	86.4	739.3
Iba			1.8	2	9.9	38.9	28.2	50.9	87.6	32.7	105.9	186.6	77	45.2	58.9	836.1
San Isidro	20.3		1	8.4	2.8	2.8	5.6	20.3	3.6	4.8	19.8	88.1	21.4	23.3	8.2	282.2
Hacienda Luisita, Comillas, Tarlac ^a		6.9	2.5	5.3	15.7	19.8	55.9	24.1	10.9	11.7	5.1	18.3	67.3	61.2	8.9	432.5
Hacienda Luisita, San Miguel, Tarlac ^a		6.4	1.8	5.6	15.2	19.3	54.6	24.6	10.2	11.9	5.8	17.8	66	60.7	6.9	425.3
Tarlac		5.8	1.3	5.6	18	18.5	55.4	24.1	10.4	12.2	7.1	19.8	65	62.2	11.4	434.1
Baler	17		21.6	22.6	96.6	112.7	38.1	43.2	17		31	15	5.3	16	1	543.6
Paniqui, Tarlac ^a							46.7	34.3	13.2	48	20.6	34.3	17.8	34.3		307.3
C. L. A. S. Muñoz, Nueva Ecija ^a	12.2	2.3	.8	10.2	.5	4.6	3.8	1.3	6.4	.5	6.3	27.7	30	34.8	17.8	250.2
Dagupan			8.9	.5	.8	66	11.2	49.8	1	2.5	11.7	8.4	35.4	13.9	7.8	411.9
Bolinao			*	*	.3	25.2	6.9	6	26.4	26.9	15.8	7.2	32.5	63.8	36.8	252.84
Baguio	37.6	19.3	.5	1.8	1.6	39.4	4.6	24.9	18.6	4	25.4	3.6	50.3	214.1	27.7	837.9
San Fernando, Union						11	2.3	19	9.7	11.9	1	35.4	.8	22.6	162.8	18.8
Echague				18.3	5.6	10.2	14.5	14.5	7.6	3.3	41.2	22.6	.6	18.5		241.6
Sagada, Mountain Province ^a	15.2		1	5.3	6.9	13	4.5	13.2	28.7	5.3	43.4	6.4	12.5	136.4	8.1	548.2
Bontoc, Mountain Province ^a	11.4			2.3	3	16.5	3.8	13	4.8	1.3	2.5	3.6	5.6	69.1		277.7
Candon				1.5	45	20.6	7.6	74.7	1.5		9.7	8.9	47.5	145.5	16	592.3
Vigan			.3			48.5		49.6	9.7	1.6	19	35.3	89.9	116.9	33.5	604.6
Tuguegarao				7.6	3.8			6.9	22.3	8.1		5.6	15.7			277.2
Laocag		.5				7.2	2.3	1.8	80.6	7.4	7.7	1.6	30.1	62	18.6	647.9
Aparri		1.3		1.3	7.4	.3		14.9	6.9		1	23.1		13	1.3	224.1
Cape Bojeador					.8			1	17.8	.3	14.8	1.8	5.9	36.9	14.6	498.9
Santo Domingo, Batanes			1.3		8.6	2.3	.9	12.2	24.5	9.7			1.3	2.7	1.3	165.7

* No observation.
^a Voluntary or cooperative station.
^b Rain in 24 hours beginning 8 a. m.

^c Rain in 24 hours beginning 7 a. m.
^d 12 days of observations.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, JULY, 1919.

Day.	Jolo.		Malamau, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Butuan.		Dumaguete.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.9	22.5	29	21.2	27	22.4	29.8	22.3	28.2	22.6	26.3	19	31.9	22.3	30.3	23.3
2	30.2	24.2	31.4	22.2	29.9	23.9	30.2	20.6	31.1	21.8	26	19.2	30	22.6	31.3	23.5
3	30.4	24	30.7	23.5	29.2	23.5	30.7	23.2	31.5	22.2	28	18	32.3	23	31.3	24
4	30.6	21.3	31	22.5	29.7	22.2	31.7	22	32	22.5	27.7	17.8	33.5	22.3	31.2	23.3
5	26.7	22.7	27.5	22.8	28	22.6	31.7	21.9	33.2	21.5	26.6	18.6	33	22.8	30.8	22.7
6	31.8	21.6	31.4	23.4	29.6	22.5	30.5	22.4	32.1	22	28	18.9	32.6	21.7	30.4	24.5
7	29.3	22.3	29.9	22.9	29.5	24	31.2	22.3	32.8	23.7	27.8	19.6	33.4	23	30.9	23.6
8	28.8	22.4	31.4	23.4	30.3	23.2	31	22.5	33.3	23	27.6	18	34.4	22.8	31.1	24.1
9	27.3	22.4	28	23	27	23.4	31	22.9	31.9	23.1	28	18.2	34.9	23.4	30.9	24.3
10	30.5	21.6	29.5	23.4	28.2	23.1	30.2	22	31.3	22.5	27	18	33.1	22.7	30.6	23.3
11	29.4	21.6	30.2	22.9	28.9	22.8	30.3	22.3	32.7	22	28.1	17.6	34.2	22.5	31.3	23.2
12	29.4	21.2	30.5	24.4	29	23.4	30.7	23.1	33.3	23	28.2	18.2	35.6	23.2	30.2	24.5
13	27.5	21.7	29.8	22.9	28.2	23.5	30.2	23.3	31.7	24	26.3	19.2	28.1	23.4	29.8	23.9
14	29.7	20.8	29.3	22.9	28.2	22.5	30.7	22.1	31.7	21.9	27	19	33.9	22.7	31.3	23.3
15	29.8	21	30.7	22.6	28.6	22.5	31	22.1	32.5	22.6	28.6	18.9	34.6	22.8	30.7	23.3
16	30.6	22.4	30.1	22	29	23.5	30.7	23.5	32.2	23	27.8	19.4	33.6	22.7	32.4	23.6
17	30.2	22.5	30.4	23	30.5	23.7	30.2	23.3	32.6	22.7	27.3	20	32.6	22.8	31.4	23.7
18	30.2	22.8	31.6	24	29.3	23.6	31.5	22	32.7	22.4	27.8	18.5	32.6	22.4	30.4	23.5
19	30.6	23.4	30.1	23.4	28.3	23.1	31.4	22.3	31.8	22.9	26.8	18.5	31.1	22.6	32.3	23.5
20	31	22.1	29.6	24	29	23.3	30.6	23.5	31.7	23.2	27.3	19	32.1	22.6	31.6	23.4
21	29.2	22.9	31.5	23.9	29	23	30.2	23.3	30.5	22.7	26	19.5	31.9	21.8	30.8	23.9
22	29.8	23.2	30.9	22.8	29.5	22.7	28.8	22.9	29.8	23.5	25.7	20	31.9	23.5	32.8	22.5
23	28.8	24	29.9	23.1	28.5	24.2	30.7	23.2	32.3	23.4	26.9	20.5	33.1	22.9	31	23.9
24	30.6	23.2	30.5	23.4	29.3	23.5	30.1	23.3	31.8	23.1	27.8	19	33.6	23.4	33.8	24.4
25	28.8	24.1	30.2	23.6	28	23.6	30.3	22.5	31.9	23.2	26.1	20.6	32.6	23	30.3	23.8
26	31.3	23.9	30.5	23	28.9	23.4	29.2	23.8	31.3	23.6	24.8	20.7	28.7	24.2	29.3	24.3
27	31.3	24.1	30.3	23.6	28.8	23	30.7	23.8	28.8	22.2	24.3	19.5	29.1	23.2	27.5	23.5
28	31	26.1	28.9	23.6	28.6	21.8	31.8	23.9	28.9	22.2	25.6	18.5	31.7	23.7	30	24
29	31.8	25.7	32.2	23.6	30	24.8	30.9	24.1	32.2	23.5	28.5	21.3	34.6	23.5	30.8	24.9
30	31.1	25.4	32.3	23.6	29.5	24.4	31.3	23	32.6	23.1	29.1	20	34.4	23.7	33	25.3
31	31.6	25.3	32.5	23.1	30.2	23	31.2	22.8	32.1	22.7	27.9	17.7	34.1	23.6	33.2	23.4
Mean	30	23	30.4	23.2	29	23.2	30.7	22.8	31.7	22.8	27.1	19.1	32.7	22.9	31.1	23.8

Day.	Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.		San Jose Buenavista.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	28.5	23.5	30.9	24.3	31.1	23.1	29.2	23.2	30.6	22.5	29.5	23.5	29.5	24	26.6	22.4
2	30.7	24.3	30.4	23.9	29.5	23.3	32.5	24.1	30.6	24.8	29.2	22.6	26.8	22	26.8	22.9
3	30.2	23.7	31.3	23.4	30.1	22.6	31.1	23	31.4	24.5	31.7	24	30.8	23	31.1	21.9
4	30.3	24.6	31.1	23.1	31.1	22.1	30.8	23.2	34	23.5	31.8	22.6	33.5	23.2	31.6	22.7
5	31.7	24	30.4	22.5	32.8	21.8	30.7	22.6	34.2	22.1	31.2	22.5	30.1	22	30.7	22.7
6	30.8	23.6	30.9	23.2	32.1	22.7	31.4	23.9	31	23.2	31.7	24.2	33	23	31.8	21.2
7	31.2	23.8	31.5	22.4	32.3	22.1	30.8	24.1	30.5	24	31.6	24.7	30.5	24.5	31	23.4
8	31.4	25	31.3	23.2	32.2	22.6	32.5	23.7	34	23.4	33.7	24.7	33.2	23.9	31.1	22.8
9	30.9	23.9	31	23	33.6	21.8	32	24.1	33.1	23.4	32.3	25	34.4	24.6	32.2	22.7
10	31.6	23.5	29.7	23.2	32.6	22.7	30.8	23.8	33.1	23.6	30.5	23.3	31.6	24.3	32.6	22.7
11	30.7	23.6	32	23.5	32.2	22.1	32	23.4	32.6	23.8	32.6	24.4	30.8	24.8	31.6	24
12	31.6	23.6	30.4	23.8	32.3	21.1	32.4	23.8	33	23.7	32.7	26.1	32.8	23.5	32.1	23.1
13	29.5	24.1	30.3	23.1	32.8	21.2	28.3	23.3	33.5	24	30.8	25.2	32	24.3	31.5	22.7
14	32.2	24.5	32	23	32.1	21.2	30.5	22.4	33.4	23.6	31.2	25	32.3	23.8	31	22.8
15	31.7	23.6	32	23.5	32.1	21.3	30.5	23.2	33.1	23.9	30.7	24.4	30.5	24.7	31.4	23.2
16	30.7	23.5	32.6	23.9	32.3	22.1	30.8	23.4	33.4	23.8	30.3	25.5	30.8	24.3	31.4	23.3
17	30	23.1	32	23.4	33.1	22.3	29.3	24.2	33	23.6	23.2	22.8	30.3	23.9	30.5	22.8
18	30	24.1	30.2	22.7	31.6	22.3	29.2	23.3	31.5	23.4	30.6	24.1	32.3	23.3	30.8	22.6
19	30.7	24	32.2	22.6	32.5	21.3	29.4	24.2	31	24	30.4	24.3	31	24.5	31	23.5
20	30.1	25	31.5	22.5	32.1	21.6	29.2	23.9	29.8	23	30.6	24.3	30.8	24.3	31.6	22.1
21	28.7	24.4	29.9	23.3	31.6	21.5	30.4	22.9	32.6	22.6	29.5	24.5	29.2	23.7	31	23
22	30.3	24.9	31.4	23.1	31.8	21.9	31.3	24.8	31	24	30.5	25.1	30.3	24.5	31.1	23.4
23	31.7	24.1	31.8	24.8	26.9	22.8	31.3	24.1	30.5	23.4	29.4	23.8	28.4	23.7	26.4	22.6
24	31.1	23.7	32.1	24	29.1	22.3	31.5	24.9	30	23.2	30.2	23.6	30.5	24.8	30.2	23.2
25	31	24	32.2	25.2	31.6	22.2	31.5	24.1	33	23	30.4	25.8	29.4	23	30.8	23.4
26	30.8	24.4	29.1	24.3	30.1	22.5	28.4	25.2	29.1	23.6	29.5	26	28.6	23.3	28.4	22.8
27	30.8	23.5	27	25.4	31.5	24.4	28.4	26.2	28.6	23.2	28.2	25.8	29	24.7	30	22.9
28	28.3	23.5	29.7	23.8	30.6	23.2	29.2	24.8	30	22.8	28.2	24.4	28	22.7	28.6	22.2
29	32	24	30.8	25.4	33.2	21.4	32.4	27.4	32	23.2	30.7	26.7	30.3	23.2	31.3	22.2
30	31.7	24.6	32.9	25.9	34.5	20.5	32.7	27.6	32.8	24.4	30.2	27	30.8	25.3	32.6	23.9
31	29.2	24.5	33.1	25.7	34.1	21.8	32.9	26.5	33.5	23.6	31.4	26.5	30.3	25.9	31.8	27.2
Mean	30.6	24	31.1	23.7	31.8	22.1	30.8	24.2	31.9	23.5	30.7	24.6	30.7	23.9	30.7	23

Maximum and minimum temperatures at the stations of the Weather Bureau, July, 1919—Continued.

Day.	Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.		Calbayog.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	28.1	25.8	30	23.3	30	26	27.5	23.2	29	24.8	28.3	24.2	27.8	23	28.2	23.9
2	27.8	23.7	30	23.5	29.9	25.9	30.5	23	27.8	22.7	32	25.3	29.7	23.9	28.6	23.6
3	29.3	23.3	32.6	23.1	30.2	24.2	32.4	22.5	33.1	22.8	32.3	23.3	31.2	23.6	31.4	24
4	31.8	23	33.6	23	33	23.4	33.2	23.8	32.4	23.8	32.3	23	31.7	22.5	31.8	23.5
5	31.3	24.6	33	23.1	32.5	23.2	32.5	23.5	32.3	23.8	31.6	23.2	29.8	22.9	31.5	23.1
6	31.5	23.8	33.2	21.9	31	23.6	32.8	23	31.5	23.3	32	23.5	31.3	22.5	30.4	22.6
7	29.6	24.5	32.2	22.5	32.2	25.2	33.5	23.4	32.7	23.3	32.9	23.6	31.1	22.8	31	23.8
8	31.9	23.5	34.3	22.5	32.5	23.7	34.8	22.5	32.7	23.5	32.5	23.1	32	22.1	31.4	22.7
9	31.9	24.2	34.4	22.6	33.4	24.2	33.7	23.9	32.9	26	32.6	23.4	32	22.2	31.7	21.7
10	30.2	26.2	33.8	22.6	32.3	24.7	33.8	23.4	33.6	23.3	32.1	23.2	32.5	22.5	31.4	22.9
11	31.1	24.2	33.9	22.6	31.5	23.6	34	24	32.9	24.2	32.9	23.2	32.1	22.4	31.3	22.8
12	31.6	24	34.3	22.4	34	24	35.2	23.5	33.4	23.8	33.3	23.3	32.1	22.1	32	22.8
13	31.3	23.8	34.6	22.9	31.5	24.4	33.8	22.7	33.1	23.9	33.2	23.6	31.5	23.2	32.6	23.7
14	32.4	24.4	33.5	22.7	33	24.5	34	22.5	33.2	24	33.1	24.3	31.8	22.5	32	23.1
15	31	23.5	34.4	23.4	31.3	24.1	35.6	22.8	33.2	24.6	33.6	23.4	32.2	22.9	31.9	22.7
16	30.7	24.2	34.2	23.4	31.4	24.7	36	24	32.5	24.2	33.9	23.4	32	23	31	22.9
17	30	23.3	34.1	23.8	31.8	25.5	32	23	33	23.7	33.6	25.2	31.9	23.5	31.3	22.8
18	32.3	23.2	32.4	23.1	30.4	23.6	31.3	22.8	32.7	23.7	32.8	25.5	30	22.4	30.1	22.8
19	31.3	23.4	31.2	23.6	30.9	23.5	30.5	24.1	30.9	24.8	31.3	23.5	30.2	22.7	29	23.3
20	31.1	24.3	32.4	23.8	29.9	24.2	29.1	23.6	30	24.2	29	23.7	28.7	22.3	27.3	22.8
21	30.9	24.3	32.1	23.7	30.8	23.5	34	23.1	29.4	23.8	32.1	22.9	32	22.7	30.7	22.8
22	29.5	24.6	32.9	23.8	30.2	25	32.2	23.4	32	23.3	32.7	23	29.7	23.5	29.1	23.4
23	28.5	23.6	32.2	23.5	30.6	24.2	31.2	23	30.8	23.3	30.9	22.9	30.7	23.5	29.2	23.6
24	30.6	24.3	33	23.4	31.1	24.1	33	23.5	32.4	24.2	33	23.2	31.7	23.9	31	24.2
25	29.9	24.7	33.3	23.6	32	23.5	32	23	32.2	24.6	34	22.8	31.6	23.5	30.3	24
26	29.2	24.7	33.5	24.5	29.7	25.8	29.5	24.2	32.1	24	28.6	24.4	29.5	26	28.5	24.3
27	29.9	23.8	29.8	25.4	28.4	26	28	23.5	30.5	24	27.9	24	28.8	24	28.5	24.1
28	28.7	23.6	29.6	25.7	30	26.4	30.2	23.5	28.6	24	30.1	25	29	24.7	28.2	24.5
29	30	24.6	32.4	26.7	30.6	27.2	33	24.2	33.4	24.6	32.5	23.1	32.5	26	29.5	27
30	30.1	25.8	33.2	26.8	31	27.9	34	24.3	35.8	24.4	34.2	23	33	27.5	30.5	27.2
31	30.3	27.6	33.2	26.6	32	27.9	35.8	23.5	35.2	25.4	34.9	22.9	33.5	26.2	30.3	27.4
Mean	30.4	24.3	32.8	23.7	31.3	24.8	32.6	23.4	32.1	24	32.1	23.6	31.1	23.4	30.4	23.7

Day.	Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.		Virac.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	28.8	22.4	31	25.4	27.3	22.3	27.7	21	27.4	23.9	28.6	23.2	33.5	25.8	27.5	23
2	29	25.4	27.8	23.9	28.3	23.3	28.4	21	27.4	23.8	31	23.2	28.5	22.5	28.4	22
3	33	25.4	30.9	23.3	32.7	23.5	32.3	22.3	32.3	23.5	31.2	24.8	28.2	22	32.4	23
4	32.8	25	31.9	22.7	32.4	24.6	33	22.7	31.9	23.1	30.4	24	32.5	22.1	32.6	22.8
5	30	24.4	32.5	24.7	31.4	23.2	31	21	29.5	22.8	30.4	23.6	32.3	22	28.8	23
6	31.8	25	32.9	24.1	30.7	23	32.8	21.4	32	22.6	31.6	23.6	33.5	23.5	30.9	22.7
7	31.4	25.5	32.5	23.9	31.7	23.4	30.6	22	30.8	23.3	32	25	33.5	23	34	22
8	33.2	25	33.4	23.7	32.3	24.5	33	22.5	32.3	23	31.8	24.2	33.5	21.5	33	22.5
9	32.8	26.4	32.9	24.8	32.2	25	33.5	23	32.9	24.5	31.2	23.8	33.3	23.6	32.7	23
10	32.4	26.2	32.6	23.7	32	24	33.2	23	33.6	24.4	31.6	25	33.5	23	32.6	24
11	32.4	25.4	33.1	23.7	32.4	24	33.6	21.8	34.1	23.6	31.2	24.6	33.5	22.5	33	23.1
12	33	25.4	32.6	23.7	31.7	24.1	33.7	21.5	33.4	24	31.4	24.4	34	22.5	33.2	23
13	32.6	26.2	32.9	23	32.5	24.9	33.6	21.8	33.9	24.4	30.8	24.6	34	23	32.8	22.5
14	32	25.5	32.9	23.6	32.3	23.8	33.8	21.5	33.8	24	31.2	25.4	33.8	23	31.3	22.6
15	31.8	25.4	33.3	24.6	32.4	23.6	33.9	21.8	34.3	24.1	31	25.2	34.5	22.9	34.5	23.3
16	31.8	24.5	33.9	24.6	33.3	23.5	33.5	22	33.3	24.5	32	26	33.5	23	33.1	23.1
17	32.8	24.2	32.9	24.2	32.8	23.3	31.5	22	33.8	23.3	32	24.6	34.3	23.4	34	23
18	31.8	25.5	33	23.7	32.8	23.6	33	22	33.3	23.1	31	25.8	34.1	23	32.6	22
19	29.4	25.6	32	23.2	29.3	23.8	28.1	22	29.2	23.5	31.4	24.6	33	23	28.9	22.4
20	29.8	24.4	30	23.7	26.8	23.5	28	22	29	23.5	31.4	24.6	33	23	30	22.4
21	32.8	25	31.9	23.7	31.4	23.7	32.1	22.5	32.2	23.9	31.2	24.4	30.5	22.6	30.7	22.4
22	30.6	24.6	30.9	23.2	31	23.5	31.1	22.5	31.2	24.4	31.6	25.2	33	22.5	31.7	22.1
23	28.8	24.4	29.8	24.2	29.2	22.5	28.7	22.3	30.1	24.1	31.6	25	31	23.1	31.9	22.8
24	31.6	23.8	31	24	32	23.8	32.8	23.8	31.8	23.9	30	24.8	31.4	23.5	32	23.8
25	30.8	24.4	31.4	24	30.7	23.6	31.5	23	32.8	24.1	30	24	31.5	23.5	33.7	23.1
26	31	26.2	30.5	24	27.6	25.2	31	21.7	31.8	25.2	30.2	24.8	32.5	24	32	23.5
27	30.2	26	30.8	24.7	26.9	24.3	29	23.8	29.9	25	31	25	31	25.1	31	24.5
28	29	24.5	30	24.5	28.5	24.8	28.8	23	28.9	25.5	31.2	25.2	28	23.5	31	24
29	31.8	26.4	30.9	25.2	29.8	24.5	29.5	24.5	29.8	24.7	31	25.8	28.8	24.5	31.1	23.1
30	32.2	26.6	32.4	25.8	30.5	24.4	30	23.5	30.8	24.5	31	24	32.5	23.4	33.5	24.7
31	32.8	27	32.2	27	32.2	24.6	31.5	25	31.8	26.4	31	24.6	33.5	24.6	33.3	25
Mean	31.4	25.2	31.8	24.1	30.9	23.9	31.4	22.4	31.6	24	31.1	24.6	32.3	23.2	31.8	23.1

Maximum and minimum temperatures at the stations of the Weather Bureau, July, 1919—Continued.

Day.	Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	27.6	22.7	29.1	22.3	29.5	24.8	29.7	23.5	29.2	24.3	31.2	25.3	32	23.2	26.7	23.9
2	27.9	22.2	26.8	21.1	26.6	22.8	27	21.9	27.4	23.6	27	21.8	28.2	22.8	27.8	23.8
3	31.5	23.1	30.4	22	27.9	22	28.4	22.5	27.8	22.8	27.3	21.8	28	21.8	28.3	23.8
4	34	22.2	32.4	19.4	32	22.1	30.4	22.6	33.1	23	32.1	22.2	32.8	21.1	32.1	23.2
5	31.1	22.2	31.1	20.4	32.5	23.5	31.7	22.5	31.9	23.2	32	24.2	32.8	22.1	31.4	23.3
6	30.5	21.7	30.8	19.9	32.5	24.3	31.4	23.8	32.6	23.8	32.3	23.5	32.4	22.2	30.4	24.2
7	33.1	22.8	31.9	20.9	32.1	23	31.4	22.8	32.8	23.4	31.7	22.8	32.6	21.3	31.9	24
8	33.5	22.5	32.8	20.5	32.5	22.8	32	23	32.6	23.2	33.1	22.3	32.4	21.4	32.2	23.3
9	34.1	22.5	33.1	20.8	33.5	23.9	32.5	23.1	33.1	25	33.6	24.2	34	22.3	32.5	24
10	35	22.5	32.4	21.9	33.4	22.7	32.9	22.6	35.2	23.5	34.3	23.2	34.3	21	33.2	24
11	34.9	23.1	33	21.3	33.5	24	32.2	22.7	35.1	24	33.2	24	33.2	22	32.7	24.4
12	34.7	23	33.2	21.3	33.5	23.6	32.2	23	34.4	24	33.1	25.3	33	21.9	33.4	24.3
13	34	23	33.3	20.9	34.2	23.8	33.8	23.6	33.4	24.2	35.6	24.9	34.2	22.3	33.6	24.6
14	34.7	22.7	34.2	20.6	33.4	23.4	32.6	22.5	33.8	24.1	33.3	25	34.4	22.5	33.4	23.9
15	34.4	22.5	33.9	20.4	33.7	23.2	32.1	23.1	35.5	23.5	33	24.4	34	22.2	33.8	23.8
16	35	22.7	33.6	20.4	33.9	24.1	32.1	22.4	35.2	24	32.3	25.2	35	23	34.3	24
17	35	22.7	33.9	19.6	33.3	24.3	32	22.8	35.5	24	33	24.5	33.7	22.3	33.9	23.8
18	33.3	22.3	32.9	18.9	34	23.4	32	23	33.2	23.7	33.4	24	34.6	22.2	32.8	23.5
19	31.2	23	31.4	21.2	32	21.9	32.4	21.6	32.9	23	33	23	34	22.1	30.5	24
20	30.2	22.7	29.7	20.6	32	23.6	29	22.6	28.3	23.4	28	24.5	28.4	22.4	30	23.5
21	31.6	22	31.6	20.8	32.5	23.2	31.9	22.6	32.2	23.6	33.2	23.5	32.4	22.2	32.5	23.6
22	31.4	23	30.8	22.4	31	23	30.5	23.9	31.1	23.7	32.4	24.5	30.4	22.6	31.6	23.9
23	31	22.5	30	22.1	30.6	23.8	29.6	23.7	29.9	23.5	28.6	24.2	30.8	22.9	29.2	23.9
24	32.5	23.7	29.8	22.8	31.1	23.7	31	22.9	31.5	23.6	29.8	23.9	31.2	22.6	31.4	24.3
25	31.3	23.4	31.5	23.4	30.8	24.4	30	24.1	31.3	24.6	30	25	31.6	22.9	31.6	24.2
26	32.8	23.3	31.9	22.4	31.5	24.4	31.1	24.1	31.9	24.4	30	25.4	32	23.2	31.2	24.5
27	31.5	24.7	29.9	24.3	29.5	25.8	30.3	25	31.1	23.5	27.8	24.6	30	23	32	25
28	29.1	24.5	29.6	23.7	27.8	23.3	27.1	23.4	28.1	23	28.3	24	27	22.8	28.4	24.2
29	30.5	24.8	28.3	23.6	27.8	24.8	27.1	24.1	26.7	23.9	27.9	25	26.3	22.5	26.3	24.2
30	32.5	24.9	29.9	24	31.9	24.6	30.7	23.5	31.9	24.1	29.6	26.9	31	22.9	32.4	24
31	32.5	26.3	29.6	25	31.8	23.8	31.8	23.1	32.1	24.2	30	26	32.8	22	34.2	24.7
Mean	32.3	23.1	31.4	21.6	31.7	23.6	30.9	23.1	32	23.7	31.3	24.2	31.9	22.3	31.5	24

Day.	Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.4	24.2	31.2	23.4	30.2	22.5	31.2	23.4	30.9	23.4	33.6	22.6	33.6	23.9	32.2	25.2
2	26.7	23.5	25.8	20.8	25.2	21	26	22.8	25.6	21.6	25	21.8	30.5	22	26.9	22.2
3	28	20.4	27.2	21.5	28.2	19.8	29	22.4	28	21.6	28.6	20.2	30.6	21.2	28.8	22
4	33.2	21.7	32.2	22.5	31.8	20.6	31	22	31.1	22.4	32.5	21.4	32.7	22.5	32.5	22.7
5	32.9	22.6	32.1	22.8	31.8	21.6	31.8	22.3	32.5	22.4	33.6	20.4	34.3	22.2	34	22.1
6	33.1	24	31.5	22.9	32.1	21.3	32.4	22.8	33.4	23.2	35.6	22	32.7	22.1	33.5	23.2
7	32.4	23.1	32.2	22.8	31.7	22	31.3	22.5	32.2	23.4	34.4	21.4	32.9	22.4	32.5	23
8	33	22.8	32.2	22.9	32.7	21.3	31.8	22.9	33.1	24	34.5	21.6	32.2	23.4	34.8	23.5
9	33.8	22.6	32.5	23.4	31.4	22.1	32.3	23.8	33.9	22.2	35.5	22.2	33.5	22.2	33.1	24
10	33.8	22.9	33.3	21.7	33.2	21	31.6	28.2	33.4	20.8	34.2	20.6	34.5	20.6	33.6	22.5
11	33.7	22.5	32.9	24.2	33	22.9	32.3	23.5	33.9	24.3	35.2	21.8	34.8	22	33.5	23.9
12	34.1	22.6	33.9	24.4	33.8	23.1	32.2	23	34.6	24.4	36	22.8	33.7	24.8	33.5	23.8
13	33.8	22.6	33.9	24.7	33.5	23	33	23.5	34.4	24	36	22.2	33.9	23.6	33.5	25
14	34.2	23.1	33.3	25.7	33.3	23.1	33	24.5	34.6	23.3	36.6	23.4	34.8	23.7	33	25.8
15	33.7	22.6	32.8	23	32.7	22.1	32	23.6	34.5	23	37	22.9	35.3	23.4	33.6	24
16	33.6	23	33.5	23.8	33.5	22.5	32.5	22.6	34.7	24.7	37	22	33.7	24.1	33.2	24.2
17	33.5	23	33.1	23.1	32.7	22.4	32	24.2	35	23.4	35.8	22.6	33.8	22.9	34	24.7
18	33.4	23	31.8	22.8	32.7	21.3	32.2	24.6	33.9	23	35.6	22.6	33.2	23.5	33.9	23.7
19	33.2	21.9	32	23.2	33.3	21.4	32	23.8	33.6	23.7	35	22.8	33.1	22.9	36	24
20	28.7	22.5	28.4	23.3	33.5	21.5	30.6	24.6	26.5	23.3	28.9	23.2	30.1	23.2	30.6	24
21	31.7	22.2	31.7	23.5	31.7	21.7	32.8	23.6	32.5	23.4	34.5	21.7	32.4	22.2	35.6	23
22	30.3	23	29.7	24	28.5	22.7	31.5	23.8	31.8	24.2	33.6	22.8	30.7	23.4	33.8	23.6
23	29.3	23.4	29.7	24.2	29	22.6	30.8	23.8	31	23.8	33	23.1	30.5	23.2	33.2	23.4
24	30.6	22.4	31.1	23.8	31.9	22.7	31	24	31.6	24	32.5	23	30.3	23.3	32.7	23.8
25	32.1	23.2	30.7	24	31.2	22.8	28	23.8	30.9	24	29.6	22.8	29.5	23.2	31.8	24
26	31.8	23.4	30.6	24.5	30.9	23.1	29.4	23.8	30.2	23.9	30	23.5	32	23.7	30.9	24.1
27	30	24	27.9	23.6	27.5	23	25.6	23.8	27.2	23.7	30.2	23	33.4	23.4	31.2	24.2
28	25.7	23	26.4	23.6	25.3	22	25.8	23.2	26.6	23.5	29.5	23.4	30.7	23.7	29.8	23.8
29	24.9	23.3	26.3	23.2	25.7	21.9	27.5	23.2	26.4	23.4	26.6	22.8	29.1	23.7	28.1	24
30	30.6	22.5	29.1	23.6	28.2	22.5	28.8	23.8	28.4	23.4	28.5	22.6	29.9	24	28.4	23.7
31	32.5	22.9	31	23.9	29.5	22.6	29.5	23.6	30	23.7	32	22.5	31.2	23.8	30.4	23.7
Mean	31.6	22.8	31	23.3	31	22.1	30.7	23.4	31.5	23.3	32.8	22.3	32.4	23	32.3	23.7

Maximum and minimum temperatures at the stations of the Weather Bureau, July, 1919—Continued.

Day.	Bolinao.		Baguio.		San Fernando, Union.		Echagüe.		Candon.		Vigan.		Tuguegarao.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1			22.4	15.5	33.4	23.6	31.8	24.4	31.9	24.9	32.7	25	34	24.5
2			16.4	13.5	27.5	22.5	24.4	21.6	26	23.8	28.4	21.5	25.8	21.5
3			19.4	12.9	30.5	22	31.4	21	29	22	26.2	21	32	21.5
4			22.3	14.9	32.6	23	32.2	22.3	31.5	24.6	31.8	24.4	34.1	24.1
5			23.6	15.3	32.7	22.7	34.2	22.1	31.5	24.1	32	24	34	23.6
6			23.4	14.7	33.3	23.4	33.5	21.2	33.1	24.5	33.4	24	34.2	22.5
7			21.2	15.7	32	21.7	32.6	22.3	31.5	23.5	32.9	23.5	34.1	24
8			23.5	15.5	33.2	23.2	34.9	22	32.1	24.8	33.2	23.9	35.1	22.8
9			24.5	16.3	33.3	23.7	35.4	23.1	32.9	25.2	33.5	24.6	35.2	23.6
10			22.8	15.9	34	23.1	35.4	21.7	32.5	24.5	33.8	24.5	36.5	23.5
11			24.5	15.7	34	23.7	35.6	21.4	33	25.1	33.6	24.9	37	23.5
12			25.2	16.6	34	23.7	36.8	22.9	33	25.1	33.8	24	37.4	25
13			23.5	16	34.4	24	36.4	23.4	33	25.1	32.5	24.4	36.8	25.2
14			24.6	15.9	34.4	24.5	36.1	25	33.5	24.9	33	24.2	36.8	25.4
15			23.8	16.6	34.5	23.3	36.6	23.7	33.1	25	33.5	25.2	35.8	24.4
16			24.3	16.8	34.5	23.9	35.9	24.2	33.4	24.5	33.5	24	36.5	24.1
17			24.2	16.8	34	24	35.8	23.8	33.5	24.8	33	24	33.5	25
18			23.3	16.4	34.2	24.5	36.5	23.3	33.5	25	33.5	24	36.4	23.6
19			23.8	16.3	35	24.5	35.4	23.5	33.5	25.6	34.6	25.5	36.8	23.5
20	33.6	24.8	22	16.4	33.5	24.5	28.4	23	31.8	26.5	34	25.6	30	24
21	33.7	24.8	24	16.2	33.2	23	32.6	22.8	33.2	25.9	33	25	30.4	23.2
22	32.2	24.4	23.3	16.3	33.5	23.7	33.2	22.8	33.2	25.6	34.5	24.5	32.7	24
23	33.7	24	23.3	16.1	31.5	23.3	32.4	23	31	25.2	31.9	23.6	32.8	23.8
24	31.8	24.8	21.3	16.1	31.7	24.1	28.9	23.4	31	26.1	32.4	23.4	30.7	24.4
25	30	24.9	20.2	16.3	33.5	23.5	32.9	23.5	31.9	24.2	33	23.5	34.3	24.1
26	29.2	24.6	20.1	16.4	31	26.1	32.9	23.5	32	25.5	31.3	24.5	34.7	24.6
27	31	25	22.8	16.6	33.1	24.8	34.6	22.6	30	25.5	33.9	24.3	34.6	24
28	31	24.2	20.9	16.2	31.2	24.1	30.6	23.1	30.9	25.9	31.1	23.8	31	24
29	29	24.4	19.3	16.4	30.5	24.5	29.9	23.2	28	25.2	25.7	23.2	28.4	23.5
30	29.7	24.4	17.9	15.8	29.7	23	28.4	24.1	28.1	24.8	27.9	23.2	30	24
31	32.2	24.4	17.8	16.4	30.5	24.2	34.3	23.4	29.9	24.5	28.4	23.1	32.8	24
Mean	31.4	24.6	22.3	15.9	32.7	23.7	33.2	22.9	31.7	24.9	32.1	24	33.7	23.8

Day.	Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.4	23	33.2	24.2	31.7	24.7	32.9	22.7
2	28.1	22.1	27.8	21.5	28.2	22.3?	29.6	25.9
3	25	22	30.6	22	25.6	21.1	26.7	20.9?
4	32	22.3	34.3	22.8	29.9	21.6?	31.3	22?
5	33.3	23	33.4	22.6	30.1	24	31.7	25.4
6	33.8	23	33.2	22.3	32.9	25.5	32.4	25.5
7	32.3	22.6	30.5	23.6	29.7	25.8	30.4	23
8	33.5	22.8	33.6	22.5	32.6	24.4	31.1	24.5
9	33.4	22.7	33.6	22.7	32.6	24.1	31.4	26.3
10	33.9	22.3	34	22.9	31.1	24.6	30.9	26.6
11	33.7	23.5	35.1	23.5	30.5	24.4	31.1	26
12	33.8	23.5	36	24.8	32	25.2	31.8	25
13	33.4	23.2	34.5	24.5	32.2	25.2	32.2	24
14	34.3	23.5	34.5	24.1	33	25	31.5	25.2
15	33.8	24	35.5	24.6	32.8	25.5	31.7	25.5
16	33.9	23.2	34.6	24.3	32.4	25.5	31.8	25.2
17	33.9	22.3	35	24	32.5	25.8	32.6	25
18	34.5	22.4	34.5	23.5	31.9	24.7	32.2	22.7
19	34.2	22.7	34.1	23.6	33.7	24.9	33	24.2
20	35.2	24.1	34.6	23.9	31.9	24.7	33	24.5
21	34.4	24.2	31.5	22.5	33.4	25.9	32.7	25.9
22	34.5	24.5	33.2	23.7	32.9	25.5	32.7	25.5
23	32.7	24	34.1	24.1	31.9	24.5	33	25.6
24	33.8	24.5	30.6	24	32	25.6	31.3	25.7
25	33.5	23.8	32.8	23.8	33.2	24.6	31.6	24.4
26	32.2	23.8	33.7	24	31.2	23.2	31.1	24?
27	33.5	24	33.4	24.5	32.2	24.4	31.9	25.5
28	30.8	24.1	34	23.3	29.2	23.8	31.5	24.8
29	26.6	23.9	31.6	23	27.6	24.7	31.7	25.1
30	29.2	23.9	28.2	23.7	28	23.3	31.1	25.8
31	29.7	23.5	32.5	23.8	28.2	23.3	30.4	25.5
Mean	32.6	23.3	33.2	23.5	31.2	24.4	31.6	24.8

SEISMOLOGICAL BULLETIN FOR JULY, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,

Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

2, 22^h 38^m 50^{s*} [3, 6^h 38^m 50^s]. Butuan (N Mindanao). Oscillatory earthquake, direction ESE-WNW, intensity III, duration 8 seconds. Its epicenter lay far off in the Pacific.

3, 9^h 30^m [3, 17^h 30^m]. Candon (NW Luzon). Earthquake shock of intensity II-III.

4, 1^h 38^m 35^{s*} [4, 9^h 38^m 35^s]. Panay and Negros. Earthquake of intensity III-IV felt through the southern part of Panay and western of Negros Islands. The origin was south of the strait which separates these islands.

4, 18^h 55^m 28^{s*} [5, 2^h 55^m 28^s]. Maasin (S Leyte). Earthquake of intensity III.

5, 2^h 45^m [5, 10^h 45^m]. Port Lebak (SW Mindanao). Earthquake of intensity IV-V, felt in the southern portion of the Cotabato province. Aftershock at 15^h 30^m I. T. Both shocks were recorded by the seismograph at Butuan; the origin was in the Celebes Sea.

6, 6^h 14^m [6, 14^h 14^m]. Surigao (NE Mindanao). Oscillatory earthquake, direction W-E, intensity III, duration 3 seconds. Recorded at Butuan where an instrumental shock from the same origin, N of Butuan Bay, occurred at 15^h 0^m I. T.

6, 19^h 11^m [7, 3^h 11^m]. Camp Keithley (N Mindanao). Oscillatory earthquake, direction ESE-WNW, intensity III, duration 5 seconds.

7, 12^h 0^m [7, 20^h 0^m]. San Joaquin (S Panay). Earthquake of intensity IV, followed by other seven local shocks of varying intensity: the strongest occurred at 21^h 30^m and 23^h 35^m I. T. On the 6th, during the day, several light local shocks were also felt at Valladolid, Occidental Negros.

8, 12^h 1^m 33^{s*} [8, 20^h 1^m 33^s]. Panay and Negros. Earthquake of intensity III-IV, and of the same character, extension and origin as the one occurred on the 4th. To the same epicenter south of Guimaras can be traced the shocks felt at San Joaquin and Valladolid, two coastal towns facing to the Iloilo Strait.

13, 17^h 0^m [14, 1^h 0^m]. Tablas Island. Earthquake shock of intensity III.¹

15, 22^h 48^m [16, 6^h 48^m]. Guiuan (SE Samar). Oscillatory earthquake, direction E-W, intensity III-IV, duration 7 seconds.

16, 11^h 37^m [16, 19^h 37^m]. Cabo Bojeador (NW Luzon). Earthquake shock of intensity II-III.

17, 4^h 48^m [17, 12^h 48^m]. Butuan (N Mindanao). Oscillatory earthquake, direction NNW-SSE, intensity III, duration 6 seconds.

17, 7^h 25^m [17, 15^h 25^m]. Tablas Island. Earthquake shock of intensity III-IV.²

19, 20^h 0^m [20, 4^h 0^m]. Camp Keithley (N Mindanao). Earthquake shocks of intensity III, direction ESE-WNW, duration 4 seconds.

24, 19^h 38^m [25, 3^h 38^m]. Ambos Camarines (SE Luzon). Earthquake shocks of intensity III-IV, felt in the region around Mount Isarog.

25, 23^h 19^m [26, 7^h 19^m]. Camp Keithley (N Mindanao). Earthquake of intensity IV, short duration.

¹The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of the Philippine readers.

²See "Bulletin for April, 1919."

RECORDS OF THE MICROSEISMOGRAPH.

(Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.25$, $\epsilon=2.906$, $\frac{r}{T_0^2}=0.053$;
 A_E : $T_0=6.18$, $\epsilon=2.393$, $\frac{r}{T_0^2}=0.042$. Alluvium. 2.40 meters above sea level.)

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
247	1	Iv	eP F	<i>h. m. s.</i> 2 22 25 27				
248	2	Ir	(PS) L M _N M _E F	22 38 50 +1 12 41 21 41 59 56	8 8	60 46		Felt at Butuan (N Mindanao).
249	3	Iv	e F	2 15 23				
250	3	Iv	e F	7 00 15				
251	8	Iv	eP F	23 14 08 19				
252	4	Iv	eP F	0 54 45 1 04				
253	4	Iv	eP L M _E M _N F	1 38 35 39 25 39 48 39 56 2 01	7 7	86 115		Felt in Panay and Negros Islands.
254	4	Iv	eP F	9 55 14 10 02				
255	4	Iv	(PS) F	18 55 28 19 09				Felt at Maasin (S Leyte).
256	7	Ir	e F	13 59 55 14 39				
257	8	Iv	eP F	12 01 33 12				Felt in Panay and Negros Islands.
258	8	Iv	eP F	12 26 00 36				
259	8	Iv	eP F	13 11 40 24				
260	8	Iv	eP F	14 59 42 15 13				
261	8	I	e F	21 19 23 23 08				
262	11	Iv	eP F	17 12 43 32				
263	12	Iv	eP F	9 39 55 10 02				
264	13	IIv	eP iL M _N F	5 21 11 21 29 21 33 32	3	464		
265	13	Iv	eP F	14 36 12 46				
266	14	I	e F	11 22 32 44				
267	14	Iv	eP F	11 59 11 12 02				
268	14	I	e F	13 55 14 57				
269	15	Iv	e F	5 33 46				
270	16	Iv	(PS) L F	0 47 44 48 36 1 05				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A _N μ	A _E μ	
271	16	Iv	(PS) F	h. 4	m. 22	s. 12				
272	16	Iv	(PS) F	10	08	00				
273	16	Iv	eP F	18	18	48				
274	17	Iv	eP L M _E M _N F	7	29	07				
					29	22				
					29	29	3		65	
					29	41	3	78		
					35					
275	17	Ir	e L M _E M _N F	9	51	40				
					54	10				
					56	22	11		54	
					56	30	11	53		
					11	04				
276	17	Iv	eP F	15	58	28				
				16	02					
277	18	Iv	eP F	10	55	13				
				11	07					
278	18	Ir	e F	15	12	16				
					36					
279	20	Ir	(PS) L F	8	08	14				
					07	26				
					21					
280	21	Ir	(PS) L F	13	58	23				
					59	18				
					14	46				
281	21	Ir	e F	19	09	28				
					42					
282	22	Iv	eP F	8	37	28				
					54					
283	22	Iv	eP F	17	10	45				
					16					
284	23	I	e F	18	20					
					39					
285	24	Iu	e S L M _{E1} M _{N1} M _{E2} M _{N2} F	2	12	08				
					20	18				
					31	06				
					34	13	10		27	
					34	18	11	42		
					35	19	13		32	
					35	50	14	66		
					3	38				
286	24	Ir	(PS) F	4	03	35				
					29					
287	24	Iv	eP F	11	54	36				
					58					
288	29	I	e F	13	28	20				
					43					

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

2, 22^h 38^m 50^{s*} [3, 6^h 38^m 50^s]. **Butúan** (N de Mindanao). Temblor oscilatorio, dirección ESE-WNW, intensidad III, duración 8 segundos. Su origen se hallaba algo lejos en el Mar Pacífico.

3, 9^h 30^m [3, 17^h 30^m]. **Candón** (NW de Luzón). Temblor de tierra de intensidad II-III.

4, 1^h 38^m 35^{s*} [4, 9^h 38^m 35^s]. **Panay y Negros**. Temblor de tierra de intensidad III-IV, sentido en la parte sur de la Isla de Panay y oeste de la de Negros. El epicentro parece se hallaba en la parte sur del estrecho que separa dichas islas.

4, 18^h 55^m 28^{s*} [5, 2^h 55^m 28^s]. **Maasin** (S de Leyte). Temblor de tierra de intensidad III.

5, 2^h 45^m [5, 10^h 45^m]. **Port Lebak** (SW de Mindanao). Temblor de tierra de intensidad IV-V sentido en toda la parte sur del distrito de Cotabato. Repetición a 15^h 30^m T. I. Ambos fueron registrados por el sismógrafo de Butúan; el epicentro estaba en el Mar de Célebes.

6, 6^h 14^m [6, 14^h 14^m]. **Surigao** (NE de Mindanao). Temblor oscilatorio, dirección W-E, intensidad III, duración 3 segundos. Registrado en Butúan, donde a 15^h 0^m se registró otro choque instrumental originado en el mismo epicentro en la parte N de la bahía de Butúan.

6, 19^h 11^m [7, 3^h 11^m]. **Camp Keithley** (N de Mindanao). Temblor oscilatorio, dirección ESE-WNW, intensidad III, duración 5 segundos.

7, 12^h 0^m [7, 20^h 0^m]. **San Joaquín** (S de Panay). Temblor de tierra de intensidad IV; seguido de una serie de siete temblores locales de varia intensidad; los más fuertes ocurrieron a 21^h 30^m y a 23^h 35^m T. I. Durante el día 6 se sintieron también en Valladolid (W de Negros) varios temblorcitos locales.

8, 12^h 1^m 33^{s*} [8, 20^h 1^m 33^s]. **Panay y Negros**. Temblor de tierra de intensidad III-IV, de igual carácter, extensión y origen que el del día 4. Del mismo epicentro, al sur de la Isla Guimará, se propagaron sin duda los temblores sentidos en San Joaquín y Valladolid, dos poblaciones playeras que miran al estrecho de Iloilo.

13, 17^h 0^m [14, 1^h 0^m]. **Isla de Tablas**. Temblor de tierra de intensidad III.²

15, 22^h 48^m [16, 6^h 48^m]. **Guiuan** (SE de Sámar). Temblor oscilatorio, dirección E-W, intensidad III-IV, duración 7 segundos.

16, 11^h 37^m [16, 19^h 37^m]. **Cabo Bojeador** (NW de Luzón). Temblor de tierra de intensidad II-III.

17, 4^h 48^m [17, 12^h 48^m]. **Butúan** (N de Mindanao). Temblor oscilatorio, dirección NNW-SSE, intensidad III, duración 6 segundos.

17, 7^h 25^m [17, 15^h 25^m]. **Isla de Tablas**. Temblor de tierra de intensidad III-IV.¹

19, 20^h 0^m [20, 4^h 0^m]. **Camp Keithley** (N de Mindanao). Temblor oscilatorio, dirección ESE-WNW, intensidad III, duración 4 segundos.

24, 19^h 38^m [25, 3^h 38^m]. **Ambos Camarines** (SE de Luzón). Temblor de tierra de intensidad III-IV, sentido en la región del Monte Isarog.

25, 23^h 19^m [26, 7^h 19^m]. **Camp Keithley** (N de Mindanao). Temblor de tierra de intensidad IV, duración corta.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche = 0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² Véase "Bulletin for April, 1919."

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR AUGUST, 1919

PREPARED UNDER THE DIRECTION OF
REV. JOSÉ ALGUÉ, S. J.
DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1920

BULLETIN FOR AUGUST, 1919.

METEOROLOGICAL BULLETIN FOR AUGUST, 1919.

By Rev. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—Owing to the frequency of typhoons which influenced the weather of the Philippines during this month, it is not surprising that the monthly mean atmospheric pressure is quite below that of the preceding year and below the August's normal, especially in Luzon. That of Aparri differs from the normal by -2.58 mm., and from the monthly mean of August, 1918, by -3.72 mm. The lowest pressures of the month were generally observed on the 7th and 8th or on the 20th.

The mean monthly temperature is slightly below the normal in Luzon while it is above the same in the Visayas and Mindanao. The abundant rains experienced in Luzon during this month may account for this apparent anomaly. The highest and lowest monthly temperatures for Manila were 31.8° C. and 22.5° C.: they were registered on the 22nd and 25th, respectively. The extreme temperatures for Baguio were 21.9° C., 14.3° C. on the top of Mirador, and 22.8° C., 14.9° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR AUGUST, 1919.

Station.	Pressure.						Temperature.								
	Mean.	Departure from August, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from August, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.	
Zamboanga	758.53	-1.03	mm.	759.80	16	757.16	8	$^{\circ}$ C.	$^{\circ}$ C.	$^{\circ}$ C.	$^{\circ}$ C.				
Yap, W. Carolines	57.69		mm.	59.44	30	55.35	22	27.2	+1.1		31	7	21	19	
Tagbilaran ^a	57.45	-1.09	-0.56	59.06	16	55.44	8	26.8			32.7	13, 19	21.7	15	
Surigao	56.92	-1.37	-.84	58.77	16	54.72	8	28.5	+1.5	+1	35.4	17	22.7	28	
Cebu	57.12	-1.37	-.64	59.02	16	55.03	8	28.8	+1.4	+1	35	13	23.3	26	
Iloilo	57.11	-1.37	-.57	59.01	16	54.93	8	28.4	+ .8	+ .9	33.6	18	23.6	10	
Tacloban	56.72	-1.37	-.87	58.83	27	54.47	8	27.3	+ .8	+ .4	32	18	22.3	31	
Capiz	56.44	-1.76	-1.09	58.80	27	53.94	8	28.4	+1.5	+ .8	37.4	25	22.7	26	
Calbayog	56.54	-1.58	-.99	58.81	27	54.11	8	27.7	+1.1	+ .7	35.5	1	22.5	27	
Legaspi	55.74	-2.09	-1.31	58.71	27	52.98	8	27.8	+1.3	+ .3	33.4	17	22.4	28	
Atimonan	55.44	-2.23	-1.26	58.38	27	52.13	7	27.2	+ .6	-.1	33.6	22	23.1	22	
Ambulong, Tanauan	55.37	-2.12		58.09	17	52.25	8	26.9	+ .4	-.6	33.1	18	21.9	29	
Paracale	55.06	-2.53		58.28	27	51.78	8	26.4	+ .2		30.7	22	22.7	25, 29	
Manila	55.73	-2.16	-1.57	58.78	17	52.24	7	26.3	+ .2		33.5	1	22.5	23	
San Isidro	55.53	-2.50	-1.46	58.69	17, 27	51.92	7	25.9	-.6	-1.1	31.8	22	22.5	25	
Dagupan	54.40	-2.53	-2.03	57.67	17	50.59	20	25.5	-.8	-1	32.2	2	22.4	27	
Baguio ^b	635.26	-2.35	-1.65	636.52	17	628.69	20	25.7	-1.2	-1.2	32.8	19	22.5	26	
Vigan	753.94	-2.88	-2.38	757.65	17	748.98	20	17	-.4	-.6	21.9	19	14.3	6	
Tuguegarao	53.13	-3.64	-2.59	57.68	19	45.86	20	26.2	-.7	-.5	32.5	29	22.4	7, 21	
Laoag	53.70	-3.04		57.45	23	47.78	7	27	+ .1		36.2	26	21.9	27	
Aparri	53.19	-3.72	-2.58	57.75	19	45.75	7	26.6	+ .5		33.3	22	22.8	7	
								27.3	-.1	-.1	35.3	26	22	19	

^a 29 days of observation.

^b The barometric readings of this station are not reduced to sea level.

Rainfall.—The distribution of rainfall is very remarkable. While the rains were very abundant and considerably above the normal in Luzon and most particularly so in the western part of the Island, they were below the normal in the Visayas with the only two exceptions of Romblon and Iloilo. The total monthly rainfall for Manila is 1,983.0 mm. This breaks all our records since the foundation of the Observatory in 1865. The

highest monthly rainfall for August had been that recorded in 1877 with a total amount of 1,095.6 mm. Even including all the other months of the year, the absolute highest amount ever recorded was that of September 1867 with a monthly total of 1,469.7 mm. Our readers are referred to a special pamphlet which will be published as a separate publication on the rains, floods and typhoons of this month and on the annual rainfall for the whole year 1919. As to the floods of Manila and neighbouring provinces, we will only say here that they were very remarkable not so much for their height as for their extremely protracted duration.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF AUGUST, 1919.

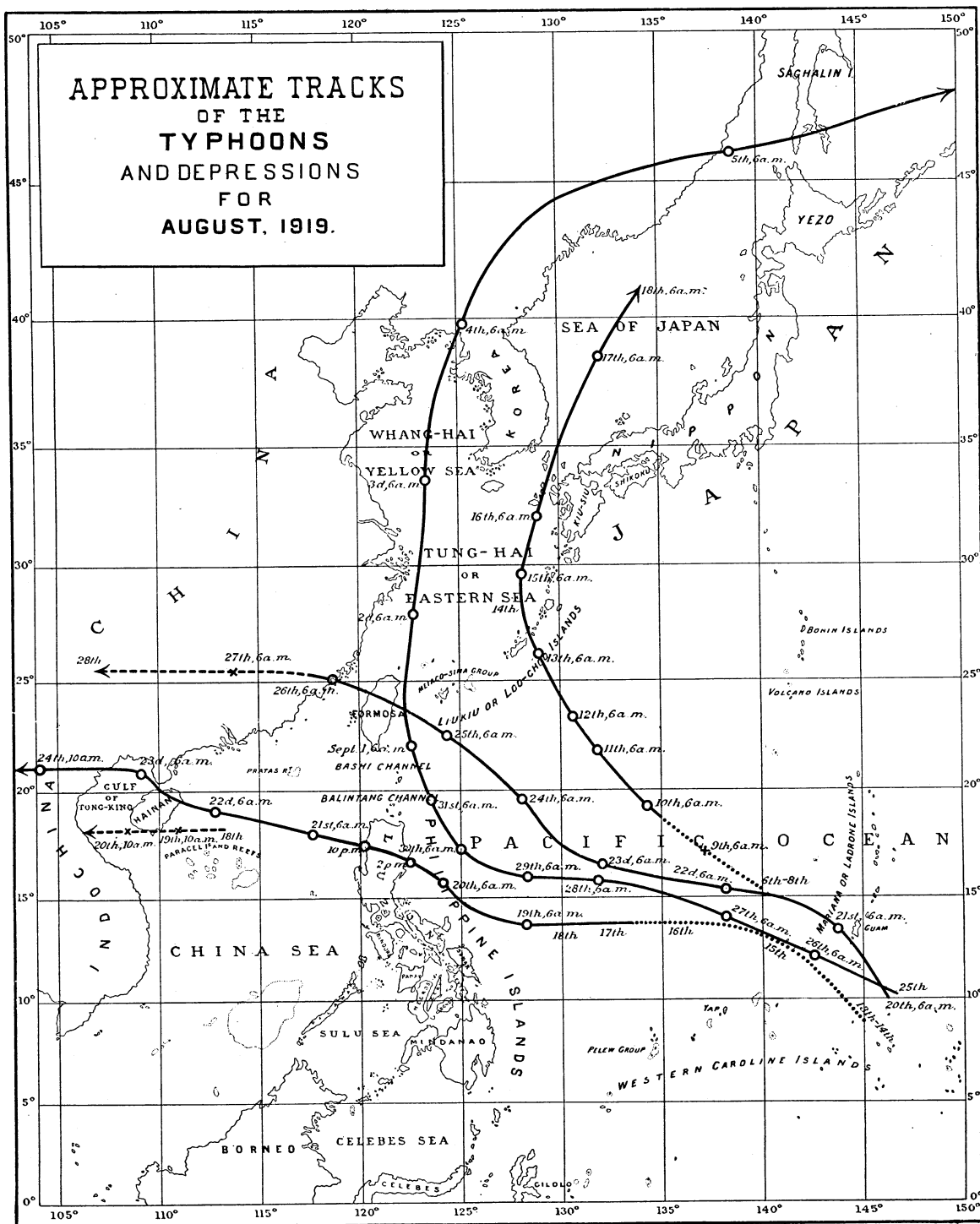
Station.	Total.	Departure from August, 1918.	Departure from normal.	Days of rain.	Departure from August, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from August, 1918.	Departure from normal.	Days of rain.	Departure from August, 1918.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.			mm.			mm.	mm.	mm.			mm.	
Jolo	14.8	-102.2	-156.7	5	-2	7.6	10	Sumay, Guam	668	+ 451.4	+ 275.2	24	+10	118.1	6
Malamau	19.8			12		11.4	3	Calapan	453.8	+ 354.4	+ 320.6	22	+ 8	58.9	6
Zamboanga	17.5	- 48	- 70	4	- 4	8	18	Virac	301	+ 117.8	+ 158.1	18	- 5	188.2	19
Davao	78.4	- 25.9	-108.2	8	- 1	27.9	26	Naga	283.4	+ 16.1	+ 118.1	20	- 3	39.1	12
Cotabato	161.4	- 54	- 80.6	13	- 7	48.5	18	Tigaon	438.3	+ 149		23	0	59	8
Camp Keithley, Lanao	125.5	- 72		17	- 6	28.4	28	Batangas	649.9	+ 396.1	+ 454.3	25	+ 5	93.2	12
Cagayan, Misamis	16.6	-122		3	- 2	6.4	3, 25	Lucena	363.7	+ 239.9		21	+ 5	55.8	7
Butuan	33.6	- 67.3	- 68.4	4	- 6	20.3	31	Atimonan	315.9	+ 134.6	+ 161.8	23	+ 3	44.7	12
Dumaguete	107.6	+ 32.2		9	- 5	50.8	19	Ambulong, Tanauan	907.9	+ 697		25	+ 6	146.1	12
Yap, W. Carolines	484.2	+ 30.4	+ 86.6	22	- 5	61.2	6	Canlubang, Calamba	1,097.7	+ 638.2		28	+ 5	155	12
Tagbilaran	24.9	- 49.7	- 94.9	7	- 5	7.7	19	Paracale	141.7	- 72	- 26.7	21	+ 1	35.7	19
Iwahig	68.1	- 54.2		16	- 4	11.9	31	Santa Cruz, Laguna	804	+ 549.3	+ 508.7	31	+ 8	115	12
Surigao	83.3	- 67.6	- 10.9	7	- 12	46.8	28	Manila	1,983	+ 1,499.3	+ 1,590.2	30	+ 9	227.9	25
Maasin	141.8	-165.6	- 67.2	10	- 1	41.9	18	Antipolo	2,104.7	+ 1,575.6		30	+ 4	273.8	11
Cebu	18.9	-129.8	-125.2	11	- 6	3.8	27	Iba	2,348.3	+ 1,646.2	+ 1,301	31	+ 3	300	25
Iloilo	647.8	+344.3	+304.8	28	+ 5	95.1	6	San Isidro	922.4	+ 545.8	+ 609.1	29	+ 4	92.8	11
San Jose Buenavista	712.5	-208.1	+191.4	28	+ 12	136.6	19	Tarlac	825.2	+ 424.6	+ 447.4	30	+10	64.5	10
Cuyo	379.2	-331.9	- 7	21	- 2	66.6	13	Baler	108.3	- 257.7	- 42.5	19	+ 2	22.1	20
Ormoc	56.5	-170.8	-195.3	12	- 8	25.9	23	Dagupan	1,681.4	+ 1,171.9	+ 1,139.9	29	+ 4	205.3	26
Guiuan	17.7	-144.2		7	-11	6.6	4	Bolinao	1,635.3	+ 1,142.4	+ 1,036.2	31	+ 9	221.9	20
Tacloban	52.1	- 62.7	- 78.7	6	-12	12.2	4	Baguio	3,462.1	+ 2,918.1	+ 2,240.7	31	+ 5	369.6	20
Capiz	139.5	+ 86.4	-100	17	+ 5	56	26	San Fernando, Union	1,408.5	+ 856.7	+ 691.1	29	+10	166.5	9
Borongan	47.2	-155.1	- 83.3	9	-10	25.9	19	Echague	223.5	- 142	+ 13.7	21	0	89.4	20
Catbalogan	121.6	-237		9	- 9	61.2	29	Candon	1,592.3	+ 1,181.9	+ 847.3	26	+ 9	358.3	10
Calbayog	155.7	-160.6	- 27.7	15	- 9	29.7	2	Vigan	1,472.4	+ 1,158.8	+ 766.9	27	+ 3	121.9	7
Masbate	142.4	-202.3	- 19.1	17	- 8	50.6	3	Tuguegarao	605	+ 438.4	+ 390.9	19	+ 8	121.6	3
Romblon	306.8	+183.3	+139	24	+ 9	52.3	6	Laog	949.2	+ 258.2	+ 105.5	28	+ 8	338.4	7
Batag	161.3	- 74.1		10	- 3	111.7	19	Aparri	413.8	+ 161.9	+ 176.5	20	+ 3	99.8	6
Sorsogon	332.3	-222.9		19	0	73.1	19	Cape Bojeador	816.9	+ 599		26	+16	238.1	6
Legaspi	358.2	+123.3	+178.5	18	- 3	70.1	6	Basco	655.6		+ 262.2	23		195.6	7

DEPRESSIONS AND TYPHOONS.

There were no less than eight typhoons influencing the weather in the Philippines during about five weeks beginning the last week of July until the first day of September. The tracks of all these typhoons are reproduced in Plates V and VI, and a brief description of same shall be given here, it being our intention, as stated above, to study them more in detail in a separate pamphlet.

Two simultaneous typhoons: July 22 to August 6, 1919.—On July 22 to 23 a depression or typhoon seemed to be forming over the Pacific to the SW of Guam near 11° latitude N and 142° or 143° longitude E. Its center appeared on our weather map for 6 a. m. of July 26 to the east of central Luzon not far from 130° longitude E and 15° latitude N moving at that time WNW. The typhoon moved northward on the 27th, northeastward on the 28th, and recurved northwestward on the 30th passing near Naha on the evening of that day. When the typhoon reached 30° latitude, it inclined again northward on August 1st, to the east of Shanghai, and recurved northeastward, thus crossing the southern part of Korea during the night of August 3 to 4.

Simultaneously with the preceding typhoon, another one formed over the China Sea on July 24 to 25, near 16° latitude N and 117° longitude E. It moved WNW until July 29, when it recurved northeastward near the southern coast of Hainan. The ty-



phoon was south of Hongkong in the early morning of August 1, when it seems to have recurved back northwestward.

Two typhoons over or near southern Formosa: August 3 to 10, 1919.—That there were two simultaneous typhoons since the afternoon of August 8, one to the southeast of Formosa and the other to the west of southern Formosa, over the southern part of Formosa Channel, there can be no doubt. Yet, it is hard to point out with certainty the origin of the two typhoons. The observations made at Basco, Batanes Islands, however, as compared with those of Luzon and Formosa, seems to show (1) that one typhoon appeared on August 3 to 5 over the Pacific and crossed the Balintang Channel on the 6th to 7th, recurving northeastward near and to the south of the Batanes Islands (See Plate V); then in the afternoon of the 8th it moved back northwest toward southern Formosa, crossing that part of the Island in the afternoon of the 9th; (2) that the other typhoon formed near and to the west of Bashi Channel in the morning of the 8th, and after moving northward for a short time, it crossed westward the southern part of Formosa Channel on the 9th and entered China to the south and very close to Swatow during the night of August 9 to 10.

A typhoon in the Loochoos and the Korea Strait: August 6 to 18, 1919.—This was a well developed typhoon and of great extension, influencing at the same time on the weather of Japan, Formosa and the Philippines. It formed on the 6th to 8th west of the Ladrone Islands in about 140° longitude E and 15° latitude N, and moved NW and NNW until the 13th when, reaching the Loochoos, it inclined northward and finally recurved to NNE on the 15th.

A typhoon over northern Luzon: August 13 to 24, 1919.—This typhoon was probably formed on the 13th to 14th to the south of Guam near 145° longitude E and 9° latitude N. Owing to lack of sufficient observations, the first part of the track of this typhoon up to the 16th can only be given with a certain degree of probability. On the 17th to 19th the typhoon could be situated east of southern Luzon but moving very slowly westward; on the 19th, however, it inclined northwest while increasing considerably its rate of progress; on the 20th it inclined again westward and crossed the northern part of Luzon moving W by N through the provinces of Isabela, Mountain and Ilocos Sur. The center of the typhoon reached Hainan in the afternoon of the 22nd.

While the preceding typhoon was near or over Luzon on the 18th to 20th, a depression of little importance seems to have appeared over the China Sea near the Paracels and moved westward close to the southern coast of Hainan.

Another typhoon over Formosa: August 20 to 28, 1919.—Simultaneously with the Luzon typhoon of August 20, another one appeared on that day to the SSE of Guam in about 10° latitude N and 146° longitude E. It moved first northwestward passing to the southwest and west of Guam in the early morning of the 21st, when the barometer registered its lowest reading 743 mm.; but in the afternoon of the same day it inclined decidedly westward threatening the northern part of Luzon. Fortunately, however, for Luzon, but unfortunately for Formosa, the typhoon inclined again northwestward in the afternoon of the 23rd, and reached Formosa in the afternoon of the 25th moving WNW. The center entered China north of Amoy in the morning of the 26th.

Typhoon near the Batanes and Formosa: August 25 to September 5, 1919.—The preceding typhoon did not yet reach Formosa, when another one made its appearance on August 25 in about the same place where the former had appeared, viz. near 10° latitude N and 146° longitude E. It moved first WNW and then W until the afternoon of the 29th when it began to incline northward. On the 30th it was moving NNW, thus disappearing any danger for Luzon. On the 31st it passed to the east and not far from the Batanes Islands; on September 1st it moved northward near the eastern coast of Formosa; on the 2nd it passed east of Shanghai moving still northward, and on the 4th it entered northern Korea recurving northeastward.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—Debido a la frecuencia de tifones que influyeron en el tiempo de Filipinas durante este mes, no es de extrañar que la presión atmosférica media mensual sea bastante menor que la del año pasado y menor también que la normal de agosto, especialmente en Luzón. La de Aparri difiere de la normal en -2.58 mm., y de la media mensual de agosto de 1918, en -3.72 mm. Las presiones más bajas del mes se observaron generalmente los días 7 y 8 o el 20.

La temperatura media mensual es ligeramente menor que la normal en Luzón, al paso que es mayor que la misma en Visayas y Mindanao. Las abundantes lluvias caídas en Luzón durante este mes pueden justificar esta aparente anomalía. Las temperaturas máxima y mínima del mes en Manila fueron 31.8° C. y 22.5° C., las cuales tuvieron lugar los días 22 y 25, respectivamente. Las temperaturas extremas de Baguio fueron 21.9° C., 14.3° C. en la cumbre del Mirador, y 22.8° C., 14.9° C. en el valle.

Precipitación acuosa.—La distribución de la lluvia de este mes es muy extraordinaria. Mientras que las lluvias fueron muy copiosas y considerablemente mayores que la normal en Luzón y más particularmente en la parte occidental de la isla, fueron menores que la normal en Visayas y Mindanao, con las dos únicas excepciones de Romblón e Iloílo. La cantidad total de lluvia caída en Manila durante el mes es 1,983.0 mm., la cual supera todos nuestros registros desde la fundación del Observatorio en 1865. La máxima lluvia mensual de agosto había sido la observada en 1877 con una cantidad total de 1,095.6 mm. Aún incluyendo todos los demás meses del año, la mayor cantidad de lluvia mensual registrada hasta aquí había sido la de septiembre de 1876 con un total de 1,469.7 mm. Remitimos a nuestros lectores a un folleto especial que pensamos publicar aparte referente a las lluvias, inundaciones y tifones de este mes y a la lluvia anual de todo el año 1919. Cuanto a las inundaciones de Manila y provincias vecinas, nos limitamos a decir aquí que fueron sumamente notables no tanto por la altura a que llegó el agua cuanto por su duración extremadamente prolongada.

DEPRESIONES Y TIFONES.

Hubo no menos de ocho tifones que influyeron en el tiempo de Filipinas durante unas cinco semanas a contar desde la última de julio hasta el día 1.º de septiembre. Nos contentaremos por ahora con reproducir las trayectorias de estos tifones en las Láminas V y VI y dar una breve descripción de las mismas, confiando poder dar más detalles en un folleto aparte que, como queda indicado, pensamos publicar más tarde.

Dos tifones simultáneos: 22 de julio a 6 de agosto, 1919.—Del 22 al 23 de julio parece haberse formado una depresión o tifón en el Pacífico al SW de Guam cerca de 11° latitud N y 142° o 143° longitud E. Su centro se echa de ver en nuestro mapa del tiempo de 6 a. m. del 26 de julio al E del centro de Luzón no lejos de 130° longitud E y 15° latitud N, moviéndose entonces al WNW. El tifón se movió al N el día 27, y al NE el 28, y recurvó al NW el 30, pasando por Naha la noche de aquel día. Cuando el tifón llegó a 30° latitud, se inclinó de nuevo al N, el día 1.º de agosto, por el E de Shanghai, y recurvó después al NE, cruzando así la parte meridional de Korea durante la noche del 3 al 4 de agosto.

Simultáneamente con el tifón anterior, se formó otro en el Mar de China del 24 al 25 de julio, cerca de 16° latitud N y 117° longitud E. Se movió al WNW hasta el 29 de julio en que recurvó al NE cerca de la costa meridional de Hainán. El tifón se hallaba al S de Hongkong la madrugada del 1.º de agosto, cuando de nuevo cambió de dirección moviéndose al NW.

Dos tifones en el, o cerca del sur de Formosa: 3 al 10 de agosto, 1919.—Que hubo dos tifones simultáneos desde la tarde del 8 de agosto, uno al SE de Formosa y otro al W

del sur de la misma isla, en la parte meridional del Canal de Formosa, está fuera de toda duda. Con todo, es difícil indicar con certeza el origen de los dos tifones. Sin embargo, las observaciones hechas en Basco, Islas Batanes, comparadas con las de Luzón y Formosa, parecen demostrar (1) que un tifón apareció del 3 al 5 de agosto en el Pacífico y atravesó el Canal de Balintang del 6 al 7, recurvando al NE cerca y por el S de las Islas Batanes (véase Lámina V); luego la tarde del 8 se movió de nuevo al NW en dirección al S de Formosa, cruzando aquella parte de dicha isla la tarde del día 9; (2) que el otro tifón se formó cerca y al W del Canal de Bashi la mañana del día 8, y después de moverse al N por breve tiempo, cruzó en dirección al W la parte meridional del Canal de Formosa el día 9, y penetró en China por el S y muy cerca de Swatow durante la noche del 9 al 10 de agosto.

Un tifón en Loochoos y en el Estrecho de Korea: agosto 6 al 18, 1919.—Este fué un tifón bien desarrollado y de grande extensión que llegó a influir simultáneamente en el tiempo de Japón, Formosa y Filipinas. Se formó del 6 al 8 al W de las Islas Ladrones en los alrededores de 140° longitud E y 15° latitud N, y se movió al NW y NNW hasta el día 13 en que, llegando a Loochoos, se inclinó al N, y finalmente recurvó al NNE el día 15.

Un tifón en el N de Luzón: agosto 13 al 24, 1919.—Este tifón se formó probablemente del 13 al 14 de agosto al S de Guam cerca de 145° longitud E y 9° latitud N. Debido a la falta de suficientes observaciones, la primera parte de la trayectoria de este tifón hasta el día 16 sólo puede darse como probable. Del 17 al 19 el tifón se hallaba al E del sur de Luzón, pero moviéndose muy lentamente al W; el 19, sin embargo, se inclinó al NW mientras aceleraba considerablemente su movimiento de traslación; el día 20 se inclinó de nuevo al W y cruzó la parte septentrional de Luzón en dirección al $W\frac{1}{2}NW$ a través de las Provincias de Isabela, Montañosa e Ilocos Sur. El centro del tifón llegó a Hainán la tarde del 22.

Mientras el tifón anterior estaba en o cerca de Luzón del 18 al 20, una depresión de poca importancia parece haber aparecido en el Mar de China cerca de Paracels, la cual se movió al W no lejos de la costa meridional de Hainán.

Otro tifón en Formosa: agosto 20 al 28, 1919.—Simultáneamente con el tifón de Luzón de 20 de agosto, apareció otro en dicho día al SSE de Guam en los alrededores de 10° latitud N y 146° longitud E. Se movió primero al NW, pasando por el SW y W de Guam la madrugada del día 21, en que el barómetro registró su mínima lectura que fué 743 mm.; pero la tarde del mismo día se inclinó decididamente al W, amenazando la parte septentrional de Luzón. Afortunadamente, sin embargo, para Luzón, pero desgraciadamente para Formosa, el tifón volvió a inclinarse al NW la tarde del 23, y llegó a Formosa la tarde del 25, moviéndose al WNW. El centro del tifón penetró en China por el N de Amoy la mañana del 26.

Tifón cerca de Batanes y Formosa: 25 de agosto al 5 de septiembre, 1919.—No había llegado aún a Formosa el tifón anterior, cuando apareció otro el 25 de agosto cerca de 10° latitud N y 146° longitud E. Empezó a moverse al WNW, y luego se dirigió al W hasta la tarde del 29 en que comenzó a inclinarse al N. El día 30 se movió al NNW, desapareciendo así todo peligro para Luzón. El día 31 pasó por el E y no lejos de las Islas Batanes; el 1.º de septiembre se movió al N cerca de la costa oriental de Formosa; el 2 pasó por el E de Shanghai, moviéndose aún al N, y el 4 penetró en el N de Korea recurvando al NE.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.*

[$\phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 38''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. ^b			
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a.m.	8 a.m.				
1	754.16	27.4	29.8	25	27.3	27.7	27.6	27.7	29	29.6	85.2	23	23.2	51.2	1.9	1.8
2	755.01	27.2	31.1	24.1	27.7	28.5	28	28.3	29.3	29.6	87.6	23.4	25.4	51.5	1.8	1
3	756.49	25.9	28	24	27.4	27.3	28	28	29.1	29.5	92.7	22.9	23.6	39.2	2.1	2
4	756.35	26.2	28.5	24.4	27.3	28	27.9	28.1	29	29.4	88.8	22.3	23.6	40.2	1.9	1.3
5	755.55	24.7	26.2	23.6	27.3	26.7	27.8	27.8	28.8	29.3	96.1	22.2	23.7	31.4	.5	.8
6	754.42	25.4	27.6	23	26.7	26.8	27.7	27.7	28.9	29.5	91.9	22.2	22.5	35.8	.4	1.6
7	752.24	25.9	28.5	23.5	26.5	26.7	27.2	27.2	28.3	29.2	90.9	22.6	22.8	41.8	.6	1.1
8	752.33	27.1	30.2	25.2	26.5	27.6	27.2	27.5	28.5	29.2	87.8	23	22.6	52.6	1.2	1.3
9	753.26	25.7	27	23.9	26.5	26.5	27.2	27.3	28.2	28.9	93.8	23.3	23.2	33	.1	.3
10	753.92	26.2	28.3	24	26.2	26.6	27	27.2	28.3	29.3	90.1	22.8	23.5	40	.4	1.1
11	753.41	25.5	27	23.6	26.5	26.5	27.1	26.9	28.3	28.8	92.9	22.5	24.2	30.3	0	.1
12	753.58	24.4	25.5	23.4	25.6	25.7	26.7	26.7	28.2	29.1	94.5	21.4	23.2	27.9	0	.3
13	754.87	24.9	26.5	23.5	25.3	25.7	26.3	26.3	27.8	29.2	94.2	22	22.9	33.1	0	1
14	756.60	25.2	29	23.6	25.5	26.3	26.8	26.4	27.5	29.2	93.5	22.3	23.2	41.9	.3	.8
15	756.90	25.5	27.8	23.8	25.8	26.5	26.4	26.7	27.4	28.9	90.9	22	23.1	40	1	.7
16	758.29	25.5	30.9	23.3	26.4	27.1	26.7	26.8	27.7	28.9	90.5	21.8	22.8	53	1	.4
17	758.78	26.5	30.5	24	26.7	27.7	27	27.2	27.8	29.1	91.6	23.4	22.8	56.2	1.2	.8
18	758.07	27.1	31.1	24.6	27.7	28.2	27.6	28.2	28	29.1	86.2	22.9	23.2	51.5	2.8	1.6
19	757.49	26.8	30.3	24.3	28	29.5	28	28.5	27.9	29.1	85.7	22.3	23.2	52.1	2.9	1.7
20	758.38	26	27	24.5	27.9	27.8	28.2	27.8	28	28.9	87.5	21.8	23.5	32.3	.6	1.9
21	756.45	26.5	30.7	24	26.8	28.2	27.6	28.4	27.9	29	84.2	21.5	23.2	49.4	2.7	1.6
22	758.35	27	31.8	23.7	27.7	29.2	28.1	28.3	28.1	28.9	81.9	21.4	22.8	50.7	3.6	2
23	757.74	26.8	30.5	23.9	28.2	29.3	28.4	28.6	28.2	29	85.3	22.3	22.4	51.7	3.2	2.1
24	755.96	27.2	29.8	25.7	28.5	28.8	28.7	28.8	28.3	29	85.3	22.7	24.5	49.7	2	1.8
25	755.35	24.8	27.3	22.5	27.7	27.1	28.5	28.4	28.4	28.7	94.5	22	23.3	27	0	.5
26	757.41	24	25.7	22.8	25.9	26.4	27.5	27.4	28.2	28.7	95	21.1	22	34	.1	.9
27	758.68	24	26.7	22.9	26	26.5	27.2	27	27.7	28.8	94.2	20.8	22.1	36.9	.1	.4
28	757.75	24.9	27.5	23	26.2	26.9	27.1	27	27.9	28.8	92.5	21.6	22	40.1	.8	.6
29	756.40	26.4	29.7	23.5	26.7	28	27.1	27.5	28.1	28.7	86.9	22	21.7	50	2.5	1.5
30	755.33	25.7	27.3	24.3	27.2	27.3	27.6	27.5	28.1	28.8	88.8	21.8	23.3	36.5	.6	1.2
31	755.30	25.2	26.1	23.8	26.5	26.4	27.3	27.2	27.8	28.5	92.2	21.9	23.2	28	.1	.7
Mean	755.73	25.9	28.5	23.9	26.8	27.3	27.5	27.6	28.2	29.1	90.1	22.2	23.1	41.6	1.2	1.1
Total															36.4	35
Departure from normal	-1.57	-1.1	-2.2	+0.2							+4.9	-0.2			-36.5	

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.		Miscellaneous.
	Prevailing direction.	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.			On the tower.	In the park.	
						Upper.	Lower.				
1	SW	598	39	SW	9.3	A.-Cu.	Cu. SW	1 40	12	13.2	☉ a. a. p.
2	SW	445.5	32	SW	9.2	A.-Cu.	Cu.-N. W	3 40	185.1	186.9	☉ a. ☉ p.
3	WSW	240.5	34	WSW	10	A.-Cu.	Cu.-N. wsw	0 00	74.8	75.9	☉ a. ☉ p.
4	SW	423	26	SW	10	Ci.-S.	Cu.-N. wsw	0 00	37.6	38	☉ a. p.
5	SW	301	27	WSW	10		N. WSW	0 00	158.5	166.7	☉ a. ☉ a. p.
6	SW	576	37	WNW	9.9		N. WSW	0 00	61.5	61.5	☉ a. ☉ p.
7	WSW	752	47	WSW	10		N. WSW	0 00	148.4	167.9	☉ a. ☉ a. p.
8	WSW	779	43	WSW	9.8	Ci.-S.	Cu.-N. wsw	1 35	106.9	117.8	☉ a. p. ☉ p.
9	WSW	569	40	W	10		N. WSW	0 00	107.7	115.3	☉ a. a. p. ☉ p.
10	SW	611	37	WSW	10	Ci.-S.	N. WSW	0 00	112.8	126.5	☉ a. ☉ a. p.
11	WSW	667	44	WSW	10		N. WSW	0 00	210.4	222.2	☉ a. a. p. ☉ p.
12	WSW	463	35	W	10		N. WSW	0 00	180.3	136	☉ a. p.
13	WSW	536	43	SW	10	A.-Cu. W	N. WSW	0 00	68.6	75.8	☉ a. a. p.
14	SW	314	34	SW	10	Ci.-S.	N. WSW	0 00	32.6	32.7	☉ a. p.
15	SW	450	29	SW, WSW	10	Ci.-S.	Cu.-N. wsw	0 00	30.7	32.3	☉ a. a. p.
16	SW quad.	200	28	WSW	8.8	A.-Cu. W	N. W	3 20	13.4	15.9	☉ a. p. p.
17	WSW	200	19	WSW	9.3	Ci.-S., A.-Cu.	Cu.-N. W	2 35	2.6	2.6	☉ a. p. p.
18	WSW, SW	240	24	WSW	6.9	Ci.	Cu. WSW	6 05	1.3	1.3	d ² a.
19	WSW	255.5	23	WSW	7.8	Ci.-S.	Cu. W	5 50	3	3.5	☉ a. p.
20	WSW	746.5	54	WSW	10		N. W	0 00	48.9	57.5	☉ a. a. p. ☉ p.
21	S	369.5	26	SSW	9	A.-Cu. W	Cu.-N. SSW	4 05	19.9	20.8	☉ a. d. p.
22	W quad.	156.5	83	W	6.8	A.-Cu. W	Cu. SW	8 30			☉ a. ☉ p.
23	W quad.	258	31	WSW	7.7	Ci.-Cu. ENE	Cu. W	5 05	1	1.1	☉ a. d. a. p.
24	ws, wnw	474	34	WSW	9.8	A.-Cu.	Cu.-N. W	1 40	52.7	57	d ☉ a. ☉ a. p.
25	SW quad.	455	32	WSW	10		N. WSW	0 00	227.9	229.8	☉ a. p. ☉ p.
26	S quad.	238.5	28	S	10	A.-Cu.	N. SW	0 00	53.9	52.5	☉ a. p.
27	SW quad.	110.5	17	SSW	10	Ci.-S.	Cu. SW	0 05	11.3	12.2	☉ a. p. ☉ p.
28	SW quad.	98	13	W	9.8	A.-Cu. NW	Cu. W	0 05	2	1.8	d a. p.
29	W quad.	176	19	WSW	9.2	A.-Cu.	Cu. WNW	2 25	.9	.9	d ☉ a. p. ☉ d p.
30	SW quad.	610	43	W by S	10	A.-Cu. WNW	Fr.-N. W	0 00	40.7	44.2	d ☉ a. p.
31	WSW	588	37.5	SW by W	10		N. W	0 00	33.1	35.1	☉ a. p.
Mean		416	32.5		9.5			1 30			
Total		12,896						46 35	1,983	2,104.9	
Departure from normal		+3,307.9			+1.6			-92 06	+1,590.2		

* All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[φ=16° 25' N; λ=120° 36' E; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pressure ^b (mean).	Air temperature at Mirador (on the top of the mountain).					Air temperature in the valley (near the city hall).				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation.	
		Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.	Hour.			Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
	mm.	°C.	°C.		°C.		°C.	°C.		Per ct.	mm.	°C.	°C.	mm.	mm.	
1	632.19	17.7	18.1	3.05p.	16.4	8.50a.	19.2	1.30p.	17.4	8.25a.	99.3	15	17.4	29.4	0	0
2	38.42	17.9	18.5	3.20p.	16.9	12m.n.	19.6	0.15p.	17.2	12m.n.	99	15.1	17	41.3	0	0
3	38.79	18	20.5	1.05p.	16.4	6.00a.	21.4	1.00p.	16.6	5.45a.	98.8	15.2	15.4	44.7	0	0
4	38.86	17.3	21.4	11.00a.	15.6	11.00p.	21.5	11.00a.	16.4	10.50p.	97.5	14.3	15.5	56	0	0
5	38.85	17	19.5	1.20p.	15.6	1.00a.	20.6	2.40p.	16.3	3.00a.	96.3	14	15.7	49.5	.2	.1
6	31.65	16.2	16.9	7.20p.	14.3	2.20a.	18	3.20a.	14.9	9.00a.	98.7	13.6	14.3	24.7	0	0
7	29.61	16.4	17.7	9.20p.	14.4	2.00p.	18.5	8.00a.	14.9	1.05p.	97.8	13.6	14.4	20.2	0	0
8	29.91	17.8	18.4	2.40p.	15.3	2.05a.	19.5	2.25p.	15.9	4.05a.	98.3	14.9	14.5	21.4	0	0
9	31.10	17.7	18.2	1.40p.	16.6	8.55p.	19.4	1.35p.	16.8	8.40p.	99.5	15	16.8	22.3	0	0
10	31.98	17.1	17.9	0.05a.	15.8	6.40a.	18.9	0.05a.	17	6.20a.	99	14.4	17	28.8	0	0
11	31.06	17.1	18.1	0.05p.	16.4	2.45p.	18.9	0.10p.	17	3.55a.	99.8	14.5	16.6	25.9	0	0
12	31.20	16.8	17.6	8.25a.	16.3	6.00a.	18.4	8.00a.	16.9	5.55a.	98.5	14	16.3	29.8	0	0
13	32.32	17	17.6	9.00a.	15	3.10a.	18.9	9.00a.	15.6	3.30a.	98.5	14.2	15	27.5	0	0
14	33.90	17.6	19.3	10.05a.	16.5	12m.n.	19.7	Noon	17.1	12m.n.	97.5	14.6	16	33.3	0	0
15	34.11	16.3	16.9	8.40a.	15.7	1.00p.	17.9	1.15a.	16.4	0.40p.	99.2	13.7	15.9	29.1	.2	0
16	35.75	16.5	18.2	10.20a.	15.2	6.40a.	18.5	10.05a.	16.2	4.00a.	98.5	13.8	15.4	38.7	0	0
17	36.52	17.6	20.8	3.20p.	15.9	0.05a.	21.4	2.25p.	16.5	0.05a.	96	14.4	15.8	52	.8	0
18	36	17.2	20.8	10.20a.	16.1	4.00a.	21.6	11.55a.	16.4	4.00a.	94.5	13.8	15.7	55.2	.5	.4
19	35.70	17.3	21.9	11.05a.	15.7	5.00a.	22.8	11.00a.	15.9	6.00a.	94.2	13.9	15.1	61.7	1.3	.4
20	28.69	17	18.5	9.00p.	15.6	6.40a.	18.8	5.05p.	15.9	0.10a.	96	13.8	15	26	0	0
21	32.50	16.6	17.6	1.20p.	15.4	3.00a.	18.5	11.30a.	16	3.55a.	96.5	13.6	14	39.2	.6	.4
22	35.99	17.7	21.4	0.15p.	16.1	7.00a.	22.7	1.25p.	16.5	6.10a.	91.3	13.7	15.7	57	1.9	.9
23	35.90	17.4	21.8	1.00p.	15.6	5.25a.	21.7	1.00p.	16.6	5.00a.	97	14.3	15	57.7	.2	0
24	33.83	16.6	17.4	10.10a.	15.4	4.30p.	17.9	10.00a.	15.9	4.05p.	99.3	14	15.6	30.8	0	0
25	32.07	16.8	17.7	2.00p.	15.8	6.00a.	18.4	2.15p.	16.1	6.00a.	99.7	14.2	15.6	35	0	0
26	34.36	16.5	20.5	3.10p.	14.7	5.10a.	20.6	3.10p.	15.4	5.20a.	97	13.6	14.6	46.7	0	0
27	35.45	16.2	18.1	11.10a.	15.1	11.20p.	18.6	11.05a.	15.7	12m.n.	98.3	13.5	15	33.8	.5	.3
28	35.34	17.1	21.3	Noon	15.2	3.20a.	21	Noon	15.4	5.15a.	91.3	13.3	13.8	53.7	1.1	.4
29	34.55	17	18.8	2.40p.	15.7	12m.n.	19.5	2.50p.	16	12m.n.	98	14.2	15.7	41.1	0	0
30	32.89	17	19.1	11.40a.	15.6	0.55a.	20.1	10.30a.	15.9	0.05a.	97.5	14	15	40.8	0	0
31	32.52	15.7	17	2.00p.	14.9	7.20p.	17.7	0.35p.	15.5	7.30p.	99.3	13.2	15.2	42.8	.5	0
Mean	633.26	17	19		15.7		19.7		16.2		97.5	14.1	15.5	38.5	0.3	0.1
Total															7.8	2.9

Day.	Wind.				Clouds.		Sun-shine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.	
	Prevailing direction. ^d	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Form and direction.					
					Upper.	Lower.				
1	SW	1,193.5	68.9	SW	0-10.	N.	h. m.	mm.	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
2	SW, W	755.6	47	SW	10	N.	0 00	46.4	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
3	W quad.	329.3	32.2	SW, W	9.3	Ci.-S.	0 10	37.2	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
4	W	344.7	34	W	9.9	Ci.-S.	0 25	39.1	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
5	W	392.6	26.8	W	10	Cu.-N. WNW	0 00	34.6	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
6	W	1,232.4	81.3	W	10	N.	0 00	292.9	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
7	W	2,029.3	102.2	W	10	N.	0 00	246.6	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
8	W	1,740.5	98.3	W	10	N.	0 00	263.3	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
9	W	1,254.8	67	SW	10	N.	0 00	316.2	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
10	SW	1,288.6	66	SW	10	N.	0 00	213	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
11	W	1,140	67.6	W	10	N.	0 00	237.9	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
12	W	845.5	53.7	W	10	N.	0 00	185.1	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
13	W	753.5	48.8	W	10	N.	0 00	58.1	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
14	SW quad.	373.4	31.7	SW	10	N.	0 00	20.3	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
15	SW	988.4	59.8	W	10	N.	0 00	89.7	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
16	SW	771.6	52.9	SW	9.9	Ci.-S.	0 00	37.7	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
17	W	530.6	29.8	W	9.9	Cu.-N. w, wsw	1 50	4.9	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
18	E quad.	214.1	20.6	W	8.9	A.-Cu. SW	1 20	37.8	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
19	NW, SE	293.8	25.7	W	6.4	Ci. SW	3 25	52.7	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
20	W quad.	1,041.4	96.8	SW	10	N.	0 00	369.6	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
21	SW, S	687.4	49.6	SW	10	N.	0 00	18.3	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
22	SE quad.	314.3	22.5	W	7.6	Ci.	3 30	8	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
23	W	415.2	36.2	W	9.7	Cu.-N. SW	1 55	57.9	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
24	W	986.1	60	W	10	N.	0 00	337.9	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
25	W	978.3	56.1	W	10	N.	0 00	120.8	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
26	SW quad.	529.4	49.3	W	10	Cu.-N. wsw, s	0 40	59.8	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
27	S quad.	228.7	19.9	W	10	N.	0 00	21.6	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
28	W quad.	290.3	22.2	W	8.9	A.-Cu. SSE	2 05	3.6	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
29	W	389.4	24.7	W	10	N.	0 05	12.4	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
30	NW, W	671.5	51.7	W	9.9	Ci.-S.	0 45	144	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
31	W, NW	806.4	39.6	W	10	Cu.-N. WNW	0 00	66.1	☉ ☽ ☿ ♀ ♁ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓	
Mean		767.9	49.6		9.7		0 32			
Total		23,805.6					16 10	3,462.1		

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
^b The barometric readings of this station are not reduced to sea level.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
^d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, AUGUST, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo										7.6				0.1	2.5	
Lais, Malita, Davao											0.5					
Port Lebak, Cotabato		9.1		3		3		2.5	1.5	27.1			3.6			
La Union, Davao *																
Basilan Plantation, Isabela, Basilan, Kabumbatan *									10.2							
Basilan Plantation, Isabela, Basilan, Office *																
Parang-Lalap, Isabela, Basilan *			0.8							7.6						
Latuan, Isabela, Basilan *			.8						.3	3.8						
Malamau, Zamboanga			11.4						8.4	4.8						
Guabo, Davao	2															
Zamboanga		2.3			0.5					.3						1.3
Fort Pikit, Cotabato		2.5		4.3						2.3						
Davao			9.4	8.9		2.5										
Strib, Guianga, Davao *		6.1	.8	6.4												2.5
Bual, Cotabato		5.8	10.4	1.3	1.3	.5					1.8					
Cotabato		10.2	21.3		2.8	1.3									.8	
Naga-Naga, Zamboanga		15.2	20.6	34.5	66	73.2	25.4	27.4	23.3	26.2	25.4					
Malabang, Lanao		4.3	41.1	20	20.6	3.8		.3		.8		1.8		12.4		
Malangas, Zamboanga *		1	5.1	5.9	20	32.6	32.8	53.1	36.8	30.9	26.2	.3				
Lumbatan, Lanao *			13.2	14.7	56.2	36	45	32.7	86.9	41.9	6.1	5.3				
Ganassi, Lanao																
Moncayo, Davao *						2.5										
Camp Kalaw, Moncayo, Davao																
Mailag Agricultural School, Bukidnon			.5		.5			.3								
Camp Keithley, Lanao			6.6	.8	11	15.1	.1	2.8	.8	4.6		1.8				
Pantar, Lanao *	21.6			10.2	1.5											
Veruela, Agusan			19.8	.5											3	2
Sumilao, Agusan			15.5													
Diklom, Bukidnon *			15.2													
Cagayan, Misamis			6.4	3.8											3.8	
Talacogon, Agusan			14.2	3.8		4.3										
Butuan											.3					
Dumaguete			16.3		3.6		1.5									
Hacienda San Jose, Tanhai, Bais, (Sur) Oriental Negros *	7.6	18.3	2.5	3.8	8.1	8.6		32.5	48.5	4.8						
Palanas, Bais, (Centro) Oriental Negros *	2.3			9.7	30.5	5.6	13.5	27.4	26.7	49.3						
Hacienda Tamogon, Bais, (Norte) Oriental Negros *			5.1	22.9		20.3	27.9	35.6	35.6	22.9	10.2	12.7	7.6			
Yap, Western Carolines	44.2	43.7	27.4	13.5	48.3	61.2	23.7	7.4			.3			47.2	9.4	7.7
Tagbilaran		.8	3.6	.3												
Iwahig	.3	6.1	3.8	9.6	6.3		.5	4.1	.5	.3			4.1	1.3		
Dalaguete, Cebu		.8	1.5	.3		.5		.5	.3	4.3						
Surigao										.3						
Central Palma, Ilog, Occidental Negros			5.8	6.1	8.9	7.6	2	1.8	15.2	15.3	15.3				3.8	
Hacienda Naval, Himamaylan, Occidental Negros		.5	7.6	29	.8	10.2	5.1	7.6	3.6	3.3			11.7	2.3		
Biaong Cui's Farm, Barili, Cebu Maasin				7.4	6.6					2.3		17.8	5.1			
Isabela, Occidental Negros	3.3	3.3	13.2	30		11.2	1.5	3.6	4.3	1			16.2	7.6		
Hacienda Tanolo, Hinigaran, Occidental Negros	1	2	27.7	61.7	7.1	3.6	.5	.5	7.7				20.1	2.6		
Cebu				3.1	2	.3			2.8	1.3			.5			
La Castellana, Occidental Negros	2.3	1.5	52.1	54.9	6.9	3.8	.8	.5	8.1	3.6			13.8	1.8	.3	
Hacienda Vallehermoso, Oriental Negros *				2								3.8			1	
Hacienda Canlaon, La Castellana Occidental Negros	4.3	.3	49.1	61	25.2	1.8		.3	1.6	6.9	1.8		13.9	1		
Central Azucarera de la Carlota, Occidental Negros	8.4	4.8	87.2	72.4	19.8	1.5		.3	19.3	13.5	.5		16	3.8		
La Carlota, Occidental Negros *	7.9	3.3	72.4	78.3	16.3	1.5			18.6	15.5	1.3		11.7			
Valladolid, Occidental Negros	9.1		57.4	119.4	33.8	1.8	5.6	3.3	20.8	8.2	20.6	11.9	10.1	6.4	.3	
Hacienda San Antonio, Occidental Negros *																
Hacienda San Carlos, Occidental Negros			13	2.3						3.8			5.6			
Hacienda Refugio, Occidental Negros *					1.3									7.4		
Santa Cecilia, Ma-Ao Sugar Central, Bago, Occidental Negros	4.8	1.8	83	109.2	13.5	.3	.8	.3	20.3	3.8	6.6	8.1	20.3	7.6		
Murcia, Occidental Negros	2.8	6.6	61.2	93.8	10.4	3.6		.5	21.6	10.7	39.1	1	15.7	3.6		
Iloilo	12.2	14.2	43.2	44.2	54.4	95.1	25.7	15	23.3	51.5	32.2	14.4	6.3	11	.5	
Concepcion, Talisay, Occidental Negros		1	42.9	54.3	18.5	2.8	7.2	.5	9.4	1.5	13.2	2.3	13.5	18.8	5.1	
Tuburan, Cebu				.8									2.3			
San Jose Buenavista	15.2	1.3	111.3	48	8.7	9.7	6.4	15.7	4.1	32.8	3	26	22.9	24.9	.3	1
Silay, Occidental Negros	1.3	1.8	40.7	18.5	9.1	34.3	16	14.5	12.7	21.1	44.2	14.2	3.3	26.5	.3	
Cuyo	26.4	4.1	11.4	43.7	.5		3.3	5.6	.8	3.3			66.6	11	9.4	
Lucena, Iloilo *			11.4		33	50.8	7.1	15.7				162.6	207			
Victorias, Occidental Negros			21.3	12.4	42.9	30			27.4	33.5	55.9	9.9		10.9		
Cadiz, Occidental Negros			2.3	6.4	3.9	.5	1.8	3.8	2.8	3.8	16.6	.6	1	.3		
Hacienda Bilbao, Manapla, Occidental Negros				10.7	12.4	52.3	10.2		43.9	4.8		68.1	9.7			
Ormoc			1.8	13.2	.5	.5				.8				3.3		
Guiuan			1	6.6									2			
Bogo, Cebu		.3	.3	7.7				.5				3		.5		
Dueñas, Iloilo *				10.4												
Bitagan, Iloilo (Railroad Iloilo to Capiz) *			3	18.5	1.3	.5					11.4	.8				
Lapu, Iloilo (Railroad Iloilo to Capiz) *																
Tacloban	8.4	16.5	34.7	40.7	40.1	57.2	23.6	21.1	5.6	66.3	32.3	11.4	17.5	11.2	2.3	
Dumarao, Capiz *			2.6	12.2	8.9								11.9			
Dao, Capiz *			5.1						6.4							
Capiz		5.8	.8	14.7	2.5		1	14.2		1	.8					
Capiz			2.3	21.8	3.8		.5	7.8	.3		.3			.3		10.7

* Voluntary or coöperative station.

Daily rainfall at the stations of the Weather Bureau, August, 1919—Continued.

Station.	Day of month.															Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo											4.3			0.3		14.8
Lais, Malita, Davao	2.5	0.8				1				10.4	21.8	1.5				58.5
Port Lebak, Cotabato	10.7	23.4	46.7									5.6		8.1		154.2
La Union, Davao ^a						27.7			0.3		19.8		25.9			73.7
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a								22.1					3			35.2
Basilan Plantation, Isabela, Basilan, Office ^a										24.6						32.2
Parang-Lalap, Isabela, Basilan ^a														2.3		6.4
Latuan, Isabela, Basilan ^a														1.8		7.7
Malamaui, Zamboanga																19.8
Cuabo, Davao					1.8	31.5			1	3.6			9.9	.8	0.8	51.4
Zamboanga	.3	8	4.8													17.5
Fort Pikit, Cotabato		6.1	22.4										22.9		3.3	63.8
Davao									2.5	4.6	27.9	2			12.7	78.4
Sirib Guianga, Davao ^a					4.3	17.3				5.8	17.5	5.1		11.7		60.2
Bual, Cotabato		24.1	30	24.9								5.8	3.9		7.4	107.3
Cotabato	2.3	48.5	46.4				9.1	16.3		2.5		10.4	5.3	1.3		161.4
Naga-Naga, Zamboanga												3.6	30.7	13.5		84.2
Malabang, Lanao	1.8	112.2	11.5		3		.8	3.3	15.2		7.9	16.5	30.2			599.6
Malangas, Zamboanga ^a		17.5							.5		1.3	1.8	3.8	17.5	7.6	154.9
Lumbatan, Lanao ^a			48.8	12.7							5.1	3.8	15.2	10.7	7.6	348.6
Ganassi, Lanao		1	3.3	5.1							14	17.8	10.9	15.5		465.6
Moncayo, Davao ^a						13.5				3.3						16.8
Camp Kalaw, Moncayo Davao	10.2				2.3	.8			.5	1.5						17.8
Mailag Agricultural School, Bukidnon	2.8	28.2	1.3	.8	.5		.8	7.9	.3	23.6	20.8	61	.3			149.6
Camp Keithley, Lanao		10.7	.5			4.6				6.9	26.2	28.4	.8	3.8		125.5
Pantar, Lanao ^a		25.4		10.2		1.3				20.3			10.2	4.6		105.3
Veruela, Agusan					.8		15.5			19.6	32.8	1.5				118.2
Sumilao, Agusan			5.6					37.8	22.9			2.8		9.9	34.3	108.4
Diklom, Bukidnon ^a								15	4.6			4.1		17.3		56.2
Cagayan, Misamis									6.4							16.6
Talacogon, Agusan								18.3	6.6	6.9			3.6	.5	21.6	83.6
Butuan											.3		12.7	20.3		33.6
Dumaguete		5.3	50.8	7.7								7.1	3.3	12		107.6
Hacienda San Jose, Tanhai, Bais (Sur) Oriental Negros ^a	12.7	55.9	52.5								22.9	20.3	10.2			309.2
Palanas, Bais (Centro) Oriental Negros ^a		25.4	23.9	8.4								49.3	24.4			296.4
Hacienda Tamogon, Bais (Norte) Oriental Negros ^a	5.1	58.4	2.5								22.9	5.1	10.2			305
Yap, Western Carolines	11.2			17.1	14.8	35.8	27.2	5.6		3.9	11.8	22.5			.3	484.2
Tagbilaran			7.7	6.9							3.1			2.5		24.9
Iwahig			8.4	8.4	2									.5	11.9	68.1
Dalaguete, Cebu			7.6	.3							10.2		1	2.1		29.4
Surigao		7.9	.3			21.1						46.8		6.4		83.3
Central Palma, Ilog, Occidental Negros	12.7	109.2	2.5											52.6	27.9	286.7
Hacienda Naval, Himamaylan, Occidental Negros	.3	2.5	66.1	5.1						7.1		1.3	76.2	13.5	5.1	258.9
Biaong Cui's Farm, Barili, Cebu			2.5	12.7									7.6		1	63
Maasin	4.1	41.9	6.1			7.1		12.2			6.9	27.4	12.7	13.8		141.8
Isabela, Occidental Negros		3	54.8	7.4							11.4	78.5	23.6	12.7		286.6
Hacienda Tanolo, Hinigaran, Occidental Negros		.3	57.1	27			1			11.4	.3	14.2	65.3	24.1	6.9	342.1
Cebu										3.8	.8	1	2.5	.8		18.9
La Castellana, Occidental Negros		1	31	23.2	.3					.5		10.2	49.1	25.2	10.2	301.1
Hacienda Vallehermoso, Oriental Negros ^a		8.4				13	20.8		3				23.6	13		88.6
Hacienda Canlaon, La Castellana, Occidental Negros		8.9	29.2	25.7						1.8			102.1	22.1	10.9	367.9
Central Azucarera de La Carlota, Occidental Negros			13.7	25.9				25.4		.8		.8	79	19.3	9.7	422.1
La Carlota, Occidental Negros ^a		.3	11.9	25.6	.3					.8		.3	72.9	27.4	9.1	375.4
Valladolid, Occidental Negros			9.4	16.8				3.6		40.4			95.2	16.5	20.6	511.2
Hacienda San Antonio, Occidental Negros ^a												43.2	3.8			47
Hacienda San Carlos, Occidental Negros ^a	1.3	1	8.4								.8	22.6	4.1			62.9
Hacienda Refugio, Occidental Negros ^a			5.1	20.3								25.4	3.3			73
Santa Cecilia, Ma-Ao Sugar Central, Bago, Occidental Negros			11.7	37.4			1.3	1.5		4.1			82.3	22.9	6.4	448
Murcia, Occidental Negros			13.7	49.6						11.4			64.5	14.3	21.6	445.7
Iloilo			20.3	14.5				2.5	7.4	33.5			28.7	32.2	65.5	647.8
Concepcion, Talisay, Occidental Negros				27.9	26.4			2					25.9	32.6	29.7	335.5
Tuburan, Cebu			1	2.3								11.2		.5		18.9
San Jose Buenavista	1	16.5	136.6	20.1				3.8	5.1	3	3.8	20.8	77.2	47.5	48.5	712.5
Silay, Occidental Negros			9.7	49.3				1.3				.8	14.7	12.4	14.8	361.5
Cuyo	3.8	39.1	17.8	38.1		1.8			5.6			26.9	30	30		379.2
Lucena, Iloilo ^a				78.7	15.7				30.5			10.2	2.5	26.7		651.9
Victorias, Occidental Negros		1.3		26.1								.5	5.6	3.5		281.2
Cadiz, Occidental Negros				13.7								.3	.3		6.4	64.5
Hacienda Bilbao, Manapla, Occidental Negros				25.4									5.1		8.6	251.2
Ormoc		1.3	.5	1.3								25.9	1.3	6.1		56.5
Guiuan			4.3								2.5	.5	.8			17.7
Bogo, Cebu	3.3		.5	1.8							12.2	4.8	.8			33
Dueñas, Iloilo ^a				45.2							21.8		5.6			83
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a				30.7								6.9	12.4	3.1	3.8	92.4
Lapus, Iloilo, (Railroad Iloilo to Capiz) ^a			2.3	34				1.8	6.6	32			29.7	53.1	28.4	576.8
Tacloban			5.1										11.4			52.1
Dumarao, Capiz ^a				7.6		6.4							30.5			68.7
Dao, Capiz ^a				5.3	.8	1.5							7.6	7.6	1.5	86
Capiz				5.1						56	26.7	4.8	1.8	4.6	.6	139.5

^a Voluntary or cooperative station.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, AUGUST, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Borongan	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Catbalogan	2.5	1.3	3.8	2.5	3.8											
Calbayog	7.1	4.8	22.1	3.8												
Masbate	29.7	14.3	17	14				2.8					0.8		0.3	
San Jose Estate, Tamaraw Plantation, Mindoro ^a	0.8	11.7	50.6	7.4	4.8	0.5		4.1	1.3		3		6.9		3.3	
San Jose Estate, San Agustin, Mindoro ^a	64		70.4	67	18.8	67.8	27.9	35.1	50.8	26.7	24.1	29	50.8	12.7	13	4.1
San Jose, Mindoro ^a	21.6	34.8	39.4	58.9	15.2	41.9	16.5	6.3	65.5	26.7	6.4	19	60.9	12.7	21.6	12.7
San Jose Estate, Tunnel D-12, Mindoro ^a	44.2	40.9	36.8	52	22.8	42.7	19.3	10.4	70.1	24.8	7.6	21.4	90.7	17.5	20.3	4.3
Romblon	47.3	35.8	27.4	58	27.7	37.8	24.1	10.9	95	20.1	15.8	32	86.1	12.7	20.3	12.2
Batag	5.1	17.5	12.4	29.7	24.4	52.3	19.3	6.4	40.1	4.9	10.2	22.1	11.2	2.1	7.9	3.8
Irosin, Sorsogon		5.8	1.3	6.9	6.4						5.8					
Sorsogon		10.2	19.5	3	9.2	3.9	1.1	2.8	(*)	(*)	(*)	(*)	(*)	(*)	.5	.5
Legaspi	1.5	44.2	24.1	9.9	24.1	9.1					b 7.1		6.9			
Sumay, Guam	.5	30.8	21.1	4.5	8.4	70.1	20.6	9.8	10.5		3.8	6.7			1.5	
Calapan	3.8		38.1	26.7	110.5	118.1	11.5	34.3	45.7	6.3	31.8		5.1	3.8		14
Virac		3.3	14.2		3.5	58.9	50.8	24.7	38.6	19.1	38.6	24.1	37.1	6.4	3.6	
Naga		4.7	29.5	8.2	25.4	13.7	2.8			2	1	4.3	1.8			
Tigaon		39.4	13.9	5.6	17.3	51.3	25.4	59	21.6	22.9	43.4	43.7	3.5			
Batangas	7.7	2.5	5.8	2.8	52.6	43.9	36.1	43.7	41.7	17	22.4	93.2	43.9	2.8	2.8	
Lucena			7.1		32.5	17.3	55.8	15.2	30.7	9.7	15.8	55.7	31	.8	2.8	
Atimonan	2	.3	.8	15.5	22.1	22.1	31.7	7.4	20.8	5.6	6.4	44.7	22.4	1.8	1.8	.5
Ambulong, Tanauan	10.4	.8	2.5		81.5	2.1	87.3	79.8	75.1	35.3	32	146.1	72.5	2.3	8.9	.8
Canlubang, Calamba	3.1		18.8		80	14.8	68.1	51.5	91.4	52.1	130.8	155	38.1	2.3	16.5	9.7
Paracale	.3	4.1	3.8	6.8	10.2	1.8	21.3	.3		1.5	1.5	10.7	2.1			
Santa Cruz, Laguna	5.1	13.2	2.8	3.6	62.9	18.8	72.7	18.5	46.9	42	86.4	115	53.8	3.3	20.8	4.1
Fort Mills, Corregidor ^{a,c}	14.5	14	90.2	15	90.7	59.2	45.2	24.9	77.4	12.7	190.5	312.5	99.9	96.3	22.1	24.4
Alabang, Rizal ^a	2.3	10.6	11.4		56.9	27.4	78.2	14	63	41.4	84.4	225.6	41.9	33.5	66	36.1
Lamao, Bataan ^a	52.1	33.5	44	67.8	78.5	54.1	144	108.2	129.5	60.1	246.9	133.6	106.4	66.5	35.1	45.7
Manila	12	185.1	74.8	37.6	158.5	54	148.4	106.9	107.7	112.8	210.4	130.3	68.6	32.6	30.7	13.4
Antipolo	10.6	81.3	39.1	34.3	103.9	71.9	192.3	133.6	120.7	70.9	273.8	169.9	51.8	20.3	53.8	22.6
Montalban, Rizal ^a	14.7	85.1	27.9	6.4	58.4	109.2	64.3	59.7	96.5	198.1	173.2	182.9	115.1	82.6	55.9	29.2
Hacienda Pintong-Sapang, San Jose del Monte, Bulacan ^a	46.2	25.9	3.8	24.4	43.1	16	97.8	73.9	109.5	72.9	122.2	104.7	52.1	44.2	42.2	4.6
Mabayuan Dam, Olongapo, Zambales ^a	33.2	23.6	35.6	56.9	132.6	72.9	209.5	145.1	120.6	149.4	232.2	156.7	101.9	110	99.8	89.4
Pampanga Sugar Mills, Del Carmen, Pampanga ^a	6.1		b 42.6	11.4	55.9	26.4	82.6	49.6	117.8	180.6	88.1	85.6	24.9	70.9	80.2	65.3
Iba	8.1	20.6	49	154.4	104.3	89.5	73.4	28.5	40.9	196.1	146	91.7	64.3	197.1	70.9	37.9
San Isidro	1.8	1	9.4	16	36.6	35.4	45.3	24.3	38	53.8	92.8	33.2	48.7	41.8	28.7	8.4
Hacienda Luisita, Comillas, Tarlac ^a	12.7	1.3	2.3	5.1	26.4	36.8	47	49.8	71.6	91.4	58.2	52.1	48.8	33.3	29.2	7.6
Hacienda Luisita, San Miguel, Tarlac ^a	5.9	8.9	1.8	4.6	22.1	29.2	40.4	55.2	74.9	80.2	61.8	53.1	51.1	46	18	18.5
Tarlac	2.5	3	6.1	7.9	8.6	33.5	25.4	26.9	57.4	64.5	58.9	40.6	38.1	49.3	15.2	45.7
Baler			15.7	1.8	.3		6.1	.5		3.1	1.8	3.8	3.8	1	3	5.6
Paniqui, Tarlac ^a	28	11.4	9.7	21.6	20.3	39.6	35.6	42.7	27.4	60.2	77.7	79.5	40.9	14.5	29.7	11.2
C. L. A. S. Muñoz, Nueva Ecija ^a	3.6	4.8	19.6	52.1	9.7	38.6	13.7	15	10.4	20.8	53.4	53.1	36.8	25.1	10.7	3
Dagupan	16.3	8.4	28.8	22.6	4.1	53.5	12.6	49.8	186.9	188.9	116.7	122.9	74.5	24.7	31.2	37.8
Bolinao	8.4	3.6	48	22.3	66.6	25.4	86.8	44.1	66.6	102.4	110.5	87.2	66.1	82.3	27.2	89.4
Baguio	46.4	35.8	37.2	39.1	34.6	292.9	246.6	263.3	316.2	213	237.9	185.1	58.1	20.3	89.7	37.7
San Fernando, Union	26.2	19.3	7.4	34.3	35.8	94.5	73.4	98.3	166.5	117.1	159	91.9	26.9	8.6	35.8	32
Echague			29	1.9	6.4	1.8	1.4	.8	.5		1.8		.5			
Sagada, Mountain Province ^a	12.5	7.6	15.2	5.1	8.9	152.4	298.3	169.7	78	66.3	30.2	15.2	12.2	5.6	8.7	16.8
Bontoc, Mountain Province ^a			17.5	4.8	2.3	42.4	108.7	82.5	26.4	26.4	13.9	2.3	1		1.5	10.9
Candon	32.5	5.8	8.9	11.4	18.8	154.7	259.6	188.7	118.9	288.3	69.3	74.9	32.8		35	17.8
Vigan	41.9	29.5	5.5	88.6	172.7	118.1	355.9	172.3	60.5	72.2	55.2	19	26	1.1	75.9	21.7
Tuguegarao	3.3	37.6	121.6		22.3	32.5	20.5	9.6	7.1		9.4	14.7			49.5	8.1
Laogag	8.5	6.2	10.4	.7	32	210.3	338.4	83	27.5	3.6	.5	26.5	59.4	1.1	36.7	4.8
Aparri	.8		27.9	5.3	38.9	99.8	73.6	14.5	.3	.3		.3				
Cape Bojeador	11.9	6.8	12.4		29.7	238.1	235.3	105.9	23.9	17.6	1.1	4.9	3.1	.3	31.5	.8
Basco	3.8				42.7	6.5	195.6	21.3	3.8	4.3	18.6		1			

^a Voluntary or cooperative station. ^b Total amount for 2 days. ^c Rain in 24 hours beginning 7 a. m. * No observation.

Daily rainfall at the stations of the Weather Bureau, August, 1919—Continued.

Station.	Day of month.														Total.		
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.		31.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.		mm.	
Borongan			25.9				2.5				0.8	1.3	6.6		47.2		
Catbalogan		4.8	3.3									9.4	61.2	5.1	121.6		
Calbayog		8.7	17.1	6.9						2.3		5	17.7	17.5	155.7		
Masbate			1.8	29.3					1			2.8	10.6		142.4		
San Jose Estate, Tamaraw Plantation, Mindoro ^a			52.1	26.2					21.6	50	14			23.6	42.9	792.6	
San Jose Estate, San Agustin, Mindoro ^a	8.9	25.1	40.6	25.9	3.3	7.8			15.2	28	14.5		82.6	12.7	51.3	776	
San Jose, Mindoro ^a		6.1	53.8	53.6	1.5	4.8	1.5		17.8	36.3	18.1		76.4	12.2	55.9	863.8	
San Jose Estate, Tunnel D-12, Mindoro ^a	1.5	5.6	121.7	30.2	2.3		3.3		27.2	30.9		1.3	66.3	37.1	36.1	926.7	
Romblon			1	10.4					2.5	6.3		2.3	4.6	3.8	6.5	306.8	
Batag			111.7	2.5			6.9		2.1				12.7	1.3		161.3	
Irosin, Sorsogon		1.5	38.6	3.3			2.1			.3	.5	5	39.8	3.8		152.6	
Sorsogon		13	78.1	8.4			15.2					39.9	33.2	3.8	15.7	332.3	
Legaspi			57.9	18.5			29.2					14	46.2	4.1		358.2	
Sumay, Guam	5.1	8.9	2.5	41.9	31.7	6.3			69.8	6.3	26.7	8.9	10.2			668	
Calapan			10.7	7.1				5.1	43.9	22.1		2.5	.5	15.3	8.3	458.8	
Virac		5.8	188.2	10.9			3					9.6	31.5	3.5	8	301	
Naga		5.6	21.7	5.4				2.6	8.5	8.1		6.1	10.8	5.9		288.4	
Tigaon			37.8	19.5			2.8	.5	3.6	5.6		2	12.2	.8	6	438.3	
Batangas				58.7	6.9			.8	77	17.5		2.5	12.2	14.7	26.7	649.9	
Lucena			3	24.9	3			3.3	31.5	1.8		7.6		11.9	2.3	368.7	
Atimonan			3.8	34.3					17.8	.8		42.1		7.9	3.3	315.9	
Ambulong, Tanauan				5.1	2.3			17.6	103.3	40.1	8.4	.8	5.1	54.6	33.2	907.9	
Canlubang, Calamba	3.8	1	2.3	5.8	22.1		4	21.4	128.5	48.8	12	.5	7.6	74.7	33	1,097.7	
Paracale			35.7	18.3				.5	10.9	3.3		2	3	5.4	2.1	141.7	
Santa Cruz, Laguna	3.3	.3	2.8	21.9	1.3	14.2	.5	14.5	83	14.5	2	12.4	4.1	38.8	20.5	804	
Fort Mills, Corregidor ^{a,c}	23.1	29.7	4.6	59.7	34.3	19.8		56.9	32.7	140.2	89.9	30.2	34.8	31.2	42.4	62.6	1,871.6
Alabang, Rizal ^a	16.5			31	1			18.8	80	153.7	56.1	78.7	1.5	39.1	46.2	1,317.8	
Lamao, Bataan ^a	5.6	3.3	3	138.5	36.1	3.8		7.9	73.4	268.5	152.6	36.1	16.5	1	92.2	135.6	2,380.1
Manila	2.6	1.3	3	48.9	19.9			1	52.7	227.9	53.9	11.3	2	.9	40.7	33.1	1,988
Antipolo	.8		3.8	57.9	4.9			1.3	54.6	250.2	38.9	19.8	3	50.8	114.5	62.6	2,104.7
Montalban, Rizal ^a	31.7	2	5.1	135.6	29.5	2.3	10.7	21.1	261.6	58.4	11.4	2	67.3	55.4	38.1	2,091.4	
Hacienda Pintong-Sapang, San Jose del Monte, Bulacan ^a			4.8	71.6	36.6			10.4	30	365.6	83.1	24.1		39.9	59	40.4	1,649
Mabayuan Dam, Olongapo, Zambales ^a	61	21.4	5.6	123.7	134.4	5.4	16.7	181.1	229.1	216.4	85	7.9	4.1	208.2	233	3,242.5	
Pampanga Sugar Mills, Del Carmen, Pampanga ^a	3	4.3	.3	53.1	56.7	9.9		43.9	188.8	295.1	49.7	2.3	1.5	87.8	25.1	1,809.5	
Iba	2.8	21.5	23.6	116.8	44.2	16		58.2	98.1	300	68.8	89.7	6.8	3.3	95	30.8	2,348.3
San Isidro	1.8	3.8	4.1	89.3	22			2	34.9	87.6	91.1	32.2		5.6	14.2	18.6	922.4
Hacienda Luisita, Comillas, Tarlac ^a	5.3	5.1	22.6	86.6	26.7	1.3	7.6	68.6	165.6	26.2		2.8	15	15.5	52.1	1,074.6	
Hacienda Luisita, San Miguel, Tarlac ^a	7.3	2.3	4.1	86.9	39.1	7.1	6.6	50.5	102.4	105.4	.8	2.3	7.4	25.4	37.3	1,056.6	
Tarlac	5.6	1.3		55.9	50.8	6.1	4.6	57.9	61.2	32	25.9	6.1	3	16.5	14.7	825.2	
Baler			18.3	22.1	6.2			4.6		3.2	3.3					4.1	108.3
Paniqui, Tarlac ^a	2	19	59.2	39.9	30.2	3	14.2	38.1	39.4	92.2	32.3	6.9	32	26.1	2.5	987	
C. L. A. S. Muñoz, Nueva Ecija ^a	21.6		26.5	90.9	27.9		3.3	55.6	42.2	21.6	1.3	5.6		54.3			721.2
Dagupan	2.8	.5	1.8	187.1	24.9		3.8	48.3	91.6	205.3	52.5		1.5	68.2	13.4	1,681.4	
Bolinao	57.1	7.1	3.8	221.9	68.3	35		48.8	49	51.8	75.4	50	2.8	3	16.3	8.1	1,635.3
Baguio	4.9	37.8	52.7	369.6	18.3	.8		57.9	337.9	120.8	59.8	21.6	3.6	12.4	144	66.1	3,462.1
San Fernando, Union	29.2	.3	3.8	110.2	7.6			33	58.7	33	27.3	3.8		8.9	69.9	.8	1,408.5
Echague	24.6	7.7	7.4	89.4		40.6	2.8		.3	1.3	.3			3.9	.6		223.5
Sagada, Mountain Province ^a	6.4	44.2	1.8	224.8	5.6	10.7	13.2	107.2	9.9	2	5.6	5.6	19	152.4	17.3	1,523.4	
Bontoc, Mountain Province ^a		38.3	2.3	114	4.8	9.4		1.5	27.7	4.1		2.8	5.6	1.8	39.6	2.3	594.9
Candon	16.8		4.8	83.6	5.6			17	53.1	6.4	11.4			4.3	68.6	3.3	1,592.3
Vigan	20.8		2.3	37.4	8.9			12.4	19	.5	8.4			2	38.3	6.3	1,472.4
Tuguegarao		45.7	1.3	71.9							30			33.8	65.6	20.5	605
Laoag	18.4	1.9	35.5	13.2	.5	.4	.5	1.3						1.8	18.8	6.7	949.2
Aparri	7.3	3.8	9.7	24.9	.5					2	35.6			15.4	31.3	21.6	413.8
Cape Bojeador	3.8	1.5	15	50.3	.5					3	.5			10.4	.8	1.1	816.9
Basco	3.5	3.6	1.8	110.3	2.1	5.1	10.4	81.3	59.7			.5	2.3	7.6	49.5	21.3	656.6

^a Voluntary or Coöperative station.

^b 25 days of observation.

^c Rain in 24 hours beginning 7 a. m.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, AUGUST, 1919.

Day.	Jolo.		Malamaui, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.8	25.1	33.3	24	30.5	23.5	30.7	24	31.8	23.1	27.5	19.6	35.2	23	34.9	24.2
2	31.9	24.9	32.7	23	30.6	24.8	30.1	24.7	31.2	25.1	24.3	20.6	32.2	23.6	33.9	24.5
3	32.8	25.6	33.2	24.8	30.6	24.3	31.7	24	31.2	23.3	26.5	21	33.8	23.5	34.1	24.4
4	33	25.4	32	24	29.5	23.8	30.8	24.4	30.2	22.5	26.5	20	33.2	22.8	35.2	22.7
5	32.6	26.1	32.6	24.5	30.2	25.9	31.3	23.5	32.2	23.6	26.8	21.5	35.3	23.8	32.7	23.8
6	32.6	25.8	33.5	24.5	30.5	26.6	31.5	24.5	31.6	23.8	26.2	19.4	33.8	23.8	33.2	23.9
7	33.3	26.2	33	24.5	31	26	32	24.3	34.7	23.5	26.8	20.1	35.3	23.8	36.2	23.5
8	32.8	26.9	32.8	24.1	29.7	27.2	31.7	23.2	34.8	24.5	26.8	21	35.3	24.4	36.4	24
9	33.2	26.6	32.9	24.5	29.8	25.8	32.6	24.4	33.7	23.5	26.3	21.5	34.8	24.6	36.6	23.9
10	30.9	23.9	33.3	24.4	30	24.7	31.9	24.3	34.4	23.5	26.3	21.4	34.6	24.4	36.9	23.7
11	31.8	25.6	32.4	23.4	29.8	24	30.8	24.9	34.2	22.7	26.6	20.5	34.6	23.4	36.9	23.1
12	32.2	26	32.7	23.8	30.8	24.9	31.5	26	32.2	23.5	26	21.3	34.8	25.4	34.2	23.9
13	31.7	26.1	31.6?	24	30.3	24.4	31.3	24.1	32.9	22.3	27	21.5	36.2	24	36.8	23.7
14	30.8	24.9	31.9	22.9	29.8	24.4	31.2	24	32.2	22.5	27.3	21.4	34.4	22.8	34.8	24.2
15	32.6	24	32.7	25	30.5	24.3	31.9	24.1	32.6	22.3	28.2	20.1	34.4	23.6	37.1	23.9
16	32.1	23.7	32.4	23	29.4	24	32.3	23.5	32.6	22.4	28.8	19.5	34.8	24	35.6	23.9
17	30.6	22.9	31.9	24	28.7	22.5	31.7	23.3	33	22.4	28.5	18.4	34.5	22.9	35.3	21.9
18	32.5	22.4	32.2	23.6	29.9	24.2	32.2	24	33	22.7	26.3	18	34.8	23	34.8	23.3
19	31.6	25.5	32.7	22.6	29.9	21	30.5	23.5	29.5	22.1	25.8	19.6	32.8	23.8	32.6	23.4
20	32.5	24.4	33.4	23.8	29.5	26.5	32	22.5	32.8	22.4	25.8	21.4	34.8	24.2	36.4	23.4
21	33	25.2	33	23.6	30.4	24.5	31.7	22.4	32.4	22.2	28.4	19.8	34.8	23.2	37.1	23.3
22	31.3	25	33.2	23	29.1	24.2	32.2	24	32.5	23.1	26.8	19.3	33.9	23.5	34	23.1
23	32.4	22.5	32.3	23.4	28.7	22.5	31.7	23.5	32.9	22.9	28.4	17.7	34.8	22	35.6	22.8
24	33.3	23.8	33.9	24	29.5	24.2	31.9	22.3	32.1	23.3	27.8	18.9	35.2	22.4	35.9	21.3
25	33	25	34.4	23.4	29.8	23.1	30.9	23.5	32.4	22.4	28.3	21.1	35.2	23.1	37.6	23.3
26	33	23.3	33.1	23.2	30	23.3	31	22	33.3	22.5	28.6	18.9	32.8	21.8?	37.6	22.3
27	30.8	23	32	24	28.8	22.9	31.2	21.5	32.9	23.5	27.8	18.3	32	22.1	34.1	22.2
28	31.1	23.5	32.7	22.6	29.2	23.8	30.5	22	32.4	22.1	28.6	17.6	32.8	22.5	33.9	21.9
29	33.2	23.3	34.2	23	30	23.9	31	22.9	31.8	21.5	27	18.5	33.3	21.8	34.9	23.9
30	32.8	25.5	33.4	23.2	29.4	23.8	31.7	22.5	30.6	21.5	26.8	20	33.4	24.2	33.6	22.9
31	32.6	23.7	32.4	23.4	29.4	22.8	31.2	22.4	32.7	21.5	28.6	19.2	35	22.2	34.9	21.5
Mean	32.3	24.7	32.8	23.6	29.9	24.3	31.4	23.5	32.5	22.9	27.2	19.9	34.3	23.3	35.3	23.4

Day.	Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.1	26.2	28.6	24.7	33.6	26.4	33.6	22.5	33.4	27.9	33	25	30	27.5	30.2	25.4
2	32	26.4	29.2	24.4	31.7	24.9	32.1	24.9	30.4	27.7	30.5	25.4	29.8	26.6	30	23.8
3	31	24.6	29.3	23.5	31.3	24.9	29.8	23.2	31.1	27.1	32.4	24.6	30.2	26.4	28.8	24
4	31.6	23.9	32	24	30.6	24.7	31.9	23.3	31	27.2	30	24.4	29.7	25.8	27.5	23
5	30.4	25.3	31.7	24	31.3	24.6	31.6	22.3	31.3	26.8	33.6	24.8	29.5	26.5	29	24.2
6	32.3	23.9	30.8	23.5	32	25	32.7	23.6	32	25.9	32	26.5	30.1	25.4	28.5	23
7	32	26.3	28.2	22.5	33.4	25.6	33.5	25.6	34	28.4	32.7	26.4	30.5	26.8	29.4	23.7
8	31.2	25.3	30.8	24.6	32.7	25.3	33.5	25.3	33.3	28.1	32	26.6	30	26.3	30.5	24.6
9	33.2	25	31.4	25.2	24.1	26.6	32.1	25.3	33	27.4	33.5	25.4	30.3	25.6	30.3	24.1
10	31.4	26.9	32.1	26.9			32.6	25.2	32.9	25.1	33.6	25.6	30.6	23.6	29.6	23.8
11	32.1	25.3	31.7	26.8			34.1	25.3	32.2	28.1	32	25	30.3	27.2	29.8	24
12	32.6	26.9	31.6	24	34.4	27.1	34.5	27.4	34.1	28	32.8	26.2	31	27.7	29.8	22.4
13	32.2	27.4	32.7	24.5	34.4	26.2	33.6	23.4	35	26.4	32.4	25.8	30.2	24.7	30.1	23.5
14	33.2	24.8	31.1	22.9?	34.5	25.4	31.1	23.6	32.4	25	32.5	24.6	30.6	25.4	28.6	23.3
15	34.5	23.6	29.7	21.7	35.2	26	38.1	22.8	34.1	27.5	32.8	24.6	30.7	26.4	30.3	24.8
16	32.9	23.9	29.7	23	35.3	24.9	34.6	21.4	33.5	27.7	32.2	25	30.7	26.9	31.8	25.2
17	33.9	22.5	31.6	24.5	35.4	24.2	33.5	21.4	32.2	25.1	34.2	23.8	32.2	26.5	31.9	26
18	31.9	22.9	31.7	23.5	34.3	26.1	33.5	21.9	31	25.2	33.4	24.5	33.6	27.1	32	25.2
19	30.5	24.4	32.7	24.5	31.3	24.3	33.3	26.8	29	27.2	30.8	23	31.2	25.8	29.5	23.3
20	30.7	23	31.7	23.9	32.2	23.9	31.6	23.7	33.1	25.5	30.8	23.2	29.3	26.1	28.9	24.4
21	33.9	24.3	28.7	23.5	32	23.9	33.1	22.9	31.8	24.4	34.4	23.6	30.7	25.8	31.2	25.2
22	31.4	22.7	28.9	23.6	34.8	23.3	34.1	20.5	32.2	23.6	34	24.2	30.7	24.7	30.8	25.1
23	32.8	21.7	28.2	23	34.4	23.5	33.8	20.6	31.3	26.2	34.2	24.4	33	25.8	30.5	26.5
24	32.6	23	29.6	23.2	34.3	24.8	33.7	20.1	32.7	27.5	33.1	24.5	30.5	27.2	30.8	26.5
25	32.9	23.2	31.2	23.5	33.6	25	32.9	21.1	34.2	24.5	31.9	23.6	30.8	27.2	30.2	26.3
26	32	22.2	31.2	23.9	32.9	24.6	34.5	21.7	31.4	23.3	32.9	23.8	30.7	26.8	30.5	23.5
27	32.1	22.9	31.4	24.5	34.4	23	34.3	22.1	31.4	24	32.4	23.6	30.8	23.8	29.5	23.3
28	30.4	23.9	30.7	23.7	34	22.7	33.6	21.2	31.3	23.5	32.2	22.6	30.3	24.2	30.8	24.1
29	30	24.2	30.9	23.3	31	26.1	33.2	20.1	29.4	25.9	30.1	22.8	30.2	26.3	29.5	23
30	32	22.8	30.7	23.3	33.6	24	32.4	23.7	31.5	23.9	32	22.6	29.7	24.1	27.8	23
31	31.6	22.3	30.8	24.1	32.4	23.8	32.1	22.8	33.6	24	31.5	23.8	28.8	25.4	29.5	22.3
Mean	32.1	24.2	30.7	23.9	33.3	24.9	33	23.1	32.3	26.1	32.4	24.5	30.5	26	29.9	24.2

Maximum and minimum temperatures at the stations of the Weather Bureau, August, 1919—Continued.

Day.	San Jose Buenavista.		Cuyo.		Ormoc.		Guluan.		Tacloban.		Capiz.		Borongan.		Cathalogan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.5	22.7	30.6	28	33.7	27.8	32.5	28	36	25.5	35.5	26.8	35.1	23.3	33.8	26.8
2	31.2	22.7	30.1	23.5	33	26.9	30.3	27	31	25.5	32	25.3	31.6	24.6	29.7	26.3
3	30.8	24.4	29.5	25.6	30.6	25.6	29.5	26.9	29	24.5	31.1	25.3	30	24.5	29.5	24.9
4	28	22.2	28.7	24.1	32	25.4	30.6	27.2	31.5	23.6	29.9	24	30.5	24.6	30	25.2
5	30.4	23.2	30	22.4	31.4	22.9	31.8	23.1	32	23.2	32.7	23.9	33.3	24.2	30	24.3
6	30.3	24.4	29.8	24.4	31.8	25.4	30.8	28	33	25	32.7	25.5	32.6	24.6	31	25.3
7	31	25.5	30.2	24.1	32.2	27.6	31	28	34.6	26	34.2	25.6	33.4	23.8	32.2	26.7
8	31.3	25.3	30.1	25.6	32	27.6	31.5	28.1	34.8	27.6	34.7	24.5	33.5	23.5	33	26.6
9	31.2	23.4	29.8	22.2	32.4	28	32.5	28.1	34	27.1	33.9	24.3	33.3	25.7	32	25.7
10	31.7	24.4	30	27.4	32.6	28	31.6	28.2	33.8	26.7	34.3	25.5	32	24.4	31	27.7
11	31.2	23.7	29.9	25.2	31.9	27.6	31.8	27.7	33.1	25.1	34.3	25.3	31.8	26	31.1	27.5
12	30.8	26.4	30.1	22	31.9	28	31.5	28.2	34.6	27.2	34.2	25.7	34.6	27	30.8	27.9
13	29.8	24.3	29.8	27.8	32.6	27.8	31.1	28	34.6	25.4	34.2	24.9	33.4	24	31.6	27.9
14	29.3	22.8	28	23	32.6	24.8	30.6	25.4	34.8	23.7	31.1	24.4	34.5	24.7	32	23.8
15	30.6	24.1	29.8	26.4	33.4	24.5	31.3	27	34.8	23	33.4	24	34.7	23	32.6	23
16	31.6	23.8	30.5	23.9	33.2	23.9	31.9	26.4	35.6	23.8	33.3	23.9	35.2	23.4	32.8	24.2
17	31.6	24.2	30.2	26.7	34	23.2	33.5	25.6	33	24.6	33.8	24.3	34.5	22.9	32.5	24.2
18	31.7	23.8	31.4	25	34.3	23.6	32.6	27.2	31.4	26.3	34	24.3	33	25.8	31.2	27.5
19	29.8	22.4	28.9	23.5	31.5	25.4	30.8	27.2	29.1	25.1	31.9	25.1	27.8	25.7	28.5	26.9
20	29.2	22.6	28.7	24.2	30.9	26.7	29.6	24	33.3	25	29	24.2	32.3	25.3	31.2	26.7
21	30.7	22.9	30.6	23.8	33.6	26	31.2	27.3	35	23.6	34.1	24.5	34.9	22.8	33.3	24
22	31.8	23.3	30.9	26.5	33.8	22.4	32.3	23.5	34.2	24	33.6	24	32.5	23.4	32.2	21.5
23	31.7	22.4	30.3	23.8	33.8	23.2	32.5	24.9	32.6	25.2	34.3	23.3	34.1	25.2	31	25.9
24	31.3	24.5	30.2	27.3	33.8	24.9	31.3	27.9	35.8	24.5	35.1	24.7	33.6	24.6	33	27.3
25	30.8	26.2	29.8	26.8	33	27.5	30.8	27.8	37.4	24	33.2	25.1	35	22.8	33.5	23.8
26	31.2	21.9	29.8	25	34	25.9	32.2	27.5	35.2	22.7	33.4	23	33	23.2	33.3	23.5
27	30.2	22.4	30.9	23.1	34	23.1	32.2	24	35	24	31.6	22.5	31.8	23	31.2	23.5
28	31.8	22.2	32	23.3	32.5	23.3	32	23.4	31.4	23.9	33.1	23.4	32.1	22.3	31	23.5
29	30.3	22.1	30	27.6	31.2	22.5	29.1	26.4	26.5	23.5	29.9	23.5	26.6	24.2	27.5	24.4
30	29.2	22	28.2	23.2	31.2	24.2	30.6	26.5	33.5	23.8	29.8	22.9	32	24.3	30	24.5
31	30.3	21.7	30.1	24	31	23.6	30	27	34.3	23.6	32.7	22.8	33	24.5	31.4	23.4
Mean	30.7	23.5	30	24.8	32.6	25.4	31.3	26.6	33.4	24.7	32.9	24.4	32.8	24.2	31.4	25.3

Day.	Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.8	23	32.8	27.5	31.5	24.4	32.7	24.4	32.5	25.7	32.4	26.4	29.8	25.6	33.1	25
2	30.1	26.6	31	25.8	30.6	26	30.3	25.3	29	25.3	28.9	25.6	32	24.8	34	24
3	28.2	24.5	28.4	23.6	29.4	24.2	27.2	24	29.1	23.5	29.4	24.6	32	25.2	33	23.5
4	28.5	24.1	30.4	24.2	30.5	23.9	28.5	24.2	29.5	24	30.3	24.4	31	24	31.1	24
5	28.9	23.2	30.8	24.6	30.9	23	27.5	23.7	29.1	24	30.8	25	29.2	24.4	34	23.6
6	30.4	27	30.4	27.2	29	23.8	30.7	25	29.6	25	28.9	24.3	28.6	23.4	33	22.5
7	30.6	27.5	31.4	26.6	30.3	24.4	31	24.8	31	24	30.6	24.1	27.7	24	28	21
8	29.5	26.8	33	26.6	29.4	25.6	31.4	26.1	30.2	25.7	29.6	24.6	29.8	24.6	29.8	20.6?
9	30	27.3	31.6	25.6	29.4	23.9	31.8	26.2	31	25	28.8	25.6	28	24	28.2	22
10	29.4	27.5	30.8	25.8	29.8	24.5	31.5	25.8	30.1	25	30.4	26	29	24	28.9	23.5
11	29.5	27.6	32	27	30.3	25.1	29.3	24.5	30.1	24.8	29.8	25.3	30.2	24	32	23.2
12	30.2	27.4	32	24.6	30.4	24.7	30.9	25	30.8	23.5	31.4	25.6	30.8	25	27.1	23
13	30.8	27.5	31	27.2	30.5	24.5	31.1	25.8	32	25.8	31.8	24.5	29.6	26.2	28.5	23.5
14	30.7	26.5	30.4	25.2	28.3	24.1	32.1	24.5	30.1	24.4	31.3	25.1	31.2	25.2	30.6	23.1
15	31.2	25.8	31.8	25.5	30.6	24.5	33.3	24	31.5	24.4	31.8	24.9	31.4	26.4	31	23.9
16	30.4	24.8	32.4	25.5	30.2	24.2	32.4	24	32.1	24.3	32.1	24.6	31.2	24.6	33.5	22.5
17	33.4	25	31.6	26.2	32.4	23.9	32	23.7	32	24	32.8	25.1	30.4	24	33	22.8
18	32.5	26.3	32	26.2	32.9	24.6	31.7	25.8	32	23	33.3	25.9	30	24	33.5	22.8
19	28.5	25.8	31	26.8	31.6	24.1	27.5	25	28.8	23	29.4	24.5	30.4	23.6	33.5	23
20	28.5	26.4	29.2	24.6	28.3	24.4	29.4	22.4	29	23	28.5	24.3	30.4	25	30.4	21.7
21	31.8	23.9	31.6	25.6	31.3	24	32.6	24.6	32	24	31.5	24.8	29.2	23.8	30.5	22.8
22	31.5	23	32	24.6	33.3	24.1	31.4	24.2	32.5	21.5	33.6	23.1	29.6	24	31.8	22
23	31.6	23.8	31.6	26.4	32.4	23.2	30.6	24.9	31.5	24.5	32.6	25.3	31	24	31.6	22.1
24	30.4	27	31.6	27.4	32.4	24.8	31	24.5	30.1	24.3	30.8	24.9	31.2	23.6	27	23.8
25	31	27.3	31.8	27	31.5	25.3	31.8	24.3	32	25.6	31.8	26.4	31	25.8	27	23.5
26	32.1	24	31.6	24.6	30.5	23.2	33.4	24.2	31.7	25.4	31.3	24.7	29.4	23.4	27	21.6
27	31	23.3	31.6	24.8	31.1	23.2	30.8	23.2	31	22.5	31.8	24.1	31.4	24	28.6	22
28	32.5	22.4	31.8	24.5	32.8	22.2	29.9	23.5	31.3	21.3	32.4	23.3	30.4	23.6	31	22
29	26.6	24.3	28.8	24.5	29.2	23.2	26	24.4	27	23.5	26.3	24.3	30.4	23.6	29.6	22.6
30	28.5	23.1	28.4	24.5	28.4	23.7	28	23.3	27	23	27.2	24.4	31	23	31	23.5
31	30.5	22.5	30.8	24.5	29.5	23.9	31.7	23.5	30.1	23.2	30	24.5	31	25.2	30.5	22.3
Mean	30.3	25.5	31.1	25.6	30.6	24.1	30.6	24.5	30.5	24	30.7	24.9	30.2	24.4	30.9	22.8

Maximum and minimum temperatures at the stations of the Weather Bureau, August, 1919—Continued.

Day.	Virac.		Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.5	24.9	32.1	26.8	30.7	26.6	31	25.1	31.9	25.2	31.2	25.2	29.3	26.2	32.1	24
2	30.4	24.8	31.2	25.3	30.8	25	31.8	25.2	30.5	25	30.6	25.1	29.3	27	32.5	23.9
3	29.7	24.5	30.3	25.2	29.4	23.7	31.4	25.2	30	24.6	30.3	25.5	28.8	25.4	29.9	23.2
4	32	23.1	30.9	23.1	28.8	24	29.6	24.1	29	24	30.2	24.3	28.1	25	29.5	22.6
5	32.8	24	31.1	24.4	27.7	23.8	30.4	25.3	29.4	25	29.3	24.1	27.2	24.8	26.9	22.5
6	29.5	23.7	29.5	22.7	26.6?	24	29.1	23.1	28	22.9	29.2	23.8	28.1	24.9	29.9	22.4
7	31.4	23.6	30.2	24	27.6	21.9?	28.3	23.2	27.3	23	28.8	23.8	27.9	24.9	28	23
8	32.3	24.1	30	23.7	28.2	21.9?	29.6	22.7	30.5	23.4	29.7	25	28.7	26.2	32	23.2
9	30.6	24.4	30.3	24.4	28.8	22.6	28.4	23.9	27.6	24	27.9	24.8	27.3	26	30.1	23.3
10	30.7	24.7	30	25.9	27.7	22.4	28.8	24.6	27.4	24	27.8	24.6	27.7	25.4	30.6	23.1
11	32	25	30	25.7	28.8	23.3	28.4	24.5	29.2	24.1	29.9	24.6	27.6	25.9	29.8	23.2
12	30.5	24.1	28.4	24.3	27.8	24	27.7	23.5	26.5	23	26.9	23.7	27.2	23.5	29.6	22.5
13	32.7	24	29.8	24.1	28.3?	23.4	27.3	23	27	22.9	27.4	24	27.8	23	27.9	21.9
14	33.3	24.3	29.7	25.2	28.9	23.2	28.9	23.9	28.3	23.5	27.8	24.4	28.3	25	30	22.9
15	34.4	24.3	31.6	25.2	30.2	24.4	28.8	24.2	29	24.8	30.2	25.1	27	25.2	29.8	22.8
16		23.5	32.1	24.6	31.4	24.1	31.3	24.5	31	24.3	32.1	24.6	28	24.9	30.5	22.5
17			32.7	22.8	31.6	21.2?	31.7	23.4	31.7	25	31.8	24.8	28.5	23.9	29.9	22.2
18			33.5	23.7	32.9	21.2	31.9	23.9	32.4	24	33.1	23	30	23.8	31	22.3
19			31.9	23.5	31	23.2	31.4	23.8	31.5	23.6	32.6	23.4	30	24	30.4	22.4
20			27	23.9	27.4	22.9	27.2	24.8	25.9	24.6	27.6	23.6	28	25.5	27.2	23
21			32.2	23.7	29.9	22.9	31	23.1	29.5	23.1	30.5	24.2	28.5	25	30	23.1
22	35	21.5	33.7	23	32.2	20	32.3	22.3	30	22.3	32.3	23.4	30.7	23.3	32	22.1
23	32.3	22.4	34	23.6	31.4	22.5	31.8	23.8	31.4	22.9	32.6	22.9	30.4	23.2	32.5	21.6
24	33.5	23.1	32.2	25.4	29.9	24.4	31.7	26.7	30	25.4	32.3	25.9	28.5	26.8	31.4	23.1
25	33.3	24	30.5	26.7	28.9	23.8	26.8	24.5	26.5	24	27.8	22.6	28	22.7	26.3	23
26	33.9	23.2	30.9	22.5	28.9	23.9	25.8	21.9	27.9	21.1	28.9	22.5	26.2	22.8	26.2	22.1
27	33	22	31.5	23.3	30.9	21.4?	27.7	22.8	28.5	22.5	29.7	23.2	26.8	22.9	27.4	21.6
28	34	21.6	34.4	23.2	32.9	21.4	29.2	21.4	27.5	21.6	30.6	22	27.3	22.8	31	21.4
29	26.9	22	26.7	23	25.9	21.6	28.7	23.2	29.5	22	28.4	21.9	28.7	22.7	29.8	21.5
30	29.8	22.7	28.2	24.3	26.6	23.4	29.2	23.7	28.5	24.4	29.1	24	27.2	24.7	28.5	22.9
31	32.9	23	29.9	24.7	27.8	23.7	29.3	23	27.7	23	28.6	24.1	26.3	25.1	26.4	22.3
Mean	32	23.6	30.9	24.3	29.4	23.1	29.6	23.8	29.1	23.7	29.8	24	28.2	24.6	29.6	22.6

Day.	Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.5	25.7	31.8	24.2	29.8	25	29.4	22.6	30.5	24.5	31	24.1	32.1	23	33.1	24.1
2	32.7	25	32.2	24.7	31.1	24.1	29.6	23.5	31.1	25.8	32.2	25.4	33.2	24	33.8	24.4
3	31.7	25.3	28.6	24.2	28	24	26.6	23	30.8	24.6	30.9	25.4	31.2	24.4	32.3	25.4
4	30.3	24.6	30.2	24.3	28.5	24.4	27.3	22.2	28.2	23.5	29.2	23.4	30.9	24.4	30.5	24.3
5	29.8	24.5	27.9	23.8	26.2	23.6	25.5	22.1	25.7	23.5	28	23.1	29.8	22.8	29	24.1
6	31.3	24	30.2	22.6	27.6	23	26.6	21.5	28	23.5	27.7	23	27.6	22.6	29.4	24.2
7	31.8	24.7	26.8	22.8	28.5	23.5	26.8	21.7	28.2	22.7	27.4	23.2	26.5	22	30.5	24
8	32.6	25	31.1	23.4	30.2	25.2	28.4	21.8	28.6	23.6	29.1	23.6	30.2	22	31.2	23.5
9	31.2	25.7	28.6	24.2	27	23.9	26.2	21.8	27.8	24.5	26.1	23.9	26.6	23.2	30.6	25
10	30.3	25.8	27.7	23.7	28.3	24	26.7	22.5	27.7	23.9	27.2	23.9	26.6	23.4	33.4	24.7
11	31	25.5	28	23.4	27	23.6	25.7	22.6	25.8	23	25.5	23.4	26	22.6	31.6	24.5
12	28.2	24.8	25.9	23.1	25.5	23.4	24.2	22	28	23.6	27	23.5	27.5	22.4	29.1	24
13	30.2	23.7	26.4	22.7	26.5	23.5	25.3	21.7	26.6	23.2	26.8	23.4	28	22.6	30.3	24.6
14	29.2	25	30	23.6	29	23.6	27	22.5	26.3	23.8	25.4	23.4	27.4	22.4	32.5	23.1
15	32	24.5	28.9	23.4	27.8	23.8	26.5	21.6	26.8	23	26.9	23.6	22	22.9	29.9	24.6
16	33.4	23.3	32.4	22.4	30.9	23.3	28.4	21.8	26	24	27.1	23.4	26.4	22.4	30.6	23.3
17	33.4	24.2	32.1	23.8	30.5	24	28.5	21.8	29.8	24	30.4	23.2	31	22.1	32.9	23.5
18	32.7	24.6	32.6	23.3	31.1	24.6	30.2	23.7	27.8	24.6	31.4	24.7	32.4	22.4	32.9	23.7
19	32.1	25.2	32	23.8	30.3	24.3	30.2	22.8	30	23.2	31.6	23.9	33	21.6	33	22.7
20	26.8	24	27	24.5	27	24.5	25	22.3	27.6	23	25.7	22.8		22.1	32.6	23
21	31.8	25.6	32.2	23.6	30.7	24	30	22.9	28	23	28.4	23.4	27	21.7	30.2	23.1
22	33.2	23.5	33.8	23.2	31.8	23.7	31.7	22	30.2	23.5	31	23.4	30.2	22.4	32.4	23.3
23	33	24.5	31.9	23	30.5	23.9	30	22.4	30.5	23.6	30.4	23.6	34	22.6	34.4	23.1
24	32.4	25.2	30.5	24.6	29.8	25.7	27.8	23.2	26	23.8	28.6	24	30.2	23.4	33.3	24.5
25	30.2	25.3	27	23.8	27.3	22.5	25	22.1	26.2	23.2	24.9	23	25	22.5	32.5	24.5
26	29.1	23	26.8	21.5	25.7	22.8	25.3	21.5	27.2	23.5	24.2	22.8	25	21.6	29.6	25
27	30.1	23.4	28.2	22.3	26.7	22.9	26	21.3	25	23.2	24.8	22.4	25.4?	22.4	29.1	23.1
28	32.4	22.5	29.2	22.5	27.5	23	28	21.3	28	23	28.8	22.8	30	21.6	32.6	22.4
29	27.8	24.4	29.7	22	29.7	23.5	29.3	21.7	29.2	23.8	29.2	23.4	32	21.2	32.7	23.3
30	29.2	24.3	28.6	23.7	27.3	24.3	25.5	22	26.4	23.8	28	23.9	29.5	22.1	30.7	25.3
31	29.3	24.5	26.5	23.3	26.1	23.8	24.5	22	28	22.8	29.3	23	32.2	21.8	32.7	22.7
Mean	31.1	24.6	29.5	23.4	28.5	23.9	27.3	22.2	27.9	23.6	28.2	23.5	28.6	22.5	31.6	23.9

Maximum and minimum temperatures at the stations of the Weather Bureau, August, 1919—Continued.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echagüe.		Candon.		Vigan.		Tuguegarao.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.5	24.5	32	24.8	18.1	16.4	31.5	25	35.5	24.6	31	25.5	30.7	23.3	35.7	24.3
2	32.3	25.5	32.5	25.9	18.5	16.9	31.6	25.5	35	23.4	30.1	26	30.7	24.3	35.2	25
3	32.1	24.8	30.8	25.5	20.5	16.4	32	25	33.4	23.5	31.9	25.9	31.6	24.1	32	22.9
4	32.4	23.7	31.2	24.7	21.4	15.6	31	24.6	28	23.6	30	25.8	30.5	23.1	29.8	22.7
5	29	23.6	31	23.3	19.5	15.6	31	23.3	28.4	24	29.5	25	29.5	22.7	27	24.5
6	26	23.2	28	22.8	16.9	14.3	27	23.3	27.7	24	28.2	24	26.4	22.5	25.7	23.5
7	28.2	23.2	28.2	24	17.7	14.4	28.1	23.5	29.1	23.6	27	23.5	26	22.4	25	22.5
8	28.4	24.4	29	25	18.4	15.3	28.8	24	30.4	24.9	27.5	23.5	26.4	22.9	26	22.5
9	27.9	24	30.8	25.2	18.2	16.6	30	24.2	33.9	22.6	28.5	24.8	30.3	24	33.6	23.5
10	27	24	28.5	24.7	17.9	15.8	28.3	24.1	31.8	24	27	24.5	28.9	23.6	31.4	24.3
11	26	24	26.6	23.5	18.1	16.4	25.6	24	31.1	23.6	27.2	24	26.8	23.3	33.2	24.7
12	26.2	24	27	23.7	17.6	16.3	27.1	23.5	32.4	23.4	27.9	24	26.7	23.5	33.7	24.5
13	26.5	24	26.5	23.7	17.6	15	27.6	23.9	35.1	22.5	29.6	24	27.6	23	33.8	24
14	25.5	23.9	27.2	23.9	19.3	16.5	29.7	24.1	34.4	23.2	29.1	25.1	29.6	24.8	33.7	24.7
15	26.5	23.5	28.5	23.2	16.9	15.7	27.9	24.2	34.4	24	27.7	25	27	23	34.4	24.4
16	26.5	23.5	26.5	23.2	18.2	15.2	30.2	23.4	33.6	23.8	29	24.4	29.5	23.2	33.5	23.5
17	32	23.5	31.1	23.3	20.8	15.9	31	24	34.6	23.5	30	24.8	30.1	23	32.5	24.9
18	30.4	24.5	29.5	23.5	20.8	16.1	31	22.8	34.9	22	30	24.4	30.1	23	33.8	22.2
19	32.8	24.3	31.5	24.1	21.9	15.7	32.2	23.6	33.3	21.6	32	25.5	31.8	24	31.1	22.2
20	27	23.8	28.5	24.8	18.5	15.6	30	23.6	29.5	20.6	27.5	24.7	29.9	23.5	32.8	22.5
21	26.7	22.8	27.4	22.7	17.6	15.4	31	22.3	30.4	22.3	28.6	24.7	29.4	22.4	31	23.8
22	30.6	23.6	31.2	23.7	21.4	16.1	32.5	24.4	35	22	31.5	24.7	32.4	24.5	34	23.5
23	32.2	24.5	32	24.2	21.8	15.6	32.5	24	33.6	23.1	31.5	25.6	31.5	23.4	33.7	24.4
24	28	24.2	28.5	24.5	17.4	15.4	29.5	24	35.2	22.6	29	25.2	29.1	23.2	35.1	23.7
25	29	23.5	31	23.7	17.7	15.8	30	23.9	34.1	23.6	30	25	29.8	24.4	32.5	24
26	24.8	22.5	26.5	23.2	20.5	14.7	27.3	23.5	34.1	22.5	28.5	25	25.9	24	36.2	24
27	24.4	22.6	25.9	23	18.1	15.1	29.4	24	30.9	23.5	30.1	25	30.4	24.3	38.4	21.7
28	27.9	22.9	29.8	22.9	21.3	15.2	31.9	23.6	33.9	22.8	32	24	32.1	22.9	35.4	22.5
29	30	23.8	30.5	23.6	18.8	15.7	32	24.5	32.2	25	30	26	32.5	24.1	30	23.3
30	28.6	25.1	29.9	24.7	19.1	15.6	31	24.3	30.7	23.3	30.2	25.3	28.7	23.6	30	23.6
31	29.1	23	30.5	25.2	17	14.9	30.9	23.2	29	23.2	30	25	29.7	24.3	25.8	22.3
Mean	28.6	23.8	29.3	24	19	15.7	30	23.9	32.4	23.2	29.4	24.8	29.5	23.5	31.8	23.6

Day.	Laoag.		Aparri.		Cape Bojeador.		Basco.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.4	24.8	34	25.5	29.2	23.6	30.4	26.5
2	31.5	25	34	25.2	29.9	23.7	32.1	24.5
3	32.2	24	34.4	24.5	30.1	25.4	32	27.4
4	31.5	25	29.7	23.5	30.2	24.1	32.3	25.7
5	29.7	24.3	29.6	24.6	28.2	24.3	31	26
6	25.4	23.3	25.8	22.8	25.2	22.7	29.2	23.4
7	25.7	22.8	24.8	22.2	26.2	22.2	27.2	24
8	26.7	24	25.8	22.3	26.6	23.2	27.1	23.5
9	29.5	24.4	32.3	22.8	27.6	23.5	28	
10	30.4	24.2	33.1	24.3	28.5	23.8	29.1	26.4
11	30.2	24	33.3	24.1	28.2	23.8	29.2	25.8
12	30.8	24.6	31.8	24.3	29.3	23.9	30.6	26
13	31.4	24.5	34.4	24.5	29.8	23.7	29.3	27
14	30.9	24.2	34.6	24.5	28.8	23.9	30.5	26.5
15	28.4	24	35.2	25.2	28	24.5	30	26.1
16	31.8	23.5	35.2	25	29.7	22.9	29.5	25.4
17	32.2	23.9	35	23.5	30.4	23.1	30.6	26
18	31.5	23.5	33.8	22.5	30.4	22.6	33.2	25.4
19	31.8	23.3	33.4	22	31.4	24.1	32.7	26.1
20	28.4	23.5	28.6	23.8	30.9	23.6	29.6	
21	29.5	25.5	32.2	25.1	28.5	19.5	31.5	24.1
22	33.3	24.2	33.3	23.8	33	24.3	33.4	26
23	32.5	24.1	32.2	23.4	31	25	31.1	24.1
24	31.3	24	32.3	23.1	30	23.7	29.5	26.2
25	29.5	25.8	33.6	24.6	29.1	25.1	28.2	
26	30.5	25.4	35.3	24.4	29.1	24.9	31.2	26.4
27	32.3	24.3	34.3	23	30.1	24.7	30.7	25.7
28	32.6	23	31.8	22.2	31.4	23	31.8	24.6
29	31.8	23	30.4	22.8	31.2	24.1		24.2
30	30.2	24	30	24	29.8	23.8	30.4	26.4
31	30	24.2	27.4	23.3	28.2	25.3	27.6	24.4
Mean	30.5	24.1	32	23.8	29.4	23.7	30.3	25.5



SEISMOLOGICAL BULLETIN FOR AUGUST, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,

Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

2, 6^h 56^m [2, 14^h 56^m]. Butuan (N Mindanao). Earthquake shock of intensity II-III; very near origin.

4, 9^h 31^m [4, 17^h 31^m]. Tigaon (SE Luzon). Earthquake of intensity III, with subterranean rumbling. It repeated at 9^h 50^m [17^h 50^m]. Origin in the Isarog mountain.

5, 2^h 0^m [5, 10^h 0^m]. Cabo Bojeador (NW Luzon). Oscillatory earthquake, intensity III; short duration.

6, 5^h 37^m 36^s * [6, 13^h 37^m 36^s]. S Mindanao. Earthquake of intensity V-VI, originated in the Celebes Sea and felt through the Cotabato and Davao Provinces. It was recorded and lightly felt at Butuan.

6, 18^h 0^m 0^s * [7, 2^h 0^m 0^s]. Davao (SE Mindanao). Earthquake of intensity IV-V; originated apparently towards the southern part of the Davao Gulf. It was also weakly felt at Butuan.

11, 8^h 4^m [11, 16^h 4^m]. Central Mindanao. Earthquake of intensity V-VI, felt only in the Province of Lanao. It probably originated in the volcanic region of Makaturing and Ragang volcanoes, S of Lake Lanao. Recorded at Butuan.

13, 4^h 2^m [13, 12^h 2^m]. Davao (SE Mindanao). Earthquake shock of intensity III; it repeated few minutes later. The region shaken comprised a small portion of the south Agusan Valley belonging politically to the Davao Province.

14, 7^h 59^m 55^s * [14, 15^h 59^m 55^s]. Tablas Island. Earthquake of intensity VI-VII; the epicentral region comprised the southwestern portion of the island. It was also felt in the Island of Romblon, eastern Mindoro and NW Panay. The earthquake was preceded by four premonitory shocks of intensity IV-V at 6^h 0^m, 6^h 8^m, 6^h 28^m, and 13^h 11^m L. T. Two light aftershocks occurred at 23^h 0^m and 23^h 58^m. These earthquakes form a continuation of the seismic period which began with the destructive earthquake of April 28th.²

14, 20^h 22^m [15, 4^h 22^m]. Surigao (NE Mindano). Earthquake shock of intensity III. Recorded at Butuan; origin in the Butuan Bay.

18, 4^h 15^m [18, 12^h 15^m]. Borongan (E Samar). Oscillatory earthquake, intensity III, duration 4 seconds.

19, 14^h 21^m 48^s * [19, 22^h 21^m 48^s]. N Luzon. Extensive earthquake felt with intensity V-VI in the northernmost provinces of Luzon. Its origin lay near the northern end of the central mountain range of Luzon. It was felt through the main portion of the island north of parallel 16° N. Recorded at Taihoku, Formosa.

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

² See "Bulletin for April, 1919."

21, 4^h 4^m [21, 12^h 4^m]. Ormoc (W Leyte). Oscillatory earthquake, direction SW-NE, intensity IV, duration 10 seconds. After few seconds occurred light shocks apparently subsidiary.

22, 5^h 25^m [22, 13^h 25^m]. Davao (SE Mindanao). Earthquake of intensity III, felt in the eastern part of Davao Gulf.

23, 11^h 50^m [23, 19^h 50^m]. Isabela (W Negros). Earthquake of intensity III, felt in an extensive portion of Occidental Negros.

29, 5^h 49^m [29, 15^h 28^m]. Guam (Mariana Islands). Earthquake of intensity III, originated in the Pacific, towards the Palaos Islands. Recorded at Manila at 5^h 48^m, in the Far East and in America.

RECORDS OF THE MICROSEISMOGRAPH.

(Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N: T₀=6.25, ϵ =2.906, $\frac{r}{T_0^2}$ =0.053;
A_E: T₀=6.18, ϵ =2.393, $\frac{r}{T_0^2}$ =0.042. Alluvium. 2.40 meters above sea level).

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A _N μ	A _E μ	
289	1	Iv	eP F	h. m. s. 1 25 25 27				
290	3	Iv	eP F	14 32 12 34				
291	3	Ir	e F	18 16 14 19 04				
292	5	Iv	e F	10 44 52				
298	6	Iv	e F	5 37 36 52				Felt at Butuan (N Mindanao).
294	6	Iv	e F	18 00 00 12				Felt at Butuan (N Mindanao).
295	8	Iv	eP F	13 35 22 38				
296	13	IIv	eP L M _E M _N F	22 14 23 14 56 15 23 15 42 29		5 5	145 222	Felt in Romblon Island.
297	14	Iv	eP F	6 10 14 12				
298	14	Iv	eP L M _E M _N F	7 59 55 8 00 31 00 50 01 14 11		5 5	89 128	Felt in Romblon Island.
299	15	Iv	eP F	15 53 17 55				
300	16	Iv	eP F	15 44 30 46				
301	18	IIr	e S L M _N M _E F	17 06 06 11 09 14 45 15 22 15 22 58		8 6	232 212	
302	19	IIv	eP L M _E M _N F	14 21 48 22 42 23 04 23 10 32		5 5	186 266	Felt in northern Luzon.
303	21	Iv	eP F	9 37 44 39				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A _N μ	A _E μ	
304	21	I _v	eP	<i>h. m. s.</i>				
			L	9 39 32				
			M _N	39 49				
			F	39 52	3	91		
				42				
305	25	I _r	e	20 01				
			L	10 06				
			M _E	12 23	10		36	
			M _N	13 10	10	62		
			F	35				
306	27	I _r	eP	5 26 54				
			L	33 48				
			F	6 22				
307	27	I _v	eP	7 22 08				
			F	25				
308	29	II _r	(PS)	5 48 12				
			L	52 00				
			M _{N1}	52 09	6	327		
			M _{E1}	53 58	6		251	
			M _{N2}	54 12	6	427		
			M _{E2}	55 28	6		271	
		F	7 09					
309	29	I _v	eP	13 56 26				
			F	14 07				
310	30	I _v	eP	17 33 46				
			F	36				
311	31	II _r	eP	17 30 04				
			S	34 39				
			L	37 34				
			M _E	38 07	6		334	
			M _N	38 14	6	345		
			F	18 46				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

2, 6^h 56^m [2, 14^h 56^m]. Butúan (N de Mindanao). Temblor de tierra de intensidad II-III, de origen muy cercano.

4, 9^h 31^m [4, 17^h 31^m]. Tigaon (SE de Luzón). Temblor de tierra de intensidad III, acompañado de ruido subterráneo. Repitió a 9^h 50^m [17^h 50^m]. Origen en el monte Isarog.

5, 2^h 0^m [5, 10^h 0^m]. Cabo Bojeador (NW de Luzón). Temblor oscilatorio de intensidad III, duración corta.

6, 5^h 37^m 36^s * [6, 13^h 37^m 36^s]. Sur de Mindanao. Temblor de tierra de intensidad V-VI originado en el Mar de Célebes y sentido en las provincias de Cotabato y Davao. Registrado y sentido también muy débilmente en Butúan.

6, 18^h 0^m 0^s * [7, 2^h 0^m 0^s]. Davao (SE de Mindanao). Temblor de tierra de intensidad IV-V originado al parecer hacia la parte sur del Golfo de Davao. Sentido también muy débilmente en Butúan.

11, 8^h 4^m [11, 16^h 4^m]. Centro de Mindanao. Temblor de tierra de intensidad V-VI, sentido solamente en el distrito de Lánao. Su origen probablemente se hallaba en la región volcánica del Makaturing y del Ragang, situados al sur de la laguna de Lánao: registróse en Butúan.

13, 4^h 2^m [13, 12^h 2^m]. Davao (SE de Mindanao). Temblor de tierra de intensidad III. Repitió pocos minutos después. La región afectada comprendía una pequeña porción de la parte más meridional del Valle del Agusan, perteneciente políticamente a la Provincia de Davao.

14, 7^h 59^m 55^s * [14, 15^h 59^m 55^s]. Isla de Tablas. Temblor de tierra de intensidad VI-VII; el origen y región epicentral comprendía la parte SW de la Isla de Tablas; sintióse también en las islas vecinas de Romblón, E de Mindoro y NW de Panay. Precedieronle a manera de choques premonitores cuatro temblores de intensidad IV-V, a 6^h 0^m, 6^h 8^m, 6^h 28^m y 13^h 11^m de Tiempo Insular. Solamente ocurrieron dos repeticiones de poca intensidad a 23^h y 23^h 58^m. Estos temblores son continuación del período sísmico que principió con el terremoto destructor del 28 de abril.²

14, 20^h 22^m [15, 4^h 22^m]. Surigao (NE de Mindanao). Temblor de tierra de intensidad III. Registrado en Butúan y originado en la bahía de este nombre.

18, 4^h 15^m [18, 12^h 15^m]. Borongan (E de Sámar). Temblor oscilatorio, intensidad III, duración 4 segundos.

19, 14^h 21^m 48^s * [19, 22^h 21^m 48^s]. N de Luzón. Temblor de tierra de intensidad V-VI sentido principalmente en las provincias más septentrionales de Luzón: su origen parece se hallaba cerca del extremo norte de la cordillera central de Luzón. Fué perceptible en toda la porción de la isla que cae al N del paralelo 16° N. Registróse en Taihoku, Formosa.

21, 4^h 4^m [21, 12^h 4^m]. Ormoc (W de Leyte). Temblor oscilatorio, dirección SW-NE, intensidad IV, duración 10 segundos. Repitió a los pocos segundos con movimientos al parecer susultorios.

22, 5^h 25^m [22, 13^h 25^m]. Davao (SE de Mindanao). Temblor de tierra de intensidad III en la parte E del Golfo de Davao.

23, 11^h 50^m [23, 19^h 50^m]. Isabela (W de Negros). Temblor de tierra de intensidad III, sentido en una extensa región de la parte occidental de la Isla de Negros.

29, 5^h 49^m [29, 15^h 28^m]. Guam (Islas Marianas). Temblor de tierra de intensidad III, originado al parecer en el Pacífico hacia las Islas Palaos. Registrado en Manila a 5^h 48^m, en el Extremo Oriente y América.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² Véase "Bulletin for April, 1919."

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WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR SEPTEMBER, 1919

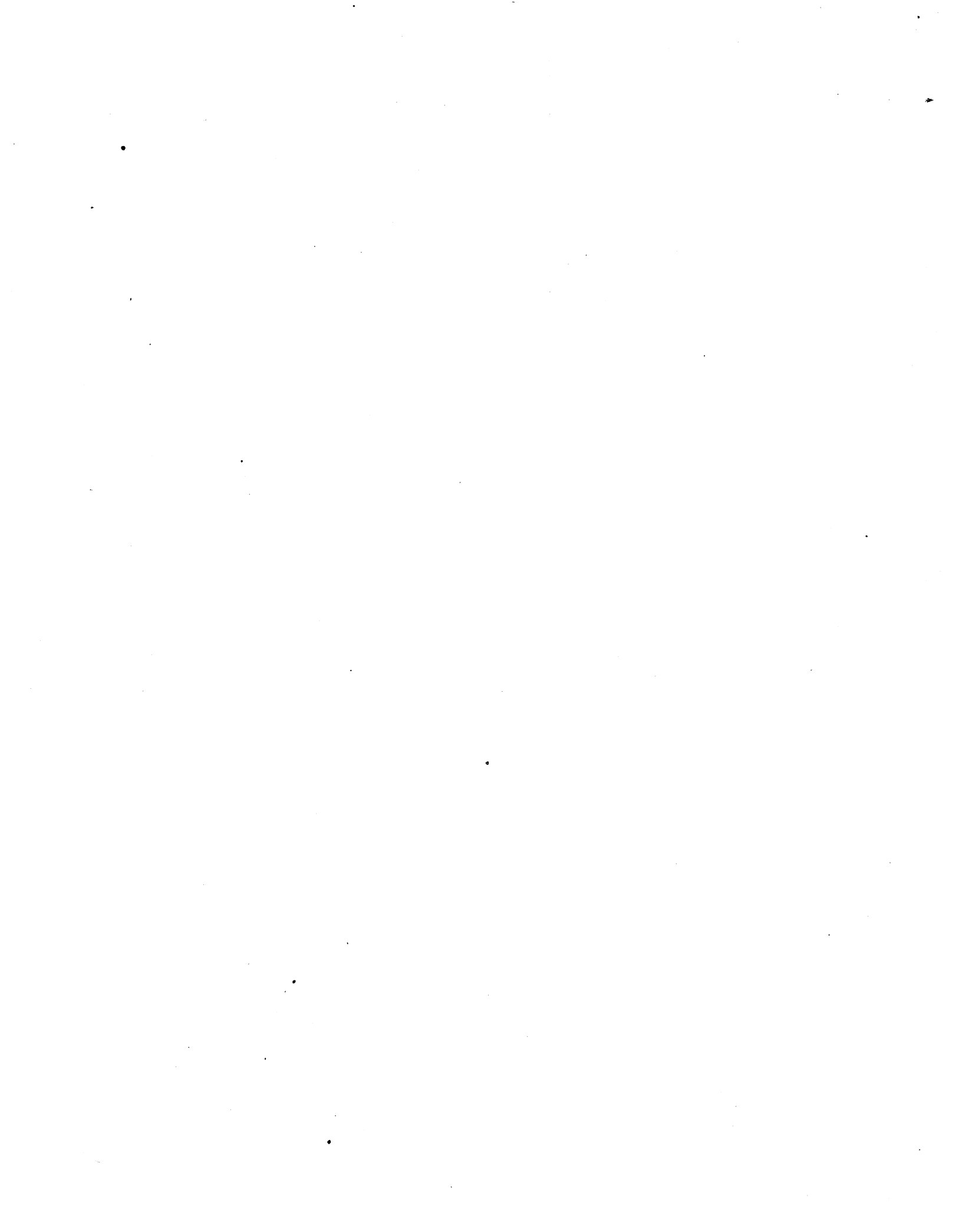
PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1920

BULLETIN FOR SEPTEMBER, 1919.



METEOROLOGICAL BULLETIN FOR SEPTEMBER, 1919.

By Rev. JOSÉ CORONAS, S. J.,
Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month in the Philippines is somewhat above the normal, the differences being greater in northern Luzon. The mean monthly temperature is slightly above the normal in about half of our stations, and slightly below in the other half. The extreme temperatures for Manila were 32.9° C. and 20.8° C.: they were registered on the 21st and 24th, respectively. The absolute highest and lowest temperatures for Baguio were 24.5° C., 14.7° C. on the top of Mirador, and 25.9° C., 14.3° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR SEPTEMBER, 1919.

Station.	Pressure.						Temperature.							
	Mean.	Departure from Sept., 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Sept., 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga	758.67	-1.13		759.82	18	757.04	11	26.1	-0.3		31	22	21	10
Yap, W. Carolines	57.29			59.35	18	54.90	11	23.8			33	19	23	8, 10
Tagbilaran	58.14	-.54	+0.25	59.74	18	55.74	12	26.5	-1.2	-0.8	34.8	1	22.3	28
Surigao	58.11	-.31	+.26	59.77	18	54.91	12	26.5	-1.3	-.9	32.7	1	22.3	8
Cebu	58.25	+.01	+.39	59.94	18	55.44	12	27.4	-.8	+.1	33.1	3	23.1	19
Iloilo	58.20	-.38	+.42	59.98	18	55.80	12	26.7	-.5	+.1	32.8	4	22	7
Tacloban	58.28	+.18	+.59	59.93	18	54.31	12	26.7	-.9	-.6	36.2	23	22.5	12
Capiz	58.17	-.07	+.42	60	18	54.95	12	26.8	-.3	+.1	33.7	2	22.7	10
Calbayog	58.27	+.14	+.64	60.14	18	54.28	12	25.7	-1.4	-1.3	33	26	20.5	18
Legaspi	58.28	+.48	+.97	60.13	18	53.79	12	27	-.2	0	33.4	3, 26	22.5	7
Atimonan	58.45	+.66	+1.30	60.74	18	54.64	12	26.9	-.3	-.1	32.6	14	21.9	14
Ambulong, Tanauan	57.78	+.17		59.78	18	54.44	12	26.7	+.2		34.5	4	22.4	30
Paracale	58.36	+.78		60.68	18	54.13	12	26.6	-.9		32.4	4	22.4	24
Manila	58.37	+.34	+.90	60.61	18	54.85	12	26.5	-.3	-.3	32.9	21	20.8	24
San Isidro	58.39	+.12	+1.04	60.52	18	55.03	12, 13	27	+.6	+.5	34	29	21.4	28
Dagupan	57.37	+.12	+.55	59.26	18	53.86	13	27.6	+.5	+.7	34.7	30	23.3	22
Baguio ^a	636.20	+.28	+1.06	637.84	4	633.10	1	18	+.6	+.2	24.5	25	14.7	25
Vigan	757.63	+.33	+.83	759.66	4	753.78	1	27.7	+.8	+.8	33.8	18, 29	20.2	12
Tuguegarao	58.20	+1.12	+1.63	60.95	18	52.14	1	26.8	-.1	-.4	36.5	30	20.5	24
Aparri	58.56	+1.20	+1.73	61.55	18	51.98	1	26.8	-.5	-.3	34.7	2	21	24

^a The barometric readings of this station are not reduced to sea level.

Rainfall.—The monthly amount of rainfall of central and northern Luzon is considerably below that of the preceding year and below the normal of September, thus offering a great contrast with the abundant rains of last August. But in southeastern Luzon, in the Visayas and Mindanao the monthly rainfall is generally above that of last year, and in the majority of the stations it is also above the normal of this month. The total monthly amounts of rain for Manila and Baguio differ from the respective normals by -190.3 mm. and -414.2 mm.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF SEPTEMBER, 1919.

Station.	Total.	Departure from Sept., 1918.		Days of rain.	Departure from Sept., 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Sept., 1918.		Days of rain.	Departure from Sept., 1918.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo	119.6	-10.5	-47.6	13	0	45	6	Sumay, Guam	491.3	+101.6	19	91.4	29		
Malamau	179.8			12		46	11	Virac	377.6	+259.6	14	+3 105.7	12		
Zamboanga	285.1	+193	+178.3	13	+3	65.8	6	Naga	161.8	+33.8	14	-1 97	10		
Davao	196.7	+33.5	+8.5	17	+6	87.6	18	Tigaon	222.4	+8.7	15	-3 42.4	10		
Cotabato	326.7	+143.8	+86.8	15	+2	79.2	11	Bitangas	169	-139.5	12	-6 81.5	16		
Camp Keithley, Lanao	403.7	+136		25	+4	44.2	6	Lucena	189.2	+11.2	14	+3 83.6	20		
Cagayan, Misamis	149.6	+92.3		12	+5	44.4	15	Atimonan	274.2	+63.9	+4	17	+6 48.3	20	
Butuan	163	+157.9	+18.9	23	+19	31	6	Ambulong, Tanauan	110.7	-153.8	9	-5 24.9	16		
Dumaguete	261.2	+199.4		18	+10	102.9	11	Canlubang, Calamba	172.1	-91.1	9	-13 41.7	11		
Yap, W. Carolines	265.2	+60.8	-53.3	22	+2	70.7	8	Paracale	493.4	+306.2	+222.4	18	+1 153.4	16	
Tagbilaran	264.2	+184.8	+85.9	21	+13	45.8	6	Santa Cruz, Laguna	152.3	-130.9	-141	20	-5 52.8	11	
Iwahig	232.2	+104.4		21	+1	41.6	16	Manila	176	-162.3	-190.3	16	-8 34	15	
Surigao	398.6	+320.5	+239.9	22	+10	79.4	16	Antipolo	184.5	-307.6	22	-4 28.9	1		
Maasin	356.7	+151.6	+81.7	10	-1	85.8	11	Iba	198	-648.1	-561.6	12	-13 38.4	6	
Cebu	178.7	+175.9	+8.16	10	0	77.6	17	San Isidro	81.7	-261	-231.3	12	-11 18.6	10	
Iloilo	192.7	-12.7	-119.9	20	+9	43.9	20	Tarlac	180.4	-133.2	-153.3	18	-5 57.9	7	
San Jose de Buenavista	465.2	+188.8	-35.6	22	+1	102.4	8	Baler	189.2	-5.7	-115.7	17	+1 59.7	8	
Cuyo	255.7	+105.5	-105.8	18	-2	62.5	6	Dagupan	167.3	-310.7	-282.2	15	-8 69.6	7	
Ormoc	308.2	+110	+33.8	19	+3	156.5	11	Bolinao	251.3	-138.7	-282.5	17	-4 81.8	21	
Guiuan	363.4	+314.4		20	+8	52.1	16	Baguio	392.4	-284.4	-414.2	22	-6 62.1	21	
Tacloban	137	+31.6	-12.5	13	+3	28.2	30	San Fernando, La Union	284.7	-143.9	-156.6	14	-11 57.9	15	
Capiz	306.6	+181.3	+22.4	21	+6	64.3	20	Echague	142.4	-272.3	-57.8	13	-9 59.7	4	
Borongan	158.2	+110.3	-27	19	+9	39.3	16	Candon	99.2	-141.4	-346.5	13	-6 21.1	9	
Catbalogan	255.3	+105		24	+9	53.1	20	Vigan	77.1	-419	-423.9	9	-12 29.5	17	
Calbayog	268.9	+70.9	-3.6	22	+2	42.5	29	Tuguegarao	19.2	-212.8	-236	4	-5 5.3	15	
Masbate	85.7	-29.1	-92.9	10	-2	31.8	16	Laos	26.2	-884	-633.2		-12 27	18	
Romblon	163.8	-20.4	-51.1	23	+11	36.8	20	Aparri	95.1	-2.4	-175.6	10	-4 39.6	2	
Batag	541.2	+304.4		18	+8	109.2	7	Cape Bojeador	11.6	-333.7		5	-10 9.9	7	
Sorsogon	324.5	-97.4		18	+4	75.2	12	Basco	47.7	-280.4	9	22.1	2		
Legaspi	266	+173.8	+14.8	16	-1	52.3	16								

DEPRESSIONS AND TYPHOONS.

Not a single typhoon traversed the Philippines during this month, although a not very definite low-pressure area seems to have extended from northern Luzon to the China Sea from the 11th to the 14th while a well developed typhoon was recurving northeastward over the Pacific. Another low-pressure area seems to have moved from the China Sea southwest of Paracels to Indochina from the 20th to the 21st.

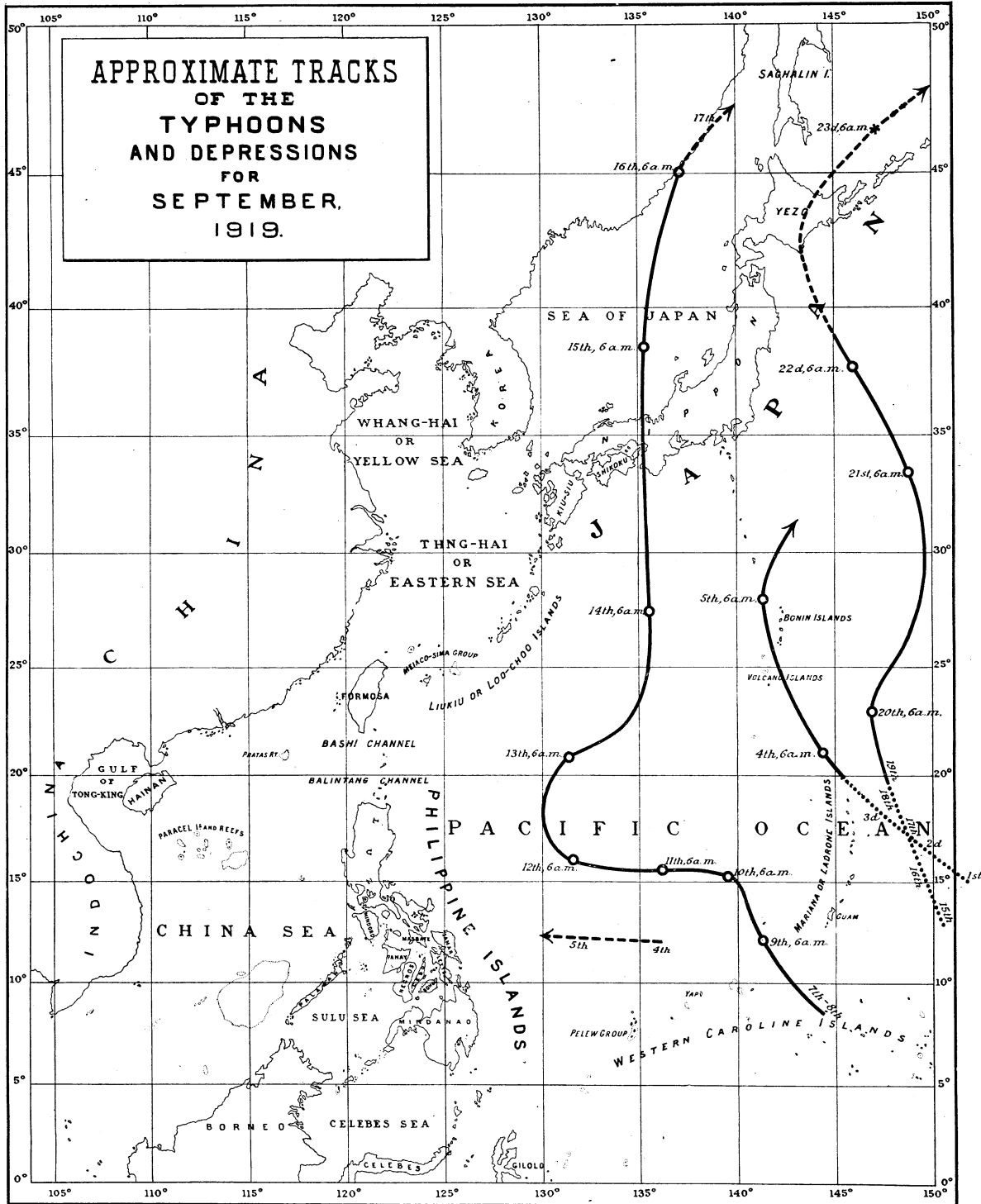
In the Pacific there were three typhoons during this month: their tracks are given in Plate VII. The first typhoon seems to have appeared on the 1st to the ENE of Guam in about 153° Longitude E and 15° Latitude N. It moved NW first, and then N toward the Bonin group of Islands, where the barometer was very low during the night of the 4th to the 5th. It probably recurved northeastward on the 5th and filled up on the next day N or NNE of the Bonins.

The second typhoon was formed on the 7th to 8th over the Western Carolines, south of Guam, in about 144° or 145° Longitude E and 8° or 9° Latitude N. According to the observations of Guam and Yap, the center of the typhoon passed between the two stations on the 9th moving NNW. On the 10th the typhoon began to move almost due west, this part of the track having been confirmed by observations made on board of the U. S. A. Transport *Thomas* on the way from Manila to Guam. Then on the 12th the typhoon recurved N and NE in about 130° Longitude E; but in the afternoon of the 13th it began to move with great speed straight N, thus reaching Japan in the evening of the 14th near 135° Longitude E.

The third typhoon seems to have appeared on the 15th to the east of Guam in about 150° Longitude E and 12° or 13° Latitude N. It moved northward remaining always very far from the Philippines.

Besides these three well developed typhoons, there was another depression or typhoon, likewise over the Pacific, which moved westward on the 4th to 5th, between 130° Longitude E and in about 12° or 13° Latitude N, to the east of northern Samar. It probably filled up on the 6th, a low-pressure area remaining afterward over the Philippines for the next two or three days.

Plate VII.



NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media para este mes en Filipinas es algo superior a la normal, siendo las diferencias mayores las del norte de Luzón. La temperatura media mensual es algo superior a la normal en la mitad de nuestras estaciones y algo inferior en la otra mitad. Las temperaturas extremas para Manila fueron 32.9° C., y 20.8° C., habiendo sido registrados en los días 21 y 24, respectivamente. Las temperaturas absolutas máxima y mínima para Baguio fueron 24.5° C., 14.7° C. en la cumbre del Mirador, y 25.9° C., 14.3° C. en el valle.

Lluvia.—La cantidad mensual de lluvia en la parte central y norte de Luzón es considerablemente inferior a la del año precedente y a la normal de septiembre, resultando así un buen contraste con las lluvias abundantes del pasado agosto. Pero en la parte sudeste de Luzón, en Visayas y Mindanao la lluvia mensual es generalmente superior a la del año pasado, y en la mayoría de las estaciones es también superior a la normal de este mes. Las cantidades totales mensuales de lluvia para Manila y Baguio difieren de las respectivas normales en -190.3 mm. y -414.2 mm.

DEPRESIONES Y TIFONES.

Ni un solo tifón cruzó las Islas este mes, aunque un área de baja presión no muy definida parece haberse extendido desde el norte de Luzón hasta el Mar de China del 11 al 14, mientras un tifón bien desarrollado estaba recurvando hacia el nordeste en el Pacífico. Otra área de baja presión parece haberse movido del 20 al 21 desde el Mar de China al sudoeste de Paracels a Indochina.

Hubo durante este mes tres tifones en el Pacífico, cuyas trayectorias pueden verse en la Lámina VII. El primer tifón parece haber aparecido el día 1.º al ENE de Guam cerca de 153° Longitud E y 15° Latitud N. Se movió al NW primero, y después al N en dirección al grupo de las Islas Bonín, donde el barómetro estuvo muy bajo durante la noche del 4 al 5. Recurvó probablemente al NE el día 5, y se deshizo el día siguiente al N o NNE de las Islas Bonín.

El segundo tifón se formó del 7 al 8 en las Carolinas Occidentales, al S de Guam, cerca de 144° ó 145° Longitud E y 8° ó 9° Latitud N. Según las observaciones de Guam y Yap, el centro del tifón pasó entre las dos estaciones el día 9 moviéndose al NNW. El día 10 comenzó el tifón a moverse casi en dirección oeste, habiéndose confirmado esta parte de la trayectoria con las observaciones hechas en el Transporte Americano *Thomas* en su viaje de Manila a Guam. Después recurvó el tifón al N y NE el día 12, cerca de 130° Longitud E; pero en la tarde del 12 comenzó a moverse con gran velocidad en dirección al N, llegando así al Japón en la tarde del 14 cerca de 135° Longitud E.

El tercer tifón parece haber aparecido el día 15 al E de Guam, cerca de 150° Longitud E y 12° ó 13° Latitud N. Se movió hacia el N permaneciendo siempre muy lejos de Filipinas.

Además de estos tres tifones bien desarrollados, hubo otra depresión o tifón, igualmente en el Pacífico, que se movió hacia el oeste del 4 al 5, entre 130° y 135° Longitud E y cerca de 12° ó 13° Latitud N, al E del norte de Sámar. Desapareció probablemente el día 6, permaneciendo después un área de baja presión sobre Filipinas durante los dos o tres días siguientes.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[Φ=14° 34' 41" N; λ=120° 58' 33" E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pressure (mean).	Air temperature. ^b			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. ^b			
		Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.								
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per cent.	mm.	°C.	°C.	mm.	mm.	
1	755.78	25.6	28.3	24.2	26.3	26.7	27.1	27.1	27.8	28.6	90.4	22	22.7	41	1.1	0.8
2	58.06	26.2	30.6	23.1	26.6	28	27.1	27.5	27.8	28.8	86.6	21.8	21.3	52.8	2.9	1.5
3	59.67	26.7	30.9	23.2	27.5	28.8	27.8	28	28.1	28.8	85.5	22	21.6	51.7	3	1.9
4	59.83	26.6	32.2	22.8	28.1	29.5	28.1	28.4	28.1	28.7	86.5	22.2	22	52.7	2.8	2
5	59.34	26.6	31.9	23.2	28.4	29.7	28.3	28.8	28.2	28.7	84.4	21.5	22	50.4	3.2	2.1
6	58.33	27	31.8	23.4	28.5	30.1	28.5	29	28	28.7	83.7	21.9	22.2	53.6	3	2
7	57.26	26.4	30.6	24	28.7	29.7	29	29.1	28.3	28.7	86.2	21.9	23	52.6	2.1	1.4
8	57.24	26.6	30.7	22.7	28.5	30	28.6	29.3	28.3	28.5	83.3	21.4	21.4	52.9	2.7	1.6
9	57.92	25.6	29.9	23.3	28.9	29	29.1	29.4	28.4	28.7	89.2	21.7	22.1	47.1	1	0.8
10	57.12	26.4	31	22.8	28.3	29.6	28.9	29.3	28.2	28.6	85.9	21.9	21.9	50.2	2.1	1.3
11	55.85	26	28.8	24	28.5	29.2	29	29.4	28.4	28.5	89.6	22.3	22.8	41.5	8	9
12	54.85	26.4	29.2	23.3	28.3	29.4	29	29	28.5	28.6	87.9	22.5	22.2	43	1.7	1.1
13	55	26.5	29.8	23.8	28.1	29.1	28.9	28.9	28.5	28.6	86.8	22.2	22.6	45.5	2.2	1
14	56.45	26.9	30.6	23.8	28.2	29.7	28.9	28.9	28.4	28.5	85	22.3	22.6	52.5	3	2.5
15	57.17	27	31.7	24.1	28.8	30.5	29	29.4	28.5	28.6	84.6	22.2	22.6	53.7	2.8	1.8
16	58.27	25.8	28.4	24	28.8	29.2	29.2	29.3	28.5	28.6	89.6	22	22.7	38.8	1.1	1
17	59.50	26.9	31.7	23.8	28.7	30	29.2	29.5	28.6	28.6	78.6	20.5	23.1	51.7	3.4	2.2
18	60.61	26.2	30.9	23.4	28.4	29.8	28.9	29.3	28.5	28.4	83	20.8	22	51.4	2.7	1.7
19	59.85	26.7	31.6	23.2	29	30.1	29.3	29.4	28.6	28.4	80.6	20.7	21.9	51.2	3.2	2.1
20	59.24	26.5	31.4	22.6	28.5	29.8	29.2	29.5	28.7	28.5	83.3	21.4	21.3	53.7	3.2	1.8
21	59.34	27.8	32.9	24.7	28.9	30.8	29.3	29.7	28.7	28.5	76.9	21.1	23.9	54.2	4.8	2.6
22	59.43	27.2	31.7	23.8	29.3	30.9	29.6	29.8	28.6	28.6	77.5	20.6	22.4	56.8	4.1	2.5
23	59.22	27	31.8	23.3	29.3	30.8	29.7	30	28.8	28.6	78.1	20.5	22.1	49.9	3.9	2.3
24	59.47	26.2	32.8	20.8	28.5	30.7	29.5	29.9	28.6	28.5	76.5	19	18.8	51.8	3.8	2.4
25	59.70	26.4	32.1	21.6	28.7	30.3	29.8	29.8	28.7	28.6	80.3	20.4	19.8	51.2	3.1	2
26	59.73	26.8	32.7	22.7	28.8	30.5	29.6	29.9	28.8	28.6	81.5	21.1	21.1	53.2	3.2	2.1
27	59.55	26.3	31.2	22.6	28.8	30.2	29.6	29.5	28.9	28.7	81.6	20.5	21.5	49	2.7	1.9
28	59.25	25.5	31.1	21.3	28.3	30.2	29.5	29.5	28.9	28.5	85.7	20.6	19.4	53.5	2.1	1.6
29	59.07	26.9	32.5	22.5	28.3	30.4	29.5	29.7	29	28.6	80.8	20.9	21.2	53.8	4	2.3
30	58.93	27.2	32.2	22.8	28.8	31	29.6	30	28.9	28.6	77.9	20.6	21.2	52.9	4.4	2.9
Mean Total	758.37	26.5	31.1	23.2	28.4	29.8	29	29.2	28.5	28.6	83.6	21.4	21.8	50.5	2.8	1.8
Departure from normal	+0.90	-0.3	+0.4	-0.4							-2.2	-1		83.6	54.1	

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.	
	Prevailing direction.	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.			On the tower.	In the park.		
						Upper.	Lower.					
1	SW	303.5	30	WSW	0-10	Ci.-S.	N., Cu.-N. WSW	h. m.	mm.	mm.	⊕ a. ● a. p.	
2	WSW	219	29	WSW	9.7	A.-Cu. SSW	Cu.-N. SSW	5 40	17.2	17.3		
3	WSW	130	14.5	WSW	8.1	Ci.-S.	Cu.	5 40			⊕ a. ⊕ p.	
4	WSW	134.5	14	WSW, W	4.4	Ci.	Cu. NE	8 10	8.9	9.4	● p.	
5	WSW	132	15	WSW	4.3	Ci.	Cu. NE	9 45	26.6	28.7	⊕ a. ⊕ p.	
6	WSW	140	19	NW	5.5	A.-Cu. NE by E	Cu. NE	7 25	21.1	22.9	● p.	
7	Variable	106	15	SSE	8.9	A.-Cu. NE	Cu.-N. ENE	3 35	2	2.3	● p.	
8	W quad.	87	11.5	W	8.4	Ci.-Cu. SE	Cu. E	5 00			⊕ a.	
9	Variable	51	9	W	8.4	Ci.	Cu. ENE	2 55	3.8	3.8	⊕ a. ● p.	
10	SW quad.	79.5	9.5	WSW	7.1	A.-Cu.	Cu. ENE	4 00	3.1	3.5	⊕ a. ⊕ p.	
11	S quad.	82.5	8	SE, S	9	Ci.-S.	Cu. NE	0 00	9.2	9.7	⊕ a. ⊕ p.	
12	SW	171	19	SW	9.2	Ci.-S.	Cu. W	0 00	26.7	26.7	⊕ a. ⊕ p.	
13	SW	262	23	SW	9.2	Ci.-S.	Cu. WSW	0 00	3.1	4.1	⊕ a.	
14	WSW	207	27	WSW	6.5	A.-Cu. NW	Cu. WNW	4 35	3	3.3	⊕ a.	
15	SE, SW	157	18	SW	6.5	Ci.	Cu. SSE	7 20	34	35.1	⊕ a. ● p.	
16	E quad.	30.5	6.5	ENE	9.7	A.-Cu.	S.-Cu. E	0 00	4.1	4.3	⊕ a. ● p.	
17	ESE	122.5	13	ESE	8.9	A.-Cu. WNW	Cu. E	1 40			⊕ a. d p.	
18	NE	118	11	WNW	8.2	A.-Cu. NW	Cu. E	4 05	5.2	5.8	⊕ a. d p.	
19	E quad.	100.5	13	WNW	6.2	A.-Cu. E	Cu. E	6 10			⊕ a. d p.	
20	W quad.	79.5	10	WNW	6.8	Ci.	Cu. E	5 55			⊕ a. d p.	
21	E	93.5	12	ESE	5.4	A.-Cu., Ci.	Cu. E	6 20			⊕ a. d p.	
22	ESE	105.5	12	W	6.1	A.-Cu.	Cu. E	6 05			⊕ a.	
23	SE, W	107	13.5	WNW	4.3	Ci.	Cu. E	7 35			⊕ a.	
24	NE, W	97	13	W	3.2	Ci.	Cu. E	7 25			⊕ a.	
25	NW quad.	96	13	W	5.2	Ci.	Cu. E	6 35			⊕ a.	
26	E quad.	126.5	13	SE	5.8	A.-Cu., Ci.	Cu. E	2 40	3	3	⊕ a. d p.	
27	NE, W	75.5	13.5	W	7.6	Ci.-S.	Cu. E	5 20	7.7	7.2	⊕ a. d p.	
28	E quad.	129	14	W, E	4.8	Ci.	Cu. E	8 30			⊕ a.	
29	SE, W	128.5	15.5	W	4.8	Ci.	Cu. E	8 30			⊕ a.	
30	W quad.	117	11.5	W	3.2		Cu. E	9 55			⊕ a.	
Mean Total		126.2	14.9		6.8			4 55	147 40	176	184.4	
Departure from normal		-3,920.1			-0.9			+12 54	-190.3			

^a All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[$\phi = 16^{\circ} 25' N$; $\lambda = 120^{\circ} 36' E$; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pres- sure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Rela- tive humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation.		
		Mean.	Maxi- mum.	Hour.	Mini- mum.	Hour.	Maxi- mum.	Hour.	Mini- mum.			Hour.	Mini- mum on grass.	Maxi- mum in sun. Black bulb in va- cuo. ^c	Free ex- posure (total)	Shel- ter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	633.10	16.7	19.7	0.15p.	15	3.00a.	21	0.05p.	15.7	2.30a.	99.2	14	14.8	48.9	0.3	0
2	35.28	16.7	19.2	9.30a.	15.3	6.00a.	20.9	1.25p.	16	6.00a.	98.3	13.9	15.3	49.7	0	0
3	37.47	18	22.2	1.00p.	15.8	2.25a.	22.8	1.30p.	15.6	6.05a.	87.7	13.5	14.7	60.7	2.6	1.2
4	37.84	18.3	23.3	1.20p.	16.2	1.00a.	24.3	0.55p.	15.8	6.05a.	86.8	13.6	14.7	61.6	2.1	1.4
5	37.34	18.4	22.8	2.50p.	15.8	3.00a.	23.6	11.05a.	14.9	5.40a.	85.8	13.6	14	58	2.1	.9
6	36.39	17.7	22.5	11.35a.	15.3	6.00a.	23.7	1.40p.	14.4	6.00a.	88.7	13.4	12.1	57.7	1.7	.9
7	35.34	17.4	21.3	11.15a.	15.6	9.25p.	22	11.05a.	15.1	4.50a.	93.8	13.9	14	52.7	.9	.7
8	35.37	18.3	23	1.35p.	15.1	2.30a.	23.4	3.15p.	14.6	4.25a.	87.5	13.8	13.6	59.7	1.8	.8
9	35.88	18	22.6	1.40p.	15.4	3.55a.	24.4	1.40p.	15.4	5.00a.	91.7	14.1	14.7	58.2	.9	.4
10	35.35	18.8	22.9	0.30p.	16	5.05a.	24	1.40p.	14.6	6.00a.	90	14.6	13.6	61	1.2	.8
11	34.21	18.4	22.9	11.40a.	15.9	5.00a.	23.3	0.55p.	15.4	3.00a.	92.7	14.5	14.6	59.9	1.1	.4
12	33.29	17.6	22.3	0.25p.	14.8	9.15p.	23.6	11.40a.	15.1	9.25p.	90.8	13.6	14.2	59.3	1.2	.7
13	33.20	17.7	21.3	0.05p.	15.1	6.00a.	22.4	1.50p.	14.6	5.30a.	88.5	13.4	13.7	54.8	1.4	.7
14	34.35	17.9	23.5	1.35p.	15.4	6.00a.	23.9	Noon	15.2	4.30a.	93.3	14.2	14.2	59.3	.9	.6
15	34.90	18	21.8	10.45a.	16.3	6.00a.	23.4	11.05a.	16.9	4.30a.	93.5	14.3	15.9	57.1	.9	.4
16	35.84	18.2	22.6	10.20a.	16.3	4.05a.	24.1	10.45a.	16.9	5.35a.	92.7	14.4	15.9	57.4	.9	.6
17	37.02	18.4	23.1	Noon	15.5	6.00a.	23.5	Noon	15.9	5.40a.	89.3	14	14.6	56.1	2.4	1.1
18	37.73	17.7	22.7	11.05a.	15.7	6.00a.	25.2	Noon	15.8	5.55a.	91.3	13.7	14.8	60	1.3	.7
19	37.44	18.2	22.5	10.10a.	15.1	6.00a.	24.9	11.35a.	15.5	6.00a.	86.8	13.5	14.2	56	2	1.3
20	36.97	17.4	22.3	1.05p.	15.4	3.30a.	24	1.20p.	15.8	5.25a.	93.8	13.9	14.4	58.3	1.3	.8
21	36.94	17.6	22.8	11.55a.	15.5	5.05a.	23.4	10.30a.	15.5	4.05a.	93.7	14	14.5	63.1	1.5	.8
22	37.10	18.3	23.4	11.05a.	15.7	2.30a.	24.2	1.05p.	15.4	6.00a.	90	14.1	14.7	58.6	2.5	1.1
23	36.99	18	23.4	1.30p.	15.2	6.00a.	23.8	2.00p.	15.6	6.00a.	89.2	13.7	14.4	59.3	2.1	1.5
24	37.15	18	23.5	0.25p.	15.1	5.30a.	24.8	1.15p.	14.9	5.55a.	88.2	13.6	13.6	62.9	3	1.6
25	37.56	18.9	24.5	11.30a.	14.7	5.50a.	25.9	0.20p.	14.3	3.05a.	78	12.7	12.5	55.8	4.5	2.6
26	37.67	18.5	24.3	10.40a.	15.6	5.00a.	24.4	1.30p.	15.4	6.00a.	85.2	13.5	14.2	62.3	2	1
27	37.40	18	22.5	1.00p.	16.1	6.00a.	23.6	1.00p.	15.4	5.55a.	92.8	14.3	14.3	60.9	1.3	.5
28	37.09	18	22.7	11.10a.	15.2	6.00a.	23	Noon	14.3	6.00a.	92.3	14.2	13.8	61	1.7	.7
29	37.11	18.5	23.5	1.05p.	15.9	5.45a.	23.9	2.00p.	15.4	6.00a.	90.2	14.3	13.3	61.1	1.9	.8
30	36.82	18.6	24	11.25a.	16	6.00a.	24.1	2.00p.	16	12m.n.	91.7	14.5	14.7	65.6	1.7	.6
Mean	636.20	18	22.6		15.5		23.6		15.4		90.4	13.9	14.3	58.6	1.6	0.9
Total																

Day.	Wind.				Amount (mean). 0-10.	Clouds.		Sun- shine. h. m.	Rain, 24 hours begin- ning 6 a. m. mm.	Miscellaneous.
	Prevailing direction. ^d	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.		Form and direction.				
		Km.	Km.		Upper.	Lower.				
1	W, SW	826.8	45.7	W	9.9		Cu.-N. SW	0 50	34.3	≡ d ² a. p. Γ ² ° ● p.
2	SW, W	453	33.3	W	9.9	Ci.-S.	N. WSW	0 30	23.6	≡ ● a. p. Γ ² ° p.
3	W	229.3	21.5	W	6.7	Ci.	cu.-N. SSE, SW	4 40		≡ d ² a. p. Γ ² ° p.
4	Variable	289.3	20.3	W	6.4	Ci.-Cu. SE, NE	Cu.-N. ESE	5 20	1.1	≡ d ² a. p. Γ ² ° p.
5	W, NE	321.2	21.7	W	5.1	Ci.	cu.-N. NNE	5 50		≡ d ² a. p. Γ ² ° p.
6	NE quad.	333.9	22.8	NE	5.6	Ci. SE, SSE	Cu.-N. NNE	5 20	19.5	≡ d ² a. p. Γ ² ° p.
7	W quad.	280.2	24.3	W	7.1	Ci. NE, SE	Cu.-N. E	2 20	39.1	≡ a. p. Γ ² ° p.
8	Variable	269.4	20.3	W	6.1	Ci. SE	Cu. E	7 00	6.6	≡ d ² a. p. Γ ² ° p.
9	E, W	247.6 ^e	19.9	W	7.1	Ci. SE, SSE	Cu.-N. E	3 20	1.1	≡ d ² a. p. Γ ² ° p.
10	W	146.6 ^f	19.5 ^g	W	7	Ci. E	Cu. ESE	5 10	.5	≡ d ² a. p. Γ ² ° p.
11	W quad.	234.4	19.9	W	8.6	Ci.	cu.-N. Variable	3 15	20.3	≡ d ² a. p. Γ ² ° p.
12	W	256.8	19.1	W	7.9	Ci.-S. ENE	cu.-N. N quad.	2 45	4.1	≡ a. p. Γ ² ° p.
13	W	249.6	21.4	W	6.7	Ci.-S. E, SSW	cu.-N. NW	4 25		≡ d ² a. p. Γ ² ° p.
14	E, W	181	21.1	SW	8	Variable	Cu.-N. SE	2 10	36.9	d ² a. p. ≡ ● Γ ² ° p.
15	E	214.8	18.2	SE	8.3	Ci.-S., Ci.	Cu. ESE	3 20	26.4	d a. p. ≡ a. p. ● p.
16	SE, E	272.5	20.7	SE	8.4	A.-Cu. S, SSW	Cu.-N. S	2 55	49.3	≡ ● a. p. ≡ ● Γ ² ° p.
17	E	312.6	27.1	E	5.9	Ci. SE, S	Cu.-N. E	5 05	4.8	≡ p.
18	E, SE	263.5	18.5	E	6.6	Ci. W	Cu. ENE, NE	3 45	16.1	≡ a. p. Γ ² ° p.
19	E	281.1	19.9	SE, E	5.7	Ci. E, NNW	Cu.-N. SE	4 00		≡ p.
20	W quad.	277.9	21.2	W	7.4	A.-Cu. SE	cu.-N. w, NNW	3 20	8.2	≡ d ² a. p. ≡ ● p.
21	W, E	323.1	22.8	W	7.4	Ci. W	Cu. W	3 55	62.1	≡ d ² a. p. Γ ² ° p.
22	E	295.2	20.3	W	5.6	Ci. S	cu.-N. ESE, NW	6 05		d ² a. p. ≡ p.
23	E, W	314.1	21.2	W	8.4	A.-Cu.	cu.-N. ESE, NNE	4 10	.8	d ² a. p. ≡ a. p. ● p.
24	E, W	305.9	22.8	W	5.3	Ci. SSW	cu.-N. Variable	6 15		≡ d ² a. p. p.
25	E	348.2	18.8	E	3	Ci. W quad.	Cu. SSE	7 30		≡ p.
26	E, W	287.1	21.5	W	5.7	Ci. SSW	Cu.-N. NNW	4 15	6.1	≡ d ² a. p. ≡ ● p.
27	W, SE	240	22	SW	6.9	Ci.	Cu.-N.	4 10	26.9	≡ p.
28	W	263.9	20.9	W	6.1	Ci. NW	Cu. ENE	4 30	1	≡ a. p. ● p.
29	E, W	253.8	22.2	W	5.9	Ci.	Cu.-N.	5 00		≡ d ² a. p. p.
30	SE, W	276.2	19.8	W	7.1	Ci.-S.	cu.-N. ENE, WSW	4 35	3.6	≡ a. p. ● p.
Mean		295	22.3		6.9			4 12		
Total		8,849						125 45	392.4	

* All the mean values given in this table are deduced from 6 daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
^b The barometric readings of this station are not reduced to sea level.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
^d The element is based on hourly observations taken from a quadruple register, which gives only eight possible directions

of the wind.
^e 3 hours missing.
^f 9 hours missing

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, SEPTEMBER, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo						45	6.1	1.8			22.4	0.1				2.5
Lais, Malita, Davao						44.2	5				2.8				0.5	7.4
Port Lebak, Cotabato					17.3	62	38.1	49.7	24.4	25.9	89.9	13.2				3.6
Lamitan, Basilan						40.6	20.3				33.3				8.4	
La Union, Davao ^a				63.5	2.5			2.5		.5					5.1	13
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a		5.1		4.8		34.8	53.8	15.7	2	30.5	25.4	9.1				
Basilan Plantation, Isabela, Basilan, Office ^a	3	8.9				20.1	58.4	23.6	25.4	1.5	30.5	3.3	11.9	2		
Parang Lalap, Isabela, Basilan ^a	23.1	38.1			16.3	14	63.5	17.7	1.3	3.8	27.9	2.5				12.7
Latuan, Isabela, Basilan ^a	4.4	16.6			5.6	7.4	63.5	23.3	1.6	3.6	41.4	7.1	1.3			.5
Malamaui, Zamboanga	8.6				19	17	30.3	24.4	3.8		46	6.1	3.8			
Cuabo, Davao				7.9	14		1.5	11.9				2		1.8	3.8	
Zamboanga		1			9.7	65.8	55.4	20.9	34.4	16.5	38.2	12.9	8			
Cagayan de Sulu, Sulu ^a				14.7	50.8	16.5	16.5	6.8		1				1.5	.5	
Fort Pikit, Cotabato				4.1	2.5	19.6	22.9	24.8	1.8	14	20.3	4.6				
Davao				2	3.8	2.5	4.5	6.4		4.3					5.6	
Sirib, Guianga, Davao ^a				3.3	20.3	50.5					11.7				11.9	3.8
Bual, Dalauan, Cotabato				2.3		3.8	30.4	8.1	7.4	7.9	78.2	13	.3			2.5
Cotabato				13	54.4	55.6	17.3	4.3	18.8	79.2	25.1					2.3
Naga-Naga, Zamboanga				4.8	3.8	7.6	52.4	14	17.8	16.3	19.3	6.1	80.3			13
Malabang, Lanao	.8			11.7	30.8	17.3	18.3	3	51.6	49.8	55.1	13	66.6			1.3
Malangas, Zamboanga ^a	17.5			3.8	.3	18.3	4.3		19.8	27.2	27.4		7.1			9.9
Lumbatan, Lanao ^a				32	15.5	14.5	14.7	14.5	9.1	14	60.4	48.5	12.2	3.3		16.5
Ganassi, Lanao			0.5	3	5.6	22.9	16.5	3.3	6.3	1	24.9	84.5	33.8	1.3		
Moncayo, Davao ^a				45.2	15.7	15.2	1.8			28.4				8.9	8.6	43.7
Camp Kalaw, Moncayo, Davao				44	18	14.2	2.5			30			14.2		14.2	37.8
Mailag Agricultural School, Bukidnon		3			9.1	35.6	44	10.4	5.1	9.7	2	4.1			26.4	6.9
Camp Keithley, Lanao		.3	15.7		43.1	44.2	24.7	15.5	5.8	7.4	11.9	19.1		.8	19.3	40.9
Pantar, Lanao ^a	2.5	1.3	20.3	38.1	19	31	15.3	5.1	2	12.7	15.7			5.3	14.7	17.8
Vervela, Agusan	2			4.3	7.4	3.8	47.2	11.9	9.1	11.9	27.2			16.3	26.7	83.8
Sumilao, Agusan	14.5	1.3			36.6	32.3	36.3	18.3	12.5	10.4	21.1	1.3			29.7	
Sindangan, Zamboanga ^a	16		17.8	37.3	114.3	117.6	134.9		17.8	40.9	64.8	9.1		9.1		85.1
Diklom, Bukidnon ^a	67.1		1		45.7	37.8	40.9	29.2	57.4	.8	10.2	10.7		16.5	9.9	
Cagayan, Misamis	8.9				9.7	16.5	31.2	2	1.3	6.4	2.5			44.4		3.8
Talacogon, Agusan	24.4				3.6	21.8	54.9	5.1	9.4	2.3				4.6	9.9	1.8
Butuan	.8	.3			24.1	31	1.3	.8	.3		7.9	2.8	10.7	5.1	.5	.5
Dumaguete					6.1	3.3			6.6	.5	7.5	102.9	35.8	2.8	.8	1.3
Hacienda San Jose, Tanhai, Bais (Sur) Oriental Negros ^a									40.6	71.1	25.4	132	35.6			
Palanas, Bais (Centro) Oriental Negros ^a								18.8	15.2	50.8	50.8	58.2		12.7		18
Hacienda Tamogon, Bais (Norte) Oriental Negros ^a						2.5		6.4	27.9	30.5	50.8	55.9	96.5	73.7	5.1	
Yap, Western Carolines	1.6		14.7	3	1.1	3.5	12.4	70.7	24.7	3	2.5			5.6		.8
Tagbilaran			1.7		18.2	45.8	13.2	12.2	3.5		14.3	26.4	3.8	5	1.8	1.3
Iwahig	8.2	11.7			.8	1		16.3	.3	6.9	32	11.2	23.7	2.5	2.5	41.6
Dalaguete, Cebu					6.6	10.5	12.7	5.3		.8	17	16.5	2			.8
Surigao					16.3	3.6	58.2	27.2	4.6	41.8	35.8	40.9	.8	.3		79.4
Central Palma, Ilog, Occidental Negros					12.7	27.9	22.9	12.7	8.1	28.9	40.6	35.6	35.6	20.3	27.9	3.8
Hacienda Naval, Himamaylan, Occidental Negros					6.4	8.9	79.8	69.1	1.5	32.3	33	71.1	17.5	24.1	.8	
Biaong Cui's Farm, Barili, Cebu		6.6			14.5	5.1	6.1				46.2	8.6	5.3	4.3		
Maasin					36.8	52.3	29.2	82.6		24.1	85.8		17			8.9
Isabela, Occidental Negros		2.3			12.7	23.4	22.1	17.5	.3	15.2	142	57.2	20.8	11.9	.3	
Hacienda Tanolo, Hinigaran, Occidental Negros					17	27	62.5	23.3	3.9	14.4	66	54.9	59.2	41.7	2.5	
Cebu	.5				4.7	22.4	13.5			4.6	3.1	.5	.8			3.6
La Castellana, Occidental Negros					31	21.4	3.8	36.1	6.9	5.6	100.1	45.9	64.3	15.5	2.5	
Hacienda Vallehermoso, Oriental Negros ^a	2.5										30.7			4.6		23.4
Hacienda Canlaon, La Castellana, Occidental Negros	.3				20.8	21.4	1.8	60.4	12.2	7.2	36.6	34.3	61.5	24.9	8.1	
Central Azucarera de La Carlota, Occidental Negros	8.6				38.1	17.8	25.1	77.2	8.4	6.3	50.3	40.7	80.2	25.4	6.6	
La Carlota, Occidental Negros ^a	.3				27.2	13	6.6	52.4	7.4	11.9	59.7	71.1	29.5	5.9		
Valladolid, Occidental Negros	8.9			21.1	2.5	62.7	16.6	53.6	19.1	13.7	11.4	42.6	27.4	44.7	6.4	.8
Hacienda San Antonio, Occidental Negros ^a						14						22.9	15.2			
Hacienda San Carlos, Occidental Negros ^a			2.5	8.9		9.1	10.7		2.8	9.1	2.8	7.4				4.8
Hacienda Refugio, Occidental Negros ^a						17.8	3.3	10.2	1		3.6	5.6	8.6			12.4
Santa Cecilia, Ma-Ao Sugar Central, Bago, Occidental Negros	9.4				61.2	8.9	9.4	47.5	2.1	18.8	33.5	44.2	63.5	39.9	7.1	1.5
Murcia, Occidental Negros	.8				32.8	5.1	4.6	94.8		2.8	13.5	14	34.5	20.3	1.6	
Iloilo	.8	.3			6.9	15.8	22.4	15.5		9.9	1	6.9	8.4	25.9	5.9	
Concepcion, Talisay, Occidental Negros	3.8				9.7	7.4		9.1		2.3	6.6	5.6	10.2	7.9	3.6	
Tuburan, Cebu		1.5	48.8		19.5	29.7	20.8	11.9		1	4.3	.8	.5			3
San Jose de Buenavista	7.6	6.6			92.5	11.4	15	102.4	1.3	17.3	86.4	67.8	4	18.8	10.2	.6
Silay, Occidental Negros					6.9	5.1	10.2	25.9		8.9	2.8	2.1	5.8	7.4	5.4	1.8
Cuyo	33.3	1			1.5	62.5	31.5	27.4	10.2	2.8	17.5	8.3	1		19.5	1.8
Lucena, Iloilo ^a	26.7				11.4	30.5	7.6	5.1	3.8	11.7	2.5					
Victorias, Occidental Negros	11.5				1	8.9	76.5				30.5		5.1	2		
Cadiz, Occidental Negros				18.5	3.8	16	4.8	6.6	.3	.8	4.9					
Hacienda Bilbao, Manapla, Occidental Negros					4.8	8.9	2.3	58.4								
Ormoc					4.3	15	4.3	6.6	2.5	14.5	156.5	.5				10.2
Guiuan					39.1	38.9	9.7	6.4	11.9	6.9	15.2				16.8	52.1
Bogo, Cebu		7.6			18	9.6	60.7	6.1	4.3	44.5						26.7
Dueñas, Iloilo ^a					8.6		20.1			26.9						42.7
Bitaguan, Iloilo (Railroad Iloilo to Capiz) ^a					13.5	42.9		2.5		18.8	1.5		2.8	4.3		4.3
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a			4.8		35.5	16	19.1	2.5	11.4	3.8	7.6	7.4	22.1	11.2		
Tacloban					2.5	6.9	9.7			6.4	14.7				11.7	26.7

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, September, 1919—Continued.

Station.	Day of month.														Total.		
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.			
Jolo		0.5		2.5	0.8											119.6	
Lais, Malita, Davao						18.3										244.4	
Port Lebak, Cotabato								42.7	.8	116.1						368.2	
Lamitan, Basilan	7.1			22.9		9.1	2.3			15.2						147.6	
La Union, Davao ^a	9.7									3.6						133.2	
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a	26.2			15.2	20.3	10.4										274.5	
Basilan Plantation, Isabela, Basilan, Office ^a	17.8			8.9	11.2	6.4				3.8	3.3				7.1	247.1	
Parang Lalap, Isabela, Basilan ^a	43.2			25.4	2.5	8.9				3.8						304.7	
Latuan, Isabela, Basilan ^a	25.4			24.1		9.1			.8							245.3	
Malamaui, Zamboanga	6.1			4.8						6.3				2.3		179.8	
Cuabo, Davao	1.3							9.9								129.3	
Zamboanga	22.9		0.8			3.6		3.3		27.7		17.3	35.3		5	285.1	
Cagayan de Sulu, Sulu ^a	3	15.2			8.9			8.1	.5	8	2.5				3	219.6	
Fort Pikit, Cotabato	3	13.5		6.6					3	1.3						158.8	
Davao	2.8	87.6	5.1	3				3.8	2.8			7.1				196.7	
Sirib, Guianga, Davao ^a	5.1	3.8			5.1	1.5		43.2		8.9	10.2					191	
Bual, Dalauan, Cotabato	6.9	25.4	.5	1.8				3.6	13.7		7.6	30.2			8.6	260.8	
Cotabato	5.8	6.1						8.1	4.3		15.7			16.7		326.7	
Naga-Naga, Zamboanga	12.2							44.2	40.1		50.8	8.7			2	419.3	
Malabang, Lanao	.3	6.4	6.1	.5				.8	.8	53.1		2.8			5.6	398.5	
Malangas, Zamboanga ^a	47.5	30.5	30.5		35.6	11.9	11.4	7.1	1	1.3	9.4	16.3	14		24.4	376.8	
Lumbatan, Lanao ^a	35.8	6.6				2.5	10.2	6.1			35.8				12.4	364.6	
Ganassi, Lanao	1.8		15.2					10.2	22.1		1	2.6			18.5	272.3	
Moncayo, Davao ^a	5.8							23.4			3.8				15.7	216.2	
Camp Kalaw, Moncayo, Davao	15.5	.5	3.6	2	.3	.5	3.6	16	3.8	1.3					11.7	8	234.5
Mailag Agricultural School	30.5	2.8	3.3	17	.8						20.8	7.6	58.4	3.8		301.3	
Camp Keithley, Lanao	29.5	5.8	16.8	27.2	1.8	5.6	6.9	5.1	4.1				34.9	8.9		403.7	
Pantar, Lanao ^a	5.6	10.2	12.7	1	3.8	13	7.6	12.7	2.5		12.7	5.1	10.2	27.4	44.9	370.2	
Veruela, Agusan	33		6.4	1.5	.5	7.3	20.3	34	7.4	13.2					1.3	376.5	
Sumilao, Agusan	27.4	14.5	11.4	9.4	6.4	2.8	13	53.6	49	.5	35.6	65.3		5.1	3.8	520.2	
Sindangan, Zamboanga ^a	39.4	17.8			7.6	4.6	5.6	4.1	13.9					1	21.3	780	
Diklom, Bukidnon ^a	5.8	6.4	10.7			6.6	2.8	3	16.3				5.1	4.6		388.5	
Cagayan, Misamis									14				8.9			149.6	
Talacogon, Agusan	13.2	20.8	2	5.3		.8	2.5	6.9	19.8	13.7			4.3	25.7		252.8	
Butuan	4.6	1.3	2.3	13.5	.3	7.7	16	14.9	.8				13.7	2.3		163	
Dumaguete	1.8	33.8	12.7	14.2			2.5			20.8	2			5.8		261.2	
Hacienda San Jose, Tanhai, Bais (Sur)			7.6	2.5												439.3	
Oriental Negros ^a	38.1											86.4					
Palanas, Bais (Centro) Oriental Negros ^a	15.5	35.6								8.4		3.3		4.8		292.1	
Hacienda Tamogon, Bais (Norte) Oriental Negros ^a	68.6	53.3	25.4	7.6								10.2	33			547.4	
Yap, Western Carolines	.3			.8	55.1	.3	2.5	5.1	.3				5.6	30.2	24.1	265.2	
Tagbilaran	16.1	3.6		13.5		2.3	7.9	17.4	12.7		35.6			7.9		264.2	
Iwahig	17.8	4.1	8.4		17.5	1.5	12.2	2.3						9.7		232.2	
Dalaguete, Cebu	53.1	9.9	.5	5.8	4.3		2.3				16.3		13.7	1.3		179.4	
Surigao	.5		1.5		20.3	15	16	11.3	6.8	10.4		2.6	4.3	1		398.6	
Central Palma, Ilog, Occidental Negros		4.1	7.6	9.7			10.2	12.7	22.9							344.2	
Hacienda Naval, Himamaylan, Occidental Negros		.5	15.2	38.6		2.3			.5					1	2.3	404.9	
Biaong Cui's Farm, Barili, Cebu	17	16.8		13.5					17.5					19		180.5	
Maasin				5.8							14.2					356.7	
Isabela, Occidental Negros		1	6.9	95.7	9.6	19.3			.8			2.5	.8	74.2	5.1	541.6	
Hacienda Tanolo, Hinigaran, Occidental Negros	.5		49	12.2	3.6	4.3			6.9				19.6	.5	4.1	473.1	
Cebu	77.6	.5	11.4	27.9	1.5	1.8			4.3							178.7	
La Castellana, Occidental Negros	13.2	.6	4	23.1	.8	6.1	5.8	.3	5.8	.3	33.8	1.3	12.7	12		452.9	
Hacienda Vallehermoso, Oriental Negros ^a		26.2				21.6				15.7	3.3		24.4			152.4	
Hacienda Canlaon, La Castellana, Occidental Negros	.8		9.9	4.1	1.3	9.7			5.1		2.5	9.2	8.1	13.5		353.7	
Central Azucarera de La Carlota, Occidental Negros	1		7.1	12.4	1.8	2.3	5.3		.8	2.5			5.6	1.5	15.5	433.4	
La Carlota, Occidental Negros ^a				4.1	3	1	4.6		1.8				5.6	1.5	5.1	311.7	
Valladolid, Occidental Negros				26.9		1.3	2									361.7	
Hacienda San Antonio, Occidental Negros ^a				36.8	43.9											132.8	
Hacienda San Carlos, Occidental Negros ^a		1		8.9	21.6		7.1	.5				5.8	8.4			111.4	
Hacienda Refugio, Occidental Negros ^a	7.6	2		10.7		10.7		20.6			14		6.4			134.5	
Santa Cecilia, Ma-Ao Sugar Central, Bago, Occidental Negros	.3		.5	9.6	.5	12.5								1	17.8	389.2	
Murcia, Occidental Negros	2			75	4.5	4.8		13	3.1				18.3			345.5	
Iloilo	2	7.6		43.9		6.9		.5	7.6			3	1.5			192.7	
Concepcion, Talisay, Occidental Negros	.3	5.4	.8	30.4	1.6	7.1		4.8	4.6							121.2	
Tuburan, Cebu	2			5.8				3	4.3	4.8	21.6	2.3				185.6	
San Jose de Buenavista	2.8	1.5	.3	15	.3				.8			1.3		1.3		465.2	
Silay, Occidental Negros		4.9		40.6		2	56.4	19.6	13.7	.3	6.6			2.3	14	242.7	
Cuyo	34.8	3	2.8	.8		1										255.7	
Lucena, Iloilo ^a	66			7.6							30.5	5.1				208.5	
Victorias, Occidental Negros	3.8	16.3	4.6	16	36.8	3.6	7.9	5.1		1	22.9	5.8	23.9	3.3		286.5	
Cadiz, Occidental Negros	.3	17.3		10.4	.8			1.8			28.7	8.4	3.1			126.5	
Hacienda Bilbao, Manapla, Occidental Negros		12.7	15.2	8.3	8.1			6.1			33.3	53.8	42.7	4.6		225.9	
Ormoc	2.5	18.3	11.9					3.6	3.3	1.3	3.3	1.3	5.6	12.7		308.2	
Guiuan	43.5	1.3	1	46.9	23.4	2		23.8	13.4	2	4.8			4.3		363.4	
Bogo, Cebu	4.6	.5			34.5			.5			9.4	1		1.3		229.3	
Dueñas, Iloilo ^a	3.3		32.5													134.1	
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a	20.6	2		14.7	3.6	1.3		14.8							2.5	150.1	
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	12.2		33.5	4.6	12.2	3	1.3	5.6					5.1	1.3		220.2	
Tacloban	9.4							6.4	3.8			5.3			28.2	137	

^a Voluntary or coöperative station.

Daily rainfall at the stations of the Weather Bureau, September, 1919—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Dumarao, Capiz ^a					34.8	61.5										
Dao, Capiz ^a				0.5	29.7	19	0.5	0.5	11.7	2.8	3.5	31.2	6.4	4.6	7.4	8.4
Capiz		1.8			52.9	19.8			2.1	6	26		3.1	3.8	22.4	
Borongan					1.3	16.3	14.7	9.2	5.8	10.6	.8	2.3		3	7.1	39.3
Catbalogan	19.8		0.3		7.4	12.2	8.6	16.5	2.1	23.9	11.7	16	1	10.9	.3	13.2
Calbayog	.5					9.9	5.4	13.4		36.6	4.4	8.2	34.3	5.1	4.3	24.9
Masbate						3.3		4.1	11.2	11.5	13	1.3			5.9	31.8
San Jose Estate, Robles Camp, D-17, Mindoro ^a	48.3	64.8					61	35.6	45.8	16.5	29.2	30.5		5.1		
San Jose Estate, Tamaraw Plantation, Mindoro ^a	45.7						50.8	27.1	27.9				12.7	3		
San Jose Estate, San Agustin, Mindoro ^a	12.7	28.4				3.8	12.7	38.1	15.3	2.5	3.8	17.8		3.6		8.9
San Jose, Mindoro ^a	27.9	18			.5	1.5	13	44.9	2.8	21.6	1.5	17.8	4.8	5.3		1.5
San Jose Estate, Tunnel D-12, Mindoro ^a	34	21.3				2	16.8	46.2	30.3	12.5	2	2.3	7.8	6.4		1
Romblon	3.5				15.2			35.8	1.1	3	10.4	1.1		3	.3	1
Batag						1.8	109.2	21.8	15.2	98.6	18.3	98.5	2	2.3	1.3	84.1
Irosin, Sorsogon					5.1	.8		21.8	1	38.1	6.8	25.9	2.3		4.8	36.9
Sorsogon					23.1			26.7	4.1	44.1	5.1	75.2	27.9	1.5	2.3	27.2
Legaspi					.3			49.5	28.2	27.5	8.4	33.8	.5	3.8	4.4	52.3
Sumay, Guam				43.2	33		6.9	36.8	11.5	3.8	39.4	1.3		22.9	63.5	
Calapan	3.5	2.3		.8				19.8	.8	5.1	2.5	.3		.3	15.2	52.3
Virac					2			7.6	28.2	57.9	46.4	105.7			19.3	11.9
Naga								16	8.6	97	5.6	9.4	4.7	.5	.8	3
Tigaon					1.3			7.4	16.3	42.4	13.9	14	10.1	9.4	38.1	24.4
Batangas	3			.5	28.2	1.3	9.7	2.5	9.4	1.3	7.4					81.5
Lucena	1.3	2					19.6	2.3	8.6	10.9	13.3			6.4	1.3	31.2
Atimonan	.3				15	.5		5.3	47.3	24.6				4.6	38.1	25.4
Ambulong, Tanauan	5.6			2.5		17.8	20.8		11.2		20.3	2.5				24.9
Canlubang, Calamba			12.4	33	3.8	41.1			3.8		41.7			21.3	5.6	9.4
Paracale					1.5	5.1		11.5	6.9	34.5	18.3		6.1	.5	81.6	153.4
Santa Cruz, Laguna	5.1			.3	3.8	6.1	1		4.9	3.8	52.8	1.3	16.3		14	20.8
Fort Mills, Corregidor ^{a,b}	27.4	2		4.6	8.6		1.3		1.3	3.6	5.5	42.4	6.9	25.4	11.7	23.6
Alabang, Rizal ^a	2.8			3.8	26.4	44.4	1.3				18.5			2.5	3.8	1.3
Lamao, Bataan ^a	60.7	3		7.9	6.6	.8			5.6	32.3	1.1			40.9	4.1	14.5
Manila	17.2			8.9	26.6	21.1	2		3.8	3.1	9.2	26.7	3.1	3	34	4.1
Antipolo	28.9	.5		15.2	10.7	7.4	1.3	1	7.1	2.3	11.7	15.7	7.9	.5	7.4	3
Bosoboso, Rizal ^a	26.9			6.4	9.7	16.8	4.3		3.6	19.6		11.7		8.6	3.3	2
Montalban, Rizal ^a	31.7			9.7	5.1	9.1	23.9	9.7	58.9		3.8	7.4			2.3	
Hacienda Pintong Sapang, San Jose del Monte, Bulacan ^a	42.5				32.8		14.5		30.2		3.8	4.1		2.3	1.3	
Mabayuan Dam, Olongapo, Zambales ^a	54	56.3			8.9	7.8	4.1		25.7	11.7	22.1			2.8	14.7	18.3
Pampanga Sugar Mills, Del Carmen, Pampanga ^a	64.8	13.2				8.9	.3		.5	32.8				23.4		.3
Iba	16.5	21.3				38.4	23.4		3.6	4.3	.5		18.3			22.6
San Isidro	1	12.9			6.4		13.2	10.2		18.6	7.4	7.9				1
Hacienda Luisita, Comillas, Tarlac ^a	3.3	6.4	15.7			1.8	92	3.3		1.8		7.1				
Hacienda Luisita, San Miguel, Tarlac ^a	14.8	8.9	16			1.3	91.2	3.6		1		7.4				
Tarlac	15.2	4.6	4.1		2		57.9	15.2	4.1	29.7	2	5.3		4.6	10.4	5.1
Baler				7.1	.5			59.7			14.7			.5	29.2	15.7
Paniqui, Tarlac ^a	21.3	3.8													18.3	27.9
C. L. A. S. Muñoz, Nueva Ecija ^a	2.3	1.8					26.7		48.3	13.5	4.8	16	31.2	21.1		
Dagupan	4.8	1.5				29.7	69.6			1.8		.8		10.7	9.4	12.5
Bolinao	3.6	21.3				3.6	11.7		2		3.3		2.5	.8	65.5	35.1
Baguio	34.3	23.6		1.1		19.5	39.1	6.6	1.1	.5	20.3	4.1		36.9	26.4	49.3
San Fernando, La Union	9.1	15.3				49.8	57.2		7.1		11.3		6.4	10.7	57.9	37.6
Echagüe				59.7		1					1.3	10.2		36.1	3	
Sagada, Mountain Province ^a	2.5	3	2	6.9	1	45.2	27.4	.4	2.8			4.8		5.8	20.3	73.7
Bontoc, Mountain Province ^a			6.6		9.9	13.5	40.6	7.1						8.4	25.9	20.8
Candon	1.5	5.1				9.7	15		21.1				4.6		2.3	9.1
Vigan	5.7	6.1				6.1	3.6								4.8	7.1
Tuguegarao		4.5											4.3	5.1	5.3	
Laoag																
Aparri		39.6				1.8	3.1				25.5	11	4.6			3.4
Cape Bojeador		.5			.5		9.9									.4
Basco	11.5	22.1					1	1.3		2.5		.5	3			

^a Voluntary or cooperative station.

^b Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, September, 1919—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Dumarao, Capiz ^a								27.4	1.8						
Dao, Capiz ^a	6.1	16.5		37.3	15			6.6	40.6	0.5	1		2	28.4	172.1
Capiz	30.5	2.8	1	64.3	38.9	0.5		2.5	3.3		14.5	1.5	2	6.9	280.2
Borongon	17.8	6.4			.8			11.7	4.1	7.9		.8			306.6
Catbalogan	14.4	1.6	24.9	53.1		.3		1	2.1		5.6	1	7.4		158.2
Calbayog	24.8	7.9	2.8	.3	1.3			5.1	1.1	.5	22.6	13	42.5		255.3
Masbate	3.3								.3						268.9
San Jose Estate, Robles Camp, D-17, Mindoro ^a												36.8			85.7
San Jose Estate, Tamaraw Plantation, Mindoro ^a										45.7					373.6
San Jose Estate, San Agustin, Mindoro ^a		2.5		12.7	2.8							4.3	5.1		222.9
San Jose, Mindoro ^a		13.2		17.3	1							3.1	4.3		170
San Jose Estate, Tunnel D-12, Mindoro ^a		7.6		111.7								25.4	6.1		200
Romblon	1.6	2.3	.8	36.8	1		1.3		8.1	2.9	8.7	11.4	3.8	5.6	333.4
Batag	25.9				21.6			3.8	3	10.2	15.7	7.9			163.8
Irosin, Sorsogon	9.9			3	8.4				13.5		4.5	2.8			541.2
Sorsogon	24.2		1.5	26.7	8.9				8.6		11.6	2.8	3		185.6
Legaspi	26.1	1.5	.8	16	3						9.9				324.5
Sumay, Guam	63.5	9.4			8.9	16.5		7.6			2.5	7.6	91.4	21.6	266
Calapan	7.6	.5	1	11.2	.5		(*)	(*)	(*)		2.5	3.6		(*)	491.3
Virac	68.6	14.5	5.6								7.1		2	.8	127.3
Naga	6.4	1.1		4.9					2.4			1.4			377.6
Tigaon	13.5	5.8	13.7	6.6					5.5						161.8
Batangas				4.6								19.6			222.4
Lucena			4.1	83.6	.3							4.3			169
Atimonan		1	11.4	48.3					1		3.6	44	2.3	1.5	189.2
Ambulong, Tanauan													5.1		274.2
Canlubang, Calamba															110.7
Paracale	37.6	21.3	45.7	43.9				1.3	3.3		20.1	.8			172.1
Santa Cruz, Laguna	8.9	3		1	.8				2.3	.5		3.6		2	498.4
Fort Mills, Corregidor ^{a,b}			.3												152.3
Alabang, Rizal ^a				36.1	8.1										164.3
Lamao, Bataan ^a	1.3														114.8
Manila		5.2									.3	7.7			223
Antipolo	7.6	8.1		24.3	2.3							14	5.1	2.5	176
Bosoboso, Rizal ^a	5.1	4.8										5.6	7.6	.8	184.5
Montalban, Rizal ^a	1.3	16.5		1	1.5					1	.5	1.5			136.8
Hacienda Pintong Sapang, San Jose del Monte, Bulacan ^a	14											3.6			184.9
Mabayuan Dam, Olongapo, Zambales ^a	.5			20.6		.5				.5			1.5		149.1
Pampanga Sugar Mills, Del Carmen, Pampanga ^a		.5													250.9
Iba			10.7		35.6	2.8									144.7
San Isidro	.8	.5			1.8										198
Hacienda Luisita, Comillas, Tarlac ^a					22.6									13	81.7
Hacienda Luisita, San Miguel, Tarlac ^a					22.1									14	167
Tarlac		.8		.3	.14							4.1			180.3
Baler	1.3	5.6	4.1	5.1	2	3.8	3			18.1			1	16.5	180.4
Paniqui, Tarlac ^a		16		21.6		18.8		23.9		4.8					189.2
C. L. A. S. Muñoz, Nueva Ecija ^a					.8									14.7	156.4
Dagupan		2	1	13.7	3.1					6.4	.3				181.2
Bolinao			10.4	4.8	81.8	.3					2.3		.8	1.5	167.3
Baguio	4.8	16.1		8.2	62.1		.8			6.1	26.9	1		3.6	251.3
San Fernando, La Union		6.1				2.5					13.2	.5			392.4
Echague	8.1	3.3		7.2	5.3	2.1				4.6					284.7
Sagada, Mountain Province ^a	1.3	2.5	2.8		4.8		2.3			1.5					142.4
Bontoc, Mountain Province ^a		3.8		4.8											211.0
Candon	1.5	10.2			13	2.5						3.6			141.4
Vigan	29.5	2.8									11.4				99.2
Tuguegarao															77.1
Laog	12.7	12.2	1.3												19.2
Aparri		1.3	4.3			.5									26.2
Cape Bojeador															95.1
Basco					5.5									.3	11.6
															47.7

* No observation.

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 7 a. m.^c 24 days of observation only.^d Total amount from 1 to 17.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, SEPTEMBER, 1919.

Day.	Jolo.		Malamauai, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	33.2	23.7	32.7	23	30	24.2	30.3	23.5	33.1	22.3	28.7	19.5	35	23.4	34	22.2
2	33.9	23.8	32.5	22.5	29.5	24.2	31.2	22.3	33.7	21.2	28.9	19.7	34.2	21.6	35.9	21.3
3	31.9	22.4	32.5	23	30.5	23.8	31.7	23	33.9	21.2	28.8	18	33.1	21.5	35.6	22.2
4	32.2	21.9	32.6	24	29.5	24.2	32.7	23.8	33.1	23.5	27.8	18.9	33	23.4	34.1	22.6
5	31.7	23.6	32.5	25	29.5	23.6	29.4	22.5	32.3	23.2	26.1	18.6	32	21.4	31.4	23.6
6	29.4	22.7	28.2	21.6	27.7	22.3	30.7	22.1	31.2	21.9	24.5	17.7	29.8	21.6	30.3	21.6
7	30.3	21.7	28	22.5	27.5	21.2	30.2	22	29.4	21.9	25.3	17.6	29.5	22.2	30.7	22.9
8	29.7	22.7	28.2	22.1	26.7	22.2	31.2	22.5	28.7	22.5	24.8	18.9	29.2	22.1	31.2	22.3
9	29.9	22.8	29.3	21	28	21.5	30.7	22	30.3	22	25.5	19.3	30.5	21.5	31.2	22.9
10	31	23.1	29.5	22.6	27.6	21	30.5	22.2	30.7	22.1	25.5	19	29.7	21.7	32.1	22.9
11	31	24.4	30.8	23.5	27.7	22	28.7	22.7	29.8	23.7	26.8	19.3	30.3	22.9	30	22.8
12	31.3	21.7	30.8	22.4	28	22	30.2	22.2	30.7	22	26.8	19.6	31.2	22.4	31.4	22.2
13	32.3	24.8	32	22.4	29	22.3	30.7	21	29.7	22.5	26.1	19.5	33	22.2	32.4	22.3
14	31.2	24.1	32.4	22.3	29.5	22	31.2	22	31	22.2	26.9	20.1	32.9	22.4	34.5	22.7
15	32	23.3	32.5	23.1	29	24	31.4	23.3	31.7	22.8	26.4	19.9	32.4	23.6	33	23.2
16	31.8	23.8	31.2	23.1	28.6	23.5	30.3	22.5	31.4	23.2	27.8	18.9	31.2	22.2	32.6	22.8
17	29.8	23	30.1	23.4	29.7	23.5	29.2	22	32.3	22.1	27.9	18	31	22.1	32	23
18	29.4	21.5	31.9	23.4	30.3	22.4	31	22.3	32.9	22.6	27.3	18	31.2	22.2	31.4	22.8
19	30.6	22.3	32	23.5	28.5	23	30.2	23.2	32.8	23	27.9	19.2	30.8	22.5	33.6	22.4
20	30	22.6	31	23.2	28.7	24.1	31.1	23.8	33.5	23.9	28.2	19	31.5	23.4	34.7	23.2
21	31.8	23	30.9	23.6	30.2	23.7	30.9	23.4	33.4	22.7	28.4	19.6	31.8	21.6	33.4	21.3
22	32.2	22	31.6	23.7	31	23.5	31.7	22	34.8	23.6	28.5	19.6	32.1	22.4	35.1	22.5
23	30.1	23	30.3	22.9	29.1	24.5	32.2	23.1	32.9	23.1	27.6	17.7	31.8	22.2	32.9	22.8
24	30.3	23.4	31.5	23.9	29.1	23.7	31.2	22.5	33.7	23.2	26.9	17.9	31.2	22.8	33.1	22.4
25	30.6	23.1	32	23.5	29	23.5	31.7	22.9	34.3	23.5	27.3	18.5	32.2	22.1	32.9	22.3
26	30.3	22.9	30.8	23.6	28.9	23.9	31.7	22.5	34.5	23	27.6	19	31.5	21.8	32.3	22.5
27	30.1	22.6	30.1	23	28	23.2	32.2	22.7	33.8	23.2	27.4	18.7	32	22.8	33.1	21.7
28	29.3	22.6	30.2	22.6	29.3	23.6	31.2	23	32.8	23	27.3	18.1	32	22.3	34.4	22.5
29	30.8	22.7	30.8	23.5	28.2	22.7	30.9	23.5	32.5	23.4	27.3	18.7	31.4	22.8	33.6	22.2
30	31.6	23.1	29.7	23.6	28.1	23.5	29.8	22.3	32.6	23	26.3	19.6	31.2	22.4	33.3	22
Mean	31	22.9	31	23	28.9	23.1	30.9	22.6	32.2	22.7	27.1	18.9	31.6	22.4	32.9	22.5

Day.	Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	32.2	23	30.7	24.3	34.8	24.5	29.5	22.1	32.7	24.9	32.5	23.8	31.5	25.5	30	22.5
2	31.3	23.2	31.9	24.5	33.2	25.9	31.9	22.7	31.5	24.1	31.5	24.6	30.7	25.7	30.3	25
3	31.7	22.7	31.1	24.5	33.3	23.8	32.1	22.4	31.3	23.9	34	24.2	30.1	25.3	31	23
4	31.8	24.9	31.4	24.5	32.7	24.3	32.7	21.5	31.3	23.7	33	23.6	32.2	25.7	32.8	23.7
5	31.4	24.3	31.1	24	32.1	23.2	34.1	21.1	31.5	23.4	32.5	23.9	29.8	25.9	31.3	24.1
6	28.5	23.4	32.4	25.2	27.6	22.7	30.1	23.4	28.5	23.1	30	23	28.7	24	29.6	23.7
7	29.8	23.5	29.2	23.3	30.4	25	30.6	22.4	28.1	24.2	29.5	22.4	31	23.8	28.8	22
8	28.8	23.2	27.7	23	29.1	22.4	29.2	22.8	27.2	22.3	28	21.6	27.9	23.6	29.4	23.6
9	30	22.7	28.8	23.3	29.7	25	29.3	23.5	27.9	23.3	30	22.8	28.6	24.7	28.3	23.9
10	28.8	23.3	29.8	23	29.2	23.5	32.1	21.9	27.1	24.2	29.8	23	28.3	25.2	28.3	23.5
11	27.7	23.7	30	23.5	28.3	23.6	27.9	22.7	26.3	24	28.1	22.5	28.4	24.9	27.5	23.5
12	26.4	22.3	31.7	25	25.5	22.9	29.1	22.1	27.5	23.6	28.3	23	26.7	23.5	27.7	23
13	27.4	22.8	30.1	24.8	27.8	23.6	26.6	23.1	29.6	25	30.8	23.8	27	23.8	27.9	23.8
14	30.6	23.4	32.5	24	31.1	24.5	30.7	22.7	31.4	26.5	32	23	29.2	24.8	29	24.3
15	29.9	23.7	30.7	24.5	31.4	23.9	27.7	22.8	30.8	24.9	32.6	23.5	29.6	24.8	28.9	23
16	31.3	22.5	31.2	23.8	31.9	22.8	30.1	22.4	31.5	24.2	32.4	23.8	29.8	25.4	28.8	23.8
17	30.1	24.3	32.2	24	30.2	23.7	31.2	21.1	29.5	23.1	32.5	23.4	28.2	23.4	27.7	24.5
18	30.6	24.7	31.3	23.9	31.3	23	29.6	22.5	29.5	23.8	32	23	30.5	23.8	31.5	23.1
19	29.2	23.8	33	23.8	30.7	23.8	30.1	22.2	30.7	24.3	32	22.8	31.6	23.1	30.5	23.1
20	29.9	23.9	32.4	23.9	31.9	23.3	31.5	22.4	30.3	24.4	31	22.8	31.5	25	31.3	24.1
21	29.9	24	30.6	24	31.8	23.5	30.9	21.7	30.4	24.2	33.4	23.6	31.3	23.8	30.5	23.8
22	30.9	23.8	32.2	23.9	31.9	22.7	31.5	22.2	30.5	24.6	33.5	23.1	30.9	25.2	31	24.5
23	29.9	26.6	31.2	24.6	31.5	23.2	31.7	23.6	29.7	24.8	33.1	24.7	31.8	23.8	31	24.7
24	30.4	24.3	30.6	23.8	31.2	23	31.6	22.9	29.4	24	31.5	23.3	31.8	25.4	30.7	24.6
25	31	25.3	31.9	25	32.4	23.4	32.1	22.3	29.5	23.8	31	24.2	31.6	24.6	31.7	24.5
26	31	24.4	30.7	24	32	23.4	31.6	22.2	31.2	24.3	33	23	33	25.5	31.8	24.8
27	30.8	24.7	30.7	23.2	32.3	23	32.3	22.5	30.6	23.2	32	23.2	32.2	25.3	31	24
28	29.8	23.8	32.7	23.6	31.3	22.3	32.5	21.4	30.4	23.2	32.1	23	31.6	24.6	30.8	23.5
29	30.1	23.5	32.7	24.5	31.5	23.5	32.1	21.6	29.8	24	32.5	23.8	31.7	24.9	31.3	22.8
30	31	23.8	31.2	24	30.7	23.4	32.1	21.7	29.8	24	33.2	24	31.6	25.3	31.2	23.5
Mean	30.1	23.8	31.1	24	31	23.4	30.8	22.3	29.8	24	31.6	23.3	30.4	24.7	30.1	23.7

Maximum and minimum temperatures at the stations of the Weather Bureau, September, 1919—Cont.

Day.	San Jose de Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	28.8	22.2	27.5	23	33.2	25	31.1	27.1	34.2	23	33.1	23.7	34.4	22.6	32.6	24
2	30.4	22.5	29.7	23.3	33.7	24	32	27.2	34.7	23.7	33.7	24.1	32.2	22.7	32.3	23
3	31.2	22.1	30.6	23.3	33.8	22.8	32.3	23.6	34.7	23.2	32.6	23.6	32.1	23.4	32.5	23
4	31.7	21.9	31.2	23.5	34.2	22.9	33.6	23.5	35	24.3	32.5	24.3	32.2	23.4	32	22.7
5	31.8	23.2	31.8	26.7	34.2	23.5	33	25.7	32.7	24.1	32.5	24.2	31.6	23.2	31.5	22.2
6	31.4	22.6	31.4		31.2	23.9	29	22.7	30.4	24	31.6	23.5	30.5	23.2	29	23
7	29.4	23.5	30.7	23.2	30.7	23.3	28.9	22.6	27.2	22.9	29.7	23.3	29.5	23.6	27.3	22.6
8	30.2	22.5	29.5	23	28.8	23.4	29.9	25.3	27.2	24.2	28.6	24	28	23	28.2	23.2
9	27.5	22.4	27.2	24.1	27.6	23.8	28.7	25	27.8	23.3	29.7	23.3	28.3	23.4	27.2	22.8
10	29.7	22.7	29.2	23.5	28.2	23.4	27	24.6	26	23	28.5	22.7	28	23.3	27.4	24.2
11	28.8	22.2	28.8	24.2	26.4	23.4	26.9	23.2	25.7	23.2	26.5	23.2	27.4	23.3	26.9	24
12	29	22.2	27.8	24.2	29.6	21.6	29.1	24.4	29.5	22.5	29.2	23.1	29	24.2	28	23.4
13	29.6	22.6	28.7	26.2	31.2	22.4	30.1	25.9	33.1	22.9	30.2	23.6	32	23.9	31.1	23.5
14	29.3	23.5	29	25.8	31.4	25.7	30.6	26.6	33	23.3	31	23.8	33.5	22.8	31	24
15	30.2	23.4	28	24.9	32.5	24.4	31.2	26.7	31	23.3	30.9	23.6	33.8	23.8	31	23.8
16	29.2	23.1	29.4	23.3	33.4	23.7	31.9	24.3	33	23.1	31.6	23.3	31.6	23.2	30.8	23.5
17	29	22.9	29.4	23.9	31.8	23.2	30.6	23	28.1	23	27.5	23.8	31.6	23.2	28.1	23.8
18	31	22.2	29.4	23.2	32.8	22.7	32	23.1	31	23.5	30.5	23.2	31.5	22.9	30	21.8
19	31.2	20.9	31.1	23.5	32.6	21.9	32.5	24	32.2	23.5	31.4	23.5	31	23.2	30.3	21.9
20	31.2	22.6	31	25.5	32.2	22.3	32	24.3	33.1	23.3	32.1	24.6	31	22.1	31.8	21.6
21	31.3	23.1	31.2	24.2	33.8	22.7	31.3	23.6	33	23.3	31.7	23.1	31.1	22.7	32	23
22	31.7	23.1	31.4	25.3	33.8	22.9	32.1	23.8	33.9	24	31.4	24.3	31.5	23.5	31.2	22.2
23	32.2	22.6	31	26.4	34.1	22.4	33	26	36.2	23.8	32	25.3	31.5	25.8	31.5	21
24	31.8	21.8	30.4	25.3	33.9	22.2	31	24.7	32.6	23.9	31.4	24.1	31.4	23.9	30	20.5
25	32.7	23.5	30.3	26.4	32.9	22.6	31.8	24.8	32.4	24.1	32	25.8	31.6	24.3	32	22.5
26	32.6	22.9	32.4	26.6	33.9	22.4	32.7	23.6	35	24	32.5	25.5	32.1	24	31.8	21.7
27	32.2	21.8	30.9	26.6	38.4	22.4	31.9	24.1	34.2	23.5	31.9	24.3	31.1	23.8	30.3	21.9
28	31.8	22.5	31.2	26.3	33.2	21.5	32.5	23.3	33.4	23.5	31.8	24.3	31.1	23.1	31	21.3
29	31.3	22.1	30.9	26.5	33	21.8	32.2	24	33.2	23.6	32.2	24.5	31.5	22.6	30.2	22
30	32.2	21.9	31.4	23.8	33.1	22.8	32.5	23	35	23.5	31.6	24.1	31.3	22.7	31.3	21.9
Mean	30.7	22.6	30.1	24.7	32.2	23	31.1	24.5	32	23.5	31.1	23.9	31.1	23.4	30.4	22.7

Day.	Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.5	26.8	31.6	24.8	30.5	23.8	33	22.8	32	22.5	31.8	24.4	29.8	23.8	29.6	22
2	31.2	23.7	32.6	24.6	31.6	25.1	32.4	22.6	32.1	22.9	33.1	23.9	31	23.4	32	22.5
3	32	22.8	32.4	24.2	32.6	22.3	32	24.2	32.6	20	33.4	22.9	32	23.8	32.5	22
4	32.5	23.3	31.6	24.6	32.6	22.7	32.4	24.3	33.1	20.8	32.8	23	31.6	24	33	21.5
5	32.4	23	31.8	25.5	32.9	23.9	31.7	25	33.6	23.5	32.8	24.5	29.6	23.8	34.5	23.3
6	30	23.2	31.8	25.5	31.9	23.9	31.8	25.1	32.5	22	33.1	24.1	30	23.6	33.5	25
7	27	22.8	29	24.6	30.5	24.2	26.8	24.5	28.9	21.5	29.9	22.5	30.2	24.6	32	24
8	27.6	22.3	30.6	25	32.3	23.5	26.8	22.4	30.5	20	31.8	22.6	31	24	35	23
9	27.5	23.2	30.6	23.6	28.6	22.4	26.8	23.2	29.9	23	31.8	23	30.6	24.4	30.1	23.5
10	26.9	22.8	27.4	24.2	29	22.2	26.6	23.2	29.9	21.5	31.8	22.8	30.8	24.4	33	22.2
11	27	22.8	27.6	23.4	28	22.2	25	22	26.6		26.8	22.7	30	24.4	28.5	23.2
12	26.6	22.9	27.6	24.2	28	22.4	24.7	21.5	25.8	21	25.7	23.6	29.6	22.2	29.5	22.4
13	28.5	24	29.6	25.2	31.9	23.4	29	22.1	28.5	22	30.2	24.3	30	23.6	31.5	22.5
14	29.6	24	30.8	24.5	30.4	23.9	30.3	22.9	29.9	22.5	31.6	24	31.2	23.4	31.5	22.5
15	29.5	24.1	30.6	24.4	30.4	23.9	30.8	22.5	30.5	23	31.8	23.6	31.8	24	31	22
16	30	23.2	30.4	23.8	31.6	23.9	30.7	23.2	31	23	31.1	24.1	32	24	33	23.5
17	26.5	22.9	28.2	23.8	29.1	24	29.7	22.8	28.5	23.7	27.7	23.7	30.4	24	28.5	22.5
18	30.5	20.5	30	24.6	30	22.9	30	23.4	30.8	23	30.4	23.3	28.6	23.4	32.5	22
19	30.2	22	31.4	25.2	32	23.5	30.1	23.6	32.3	21	31.8	24.9		24.6	32.6	23
20	31	22.1	31.4	24.6	32.4	23.4	30.2	23.4	30.2	21.8	30.4	24.6	31	25.2	31.8	24.5
21	30.9	23.1	31.5	25.4	30.3	23.7	29.8	24.4	30.9	22	31.5	23.9	31.4	24.2	31.2	24.5
22	32.1	23	31.6	25.4	31.5	25.1	29.8	24.1	30.9	23	31.8	25.5	29.4	24.4	33	24
23	32.4	21.8	31	24.5	31.4	25.3	30	23.4	31.1	21	31.7	25.4	30.6	26		
24	31.1	21.7	31.6	24	31.8	24.2	30.6	23.8	31.4	21.8	32.6	25.6	31.2	25.2		
25	31	23.2	32.4	26	31.9	24.3	30.7	24	31.7	24.6	32.3	26.1	31.2	25.2		
26	33	22.6	32	25.6	31.9	25.9	31	24.8	31.5		33.4	26.3	31.2	24.6		
27	31.5	22.4	31	25	32.4	23.7	29.8	22.8	31.3	21.5	32.8	25.7	31.4	24.2		
28	31	21.7	31.6	25.2	31.8	23	30.1	23.2	31.1	22.4	31.4	24.1	31.4	24.6		
29	31.1	22.2	32.6	25.5	32	23.2	30.7	23.9	32	22.5	32.7	25.4	28.8	24.8	32.5	22.5
30	31.9	21.7	31.6	25.2	32.4	23.6	30.8	24	32	22.5	33	23.5	28.6	22.6	32.5	
Mean	30.1	22.9	30.8	24.7	31.1	23.6	29.8	23.4	30.6	22.1	31.2	24.1	30.6	24.1	31.9	23

Maximum and minimum temperatures at the stations of the Weather Bureau, September, 1919—Ctd.

Day.	Virac.		Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.4	23.3	32	24.2	31.3	22.9	29.5	23.5	28.2	23.4	29.2	24.6	27.8	24.5	30	22.2
2	34.8	23	33.1	23.5	32.2	22.4	32.3	22.8	29.5	22.5	31.6	23.5	31.3	24.2	31.5	21.9
3	31.8	22	33.4	22.7	31.7	20.5	31.7	22.3	29.6	22	31.8	22.7	31.2	22.8	30.6	21.2
4	31.1	22.2	34.4	21.6	32.8	19.4	32.2	21.7	30.7	21.1	31.8	22.2	34.5	23	33	20.8
5	31.8	22.7	32.5	24.8	33.6	23.2	32.6	23.1	31.5	22.2	31.4	24.2	33.9	22.9	32.4	21
6	31.6	22.8	33	23.4	33.4	20.5	31.8	22.4	31.5	23.1	31.3	23.6	33.6	23	32.9	21.6
7	29.7	21.5	31	22.8	30.6	20.3	30.9	23.2	30	22.6	30.1	23.4	28.9	23.4	30.5	21.8
8	30.9	21.6	32.4	22.6	32.2	19.9	31.6	22.7	30.2	21.8	31.1	23	30.5	22.6	31.7	21.4
9	31.4	22.5	31.4	23	31.6	21.9	29	24.3	28.6	23.5	29.6	23.7	27	24	30.3	21.5
10	30.2	22.7	29.3	23.1	28.3	21.9	30.8	21.9	29.5	21.9	31.1	22.5	31	22.5	31	21.4
11	26.5	22.1	26.1	22.1	28	21.2	27.8	23.5	25.7	22.9	25.6	22.9	27.2	24.2	27.8	21.3
12	25.8	22.8	25.9	23.2	25.1	22.2	28	23.5	28	23	28.2	23	28.6	23.9	28.8	21.4
13	29.5	23	29.6	24.2	28.2	23.2	30.1	23.4	29.5	23.1	30.1	23.8	28.1	25	31	21.8
14	32.7	22.7	32.4	24.1	30.7	21.2	31.4	22.5	30	21	32.6	21.9	29.7	23.6	31.2	21.2
15	32.8	22.7	32.5	24.1	30.7	21.2	31.4	22.5	30	21	32.6	21.9	29.7	23.6	31.2	21.2
16	30.2	22.9	29.3	23.8	30.8	22.6	32.3	23.3	29.5	21.9	29.7	22.8	29.5	23.7	31.4	21.9
17	29	22	28.6	23.7	28.6	21.9	29.4	23.1	29.5	23.8	28.7	23.5	29.8	24	29.6	21.6
18	29.8	22.5	31	21.3	31.2	20.3	32.1	22.2	29.8	22.4	27.9	24.3	30	22.7	29.4	21.8
19	30.9	21.6	31.9	21.8	31.1	21	32.3	23.7	29.8	23.9	28.8	24.8	31.5	24.3	30.5	22.7
20	29	22.2	32	21.7	30.3	19.9	32.3	22.8	28.8	23.8	27.6	23.7	30.3	23.5	30.4	22
21	30.4	21.7	32.7	23.3	31.9	21.8	32.5	23.3	29.6	22.6	29.6	22.8	31	23.6	29.8	22.4
22	31.9	21.5	31.5	22.4	31.5	20.9	32.8	23.2	29.7	24.1	29.3	25.9	32.1	24	30.9	22.9
23	31	20.8	33	20.1	31.4	21.2	33.4	23	30.3	24	30.1	26	32.2	24.8	31	22.5
24	31.3	20.7	32.8	20.3	31.9	18.8	32	21.2	30	22.9	29.7	25.9	32.7	22.5	31.4	21.8
25	31.7	22.1	33.6	21.7	32.8	21.9	33.2	22	30.5	23.5	29.9	25.6	32.8	23.8	31.7	21
26	31.5	22.3	34.2	22.7	32.5	21.4	33.3	23.3	30.5	24.6	30.9	25.9	33	25.8	31.6	21.2
27	31.3	21.7	33.1	21.6	31.7	19.9	33.5	22.7	30.5	23.9	29.8	25.8	33.9	23.8	31.7	22.2
28	31	22.4	33.4	21.9	31.6	21.3	31.3	21.6	30.6	22.7	30.5	23.6	32	23.3	31.9	21.2
29	30.7	21.2	33.6	21.7	33.2	19.4	32.4	22.4	31	23.5	30.9	22.8	33.3	23	32.9	21.3
30	31.5	21	33.2	20.7	33.8	19.8	33.2	22.2	30.7	22.1	30.3	23.6	32.8	22.4	32.8	20.6
Mean	30.8	22.2	31.9	22.6	31.2	21.2	31.6	22.8	29.7	22.9	30	23.9	31	23.6	31	21.6

Day.	Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.9	24.8	31.7	23.5	28.3	24.2	26.7	22	29.2	24.2	28.9	23.5	30.2	22	33.4	23.9
2	32.2	24.4	31.7	22.7	30.6	23.1	30.2	21.7	27.2	23.8	30.1	24	30	22.8	33.9	23.3
3	31.2	23.5	32.3	22	30.9	23.2	30.7	21.2	30	23.2	31.4	23	32.4	22.5	33.5	22.2
4	32.4	22.7	33.1	22.3	32.2	22.8	31.7	21.5	30	23	32.4	24	34.6	22.1	32.7	22.7
5	32.1	24	32.9	22.2	31.9	23.2	31.7	21	30.6	22.2	32.4	23.9	34.6	21.6	32.3	21.8
6	31.2	24.2	32.9	23.1	31.8	23.4	32.2	21.5	31.8	22.2	33	24.4	34	21.6	32.3	23.4
7	31.7	23.7	30.6	23	30.6	24	29.7	21.8	29.8	22.6	32.5	23.1	34.8	22.5	33.6	23.6
8	31.2	23.2	32.1	22.6	30.7	22.7	31.6	20.8	30.5	22.5	32.2	22.6	33.6	21.6	33.8	22.1
9	29.2	23.7	29.7	23.3	29.9	23.3	29.1	21.8	30.2	23.5	31.8	23.9	34.2	22.5	31.9	22.9
10	30.3	23.5	31.8	22.2	31	22.8	30.7	21.5	30.2	23.4	32.6	23.4	34.5	21.8	32.3	23.2
11	28.3	24	28.5	23.3	28.8	24	28.5	22.5	30.2	23.2	30.4	23.5	32.2	21.8	32.1	22.6
12	28	24.3	29	22	29.2	23.3	28.2	22	30	24.4	29.2	23.4	30.8	22.3	32.9	21.4
13	30.2	23.9	30.6	23.6	29.8	23.8	28.9	22.3	30.2	23.8	30.9	23.3	30.5	22	31.9	23.1
14	31.8	22.7	32	22	30.6	23.8	30.5	22.5	30	23.6	31.5	24.4	32	22.5	32	23.1
15	29.8	23.3	32.4	22.8	31.7	24.1	32.2	21.9	30.2	23.8	32.2	24.1	32.4	22.2	27.8	22.5
16	30.4	23.8	29.2	23.6	28.4	24	27.7	22.5	30	23.6	31.1	24	31.6	23	30	22.4
17	28.4	23.2	30.6	22.5	31.7	23.8	30.3	21.8	31	23.5	30.8	22.9	31.2	21.8	29.5	22.6
18	30.8	23.3	29.8	20.9	30.9	23.4	30.2	22	31.2	23.5	29.1	23.6	31.5	21.6	30.4	22.9
19	30.5	23.8	30.8	23.7	31.6	23.2	32.2	21.6	31.2	23.5	31.9	22.6	34	22	31	21.9
20	30.1	23.7	30.3	23.6	31.4	22.6	31.2	21	32	23	31.8	22.8	34	21.8	31.3	22.9
21	30.5	23.3	30.2	23.5	32.9	24.7	33	22.5	32	24.8	32	24.1	33.8	22.4	31	22.1
22	31.3	24.6	31	24	31.7	23.8	32.2	21.7	31.5	23.8	32.4	23.1	33	22	30.8	22.4
23	31.6	23.6	31.4	23.7	31.8	23.3	33.1	22.5	31.9	24	32.1	23	33.5	20.6	31.1	21.1
24	31.4	22.4	31.6	21.8	32.8	20.8	32.2	19	31.6	23.6	32.9	23.1	33.6	21.4	31.3	21.1
25	32	25	32	22.6	32.1	21.6	33.5	20.5	32	22.2	32.9	21.7	34.5	20.2	31.5	21
26	31.8	24.8	31.9	24.1	32.7	22.7	33.7	21.2	32	23	33.2	23.1	34.8	20.2	31.3	23.8
27	30.3	24.8	31.9	22.5	31.2	22.6	30.5	21.1	30.6	24.2	32	23.2	33.5	21.2	31.5	22.5
28	31.1	23.8	31.2	22.2	31.1	21.3	31	20	30.8	23.2	32.9	21.4	34.5	21.2	31.4	20.7
29	31.2	23.5	32.5	22.9	32.5	22.5	31.9	20.7	31.6	23	34	23	35	20.8	31.4	21.1
30	31.3	23.2	32.1	21.9	32.2	22.8	32.5	20.3	31.3	24	33.9	23.4	34.6	22	31.4	22.5
Mean	30.8	23.8	31.3	22.8	31.1	23.2	30.9	21.5	30.7	23.4	31.8	23.3	33.1	21.8	31.7	22.4

Maximum and minimum temperatures at the stations of the Weather Bureau, September, 1919—Ctd.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, La Union.		Echague.		Candon.		Vigan.		Tuguegarao.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.	32.3	23.9	31.8	23.7	19.7	15	32.6	23.3	34.4	20	31.6	24.7	30.9	24	34	21.4
2.	31	24.3	29.5	23.8	19.2	15.3	31.9	24	37.4	22.9	31.7	25.2	29.3	24.3	35.2	22.3
3.	32	24	32.9	24	22.2	15.8	32.5	24	34.9	22.2	32.2	24.5	31.6	23.5	34.7	23
4.	32.1	25.3	31	24.2	23.3	16.2	31.5	24.3	35	22.6	31	25.9	32.7	23.9	34.6	22.9
5.	31.4	24.8	30.6	25	22.8	15.8	32.1	23.7	33.5	21.6	31.6	24.4	31.3	23.1	34.8	22
6.	31.9	24.8	31.2	25	22.5	15.3	32.2	23.4	34.1	23.4	32.5	24.8	31.3	23.4	34.7	23
7.	32	23.8	31	24.4	21.3	15.6	32	23.5	33.1	24	31	24.8	31.5	23.5	33.7	24.4
8.	31.4	23.4	30.8	23.8	23	15.1	31.9	22.5	34.3	22.9	31.5	24.6	31.2	23.4	34.8	24.7
9.	33	25	31.7	24.5	22.6	15.4	32.5	24.4	35.4	24.2	31	25.6	32.9	25	36.4	23.2
10.	32.5	23.7	31	24	22.9	16	32.5	23.5	33.9	22.6	31.5	25	32.9	24.3	35.4	23.9
11.	32.5	25	31.6	24.5	22.9	15.9	32.4	24.5	32.6	23.6	32.5	25.5	33.1	24	31.8	23
12.	32.2	24.3	31.2	25	22.3	14.8	32.4	23.8	32	22	31.9	24.2	32.5	20.2	31	22.2
13.	31.2	24	31.5	24.6	21.3	15.1	32.4	23.3	31.5	22.2	32	25.2	32.3	23.5	32.4	23.2
14.	34	24.4	32.1	24.5	23.5	15.4	32.5	24.3	32.7	23.1	32	25.6	32.9	25.4	32.5	22.4
15.	33.6	24.1	32.5	24.8	21.8	16.3	32.5	24	28.9	22	32	25	32	24.9	29.5	23.3
16.	33.6	24.3	32.8	24.2	22.6	16.3	32.3	23.5	32.5	21	31.6	25.5	33.2	24.1	32.8	20.7
17.	32.6	23.4	32.4	23.3	23.1	15.5	32	24	31	22.6	30.5	25.5	31.3	23.5	29.5	23.4
18.	33.6	23.6	32.8	24.5	22.7	15.7	32.5	24.2	30.1	22.2	31	25.1	33.8	23.4	30.4	22.6
19.	33.2	24.1	32	24	22.5	15.1	31.6	23.5	30.9	21.5	32	24.2	31.6	23.4	30.8	21.4
20.	34.4	23.5	33	23.8	22.3	15.4	32	24.8	31.5	22.4	32	26	32.7	24	30	22.6
21.	33.1	23.7	32.5	24.2	22.8	15.5	32.5	23.8	31.6	21.2	31.5	25.1	33.4	24.4	31.2	22
22.	33	23.3	32.6	24	23.4	15.7	33	23.7	30.2	20.6	31.8	24.6	32.5	23.5	31.3	22.5
23.	33.9	23.9	33.1	24.7	23.4	15.2	31.8	24.5	32.6	22.3	32	25.6	32.9	24.4	34.6	22.3
24.	34.2	23.8	32.8	24	23.5	15.1	32.5	23.2	32.8	21.9	31.5	25	32.8	23.5	34	20.5
25.	33.3	23.4	33	22.4	24.5	14.7	32.5	23.2	32.2	20.2	31.9	24.5	33.1	23.4	33.2	21.3
26.	34.5	24	33.2	23.9	24.3	15.6	32.9	24.2	32.6	23	32.5	25.6	33.5	25.1	35.8	23.1
27.	34.5	23.8	33.5	24.5	22.5	16.1	33.5	23.5	33.4	22	32.4	26.2	33.5	24.9	35.7	22.6
28.	33	24	31.5	24.4	22.7	15.2	32	24	34.2	20.4	32.6	26.2	33	24.8	35.2	22.1
29.	33.7	23.9	32.2	23.8	23.5	15.9	32.3	24.6	34.5	21.5	32	25.5	33.8	25	36.4	22
30.	34.7	24.5	32.5	25	24	16	32.6	24.3	34.4	23	32.1	25.2	33	23.9	36.5	23.6
Mean	32.9	24.1	32	24.2	22.6	15.5	32.3	23.8	32.9	22.2	31.7	25.2	32.4	23.9	33.4	22.6

Day.	Laoag.		Aparri.		Cape Bojeador.		Basco.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.			33.5	22.7	30.7	24.6	28.2	25.4
2.			34.7	22	29.7	24.5	29.5	26.4
3.			34.4	22.1	30	24.1	29.9	22.1
4.			32.2	23.4	31	24.6	30	25.7
5.			33.1	22.1	31.6	24.4	30.1	25.9
6.			33.3	23.7	31.3	24.6	29.9	26.2
7.			33.1	24	31.5	24.6	32.5	24.5
8.			33	23.5	30.6	23.7	31.1	25.2
9.			33.6	22.5	31.9	24.5	32.1	25
10.			33	23.8	31.5	23.9	31.1	24.1
11.			31.5	23.5	30.9	23.5	31.1	24.5
12.			31.1	22.6	31.3	24	31.1	24.2
13.			32	22.2	30.7	22.7	30	24.6
14.			30.2	22	31.2	23.5	30.1	23
15.			30.7	22.4	30.4	23.9	29.5	21
16.			32.1	21.6	30.3	22.6	28.6	21.8
17.			30.3	22.2	31.4	23.3	29	22.5
18.	33.5	23	30.5	22.9	30.3	24	29.9	23.7
19.	33.5	21.5	28.7	22.2	29.5	23.5	29.1	22.6
20.	32.6	22.5	30.8	22.3	30.2	23.8	30.1	20.2
21.	33	22.3	29.7	22.1	32.3	23.1	26.7	20.3
22.	33	22.4	30.7	21.8	31.6	23.7	29.2	20
23.	33.2	21.9	33.3	22.3	33.2	23	30.7	22
24.	33.2	20.7	31.8	21	31.8	22.9	31.7	24
25.	33	21.7	32.2	21.6	33.3	24.1	31.9	24.8
26.	33.2	22.6	33	23	33.1	24.4	32	24.3
27.	33.2	23.3	33.3	22.5	32.3	24.4	32	23.8
28.	33	23.7	32.8	21.9	32.4	24.9	32.3	24
29.	32.4	24	33.8	23.1	31.8	25.2	32.6	24.8
30.	32.2	22.5	33.5	22.5	32.8	23.6	32.2	24.2
Mean	33	22.5	32.2	22.5	31.3	23.9	30.5	23.7

SEISMOLOGICAL BULLETIN FOR SEPTEMBER, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,

Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

7, 23^h 21^m [8, 7^h 21^m]. Surigao (NE Mindanao). Oscillatory earthquake, direction WSW-ENE, intensity III-IV, duration 8 seconds. Apparently it originated in the Butuan Bay: it was recorded and very lightly felt also in that town.

10, 4^h 39^m 51^{s*} [10, 12^h 39^m 51^s]. Paracale (SE Luzon). Oscillatory earthquake of intensity III. Its origin lay in the Pacific off the northern coast of Camarines.

12, 5^h 55^m [12, 13^h 55^m]. Cape Bojeador (NW Luzon). Earthquake of intensity III, very short duration.

14, 11^h 22^m [14, 19^h 22^m]. Cape Bojeador (NW Luzon). Oscillatory earthquake shock of intensity II-III.

16, 3^h 25^m [16, 11^h 25^m]. San Jose de Buenavista (SW Panay). Earthquake of intensity II-III.

19, 9^h 46^m 26^{s*} [19, 17^h 46^m 26^s]. W Luzon. Extensive earthquake felt along the western coast of Luzon from Ilocos Norte to Zambales, an extension of more than 400 kilometers: it had only intensity III-IV. The origin lay in the China Sea off the coast. From the Zambales province was reported an aftershock at 10^h 5^m [18^h 5^m].

21, 4^h 3^m 34^{s*} [21, 12^h 3^m 34^s]. Davao (SE Mindanao). Earthquake of intensity IV, felt chiefly in the northern part of Davao Gulf. Recorded also at Butuan.

22, 23^h 50^m [23, 7^h 50^m]. Veruela (E Mindanao). Earthquake of intensity III, felt in the southern part of the Agusan Valley. Recorded at Butuan.

23, 13^h 46^m 39^{s*} [23, 21^h 46^m 39^s]. W Luzon. Earthquake of intensity III-IV, with many aftershocks during the following hours. It was felt along the Zambales province, the origin being off the coast in the China Sea.

26, 9^h 7^m 34^{s*} [26, 17^h 7^m 34^s]. NW Luzon. Extensive and heavy earthquake, which had its epicenter in Ilocos Sur, shaking the same region affected by the earthquake of June 25th.² It reached intensity VII, causing some damage to the masonry buildings of the Capital, Vigan, and other towns of that province. The main cracks produced in walls and the displacements of some blocks of masonry indicate that the stronger movements had an W-E direction. Numerous aftershocks occurred during the following night. The earthquake was perceptible through the main part of Luzon Island north of the 13° N parallel. It was recorded at Taihoku, Formosa, and in other stations of the Far East and America.

On the afternoon of the 28th, between 14^h and 22^h I. T. a series of seven light shocks occurred in the epicentral region. About the probable origin and cause of the Ilocos shocks may be seen the Bulletin for June quoted above.

26, 19^h 42^m 0^{s*} [27, 3^h 42^m 0^s]. Central Mindanao. At this hour there began a series of earthquake shocks in the central and western Mindanao. Their origin was probably in the Celebes Sea south of Illana Bay. In the Lanao province, the most affected, not less of seventeen shocks of intensity V-VI were felt; the strongest noticeable through the whole island occurred at 3^h 42^m, 3^h 51^m, 5^h 41^m, 6^h 51^m and 8^h 55^m I. T. They were recorded at Taihoku, Formosa. The seismograph at Butuan recorded 18 disturbances during the same day.

30, 19^h 17^m [Oct. 1, 3^h 17^m]. Cape Bojeador (NW Luzon). Earthquake of intensity III, duration 2 seconds.

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismographs at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

² See "Bulletin for June, 1919."

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.25$, $\epsilon=2.906$, $\frac{r}{T_0^2}=0.053$;
 A_E : $T_0=6.18$, $\epsilon=2.393$, $\frac{r}{T_0^2}=0.042$. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
312	5	Iv	eP F	<i>h. m. s.</i> 3 08 12				
313	5	Iv	eP F	3 40 13 44				
314	5	IIr	eP S L M _N M _E F	16 55 08 57 24 58 04 58 32 58 33 18 08	7 7	418 172		
315	6	I	e F	14 53 40 15 36				
316	7	I	e F	18 25 13 48				
317	8	Iv	eP F	1 47 24 50				
318	8	Ir	e L M _E M _N F	4 13 36 20 40 22 32 23 00 52	12 11	7 272		
319	8	I	e F	14 06 40 34				
320	10	Iv	eP F	4 39 51 46				Felt at Paracale (SE Luzon).
321	11	I	e F	13 58 14 22				
322	12	I	e F	6 17 40 7 04				
323	12	I	e F	14 00 04 35				
324	13	I	e F	12 51 13 14				
325	13	I	eP F	13 19 12 29				
326	16	Iv	eP F	21 17 08 20				
327	17	Iv	eP F	9 51 10 54				
328	19	III _d	eP	9 46 26				Felt in western Luzon. Maxima and end lost by the force of the shock.
329	20	Iv	eP L M _N M _E F	15 36 05 36 19 36 21 36 21 47	2 2	131 56		
330	21	Iv	(PS) L M _E M _N F	4 03 34 05 31 05 33 05 40 43	4 4	33 75		Felt at Davao (SE Mindanao).
331	21	Iv	eP L M _E M _N F	22 46 44 47 04 47 15 47 28 23 00	2 2	217 218		
332	22	Iv	eP F	1 35 40 42				
333	22	Iv	eP F	5 43 36 55				
334	22	Iv	e F	6 03 22 21				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A _N μ	A _E μ	
335	22	Iv	eP F	h. m. s. 12 17 20						
336	22	Iv	eP F	22 19 18 31						
337	22	Iv	eP F	23 15 30 18						
338	23	Iv	eP F	8 35 34 45						
339	23	IIv	eP L M _N M _E F	10 46 24 46 42 46 48 46 52 55		3 3	200	165		
340	23	IIv	eP L M _E M _N F	10 58 35 58 53 59 04 59 08 11 09		3 3	242	153		
341	23	IIIv	eP L M _E M _N F	13 46 39 46 57 47 06 47 08 54		2 2	704	623	Western Luzon.	
342	23	IIv	eP F	14 19 16 24					Western Luzon.	
343	23	IIv	eP F	20 03 37 08						
344	23	Iv	eP F	20 27 31 30						
345	24	Iv	eP F	19 25 37 29						
346	26	I	e F	6 29 38 56						
347	26	IIIa	eP	9 07 34					Northwestern Luzon. Maxima and end lost by the force of the shock.	
348	26	Iv	eP F	10 15 24 19						
349	26	Iv	eP F	11 51 09 54						
350	26	Ir	eP F	19 42 00 20 48					Felt in the Central and Western Mindanao.	
351	26	Ir	eP F	21 41 36 22 32					Felt in the Central and Western Mindanao.	
352	26 27	Ir	eP F	22 51 12 0 21					Felt in the Central and Western Mindanao.	
353	27	Ir	eP F	0 54 44 1 18					Felt in the Central and Western Mindanao.	
354	27	Ir	eP F	6 44 52 7 32						
355	27	I	e F	11 02 20 24						
356	28	Iv	eP F	11 51 34 57						
357	29	I	e F	13 26 39						
358	29	I	e F	13 43 53 14 48						
359	30	I	e F	1 06 33 28						

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

7, 23^h 21^m [8, 7^h 21^m]. Surigao (NE de Mindanao). Temblor oscilatorio, dirección WSW-ENE, intensidad III-IV, duración 8 segundos. Al parecer se originó en la bahía de Butúan y fué registrado y muy débilmente sentido en esta estación y su comarca.

10, 4^h 39^m 51^{s*} [10, 12^h 39^m 51^s]. Paracale (SE de Luzón). Temblor oscilatorio de intensidad III: originado en el mar Pacífico al N de la costa de Camarines.

12, 5^h 55^m [12, 13^h 55^m]. Cabo Bojeador (NW de Luzón). Temblor de tierra de intensidad III, duración muy corta.

14, 11^h 22^m [14, 19^h 22^m]. Cabo Bojeador (NW de Luzón). Temblor oscilatorio de intensidad II-III.

16, 3^h 25^m [16, 11^h 25^m]. San José de Buenavista (SW de Panay). Temblor de tierra de intensidad II-III.

19, 9^h 46^m 26^{s*} [19, 17^h 46^m 26^s]. W de Luzón. Extenso temblor de tierra sentido a lo largo de la costa occidental de Luzón desde Ilocos hasta Zambales, en una extensión de N a S de más de 400 kilómetros: no pasó de intensidad III-IV. El origen se hallaba algo distante en el Mar de China. En Zambales se experimentó una repetición a 10^h 5^m [18^h 5^m].

21, 4^h 3^m 34^{s*} [21, 12^h 3^m 34^s]. Davao (SE de Mindanao). Temblor de tierra de intensidad IV sentido principalmente en la parte N del Golfo de Davao. Registrado también en Butúan.

22, 23^h 50^m [23, 7^h 50^m]. Vuela (E de Mindanao). Temblor de tierra de intensidad III, en la parte sur del Valle del Agusan. Registrado en Butúan.

23, 13^h 46^m 39^{s*} [23, 21^h 46^m 39^s]. W de Luzón. Temblor de tierra de intensidad III-IV seguido de varias repeticiones durante las dos horas siguientes. Sintióse a lo largo de las costas de Zambales: el origen se hallaba algo lejos en el Mar de China.

26, 9^h 7^m 34^{s*} [26, 17^h 7^m 34^s]. NW de Luzón. Extenso y fuerte terremoto el cual tuvo su epicentro en la Provincia de Ilocos Sur en la misma región que el terremoto del 25 de Junio último.² Tuvo intensidad VII, causando pequeños desperfectos en los edificios de mampostería de la capital, Vigan, y otros pueblos de la provincia. A juzgar por las grietas de las paredes y los desplazamientos de algunas masas de mampostería, los movimientos principales tenían una dirección de W a E. Siguiéronse numerosas repeticiones de poca intensidad durante la noche siguiente. Este terremoto fué perceptible en toda la parte central de la isla de Luzón o sea desde el paralelo 13° hacia el N. Registróse en Formosa y seguramente en otras estaciones del Extremo Oriente y América.

En la tarde del 28, de 14^h a 22^h T. I., se experimentó en la región epicentral de este terremoto una serie de siete choques de poca intensidad. Sobre el origen probable de estos temblores véase el Boletín de junio.

26, 19^h 42^m 0^{s*} [27, 3^h 42^m 0^s]. Centro de Mindanao. A esta hora comenzó una serie de temblores de tierra sentidos en la parte central y oeste de Mindanao. Su origen probablemente se hallaba en el Mar de Célebes al S de la bahía Illana. En la Provincia de Lánao se contaron hasta 17 diferentes temblores; los más fuertes, de intensidad V-VI, sentidos en toda la Isla de Mindanao tuvieron lugar a 3^h 42^m, 3^h 51^m, 5^h 41^m, 6^h 51^m y 8^h 55^m T. I. Registróronse también en el Observatorio de Taihoku, Formosa. El sismógrafo de Butúan registró 18 choques durante el mismo tiempo.

30, 19^h 17^m [Oct. 1, 3^h 17^m]. Cabo Bojeador (NW de Luzón). Temblor de tierra de intensidad III, duración 2 segundos.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² Véase "Bulletin for June, 1919."

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MAR 29 1921

THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR OCTOBER, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1920

BULLETIN FOR OCTOBER, 1919.

METEOROLOGICAL BULLETIN FOR OCTOBER, 1919.

By Rev. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure of this month is, with a few exceptions, slightly above the normal of October. The lowest pressures were generally observed on the 10th in northern Luzon, and on the 14th in the rest of the Archipelago. The highest pressures were recorded in the majority of our stations on the 27th.

The mean monthly temperature differs very little from the normal of this month. The absolute maximum and minimum temperatures for Manila were 32.5° C. on the 16th, and 21.6° C. on the 1st and 24th. The extreme temperatures for Baguio were 24.3° C., 15.1° C. on the top of Mirador, and 25.7° C., 14.3° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR OCTOBER, 1919.

Station.	Pressure.						Temperature.							
	Mean.	Departure from October, 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from October, 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
Zamboanga	758.72	-0.44		759.76	27	757.30	14	25.8	-0.6		32.6		21.4	8
Yap, W. Carolines	57.51			59.66	23	54.50	18	26.7			32.3	22	22.7	11
Tagbilaran	58.18	-.24	+0.08	59.54	27	54.80	14	26.8	-.1	-0.1	33.1	19	21.9	31
Surigao	58.16	-.20	+0.03	59.61	27	54.42	14	26.6	-.6	-.4	31.9	9	22.6	80,31
Cebu	58.29	-.18	-.01	59.79	26	54.30	14	27.3	-.7	+.2	32.2	22	22.8	7
Iloilo	58.30	-.11	+.11	59.88	12	54.43	14	26.7	0		32.2	1	21.5	1
Tacloban	58.57	+.36	+.21	60.14	27	54.97	14	26.9	-.3	0	32.2	26	22.5	1,21,27
Capiz	58.25	+.08	-.18	59.98	12	55.26	14	26.8	-.1	0	34.6	17,18	22.4	26
Calbayog	58.40	+.23	-.04	59.95	26	55.37	14	25.5	-1.2	-.7	32.9	3	21	22
Legaspi	58.51	+.46	+.24	60.31	27	56.57	14	27	-.1	0	33.3	6	21.8	1
Atimonan	58.68	+.69	+.22	60.44	27	56.43	9	27	0	0	32.2	4,19	22.5	26
Ambulong, Tanauan	58.01	+.48		59.79	27	55.35	15	26.7	+.6		34	6	21.8	2
Paracale	58.65	+.75		60.38	27	56.60	9	26.6	-.4		32.1	17	22.8	26
Manila	58.65	+.67	+.05	60.61	27	56.18	15	26.2	-.2	-.4	32.5	16	21.6	1,24
San Isidro	58.78	+.42	+.29	60.61	27	56.50	9	26.4	+.2	0	34.4	2	21.5	22
Dagupan	57.69	+.57	-.30	59.55	27	55.18	10	27.7	+.8	+.4	35	29	22.8	21
Baguio*	636.61	+.86	+.32	638.27	13	634.53	10	18.4	+.1	+.4	24.3	30,31	15.1	21,22
Vigan	757.97	+.82	-.17	760.03	13	755.37	10	27.9	+.1.2	+.6	35	15	22.1	24
Tuguegarao	58.96	+.1.36	+.31	60.86	21	56.99	10	26.3	+.6	+.2	35.4	1	21.4	9
Laog	58.17	+.1.01		60.18	27	55.45	10	27.2	+.1.1		35	30	20.7	21
Aparri	59.48	+.1.51	+.46	61.52	24	57.42	10	26.4	+.2	+.1	33.7	1,5	21.3	27

* The barometric readings of this station are not reduced to sea level.

Rainfall.—The monthly amount of precipitation is generally above that of the preceding year, and also above the October's normal, in southern Luzon, the Visayas and Mindanao, while it is below the same in northern Luzon. The total monthly rainfall for Manila is 357.3 mm., the difference from the normal being + 164.2 mm. That of Baguio is 196 mm., and it differs from the the normal by -211.5. The daily amounts of rainfall above 300 mm. observed in the stations of Surigao, Butuan, La Castellana and Isabela (Occidental Negros), during the typhoon of October 14, is worth mentioning.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF OCTOBER, 1919.

Station.	Total.	Departure from October, 1918.		Departure from normal.	Days of rain.	Departure from October, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from October, 1918.		Days of rain.	Departure from October, 1918.	Greatest rainfall in a single day.	Day.
		mm.	mm.								mm.	mm.				
Jolo	230.4	-26.4	+13.5	16	-2	40.6	5	5	Sumay, Guam	164.3	-175.7	16	-175.7	26.7	17	
Malamaui	358.5			13	-3	65.5	6	6	Calapan ^a	288.3	+182.3	+32.9	18+3	70.1	14	
Zamboanga	331.3	+201.9	+202.6	21	+6	78.6	6	6	Virac	285.5	+65.3	-30.7	21+2	35.3	13	
Davao	151.4	-109.1	-90.6	19	+1	59.7	21	21	Naga	207.5	+73.4	-38	19	0	34.9	14
Cotabato	452.6	+95.2	+174	19	-2	71.6	6	6	Tigaon	256.1	+122		21+1	86.1	14	
Camp Keithley, Lanao	440.9	+256.8		25	-2	64.8	26	26	Batangas	209.6	-31.4	-5.2	20+6	40.4	20	
Cagayan, Misamis	218.8	+69.1	+50.7	9	-3	98.1	13	13	Lucena	249.8	+9.9		24+11	37.8	7, 14	
Butuan	513	+359.8	+330.8	17	+2	308.9	13	13	Antimonan	451.7	+197.2	+80.9	22+3	124.6	7	
Dumaguete	191.5	+29.2		12	-1	52.1	14	14	Ambulong, Tanauan	220.2	-40.4		16+3	53.6	14	
Yap, W. Carolines	293.6	+72.6	+36.3	24	+5	67.9	21	21	Canlubang, Calamba	329	-19		20-1	83.1	14	
Tagbilaran	270.1	+80.7	+8	14	-1	84.9	24	24	Paracale	589	+395.3	+59.7	27+8	124	24	
Iwahig	318.7	+149.1		24	+4	64.3	14	14	Santa Cruz, Laguna	445.9	+227	+184	24+3	73.7	14	
Surigao	539	+205.3	+286	19	+2	320.6	13	13	Manila	357.3	+33.8	+164.2	27+9	65.5	19	
Maasin	292.5	+160.5	+66.8	9	+3	156.4	13	13	Antipolo	347.1	-74.5		25+3	42.7	19	
Cebu	299.7	+256	+87	13	+4	74.7	7	7	Iba	185.6	-70.4	+5.4	14-2	51.3	7	
Iloilo	405	+87.2	+136.5	20	-4	98.9	14	14	San Isidro	188.9	-59.7	+7.2	19+1	33.8	5	
San Jose de Buena- vista	694.4	+344.3	+321.3	19	-2	260.2	14	14	Baler	217	+78.5	+41.5	17+6	50.8	6	
Cuyo	310.3	+232.9	+60	20	+4	69.8	14	14	Batlag	624.4	+4.6	+226.6	24+6	126.5	9	
Ormoc	306.5	+132.5	+67.9	19	+5	92.7	13	13	Dagupan	89.5	-83.9	-106.2	14-5	55.1	6	
Guiuan	398.2	+261.9		23	+9	82.6	13	13	Bolinao	54.9	-64.1	-121.7	11-3	15.2	20	
Tacloban	159.1	+55.7	-40.4	14	0	41.9	13	13	Baguio	196	-97.9	-211.5	23	0	38.4	25
Capiz	345.4	+138.8	-83.8	23	+3	82.5	8	8	San Fernando, La Union	73	-53.9	-85.2	11-5	51.6	20	
Borongan	386.3	+287.4	+72.7	22	+8	60.4	7	7	Echague	185.2	-23.8	-28.1	22-2	38.1	8	
Catbalogan	253.8	+135.1		21	+5	49.3	13	13	Candon	89.3	-100.1	-100.9	6-7	60.7	17	
Calbayog	385.1	+323.1	+119.8	23	+6	103.7	30	30	Vigan	70.2	-131.3	-101	9-3	49.7	10	
Masbate	140.7	+78	-2.4	16	+2	26.1	25	25	Tuguegarao	149.1	-327.2	-123.8	11-2	79.6	8	
Romblon	331	+157.9	+29.1	24	+8	60.4	14	14	Lacag	40.3	-455.8	-212.5	8-7	17.1	9	
Batag	307.4	+156.7		17	+3	74.5	13	13	Aparri	402.4	+33.3	+96.1	19-5	199.6	8	
Sorsogon	407.5	+173.3		24	+11	93.6	30	30	Cape Bojeador	199.2	+65		9-2	89.9	8	
Legaspi	382.3	+268.3	+49.9	22	+6	55.8	30	30	Basco	432.1		+72.4	29		104.4	9

^a 27 days of observation only.

DEPRESSIONS AND TYPHOONS.

Three typhoons and one depression were observed during this month in the Far East: two typhoons in the Pacific; one typhoon in the Visayas, and one depression in the China Sea. Their tracks are given in Plate VIII.

Pacific typhoon: September 29 to October 9, 1919.—The observations of Guam show this typhoon as forming to the SSW or SW of that station on the 28th to 29th. It moved WNW until the 2nd of October when it began to incline northward. According to observations made on board of one steamer that happened to be near the cyclonic center, the typhoon was much developed, at least while it was moving northward to the east of the Loochoos. Yet, after recurving northeastward on the 5th, it seems that it soon filled up to the southeast of Japan.

The following typhoon warnings were sent out by Manila Observatory concerning this typhoon.

September 29, 10 a. m. Typhoon south of Guam (Mariana Islands) moving WNW.

September 30, 12.45 p. m. Typhoon north of Yap (Western Carolines) moving WNW.

October 2, 11.30 a. m. Typhoon Pacific Ocean about halfway between the Mariana Islands and Luzon, almost stationary.

October 3, 3 p. m. Typhoon Pacific Ocean, about halfway between the Mariana Islands and Luzon, inclining northward.

October 3, 7 p. m. Typhoon in about 134° longitude E and 19° latitude N, moving north.

Depression in the China Sea: October 9 to 12, 1919.—As it was announced by Manila Observatory in the weather report for October 9th, "a low-pressure area of little importance crossed the Philippines on the 8th, it being situated in the morning of the 9th over the China Sea, west of Luzon." There it developed into a real depression which moved westward from the 10th to the 13th, when it filled up between Hainan and Indochina.

Typhoon of the Visayas: October 10 to 20, 1919.—The observations of Yap gave slight indications of a depression or typhoon to the south or southwest of that station on the 10th and 11th. The following statement was given out by Manila Observatory in the afternoon of the 13th:

October 13, 4 p. m. There seems to be a depression or typhoon over the Pacific east of the Visayas or of northern Mindanao moving W or WNW.

This typhoon was very small, and so its center was already in the Philippines at 6 a. m. of the next day, close to the southernmost part of Leyte. It moved almost due west across the Visayas, the center passing north of Cebu, and very close to the south of Iloilo and San Jose de Buenavista. Great damage was done in the towns situated in or near the path of the storm, not so much by strong winds, as by heavy rains and consequent floods. Reports from San Jose de Buenavista, however, show that considerable damage was done there also by hurricane winds from the southeast quadrant. The typhoon inclined somewhat to the north in the China Sea and moved very slowly after the 16th, entering Indo-china south of Tourane on the 21st.

The Ladrões and Bonins typhoon: October 13 to 22, 1919.—This was a well developed and severe typhoon, although, owing to its great distance, it did not influence at all the weather of the Philippines. The first part of its track is given only as probable although it is based on the insistency with which the winds at Guam were observed blowing from the NE up to 2 p. m. of the 16th. The typhoon passed to the NE and N of Guam on the 17th and 18th moving NNW across the central part of the Ladrone or Mariana Islands. The barometric minimum at Guam was 747.7 mm., and the winds backed from the NE to the N, NNW, W and SW. In the afternoon of the 20th the typhoon recurved northeastward to the southwest of the Bonins, and thus its center came to pass over those Islands, where the barometer at 6 a. m. of the 21st was as low as 723 mm. (gravity correction not applied).

Manila Observatory sent out the following typhoon warnings on the 16th to 20th.

October 16, 9.30 a. m. Typhoon in about 145° longitude E and 10° latitude N: direction unknown.

October 17, 11.15 a. m. Typhoon near or over Guam (Mariana Islands): direction unknown.

October 18, 10.45 a. m. Typhoon in about 145° longitude E and 16° latitude N, moving NW.

October 19, noon. Typhoon near or over the northern Mariana Islands, moving NNW.

October 20, 3.30 p. m. Typhoon S of the Bonin Islands, moving north.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes es, con raras excepciones, ligeramente mayor que la normal de octubre. Las presiones más bajas se observaron generalmente el día 10 en el norte de Luzón, y el 14 en el resto del Archipiélago. Las presiones más altas se registraron en la mayoría de nuestra estaciones el día 27.

La temperatura media mensual difiere muy poco de la normal de este mes. Las temperaturas máxima y mínima absolutas de Manila fueron 32.5° C., que tuvo lugar el día 16, y 21.6° C., que se observó los días 1 y 24. Las temperaturas extremas de Baguio fueron 24.3° C., 15.1° C. en la cumbre del Mirador, y 25.7° C., 14.3° C. en el valle.

Precipitación acuosa.—La cantidad mensual de la precipitación acuosa es en general mayor que la del año pasado, y mayor también que la normal de octubre, en el sur de Luzón en Visayas y Mindanao, al paso que es menor en el norte de Luzón. La lluvia total del mes en Manila es 357.3 mm., la cual difiere de la normal en +164.2 mm. La de Baguio es 196 mm., y difiere de la normal en -211.5 mm. Merecen mencionarse las cantidades diarias de lluvia mayores de 300 mm. observadas en las estaciones de Surigao, Butúan, La Castellana e Isabela (Negros Occidental), durante el baguio del 13 de octubre.

DEPRESIONES Y TIFONES.

Tres tifones y una depresión se observaron durante este mes en el Extremo Oriente: dos tifones en el Pacífico; un tifón en Visayas y una depresión en el Mar de China. Pueden verse sus trayectorias en la Lámina VIII.

El tifón del Pacífico: 29 de septiembre a 6 de octubre, 1919.—Las observaciones de Guam muestran que este tifón estuvo formándose al SSW o SW de aquella estación del 28 al 29. Se movió al WNW hasta el 2 de octubre en que comenzó a inclinarse al norte. Según las observaciones hechas a bordo de un vapor que se encontró cerca del centro ciclónico, el tifón estaba muy desarrollado, por lo menos mientras corría hacia el norte por el E de Loochoos. Con todo, después de recurvar al NE el día 5, parece que se deshizo pronto al SE de Japón.

El Observatorio de Manila despachó los siguientes avisos referentes a este tifón:

Septiembre 29, 10 a. m. Tifón al S de Guam (Islas Marianas), moviéndose al WNW.

Septiembre 30, 12.45 p. m. Tifón al N de Yap (Carolinas Occidentales), moviéndose al WNW.

Octubre 2, 11.30 a. m. Tifón en el Pacífico, a la mitad de camino entre las Islas Marianas y Luzón, casi estacionario.

Octubre 3, 3 p. m. Tifón en el Océano Pacífico, a la mitad de camino entre las Islas Marianas y Luzón, inclinándose al norte.

Octubre 3, 7 p. m. Tifón en los alrededores de 134° longitud E y 19° latitud N, moviéndose al norte.

La depresión del Mar de China: 9 a 12 de octubre, 1919.—Como anunció el Observatorio de Manila en la nota del tiempo de 9 de octubre, "un área de baja presión de poca importancia atravesó las Filipinas el día 8, hallándose la mañana del 9 en el Mar de China al W de Luzón." Allí se desarrolló hasta llegar a ser una verdadera depresión que se movió al W, desde el día 10 hasta el 13, en que se deshizo entre Hainán e Indochina.

El tifón de Visayas: 10 a 20 de octubre, 1919.—Las observaciones de Yap dan ligeras indicaciones de una depresión o tifón al S o SW de aquella estación los días 10 y 11. La siguiente nota la publicó el Observatorio de Manila la tarde del día 13:

Octubre 13, 4 p. m. Parece existir una depresión o tifón en el Pacífico al E. de Visayas o del Norte de Mindanao, moviéndose al WNW.

El tifón era muy pequeño, y así su centro se hallaba ya en Filipinas a las 6 a. m. del día siguiente cerca del extremo meridional de Leyte. Se movió casi directamente al

W a través de Visayas, pasando su centro por el N de Cebú y muy cerca por el S de Iloílo y San José de Buenavista. Grandes daños experimentaron los pueblos que se hallaron en el, o cerca, del, paso del temporal, no tanto por los vientos duros como por las torrenciales lluvias y consiguientes inundaciones. Informes recibidos de San José de Buenavista, sin embargo, indican que también los vientos huracanados del cuadrante del SE causaron allí considerable daño. El tifón se inclinó algo al N en el Mar de China y se movió muy lentamente después del día 16, penetrando en Indochina por el S de Tourane el día 21.

El tifón de las Islas Ladroneas y Boníns: 13 a 22 de octubre, 1919.—Este fué un tifón intenso y bien desarrollado, aunque, debido a su gran distancia, no llegó a influir en el tiempo de Filipinas. La primera parte de su trayectoria se da sólo como probable a pesar de estar basada en la persistencia con que los vientos en Guam soplaron del NE hasta las 2 p. m. del día 16. El tifón pasó por el NE y N de Guam los días 17 y 18, moviéndose al NNW a través de la parte central de las Islas Ladroneas o Marianas. La mínima barométrica registrada en Guam fué 747.7 mm., y los vientos rolaron del NE al N, NNW, W y SW. La tarde del 20 el tifón recurvó al NE por el SW de Boníns, y así su centro llegó a cruzar dichas Islas en donde el barómetro marcaba a las 6 a. m. del 21, 723 mm. (sin aplicar la corrección por gravedad).

El Observatorio de Manila despachó los siguientes avisos de tifón los días 16 al 20:

Octubre 16, 9.30 a. m. Tifón en los alrededores de 145° longitud E y 10° latitud N: dirección desconocida.

Octubre 17, 11.15 a. m. Tifón en, o cerca de, Guam (Islas Marianas): dirección desconocida.

Octubre 18, 10.45 a. m. Tifón en los alrededores de 145° longitud E y 16° latitud N, moviéndose al NW.

Octubre 19, 12 md. Tifón en, o cerca de, la parte norte de las Islas Marianas, moviéndose al WNW.

Octubre 20, 3.30 p. m. Tifón al S de las Islas Boníns, moviéndose al norte.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[φ=14° 34' 41" N; λ=120° 58' 33" E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pres- sure (mean).	Air temperature. ^b			Underground temperature.				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.			Evaporation. ^b		
		Mean.	Maxi- mum.	Mini- mum.	0.25 meter.		0.50 meter.				1.50	2.50	Mini- mum on grass.	Maxi- mum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a.m.	8 a.m.				
					°C.	°C.	°C.	°C.			°C.	°C.				
1	758.70	25.8	31.1	21.6	28.8	30.1	29.7	29.8	29	28.6	82.9	20.4	19.3	48.7	2.1	1.4
2	77.49	27.3	32	22.3	28.7	31	29.7	30	28.7	78.9	21	20.7	51.9	4.2	2.5	
3	77.41	28	32	24.2	29.3	31.2	29.9	30	29.2	80.7	22.4	23.4	52	4.3	2.5	
4	77.68	27.6	32.1	23.2	29.3	31	30	30.2	29.1	28.7	81.8	22.2	22.1	51.9	3.6	2.2
5	77.44	27.4	32	24.3	29.4	30.9	30	30.1	29.3	29	86.7	23.2	23.1	53.8	3.3	2
6	78.05	26.7	31.9	24.7	29.5	31	30	30.3	29.4	28.8	87.3	22.5	23.6	51.1	1.8	1.2
7	78.74	25.9	30.9	23.4	29.6	29.6	30	29.9	29.2	28.8	89.4	22	22.1	49.2	1.9	.8
8	77.61	24.4	26	23.3	28.5	28.6	29	29.5	29.2	28.7	94.5	21.4	22.3	31.8	0	.2
9	76.35	25.1	28.4	23.4	28	28.7	29.1	29	29.3	28.7	92.6	21.9	22.8	39.4	1.7	.5
10	76.58	25.8	31.2	23.5	28	29.7	28.8	29.2	29.3	28.8	89.6	22	22.3	52.6	1.7	1
11	78.29	26.1	32.3	23	28.5	30	29	29.3	29.3	28.8	88.1	21.9	22	51.1	1.9	1
12	80.26	26.5	32.3	23.1	28.5	30.2	29.2	29.5	29.2	28.7	84.2	21.4	22	50.9	2.9	1.8
13	80.18	26.6	31.4	22.6	28.5	30.1	29.3	29.5	29.2	28.7	84	21.6	22	50.3	2.8	1.7
14	78.39	26.4	32	23.3	28.9	30	29.4	29.5	29.2	28.8	79.9	20.2	21.3	52	3.2	2.7
15	76.18	25.3	28.8	23.3	27.8	28.7	29	29.1	29	28.7	92.1	22.1	22.4	37.9	5	.7
16	76.94	27	32.5	24.4	28.1	30.3	29	29.4	29.3	28.9	85	22.2	23	55.5	2.7	1.6
17	77.89	27.7	31.7	24.7	29	30.8	29.4	29.5	29.3	29	81.2	22.1	23.6	52	3.8	2.3
18	77.82	27.6	31.6	24.1	29.2	31.1	29.7	29.8	29.3	28.9	83.1	22.6	22.9	52.3	3.6	2.4
19	78.03	27.1	31.6	24.5	29.3	31	29.7	30	29.3	28.9	86.8	22.9	23.8	53.2	2.8	1.6
20	79.11	25.8	30.5	23.5	28.8	29.8	29.5	29.6	29.2	28.9	90.2	22.2	22.8	55.4	1.2	1.3
21	80.10	25	30.3	22.7	28.5	29.8	29.5	29.5	29.2	28.9	88.4	20.7	22	47.4	1.5	1.1
22	80.21	25.4	30.2	22.1	28.4	29.4	29.4	29.4	29	28.8	88.5	21.2	20.9	50.2	1.3	1
23	80.26	25.6	30.9	23.3	28.3	29.8	29.1	29.5	28.9	28.8	89	21.5	22.1	54.3	1.7	1
24	79.70	25.8	31.6	21.6	28	29.6	29.1	29.2	29.1	28.9	86.5	21.2	20.3	51.6	3	1.6
25	79.81	25.7	29.9	23.2	28.5	29.8	29.1	29.3	29.1	28.9	89.8	21.9	22	51	1.3	.6
26	80.01	26.4	32	22.9	28.4	30.3	29.3	29.5	29.3	28.9	85.9	21.7	22	54.7	2.1	1.5
27	80.61	25.4	28.1	23.7	28.3	29	29.2	29.3	29.1	28.8	91.6	22	22.7	38	1.7	.5
28	79.87	25.4	31	22.7	28	29.4	28.9	29.3	29	28.8	90	21.6	21.6	47.5	1.5	1
29	79.57	25.9	30.6	23	27.9	29.4	28.8	29.2	29	28.8	87.8	21.7	21.9	43.3	2	1.3
30	79.53	25.8	29.8	24	28.4	29.2	29	29.2	29	28.9	87.8	21.8	23.2	43	1.2	.9
31	79.36	25.6	30.6	23.1	28	28.9	28.8	28.9	29.2	28.9	90.3	21.9	22.1	45.5	1.3	.9
Mean Total	758.65	26.2	30.9	23.3	28.6	29.9	29.3	29.5	29.2	28.8	87	21.8	22.2	49	2.1	1.4
Departure from normal	+ 0.05	-0.4	-0.2	+0.2							+ 3.0	+ 0.2		- 8.9		42.8

Day.	Wind.				Amount (mean).	Clouds.		Sun- shine.	Rain, 24 hours beginning 6 a. m.		Miscellaneous.
	Prevailing direction.	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.		Form and direction.			On the tower.	In the park.	
						Upper.	Lower.				
1	Variable	84	12	SW, NNE	0-10.	Cl., A.-Cu.	Cu. E	h. m.	mm.	mm.	● p.
2	W	169.5	17	WSW	3.3	Cl.	Cu.	6 50	3.8	4.4	◊° d p.
3	SW, W	270	24	SW	4.9	Cl.	Cu. NNW	10 05	7	8.1	● a.
4	W quad.	227	20	SW	5	Cl.	Cu.	8 05	44.6	45.5	● a. p.
5	W quad.	119.5	14	NW	7	A.-Cu.	Cu. NbyW	7 20	56.6	58.7	◊° d p.
6	W quad.	107.5	10.5	SE	5.1	Cl.	Cu. E	5 40	1.5	1.8	◊° p.
7	NE	70	10.5	W	7.8	Cl.	Cu. E	4 40	18.6	20.6	● p.
8	N quad.	46	9	NNW	9.9	Cl.-S.	N.-cf. NNE	3 25	30.4	32	● a. d p.
9	NE quad.	64	8.5	WNW, NNE	9.9	Cl.-S.	Fr.-N. NNE	0 00	15.4	14.2	● a. d p.
10	SE	96	14	SSW	8.2	Cl.-S.	N. SW	1 10	2.6	2.8	● a. d p.
11	SE, E	157	22	SW	8.2	A.-Cu. S	Cu. SW	1 10	10.2	11.4	● a. p.
12	ESE, SE	122.5	9.5	SSE	7.4	Cl.-S. WNW	S.-Cu. SW	2 35	17.3	18.3	● p.
13	W quad.	95.5	11	WNW	5	Cl.	NE Cu.	4 50			d° a. ◊° d p.
14	NE, NNE	211	21	NNE	7.4	A.-Cu. NNE	Cu. E	3 35	8.9	9.1	d° ● p.
15	NNW	92.5	12	N	10	Cl.-S.	Cu.-N. SE	0 00	15.9	16.1	● a. d p.
16	SE	176.5	14	SE	6.8	A.-Cu. S	Cu. ESE	4 50	3.2	3.6	d a. ● p.
17	W, WSW	133	17	W	3.8	Cl.-S. W	Cu.	8 35			◊° p.
18	WSW	194	20.5	WSW	2.6	Cl.	SW Cu.	9 35	10.7	14.5	◊° p.
19	SW	221.5	23	SW	7.1	Cl.-S. W	Cu.-N. W	6 30	65.5	67.3	● a. ◊° p.
20	N, ESE	133	17	N	7.3	A.-Cu. W	Cu.-N. ESE	1 10	2.3	2.3	● a. p.
21	NW	58	9	W	7.2	Cl.	Cu.-N. E	2 00	1.8	2	d p.
22	NE, SE	69	9	WNW	7.3	A.-Cu. wsw	Cu. ESE	4 05	.5	1	d p.
23	NE, WNW	78.5	13	ENE	6.7	A.-Cu. NE	Cu. E	3 10	8.4	9.4	d a. ● p.
24	NE, W	86.5	11	W	4.1	Cl.-S. SE	Cu.-N. NE	7 25	.1	.4	◊° a. d p.
25	N quad.	75	12	N	8.1	A.-Cu. E	Cu. E	1 40	.6	.8	d a. p.
26	NE	96	13	N, WNW	6.5	A.-Cu. E	Cu. E	6 30	20.1	19.3	● a. p.
27	NE	81	11	SE	8.3	Cl.-S.	S.-Cu. SE	0 00			d a. d° p.
28	NE, W	66.5	11.5	W	6.4	Cl.-S. ESE	Cu. E	2 00	.3	.3	◊° a. d p.
29	NNE	74.5	12	NE	7.6	Cl.-S.	Cu. E	1 20	.8	.8	◊° p.
30	Variable	66	13	SE	8.5	Cl.-S.	Cu.-N. NE	0 45	8.9	8.9	d ◊° a. ● p.
31	NE	58.5	7	NNE	7.5	Cl.-S. W	Cu. ESE	0 50	1.3	1.5	● a.
Mean Total		116.1	13.8		6.7			3 54			
Departure from normal		-1,797.5			-0.1			120 40	357.3	375.1	

^a All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[φ=16° 25' N; λ=120° 36' E; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Day.	Pres- sure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation.		
		Mean.	Maxi- mum.	Hour.	Mini- mum.	Hour.	Maxi- mum.	Hour.	Mini- mum.			Hour.	Mini- mum on grass.	Maxi- mum in sun. Black bulb in va- cuo. ^c	Free ex- posure (total)	Shel- ter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	636.59	18.2	22.6	10.15a	15.2	5.10a	23.4	1.25p	14.3	5.00a	87.7	13.6	12.3	57.2	2.2	1.5
2	35.82	18.4	24.1	1.05p	15.7	4.50a	24.9	1.35p	15.2	6.05a	89	14	14.2	57.8	2.3	1.6
3	35.70	18.5	23.2	1.05p	16	4.15a	24.6	1.00p	15.2	6.15a	90	14.2	14.1	58.3	1.9	1.4
4	35.80	19	23.5	1.20p	16.2	4.05a	24.2	1.05p	15.7	6.30a	91.2	14.9	14.2	61	1.8	.9
5	35.70	19.7	24.1	0.50p	16.7	4.35a	24.8	3.05p	17	3.55a	91.2	15.5	14.8	59.5	1.7	.8
6	36.22	18.8	22.8	0.10p	16.5	10.55p	24.3		18.2	5.30a	93.3	15.2	16.7	55	1.4	.9
7	36.73	18.2	23.5	9.55a	15.9	4.20a	25.6	10.10a	15	4.40a	86.7	13.5	13.5	58.3	1.7	1
8	35.79	17.8	20.5	2.10p	16	11.40p	22.6	Noon	16	1.30a	87.7	13.3	14.6	40.2	1.2	.8
9	34.55	17.8	21.5	11.25a	16.1	1.55a	23.6	11.15a	15.5	1.40a	92.2	14	14.2	47.9	1.7	1.3
10	34.53	18.6	22.6	11.15a	16.4	12m. n.	25.2	12m. n.	17.2	6.10a	88.8	14	15.6	57.2	1.7	1.1
11	35.78	17.7	21.1	1.55p	15.9	4.30a	22.3	2.35p	16.4	5.05a	92.3	13.8	15.4	54.3	2.1	1
12	37.74	18.2	22.6	3.10p	16	4.25a	24	3.30p	15.9	5.50a	90.3	13.9	15.8	52.2	1.9	1.1
13	38.27	18.6	22.7	0.15p	15.9	5.55a	24.1	0.35p	15	5.30a	89	14.2	14	55.3	2.4	1.4
14	36.69	18.6	23.1	1.25p	16	5.50a	25.1	0.05p	14.6	5.55a	86.7	13.9	12.6	58.1	2.9	1.4
15	35.18	18.6	21.7	10.00a	15.5	4.05a	22.3	10.00a	16	1.10a	76	12.2	13.6	48.1	6.7	3.4
16	35.19	19.7	23.8	11.00a	17.4	2.40a	24.9	11.30a	17.5	12m. n.	79.5	13.5	16.4	56.7	5.9	3
17	36.08	18.1	21.6	0.05p	16.5	10.20p	23.7	11.30a	16.8	1.20a	93.3	14.5	15.6	56.8	.6	.4
18	35.91	18.1	22.8	1.40p	15.2	6.00a	24.6	1.10p	15.9	5.10a	94.3	14.6	14.6	52.2	.4	.3
19	36.12	18.1	22.6	1.10p	16.2	2.35a	22.9	8.40a	16.4	2.35a	94.5	14.6	14.9	54.1	.7	.5
20	36.73	17.9	22	0.20p	15.8	12m. n.	22.6	0.05p	16.5	12m. n.	92.2	14.1	15.5	53.1	.1	0.0
21	37.39	17.6	23.3	11.50a	15.1	5.30a	24.7	0.05p	15.4	6.00a	91.8	13.8	14.3	54.5	1.8	1
22	37.72	17.8	21.9	10.25a	15.1	6.00a	24.2	10.10a	15.2	3.10a	92.8	14.1	14.2	59.3	.9	.3
23	37.90	18	21.3	8.35a	15.7	5.30a	22.2	9.00a	15.4	5.50a	92.2	14.1	14.4	55.2	1.6	1.2
24	37.50	18.7	23.3	11.15a	15.7	5.20a	25	11.50a	15	5.10a	84.7	13.6	14.4	60	1.6	1
25	37.43	17.6	21.8	9.45a	15.7	12m. n.	24.9	10.20a	15.3	2.45a	92.5	13.9	15.1	57.2	1.4	1.1
26	37.60	17.9	22.6	10.35a	15.4	2.15a	24.7	11.15a	14.8	4.20a	89	13.6	14.2	55.2	1.6	1
27	38.06	17.9	22.5	10.00a	15.4	2.45a	24.7	10.25a	15.1	3.40a	87.8	13.4	14.4	57.6	1.5	1
28	37.66	18.2	23	10.10a	15.7	5.15a	24.5	10.50a	15.2	5.40a	87.7	13.6	14.2	54.2	1.9	1.6
29	37.53	19	24.1	0.30p	15.9	0.45a	24.9	0.20p	15.7	5.40a	78.3	12.7	15	57.3	4.7	2.8
30	37.56	19.4	24.3	Noon	15.8	11.20p	25.7	1.20p	15.4	3.20a	78.5	13.1	14.7	55	4.3	2.4
31	37.37	19.6	24.3	0.05p	15.6	0.35a	25.2	1.40p	15.4	4.15a	72.3	12.1	14.6	60.7	7.1	3.9
Mean	636.61	18.4	22.7		15.9		24.2		15.7		88.2	13.9	14.6	55.5	2.2	1.3
Total															69.7	41.1

Day.	Wind.				Amount (mean).	Clouds.		Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.
	Prevailing direction. ^d	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.		Form and direction.	Upper.			
		Km.	Km.		0-10.			h. m.	mm.	
1	W, SW	259.2	21.5	W	5.7	Ci.	Cu.-N. WNW	4 15	0.2	☉ a. d° ☐ p.
2	W quad.	279.5	21.2	W	6.6	Ci.	Cu.-N. NW	4 30		☉ a. d° ☐ p.
3	W quad.	238.2	23.1	W	5.9	Ci.	Cu.-N. NW	5 15		☉ a. d° ☐ p.
4	NW quad.	252.6	26	SW	5.1	Ci.	Cu.-N. NNW	6 15		☉ a. d° ☐ p.
5	SW, E	216.4	23.8	SW	7.7	Ci.	Cu.-N. WNW	5 40	1.3	☉ a. d° ☐ p.
6	E, W	216.2	17.5	W	9	Ci.	Cu.-N. WNW	0 30	19.3	☉ a. d° ☐ p.
7	E quad.	253	21.9	W	6.4	Ci.	Cu.-N. ENE	3 45	10.4	☉ a. d° ☐ p.
8	E, SE	184.6	15.3	SE	9	Ci.-S.	Cu.-N. ENE	0 20	1.3	☉ a. d° ☐ p.
9	E	307.1	33.8	E	9.3	Ci.-S.	Cu.-N. S	1 20	13	☉ a. d° ☐ p.
10	E	553.9	30.8	E	7.3	Ci.	N. ESE	3 05	8.6	☉ a. d° ☐ p.
11	SE	612.4	32.2	E	9.1	Ci.	Cu.-N. S	2 55	1	☉ a. d° ☐ p.
12	SE	407.5	31.2	E	9	Ci.	Cu.-N. ESE	3 55	3.4	☉ a. d° ☐ p.
13	W, SE	237.4	19.3	W	7	Ci.	Cu.-N. SSW	2 05	1.5	☉ a. d° ☐ p.
14	W, E	263.6	22.3	W	5	Ci.	Cu.-N. ssw, sw	4 25		☉ a. d° ☐ p.
15	E	514.5	39.7	E	7.4	Ci.-S.	Cu.-N. ENE	0 35		☉ a. d° ☐ p.
16	E	621.6	38.8	E	6.7	Ci.-S.	S.-Cu. ESE, E	3 30		☉ a. d° ☐ p.
17	W	281.4	19.6	SW	9.7	Ci.-S.	Cu.-N. S	1 10	4.9	☉ a. d° ☐ p.
18	W, SW	233	17.9	SW	7.4	Ci.	Cu.-N. S, SSE	2 00	.8	☉ a. d° ☐ p.
19	W, E	286.8	19.8	NW	8.3	Ci.	S.-Cu. S	2 30	6.2	☉ a. d° ☐ p.
20	E, W	252.2	23.9	E	9.6	Ci.-S.	Cu.-N. wnw, n	0 40	8.1	☉ a. d° ☐ p.
21	E	275.8	24.1	W	6.4	Ci.	Cu. NE, E	4 30	16	☉ a. d° ☐ p.
22	W	198.7	18.7	W	7.1	Ci.	Cu.-N.	3 50	1.1	☉ a. d° ☐ p.
23	W, NE	209.4	17.5	W	6.3	Ci.	Cu.-N. NNW	0 45	1.3	☉ a. d° ☐ p.
24	E	253.1	17.5	SW	3.4	Ci.	Cu. SSW	1 30	1.6	☉ a. d° ☐ p.
25	E quad.	263.3	18	SE	8.1	Ci., A.-Cu.	Cu. ESE	1 05	38.4	☉ a. d° ☐ p.
26	E quad.	254.6	25.1	E	6	Ci.	Cu.-N. NNW	3 40	10.7	☉ a. d° ☐ p.
27	E quad.	240.7	15.9	E	6.4	Ci.	Cu. ENE	2 55	30	☉ a. d° ☐ p.
28	E	286.9	24.1	E	6	Ci.	Cu.-N. wsw, ESE	4 00	16.8	☉ a. d° ☐ p.
29	E	307.4	21.1	E	5.1	Ci.	Cu. ENE	7 10		☉ a. d° ☐ p.
30	E	302.6	20.3	E	6	Ci.	Cu. ENE	4 45		☉ a. d° ☐ p.
31	E	403.7	27.1	SE	4.9	Ci.	Cu. SE, E	6 30		☉ a. d° ☐ p.
Mean		305.7	23.5		7			3 12		
Total		9,477.3						99 00	196	

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
 b The barometric readings of this station are not reduced to sea level.
 c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
 d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, OCTOBER, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Jolo.	4.6				40.6	21.1			12.2	1.8	3.6	17.8		18.2	30.2	
Lais, Malita, Davao	26.7	14		25.7	9.9	48.2	4.3	8.1	5.1			5.4	3.6			
Port Lebak, Cotabato	14.2	55.4	20.4	11.2	15.8	55.6	91.4	39.6	52.9	13.7		15.7	2.5	4.6		
Lamitan, Basilan				33.8				14.2			7.4	1.3				8.4
La Union, Davao ^a				10.7	25.9	3.6		9.7	30		2	23.1	3.9			2.3
Basilan Plantation, Isabela, Basilan	31	17.8	41.9	32.5	119.7	61	14.7	20.3		6.9				101.6	21.6	
Basilan Plantation, Isabela, Basilan, Office ^a	23	19.1	51.6	49	58.9	55.9	13.7	22.9		3.8				88.3	16.3	
Parang-Lalap, Isabela, Basilan ^a	14.5	22.8	62.2	31.2	22.1	33.8	17.8	55.9		38.1	2.5		2.5	83.8	17.8	
Latuan, Isabela, Basilan ^a	25.4	29.4	20.5	29.2	19.3	57.9	10.7	18.6		4.1	2		1	68.8	12.7	
Malamau, Zamboanga	26.1	39.6		39.4	24.1	65.5	18.5		9.4				49.5	22.1		
Cuabo, Davao				47.5	4.3	9.4	1.3	2.5	31.2		3.6	24.2	11.7			
Zamboanga	63.7	8.4	4.1	6.4	36.1	78.6	12.7	17.3	9.9	2	2.3		4.8	35.3	11.9	
Cagayan de Sulu, Sulu ^a	13.7							.8		1.5				7.1	5.8	3
Fort Pikit, Cotabato		32.5	28.7	2		10.4	6.8	3	2			1	1.8	2.5	1.5	
Davao	5.8	3		6.3		2.5	3	4.1	4.6	2.5	3.6		24.1	5.1		
Sirib, Guianga, Davao ^a	33	4.1	10.9	8.1	31.2			16.5								
Bual, Dalauan, Cotabato	51	10.4	11		4	36.1	28.2	1	18.8			1.5	1.5	3.3		5
Cotabato	26.1	26.9	12.2		14	71.6	37.9	4.1	4.8					26.2	30.5	
Naga-Naga, Zamboanga	51.5	.8	8.1	60.7	12.5	33	28.7	13.2	16.2			3.8				
Malabang, Lanao	36.8	14.7	13.7	21.1	2.8	109.7	14	27.9	32.8				7.6	15.7	3.5	
Malangas, Zamboanga ^a	22.6	.5	12.9	30.4	7.1	11.4	14	12	27.1			1		7.1	5.1	
Lumbatan, Lanao ^a		.3	9.4	12.2		17.8	7.1	17.2	20.3					19.3	10.2	
Cateel, Davao	1.8	17.3	9.9	12.7	30.2	49.5	4.3	6.1	13.5	25.4	2.3	91.5	82			
Ganassi, Lanao		26.7		2.5	4.6		13.7	26.2	16.8				14	5.1	4.3	
Moncayo, Davao ^a	15.2	11.4	24.1	10.7	32.8	11.4	26.7	8.9	30.5	8.9		49.3	100.6			
Camp Kalaw, Moncayo, Davao	13		33.3	4.8	31.5	17.8	26.2	3.6	13.2	17.5	2	26.4	81.3			
Camp Kalaw, Zamboanga ^a	18.8	16.3	16	18		63.8		48.3					20.8	4.6		
Milag Agricultural School, Bukidnon	6.1	9.4	15	57.7	13.2	21.3	23.6	8.9	.3	1	.5	3.6	47.5	7.4	.5	.3
Camp Keithley, Lanao	17	16.2	10.4	38.3	26.6	20.3	22.6	16	5.8	.3		13.4	4.6	4.6	.8	
Fantar, Lanao ^a	12.7	48.3	13.2	34	17.7	34.8	14.3			33	63.5	52.6	2.5	3		
Veruela, Agusan		18	26.7		54.6	4.1	27.9	2.5	22.9		1.3	17	111.2	.8		14
Sumilao, Agusan	9.2	10.2	9.1		2.5	27.2	33.8	6.1		14	.5	13.5	157.5	13.7		
Sindangan, Zamboanga ^a	8.6	5.6			73.7	8.9	9.1	1.6	11.4			10.2	36.3	12.2	1.5	2.5
Diklom, Bukidnon ^a	8.9	12.4	3.3		8.1	88.4	40.4	2.3			1	3.6	166.6	1.5		.3
Cagayan, Misamis	11.4				44.4	5.3	2					86.8	98.1			
Talacogon, Agusan	25.4	3	1.3	1	5.6	1.3	49.3	9.7	44.4	48.3	48	24.6	19.3		69.1	52.8
Butuan	.3					3.3	5.8	7.6	.5	.3	.8	76.9	308.9			
Dumaguete						2	27.7	17	2				23.4			
Hacienda San Jose, Tanhai, Bais, (Sur) Oriental Negros ^a						65	21.3	64.8						135.4	18.3	
Palanas, Bais, (Centro) Oriental Negros ^a		6.6	61.8		7.6		6.6	35.5	7.6				19	60.2	4.8	
Hacienda Tamugon, Bais, (Norte) Oriental Negros ^a																
Yap, Western Carolines	11.5	16.3	58.2	9.1		2.5	.3	9.8	2.4	33.3	5.3	4.7	16.8	11.7		4.9
Tagbilaran	5.8		18		14.7		18.6	.5	3		.3		62.5	84.9		
Iwahig	2.8	2.6	14.3		2.7	1.8	16.8	41.2	15	.6			8	64.3	32.3	1.8
Dalaguete, Cebu					12.7	15.3	58.9	.5			.5	49	62.3			
Surigao	3.8		3.8		24.7	2.3	.8	2.3			1.3	60.9	320.6	18.6		
Central Palma, Ilog, Occidental Negros						17.8	14.5	44.5	28.7	17.8		101.6	94	10.2	8.1	
Hacienda Naval, Himamaylan, Occidental Negros		5.6			9.1	1	8.6	45	3.8		3.6		27.9	246.4	12.7	
Biaong Cui's Farm, Barili, Cebu Maasin		6.1				63.5				1.8			74.9	121.9		
Isabela, Occidental Negros	27.4	2.3			1.5		2.5	43.2	1.5		16.3		18.8	363	1.3	
Hacienda Tanolo, Himigaran, Occidental Negros		.8								.5	4.1	.3	16	232.9	4.9	
Cebu	2	19.3	13	9.9	14.4	74.7	22.9	3.3		2			50.2	35.6	5.2	
La Castellana, Occidental Negros		5.6			.3	11.9	17.8	63.5	29	.3		11.7	11.2	384	3	
Hacienda Vallehermoso, Oriental Negros ^a												63.5	95.2		23.6	
Hacienda Canlaon, La Castellana, Occidental Negros		2.3	.3		.3	30.7	30.8	33.8	33.8	.3		1.8	20.8	226.6	7.9	
Central Azucarera de la Carlota, Occidental Negros		1.5	.5	.3		31.2	32	39.1	55.6	1.1	.3	4.1	22.4	180.1	8.3	
La Carlota, Occidental Negros ^a	4.6		.3		.5	28.4	49.3	31.7	35		1		28.7	257.5	10.4	
Valladolid, Occidental Negros	35.8	10.4	10.2		8.9	5.6	55.6	182.9	71.4	4.6			31.2	126.5	41.1	
Hacienda San Antonio, Occidental Negros ^a	50.3													133.6		
San Carlos, Occidental Negros ^a	2.5			12.7	6.9	3	1.3	.5				26.7	62.2	1.3		
Hacienda Refugio, Occidental Negros ^a	9.9			9.4	4.6	13.2	.8				17.8		42.9	42.9		
Ma-Ao Sugar Central, Santa Cecilia, Bago, Occidental Negros					1	5	99.3	88.1	32.8	1.8		1	28.2	32.3	2.1	
Murcia, Occidental Negros	17				15.5	9.9	15	89.4	45.2	1.3			38.1	88.7		
Iloilo	89.2	11.2			1.3	4	16.1	29.2	33.5	16.2	.5		24.3	98.9	29.7	2.5
Concepcion, Talisay, Occidental Negros						59.9	13	53.1	49	1.8			24.6	86.8	1.5	
Tuburan, Cebu						2.3	65	3	3.3				52.1	40.4		
San Jose de Buenavista		.8		2.8	53.1	.3	31.7	75.4	77.4	34.8	15.5		6.9	260.2	50.6	4.1
Silay, Occidental Negros	12.5		3		4.8	5.3	34.3	41.4	25.9	1.6			13.5	72.9	5.8	
Cuyo				15.5	1.6	39.9	18.8	21.6	27.7	18.8	8.1			69.8	11.1	13
Lucena, Iloilo ^a		3.8				2.5	53.8	10.2	129.8	24.1			38.1	58.4	35.6	
Victorias, Occidental Negros	26.4		3.8		14.5	8.9	68.1	73.4	27.5	1.5			47	45	3	
Cadiz, Occidental Negros					23.6	.3	70.6	16	3.6			2.3	25.4	52.6	2.3	
Hacienda Bilbao, Manapla, Occidental Negros		5.1				5.1	13	59.9	17			30.5	18.5	46.2		
Ormoc	1.3	3.3	1.3		.3	25.9	10.2	39.9	2.8		3.6	.5	92.7	10.4		
Guiuan	1.8	1.3		11.7	1.3	20.1	22.9		8.9		41.4	23.1	82.6	10.1		

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, October, 1919—Continued.

Station.	Day of month.															Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.		
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Jolo																	230.4
Lais, Malita, Davao																	180.7
Port Lebak, Cotabato			20.3	15.2	65.9	20.3	22.8	6.6	1			2.3					591.1
Lamitan, Basilan	9.1		27.9			3.6			39.9			7.6					168
La Union, Davao ^a		0.5			12.4	1.8		68.9		8.9				12.2			208.9
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a					12.7		8.9			58.4				2.5	61		612.5
Basilan Plantation, Isabela, Basilan, Office ^a					13.7		10.9	.5	15	58.4				2.5	55.9		554.4
Parang-Lalap, Isabela, Basilan ^a							1.3	4.3	26.2	13.2			6.9	5.1			512
Latuan, Isabela, Basilan ^a							2		57.2	7.9				2.5			369.2
Malamau, Zamboanga								24.1	14	17.8				8.4			358.5
Cuabo, Davao			7.1		2.8	3.3		.5					12.7	.8			162.9
Zamboanga				.3	23.9		6.9	.3	2.3			2.5		1.6			331.3
Cagayan de Sulu, Sulu ^a									21.3		7.9			35.6			96.7
Fort Pikit, Cotabato							11.2	2.3	3	7.4	8.6			12.5			147.1
Davao		7.1	5.6	3	59.7		4.8	1.3				2.5		2.8			151.4
Sirib Guianga, Davao ^a				6.4										43.2			153.4
Bual, Dalauan, Cotabato			2.3	3.6			20.1	10.7		2.5		14.7		35.6	9.1		265.9
Cotabato		6.1	43.4	18.3	2		37.8	25.4				50.8		3	11.5		452.6
Naga-Naga, Zamboanga						1.3	2.3	7.4	1.3		8.9	3.8		4.3			267.8
Malabang, Lanao			.3	21.3	.8	57.7	2.8	4.1	3					19.3	13		422.6
Malangas, Zamboanga ^a		28.4	2	7.4	1.3		4.3				6.6			2.8	97.6		301.6
Lumbatan, Lanao ^a				2.5	1.5	59.2	25.7	15						76.2	19.3	15.2	324.4
Cateel, Davao									14.5	2	2.3	7.4		68.6	.3		445.6
Ganassi, Lanao							36.9		11.7			3.6		54.6			220.7
Moncayo, Davao ^a	4.6	7.1	2.3					19.8	11.9			9.1		58.4	2.3		446
Camp Kalaw, Moncayo, Davao	4.8	13	2.5				19	5.1	12.2			.8		47.8	1.3	.5	377.2
Tukuran, Zamboanga ^a														11.7	58.4		276.7
Mailag Agricultural School, Bukidnon		15	22.4	.3	4.4		25.7	23.9	27.9	56.6	8.1		7.6	29.2	1.3		438.7
Camp Keithley, Lanao	.8				3.3	31	4.6	55.9	.5	64.8	1.3	7.1	14.5	18.8			440.9
Pantar, Lanao ^a			5.1		2.5		31	5.8	65.5	1.3	13.5	8.4	30	.8	10.4		508.9
Verula, Agusan	1.8				13.7			.8	3			12.2	15.5	6.6			354.6
Sumilao, Agusan				12.7				16.8	44.7	37.1		24.1	21.8	1.3	1.6		457.4
Sindangan, Zamboanga ^a			2.5	28			8.1		11.4			7.6	44.4	11.2			294.8
Diklom, Bukidnon ^a				21.6				6.4	10.7	7.9		24.9	3.6	11.4			423.3
Cagayan, Misamis				15.7					1.3					3.8			218.8
Talacogon, Agusan			2	25.4					16.3					11.4	.5		458.7
Butuan		50.8		32.2		6.4		.3	4.6					11.7	1.8	.8	513
Dumaguete				12.2	.8				1.5					4.3	47		191.5
Hacienda San Jose, Tanhai, Bais (Sur) Oriental Negros ^a										27.4		15.7			50.8		398.7
Palanas, Bais (Centro) Oriental Negros ^a						9.1						17.3	25.7				261.8
Hacienda Tamugon, Bais (Norte) Oriental Negros ^a				15.3									7.6	7.6			250.2
Yap, Western Carolines	1.5	.8		3.9	67.9	.3	.8				18.4	1.5		9.6	2.1		293.6
Tagbilaran				1.8					10.8			1.4	7.1	40.7			270.1
Iwahig	5.8	6.6		3.6	13.2				9.4	10.4	20.6	1.8	15.5	2.3	32.5		318.7
Dalaguete, Cebu				2			.8	5.3	2.3					43.4			253
Surigao		8.4	18.5	2.6	1				.3				26.7	23.8	.3		539
Central Palma, Ilog, Occidental Negros				1						7.6	5.1		10.2				369
Hacienda Naval, Himamaylan, Occidental Negros			12.4	15.5	3.5				1.3			16.3	10.7	6.3	4.8		434.5
Biaong Cui's Farm, Barili, Cebu			1.3				2.5		64.5		33.8		7.6	7.6			377.9
Maasin			17.3														292.5
Isabela, Occidental Negros			25.9	1				11.7	18	3.8	3.3	2		15.8	13.5		572.8
Hacienda Tanolo, Hinigaran, Occidental Negros			39.1	1.8					7.9					.3	1.8	2	423.2
Cebu			1.3					11.7	8.1	14.7	1.5			9.9			299.7
La Castellana, Occidental Negros			38.6	1.5				1.8	29.7	2.8	3.6		29.2	15.7			661.2
Hacienda Vallehermoso, Oriental Negros			26.7				16.5	2			51.1		25.9		42.7		347.2
Hacienda Canlaon, La Castellana, Occidental Negros			52.3	1.5				2.3	48.3	2.5		.3	4.6	2.3	.8		504.3
Central Azucarera de La Carlota, Occidental Negros				109.7	2.5				32.3	.8	.5		.3	18.5	25.7	4.3	571.1
La Carlota, Occidental Negros ^a		95.8	3.3						5.1	1.5		.5	10.7	13	1.5		578.8
Valladolid, Occidental Negros			6.4	3					1					6.7	.3		601.6
Hacienda San Antonio, Occidental Negros ^a				12.7									20.8	8.9			226.3
San Carlos, Occidental Negros ^a		10.9	12.7	1.3	2			30						24.1		41.1	239.2
Hacienda Refugio, Occidental Negros ^a			9.7	14.7		3.6								10.4		3.8	183.7
Ma-Ao Sugar Central, Santa Cecilia, Bago, Occidental Negros			41.9	3				1	.3			2.5	10.7	.5	1.3	.3	453.1
Murcia, Occidental Negros			3.8	7.6	1.5			.8	22.9			3.6		3.8			364.1
Iloilo			1	4.3					12.7	12.7	12.2			2.5			405
Concepcion, Talisay, Occidental Negros			12.7	1.3	3				38.9	4.1	4.1	.8	1.3	1	8.9		365.8
Tuburan, Cebu			30.7	7.1	.3				12.2	.3		4.3		2.8	.8		231
San Jose de Buenavista			42.7	2.5				1				6.1		27.2	1.3		694.4
Silay, Occidental Negros			10.7	15.8	2.3	.3	9.7		30.5				19	2	16.7		328
Cuyo		7.9		7.6	7.4	1.8			9.4	26.7		1.8		.8	1		310.3
Lucena, Iloilo ^a			8.9	2.5					15.2		14						396.9
Victorias, Occidental Negros			27.9	12.7	13.2		19.6		68.6		9.7	13	3.6	46.7			534.1
Cadiz, Occidental Negros			14.5	11.2	1.8		67.8		11.9	25.9	3.3		2	12.4			347.5
Hacienda Bilbao, Manapla, Occidental Negros			53.3	18.1					42.7		25.9	22.1	10.2	28.2			395.8
Ormoc		15	25.9	32.5						1.8			9.6	29	.5		806.5
Guiluan		15.5	35.3	.8			1	17.8	1.8	3.6	3.7	15.8	63.4	21.8	2.5		398.2

^a Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, October, 1919—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Bogo, Cebu	4.8	7.9				5.1	17.8	15.2	32.3							
Dueñas, Iloilo ^a						17.8	15.2		50.8	24.6						
Bitoaogan, Iloilo (Railroad Iloilo to Capiz) ^a				21.6	10.2	2.3	20.3	12.7	15.2	7.9			27.4	106.7	7.6	1.3
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	30.5	10.2				6.4	9.7	34	27.7	14.5			34.3	77.5	26.9	
Tacloban		1.5	4.6		13.5		19.8	4.8	2.5		9.9		41.9			3.3
Dumarao, Capiz ^a	.5			16.5	50.8	26.6	62.5	39.6	13.8	8.9		1.8	20.3	59.7	3	
Dao, Copiz ^a				27.7		13.2	42.2	9.7	6.1	1.3		3.6	47	111	2.3	
Capiz	4.6	2.8				20.1	13.7	82.5	8	1.5	5.1	24.9	11.2	53.1	1.1	
Borongon		4.1			4.9	30	60.4	6.6	1.8		26.7	8.7	52	10.9	.5	
Catbalogan	1		6.1	1		18	3.8	6.9	36.8	.3	2.5	4.6	49.3	8.4		
Calbayog	.3		3.8			42.7	18.7	7.8	22	1.1	1.4	.3	62.5	3.7		
Masbate					5.1	3	6.3	25.4	6.3				10.2	10.2	4.6	
San Jose Estate, Robles Camp, Mindoro ^a							45.7	12.7	24.1	106.6	10.2			35.6	27.9	
San Jose Estate, Tamaraw Plantation, Mindoro ^a	45.7					13.7	38.1	43.7	53.1			3.3		36.1	25.6	11.4
San Jose Estate, San Agustin, Mindoro ^a			10.7	2.5		6.9	48.3	27.9	20.3	92.2	16.8			39.4	28.4	16.5
San Jose, Mindoro ^a			1			3.8	25.4	18.8	28.7	95.3	19.3			27.4	11	20.5
San Jose Estate, Tunnel D-12, Mindoro ^a			3.3			17	25.4	22.1	32.2	86.6	28.2				31	5.8
Romblon	8.4	.9				2.1	38	1	11.7	10		11.8	.6	60.4	7.9	20.8
Batar	4.1			3	1.3	20.3	31	16.2	60.4				74.5	8.1		
Irosin, Sorsogon	12.7		23.9			3	3.8	15.7	22.1	.5		11.4	29	38.4		
Sorsogon	.5		8	8.9	1.5	7.2	26.7	10.2	39.3	1			42.9	65.3		
Legaspi	1.8		13.2			16.5	1.5	21.4	15.4	2			20.8	44.7		
Sumay, Guam	17.8	16.5	11.4			12.7	2.5	3.8			3.8	11.4	7.1	17.7	3.8	13.9
Calapan	1			(*)	(*)	(*)	(*)	27.5	20.3	4.6	.3			70.1	15	13
Virac	9.7				3	21.9	15.3	6.8	22.1	4.6		3.3	35.3	34.3	9.4	1.5
Naga				23.6				23.7	32	14.5	.8		.8	28	34.9	.3
Tigaon																
Batangas	5.1	11.2			3.8	7.9	10.2	21.8	10.7	11.2				26.2	20.6	4.6
Lucena					1	1.3	37.8	18.3	14.2	7.1	10.2	10.9	5.8	37.8	18.8	2.8
Atimonan		3.8			1.6	.3	124.6	25.4	13	.8	12		3.3	59.4	3.3	
Ambulong, Tanauan					8.6		14.7	1.8	14	22.6	5.3	1		53.6	23.4	
Canlubang, Calamba						13.2	17	9.1	5.6	16	.5			83.1	23.4	
Paracale	3.6		4.6	4.6		3.3	74.8	6.6	43.7	3.5	3		5.8	51	3	8.9
Santa Cruz, Laguna	.5		5		15.5		27.7	30.2	25.9	21.3	7.1	5.1		73.7	40.9	
Fort Mills, Corregidor ^{a,b}					8.4	2.5	1.5	1.8	16.5	16.5		6.1		5.1	8.1	31.3
Alabang, Rizal ^a				7.6	17.8		24.1	10.1	12.7	23.9	6.4	7.9		13.7	23.1	
Lamao, Bataan ^a					93.2		6.1	3.8	19.8	9.4	9.9			2	7.9	19.3
Manila	3.8	7	44.6	56.6	1.5	18.6	30.4	15.4	2.6	10.2	17.3			8.9	15.9	3.2
Antipolo	17.3	30.5	18.3	2.8	3.3	20.8	33.1	39.4	5.9	21.4	5.3	4.6		11.2	11.5	.8
Bosoboso, Rizal ^a	8.1	3	49.5	38.1	2.6	28.7	36.3	50.5	25.4	14.7	5.1	4.3	3	8.4	7.9	1
Montalban, Rizal ^a		6.1	5.6	19.3	5.3	19.3	33	44.2	49.3	34	1	34.5		7.4	4.6	.8
Hacienda Pintong-Sapang, San Jose del Monte, Bulacan ^a	2.8		14.5	19.8		3.8	31.7	34.1	57.6	25.1		2.3		9.1	14	6.9
Mabayuan Dam, Olongapo, Zambales ^a		.8		2.8	9.4	18	15	1.5	1.3	70.9	24.4				.3	2
Pampanga Sugar Mills, Del Carmen, Pampanga ^a			7.1	22.6	61.7	.3	7.6	3.3	6.3	31.5	2.6			1.8	2.6	13.2
Iba	.5				24.4	1.5	51.3		25.9	45.2	12.2		.8			
San Isidro		29.5	8.4		33.8		5.1	8.6	17.6	24.3	1.5		3	4.3	2.3	3.1
Hacienda Luisita, Comillas, Tarlac ^a					15.5	54.6	7.9									
Hacienda Luisita, San Miguel, Tarlac ^a					18.5	51.3	9.4									
Tarlac	2.5	8.9			19	60.8	17.3		3	8.9	1.5		16.5	20.8	2	.8
Baler	6.1			10.4	7.9	13	6.4	15.5	126.5	110.5	36.4			13.2	27.2	83.3
Paniqui, Tarlac ^a						16.5						15.7		20.1		
C. L. A. S. Muñoz, Nueva Ecija ^a					14.2	2	20.3	.5	13	7.9		1	1.5	3.3	3	
Dagupan		2.1			1.8	55.1	1		7.6	.8		2.8				
Bolinao			.3		11.4	3			1.8	13	.8					
Baguio	.2				1.3	19.3	10.4	1.3	13	8.6	1	3.4	1.5			.1
San Fernando, La Union				.5		2.8	.5		9.2	2		1.3				
Echagüe					.8		7.9	38.1	10.6	1.1	1			13.2	7.6	6.1
Sagada, Mountain Province ^a		19.8	.5		2.3	16.6	4.6	5.1	2.5	7.6	10.9					3.6
Bontoc, Mountain Province ^a		11.4				13.5	4.3	3.6	1.3	10.4	20.8					
Candon										1		2.3				
Vigan							4.1		2.5	46.7	1					
Tuguegarao							11.9	79.6	12.2	6.3					3.8	7.9
Laog						.8		7.6	17.1							
Aparri			4.1	.8	.8	1.3		199.6	54.1	4.9				.8	12.7	10.2
Cape Bojeador				2				89.9	30.7			15.5	26.9			
Basco	.9	.5	.5	.5	52	9.2		7.9	104.4	13.2	14.6	30.5	1.5	1.3	1.3	

* No observation from 6 a. m. of the 4th to 6 a. m. of the 8th.
^a Voluntary or cooperative station.
^b Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, October, 1919—Continued.

Station.	Day of month.															Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.		
Bogo, Cebu	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Dueñas, Iloilo ^a				27.6					14	0.5			1.3				227.5
Bitaoan, Iloilo (Railroad Iloilo to Capiz) ^a																	277.6
Lapus, Iloilo, (Railroad Iloilo to Capiz) ^a	39.6	22.1	4.8				3.8	4.3	18.3				36.4	9.1	5.8		377.4
Tacloban			7.9	5.1					15	25.7	13.2		3.8				337
Dumarao, Capiz ^a		1.5	8.6	6.1			10.2	26.9	53.4	5.4			16	18.6			159.1
Dao, Capiz ^a	6.4		16.5	7.3			12.2	8.4	5.1	9.4	15	2.5	21.6	16	13.4		472
Capiz	20.6		10.2	13.9			11.7	23.4	15		7.1	1.8	5.6	12.2	2.5		398.4
Borongan			42.6	8	1	3.3			3.8	1.5	7.6	19.8	9.9	53.8	35.6		345.4
Catbalogan				34.8	6.6		31.8			22.9	.3	1.8	11.7	5.4	.3		386.3
Calbayog	2.3		12.9	8.4	.3		2.1		.3	54.9	14.5	.3	18.3	103.7	2.8		253.8
Masbate		4.3	12.2	6.1			4.1	6.1	26.1					9.7			385.1
San Jose Estate, Robles Camp, D-17, Mindoro ^a	66			3.8				10.2	27.9		3.8		2.5	7.6			140.7
San Jose Estate, Tamaraw Plantation, Mindoro ^a	24.1	22.9	3.8	14.2				28.2	15			4.3	5.1				384.6
San Jose Estate, San Agustin, Mindoro ^a	25.4			2.5				26.7						14			388.8
San Jose, Mindoro ^a	49.3			11.4				30.5	22.1	10.4	.8		2	13.5			378.5
San Jose Estate, Tunnel D-12, Mindoro ^a	19			22.9			.5	30.5	5.1	23.6	11.9	2.5	7.6				391.2
Romblon			14.7	30.1	.3	5.1	8.1	14.2	6.1	8.3	26.5		4.8	8.4	38.9		396
Batag			2.3		2.3		22.4			15.2		2.8	12.2	30	1.3		331
Irosin, Sorsogon		1	27.1	14.8						3.6		3.8	11.7	32.3	3		307.4
Sorsogon		17.1	19.3	5.8	3.1	.8	.8	12.2		12.2	2.5	3.8	19.1	93.5	13		273.5
Legaspi		3.8	52.6	1.8			.8	47.2	4.6	26.7	5.3	6.9	31.2	55.8	7.8		407.5
Sumay, Guam	26.7							8.9			3.8	2.5					382.3
Calapan	.5		2.5	8.4		3		5.6	30.2	16.7		9.9		23.4	36.3		164.8
Virac			16		.5		24.1		2.5	25.4	1.8	5.6	22.4	20			288.3
Naga		6.9	1.5				.8	2.5	1.3	1.3	.3			6.6	.5		285.5
Tigaon																	207.5
Batangas			17.5	40.4			2	8.1	1	1.5	2		2.8	1			209.6
Lucena		3	2	15.5	2.8	19.8	8.9	12.7	2.8		7.2	2.5	3.8	2.8			249.8
Atimonan			48.8	21.9	.5	20.8	35.8	32.6	10.6	21.8	7.1		3.8	.5			451.7
Ambulog, Tanauan			15.2	1.3		.8			6.1	26.4			9.4	16			220.2
Canlubang, Calamba		30.4	31.5	3		2.3			14.7	34.8	7.4	1.8	4.6	24.6	1		329
Paracale	1.8		5.1	20.8	6.1		10.7	124	34.8	10.7	16.8	8.7	49.2	35.9	47.5		589
Santa Cruz, Laguna	9.4	2.3	16	2.8		7.6		*1.6	19.3	54.1	19.8	6.6	22.1	23.2	12.7		445.9
Fort Mills, Corregidor ^{a,b}			8.4						7.6	3.8			3.6	9.9			131.1
Alabang, Rizal ^a		1.3	53.6	4.6					1.8	5.1	5.6	19	3.8	11.4			253.5
Lamao, Bataan ^a			13.4			1.3			8.6	51.1	.8		3	3			248.6
Manila		10.7	65.5	2.3	1.8	.5	8.4	.1	.6	20.1		.3	.8	8.9	1.3		357.3
Antipolo			42.7	8.1			6.9		5.6	2.5	2	34.6	1	15.7	2.8		347.1
Bosoboso, Rizal ^a			59.7	.8					3.6	3	3.3	6.6	1.3	16.5	5.8		386.5
Montalban, Rizal ^a			103.6		.5		2.3		2.3	1.3	4.3	7.6	1.5	6.1	9.7		403.6
Hacienda Pintong-Sapang, San Jose del Monte, Bulacan ^a			50.8	.3				4.6		5.8		7.8	2.3	3.3			296.6
Mabayuan Dam, Olongapo, Zambales ^a		5.8	17.5	66			12.5	.5		.5		5.6	1.8	3.6	.8		261
Pampanga Sugar Mills, Del Carmen, Pampanga ^a	7.6	3.5	50	30.2							3.6	2.5	1.8	1.1	4.3		265.3
Iba			1	3			3.8		1.3	11.9		2.8					185.6
San Isidro			23.6	3		.5				1.3	3		2.8		13.2		188.9
Hacienda Luisita, Comillas, Tarlac ^a																	78
Hacienda Luisita, San Miguel, Tarlac ^a																	80
Tarlac			31	3	3.8		24.9									2.3	217
Baler	1.3	8.9	38.1	12.7		9.9		29.2	4.3	25.7	3	8.1	7.4		22.1		624.4
Paniqui, Tarlac ^a					21.6			14.2			23.9						112
C. L. A. S. Muñoz, Nueva Ecija ^a		3.6	24.9						48.3							12.7	156.2
Dagupan	1.8			5.6	1				3	.5		1.8			4.6		89.5
Bolinao		.3	.3	15.2	3									5.8			54.9
Baguio	4.9	.8	6.2	8.1	16	1.1	1.3	1.6	38.4	10.7	30	16.8					196
San Fernando, La Union		.5		51.6	.5						3.3		.8				73
Echague	3.3	1.8	4.8	2.5	1.5			2.8	19.1	16.5	6.6	8.1	23.4	6.6	1.8		185.2
Sagrada, Mountain Province ^a	16	31.7	17.8	9.4			12.4	2		2.3		12.7			2.3		180.1
Bontoc, Mountain Province ^a	31.2	47.8	45.5	2.5			8.6	10.9		3.3	8	3.6					219.5
Candon	60.7			6						4.3	15						89.3
Vigan	6.6	1.3				.3	2.3						5.4				70.2
Tuguegarao						2	4.8	3.3				7.1		10.2			149.1
Laog		4.2		.4							2.5						40.8
Apurri		23.1	6.1		5.7		30	4.6	4.1	11.7				6.4	21.4		402.4
Cape Bojeador		26.7	.1			3.3	4.1										199.2
Basco	30.2	3.5	.5	.9	11.7	12.2	52.8	.8	.8	29.8	37.1	2.4	1	4.8	5.3		432.1

^a Voluntary or cooperative station.^b Rain in 24 hours beginning 7 a. m.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, OCTOBER, 1919.

Day.	Jolo.		Malamaui, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.4	23.6	27.4	23.4	26.8	23	30.9	23.9	30.3	23.1	25.7	20.3	31.2	22.6	32.9	24
2	30.4	23.3	29.2	22.4	28.8	22.8	31.1	22.5	31.8	22.2	26.7	19	31.3	21.5	33.4	23.4
3	28.6	23.3	28	22.4	28.9	23	30.9	22.7	31.9	22.5	26.8	19.1	32.1	22.6	31.7	23.1
4	31	21.8	30.1	23.4	28.9	23.1	31.4	22.5	31.2	22.9	26.8	18.7	31.9	21.8	33.6	22.5
5	28.7	24	29.8	22.4	28.4	23.5	31.7	22.2	30.3	23.2	27.3	20.1	32.1	22.8	32.8	23.2
6	30.4	22.8	28	22.6	28.1	22	29.8	23	27.7	23	26	19.3	32.3	22.1	33.9	22.8
7	30.7	23	29.3	21.4	28.7	21.8	30.7	22.5	29.7	22	26.8	19.7	31.9	22.6	32.7	23.3
8	28	22.4	28.6	21.4	27.2	21.4	30.2	22.5	29.7	22.5	25.9	19.9	32.4	22.6	33.6	22.5
9	30.4	23.6	29.6	23	28.6	22.4	30.9	22.5	31	22.7	25.6	20.3	32.1	22.2	32.2	21.8
10	29.5	23.6	30.5	23.1	29.5	22.7	31	22.6	32	22	26.6	19	32.2	21.6	31.6	22.8
11	30.9	21.9	30.2	23.4	30.5	22.1	30.7	23.4	32.3	22.5	27.3	18.6	31	22.1	30.7	23.4
12	31.6	22.5	28.1	22.8	28	23.4	26.4	24	29.8	23.5	24.5	19.5	31.2	22.4	29.5	22.6
13	29.6	22.7	28.9	22.4	29	22.8	25	23.1	28.7	23.6	23	20.3	32	24.8	25	23
14	29.8	25.7	28.4	22	27.8	22.8	31.2	21.2	32.4	23.4	24.8	17.6	28.4	21.2	31.1	21.4
15	30.3	22.9	28	21.9	28	23	31.7	21.6	29.3	21.9	26.6	19.5	30	22	32.4	22
16	32.3	23.9	30	22.5	29.7	22.9	32.2	22.5	33.2	22.5	27.5	20.9	32.5	21.6	33	22.9
17	31.2	23.6	32.1	24	29.7	23.6	31.7	23.2	33.2	22.5	28.5	19.8	31.8	22	33.1	22.7
18	30.4	22.3	30.6	23.1	29.5	23.3	32	22.9	32.5	21.4	28.6	16.8	32.4	22.1	32.3	22.5
19	30.9	22.1	31.6	22.2	30	22.4	31.2	23.3	32.2	23.5	28.2	17.7	32.2	22.1	33.5	22.1
20	31.3	22.2	30	24	29.5	23	30	24	31.8	23.5	25.4	19.6	27.6	24	26.7	23.4
21	30.7	23.9	29.6	24.1	29.5	22	31.2	23.2	31.3	23	26.6	20	30.5	22.9	30.8	22.8
22	30.8	23.9	30.6	24	32.6	22.4	32.2	22.5	33.7	23.2	27.3	17	31.1	21.1	32.9	21.8
23	30.3	23.3	29.5	23	29.8	23.6	32.2	23	33.3	23.7	27.3	20	31.8	23.2	34.1	22.4
24	31.4	22.7	28.9	20 ?	29.8	23.4	30.7	24	33.2	23.2	28.8	18	31.8	23.2	34	22.9
25	31.5	21.9	29	22.4	30.5	23.4	31.2	23.5	32.5	22.7	28.5	19	31.1	21.6	33.8	22.7
26	30.5	23	30.6	22.6	29.6	23.4	31.7	22.5	32.8	22.9	28.3	19	31.4	22.1	33.1	22.3
27	31.6	21.7	31.2	22.2	30.5	21.8	31.7	22.5	32.8	22.7	28.3	17.8	31.4	21.3	32.9	22.7
28	31	22.7	30.8	22.4	29.6	22.8	32.7	22.8	33.3	23	28.3	17.1	31.8	22.4	32.1	22.9
29	30.3	22.4	30.8	23.3	29.5	23.4	31.2	23	31.9	23.6	27.6	18.7	32.4	22.2	33.3	22.8
30	30	22.7	29.9	23.3	28.2	23.6	29.7	22.3	29.7	23.5	26.4	18.3	31.2	22	26.2	22.9
31	30.3	23.9	29.8	23.5	31.5	23.2	30.8	22.2	32.7	22.1	27.8	17.6	31.5	22.1	32.4	21.4
Mean	30.5	23	29.6	22.7	29.2	22.9	30.8	22.8	31.6	22.8	26.9	19	31.2	22.2	32	22.7

Day.	Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30	24	28.7	23.5	30.8	23.4	32.1	21.9	30.2	24.2	32.5	22.6	32	24.8	32.2	21.5
2	31	22.5	32.1	24	32.8	24.2	32	20.9	30.4	24.5	32	24	31.8	24.1	31.5	23
3			32.3	24	31.5	24.4	31.8	21.1	31.4	24.7	33	24.2	30.5	24.7	30.3	23.5
4	31.4	22.3	28.7	22.8	31.9	23.3	32.2	21	31.1	25.8	32.8	23.9	31.3	23.9	30.3	23
5	31.8	22.8	31.1	23	33	23.5	31.7	21.7	31.2	25	32.8	25	31.1	24.4	31	24
6	31.4	22.5	31.5	23.4	30.7	23.8	31.6	21.6	30.4	24.6	32.4	23.6	30	24.7	30.5	23.7
7	32.2	23.5	31.3	23.5	32	23.4	30.6	22.1	30.4	23.9	31.5	23.6	30	22.8	30.1	23.1
8	30	22.8	28.8	23.5	29.2	23.6	29.6	22.9	31.3	24.6	32	23.5	28.8	23.7	29.3	23.6
9	30.4	23.3	28.2	23.6	30.9	23.7	28.6	22.6	31.9	24.3	32	23	29.6	24.3	28.6	23.7
10	31.4	24	30	23.5	32.4	23.9	30.5	22.5	30.8	23.3	32.8	24.6	30.1	25.2	28.8	23.5
11	31.5	24	30.2	22.7	31.2	24.3	31.5	21.6	27.3	24	30.6	24.6	31.2	24.8	30.8	22.3
12	31.7	24.5	29.9	25.2	32.8	23.9	30.5	22.7	29.9	23.4	32.4	23.2	31.2	24.8	31	24.8
13	32.1	24.7	31.2	24	31	23.5	33.3	21.7	27.8	23.2	28.4	24	31.5	23.9	31.7	22.5
14	27.3	22	30.2	24.1	26	22.6	29.6	23.3	26.8	23.2	28.4	22.8	26.6	22.9	25.2	22.9
15	30.5	22.8	30.9	24.9	29.7	22.8	26.6	22.2	30.7	22.9	30.5	24	28.1	24	28.5	22.8
16	32.8	23.8	31	24.5	32.1	23.8	30.7	22.7	31.2	24.7	32.6	23.8	30.3	24.9	29.8	23.3
17	32.2	22.9	31.3	25.2	32.7	22.6	32.1	21.3	30.7	23.8	33	23.4	31.2	24.1	29.9	24
18	31.8	22.6	31.7	24.6	32.4	23.7	32	21.3	31.3	24.9	32.5	23.8	32.1	24.3	30.5	25
19	32.3	22.7	32	26.7	33.1	24	32.1	21.5	30.7	24.9	32.8	23.6	32	25	30.8	23.3
20	31.7	25.2	32.2	24.6	30.5	24.5	31.8	21.5	28.7	24.6	32.5	23.6	30.1	25.6	29	24.9
21	31	24.2	28.2	23.9	33	23.2	31.3	21.9	29.4	23.6	32.8	23.5	30.5	25.1	30.1	23.9
22	31.4	24.6	30.4	23.9	32.3	22.6	31.5	20.4	31.4	23.3	32.4	22.6	32.2	25.5	30.1	23.7
23	32	24.7	30.6	24.8	32.2	23	32.7	20.9	30.8	23.7	33.5	22.8	31	24.5	30.8	23.8
24	31.8	23.8	30.7	24.2	32.2	23.4	32.9	21.6	31.3	23.6	32.4	22.4	31.8	25.5	31.2	23.9
25	31.6	23.5	30.5	23.7	32	23.5	31.9	21.9	31.1	23.5	32.5	23.4	31.6	24.7	29.6	23.8
26	31.4	23.4	31.2	23.6	32	22.7	31.6	22.5	30.4	23.9	33	24	31.5	23.8	32	23
27	31.4	23.8	31.3	25.6	31.8	23.3	31.5	22.6	29.8	23	32.8	23	31.8	24.5	31.1	23.5
28	32.2	24.5	30.6	25	32.6	23.3	31.4	21.3	28.1	23.6	32.5	22.6	31.2	24.8	31.3	23.5
29	32.6	25.3	30.3	25.3	30.8	23.5	30.6	22.5	30.4	24.2	32.2	23.2	31.6	25.7	31.3	24.5
30	29.7	24.9	30.9	26.8	31.7	23	28.7	22.7	26.5	22.6	31	22.6	29.7	23.9	31.3	24.5
31	31.4	22.9	31.4	25.7	31.2	21.9	28.1	22	29.9	22.6	31	22.5	31.4	24.3	31.2	24
Mean	31.3	23.6	30.6	24.3	31.6	23.4	31.1	21.9	30.1	23.9	32.1	23.5	30.8	24.5	30.3	23.6

Maximum and minimum temperatures at the stations of the Weather Bureau, October, 1919—Continued.

Day.	San Jose de Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	32.2	22.7	31.2	26.4	32.5	23.6	32	23	33.3	22.5	31.5	24.2	32.4	21.9	31	21
2	31.8	23.6	32	24.4	32.6	23.8	31	23.2	32.1	24.2	31.1	23.6	33.6	22.5	31.5	22.5
3	31.8	23.2	31.9	23.5	32.3	23.9	30.7	24.2	32.8	23.5	32.4	23.6	33.3	21.9	31.7	22.5
4	31.7	22.7	33.3	24.2	33.6	22.9	31.5	23.3	33.2	23.3	32.5	23.5	32	23.7	31.6	24.5
5	32.2	22.4	32.4	24.2	33.4	22.9	31	24.3	33.4	23.2	32.3	23.8	24.2	32.4	32.6	23.7
6	30.4	22.7	28.7	24.3	31.6	23.3	32.4	23.7	32.2	23.5	31.6	23.9	32.1	22.9	31.9	23.7
7	30.5	22.5	30.8	24.1	32	23.9	30.4	23.8	32.1	22.8	30.4	23.6	30.6	22.8	29	22.7
8	30.8	22.9	29.2	23.5	31.4	23.8	31	23.2	32	22.8	30.5	23.2	31.6	21.4	30.1	23.2
9	28.8	23.1	27.3	24.4	31.6	23.7	30.4	25.7	31	22.9	30.9	23.3	32.1	22.7	30.8	23.7
10	29.7	23	28.3	24	31.4	24.9	31	23.5	32.8	23.5	31.6	23.3	31.2	23	31.7	23.2
11	32.8	22.1	30.6	23.3	31.2	23.5	32.5	22.2	31.7	23.5	32	24.8	31	23.8	30.5	24
12	32.9	23.7	30.9	23.5	32.6	22.2	31.6	22.6	31.6	23.3	30.2	24.4	32.6	23	31.7	21.5
13	31.8	22.2	30.8	27	31.5	23.4	29	23.7	29	23.7	31.4	25	29.6	24	30.2	22.5
14	27.3	23.4	27.8	24.2	30.2	23.2	30.9	22.6	27.5	23.5	26.9	24.5	29.6	25.8	29.5	23.7
15	28.5	19.1	27.2	22.2	32.2	23.9	31.5	24	32.6	23	28.9	24.1	31.4	22.8	31.5	24
16	30.8	22.9	29.4	24.8	33.2	25.4	32.1	26.9	34	23.4	32.7	23.4	33.4	23.3	32.5	23
17	31.3	22.2	30.7	23.7	33.3	22.5	33	23.4	33.8	23.5	32.9	23.6	32.4	23.6	31.8	22.2
18	31.7	22.8	30.2	22.8	34	22.4	31.9	23.9	32.2	23	32.9	23.7	33.3	22.8	31.6	22.7
19	31.8	22.2	31	23.6	33.6	22.9	31.5	24.1	32.5	23.9	32.3	23.7	32.2	23.6	31.9	24
20	29.8	23	28.6	25.3	28.9	24	31.7	23.7	32	24	28.9	23.4	30.8	23.1	30.7	23.5
21	32.3	23.1	30	24.8	33	21.7	32	24.5	32.5	22.5	30.3	24	31.4	22	29.9	20.9
22	32	21.6	29.9	26.8	33.6	21.5	33	23.7	33.7	23.5	31.8	24.2	31.6	22	31.2	20.5
23	31.7	22.2	30.9	26.3	33.2	21.6	33.4	23.4	33.8	23.6	32.4	24.1	31.4	23.5	30.1	21.5
24	31.8	22.7	30.9	26.3	33.2	22.3	31.9	23.7	33.6	23	31.4	24.4	31.4	22.8	31.6	22.4
25	31.2	22.8	30.4	23.5	34	22.1	31.2	23.7	33	23	31.2	23.4	30.8	22.7	32	22.7
26	31.9	22.3	31.7	23.1	33.4	22.8	33.5	22.7	34.6	23.1	31.6	22.4	31.1	22.4	31	23
27	31.8	22.6	31.6	23.8	33.6	21.8	32.5	23.3	34	22.5	31.6	23.9	31.3	22.3	31	21.7
28	32.2	22.2	31	24.8	33.4	22.4	32.5	24	31.5	23.6	32.3	24.9	30.6	23.8	31.5	22.5
29	32.3	22.3	31.1	25.8	32.1	23.3	32.3	24.7	33.3	24.3	31.9	25.5	31.4	23.2	30	22.8
30	32.7	23.4	31	26.3	29.9	23.9	30.4	23.7	29.5	24	31.7	24.7	29	23.6	30.1	22.7
31	32.8	22.6	32.3	24.1	32	23.4	31.2	24	31.4	24	31.1	24.5	30.1	23.4	30.5	22.9
Mean	31.8	22.6	30.4	24.6	32.4	23.1	31.6	23.7	32.3	23.4	31.3	24	31.5	23	31	22.7

Day.	Calbayog.		Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.1	21.6	31	25.6	31.8	22.3	30.8	24.9	31.5	21.9	32.3	21.8	28.4	23.4	33.5	21.7
2	31.4	22.9	31.4	25.8	31.9	23.7	31.1	24.5	31.7	22.3	32.3	22.5	29.4	24	33.2	23
3	32	22.7	31.6	25.5	32.8	23.4	30.9	24.2	32.6	21.3	35.2	22.4	30	23.6	-----	23
4	30.9	24	31.8	26.4	31.9	24.2	31.8	23.5	31.5	23.5	32.5	23.9	31	23.8	-----	-----
5	30.7	23.3	31.6	25.8	31.4	24.3	31.7	23.3	30.6	22.6	32	24.4	31.6	23.8	-----	-----
6	29.9	23	32	25.2	32	24.1	31.5	23.5	32	21.9	33.3	23.1	32.2	23.8	-----	-----
7	28	22.3	30.6	25.2	29.8	23.7	29	23.7	29.3	23	30.8	23.9	32.2	24.6	-----	-----
8	29.7	21.8	30.8	24.5	30.9	22.7	30.2	22.8	30	21.9	30.1	23.9	31.2	24.6	30.6	-----
9	30.5	23.5	30.2	24.4	30.5	23.9	30.3	23	29.3	21.3	29.9	23.5	31.2	25.2	31.1	23.4
10	31.5	22.7	31.2	25	29.4	24.2	31	22.5	30.5	22.6	31	23.7	31.2	25.2	31	22.9
11	29.9	22.6	31	24.6	32	22.7	30	24.4	32.3	21.5	32.4	23.9	31.2	25.4	31	23.1
12	31.5	22	30.8	24.6	32.4	22.9	31.4	24.7	32.5	20.5	32.6	23.6	31	24.6	33.5	23
13	30.3	22.8	31	26	32.3	23.7	27.8	25	32.6	21.6	32.8	22.8	30.6	24.6	33	22.5
14	29	23.7	28	20.8	28.4	24.3	27.8	22.3	28.8	22.6	28.4	24.9	30.4	25	30.1	24
15	30.1	22.9	30.4	24.8	30.9	24.3	29.5	23.6	30.5	22.4	29.8	24.9	30.2	24.2	30.6	22
16	31	23.2	31.6	24.6	31.5	23.3	31.3	23.1	32	22.2	32.3	23.6	30	24.6	31	23
17	31	22.8	32.4	25	31.4	23.4	31.4	23.5	31.9	21.9	33	23.9	28.6	25	32.2	23.5
18	30.5	23	32.6	24.6	32.5	24.7	31.3	23.5	31.6	22.2	32.3	24.3	29.4	24.6	32.5	22.5
19	30.9	24	32.4	25.4	32.4	23.6	31.1	25	32.3	22.1	31.2	23.7	30	25	31.4	23
20	29.1	23.7	29.8	25	29.5	24	31	24.4	31.4	23.1	30.8	24.1	30.6	26	30.5	24.1
21	31.1	21.9	30.4	25	31.3	24.7	30.4	24.6	30.4	24.4	30.8	25.3	31	24.2	32	22.7
22	30.5	21	30.6	25.6	31.4	23.3	31.1	24.4	31	23.3	32.1	25.4	31	24	31.5	22.7
23	30	21.7	30.8	25.4	32.1	23.9	29.8	23.9	31.7	23	32.1	23.4	31	25.4	32.1	24
24	30.5	22.2	30.8	25.2	31.3	23.7	30	23.5	32.4	24	31.6	24.1	31.2	26.2	31.5	23
25	30.9	21.9	30.4	24.6	30.4	23.4	30.4	23.8	32.5	22.6	31.6	23.5	31.6	25.4	31	23.2
26	30.6	21.8	31.4	23	30.6	23.6	30	23.5	31.5	23.1	30.1	23.5	30.2	25.8	30.6	23
27	30.5	21.7	31.4	24.8	30.7	23.2	30	23.4	31.4	22.5	30.1	23.5	30.4	25.8	32	22.5
28	31	22.7	31.2	25.5	31.5	23.2	30.1	24.6	32	24	30.9	24.5	29.2?	25.4	31.1	25
29	31.6	22.8	31.6	25.4	32.3	24.8	30.4	24.5	31.4	23.4	31.2	24.5	31	25.2	32	25
30	31.4	22.6	31.4	25.4	31	25.2	30	24	31.7	23.7	27.8	24.7	31	25.2	31.8	24
31	30.5	21.9	31	23.6	31.3	23.1	30.1	22.4	31.5	23	31.3	23.6	30	24.6	31.1	22.5
Mean	30.6	22.6	31.1	24.9	31.3	23.7	30.4	23.8	31.4	22.6	31.4	23.8	30.6	24.8	31.6	23.1

Maximum and minimum temperatures at the stations of the Weather Bureau, October, 1919—Continued.

Day.	Virac.		Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	29.9	22.4	33.1	21.6	30.8	20.4	32.6	20.4	31	21.4	30.6	25.8	33.8	22	32.5	21.6
2	31.8	22	33.2	22.9	32.4	20.2	32.2	22.6	30.6	22	31.2	24.3	33	21.8	34	20.8
3	33.2	22.9	33.6	22.3	32.6	19.7	31.8	24	31	22	32.1	23.5	31.3	24.9	34.2	21.2
4	33.4	22.2	33.6	23.3	33.5	21.5	32.2	23.7	31	22.8	32.2	23	32.3	24.2	33.9	23
5	31	23	33.5	23.4	33.6	21.6	33.3	24	30.9	23	31.7	23.5	31.4	23.2	34.3	22.9
6	31.3	21.9	33.4	22.7	33.7	20.4	32	23.8	32	23.9	31.2	23.8	34	24	33.5	23
7	31.2	23	32.1	23.5	32.2	22	31.5	22.7	30.4	23.4	30.4	24.2	31.3	24	30.6	22.8
8	30.8	22.5	31.4	23.4	30.7	21.6	29.7	23.5	27.9	22.9	26.3	23.6	28	23.8	30.5	23
9	30.3	24	31	23.5	29.9	21.2	31.2	23.4	28.5	23.4	28.9	23.2	30	23.8	29	22.5
10	30.6	23.3	29.2	23.3	29.2	22.4	31.2	23.4	29.3	24	30.6	23.6	30	24.1	30.5	23
11	30.5	23	33	22.8	31.1	21.7	32	23.7	28.5	24	30.6	24.5	31.4	23.4	31.5	23
12	31.4	22.5	33.1	23.5	32.6	20.8	32.2	23.8	30	23.9	30.9	23.9	32.2	23.5	31.6	22.2
13	32.8	22.4	31.7	24.2	32.2	21.4	32.5	22.2	30.5	22.3	30.3	25	32.3	23	31.9	21.5
14	28.8	24	27.4	23.9	30.1	22.9	30.5	23.4	28.2	24.1	28.3	23.4	31.1	23.6	30.4	21.4
15	29	23.9	31.8	23.9	29.9	22.8	30.8	23.2	29	22.6	28.8	24.9	29.1	23.4	28.4	21.6
16	31.2	23	33.5	23.5	31.2	21.4	31.7	23.3	30	23.5	31.6	24.2	31	24.2	31.2	22.6
17	33.9	23.1	33.4	23.8	31.5	21.8	32.5	23.8	29.7	25.2	32.1	23.6	31.8	24.9	33.5	22.7
18	34	23.7	33.4	23.8	31.6	21.6	32.5	23	30.6	22.6	31.8	23.4	33.2	23.9	31	22.2
19	31.5	23.2	33.1	23.4	32.3	21.1	32.4	23.8	31.5	23	32.2	23.4	30.1	24	32	22.5
20	31.9	23.1	32.4	22.9	30.6	22.3	30.1	23.3	28.7	23.7	28.2	23.9	29.3	23.6	30	22.6
21	31.8	22.4	32.4	22.9	30.6	20.6	31.4	21.6	29.5	23.4	29.2	25.9	31	23.7	30.2	22.4
22	31.2	23.1	33.3	21.4	31.9	20.4	31.7	21.5	27.6	23	27.9	24.2	30.5	22.7	30.4	21.8
23	31.4	22	32.5	22.5	31.6	20.9	31.4	23.8	29.5	22.9	29.4	23.6	32.8	24.7	31.1	23
24	31	23.3	31.5	23.2	31.1	21.8	31.3	21.7	28.5	23.4	27.4	24	32.3	22.5	31.9	21
25	31	22.5	33.3	23.1	31.1	21.6	31	22.9	29.5	23.1	29.9	22.9	31.7	24	31	22
26	29.7	22.4	31.1	22.2	30.9	21.9	31.1	22.6	29.5	23.4	30.5	22.5	30.5	23.8	30.4	22.1
27	30.5	22.2	30.6	22.8	31.9	21.2	29.7	22.3	29.5	23.5	29.4	24.6	29.2	23.5	28	22.2
28	30.6	22.3	32.2	22	30.7	21.4	33.1	22.9	29.9	23	29.4	24.3	31.2	23.2	30.3	22.1
29	30.5	23	32.4	22.6	31.7	21.6	31.9	24.3	30.5	23.9	29.2	25.1	31.2	25.1	31	22.2
30	30.4	23.2	31.3	22.9	31.3	22	32	23.4	29.5	23.7	29.2	25.8	30	23.8	30.4	23
31	30.7	22.8	31.5	22.8	30.4	21.4	31.8	23.3	29.5	23.9	29.4	25.8	30.7	24.2	30.6	22.3
Mean	31.2	22.8	32.2	23	31.5	21.4	31.7	23.1	29.8	23.3	30	24.1	31.2	23.7	31.3	22.2

Day.	Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.3	23.5	31.1	21.4	31.1	21.6	30.8	19.5	31.2	22.5	33.1	21.6	35	21.6	31.6	20.7
2	31.5	23.6	33.4	22	32	22.3	32.2	20.9	31.3	23.6	34.4	23.8	35.2	22.2	32.4	22.5
3	31.3	23.5	33.5	24.2	32	24.2	32	22.7	31.9	23	33.1	24	35.6	21.8	32.9	22.7
4	31.6	24	33.3	24.5	32.1	23.2	32.2	22	32.4	22.8	33.1	24	35.2	21.8	33.5	23.5
5	31.7	25	33.9	24	32	24.3	31.7	22	32.3	23.8	32.6	25.4	35.2	22	31.3	24.3
6	31.5	24	32.4	23.7	31.9	24.7	31.8	22.9	31.2	24	32	23.8	33	22.4	31.2	23.7
7	31.1	23.8	30.6	24	30.9	23.4	29.7	21.2	31.6	24.8	31.5	23.2	34.2	21.6	29.9	22.7
8	27.8	23.6	27.6	23	26	23.3	26.2	20.8	29	23	27.2	24.1	33.8	22.8	30.1	22.8
9	30.4	23.2	28.9	23.4	28.4	23.4	26.1	22.2	31.6	23.8	28.8	23.9	33.8	22.3	28	23.1
10	28.4	23.5	30.5	23	31.2	23.5	29.6	22.3	31.2	23.8	30.2	23.4	32.4	23	28.5	23.4
11	31.2	23.2	31	23.8	32.3	23	31.4	22.6	29.2	24.1	30.9	23	34	21.8	31	23.3
12	31.1	23.7	32.1	23.5	32.3	23.1	32.2	21.5	30.2	22.9	30.8	23.2	34	22.4	29.5	22.7
13	31	23.3	31.6	22.6	31.4	22.6	31.6	21	31.7	23	31.8	22.9	31.2	21.6	31.4	21.7
14	27.8	23.3	30.5	22.8	32	23.3	30.7	20.8	31.6	23.1	33.1	23.6	33.8	22	31.7	22.5
15	29.5	24.8	28.8	23.3	28.8	23.3	27.7	21	31.5	24.2	29.4	23.4	30.5	22.4	32	22.9
16	30.3	24.3	32.5	23.9	32.5	24.4	31.7	23	33.1	25.2	31	23.8	32	22.4	29.4	24.4
17	32.1	23.5	33.1	23.2	31.7	24.7	33	23	31	25	30.9	24.2	32.4	22.1	31.6	23.4
18	31.8	24	32.3	23.3	31.6	24.1	31	22.6	31.1	24	31.4	24	33.3	21.5	32.2	22.4
19	31	24.3	32.3	24.2	31.6	24.5	31.3	23	31	23.9	32.1	24.4	32.2	21.2	32.4	22.4
20	31.2	24.2	29.3	24	30.5	23.5	29.3	22.6	29.4	24.9	30.4	23.8	31.2	22.1	30	23.3
21	31	26.3	29.6	23.6	30.3	22.7	29.7	21	31.6	23.6	30.4	22.4	32.6	21.4	31	21.9
22	30.3	24.4	30.1	22.2	30.2	22.1	31.2	20.7	31.3	22.9	30.1	21.5	33	20.6	31.3	22
23	31.5	24.7	31.3	23.1	30.9	23.3	32.2	20.6	31.6	23.2	31.4	22.9	31.6	21.6	32	23.1
24	30.3	23.8	30.6	22.1	31.6	21.6	32.7	20.2	31.2	23.1	32.4	22.5	33.5	21.5	32.1	21.6
25	30.8	23.5	30.7	23.5	29.9	23.2	30.7	21.5	31.2	23.5	28.6	23.6	30.5	22	30.1	23.2
26	31	22.8	32	23.5	32	22.9	32.8	21.3	31.7	22.8	29.8	22.1	33.8	21.2	32.1	22.2
27	30	23.8	27.4	23.6	28.1	23.7	27.4	21.5	31.1	23	29.1	22.5	31.8	21.4	31.1	23
28	29.5	24.9	30.2	23	31	22.7	30.7	21.5	31.3	23.2	30.4	22.4	34.2	21.6	32.1	22.1
29	29.7	24.4	29.8	24.1	30.6	23	30.5	21.4	31.7	22.8	29.4	22.4	34.4	21.2	31.1	22.3
30	29.2	23.8	30.2	23.7	29.8	24	28.8	22.5	33	24.8	32	23.4	35	21.2	32.7	21.5
31	30.3	24	29.7	23.3	30.6	23.1	30.7	21.5	30.5	23.4	28.4	22.6	30	21	31.8	23.1
Mean	30.6	24	31	23.3	30.9	23.3	30.6	21.7	31.3	23.6	31	23.3	33.3	21.8	31.2	22.8

Maximum and minimum temperatures at the stations of the Weather Bureau, October, 1919—Continued.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, La Union.		Echague.		Candon.		Vigan.		Tuguegarao.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	34.7	23.3	32.5	23.5	22.6	15.2	33.5	23.3	32.9	21.6	31.5	25.1	33.4	24	35.4	21.6
2	33.9	24.9	32.8	24.8	24.1	15.7	32.5	23.8	34.1	24.2	32.5	24.8	33.1	24.5	34.7	23.1
3	33.7	24.8	32.6	23.7	23.2	16	33	23.3	34.4	22.7	32.6	25	33.1	23.5	32	23
4	32.5	26	31.5	27.7	23.5	16.2	33.1	23.5	33.4	23	32	25	32.1	23.4	33.4	22.5
5	33	24.9	31.6	27.4	24.1	16.7	33	24.6	34.4	24.4	32	25.5	31.9	23.4	34.6	23.4
6	34.6	23.8	33.2	25	22.8	17.5	33.9	25.8	35	24	32.5	26	33.5	25.4	34	23.4
7	33.9	23.5	32.6	24.5	23.5	15.9	31.9	23.3	30.1	22.6	31.6	26.2	34	24.7	33.8	23.2
8	31	24.4	32.8	24.4	20.5	16	31	23.4	24.5	22.6	32	24	33.6	23.2	25.2	22.5
9	32.4	24.1	31.6	24.9	21.5	16.1	32.5	24.5	26.8	22.2	30	25.8	33.6	23.2	25.6	21.4
10	33	23.9	34	24.5	22.6	16.1	32.5	23.6	30.7	23	31	25	32.6	23.5	30.6	23.4
11	30.6	23.8	31.1	24.6	21.1	15.9	33.1	23.9	30	22.2	32.4	25	30.8	24	31.3	24.5
12	32.5	23.6	31.2	24.4	22.6	16	33.5	24.6	33.4	22.9	32	25.9	32	24.6	34.2	23.5
13	34.5	23.8	32.7	24.2	22.7	15.9	32.5	23	33.9	21.6	32	25	32.3	23.5	33.5	22.8
14	34.1	24.2	31.7	25	23.1	16	32.8	23.2	32.4	22.2	32	24.4	33.9	24	31.4	21.6
15	33.2	24.4	31.5	24.4	21.7	15.5	32.7	24.6	26.1	22.3	31.9	24	35	24	30.1	21.8
16	31.8	25	33.7	25.4	23.8	17.4	32.7	23.8	27	23	31.9	25.8	34.7	25.2	27.5	23.8
17	34.1	24.6	32.4	25.5	21.6	16.8	33.1	24.3	32.1	21.6	30.4	26	30.5	25	33.5	23
18	33.4	23.9	33.1	24	22.8	15.2	32.8	23.1	32.5	22.4	31.5	24.4	31.5	24.2	32.5	24.1
19	33.2	24.9	30.5	24.7	22.6	16.2	32.9	24.1	32.6	24	32	25.7	33.2	24.1	32.5	23.8
20	32.5	23.5	31	24.9	22	16.2	32.6	24.5	29.2	23.2	31.5	25.5	31.5	24.4	30.8	23
21	33.5	22.8	32.5	23.3	23.3	15.1	31.5	23.7	27.5	21.4	31.5	24.5	32.9	24	28.2	21.7
22	33.6	23.3	32.6	24.3	21.9	15.1	31.8	24	31.5	22.4	31.6	25	32.1	24.2	31.4	22.9
23	33.3	23.6	31.4	23.8	21.3	15.7	32	23.3	31.6	22.6	31.6	25	33.2	23.8	34.4	23
24	33.9	23.6	30.4	23.7	23.3	15.7	31.8	22.9	29.1	22.2	31.9	24	32	22.1	29	22.5
25	33.1	24	32.2	23.3	21.8	15.3	32.5	23.7	28.8	22.1	31.6	24.5	32.6	25	29.8	22.4
26	33.7	23	32.2	24	22.6	15.4	32.3	23	32.1	22.8	31.5	25	32.4	24	32.2	22.6
27	33	23.1	32.7	23.8	22.5	15.4	32.7	23	32.6	22.4	32	24.5	33.5	24	33	22
28	33	23.7	32.5	24	23	15.7	32.2	22.6	32.6	22.5	31	23.6	32.2	23.5	33.6	23.5
29	35	23.5	33	24.4	24.1	15.9	32.8	23.3	31.6	22.2	32	24.5	32.5	24.1	32	22.5
30	34.8	23.9	33	24.3	24.3	15.9	33	22.6	30.4	22.5	31.7	24.5	32.9	24.7	28.6	22.4
31	34.7	23.9	33.5	24	24.3	15.6	32.8	23.5	32.3	23	32	25.5	34.1	24.6	30.6	22.9
Mean	33.4	24	32.3	24.5	22.7	15.9	32.6	23.7	31.1	22.6	31.7	25	32.6	24.1	31.6	22.8

Day.	Laoag.		Aparri.		Cape Bojeador.		Basco.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	33.7	21.3	33.7	22	33.8	23.4	30.9	22
2	33.7	23.3	33.6	22.7	32.3	23	29.3	24.3
3	34.1	22.7	31.7	23	31	23.8	30	22.4
4	32	23.2	33.2	22	31.2	24.2	31.3	23.4
5	32.5	23	33.7	23.4	29.8	22.9	30	23.5
6	33.3	23.7	33.3	23.5	32.2	24	28.2	22.2
7	34.3	23.8	33.2	23.8	32.2	24.8	30	22
8	34.6	21.6	30.6	24	30.8	24.2	30.1	24
9	27.6	23.4	26.2	22.6	24.5	21.7	26.9	22.6
10	32.7	24.3	29.5	23.2	27.6	23.4	26.9	22.8
11	32.4	24.5	32	23	31.6	24.2	30.5	24.5
12	31.5	24.4	32.8	23.5	29.5	23.7	30.5	24.1
13	32	23.5	32.6	23	30.6	23.3	30.7	25
14	33.4	21.9	32	23.1	30	23.7	31.8	23.5
15	33.9	21.9	32	22.5	29.3	23.5	31.6	23
16	34.2	24.5	28.7	22.6	32.6	24.7	30.5	24.2
17	31.6	25.2	32	22.6	29.5	24.7	31.2	24
18	32.8	24.6	27.7	24.1	29.8	24.1	30.1	23.5
19	32	23.5	31.7	23.5	31	22.7	30.8	23.8
20	32.7	23	31.1	23.6	29.1	23.6	27.7	22.1
21	33.1	20.7	30.3	21.5	30	22.5	26.7	21.7
22	32.2	22.5	30	22	31	22.6	29.2	21.7
23	31.6	23.8	32.1	22.8	28.2	23.4	25	22.5
24	33.8	23.2	27.4	22.2	27.1	20.8	27.8	20.5
25	34.4	21.9	30.5	23.6	28.5	23.5	29.2	22.2
26	34.7	22.1	29.3	22.6	27.8	23.9	28.3	22.5
27	32.4	23	30.3	21.3	31.1	23.7	30.3	23
28	33.2	22.7	31.5	22.4	28.5	24.1	28.8	23
29	33.7	22.7	32	22.8	29.2	24.1	29.9	22.6
30	35	22.4	30.7	23.2	29.9	24.4	31	23.4
31	34.4	22.9	29	22.5	29.1	24.5	29	24.6
Mean	33	23.1	31.1	22.9	30	23.6	29.5	23.1

SEISMOLOGICAL BULLETIN FOR OCTOBER, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

- 1, 13^h 55^m [1, 21^h 55^m]. Candon (NW Luzon). Earthquake of intensity III.
- 2, 1^h 8^m [2, 9^h 8^m]. Butuan (N Mindanao). Oscillatory earthquake, direction N-S, intensity III, duration 2 seconds.
- 3, 2^h 13^m [3, 10^h 13^m]. Port Lebak (SW Mindanao). Earthquake of intensity III. It was recorded by the seismograph at Butuan.
- 5, 8^h 24^m [5, 16^h 24^m]. Candon (NW Luzon). Earthquake of intensity III.
- 6, 5^h 53^m [6, 13^h 53^m]. Port Lebak (SW Mindanao). Earthquake of intensity III. It was registered at Butuan.
- 8, 5^h 11^m 16^s * [8, 13^h 11^m 16^s]. SE Luzon, Masbate and Samar. Extensive earthquake felt in the provinces of Camarines, Albay and Sorsogon and in the islands of Masbate and Samar; its intensity did not pass No. IV of the scale: the origin seems to have been in the San Bernardino Strait. It was registered at Butuan.
- 13, 5^h 38^m 12^s * [13, 13^h 38^m 12^s]. Central Mindanao. Earthquake felt in the provinces of Lanao, Bukidnon, Agusan, Cotabato, Misamis and Davao. It had intensity IV-V in Davao, IV in Butuan and II-III in Cagayan, Cotabato and Bukidnon. The epicenter was probably near to S Mindanao and E of Celebes Sea. It was registered at Batavia.
- 15, 19^h 22^m [16, 3^h 22^m]. Surigao (NE Mindanao). Oscillatory earthquake, direction WSW-ENE, intensity III, duration 5 seconds. It was recorded only by the seismograph at Butuan.
- 16, 21^h 30^m [17, 5^h 30^m]. Candon (NW Luzon). Earthquake of intensity II-III.
- 23, 5^h 7^m [23, 14^h 37^m]. Yap (Western Carolines). Earthquake of intensity III.
- 23, 11^h 20^m [23, 19^h 20^m]. Port Lebak (SW Mindanao). Earthquake of intensity II-III.

¹The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismograph at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), Insular time being added in brackets for the convenience of Philippine readers.

RECORDS OF THE MICROSEISMOGRAPH.

(Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. $A_N: T_0=6.25, \epsilon=2.906, \frac{r}{T_0^2}=0.058;$

$A_E: T_0=6.18, \epsilon=2.393, \frac{r}{T_0^2}=0.042.$ Alluvium. 2.40 meters above sea level).

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
360	3	Ir	e F	9 49 22 10 35				
361	4	Ir	e F	17 57 18 22				
362	8	Ir	eP S L M _N M _E	4 46 36 51 22 53 53 54 30 56 11	12 11	47 36		F on next earthquake.
363	8	IIv	eP L M _N M _E F	5 11 16 12 05 12 10 12 14 33	2 2	245 135		Felt in Masbate, Samar and SE Luzon.
364	9	I	e F	7 02 26				
365	12	Ir	eP S L M _E M _N F	21 54 14 58 06 59 40 22 01 00 01 07 23 04	8 7	58 71		
366	13	I	eP F	5 38 12 6 11				Near to S Mindanao and E of Celebes Sea.
367	15	I	e F	15 48 12 16 21				
368	16	Iv	eP F	21 39 34 43				
369	18	Iv	eP F	6 46 24 49				
370	19	Iv	eP F	12 56 47 59				
371	21	I	e F	21 28 42 58				
372	22	Iv	eP F	12 19 34 22				
373	23	Ir	eP F	16 06 30 17 07				
374	26	Ir	eP F	18 07 58 49				
375	26	Ir	eP S L M _E M _N F	18 54 12 57 00 57 48 58 07 59 38 20 05	7 8	18 22		
376	27	I	e F	4 01 43				
377	29	I	e F	12 23 47				
378	31	I	e F	15 50 48 17 06				
379	31	IIr	eP S L M _N M _E F	19 04 39 06 52 07 22 08 10 08 46 20 30	9 10	195 304		

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

1, 13^h 55^m [1, 21^h 55^m]. Candón (NW de Luzón). Temblor de tierra de intensidad III.

2, 1^h 8^m [2, 9^h 8^m]. Butúan (N de Mindanao). Temblor oscilatorio, dirección N-S, intensidad III, duración 2 segundos.

3, 2^h 13^m [3, 10^h 13^m]. Port Lebak (SW de Mindanao). Temblor de tierra de intensidad III. Registrado en Butúan.

5, 8^h 24^m [5, 16^h 24^m]. Candón (NW de Luzón). Temblor de tierra de intensidad III.

6, 5^h 53^m [6, 13^h 53^m]. Port Lebak (SW de Mindanao). Temblor de tierra de intensidad III. Registrado en Butúan.

8, 5^h 11^m 16^s * [8, 13^h 11^m 16^s]. SE de Luzón, Masbate y Sámar. Extenso temblor de tierra sentido en las provincias de Camarines, Albay y Sorsogón y en las islas de Masbate y Sámar; su intensidad no pasó del grado IV: el epicentro parece se hallaba en el Estrecho de San Bernardino. Fué registrado en Butúan.

13, 5^h 38^m 12^s * [13, 13^h 38^m 12^s]. Centro de Mindanao. Temblor de tierra sentido en las provincias de Lanao, Bukidnon, Agusan, Cotabato, Misamis y Dávao. Tuvo intensidad IV-V en Dávao, IV en Butúan, y II-III en Cagayán, Cotabato y Bukidnon. Su origen se hallaba probablemente cerca del S de Mindanao y E del mar de Célebes. Registróse en Batavia.

15, 19^h 22^m [16, 3^h 22^m]. Surigao (NE de Mindanao). Temblor oscilatorio, dirección WSW-ENE, intensidad III, duración 5 segundos. Fué registrado solamente en Butúan.

16, 21^h 30^m [17, 5^h 30^m]. Candón (NW de Luzón). Temblor de tierra de intensidad II-III.

23, 5^h 7^m [23, 14^h 37^m]. Yap (Carolinias Occidentales). Temblor de tierra de intensidad III.

23, 11^h 20^m [23, 19^h 20^m]. Port Lebak (SW de Mindanao). Temblor de tierra de intensidad II-III.

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR NOVEMBER, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
1920

BULLETIN FOR NOVEMBER, 1919.

METEOROLOGICAL BULLETIN FOR NOVEMBER, 1919.

By Rev. JOSÉ CORONAS, S. J.,

Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure of this month for the Philippines is moderately below that of November, 1918, and slightly below the normal of this month. The highest pressures were generally observed on the 23 and 25, and the lowest on the 11th or 16th.

The mean monthly temperature is either identical with the normal of November or slightly below it. The absolute maximum and minimum temperatures for Manila were 33.3° C. and 19.2° C.: they were registered on the 4th and 26th, respectively. The extreme monthly values for Baguio were 26.2° C., 11.4° C. on the top of Mirador, and 26.9° C., 10.9° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR NOVEMBER, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from Nov., 1918.	Departure from normal.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Nov., 1918.	Departure from normal.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga.....	758.32	-0.62		759.62	23	757.28	6	26.1	-0.3		31.2	6, 21, 28	22	24
Yap, W. Carolines.....	57.58			58.38	7	54.90	20	27.1			32.6	21	23.2	19, 23
Tagbilaran.....	58.04	-1.03	-0.07	59.65	23	56.87	16	26.2	+1	-0.3	32.5	6	21.7	26
Surigao.....	58.09	-1.25	-0.19	59.42	23	56.69	16	26.2	+2	-0.2	31.4	15	23	19
Cebu.....	58.26	-1.22	-0.13	59.65	23	56.80	16	27.2	-0.2	+0.4	33.2	13	23.2	9
Iloilo.....	58.27	-1.13	-0.07	59.60	23	57.16	11	26.5	-0.1	+0.1	32.2	21	22	25
Tacloban.....	58.63		+0.04	59.94	24, 28	56.35	16	26		-0.3	34.5	2	21.7	25
Capiz.....	58.89	-1.49	-0.42	59.76	25	56.78	17	26.6	-0.4	-0.1	32.5	3	22.3	28
Calbayog.....	58.08	-1.86	-0.51	59.91	28	58.78	16	24.8	-0.7	-0.8	32.4	2, 3	19.1	25
Legaspi.....	58.32	-2.10	-0.51	60.22	24	58.61	17	26.3	-0.7	-0.3	32.3	3	22.3	22
Atimonan.....	59.19	-1.65	-0.17	60.67	25	56.68	18	26.5	-0.7	0	31.7	10	22.2	25
Ambulong, Tanauan.....	58.50	-1.52		59.98	25	55.98	18	26.3	+0.1		32.6	12	21.5	25
Paracale.....	59.09	-1.85		60.75	24, 25	57	10	26.3	-0.6		31.5	3	21.8	25
Manila.....	59.11	-1.60	-0.26	60.56	29	57.32	11	25.5	+0.3	-0.3	33.3	4	19.2	26
San Isidro.....	59.32	-2.12	-0.02	60.84	30	57.58	11	25.5	-0.2	-0.2	32.7	5	17.5	26
Dagupan.....	58.29	-1.82	-0.66	59.79	30	56.60	11	26.7	0	+0.1	34.5	9	19	26
Baguio ^a	636.83	-1.35	-0.06	638.12	30	635.62	11	17.9	0	0	26.2	4	11.4	25
Vigan.....	758.66	-1.60	-0.61	760.12	24, 25	756.82	11	26.8	-0.3	0	33.9	17	19	25
Tuguegarao.....	60.27	-1.40	-0.19	63.04	30	57.78	11	24.6	-0.5	-0.4	34	3, 5	19.2	25
Laoag.....	59.02	-1.65		61.24	24	57.07	11	26.2	+0.5		34.8	19	17.2	26
Aparri.....	60.88	-1.17	-0.01	63.40	25	58.41	10	25	-0.4	-0.1	32.8	8	19	26

^a The barometric readings of this station are not reduced to sea level.

Rainfall.—The total amount of rainfall for this month in the Philippines is without a single exception greater than that of the preceding year, although it is generally below the November's normal in the northern part of Luzon. The monthly rainfall for Manila differs from that of November, 1918, by +126.7 mm., and from the normal by +10.3 mm., while that of Baguio is 52.1 mm. above that of the preceding year, and 23.1 mm. below the normal. Maximum daily amounts of rain of over 100 mm. were observed in several stations of southeastern Luzon and the eastern Visayas during the typhoon of the 16-17 of this month.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF NOVEMBER, 1919.

Station.	Total.	Departure from Nov., 1918.		Days of rain.	Departure from Nov., 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Nov., 1918.		Days of rain.	Departure from Nov., 1918.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo.....	245	+129.2	+59.3	22	+9	52.6	22	Sumay, Guam.....	201.8	+84.9	-18.8	14	0	48.2	19
Malamau.....	139.4			10		45.9	5	Calapan.....	494.9	+436.7	+167.6	21	+	1117.1	18
Zamboanga.....	82.9	+19.9	-11.3	10	-3	20.3	26	Virac.....	432.6	+270.8	+58.5	23	+	5134.1	14
Davao.....	111.6	+19.2	-41.3	9	-1	34.3	6	Naga.....	330.2	+263.6	+79.1	26	+	51.6	21
Cotabato.....	195.5	+73	-8	14	0	36.3	22	Batangas.....	76.1	+63.1	-81.3	11	+	4	18
Camp Keithley, Lanao.....	199.2	+47.4		26	+6	28.4	16	Lucena.....	188.3	+101.3		17	-	1	18
Cagayan, Misamis.....	197.2	+185.4	+106.1	8	+4	49.3	8	Atimonan.....	273	+145.9	-158.6	27	+	7	17
Butuan.....	420.3	+222.4	+159.4	20	-7	191	22	Ambulong, Tanauan.....	138.1	+112.1		12	+	3	18
Yap, W. Carolines.....	257.1	+61.6	+38.9	19		83.1	5	Canlubang, Calamba.....	145.1	+91.4		15	-	1	30
Tagbilaran.....	181.1	+71.5?	+10.3	19	0	26.2	23	Paracale.....	502.3	+340.5	+6.7	30	+	5	17
Iwahig.....	151.5	+106		20	+17	37.9	25	Santa Cruz, Laguna.....	296.8	+232.6	+98.4	21	+	2	30
Surigao.....	486.2	+24.5	+86.4	23	-4	86.7	23	Manila.....	138.5	+126.7	+10.3	14	+	4	10
Maasin.....	221.6	+8	+76.4	12	+5	51.6	26	Antipolo.....	213.1	+204.8		17	+	12	18
Cebu.....	153.7	+72.1	+16	18	-1	71.9	8	Iba.....	58.2	+58.2	+13.2	9	+	9	22
Iloilo.....	163.1	+53.4	+5.7	17	+1	39.6	27	San Isidro.....	107.9	+101.5	+16.9	13	+	9	1
San Jose de Buenavista.....	92.4	+85.9	-63.7	10	+5	24.4	8	Tarlac.....	98.1	+94.9	+18.8	12	+	7	21
Cuyo.....	163	+160.7	+38.6	13	+12	41.9	27	Baler.....	458.4	+340.2	+100.8	14	+	3	30
Ormoc.....	265.1	+179.3	+59.2	22	+2	62.8	16	Dagupan.....	29.3	+10.9	-28.3	7	+	5	1
Guiuan.....	469.2	+147.1		22	-3	113	22	Bolinag.....	53.8	+53.5		7	+	6	20
Tacloban.....	345.5	+62.2	+66	21	-3	100.1	16	Baguio.....	60.7	+52.1	-28.1	13	+	9	23
Capiz.....	277.3	+141.8	+5.3	24	+11	59.6	27	San Fernando, La Union.....	12.1	+12.1	-26.7	7	+	7	23
Borongan.....	431.1	+83.1	-54	22	+5	74.7	16	Echagüe.....	212.2	+182.8		10	+	18	29
Cathalogan.....	304.1	+83.6		26	+1	86.6	15	Candon.....	44.4	+44.4	+1.6	5	+	38.1	1
Calbayog.....	561.7	+321.4	+286.3	23	+2	144.9	17	Vigan.....	6.2	+6.2	-28	4	+	4	29
Masbate.....	374.8	+205.5	+178.5	19	+1	187.2	17	Tuguegarao.....	326.4	+305.3	+57.9	11	+	7	29
Romblon.....	251.5	+56.8	-32.4	25	+2	64.9	17	Laosag.....	8.9	+8.1	-25.1	3	+	2	28
Batag.....	697.1	+453.5		27	0*	274.3	17	Aparri.....	387.1	+348.5	+103.3	22	+	11	29
Sorsogon.....	1,025.8			27		156.5?	16	Cape Bojeador.....	91.9	+78.2		11	+	9	28
Legaspi.....	634.2	+369.2	+279.8	24	+4	103.8	6	Basco.....	186.7		-153.3	23		55.9	20

* Rain for 13 and 14.

DEPRESSIONS AND TYPHOONS.

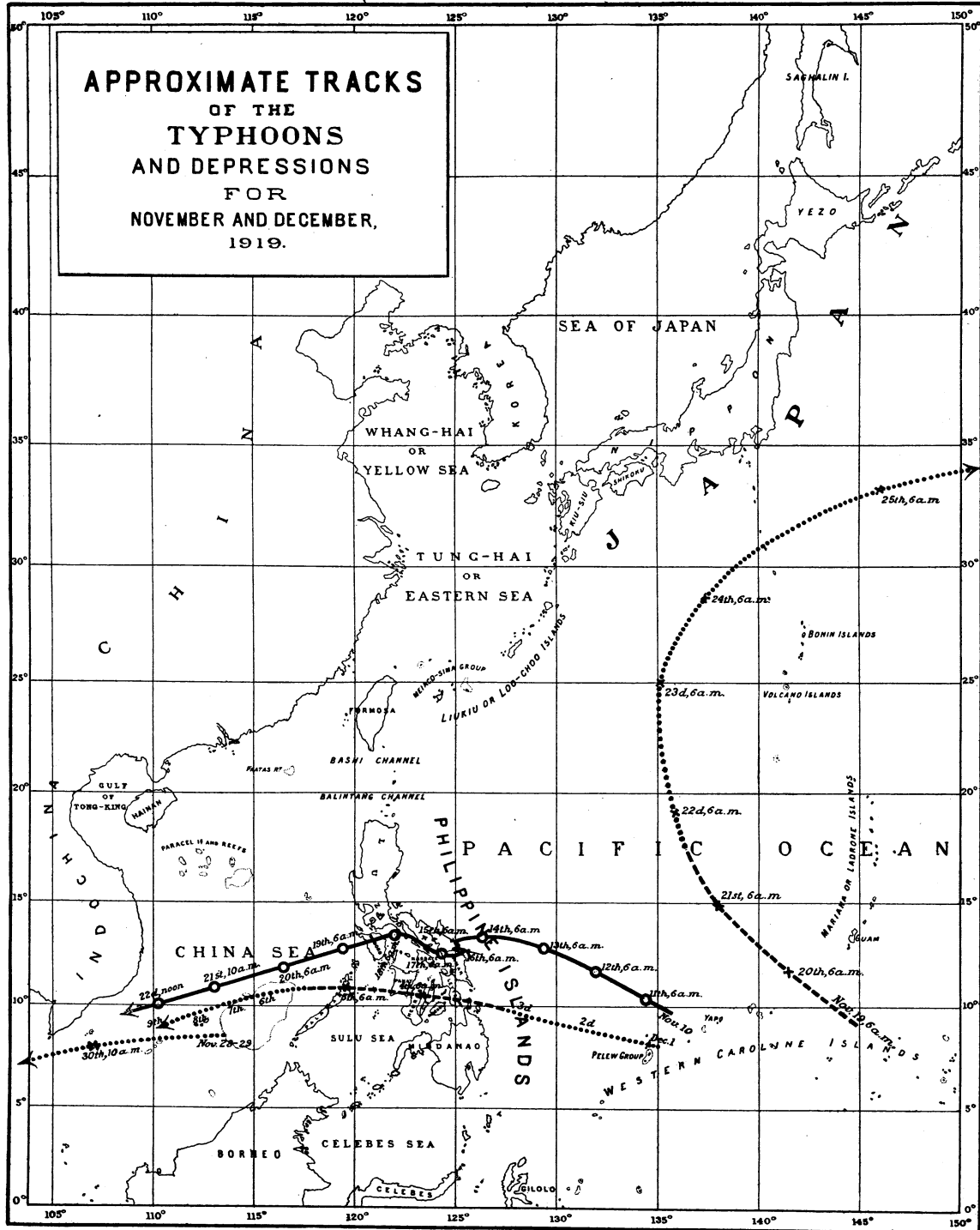
There was only one typhoon over the Philippines during this month. It was probably formed on the 10th to the west of Yap and moved WNW until the 13th when it inclined more to the west.

Beginning with the 14th the typhoon followed so an abnormal track as it is hardly ever observed in the Philippines. This track as it is given in Plate IX is based on many reliable observations which can hardly leave any doubt on its accuracy. We consider it so important, especially for shipmasters, to realize that a typhoon can, absolutely speaking, not only incline to SW, but also recurve to the S and even E, and then take up again its normal course to W and NW, as it happened in this case, that we have decided to study this typhoon more in detail in a separate pamphlet or in the annual appendix of these monthly bulletins. Hence we will only say at present that the typhoon after three sharp recurvings that took place near Batag Island on the 15th and 16th, it moved northwestward on the 17th along the western coast of southeastern Luzon, and then on the 18th it took an WSW direction across Mindoro and the China Sea. Considerable damage was done by the storm particularly in northern Samar, southeastern Luzon, Maridduque and Mindoro.

The two steamers *San Nicolas* and *Laensamud* were caught near the center of this typhoon: the former in Masagasai Bay on the eastern part of Maridduque, and the latter in the southern part of the China Sea. The interesting reports of observations made on board of them will be published latter.

On the 19th a depression appeared over the Western Carolines, to the south of Guam. It moved northwestward, the center being situated on the 20th about half way between Guam and Yap, both stations giving about the same barometric readings. It seems that the depression recurved northeastward on the 22nd, but lack of observations prevents us from giving as certain this last part of the track of this typhoon.

On the 28th to 30th there were signs of another depression, probably of little importance, moving westward northwest of Borneo and south of Indochina.



NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes en Filipinas es moderadamente menor que la de noviembre de 1918, y ligeramente menor que la normal de este mes. Las presiones más altas se observaron generalmente del 23 al 25, y las más bajas el día 11 ó el 16.

La temperatura media mensual es idéntica a la normal de noviembre o ligeramente menor que ella. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 33.3° C. y 19.2° C., las cuales se registraron los días 4 y 26, respectivamente. Las temperaturas extremas del mes en Baguio fueron 26.2° C., 11.4° C. en la cumbre del Mirador, y 26.9° C., 10.9° C. en el valle.

Precipitación acuosa.—La cantidad total de lluvia observada este mes en Filipinas es, sin ninguna excepción, mayor que la del año pasado, aunque es generalmente menor que la normal de noviembre en la parte septentrional de Luzón. La lluvia mensual de Manila difiere de la de noviembre de 1918, en +126.7 mm., y de la normal de este mes en +10.3 mm., al paso que la de Baguio es mayor que la del año pasado en 52.1 mm., y menor que la normal en 23.1 mm. Máximas cantidades de lluvia diarias mayores de 100 mm. se observaron en varias estaciones del SE de Luzón y de las Visayas orientales durante el tifón del 16 al 17 de este mes.

DEPRESIONES Y TIFONES.

Un solo tifón hubo en Filipinas durante este mes. Se formó probablemente el día 10 al W de Yap, Carolinas Occidentales, y se movió al WNW hasta el 13 en que se inclinó más al W. Desde el 14 el tifón siguió una trayectoria tan anormal cual casi nunca se observa en Filipinas. Esta trayectoria, según se echa de ver en la Lámina IX, está fundada en muchas observaciones de confianza que no dejan apenas duda alguna sobre su exactitud. Consideramos tan importante, sobre todo para los capitanes de barcos, saber que un tifón puede, absolutamente hablando, no sólo inclinarse al SW, sino también recurvar al S y aun al E, y luego seguir de nuevo su curso normal dirigiéndose al W y NW, como sucedió en este caso, que hemos decidido estudiar este tifón más en detalle en un folleto separado o en el apéndice anual de estos boletines mensuales. De ahí el que por ahora nos limitemos a decir que este tifón, después de tres recurvas muy pronunciadas que tuvieron lugar cerca de la Isla de Batag los días 15 y 16, se movió hacia el NW el 17 a lo largo de la costa occidental del SE de Luzón, y luego el 18 tomó una dirección al WSW a través de Mindoro y del Mar de China. Considerable daño causó el temporal en el N de Sámar, SE de Luzón, en Marinduque y Mindoro.

Los dos vapores *San Nicolás* y *Laensamud* se encontraron cerca del centro de este tifón: el primero en la bahía de Masagasai en la parte oriental de Marinduque, y el último en la parte sur del Mar de China. Los interesantes *reports* de observaciones hechas a bordo de los dos citados barcos se publicarán más tarde.

El día 19 apareció una depresión en las Carolinas Occidentales, al S de Guam. Se movió al NW, hallándose su centro el día 20 a la mitad de camino entre Guam y Yap, dando ambas estaciones casi las mismas lecturas barométricas. Parece que la depresión recurvó al NE el 22, pero la falta de observaciones nos impide dar como cierta esta última parte de la trayectoria de este tifón.

Del 28 al 30 hubo indicios de otra depresión, probablemente de poca importancia, moviéndose hacia el W, al NW de Borneo y S de Indochina.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.^a

[Φ=14° 34' 41" N; λ=120° 58' 33" E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Table with columns: Day, Pressure (mean), Air temperature (Mean, Maximum, Minimum), Underground temperature (0.25 meter, 0.50 meter, 1.50 meters, 2.50 meters), Relative humidity (mean), Vapor pressure (mean), Radiation (Minimum on grass, Maximum in sun), Evaporation (Free exposure, Shelter). Rows 1-30 and Mean/Total/Departure from normal.

Table with columns: Day, Wind (Prevailing direction, Total movement, Maximum hourly velocity, Direction), Clouds (Amount, Form and direction, Sunshine), Rain (24 hrs. beginning 6 a. m.), Miscellaneous. Rows 1-30 and Mean/Total/Departure from normal.

^a All the mean values given in this table are deduced from hourly observations.
^b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
^c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

(φ=16° 25' N; λ=120° 36' E; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.)

Day.	Pressure ^b (mean).	Air temperature at Mirador (on the top of the mountain).				Air temperature in the valley (near the city hall).				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation.		
		Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.			Hour.	Minimum on grass.	Maximum in sun. Black bulb in vacuo. ^c	Free exposure (total).	Shelter (total).
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1.....	637.63	18.2	22.5	11.20a.	15.9	10.00p.	23.8	10.20a.	16.5	5.45a.	80.8	12.5	15.1	56.8	5	2.8
2.....	37.90	18.3	22	1.55p.	15.9	1.20a.	23.3	0.40p.	16.6	1.30a.	74.7	11.6	15.3	51.1	7.5	3.9
3.....	37.96	19.7	25.2	0.35p.	16.2	1.00a.	25.9	1.55p.	14.6	2.15a.	66.3	11.3	13.8	57.2	7.4	4.3
4.....	37.76	19.5	26.2	11.35a.	15.4	2.15a.	26.9	Noon	14.3	5.30a.	68.2	11	13.6	54.	8	4.6
5.....	37.12	19.8	24.8	9.15a.	16.2	12 mn.	26.6	11.25a.	15.6	6.10a.	75.7	13	14.8	57.	4.2	2.7
6.....	36.78	19	24.2	10.35a.	14.8	2.30a.	26.2	10.30a.	14.2	5.10a.	73.3	12	12.2	54.6	5.2	3.4
7.....	37.29	19.1	25.2	11.45a.	15.7	4.15a.	26.3	Noon	14.9	4.30a.	77.5	12.7	14.4	54.	4.8	2.8
8.....	35.78	19	25.4	11.30a.	15.5	4.30a.	26.6	0.20p.	15.1	12 mn.	74.8	12.1	13.8	55.	4.5	3
9.....	36.22	18.4	23.3	10.25a.	15.4	3.05a.	24.6	10.30a.	13.9	6.15a.	81.3	12.8	14	54.	1.9	1.5
10.....	35.64	17.8	23.2	1.35p.	15.1	5.45a.	24.5	1.00p.	15.1	4.00a.	91.2	13.8	13.5	55.6	.9	.7
11.....	35.52	18.2	23.1	0.45p.	15.1	5.00a.	24	1.45p.	15.2	5.10a.	91	14.1	14.1	59.6	1.3	.7
12.....	35.99	18.3	23.9	1.20p.	15.4	4.15a.	24.6	0.30p.	15.2	5.45a.	85.7	13.8	14.3	58.4	2.1	1.4
13.....	36.60	17.4	23.3	Noon	14.8	12 mn.	23.9	0.30p.	15	3.45a.	91.7	13.6	13.8	55.7	1.3	.7
14.....	36.88	17.1	22.2	10.35a.	14.6	2.30a.	22.5	10.50a.	14	6.25a.	83	12	12.8	60.	2.4	1.3
15.....	36.38	17.4	22.6	10.15a.	13.9	2.00a.	24.3	10.40a.	13.4	6.15a.	79.5	11.7	12.8	60.	2.6	1.8
16.....	36.12	18.2	24.1	11.05a.	14.4	2.00a.	25.1	11.35a.	13.9	5.30a.	84.2	13	12.6	55.8	1.9	1.1
17.....	36.29	17.9	23.3	10.45a.	15.7	6.30a.	23.3	9.50a.	15.3	11.45p.	88.8	13.5	14.5	58.5	1.4	1
18.....	35.91	18.7	23.1	11.05a.	15.5	1.45a.	23.7	11.00a.	14.5	6.15a.	74.5	11.9	14	53.3	6.9	3.8
19.....	36.48	18.3	21.9	3.15p.	16	12 mn.	23.2	2.50p.	17	12 mn.	77.3	12	15.5	55.3	4.5	2.5
20.....	36.44	18.6	24.5	10.30a.	15.7	1.05a.	26.2	11.20a.	15.5	3.00a.	82.8	13.1	14.5	55.7	2.6	1.8
21.....	35.80	17.4	22.7	10.00a.	15.1	5.15a.	23.4	10.10a.	14.5	5.00a.	88.3	13	13.5	55.	1.3	.8
22.....	36.20	17.1	21.5	10.20a.	14.9	5.00a.	23.6	2.50p.	14.6	4.50a.	90.5	13.2	13.5	55.7	.9	.5
23.....	36.80	16.5	18	11.15a.	15.4	5.05a.	19.4	11.15a.	15.6	5.50a.	96.3	13.5	14.9	33.4	0	0
24.....	36.86	15	17.4	2.30p.	12.4	12 mn.	18.9	2.00p.	11.6	11.50p.	87.7	11.2	14.27	30.7	2.7	1.4
25.....	36.87	14.9	21.3	0.40p.	11.4	6.15a.	21.5	Noon	10.9	5.00a.	73.3	9.1	10.2	51.2	6.2	3.3
26.....	37.19	16.3	22.8	11.15a.	12.7	3.20a.	23.4	11.10a.	11.9	5.10a.	80.8	11.1	11.5	52.8	3.3	1.9
27.....	37.12	17.8	22.1	1.50p.	15.4	4.20a.	23.3	1.50p.	15.1	0.15a.	80.7	12.2	13.6	57.8	5.7	3.4
28.....	37.70	17.3	18.6	3.30p.	15.9	4.05a.	19.6	4.00p.	16.2	12 mn.	87.3	12.8	15.3	28.9	3.1	1.8
29.....	38.04	18	23.1	11.45a.	15.1	3.30a.	24.4	0.50p.	15	4.30a.	74.2	11.3	14.2	62.2	9.1	5.5
30.....	38.12	18.2	22.4	10.45a.	16	2.50a.	23.4	0.25p.	15.3	4.00a.	72.8	11.4	14.8	62.8	7.4	4.4
Mean	636.83	17.9	22.8		15		23.9		14.7		81	12.3	13.8	53.1	3.9	2.3
Total															116.1	68.8

Day.	Wind.				Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.	
	Prevailing direction. ^d	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.				
						Upper.				Lower.
		Km.	Km.		0-10.		h. m.	mm.		
1.....	E	587.3	38.9	E	8.3	Ci.-S.	1 45	2	☀ a. ☽ d ² ☉ ☁ ☽ ☾ p.	
2.....	E	546	37	E	7.3	Ci.-S.	1 25		☀ a.	
3.....	E	348.4	32.2	E	1.4	Ci.	8 20			
4.....	E, SE	361	22.2	E	.9	Ci.	7 45			
5.....	NE, E	278.6	26.4	SE	5.6	Ci.	6 15			
6.....	W, E	294.4	19.9	W	4.6	Cu.	6 45		☽ d ² ☾ p.	
7.....	E	376	23.6	E	3	Ci.	7 15		☽ a.	
8.....	E, W	320.5	26.9	E	3.9	A.-Cu. SE	6 20	8.9	d ² ☽ d ² p.	
9.....	SW quad.	208.9	21.2	W	5	Ci.	5 45	.5	☽ a. ☽ d ² ☾ p.	
10.....	NW quad.	255.8	20.9	W	6.9	Ci.	3 00		☽ a. d ² ☽ p.	
11.....	W	197.1	19	W	6.4	Ci.	4 20		d ² ☽ a. d ² ☽ p.	
12.....	W quad.	244.3	18.8	SW	6.3	Ci.-S.	6 20		d ² a.	
13.....	W, NE	248.4	20.7	W	8.7	Ci.	2 50	9.9	☽ a. ☽ d ² p.	
14.....	E	262.8	23.5	E	6.6	Ci.	3 05		☽ a. d ² ☽ p.	
15.....	E	307.4	22	E	4.7	Ci.	3 50		d ² ☽ p.	
16.....	E quad.	218.9	17.9	W	4.7	Ci.	5 35		d ² a. ☽ d ² p.	
17.....	NE quad.	289.2	19	E	7.4	Ci.	4 05	6.2	☽ a. ☽ d ² p.	
18.....	E, SE	416.1	35.6	E	4.6	Ci. E, NE	6 35		☽ a. ☽ d ² p.	
19.....	E	431.3	30.9	E	8.1	Ci.-S.	1 50		d ² a. p. ☽ p. ☽ p.	
20.....	E, SE	344.8	26.2	E	4.6	Ci.	5 00	8.1	d ² a. ☽ d ² p.	
21.....	E quad.	272.6	20.7	W	6.1	Ci.	2 55	.8	☽ a. ☽ d ² p.	
22.....	SW quad.	284.8	27.4	SW	9.6	Ci.	2 05	5.1	☽ a. p. ☽ d ² p.	
23.....	W	291.9	19.1	W	10	Ci.-N.	0 00	15.7	d ² a. ☽ a. p. d ² p.	
24.....	E	280.5	21.1	SE	9.6	N. NNW	0 00	1	☽ d ² a.	
25.....	SE, E	477	29.3	E	1	Fr.-Cu. NE	7 00		d ² a.	
26.....	E, W	297.6	21.9	SE	4.9	Ci. SSE	4 10		d ² a. ☽ p.	
27.....	E	550.3	37.6	E	8.9	Ci.-S.	0 50	.7	d ² a. p. ☽ p.	
28.....	E	643.8	40.2	E	9.4	Ci., Ci.-S.	0 00	.8	☽ a. p. ☽ d ² a. p.	
29.....	E	774.5	54.2	E	3.3	Fr.-Cu. E	7 30		☽ a. p.	
30.....	E	661.3	44.9	N	7.4	Ci.-S.	0 55	1	p.	
Mean		368.6	27.3		6		4 07			
Total		11,059.5					123 30	60.7		

* All the mean values given in this table are deduced from 6 daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
 † The barometric readings of this station are not reduced to sea level.
 ‡ Maximum of hourly observations taken from 6 a. m. to 6 p. m.
 § This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, NOVEMBER, 1919.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Jolo	36.4		2.8	11.2	2.3	24	10.4		3.2		7.4	0.3	9.7	31.7	0.9	mm.
Lais, Malita, Davao	5.1			22.1	29.7	4.6	3.6		14		5	7.4		3.3	2.5	
Port Leah, Cotabato	4.6			9.4	31.3	21.9	13.7	7.1				5.6	5.3			
Lamitan, Basilan									50.8		17.8					
La Union, Davao ^a				2.3	8.4	8.1	7.9		1							
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a	35.6			5.1	28.7		18.6	19.3		2.5			22.6	5.8		
Basilan Plantation, Isabela, Basilan, Office ^a	27.9				52.1	11.1	2.5		6.9	3			7.1	2		
Parang-Lalap, Isabela, Basilan ^a				6.4	43.2	4.3	15.2		9.1							
Latuan, Isabela, Basilan ^a				2	32.8	2	1.8		3.3					16.8	2	
Malsamai, Zamboanga				4.1	45.9									6.6		
Cuabo, Davao				8		3.6	1					1.3				
Zamboanga		16.5		11.2	6.9			2.5					5			
Cagayan de Sulu, Sulu ^a					5.6	6.4	9.4	1	4.6			23.2	17.8	39.1	2.5	
Fort Pikit, Cotabato	9.7	0.8			2.3	1	14.7	2					19.3			
Davao					9.2	34.3		28.7		2.8			3.8	14		
Sirib, Guianga, Davao ^a		4.1	12.7	10.2	22.9	30.5										
Bual, Dulaan, Cotabato	9.4	6.4	11.7	20.8	30.5	32.3	3.3	3	2.5			.8				1.8
Cotabato				8.1	11.2	12.2	7.1	33				16.5	9.7		1.3	11.4
Naga-Naga, Zamboanga					5.6							3.8				
Malabang, Lanao		8.9	1.8	6.4	3.3	17	5	1			5	2.3		.5	17.3	
Malangas, Zamboanga ^a		4.3	14	12.4	7.4	.8	7.1	11.7	4.1	13.5	55.2	52.6	1	6.4	5	25.9
Lumbatan, Lanao ^a	6.6	2.5	2.3			5.6	10.2	12.7								
Cateel, Davao	41.1	21.8	8.9	34.6	22.9	12.2	50.8	5.9	5.3	24.1						
Ganassi, Lanao	9.4		18.3	1.5	1.8	12.2	9.4					3.6				
Moncayo, Davao ^a	21.3	2.5			3	21.1	12.4		9.1	3.8			18.8	4.6		
Camp Kalaw, Moncayo, Davao	19.6	1.8	1.3	1.5	8	22.1	25.7	8	8.4	4.8		13.7	2.3			
Tukuran, Zamboanga ^a	5.3		3.8	2.5	8.9		11.4	21.8				8.9	15.2			23.1
Mailag Agricultural School, Bukidnon			2.1	2	5	2.3	84.1	13.7	.3	2	27.9	5.8		.3		3
Camp Keithley, Lanao	6.6	1	2.9	7.6	7.1	16	4.8	3		16.5	3	8.4	1.3	.3		23.4
Pantar, Lanao ^a	9.4	7.6		10.2	8.9	5.1		24.9	9.4	12.7	10.1	7.1	6.9	20.3	33	24.7
Veruela, Agusan	19.3	19.1	10	6.9	2.3			4.6	2.5	4.6		11.2				
Sumilao, Agusan	14					11.9	12.7	45	10.4	.3		4.6	.3	10.2	6.9	
Diklom, Bukidnon ^a					9.6	1.3	7.6	15.5		8.1		3	5.1		9.1	
Cagayan, Misamis						42.9	44.4	49.3	1.3							
Talacogon, Agusan	13	12.4	.8	17.5	3.8	27.5	32.8	18.3	1.8		4.8	4.6			4	6.4
Butuan	44.5	4.3	2.3	.5	16.8	1.6		3.3	25.7	5.6						
Hacienda San Jose, Tanhai, Bais (Sur) Oriental Negros ^a																
Palanas, Bais (Centro) Oriental Negros ^a			18.5				22.6						27.9			
Hacienda Tamugon, Bais (Norte) Oriental Negros ^a				7.1						17.3	3.6					
Yap, Western Carolines	2.5		1.1	31.5	83.1	7.6	15.2	8.9		7.6		5.1				7.6
Tgabilaran	2.3	4.1	3.3	21.5	1.3	4.3	42.4	2.3		3.3		.3	25.9	1.4		.8
Iwahig					2.2		16.3	5.1	8.2		9.9		6.2			
Dalaguete, Cebu			13	5.8		8.6		31	6.1	4.8	2			3.9	4.3	4.4
Surigao	1.8	46	18.3	14.2	16.1	15.2	31.2	.5		63.8	.3	2.1	3.6	4.3	32.1	1.5
Central Palma, Ilog, Occidental Negros	10.9	12.7	27.9	7.6	11.2	5.1	13.2		17.8		11.2	2.5		7.6		
Hacienda Naval, Himamaylan, Occidental Negros	20.3	.5	17.8					5.8		13.2		4.6	10.4	5.8	6.6	2
Bisong Cui's Farm, Barili, Cebu		15	2.8		1.8	9.9				15.5			4.1		2	2
Maasin	4.1								14.5		24.4		16.5		17.5	
Isabela, Occidental Negros	.3		7.9			.5			2.8		9.9	12.4	4.3		7.1	2.3
Hacienda Tanolo, Hinigaran, Occidental Negros	1.8	1.3	12.4			.8	2	1	71.9	6.1		2		4.6		.3
Cebu		2.5	.5							34.5	8.2	11.7	.5		5.1	.8
La Castellana, Occidental Negros															13.2	
Hacienda Vallehermoso, Oriental Negros ^a					23.6								21.6	4.1		
Hacienda Canlaon, La Castellana, Occidental Negros	1.5		8.4	.3		2.3		.3	26.4	.8	.3	.3	.8		.3	2.8
Central Azucarera de La Carlota, Occidental Negros	10.9	26.7	3.3			2.3		.8	24.6	.5	1.5			2	18.8	
La Carlota, Occidental Negros ^a	4	1.3	5.1	.5		5.1		6.4	19.6					6.6		
Valladolid, Occidental Negros	7.4					3.3			51.3	7.9				2.8	3	
Hacienda San Antonio, Occidental Negros ^a																
Hacienda San Carlos, Occidental Negros ^a		34.7		5.6	25.4											
Hacienda Refugio, Occidental Negros ^a	8.9				14	5.1		1.5	2.5	6.4	1.8				3	
Hacienda Ma-ao Sugar Central, Sta Cecilia, Bago, Occidental Negros	22.1	9.9				13.5	6.1								10.2	6.4
Murcia, Occidental Negros	24.6					.5			56.9		1.5				.5	.5
Iloilo	10.2		2.5			5.1			24.2	3.8	2	.5	.8		1.3	
Concepcion, Talisay, Occidental Negros	33.8					.5		3.8	7.9				2.3		.8	1
Tuburan, Cebu		6.6	.5			5.1	4.4		.5	3.3		31.7	14.2	6.9	7.6	
San Jose de Buenavista	2.5								24.4	15.2					1.3	3.9
Silay, Occidental Negros	19.6		7.1	2.5		1.8			3.6		16.5				1.8	.8
Cuyo	.8								4.8	12.4			23.4		7.1	8.1
Lucena, Iloilo ^a	22.9	8.1									19.3	27.9				
Victorias, Occidental Negros	8.6					42.2		6.4						1	3.6	1.3
Cadiz, Occidental Negros	9.4	1	10.7	5.1	33.3		1	43.9	.5	14.7	3.3		7.1	1	15.2	5.1
Hacienda Bilbao, Manapla, Occidental Negros	10.2	6.4		21.1		17.8	14		6.1				6.4		4.6	8.1
Ormoc	5.6	.8	4.8	3.8	1.8	7.4	1.3		7.6		1.3	33.8		5.1	12.2	62.8
Guiuan	3.3	7.6	5.1	15	4.3	23.2	54.1		30.5				5.6	.8	1.3	20.1
Bogo, Cebu			17.8	2				7.4		3.6	5.1	18.3	3.8	6.1	28.2	30.7
Ducñas, Iloilo ^a	18.8								125.5	8.6						
Bitagaon, Iloilo (Railroad Iloilo to Capiz) ^a	33.3	5.8		19.8					5.1	30.7	15.5	5.6				
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	11.7		1.3	1.5		9.1			44.7	5.1	3.6			1.8	.5	
Tacloban			15.7	15	5.9	17	22.7		5.1		9.7				7.1	100.1

^a Voluntary or coöperative station.

Daily rainfall at the stations of the Weather Bureau, November, 1919.—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Jolo		2.3	7	8.2	1	52.6	6.9	1.3	12.2		12.7	.5			245
Lais, Malita, Davao		2.3				7.6	6.4	1.3			2	5.3	1	40.6	159.3
Port Lebak, Cotabato		4.1				15.7		27.9	25.7	8.1					193.6
Lamitan, Basilan			38.6	31		21.1					17				176.3
La Union, Davao ^a			.8	1.8		2.3					.3				33.4
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a						3.8		30.5	34		16.8				223.3
Basilan Plantation, Isabela, Basilan, Office ^a	12.2	3.5		8.4		3		25.2	29.7	1	29.7	17.8			243.1
Parang-Lalap, Isabela, Basilan ^a	21.6	15.2		25.4				15.2			71.1				251.4
Latuan, Isabela, Basilan ^a		16		5.1	8			20.3			12.7	.8			116.4
Malamau, Zamboanga		19.6	5.6			4.8		20.8			2	26.2	3.8		139.4
Cuabo, Davao															6.7
Zamboanga		9				3		19.6		20.3	1.5				82.9
Cagayan de Sulu, Sulu ^a					11.7	14		1	14.3	1.8	10.4				162.8
Fort Pikit, Cotabato								2						7.6	59.4
Davao				1.5		12.7	4.6								111.6
Strib, Guianga, Davao ^a	5.8					20.3	3.8	4.3			5.1	4.6	8.6	4.6	137.5
Bual, Dulauan, Cotabato			21.8			2.3	14.5	9.7			19	6.4	1		194.5
Cotabato	2.5		32.5			36.3		3.8			9.9				195.5
Naga-Naga, Zamboanga	19.3	16			2.5	3.3	6.4		83.8		11.2				175.3
Malabang, Lanao	18.5	7.4			3.8	3.8	5.8	5	4.1			1	2		95.5
Malangas, Zamboanga ^a	12	20.3		4.6	5.1	18.3	5.3	26.9	3.6	32			21.3		359.4
Lumbatan, Lanao ^a			20.8	48.3		17.8		6.6			2			28.7	146.3
Cateel Davao	5.3		.5		20.1	3.8		1.3	1.8	1.8		17.3	3.6		278.8
Ganassi, Lanao					12.7	19	20.3			1		6.6	1.8		93.6
Moncayo, Davao ^a	1.5				20.1	3.8		7.6							160.3
Camp Kalaw, Moncayo, Davao		5.1			39.4	38.1	20.8	.3			2.5	1.3	8.4	8.7	227.4
Tukuran, Zamboanga ^a	26.7	13.2	15.5												156.3
Mailag Agricultural School Bukidnon		111.8	16.8	7.9	44.4	18.8			1.5		2				347.2
Camp Keithley, Lanao	11.2	19.6	2.9		22.6			.3	4.1	25.9	5.9	1.8	.3	2.3	199.2
Pantar, Lanao ^a	34.3	1.3					5.6	2.5	9.4	2.5		10.4			256.3
Veruela, Agusan		1.3	1.3	.5	49.5	2.5		.5		4.1		5.6	6.9	6.9	191.1
Sumilao, Agusan	27.7	16.3	20.1		2.5	.5	14.7			.3	1.5	12.2	3.6		215.7
Diklom, Bukidnon ^a	2.3	55.4	12.2			5.6	9.4				8.1		.5		150.1
Cagayan, Misamis	35.1	6.4				9.4	8.4								197.2
Talacogon, Agusan	1	3.8					7.1		10.4	12.7				.5	183.2
Butuan		1.5		1.8		191	41.6	1	8.1	32.5	.5	31.5	5.9	.3	420.3
Hacienda San Jose, Tanhai, Bais (Sur) Oriental Negros ^a							5.8					46.7			121.5
Palanas, Bais (Centro) Oriental Negros ^a			11.4			10.2					12.2				61.8
Hacienda Tamogon, Bais (Norte) Oriental Negros ^a	5.1	20.3							7.6			12.7			125.6
Yap, Western Carolines	2.3	4.3	4.6						1.8	3.5				18.3	257.1
Tagbilaran		12.8				16.5	26.2	1.4		6.4	3.1	9.9	10.8	15.8	181.1
Iwahig	3.1	.5		7.4	28.4	4.1	6.3	13.8	37.9		1.5	.8		.8	151.5
Dalaguete, Cebu	1.8	3	18.3	6.9	17.8	20.8	3.5	10.2		.8	1	4.1	1	8.9	156.5
Surigao			.3	21.1		7.4	86.7			16	80.2		1.5	22	486.2
Central Palma, Ilog, Occidental Negros									1.3			5	2	2.3	138.3
Hacienda Naval, Himamaylan, Occidental Negros	12.7			2.5			2.3	4.8		.5	27.7			4.8	142.3
Biaogon Cui's Farm, Barili, Cebu	15.2	.3	6.1		1.5		5			22.9					102.1
Maasin		11.2	14.7			21.6	7.6	30.5		51.6			7.4		221.6
Isabela, Occidental Negros	25.1	.5		5.8		9.4	9.9	4.3		.8	20.3				123.6
Hacienda Tanolo' Hinigaran, Occidental Negros	5.6	.5		13.7		2.6	2.5			1.3	14			4.6	79.2
Cebu	3.6			6.3	10.7	13.9	15.7			2.8	1		7.3		153.7
La Castellana, Occidental Negros	7.6	.3	.8			3.8	3.3			1.8	9.7				99.3
Hacienda Vallehermoso, Oriental Negros ^a			26.2			28.7	1.8	25.7	4.3		48.8		16		200.8
Hacienda Canlaon, La Castellana, Occidental Negros	6.4		1			.5	1.8			4.8	8.7	.8			68.5
Central Azucarera de La Carlota, Occidental Negros	5.1	.8	53.8				2			3.6	8.6	.3	1	.3	166.9
La Carlota, Occidental Negros ^a	5.3	22.6				.5	9.7			2.8	20.6	1.5	2.5		114.1
Valladolid, Occidental Negros	22.1	2				5.6	11.4			9.1	13.2				139.1
Hacienda San Antonio, Occidental Negros ^a						101.6					29.2				193.5
Hacienda San Carlos, Occidental Negros ^a	13.7			6.4	62.2	2.3				79					206.8
Hacienda Refugio, Occidental Negros ^a	22.4	2.3		10.9	13.2						104.9			2.8	227.2
Ma-Ao Sugar Central, Sta. Cecilia Bago, Occidental Negros	.5	.8	4.6				.3	2		6.4	13.4	3.3			224.7
Murcia, Occidental Negros	14.5	6.1	17	.8	8.6	3.5	6.1			10.2	58.9				255.5
Iloilo		20.3	3.8			25.4				15	39.6	2.5	1	5.1	163.1
Concepcion, Talisay, Occidental Negros	14.2	2	21.8	1.3	23.9	18.8	3.6		.8	77.2	15.4	9.1	.3	.8	239.3
Tuburan, Cebu	6.1	.8	3.3		19.3	19.1	.3	2.3	.5	26.7	1.8		1.3	.3	162.6
San Jose de Buenavista	13.7	13.5					8.2				9.4		.3		92.4
Silay, Occidental Negros	3.8	.8	10.2	68.6	8.1	20.4				3	32.8	41.9		8.4	266.7
Cuyo	13.5	19.1	16	4.9	1.3		9.7				41.9				163
Lucena, Iloilo ^a	30.5				4.3	74.2			38.1		10.2				235.5
Victorias, Occidental Negros	4.9	1.8	3.3	26.4	43.2	30.8	44.2	2.8	1	36.1	54.4	50.8	8.1	5.6	379.6
Cadiz, Occidental Negros	8.4	4.1	7.6	4.6		10.1	6.4	.8		14	57.7				265
Hacienda Bilbao, Manapla, Occidental Negros	5.8		38.1	20.3		11.4	7.6	9.1	6.6	20.3	63.5	17.3	15.2	10.2	320.1
Ormoc	8.7			28.4	.5	3.3				45.5	7.1		9.9	1.5	265.1
Guiuan	1.8			4.3		113		1.3	15.7	103.7	1.8	14.7	15.3	26.7	469.2
Bogo, Cebu	11.2	.8	19.5	1.3	17	9.7				19.8		2.5	2		206.8
Duñas, Iloilo ^a						70.1				2	26.9			1.3	253.2
Bitagran, Iloilo (Railroad Iloilo to Capiz) ^a	4.1	4.6		26.7		8.1	2.3			6.1	13	59.2			239.9
Lapuz, Iloilo (Railroad Iloilo to Capiz) ^a	18.5	.8	4.6			16.5		2.1		19	33.5	5.1	1	6.4	190.6
Tacloban	9.1	5.6		2.5		1.8		2.5	6.4	71.8		3.3	35	4.8	345.5

^a Voluntary or coöperative station.

Daily rainfall at the stations of the Weather Bureau, November, 1919.—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Dumarao, Capiz ^a	50.8	0.8	5.1	7.6												
Dao, Capiz ^a	46.2		33.8	23.4		21.6					2.5	6.6	5.9	.8	24.1	2.5
Capiz	1		14.5	8.1		3.8	31.8	4.6		5.1	16.3	11.2	12.2		3.3	12.2
Borongan	1.8		37.1	8.6	24.1	15.7	21.3	10.7		.3	8.6	2	3.6	1.8	13.2	74.7
Cathalogan	1	1.5	3.6	6.1	2.5	4.8		.8		14.2	2.5	1.8	8.1	21.6	86.6	59.2
Calbayog		3.1	10.7	3.6	5.6	24.7	2.3	5.6		14.2	3	.5	8.9	41.4	62.9	137.8
Masbate			2	6.6	.5		.5		3	8.4	9.7		8.9	31.2	17.2	40.1
San Jose Estate, Tamaraw Plantation, Mindoro ^a									2.8				16	5.8	7.1	16.3
San Jose Estate, San Agustin, Mindoro ^a												34.3				
San Jose, Mindoro ^a						3.6	.3			2		32	6.1	11.7		6.6
San Jose Estate, Tunnel D-12, Mindoro ^a										2.5	45.7	5.1	22.9	7.6	12.7	11.4
Romblon	5.1	.5	1.8	18.5	1.8	38.1	1	.3			.3	.6		5	7.6	4.5
Batag	13.9	3	1.3	6.1	22.1	40.9	11.6	39.3	2.5	2	3.3	25.6		c274.3		485.3
Irosin, Sorsogon	8.9	2	11.2	22.9	21.6	1.5	19.6			1.8		.8	38.4	66.3	56.3	78.7
Sorsogon	27.4	4.1	6.6	14.5	32	21.1	47.5	13		25.7	3.6	3.6	28	97.5	113.8	156.5
Legaspi	40.3	1.1	1.8	13.9	25.9	103.8	30.2	3	25.7	15.7			34.1	48	33.7	33.4
Sumay, Guam	7.6	7.6	7.6			6.4	12.7	35.5		5.1		19	5.1	22.9		
Calapan	68.2			.5	1	13.7	37.9	4.9		55.6						
Virac	13.5	3.8	3.6	22.1	6.6	10.6	8.1	4.3	8.1	19.5	2.8	.5	15.7	134.1	34.5	27.2
Naga	.5	3.3	1	1.8	1		5.1	5.8	17	10.9	5.8	.8	16.5	23.5	26.7	39.6
Tigaon									7.9	18.2	5.8	4.5	96?	45.2	31.5	69.1
Batangas	.5									1.5						
Lucena				3	.8		5.9			1.8	.3				2.3	
Atimonan	3	1		1.3		3.3	.8		3.5	1	6.6	8.9	.8	6.6	29.3	17.6
Ambulong, Tanauan			12.7	2	.5	7.6	5.1			11.9						
Canlubang, Calamba	.8	.8	5.6	14.2			3.8			10.7		.5				
Paracale	38.5	7.2	14.7	8.9	17.3	10.4	13.3	1.1	9.4	7.3	1.5	11.7	3.1	23.4	30.4	7.6
Santa Cruz, Laguna	17.8	2	11.4	7.1	1.5	.5	21.1			6.9	.5		3			
Fort Mills, Corregidor ^{a,b}											30.5					
Alabang, Rizal ^a	2.5									48.3						
Manila	25.9					14.2	.5			29.4	.6					
Antipolo	17.8	.3				3.8	1.3			38.1	3.6		2.5	2.8		
Bosoboso, Rizal ^a									12.7	15.2			12.7			22.9
Montalban, Rizal ^a	26.4	.5					1			9.9						
Hacienda Pintong Sapang, San Jose del Monte, Bulacan ^a	26.7				8.1				6.1	2.5						
Mabayuan Dam, Olongapo, Zambales ^a			.3				3.6			16	25.2	4.1	11.9			
Pampanga Sugar Mills, Del Carmen, Floridablanca ^a	6.9					1		2.8		18.5	9.1	8.1	.5			
Iba								8			1.3	3.8				
San Isidro	23.9															
Hacienda Luisita, Comillas, Tarlac ^a									3.8							7.6
Hacienda Luisita, San Miguel, Tarlac ^a	2.3								3.3							7.1
Tarlac	23.4										2					.5
Baler	7.1		1.3	.8			19.6				11.7	8.9				
Paniqui, Tarlac ^a	4.6	23.9	21.8			30.7				4.6		21.3			29.7	
C. L. A. S. Muñoz, Nueva Ecija ^a	10.4										20.1	19.6	11.9			
Dagupan	12.5									11.1			2.8			
Bolinao	6.9											3.8				
Baguio	2							8.9	.5				9.9			
San Fernando, La Union	.8							.3								
Echagüe	.4	.1	.5			.8	2.5		1			.8	1.3	.5		5.8
Sagada, Mountain Province ^a	9.7	2								5.1						
Bontoc, Mountain Province ^a	6.9															
Candon	38.1	2.8							1.5							
Vigan	3.6															
Tuguegarao							1.5									6.1
Lacag											.5	6.4	1.5	1.3	9.4	12
Aparri			3								2.8	.5				
Cape Bojeador																
Basco	5.8	.3	3.6	.3					.3	7.4	2.3	.8	1.8	1.3	1.3	

^a Voluntary or cooperative station.
^b Rain in 24 hours beginning 7 a. m.
^c Rain for the 13 and 14.
^d Rain for the 15 and 16.
 * No observation.

Daily rainfall at the stations of the Weather Bureau, November, 1919.—Continued.

Station.	Day of month.														Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.		
Dumarao, Capiz ^a	mm. 3.8	mm. 3.8	mm. 15.2	mm. 38.1	mm. 27.9	mm. 16.5	mm. 1.3	mm. 0.8	mm. 16	mm. 27.9	mm. 17.8	mm. 5.1	mm. 6.6	mm. 38.6	mm. 275.3	
Dao, Capiz ^a	12.7	8.2	50.8	2.8	11.7	12.5	.8	4.8	70.9	3.6	6.6	38.6	391.4			
Capiz	33.3	3.3	14.3	3.3	10.9	1.3	15.2	2.1	.5	4.8	59.6	4.6	277.3			
Borongnan	13.2	1	19.8	1	10.2	1	10.7	68.9	21.9	17.5	36.3	19.3	431.1			
Cathalogan	23.9	1	1.3	1	10.2	1	10.7	68.9	21.9	17.5	36.3	19.3	431.1			
Calbayog	144.9	6.9	15.7	4.4	2.5	28.7	4.3	4.3	8.4	19.8	561.7					
Masbate	187.2	5.1	13.5	5.8	2.8	29	374.8									
San Jose Estate, Tamaraw Plantation, Mindoro	10.2	79.3	15.5	7.4	190.1											
San Jose Estate, San Agustin, Mindoro	25.4	67.3	33	36.8	11.2	213.3										
San Jose, Mindoro ^a	13	127.5	2.3	7.1	12.9	225.1										
San Jose Estate, Tunnel D-12, Mindoro	10.2	149.9	2.5	10.2	280.7											
Romblon	64.9	19.3	27.2	.3	8.7	1.3	.5	8.1	5	9.9	29.9	251.5				
Batag	7.4	2.3	16.5	23.9	14.2	8.7	2.5	2.8	50.3	12.2	7.9	4.6	35.5	697.1		
Irosin, Sorsogon	125	26.9	14.2	8.7	1	8	4	37.1	28.2	11.7	8.9	51.8	646.8			
Sorsogon	204.5	36.1	9.4	1	4.1	52.1	12.5	2.3	7.6	101.3	1025.8					
Legaspi	51.6	7.4	25.6	2.5	24.9	18.1	25.2	26.2	43.6	634.2						
Sumay, Guam	38.6	117.1	73.9	.3	2.8	1	55.1	3.1	9.1	17.8	2.5	201.8				
Calapan	20.1	3.8	48.2	13.2	1	5	10.9	33	4.8	6.4	29.2	432.6				
Virac	41.8	20.3	1.3	8.6	51.6	.5	2.3	10.6	22.4	4.3	7.4	330.2				
Naga	20.6	31.3	1.3	3	127.3	1.5	.8	1.3	4.6	15.2	63.2	19.5	3.8	16.3	634.67	
Tigaon	7.4	46.5	5.8	1.8	2.5	5	5	2.8	14	15.8	8	3.3	3.5	76.1		
Batangas	33.7	59.5	2.6	29.3	9.1	4.9	7.4	7.4	3.8	15.3	18.1	8	7.9	16.5	188.3	
Lucena	43.5	27.8	13.7	3.6	4.9	7.4	7.4	3.8	15.3	18.1	8	7.9	16.5	188.3		
Atimonan	46.7	11.4	17	17.8	8.9	3.3	494.9									
Ambulong, Tanauan	11.4	25.6	1	26.2	1.8	49.2	2.5	6.6	3.8	2.6	11.4	24.9	40.1	17.2	7.8	504.8
Canlubang, Calamba	97.2	7.7	30	1.8	5.6	14	8	2	30.7	4.1	52.1	56.6	296.8			
Paracale	23.4	15.3	6.6	11.9	2	1.8	14	8	1.5	17.8	8.9	3.8	13.9	163.4		
Santa Cruz, Laguna	1.5	16.5	2	1.8	14	8	1.5	17.8	8.9	3.8	13.9	163.4				
Fort Mills, Corregidor ^a	5.3	59.4	1.1	24.1	9.4	7.4	3.1	18.5	11.8	213.1						
Alabang, Rizal ^a	1.1	24.1	3.3	59	8.1	15.8	14	16.5	2.3	9.1	14.8	213.1				
Manila	3.3	59	8.1	15.8	14	16.5	2.3	9.1	14.8	213.1						
Antipolo	35.6	10.2	45.7	2.3	.5	40.6	23.9	.8	11.7	14.2	165.5					
Bosoboso, Rizal ^a	2.3	20.8	7.6	3	2.3	51.3	29.2	2.8	6.9	2.8	162.8					
Montalban, Rizal ^a	1	9.4	7.9	5.6	2.5	1.3	.8	.3	5	.3	66.1					
Hacienda Pintong-Sapang San Jose del Monte, Bulacan ^a	1.5	5.4	.5	8.1	3.9	42.9	8.1	2	12.4	20.6	1	10.2	115.8			
Mabayuan Dam, Olongapo, Zambales ^a	.6	4	2.3	3.8	42.9	.3	1.6	22.3	8.9	4.6	19	3.6	58.2			
Pampanga Sugar Mills, Del Carmen, Floridablanca	10.8	6.8	13.2	3.8	3	1	1	1	1	1	1	1	107.9			
Iba	10.8	6.8	13.2	3.8	3	1	1	1	1	1	1	1	60.2			
San Isidro	10.9	2.1	.5	10.9	2.1	.5	4.1	2	7.4	3	3.8	61				
Hacienda Luisita, Comillas, Tarlac ^a	6.1	9.7	8.9	10.9	2.1	.5	17.5	43.9	69.8	82.5	99.3	453.4				
Tarlac	6.1	9.7	8.9	10.9	2.1	.5	17.5	43.9	69.8	82.5	99.3	453.4				
Baler	21.6	60.4	26.9	21.6	17.8	2.5	20.8	11.4	38.6	38.6	114	296.3				
Paniqui, Tarlac ^a	6.4	.8	22.9	15.7	2.5	9.7	7.7	1.8	17.8	2	5.8	114				
C. L. A. S. Muñoz, Nueva Ecija ^a	.8	.3	22.9	15.7	2.5	9.7	7.7	1.8	17.8	2	5.8	114				
Dagupan	6.2	8.1	.8	5.1	15.7	1	1	1	1	1	1	1	29.3			
Bolinao	6.2	8.1	.8	5.1	15.7	1	1	1	1	1	1	1	53.8			
Baguio	5	3	14	.5	2.3	1.8	4.6	1	1.1	3.1	11.9	25.9	27.7	68.6	42.6	212.2
San Fernando, La Union	5	3	14	.5	2.3	1.8	4.6	1	1.1	3.1	11.9	25.9	27.7	68.6	42.6	212.2
Echague	29.5	1	1.8	2.5	1.1	3.1	11.9	25.9	27.7	68.6	42.6	212.2				
Sagada, Mountain Province ^a	1	1.8	2.5	1.1	3.1	11.9	25.9	27.7	68.6	42.6	212.2					
Bontoc, Mountain Province ^a	1	1.8	2.5	1.1	3.1	11.9	25.9	27.7	68.6	42.6	212.2					
Candon	1	1.8	2.5	1.1	3.1	11.9	25.9	27.7	68.6	42.6	212.2					
Vigan	20.3	14.2	1.8	1.8	3.8	24.3	49.5	33.8	98.2	72.9	326.4					
Tuguegarao	3.8	24.4	31.6	6.1	1.3	1	6.1	1	169.2	6.4	387.1					
Laog	4.6	7.9	14	.8	.5	10.9	4.4	49.7	14	20.9	4.1	169.2	6.4	387.1		
Aparri	4.6	7.9	14	.8	.5	10.9	4.4	49.7	14	20.9	4.1	169.2	6.4	387.1		
Cape Bojeador	29.7	31.2	21.5	55.9	.8	.5	4.1	1	.8	10.7	4.8	.5	186.7			
Basco	29.7	31.2	21.5	55.9	.8	.5	4.1	1	.8	10.7	4.8	.5	186.7			

^a Voluntary or cooperative station.
^b Rain in 24 hours beginning 7 a. m.
^c Rain for the 17, 18 and 19.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, NOVEMBER, 1919.

Day.	Jolo.		Malamaui, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keith- ley, Lanao.		Cagayan, Misamis.		Butuan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.4	22.1	30.5	23.4	29.5	23	30.7	22.6	31.7	22.5	27.8	18	31.6	21.9	31.6	22.6
2	31.3	22.2	31.4	23	29.6	23.6	32.2	23.1	33.6	22.6	27.6	18.6	32.2	23.2	31.1	22.9
3	32	23.1	31.7	23.2	30.7	24.4	31.9	23	33.7	22.8	27.4	17.9	32.2	22.2	33.1	22.8
4	31	23.3	31.8	24.3	30.7	23.8	32.7	23.1	34.8	22.7	27.5	17.5	32.1	21.6	29.4	22.6
5	31.5	23.9	30.8	24	30	23.7	31.7	21.4	32.7	23.8	27.6	18.8	32.3	22.7	31	23.6
6	30.4	23.5	30	23.1	31.2	24	30.7	22.3	32.7	23.2	27.1	17.6	32	21.8	31.9	22.5
7	30.6	22.3	29	23.2	30.8	23.1	31	22.6	33	22.7	26.3	19.5	31.1	22.2	33.2	22.9
8	29.4	22.9	30	24	27.2	23.4	31.9	22.4	31.2	22.8	27.5	18.2	31.5	22.1	33.2	22.8
9	29.3	22.4	29.9	24	28.8	23.5	30.7	22.4	32.2	22.7	28	17.9	30.8	22.4	32.1	22.7
10	30.3	22.2	29.6	23.2	29.3	23.2	31.2	22.5	32.2	22.6	27.8	19.1	31.6	22	32.4	22.3
11	30.3	22.4	30.3	23.5	28.9	23.4	31.2	22.8	32.8	23	28.5	18.5	32.7	22	32.1	23.4
12	30	22.8	29.9	23.3	29	23.5	31.2	23.1	32.3	23.5	27.4	18.2	31.2	22.2	32.2	23.1
13	29.5	22.7	29.7	24.3	30	23.1	30.7	22.5	32.6	22.2	26.9	18	31.9	22	32.6	22.5
14	29.2	23	31.5	24	30.5	22.5	31.2	22.5	32.8	23	27.8	17.5	33	22.2	32.2	23.1
15	29.8	22.7	29.5	23.4	29.3	22.4	31.1	23.5	30.6	23.2	28.3	19	33	22.7	33.9	23.2
16	30.6	23.1	28.6	23.2	29.5	23.1	31.2	23	32.5	23.4	26.3	20.2	32.4	21.6	34	23.2
17	30.8	22.1	29.8	24	29	23.4	31.7	22.4	32.5	23	26.3	19.1	32.8	22.5	31.7	22.9
18	30.8	23.4	30.2	24.4	29	22.8	31.7	22.3	32.6	22.2	27.9	19.1	32.6	21.6	35.1	23.2
19	31.1	23.4	29.6	22.4	29.2	23.4	31.9	22.8	31.8	22.9	27.8	19.5	31.6	21.8	33.2	22.3
20	30.3	23	31	23.5	31	23.4	31.7	22.8	32.8	23.3	27.9	18.6	31.6	23	33.2	21.7
21	30.8	23	30.6	23.2	31.2	22.5	31.7	22.1	32.2	22.5	27.8	19.5	31.9	22.2	32.1	22.5
22	30.3	22.1	30	23	29.8	22.7	31.7	22.5	32	22	27.3	17.3	31.9	22.1	32.4	22.2
23	30.4	22.3	29.1	23.7	29.5	22.5	31.7	22.5	30.3	22.1	23.5	18.1	26.1	21.3	26.1	22.7
24	29.9	24.5	30	22	29.5	22	29.9	22.5	31.6	22.3	26.1	18.5	30.2	21.6	28.7	21.9
25	26.8	23.2	30	21.9	29.7	22.2	31.3	22.5	32.4	22.5	25.9	19	30.5	22.9	30.9	22.2
26	29.7	21.5	30.1	22.8	28.8	22.5	28.5	22.5	30.7	22.5	22.5	18.5	27.1	22.8	26.1	22.6
27	29.8	22	30.2	22.5	28.6	22.8	31.2	21.9	31.5	22.7	27.6	18.1	30.5	21	31.9	22.6
28	30.8	21.8	29.8	22.2	31.2	22.7	31.5	22.2	32.9	23.1	27.3	17.5	31.6	21.6	33.1	22.4
29	30.4	21.6	30.9	23.4	29.7	23	32.7	22.5	33.6	22.6	27.4	17.5	31.8	21.6	29.1	21.7
30	30.6	23.4	30.2	24	30	23.8	31.7	22.5	32.1	22.8	27.9	18.1	31.6	20.9	32.6	21.9
Mean	30.3	22.7	30.2	23.3	29.7	23.1	31.3	22.5	32.3	22.8	27.1	18.4	31.4	22.1	31.7	22.6

Day.	Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.		San Jose de Buenavista.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.4	25.6	32	22.8	30.6	20.7	30.8	23.9	32.6	22.4	31.4	25.4	31.8	24.3	31.6	22.7
2	31.2	25.5	32.3	23	31.6	21.6	29.7	24	32.8	22.8	32.3	26	31.3	24	31.7	23.1
3	30.2	26	31.2	23.9	32.6	21.9	29.5	24.7	32.8	22.8	30.2	25.6	30.4	24.9	32.9	21.9
4	30.8	26.1	21.3	23.9	31.9	22.7	28.6	24	33	23.8	31.3	25.8	31.3	24.3	33.4	22.9
5	30.7	23.6	31.7	23.5	32.2	23.2	28.8	24.4	32	22.8	31.4	25.9	31.7	25	33.5	23.3
6	29.7	23.5	32.5	23.2	31.6	23.8	30.7	23.3	33.1	23	31.3	25.4	31.2	25	32.6	22.9
7	30.7	23.6	30.9	23.4	31.8	22.9	28.7	23.6	31.6	23.2	29.4	24.8	29.3	23.5	31.5	22.9
8	30.7	23.4	30.3	22.5	29.8	22.7	28.1	23.2	33.1	23.4	31.4	24.9	30.6	22.7	30.8	23.2
9	30.2	24	30.4	22.3	28.6	22.3	31	23.2	31	22.7	31.5	23.2	31.3	22.5	31.6	22.9
10	31.7	23.6	31.4	22.5	31.5	21.5	29	23.3	32.4	23	29.5	24.2	30	23.1	31	22.4
11	31.4	24	32	22.9	30.8	21.6	30.2	25.4	32.7	22.8	30.7	25.2	29.8	23	30.8	22.4
12	31.6	24	30.5	23.9	32.1	21.9	29.4	24.4	32	23.6	30.2	24.8	31.3	23.9	31.5	23.2
13	31.8	24.1	31.1	23.6	32.2	21.2	29.4	24.1	32.2	23.6	33.2	24.8	32	24	31.8	22.4
14	29.9	24	32.3	23.3	31.9	21.4	31.3	24.2	32	23.2	30.5	26.3	29.9	24.3	30.4	22.9
15	30.8	23.8	32.3	23.7	31.8	21.5	31.4	24.4	31.5	24.4	29.3	25.5	29.1	23.9	29.4	22.9
16	30.1	24	31.4	23.9	31.6	21.7	30	24.6	31	23.5	30.2	25.8	31.8	23.7	30.2	23.6
17	31.2	24.5	31.6	25.4	30.1	22.2	30.6	24.9	31.9	24	28.6	25.4	28.3	24.1	28.8	23.7
18	31.3	24.3	30.2	25.3	31.7	22.5	31	24	32.5	24.4	30	25.8	29.8	23.2	27.4	23.4
19	30.5	23.2	31.8	23.7	31.5	22.3	30.2	23	31	23.8	30.2	24.8	30.3	23	31.8	22.6
20	30.6	23.7	31.6	23.3	32.6	21.2	30.5	23.6	32.4	23.2	32.2	24.6	30.8	22.7	32.4	22.1
21	32.6	23.7	31.8	23.8	31.1	21.7	29.8	23.3	31.5	23	30.9	24.9	32.2	22.9	31.4	22.9
22	31.7	24.1	31.2	23.1	30.8	21.2	30.4	23.9	31.4	23.4	29.9	24.9	30.3	24	30.3	22.6
23	31.6	23.2	24.6	22.1	30.1	21.7	26.4	23.5	27.5	23	28.5	24	29.1	23.5	30.4	22.2
24	31.7	23.7	29.7	22.3	29.9	22.3	27.9	24.3	31	22	28.7	24.3	27.9	23	30.6	22.6
25	30	25.1	30.5	22.3	27.1	22.1	28.3	24.3	31.5	23.4	29.5	23.9	28.3	22	29.6	20.6
26	30.5	25.6	29.1	21.7	30.6	22.1	25.5	23.3	28	22.4	28.7	23.5	28.8	22.7	30.8	20.1
27	31.7	27	30.1	22.9	31.3	20.2	28.8	23.1	30	22	29.7	23.5	25	22.8	27.8	22.4
28	31	25.3	30.4	22.3	30.2	21.1	29.6	23.1	32.5	22.4	30.5	25	30	22.1	30.6	21.4
29	30.3	27	31.9	23.2	31.5	22.2	28.6	23.5	31.1	23	30.5	24.2	30.3	24.3	31.7	22.1
30	30.5	24	29.2	23	32.1	22.2	29.8	23.8	32	22.5	29.9	24.2	30.1	24.7	31.3	22.4
Mean	30.9	24.4	30.9	23.2	31.1	21.9	29.5	23.9	31.7	23.1	30.4	24.9	30.1	23.6	31	22.6

Maximum and minimum temperatures at the stations of the Weather Bureau, November, 1919.—Continued.

Day.	Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.		Calbayog.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.2	24	32.7	23.1	32.5	24	32.6	23.4	32	24.3	31.5	23.3	30.5	23	30	22.7
2	31.2	26	33.2	23.2	33.5	23.2	34.5	24	32.3	25.3	32.2	23.7	33.3	22.6	32.4	22.7
3	31.3	27.3	32.9	24	32.3	25	34	24.3	32.5	24.9	32.2	25.8	31.9	22.2	32.4	22.7
4	31.5	27.1	32.6	24.6	32.3	25.8	33.3	24.3	31.9	26.1	31.8	24.7	32.1	24.1	32	23.7
5	32.2	27.1	32.5	23.9	32.6	25.6	32.6	24	31.8	24.8	31.1	25.5	30.7	23.7	30.6	22.7
6	31.4	26.5	33	22.9	31.5	24.2	31.9	24	32	25.6	30.3	23.9	31.1	23.5	30.1	22.3
7	31	26.6	31.1	23.1	29.1	22.7	31.8	23	30.4	23.8	30.2	23.7	30.3	22.7	30.6	22.3
8	29.8	24	32.7	23	32.5	23.6	32	22.5	29.3	24	31.2	23.1	30.2	22.7	29.9	22
9	31.4	24.8	32.9	23	29.4	22.7	31.4	23.5	31.9	23.7	32.9	22.5	30.6	22.7	29.9	21.9
10	31	24	33.1	23	30.6	26.2	30.8	22.5	31.8	23.1	33.4	22.5	31.3	24.1	29.4	24.3
11	31.4	23.4	31.3	23.9	30.8	26.7	29.6	23.5	31.5	23.6	31.7	23.7	30.6	25	30	23.6
12	31.4	24.9	32	23.2	30.9	25.6	31	23.5	31.6	24.1	32.8	22.5	30.5	23.3	30.5	21.9
13	30.8	27.1	32.2	22.2	30.2	23.8	29.2	23.3	31.4	24.6	28.8	22.5	28.4	22.9	27.9	22.5
14	28.7	24.1	30.1	22.9	30.4	26.9	28.2	24.9	29.8	26.2	28	24.8	27.7	25.4	26.2	23.4
15	31	24.9	29	24.5	29.1	25.7	27.5	23.8	29.8	24.8	28.3	24.9	26.8	24.3	25.4	22.9
16	30.4	24	29.2	23.5	28.6	26.3	26.8	22.5	30.6	24.4	25.4	23.5	25.2	24.4	25	22.9
17	30.7	24.3	29.4	23.4	28.5	24.9	26	22.4	27.3	23.8	26.2	23.3	25.8	23.6	25.1	22.8
18	28.3	24.3	32.8	24	31.9	24.8	31.7	22	28.5	23.4	31.1	22.5	32.6	23.6	30.6	22.3
19	30	23.6	32.2	22.4	32.2	23.4	31.3	23.5	31.9	22.9	31.1	23.7	31	22.1	29.9	21.8
20	30.2	23.5	33.2	22.4	32.4	23.9	32.2	23.4	30.9	22.4	31.4	22.2	31	21.9	31.1	21.7
21	30	23.6	33.1	22.6	31.4	23.1	31	23.3	30.4	22.5	31.7	22.1	30.6	22	30	21.6
22	29.3	23.7	31.2	22.9	30.7	25	29.4	23.7	28.1	23.5	32.1	22	28.4	23	27.5	22.9
23	29.4	24	31.2	23.6	29.5	22.8	30	23.5	29.6	24.5	29.6	23.6	30.2	22.4	29.6	22.1
24	30	23.6	31.9	23.4	29.8	22.9	29	22.4	29.6	23.3	29.2	22.2	29.1	21	28.4	21
25	28.7	25.2	31.6	20.5	30.6	23	30.3	21.7	30.2	24	30.7	20	29.1	18.6	29.6	19.1
26	28.4	25.1	31.6	21	26.5	23	25.3	22.9	30.2	24.4	26.4	23.7	26.1	20.4	27.2	21
27	27.9	24.3	30.9	21.4	29.8	22.9	29	22.7	26.7	22.9	30.1	24.8	29.8	20.6	27.8	22.2
28	31	24	31.2	21.4	32.3	23.2	31	23	30.9	22.3	31.1	23.4	31.7	22.4	30.5	21.7
29	30.2	25.4	31.6	21.8	31.5	24	27.1	23.7	30.7	25.1	30.1	23.5	30.3	22.2	29.5	22.5
30	30.5	26.4	32	23.2	31.9	24.2	29.7	23.5	31	25.4	30.6	23	30	23.3	29.6	23
Mean	30.3	24.9	31.8	22.9	30.8	24.3	30.3	23.3	30.6	24.1	30.4	23.4	29.9	22.8	29.3	22.4

Day.	Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay. Guam.		Calapan.		Virac.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.6	25.8	30.4	23.7	29.4	23.9	31.5	22.6	29.3	25.3	30.4	25.6	31	23.5	30	23.6
2	31.4	25.8	31.8	25.2	30.8	24.8	31	23	31.1	24.6	30.4	24.6	31	24	31	23.2
3	31.4	25.8	32.2	25.2	30.4	24.6	31	23.9	32.3	26.6	30.4	24.6	32.4	25	31.5	24
4	31.6	25.2	32	24.9	30.6	25.4	30.3	24.5	30.9	25.8	30.2	24	32.2	26.5	30.4	24.5
5	31.6	25.6	31.9	24.1	30.2	24.8	30.5	24.9	30.3	25.4	30.2	25.4	31.5	26	31	24.5
6	31	25	31.9	25.7	27.3	23.5	30.5	23.6	28.8	24.6	30.2	25.2	32.5	24.4	30.2	24.2
7	31	25.4	30.9	24.1	27.7	23	30.5	23.5	31.3	24.2	30	25.4	31.5	23	30.8	22.4
8	30.4	25.2	30.9	23.2	30	22.8	29.9	21.5	30.6	23.3	30.4	24.6	31.5	22.5	29.6	23.4
9	30.2	24.8	31.3	24.2	27.1	22.8	31	23.1	31.4	24.4	30.6	24.4	32.1	23.5	31.8	22.5
10	30.8	24.6	31.9	23.2	30.4	22.2	30.5	22.4	29.9	24	29	24	31	22	30.6	24
11	30.4	25.2	31.5	24	27.6	24.1	31.7	23.1	31.3	23.6	29.6	25.4	32	22.9	31.2	23
12	31	25.2	32.4	24.4	29.9	24.6	31	23	30.8	23.1	30	24.6	31.6	22.8	30.8	22.8
13	30	23.5	30.4	23.9	26	23.4	29.7	23	30.7	23.6	30	23	32.6	23.5	29.3	23
14	28.6	25.2	31.4	26	24	21.5	29.9	22	27.7	23.7	30.8	24	31.6	22.6	27	23
15	29	22	29.6	25.3	-----	-----	-----	21.7	27.4	23.5	30.6	24	30.5	23.5	27.8	23
16	30.6	23.2	29.4	23.4	-----	-----	-----	21.4	29.2	23.8	30.4	24.6	31	23	28.8	23.8
17	27	22.8	27.4	23.1	26	23.7	-----	22	27.7	23.2	30.4	26.4	30.6	22.5	27.5	23.2
18	31	23	26.8	22.6	29.9	23.7	-----	-----	29.6	23.5	29.2	25.6	29.6	21.5	30.3	24
19	30.2	24	31.9	22	30.9	24	-----	-----	30.8	23.2	29	24	30.5	22.5	31	23
20	31.6	24.4	30.9	23	31	23.2	31.5	21.3	31.2	23.4	30.6	24	30.8	22.5	31.4	22.1
21	30	23.6	31.3	22.7	30.1	23.5	30.5	21.5	31.3	22.9	30.6	25.4	31	22.4	31.9	21.6
22	27.8	23.8	29.3	23.7	26.6	23	26.5	20.3	27.3	22.3	30.8	25.2	29.5	23.4	30.8	23
23	28.8	25.2	29.8	23	29.4	22.9	29.3	23.3	29.1	23.6	30.2	22.6	27.5	22.5	30	22.8
24	28.4	23	29.3	22.6	28.9	23	29.3	23.3	28.1	22.8	30.4	24.6	27	21.5	29	21.5
25	27.8	23.5	29.4	23.2	30	23.4	29	22.7	28.8	24.5	30.6	24	28.5	21.9	29.5	21.6
26	29.6	24.6	29.6	23.4	27.5	22.9	29.5	22	30.5	23.5	31	25.2	30	21	29.1	22.5
27	27.8	23.6	28.5	24.2	27.5	22.1	27	22	27.8	24.7	29	26	29.1	22.5	27.3	24
28	30.5	23.6	31.3	24.1	30	23	31	24	30.3	23.9	29	25.2	31.1	22.5	29.4	23.8
29	30.4	24.6	31	24.7	28.5	24.2	29.5	23.8	29.9	24.1	29.4	25.6	31.5	25	29.9	23.7
30	28	25.2	30.5	24.2	29.4	24.5	28.5	24.4	28.5	24.1	30	25.2	32	24	29.5	24.1
Mean	30	24.4	30.6	23.9	28.8	23.5	30	22.8	29.8	23.9	30.1	24.7	30.8	23.1	29.9	23.2

Maximum and minimum temperatures at the stations of the Weather Bureau, November, 1919.—Continued.

Day.	Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canluban, Calamba.		Paracale.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.6	22.8			33.2	24.4	30	24	28.6	24.6	31.1	24.8	30.2	22.7	30.3	23.8
2	33.1	21.5			33.1	23.1	29.5	23.7	29.2	24.9	31	24.7	30.5	22.3	30.3	24
3	32.6	24.2			33.6	22.6	30.6	24.4	29.6	25.8	32	24.9	31.2	22.5	31.5	26
4	33.4	23			32.8	23.6	30.1	24.6	29.6	26.4	31.4	25	31	23	31.2	26
5	33.1	22.9			32.1	23.4	30.3	24.5	29.4	25.5	31.4	24.9	31.2	23.2	30.8	25.8
6	32.5	22.4			32.6	22.3	30.3	23.5	30.4	25.4	31.8	23.2	31	21.6	30.6	24
7	33.3	23.1			32.6	22.3	30.5	23.7	30.9	24.9	31.2	23.7	30.9	21.5	29.2	23.8
8	31.6	23			33.2	20.6	30.7	23.5	29.3	25.3	31	24.1	30.6	22.2	30	23.5
9	30.6	23.5	30.9		31.5	21.3	31	22	30	24.6	32.3	22.3	31	21.4	30.3	23.5
10	30.6	22.6	29.1	21.2	31.6	21.7	30.6	22.6	31.7	23.8	31.2	22	32	21.3	29.3	25
11	30.6	23.4	30	21.3	32.3	22	30.5	21.7	28.8	28.5	32.2	22.7	31.7	22	29.3	25.1
12	31	23.7	29.9	21.7	32.2	21.3	30.5	22.1	29.1	26.4	32.6	23.5	31.1	22.2	30.8	24.9
13	28.7	24	29.3	22.4	32.1	23.1	29.6	23.9	28.6	24.8	30.7	22.6	31	22.1	29.6	25
14	26.4	23.5	28.6	22.5	31.9	21.6	29.4	23.3	27.8	24.6	31.2	21.8	30.9	20.5	27.3	24.3
15	25.7	21.7	28.4	20.1	31.5	22	28.3	22.7	26.6	23.9	30	22.4	29.8	22	26.7	23.2
16	30.8	21.4	30.1	20.2	32.2	21.7	29	22.7	26.6	23.4	30.4	22.2	30	21.2	30	24
17	25	22.7	28.7	20.4	30		28	22.5	27.2	22.6	31.4	23	31	21.1	26.7	23
18	27	22.8	28.1	21.5	25.4	22.9	24.5	23.5	26.5	23.1	26.9	23.7	27	21.2	27.4	23.8
19	31.5	22.1	30.2	21.3	31.3	22.6	29.8	22.6	29.4	22.6	32.2	24.2	31	22.2	30.2	23
20	32.5	22.8	30.7	20.4	32.2	23.3	29.6	22.5	30.3	23	32	23.5	30.1	22.1	30.4	23.5
21	31.6	22.4	30.9	19.6	31.2	21.9	29.5	21.6	30.3	22.4	30.3	22.9	31.2	21.3	30	23.2
22	28.5	23.5	30.1	20.8	29.8	22.7	27.5	24.6	27	23.9	29.9	23.7	28.8	22	28.8	24.6
23	29.4	22.2	28.9	20.5	30.3	22.2	27	23	26	23.4	29.1	22.9	28.4	21.6	26.8	22.6
24	28.9	22	28	20.2	29.8	22.1	27	21.8	26.2	22.3	27.5	22.5	28.5	21.2	26.5	22.2
25	27.7	20	27	21.5	27.5	19.7	26.5	20.4	26.6	22.2	28	21.5	28.7	20.9	26.9	21.8
26	29.5	21.8	27.6	19.9	30.6	18.4	28	21.6	26.8	24.4	29.4	22.3	29.2	18.6	29.3	23.9
27	25.7	22.9	27.5	19.7	30.2	21.4	28	22.7	26.7	24	29.4	23.2	28.8	19.9	27.4	24
28	32	23.1	30	21.2	31.7	23.6	30	23.7	30	24	31	24.6	30	21.5	30.1	24.3
29	31.6	23.4	30.1	20.8	32.6	23.7	29.8	23.4	29.3	24.1	29.5	24.3	29.4	21.8	29.6	24.3
30	31.2	23.7	31.4	23.3	31.3	23.8	29.2	23.5	28.7	25.4	29.3	24	29.1	22	29.5	24.7
Mean	30.2	22.7	29.3	21	31.4	22.3	29.2	23	28.6	24.2	30.6	23.4	30.2	21.6	29.2	24

Day.	Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.5	24.1	31.1	22.6	31.1	21.4	33	24.4	30	22.1	32.2	21.2	29.4	22.8	32.5	23.3
2	30.6	23.4	30.4	22.7	30	21.5	32	24.5	30.1	22.7	32.6	21.6	30	23.4	33.5	23.5
3	31.3	23.3	32.8	21.8	32.2	20.8	32.1	21.7	32	22	33.5	21	31.6	22.3	33	22.9
4	31	23.9	33.3	22.3	32.9	21.2	32.2	22.2	31.7	22.3	33.6	21.4	33.2	23.6	34.4	22.6
5	31.6	24.2	32.2	23	33.2	21.5	32.1	22.5	32.7	22.5	34	21.6	32.5	24	33.3	22.6
6	30.6	22.6	31.9	20.8	31.7	19.9	31.8	20.8	32	19.5	34.4	18.8	30.6	19.3	34.1	21.2
7	31.1	22.6	30.7	21.4	31.8	19.7	33	21.8	30.7	20.8	33.6	20.2	31.5	21.5	34.2	23.4
8	30.6	22.5	32.2	22.5	32.2	21	33.2	22.7	31.4	22.1	34.8	18.8	31	22.3	34.2	22.9
9	31.9	21.5	31	21.7	31.4	20.3	31.2	22.4	31.6	21.4	34.4	19	31.6	21	34.5	22.8
10	32.3	22.8	31.4	23.3	30.7	21.8	31.3	21.9	32.4	22.9	35.5	18.6	32	22.7	32.3	23.4
11	32	22.5	32.1	23.6	31.2	22	30.9	21.7	32.4	23	34.6	19	32	22.7	33.2	23.4
12	31.8	23.1	31.1	23.5	31	21.2	32.1	22	32.2	23	34.6	19.2	31.7	21.8	32.6	24
13	30.3	23.8	31.9	23.4	30.1	21.6	31.5	21.8	31.2	22.8	33.8	19.6	29.9	21.9	33.8	23.2
14	30.6	22	31.1	22	31.1	19.8	31	23	31.4	22	31.6	20	30.4	20.8	31.1	22.5
15	28.3	24.4	30.2	22.4	29.9	20	30.5	22.5	31.4	21	32.8	19.2	29.8	20	31.9	21.2
16	29.5	22.8	30.4	21.3	29.8	19.7	31.1	21.1	32	20	34.4	18.8	30.5	21.2	32.6	21.4
17	30.9	21.8	31.6	22.3	31.2	21	31.9	22.3	32.5	21.6	34.6	19	33.5	21.8	32.5	23.2
18	31.6	22.5	25.1	23.3	26.2	21.5	29.2	21.5	26.1	22.9	28.5	19.4	29	21.2	31.1	24.7
19	31.5	23.7	32.7	22.3	31.8	22	31.9	24	30	22.5	31.6	19.4	32	24.4	32.4	23
20	31.1	23.2	30.6	23.1	30.7	22	32.2	23.8	30.9	22	32.6	19.5	33.3	23	33.5	23.3
21	31.9	22.1	30.9	22.9	31.6	21.5	31.4	23.1	31.5	24.6	34	19.2	31.6	22.2	31.3	24
22	29.4	23.5	28.7	23.5	29	22	30.8	23	30.3	22.9	32	20.6	29	20.8	33.1	22.9
23	29.6	23.2	30.2	22.1	29	21	29.2	22.5	28.8	22.5	31	21.2	26.7	21.2	30.6	21.9
24	27.7	22.7	28.5	22.5	27.7	21.1	29.5	22.9	27.9	20.1	29.8	20.6	30.3	21	28.5	21.6
25	27.4	21	29.6	20.4	29.2	19	29.8	22	30	18.4	32.2	18.5	29.7	20.6	31.9	19.6
26	29.2	20	31.7	19.2	30.5	18	30.4	20.4	30.4	17.5	33.2	17.6	30	18.6	31.1	19
27	29.1	22.5	29.5	22.1	28	21	29.5	22.4	28	21.6	30.8	18.4	28	22.3	29.9	21.5
28	31.1	23.5	32.6	23.2	31.7	22.3	30.8	23.1	27	22.4	29.8	19.4	29.6	23.4	29	23.1
29	29.8	22.8	30.4	23.2	31.2	21.8	31.5	23.6	28.4	22	31	18.6	29.2	23.3	33.2	21.8
30	30.1	23.5	29.7	22.9	30.5	22.1	29.6	23.2	28	22	28.4	18.2	29.2	23.8	30	22.1
Mean	30.5	22.8	30.9	22.4	30.6	21	31.2	22.5	30.5	21.7	32.8	19.6	30.7	22	32.3	22.5

Maximum and minimum temperatures at the stations of the Weather Bureau, November, 1919.—Continued.

Day.	Bolinao.		Baguio.		San Fernando, La Union.		Echague.		Candon.		Vigan.		Tuguegarao.		Laog.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	33.4	24.4	22.5	15.9	32.2	23.3	28.4	22.3	31	25.5	32.5	24.2	29.6	23.3	34.6	22.7
2	32	24.5	22	15.9	30	23	31.5	22.2	31.6	23.8	31.8	23.4	31.1	22.5	33.2	23.5
3	31.5	23.5	25.2	16.2	32.5	22.3	31.4	21	31.1	23.7	38.4	23.2	34	22.1	33.6	22.6
4	33.5	23.5	26.2	15.4	32.7	22.3	32.5	22	31.5	23	32.3	23.9	32.4	21.1	34.2	21.6
5	32.6	23	24.8	16.2	32.6	21.9	32.4	23	32	23.5	32.9	24	34	22.6	33.9	22.6
6	33.5	23	24.2	14.8	33	21.3	30.6	19.6	31.5	24	33.2	24	30	21.5	33.4	22
7	32.5	22.8	25.2	15.7	32.3	22	31.5	20.9	31.5	24.4	31.9	23.8	32.5	22.6	33.5	22.4
8	32.6	23	25.4	15.5	32.9	22.8	32.3	21.5	31.5	24	33	23.8	33.2	21.7	33.1	23.5
9	31.3	24.6	23.3	15.4	33	22.4	31.6	21	31	24.1	33.5	23.2	31.7	21	34.2	21.4
10	31.2	23.5	23.2	15.1	32.6	22.6	31.5	21.6	31.6	24.5	33.1	23.2	31.2	22.5	33.2	22.1
11	31.5	23	23.1	15.1	32.7	22.5	31.1	23	32	24.1	32.1	22.5	32.2	22.4	33.9	22.1
12	30.6	25.7	23.9	15.4	32.5	22.5	30.9	22.4	31.6	23.8	32.2	22.2	29	22.7	32.6	22.5
13	32.8	23	23.3	14.8	32.9	22.5	27.3	22.1	31	23.5	32.2	22.8	29	22.7	33	21.3
14	32	23	22.2	14.6	33	21.3	27.1	21.5	31.6	22.8	32.5	22	28.5	21.5	31	22
15	30.5	22	22.6	13.9	31.5	21.4	27.1	20.6	31.5	22.5	32.6	21.3	26.1	20.9	32.2	20.8
16	31.5	21.5	24.1	14.4	32	20.5	27.4	20.6	31.6	22.5	32	23	26.6	20.4	34	18.9
17	31	22.2	23.3	15.7	32.4	22.2	31.6	22	31.8	24	33.9	23.6	32.2	22	33	22.2
18		26.8	23.1	15.5	32	24.2	27.9	22.7	32.8	23.9	32.1	23.1	33.6	23	33.8	22
19	33	24.7	21.9	16	31.5	24.4	30.9	22.5	32	23.8	32.9	23.7	26.6	22	34.8	24
20	32.6	24.4	24.5	15.7	32.2	22.6	31.1	21.4	31.5	22.5	32.6	21.5	31.2	21	34	20.7
21	28.2	24.3	22.7	15.1	32.7	22.3	29.6	22.6	31.6	24.2	29.3	22.1	27.7	21.7	29.4	22.8
22	32	25.3	21.5	14.9	30.6	23.8	26.5	19.5	31	23.2	30.9	20.1	26.6	19.5	30.9	20.9
23	29		18	15.4	29.5	23	25.6	19.5	32	22.5	29.6	22.4	26	19.5	29.7	20.4
24	27.2	22.4	17.4	12.4	28.3	22.8	28.1	20.2	30	21.7	30.4	20.2	27.8	19.4	28.4	21
25	29.2	21	21.3	11.4	29.6	20	26.4	18.6	30	20	29.9	19	25.7	19.2	29.9	19.7
26	29.7	18.5	22.8	12.7	30.5	19	25	19	30	20	30.5	19.5	24.2	19.8	32	17.2
27	29.7	23.5	22.1	15.4	30	20.5	24.9	21	31.1	21.5	28.3	22.1	25.2	21.5	31.4	19
28	29.8	23.6	18.6	15.9	29.5	22.5	26.5	21.5	29	24	30.4	22.8	25.1	22.4	28.3	23.2
29	30.1	21.6	23.1	15.1	32.5	21.2	27.8	21.7	30	23	31.4	22.1	27.6	21.8	32.2	20.3
30	30.9	22.8	22.4	16	30.7	21.3	24.6	21.1	30	22.9	31.9	23.5	24	21.2	31.3	21.2
Mean	31.2	23.3	22.8	15	31.7	22.1	29	21.3	31.2	23.2	31.8	22.5	29.2	21.5	32.4	21.6

Day.	Aparri.		Cape Bojeador.		Basco.	
	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.	Maxi- mum.	Mini- mum.
	°C.	°C.	°C.	°C.	°C.	°C.
1	30.6	22.3	29.3	24.1	29.1	23.8
2	30.6	22.8	30.5	24	31	23.7
3	31.7	21.3	29.9	23.1	30.8	22.9
4	32.3	22.3	29.8	24	31.5	24.5
5	32.1	22.8	32.2	24	30.9	24.5
6	31.7	21.1	31.2	24.7	30.8	25
7	31.8	22	31.7	24	30	23
8	32.8	22	31.4	25.1	31.5	23.5
9	32.4	22.4	29.1	23.7	29	21
10	30.5	22.5	28.5	24	28.4	24
11	31	22.4	28.4	22.6	28.4	23.2
12	29	22	27.7	23	27.2	22.2
13	29.1	24.1	27.2		26.6	20.8
14	28.5	22.2	25.4		26	18.5
15	29.5	22.1	26		26	19.3
16	25.2	21.7	26		27.6	21
17	31.6	21.8	30.2		28.2	23
18	29.4	22.5	27.2		24.2	22
19	26.6	22.5	26.2		25.3	20.8
20	29.5	21.3	26		24.7	22.4
21	26.3	22.5	25.1		24	21
22	24	21.1	24.1		23.4	16
23	27	19.5	25.8		26.5	18.7
24	27.1	19.8	26.2		24.6	18.5
25	22.9	19.5	23.9		23	17.3
26	23.6	19	25		25.3	19
27	25	21.9	25.6		26.3	20
28	26.7	22.7	22.7	21.2	25.2	22
29	25.8	21.8	26.2	21.1	26.6	21
30	27.4	20.7	26.2	21.9	28.5	22.6
Mean	28.7	21.8	27.5		27.4	21.5

SEISMOLOGICAL BULLETIN FOR NOVEMBER, 1919.

By Rev. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

3, 13^h 18^m [3, 21^h 18^m]. **Irosin (SE Luzon).** Earthquake shocks on intensity III-IV, long duration: volcanic character, origin in the Bulusan Volcano.

3, 14^h 44^m 00^{s*} [3, 22^h 44^m 00^s]. **NE Mindanao.** Extensive earthquake of intensity IV, felt through northeastern Mindanao and very lightly in Samar Island. Its origin seems to have been in the Philippine Deep of the Pacific near to the parallel 10° N. The seismograph at Butuan recorded only one aftershock at 15^h 57^m [23^h 57^m].

4, 11^h 32^m [4, 19^h 32^m]. **Cape Bojeador (NW Luzon).** Earthquake of intensity III-IV, short duration.

4, 13^h 32^m 16^{s*} [4, 21^h 32^m 16^s]. **Davao (SE Mindanao).** Earthquake of intensity III, felt in southern and eastern Mindanao. This shock was recored by all the seismographs of the Far East; the epicenter probably was in the eastern part of the Celebes Sea.

6, 16^h 44^m 28^{s*} [7, 0^h 44^m 28^s]. **NW Luzon.** Earthquake of intensity VI-VII, felt in many provinces of northern Luzon: its origin was not far from the NW end of this Island in the China Sea. It was recorded at Taihoku (Formosa) and Osaka (Japan). To this principal shock followed as series of seven aftershocks of varying intensity noticeable only in a small area of the NW end of Luzon. The shock felt at Cape Bojeador on the 4th may be considered as a foreshock. The aftershocks occurred on the 6th at 18^h 11^m, 20^h 30^m; on the 7th, at 3^h 36^m, 9^h 17^m, 17^h 15^m; on the 11th at 10^h 04^m and on the 21st at 6^h 29^m. As none of them was recorded neither at Manila nor at Taihoku, they must have been very local. In an article published in the Monthly Bulletin for May, 1909, about "Seismic Submarine Centers in Northern Luzon" the writer expressed the opinion that there existed in the sea a seismic center of volcanic character not far from the NW end of Luzon. The seismic period of November 1919 seems to confirm that assertion.

10, 15^h 45^m [10, 23^h 45^m]. **Camp Keithley (N Mindanao).** Oscillatory earthquake, intensity IV, duration 8 seconds. Two minutes later a subsultory shock was noticed. These shocks were the first of a series of four seismic disturbances of similar character

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismograph at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

felt in the same station at 17^h 38^m and 18^h 36^m of the 10th and at 5^h 29^m of the 11th. The constant SE-NW direction of the seismic waves given by an experienced observer and their small extension induce to locate the origin in the region of Makaturing and Ragan volcanoes distant some 48 kilometers to the SE of Camp Keithley.¹ These disturbances were recorded at Butuan at a distance of some 180 kilometers.

11, 20^h 21^m [12, 4^h 21^m]. **NE Mindanao.** Earthquake of intensity V-VI felt in the Surigao district and in the northern portion of the Agusan Valley. It was not recorded in Manila and its extension did not correspond to the intensity showed at Surigao and Butuan, these two facts induce to believe that the epicenter lay within the Peninsula or to the W or WSW very near in the sea. The rumblings which at Surigao preceded the shocks apparently came from the W. A seismic center of volcanic or rockfall character has been repeatedly indicated by the writer as existing within this region of Mindanao. The seismograph at Butuan recorded but two aftershocks, during the 12th.

16, 3^h 08^m 24^{s*} [16, 11^h 08^m 24^s]. **E Mindanao.** Earthquake felt with intensity III in the eastern portion of Mindanao. The origin seems to have been in the Pacific E or SE of the Island. Recorded at Batavia.

17, 22^h 39^m [18, 6^h 39^m]. **Vigan (NW Luzon).** Earthquake shock of intensity III, short duration.

18, 4^h 03^m 41^{s*} [18, 12^h 03^m 41^s]. **Butuan (N Mindanao).** Distant earthquake very lightly felt. It was recorded throughout the globe, the records of Manila and Batavia place the epicenter in the Moluccas group not far from Seroea Island.

27, 7^h 30^m [27, 15^h 30^m]. **Fort Pikit (SW Mindanao).** Earthquake shock of intensity III.

¹ See Monthly Bulletin, December, 1916, "Volcanic Notes."

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.25$, $\epsilon=2.906$, $\frac{r}{T_0^2}=0.053$;
 A_E : $T_0=6.18$, $\epsilon=2.393$, $\frac{r}{T_0^2}=0.042$. Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A_N μ	A_E μ	
380	2	Iv	eP F	h. m. s.	s.					
				11 16 24						
381	3	Iv	eP F	14 44 00					Felt in northeastern Mindanao and eastern Samar.	
				15 02						
382	4	Ir	(PS) L M _N M _E F	13 32 16 34 13 34 16 34 17		8 7	102 64		Felt in southern and eastern Mindanao.	
				14 28						
383	4	Iv	eP F	15 35 10 38						
384	4	Iv	eP F	15 39 12 43						
385	5	I	e F	20 19 43						
386	6	I	e F	13 51 28 14 11						
387	6	IIIv	eP L M _N M _E F	16 44 28 45 16 45 34 45 43		6 5	954 612		Felt in northern Luzon.	
				17 22						
388	8	Ir	e F	7 01 50 23						
389	9	Iv	e F	7 16 33						
390	10	Iv	eP F	11 54 13 57						
391	14	I	e F	17 26 54 53						
392	16	Iv	eP F	3 03 24 43					Felt in the eastern part of Mindanao.	
393	17	Iv	eP F	22 36 51 42						
394	18	IIr	eP S L M _E M _N F	4 03 41 07 00 08 00 08 16 08 35 5 20		7 7	690 836		Felt very lightly at Butuan (N Mindanao).	
				22 45 20						
395	18	I	eL? F	23 38						
396	20	Ir	eP S L M _N M _E F	14 20 41 25 23 27 47 28 23 28 25 15 22		7 7	129 208			
				21 13 18						
397	20	Iv	eP F	21 13 18 16						
398	20	Iv	eP F	22 42 44 45						
399	21	IIv	eP L M _N M _E F	15 52 30 52 46 52 52 52 52 57		4 4	273 181			
				6 05 38						
400	23	I	e F	6 05 38 57						
401	26	Iv	eP F	14 23 53 27						
402	30	Iv	eP F	5 13 19 24						
403	30	Iv	eP F	21 22 20 25						

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

3, 13^h 18^m [3, 21^h 18^m]. Irosin (SE de Luzón). Temblor de tierra de intensidad III-IV, larga duración, carácter volcánico, origen en el vecino volcán Bulusan.

3, 14^h 44^m 00^{s*} [3, 22^h 44^m 00^s]. NE de Mindanao. Temblor de tierra de intensidad IV, sentido en toda la región NE de Mindanao y muy débilmente en la isla de Sámar. Su origen parece se hallaba en el grande Abismo del Pacífico cerca del paralelo 10° N. El sismógrafo de Butúan registró un aftershock procedente del mismo origen a 15^h 57^m [23^h 57^m].

4, 11^h 32^m [4, 19^h 32^m]. Cabo Bojeador (NW de Luzón). Temblor de tierra, de intensidad III-IV, duración muy corta.

4, 13^h 32^m 16^{s*} [4, 21^h 32^m 16^s]. Dávao (SE de Mindanao). Temblor de tierra de intensidad III, sentido en gran parte del sur y este de Mindanao, duración corta: este temblor, registrado en todo el Extremo Oriente, parece se originó hacia el E del Mar de Célebes.

6, 16^h 44^m 28^{s*} [7, 0^h 44^m 28^s]. NW de Luzón. Temblor de tierra de intensidad VI-VII sentido en gran parte del norte de Luzón: su origen se hallaba cerca del extremo NW de la isla, en el Mar de la China. Registróse también en Taihoku (Formosa) y Osaka (Japón). A este temblor siguió una serie de siete réplicas de variable intensidad sentidas tan solo en una pequeña región del extremo NW. El del 4 sentido en Cabo Bojeador debe considerarse como un temblor preliminar. Las réplicas tuvieron lugar a 18^h 11^m, 20^h 30^m del 6, a 3^h 36^m, 9^h 17^m, 17^h 15^m del 7, a 10^h 04^m del 11 y a 6^h 29^m del 21. El no haberse registrado ninguna de dichas réplicas ni en Manila ni en Formosa indica su carácter muy local. En 1909 en un artículo publicado en el Boletín del Observatorio del mes de mayo, titulado "Centros Sísmicos Submarinos cercanos a las costas N de Luzón" señalabamos uno de carácter volcánico cerca del extremo NW de la isla, cuya existencia parece confirmar el período sísmico de este año de 1919.

10, 15^h 45^m [10, 23^h 45^m]. Camp Keithley (N de Mindanao). Temblor oscilatorio de intensidad IV, duración 8 segundos, seguido dos minutos después de una sacudida subsultoria. Este temblor fué el primero de una serie de cuatro temblores de igual carácter sentidos en la misma estación a 17^h 38^m y 18^h 36^m del propio día 10 y a 5^h 29^m del 11. La constante dirección SE-NW que pone el observador y el carácter local de estos temblores hace sospechar fueran de origen volcánico. Es muy posible que su origen estuviera en la región de los volcanes Makaturing y Ragan situada al SE de Camp Keithley a unos 48 kilómetros de distancia.¹ Solamente los registró el sismógrafo de Butúan distante 180 kilometros.

11, 20^h 21^m [12, 4^h 21^m]. NE de Mindanao. Temblor de tierra de intensidad V-VI, sentido en todo el distrito de Surigao y en la parte N del Valle del Agusan. No se registró en Manila ni tuvo una extensión proporcional a la intensidad desarrollada en Surigao y en Butúan; esto hace sospechar que el epicentro se hallaba dentro de la misma península de Surigao o en el mar al W u WSW y que era de carácter volcánico. En

¹ La intensidad de los terremotes se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

¹ Véase en el Boletín de diciembre, 1916, "Notas Volcánicas."

Surigao le precedieron ruidos subterráneos procedentes al parecer del W. Dentro de la expresada región se ha señalado en varias ocasiones un centro sísmico superficial de carácter volcánico o de hundimiento. El sismógrafo de Butúan solo registró después durante el día 12 dos réplicas.

16, 3^h 08^m 24^{s*} [16, 11^h 08^m 24^s]. **E de Mindanao.** Temblor de tierra sentido con intensidad III en la parte más oriental de Mindanao. Originado seguramente en el Pacífico hacia el E o SE de dicha isla. Registróse también en Batavia.

17, 22^h 39^m [18, 6^h 39^m]. **Vigan (NW de Luzón).** Temblor de tierra de intensidad III, duración corta.

18, 4^h 03^m 41^{s*} [18, 12^h 03^m 41^s]. **Butúan (N de Mindanao).** Temblor de tierra apenas perceptible pero registrado por el sismógrafo como terremoto lejano de mucha intensidad. Registróse en todo el Globo; los registros de Manila y Batavia colocan el epicentro en las Molucas hacia la Isla de Seroea.

27, 7^h 30^m [27, 15^h 30^m]. **Fort Pikit (SW de Mindanao).** Temblor de tierra de intensidad III.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS

WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

BULLETIN FOR DECEMBER, 1919

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA
BUREAU OF PRINTING
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BULLETIN FOR DECEMBER, 1919.

METEOROLOGICAL BULLETIN FOR DECEMBER, 1919.

By REV. JOSÉ CORONAS, S. J.,
Chief, Meteorological Division of the Weather Bureau.

GENERAL WEATHER NOTES.

Pressure and temperature.—The mean atmospheric pressure for this month is very slightly above the normal, although it is slightly below the monthly mean of December, 1918. The highest pressures of the month were generally observed on the 21st, 30th, and 31st, and the lowest on the 4th and 5th, when a depression was crossing the Visayan Islands.

The mean monthly temperature is almost identical with that of the preceding year and with the December's normal. The absolute maximum and minimum temperatures for Manila were 32.5° C., observed on the 7th and 8th, and 18.5° C., registered on the 31st. The extreme temperatures for Baguio were 25.0° C., 10.2° C. on the top of Mirador, and 25.7° C., 10.2° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR DECEMBER, 1919.

Station.	Pressure.							Temperature.						
	Mean.	Departure from December, 1918.	Departure from normal.	High-est mean.	Day.	Low-est mean.	Day.	Mean.	Departure from December, 1918.	Departure from normal.	High-est.	Day.	Low-est.	Day.
	mm.	mm.	mm.	mm.		mm.		°C.	°C.	°C.	°C.		°C.	
Zamboanga	758.53	-0.49		760.	20	756.59	4	26.2	+0.4		33.2	23	22.3	5
Yap, W. Carolines	58.34			60.23	21	56.38	14	27.1			31.2	5, 23, 26	22.4	20
Tagbilaran	58.69	- .46	+0.22	60.65	21	55.39	4	25.7	- .3	-0.4	31.9	17	20.8	15
Surigao	58.90	- .31	+ .33	61.07	21	55.88	4	25.5	- .2	- .3	31	16	21.8	15
Cebu	58.99	- .49	+ .27	60.86	20, 21	55.52	4	26.7	+ .1	+ .1	33.1	7	23	31
Iloilo	58.89	- .59	+ .26	60.85	19	54.97	4	26	+ .4	- .1	31.3	7	21.3	31
Tacloban	59.66	+ .24	+ .56	61.69	22	56.51	4	25.6	0	- .4	32.5	28	21.5	10
Capiz	59.34	- .45	+ .06	61.58	31	55.07	4	26.4	+ .3	+ .1	32.4	6	22.3	15, 16
Calbayog	59.42	- .30	+ .41	61.47	20	56.08	4	24.7	- .3	+ .1	31.5	11	20.3	15
Legaspi	59.89	- .05	+ .41	62.47	31	56.82	4	26.1	- .1	- .1	31.8	15	21.3	18
Atimonan	60.41	- .48	+ .33	63.68	31	56.92	5	25.8	- .4	0	31.6	6	22	31
Ambulong, Tanauan.	59.47	- .48		62.05	31	55.94	5	26	+ .6		32.7	24	21.3	25
Paracale	60.36	- .52		63.88	30	57.02	5	25.7	- .5		30.6	7	21.5	30, 31
Manila	60.23	- .49	- .08	63.08	31	57.23	5	25	- .1	- .2	32	7, 8	18.5	31
San Isidro	60.43	-1.04	+ .22	63.74	31	56.67	5	25.1	+ .6	0	32.5	27, 28	16.5	31
Dagupan	59.45	- .63	- .15	62.13	31	56.26	5	26.1	+ .4	+ .1	34.2	7	18.8	31
Baguio ^a	637.55	- .34	+ .37	639.17	21	635.24	5	17.5	- .2	+ .1	25	11	10.2	31
Vigan	759.79	- .43	- .10	762.43	31	756.27	5	26.2	0	0	34.3	1	18.6	30
Tuguegarao	61.68	- .25	+ .28	66.34	30	57.93	6	23.7	- .4	- .1	32.1	8	15	31
Laoag	60.14	- .42		53.32	30	56.51	5	25.1	+ .1		34	3	12.9?	31
Aparri	62.32	+ .05	+ .44	67.10	30	58.08	6	23.7	- .6	0	30.8	12	16.5	31

^a The barometric readings of this station are not reduced to sea level.

Rainfall.—The total amount of rainfall for this month is, with few exceptions, below the normal of December in our stations of Luzon; but it is above the same normal in the majority of our stations of the Visayas and Mindanao. The monthly rainfalls for Manila and Baguio differ from the normal of this month by -35.8 mm. and -23.0 mm., respectively.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF DECEMBER, 1919.

Station.	Total.	Departure from December, 1918.		Days of rain.	Departure from December, 1918.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from December, 1918.		Days of rain.	Departure from December, 1918.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo	206.9	+ 65.4	+ 39	21	+14	45.7	19	Calapan	160.3	- 13.3	- 40.2	27	+11	22.6	5
Malamaui	165.6	- 70.4	- 6	6	- 4	42.9	21	Virac	317.3	-106.7	-112.9	23	+ 1	71.7	18
Zamboanga	57.5	+ 24.3	- 43.4	15	+ 5	20.3	4	Naga	246.7	- 27.3	- 38	20	+ 8	82.8	18
Davao	206.3	+115.6	+ 14.8	11	+ 4	77.5	9	Tigaon	376.1	- 49.3	-	25	+ 8	71.9	4
Cotabato	161.7	+ 97.7	+ 38.4	11	+ 5	67.1	13	Batangas	19.2	- 46.2	- 84.2	13	+ 9	4.8	3
Camp Keithley, Lanao	133.1	- 35.5	-	18	- 4	22.4	2	Lucena	175.5	+ 14.2	-	20	+ 2	26.2	1
Cagayan, Misamis	51.7	- 70.4	-	7	- 4	15.7	3	Atimonan	322	+ 97.5	- 63.2	23	+ 5	51.1	14
Butuan	289.4	-115.6	- 5	26	+ 1	58.6	9	Ambulong, Tanauan	19.1	- 74.4	-	8	+ 4	7.1	3
Yap, W. Carolines	173.8	+ 22.9	- 21.4	23	- 1	42.4	19	Canlubang, Calamba	35	- 41	-	7	0	11.4	3
Tagbilaran	278.4	+158.4	+115.4	20	+ 6	53.1	1	Paracale	561.3	+235.8	+ 48.1	29	+ 7	110.2	14
Surigao	813.6	+126.5	+267	23	0	154.7	30	Santa Cruz, Laguna	88	+ 5.3	- 63.7	19	+ 5	21.6	10
Maasin	498.4	-104.3	+169.5	9	- 1	152.4	3	Manila	25.6	- 3.5	- 35.8	9	+ 1	13.2	21
Gebu	142	- 52.6	- 5.6	16	0	31.5	21	Antipolo	41.3	- 21.5	-	12	+ 6	11.7	5
Iloilo	139	- 9.2	+ 22.7	16	+ 4	59.7	4	Iba	23.1	+ 23.1	- 4.5	8	+ 8	10.7	13
San Jose de Buenavista	75.8	+ 47.3	+ 16.9	10	+ 3	48.6	4	San Isidro	58.9	+ 56.2	+ 12.3	11	+ 7	25.4	5
Cuyo	111.5	+ 70.9	+ 51.6	7	+ 1	89.7	4	Tarlac	54.1	+ 52.8	+ 15.6	8	+ 6	16.7	5
Ormoc	193	+ 3.7	- 1.2	19	+ 1	31.8	19	Baler	250.1	- 50.4	-107.3	16	+ 4	85.4	5
Guiuan	662.5	+261	-	29	+ 6	126.8	31	Dagupan	50.3	+ 44.2	+ 29.6	6	+ 5	36	14
Tacloban	430.4	+170.3	+ 74.7	20	- 2	122.5	30	Bolinao	7.9	+ 7.9	- 3.9	4	+ 4	3.6	15
Capiz	130.9	- 38.8	-111.8	18	+ 4	24.4	18	Baguio	30	+ 29.5	- 23	11	+10	8.2	20
Borongon	790.4	+469.6	+174.5	27	+ 3	118.9	30	San Fernando, La Union	4.6	+ 4.6	- 3.6	2	+ 2	3.6	6
Catbalogan	349.2	+139.4	-	19	+ 1	54.3	30	Echague	90.6	+ 37.5	- 61.4	24	+ 6	16.5	5
Calbayog	364	+ 6.2	+ 80.2	21	+ 1	49.8	26	Candon	5.8	+ 5.8	- 4.4	2	+ 2	4.8	23
Masbate	184.7	-258.3	- 33.5	16	- 2	41.9	29	Vigan	0	0	- 5.6	0	0	0	0
Romblon	186	- 95.4	- 43.6	20	+ 6	39.9	3	Tuguegarao	139.4	+ 94.6	- 11.1	10	+ 4	48.3	21
Batag	400.5	+ 29.3	-	26	+ 7	53.3	16	Laoag	1.5	+ 1.5	- 19.4	1	+ 1	1.5	9
Sorsogon	436.3	-	-	-	-	102.3?	29	Aparri	197.6	+155.6	- 51.4	21	+12	47.8	22
Legaspi	347.9	+ 27.3	-121.7	23	+ 2	81.7	4	Cape Bojeador	34.4	+ 28.3	-	13	+12	12.7	7
Sumay, Guam	116.6	+ 57.4	- 25.2	10	0	38.1	21	Basco	502.2	+314.4	+116.1	26	+ 5	109.2	6

DEPRESSIONS AND TYPHOONS.

There was only one tropical depression during this month in the Far East. Its track was given in Plate IX, bulletin for November, together with the tracks of the depressions and typhoons for the preceding month. This depression was formed on December 1 to the WSW of Yap near 135° longitude E and 7° or 8° latitude N. It moved W by N toward the Visayas, and passed on the 4th very close to the north of Cebu and to the south of Iloilo and San Jose de Buenavista. It seems that after traversing the northernmost part of Palawan Island, it inclined to WSW in the China Sea, until it probably filled up on the 9th near 110° longitude E and 9° latitude N.

NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes es muy ligeramente mayor que la normal, aunque es algo menor que la media mensual de diciembre de 1918. Las presiones más altas del mes se observaron generalmente los días 21, 30 y 31, y las más bajas los días 4 y 5 al tiempo en que una depresión cruzaba las Islas Visayas.

La temperatura media mensual es casi idéntica a la del año pasado y a la normal de diciembre. Las temperaturas máxima y mínima absolutas de Manila fueron 32.5° C., observada los días 7 y 8, y 18.5° C., registrada el 31. Las temperaturas extremas de Baguio fueron 25.0° C., 10.2° C. en la cumbre del Mirador, y 25.7° C., 10.2° C. en el valle.

Precipitación acuosa.—La cantidad total de lluvia de este mes es, salvo raras excepciones, menor que la normal de diciembre en nuestras estaciones de Luzón; pero es mayor que la misma normal en la mayoría de nuestras estaciones de Visayas y Mindanao. Las lluvias del mes de Manila y de Baguio difieren de la normal de diciembre en -35.8 mm. y -23.0 mm., respectivamente.

DEPRESIONES Y TIFONES.

Durante este mes sólo hubo una depresión tropical en el Extremo Oriente. Su trayectoria puede verse en la Lámina IX del boletín de noviembre último, juntamente con las trayectorias de las depresiones y tifones del citado mes. Esta depresión se formó el 1 de diciembre al WSW de Yap, Carolinas Occidentales, cerca de 135° longitud E y 7° u 8° latitud N. Se movió al W $\frac{1}{4}$ NW en dirección a Visayas, y pasó el día 4 muy cerca por el N de Cebú y por el S de Iloilo y San José de Buenavista. Parece que después de haber atravesado el extremo más septentrional de la Isla de Palawan, se inclinó al WSW en el Mar de China, hasta que probablemente se deshizo el día 9 cerca de 110° longitud E y 9° latitud N.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.*

[$\phi=14^{\circ} 34' 41''$ N; $\lambda=120^{\circ} 58' 33''$ E; barometer above sea, 14.2 meters; gravity correction not applied, -1.72 mm.]

Day.	Pres- sure (mean).	Air temperature. ^b			Underground temperature.				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation. ^b					
		Mean	Maxi- mum.	Mini- mum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Mini- mum on grass	Maxi- mum in sun. Black bulb in vacuo. ^c	Free expos- ure (total).	Shelter (total).		
					8 a.m.	2 p.m.	8 a.m.	2 p.m.									8 a.m.	8 a.m.
					°C.	°C.	°C.	°C.									°C.	°C.
1	760.12	25.3	31	22.8	27.4	28.6	28.2	28.3	28.8	28.7	88.6	21.2	22.1	52	1.3	1		
2	60.24	25	30.9	21.8	27.3	28.8	28.2	28.5	28.7	88.9	19.5	20.6	52.3	2.7	2			
3	59.25	25	30	21.9	27.3	28.5	28.2	28.4	28.7	88.6	19.8	19.7	49.2	1.4	1.3			
4	57.42	24.8	28.1	22.5	27.2	28	28.1	28.2	28.7	89.2	20.7	20.9	45.4	1.5	1			
5	56.67	25.7	30.8	23.2	27.2	28.5	28	28.3	28.7	89.4	21.9	22.5	47	1.6	1			
6	57.32	26.3	31.9	23.2	27.5	28.9	28.2	28.4	28.7	86.3	21.6	22	50	2.3	1.1			
7	58.50	26.4	32.5	23.2	27.8	29.5	28.4	28.7	28.7	85.3	21.5	21.9	55.5	2.8	2.1			
8	58.98	26.7	32.5	22.7	27.9	29.6	28.5	29	28.8	84.1	21.6	21.2	52.9	3.1	1.9			
9	59.49	25.8	31.1	22.6	28.2	29.4	28.7	28.9	28.7	85.4	21	21.3	53.6	2.7	1.5			
10	60.53	25	30	21.8	27.7	28.7	28.6	28.7	28.7	86.3	20.2	19.9	46	1.6	1.1			
11	60.60	25.3	32.1	20.9	27.3	29.1	28.4	28.8	28.7	89.2	18.5	19	52.8	3.4	2.3			
12	59.75	25	30.6	20.6	27.2	29	28.1	28.5	28.7	82.3	19.2	18.6	50.2	3.1	1.9			
13	58.66	25.5	31.5	20.9	27.1	29.5	28.3	28.7	28.8	82.9	19.9	19.1	52.1	3	1.9			
14	58.18	25.5	29.4	23.3	27.6	28.8	28.5	28.7	28.6	78.9	19	22.3	40.5	3	2.1			
15	59.11	25	29.5	21.2	27	28.8	28.3	28.5	28.8	83	19.4	19.7	48.9	2	1.4			
16	59.92	24.8	28.6	21.8	27.2	28.3	28.3	28.2	28.6	85.2	19.7	20.4	43.2	2.2	1.3			
17	60.96	25.2	29	22.2	27.2	28.6	28.2	28.3	28.6	81.1	19.2	20.8	41.2	2.3	1.5			
18	61.43	25	29.9	22.5	27.2	28.5	28	28.2	28.6	81.5	19.1	21.3	43.4	2.1	1.4			
19	62.29	24.4	29.4	21	26.7	28.1	27.8	28.1	28.6	80	18	19.6	46.3	2.4	1.7			
20	62.31	24.7	29.7	20.5	26.2	28.4	27.7	28	28.5	82.2	18.9	19	51.6	2.7	1.6			
21	62.55	24.4	29.4	21.4	26.7	28	27.8	28	28.5	88.6	20	20.2	50.2	1.1	1.9			
22	62.35	24.7	31.5	20.5	26.3	28.4	27.5	28	28.5	82.9	18.9	19.3	46.5	2.5	1.8			
23	61.76	24.6	30.1	21.4	26.2	28.9	27.3	28.2	28.5	86.8	19.8	20.1	54	2.7	1.2			
24	60.28	24.7	30.1	20.3	26.5	28.5	27.6	28	28.5	83.4	19.1	19	49.1	2.9	1.7			
25	59.94	24.8	30.5	20.9	26.8	28.4	27.8	28	28.5	84.4	19.4	19.3	51.6	2.2	1.6			
26	60.31	25	30.5	21.3	26.5	28.4	27.8	28	28.5	84.7	19.6	20	48	2.1	1.4			
27	60.47	25.5	30.1	22	26.7	28.5	27.8	28.1	28.5	84.9	20.5	20.5	49.4	2.3	1.4			
28	60.68	25.9	31.2	22.4	26.9	28.7	27.8	28.2	28.4	82.8	20.4	20.8	50.7	2.9	2.3			
29	61.63	24.5	28.6	22.4	27.1	28	27.9	28	28.5	81.3	18.5	21.9	38.5	2.6	2			
30	62.44	23.6	28.4	19.6	27	28	28	28	28.5	71.9	15.4	20.2	48.9	3.8	2.7			
31	63.08	22.5	28.8	18.5	25.6	27.9	27.1	27.6	28.3	75.2	15	16.5	52.4	3.5	2.4			
Mean	760.23	25.1	30.2	21.7	27	28.6	28	28.3	28.6	83.4	19.6	20.3	48.8	2.4	1.6			
Total														75.8	50.5			
Departure from normal	-0.08	0.0	+0.2	+0.5						+1.9	+0.4			-10.8				

Day.	Wind.				Amount (mean).	Clouds.		Sun- shine.	Rain, 24 hours beginning 6 a. m.		Miscellaneous.		
	Prevailing direction.	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maximum velocity.		Form and direction.			On the tower.	In the park.			
						Upper.	Lower.						
1	N quad.	Km. 79.5	Km. 12	NE	0-10. 7.1	A.-Cu.	Cu.	E	h. m. 4 40	mm. 4.3	4.4	● ☽ p.	
2	NE	92.5	16	NE	6.4	A.-Cu.	E	Cu.	E	3 00			
3	N	140	12	NE	7.2	A.-Cu.		Cu.-N.	E	1 55	1.6	1.9	d° a. ● ☽ p.
4	NNE	127	12	NE	9.1	A.-Cu. SE by E		Cu.	E	0 45			d° a. ☽ p.
5	N	114	14.5	ENE	8.8	Ci.-S.		Cu.-N.	E, SSE	1 05	.5	.8	d° a. ● p.
6	E quad.	160.5	15	SE	7.2	Ci.		Cu.	SSE	3 25	1.9	2	d° a. ● p.
7	E quad.	122	13	SW	6.2	Ci.		Cu.	SSE	6 30			☽ p.
8	E quad.	109	14.5	SE	3.2	Ci.		Cu.	SE	8 30	.5	.8	☽ d p.
9	N quad.	124.5	13	NW, WNW	3.5	Ci.		Cu.	E	6 25			☽ a.
10	NE, N	68	11	SE	7.8	Ci.		Cu.	E	1 45			
11	NE, NNE	131.5	17	ENE	2.7	Ci.		Cu.	E	6 25			
12	NE	129	14	W, NW	1.8	A.-Cu.		Cu.	ENE	8 15			
13	NE quad.	92.5	12	SW	2.9	A.-Cu.		Cu.	E	7 15			
14	NNE	96.5	10.5	N	8.7	A.-Cu.		Cu.	E	2 15			
15	NE quad.	76.5	9.5	W	6.8	A.-Cu. ESE		Cu.	NE	3 00			
16	W quad.	74	11	WNW	8.2	A.-Cu. ESE		Cu.	E	2 05			d° p.
17	N, W	71	12	WNW	8.1	A.-Cu.		Cu.	E	2 30			
18	N, NE	78	6.5	WNE	7.2	A.-Cu.		Cu., Cu.-N.	E	3 10			
19	W quad.	89.5	11	WNW	8.1	A.-Cu.		Cu.	ESE	1 20			
20	E	108.5	12	W by S	6.9	A.-Cu.		Cu.	E	4 10			d° p.
21	NE quad.	42	9	SW	6.3	Ci.		Cu.	E	3 35	13.2	13.5	● ☽ p.
22	NE	113	16.5	ESE	7.3	Ci., Ci.-S.		Cu.	E	5 35	2.9	2.8	● p.
23	NE	80.5	13.5	WNW	6.4	A.-Cu.		Cu.	E	5 45	.4	.3	d p.
24	W quad.	85.5	13	W	1.2	Ci.		Cu.	E	8 35			
25	SW quad.	84	12	W	4.8	Ci.		Cu.	E	4 45			d° p.
26	W quad.	89	11	WSW	7.5	A.-Cu.		Cu.	E	4 00			d° p.
27	NE, SW	96	11	W, WNW	8.3	Ci.		Cu.	E	3 35			
28	NE	177	17	NE	6.9	A.-Cu.		Cu. NE, ENE	E	4 55	.3	.5	
29	N	109	15	NNW	9.3	A.-Cu.		Cu.-N. ENE	E	0 00			d° a. p.
30	N quad.	158.5	19	NE	6.9	Ci.-S.		Cu.	E	5 15			
31	N quad.	91	13	W	3.8	Ci.		Cu.	NE	6 35			
Mean		103.6	12.9		6.4				h. m. 4 12	mm. 25.6	27		
Total		3,212.5							131 00				
Departure from normal		-1,590.1			-0.2				23.43	-35.8			

* All the mean values given in this table are deduced from hourly observations.
 b These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.
 c Maximum of hourly observations taken from 6 a. m. to 6 p. m.

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.*

[φ=16° 25' N; λ=120° 36' E; barometer above sea, 1,512.5 meters; gravity correction not applied, -1.65 mm.]

Table with columns: Day, Pressure (mean), Air temperature at Mirador (on the top of the mountain), Air temperature in the valley (near the city hall), Relative humidity (mean), Vapor pressure (mean), Radiation, Evaporation. Rows include daily data from 1 to 31 and summary rows for Mean and Total.

Table with columns: Day, Wind (Prevailing direction, Total movement, Maximum hourly velocity, Direction at the time of the maximum velocity), Clouds (Amount, Form and direction, Upper, Lower), Sunshine, Rain, 24 hours beginning 6 a. m., Miscellaneous. Rows include daily data from 1 to 31 and summary rows for Mean and Total.

* All the mean values given in this table are deduced from six daily observations taken at 2, 6, 10 a. m. and 2, 6, 10 p. m.
b The barometric readings of this station are not reduced to sea level.
c Maximum of hourly observations taken from 6 a. m. to 6 p. m.
d This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.
e 3 hours missing.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, DECEMBER, 1919.

Station.	Day of month.																
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Jolo	4.1	3.3	17.5	1.1	4.8	4.8	6.1	34.6	31.7	123.4	6.9	27.7	26.2	6.9	0.1	0.3	7
Lais, Malita, Davao		1.8			1.8		16	6.9									1.8
Port Lebak, Cotabato	14	9.7		6.6			6.6	16				3.6					13.2
Lamitan, Basilan				19.6	18.8			4.1									
La Union, Davao		63.2	.8		2.5		28.4	9.1	.3	21.9							5
Basilan Plantation, Isabela, Basilan, Kabumbatan			32					29	1.3						30.5		1.8
Basilan Plantation, Isabela, Basilan Office			1.3	39.3	5.1	1.8				5.3	5	22.4		4.6	2.5		
Parang-Lalap, Isabela, Basilan		8.9	25.4	5.1		1.3			1.5	2.3		50.8					
Latuan, Isabela, Basilan		1.5	45.2	1.6		.8			1.3	3.6		19.8					
Malamau, Zamboanga		37.4	16.3								31.7						
Cuabo, Davao							2.5										
Zamboanga		14.3	20.3	4.3	.3		2.8	2.8	2.4		.3		1.3	7.1			
Cagayan de Sulu, Sulu	4.8	5.3			6.4			18.8	198.1	14.2	8.4	27.9					23.4
Fort Pikit, Cotabato			11.4				16.5	2.5	4.3								
Davao		26.4	8.9				31.7	77.5	7.1	3.8	6.4			21.6			
Sirib, Guianga, Davao	3.3	38.1	25.4		48.3	15.2	48.3	5.1	3.8	1.3		8.9					
Bual, Dalauan, Cotabato			23.1			1.5	3.6	29	5.6		19	7.6			1.3		
Cotabato			8.4				12.2	10.7		17.3		67.1			1.5	2.5	
Naga-Naga, Zamboanga		11.4	63.8	12.4			22.4	29.2	21.6		12.4	8.9					6.4
Malabang, Lanao		.5	5.1				7.7	4.1	35.1		1.3	2.5		1.3			.5
Compostela, Moncayo, Davao		2.3	5.8				50.8	2.5	5.8	2.5	7.4	3.8					5.6
Malangas, Zamboanga	.8	.5	45.7	17.8	2	6.9	23.2	57.2							14.5	6	
Lumbatan, Lanao		7.4	2.8	3			25.4	2.5							2.5		2.5
Cateel, Davao	1	8.7	.8	17.8	3.6	1	5.1	41.7			71.1	22.6	39.4	1.8	28.7	4.9	
Ganassi, Lanao		3	3.8				21.1	19	2.6	12.7	5.1	6.9	12	3.6			
Camp Kalaw, Moncayo, Davao		3.3	8.3	4.3	.3	4.1	21.1	19	2.6	12.7	6.9	12	3.6				
Tukuran, Zamboanga	24.9	8.9				30.7	33.5	10.1			35.8	10.4		20.6	13.7		
Mailag Agricultural School, Bukidnon		4.8	8.2			2.5	27.9	1.3				1.5					
Camp Keithley, Lanao		22.4	17.2	.3		.3	9.9	4.2	13.7			3.3		7.4			
Pantar, Lanao		78.7	20.3			2.5	17.8			1	4.1	2.8	30.7	2.5			
Veruela, Agusan		2.3	23.9		5.6	8.1	5.6	1	7.8	45	22.3	12.7			2.5		
Sumilao, Agusan		1.3	32	4.1	27.7	11.4	22.9	.8			1.5		21.6				
Sindangan, Zamboanga		22.9	1.3	20.3			9.9	.8	9.4		2.5	7.6			.5		
Diklom, Bukidnon		1.5	8.1	38.1	10.4	13.2	13.7										
Cagayan, Misamis		1	15.7	10.9	3		9.9	.8									
Talacogon, Agusan		7.1	26.5	4.3	17.8	17.8	13.5	2	14.2		15.2	9.2	7.4	19.8			
Butuan	4.3	9.6	52	6.4	3.3	.5	12.7	4.8	58.6	3.6	.8	2.6	1				
Hacienda San Jose, Tanghai, Oriental Negros			59.7	29		12		8.9	5.8								
Palanas, Bais (Centro), Oriental Negros			51.8	14.7				27.9	3								
Hacienda Tamugon Bais (Norte), Oriental Negros			48.3	7.6		12.7	12.7	12.7									
Yap, Western Carolines	13.7	2.3	1.3	1.8	1.8	.3	6.8	.8	6.4	4.9				3.8	.6		7.1
Tagbilaran	53.1	8.6	50.8	35.1		11.7	7.2	37.9				4.8					
Iwahig	1		2	87.4	25.4	.8		10.7	3.6			17.3					
Dalaguete, Cebu	.8	9.7	24.9	20.6	2.6		4.1	8.4	1								1.5
Surigao	42.1	59.5	123.5				2.8	12.9	89.1	3.3	18.5	2.3					
Central Palma, Ilog, Occidental Negros	2.5	24.2	4	16.5	12.7	10.4		3.3	2								
Hacienda Naval, Himamaylan, Occidental Negros	11.9	25.4	31.2	7.1	.5	10.2			2.1			3					
Biaong Cui's Farm, Barili, Cebu	21.3	21.3	187.2	8.2	13	5.8	3.3	.5	2.3	1.8	.3						
Maasin	18.5	15	152.2						69.6								
Isabela, Occidental Negros		1.5	43.4	13.2	1.5	1.3											
Hacienda Tanolo, Hinigaran, Occidental Negros	12.2	24.9	25.6	109.2	11.7	2	1.5		1.3								
Cebu		28.2	5.5	1.5	2.3	15.8	2.3	6.9	1.3	1.3	3						
La Castellana, Occidental Negros	4.1	14	64.3	19.3	2.3	.3	.8		3.5	.3							
Hacienda Vallehermoso, Oriental Negros	9.1		45.7	.8					4.3								
Hacienda Canlaon, La Castellana, Occidental Negros	3.8	5.1	92.7	7.4	1.8		.5	8.2	.3					.3			
Central Azucarera de La Carlota, Occidental Negros	1	4.3	94.5	71.2	8.2			.3									
La Carlota, Occidental Negros		3.8	102.4	20.1	1.5		2.5	.8						.3	1.5		
Valladolid, Occidental Negros	9.1	15.5	83.1	30	.8		4.6	.3									
Hacienda San Antonio, Occidental Negros	24.9	10.2	12.7			29.2			30.7								
San Carlos, Occidental Negros	18.2	1.8	63.7	15	4.6		1.8		.8	13.5							2
Hacienda Refugio, Occidental Negros	7.9	51.8		6.4						15.2							
Maao Sugar Central, Santa Cecilia, Bago, Occidental Negros	.8	10.7	99.1	9.4	5.1		1.3					3.3					
Murcia, Occidental Negros	7.1	5.3	73.7	24.6	8.6			1				15.2					
Iloilo	2.5	14.5	27	59.7	6.8				.8	.5							
Concepcion, Talisay, Occidental Negros	3.8	4.6	51.6	9.9	2		.8	1.3				1.8					1.5
Tuburan, Cebu	8.4	9.7	29.2	9.7		9.4	7.6		5.3	1.3		1.3					
San Jose de Buenavista		.5	7.2	48.6	4.1	2		.3									
Silay, Occidental Negros	50.3	4.6	41.7	13	2.3		.5	10.4	.3								4.1
Cuyo			1	89.7	15.2	2.5	.8	1.5									
Luena, Iloilo		27.9	24.1	50.8													
Victorias, Occidental Negros	63.3	8.4	38.4	9.7	2.8			39.1		1.5		3.3	1.3	.5			4.6
Cadiz, Occidental Negros	5.8	6.6	26.2	11.5	.5	11.2	1		1.8		2.3						1
Hacienda Bilbao, Manapla, Occidental Negros	10.2	7.6	24.9	20.3	10.2									25.4	5.6		7.6
Ormoc	26.2	14.2	24.4		.8		3.6						1.8				
Guiuan	24.4	30.8	80.8	19.6	6.4		1.3	6.9	4.3	2.5	2.5	11.2	.8		8.9		5.8

* Voluntary or cooperative station.

Daily rainfall at the stations of the Weather Bureau, December, 1919.—Continued.

Station.	Day of month.															Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.		
Jolo	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Lais, Malita, Davao		6.9	45.7	2.3	2.3	0.5			6.6	28.7			3	.9	.3		206.9
Port Lebak, Cotabato	4.6		12.2	6.6		.8	21.6		5.1	21.3				4.8	3.8		297.2
Lamitan, Basilan					16	1.3									15		105.5
La Union, Davao ^a		1	3.3											3.8	.5		136.6
Basilan Plantation, Isabela, Basilan, Kabumbatan ^a		4.6			11.9	12.7	17		32								172.8
Basilan Plantation, Isabela, Basilan Office ^a		1.3			16.2	11.2	17.8		22.9	1							153.2
Parang-Lalap, Isabela, Basilan ^a					14	8.9	43.2										161.4
Latuan, Isabela, Basilan ^a					24.7	11.2	18.3								11.4		139.4
Malamaui, Zamboanga					42.9	26.4									10.9		165.6
Cuabo, Davao				1.3	.5			.3		2.3			12.7				24.6
Zamboanga				23.1	8.4	2.3	20.1		5.8					.3			57.5
Cagayan de Sulu, Sulu ^a	18.8		10.2	15.8					7.9	1	1.8	1.3	11.2				423.2
Fort Pikit, Cotabato			1.5	3.6		4.6	5.6		2								50.3
Davao			5.1		3.8	5.8					14						206.3
Sirib, Guianga, Davao ^a	4.1						5.8				27.4						245.2
Bual, Dalauan, Cotabato		14	1.8	11.9	.5	1.8			6.9	5							142.4
Cotabato		5.6		14					16.3					10.2			161.7
Naga-Naga, Zamboanga	3.8	8.1	10.2	4.8			2	3.8		6.4	4.6	7.1	10.7		11.4		264.4
Malabang, Lanao			31.7	8.4		4.3		2.3		3			5.9	7.4	5.6		126
Compostela, Moncayo, Davao ^a		41.9	6.6	17.7		8.4	17.5	5.1	4.3		2.3						190.3
Malangas, Zamboanga ^a	5.3	3.6	4.3			17.8			1.3	19		1		9.9			231.4
Lumbatan, Lanao ^a			5.1			5.1	2.5		2	2.5	3.3				2.3		68.9
Cateel, Davao	5.3	7.1	118.4	39.9	31	99.6	61.5				2	3.8	6.1	117.3	2.5		711.1
Ganassi, Lanao							14.2				5.1						101.6
Camp Kalaw, Moncayo, Davao		4	21.1	29.4	6.4	18.6	21.6							37.1	4.1		240.5
Tukuran, Zamboanga ^a																	188.6
Mailag Agricultural School, Bukidnon			1.5	2.3	1.8				3.8	9.9	18.8	.3	.5	3.3	.3		50.8
Camp Keithley, Lanao			12.2	3.8					3.6	5	2	4.8	12.7	2.5	5.3		133.1
Pantar, Lanao ^a		12.7					2.8		1.3	7.1	1.3	10.5	2.3	29.2	16		207.3
Veruela, Agusan	2	3.3	33	21.6	34.8	16.5	11.9		7.9	1.3				3			327.6
Sumilao, Agusan			3.8	4.3					1.8								143.6
Sindangan, Zamboanga ^a		.5	16.5	.5	9.4												103.9
Diklom, Bukidnon ^a			5.3	5.6										1.5			97.4
Cagayan, Misamis						10.4											51.7
Talacogon, Agusan	3.6		38.6	57.7	12.4	11.9		4.6		4.8				3.6	6.6	12.7	311.3
Butuan		.8	19.1	40.2	10.2	1.3	8.2		7.6	2.1	.5	7.1	.3	26.7	5.1		289.4
Hacienda San Jose, Tanhai, (Sur) Oriental Negros ^a					13.2										6.6		135.2
Palanas, Bais (Centro) Oriental Negros ^a					2.5												99.9
Hacienda Tamugon, Bais (Norte) Oriental Negros ^a					55.9									10.2	15.2		175.3
Yap, Western Carolines	.3	3.8	42.4	18	21.1		21.3	4	7.4	1.3					2.6		173.8
Tagbilaran	1.8		4.1	.6	7.6		.5	6.3	4.3	.4	9.9	10.2	7.4	16.1			278.4
Iwahig			2.3	8.4	18.5	5.8	1.3							9.1	38.1		148.2
Dalaguete, Cebu			8.4	18.5	5.8	1.3											157.1
Surigao	3.1	7.7	108.5	75.5	20.9	8.4	42.4	1.3	2.8		5.3	6.1	4.3	154.7	18.6		813.6
Central Palma, Ilog, Occidental Negros			2.5							2.3	2.5	2.3	1		2		88.2
Hacienda Naval, Himamaylan, Occidental Negros			17.5		1.8	.8		11.9		24.1	8.6	12.2	.8	18	3.8		190.9
Biaong Cui's Farm, Barili, Cebu			3.8		26.7			14.2				32.3		26.4			368.4
Maasin			41.7		64.5	23.4								72.4	40.9		498.4
Isabela, Occidental Negros	1.3		7.8		4.8				13.7		.8			6.9	1.5		97.7
Hacienda Tanolo, Hinigaran, Occidental Negros		.3	18.6		.8	.3										7.9	216.9
Cebu		1.3	8.6		31.5		.5							15.7	16.3		142
La Castellana, Occidental Negros		.5	7.9	.3	.5	1		6.1	.8	1.8	.6		1.8	6.1	.6		136.9
Hacienda Vallehermoso, Oriental Negros ^a		2	.5		78.7		86.4		7.6					20.8			255.9
Hacienda Canlaon, La Castellana, Occidental Negros		.5	7.1			4.1		16.5	8.4		10.9	3.3	3	2.1	.8		176.8
Central Azucarera de La Carlota, Occidental Negros	.5	7.4	15	.3		1.8				1.3	5.8	2.3	3	3.8			222.5
La Carlota, Occidental Negros ^a		.3	14.3		.5			6.4	.3		3.3	3.3	3.3	4.3			164.1
Valladolid, Occidental Negros			11.9		.5					1.5	7.4	.8	1.5	1.8			168.8
Hacienda San Antonio, Occidental Negros ^a			13.2		11.4	10.2			8.1				21.8	10.7			183.1
San Carlos, Occidental Negros ^a		.8	18	1	10.9	4.1	15		.5	1			16.5	25.4	9.6		224.2
Hacienda Refugio, Occidental Negros ^a		18		2.5	4.1	19.8							20.3	28.4	8.9	5.1	188.4
Ma-ao Sugar Central, Santa Cecilia, Bago, Occidental Negros			16			1					43.9	1.3	2.8	3.3			198
Murcia, Occidental Negros			19.3		.5	8.9				1.3		5.8	6.9	.8			179
Iloilo			9.9		.5	4.6		1.8		.8		2.8	2	2.3	3		139
Concepcion, Talisay, Occidental Negros			37.8	.3	.5	4.8				4.8			5.1	10.2	8.1		148.9
Tuburan, Cebu		3.8	9.4		6.9	9.1		2.5		3			4.1	32.3	13		163.3
San Jose de Buenavista			10.5			.3				2							75.8
Silay, Occidental Negros	2.3		193.1	.3		8.6	4.1		1				14	15.7	25.6		391.9
Cuyo			.8														111.5
Lucena, Iloilo ^a	2.5	3.6	25.1				16.5					20.3					170.8
Victorias, Occidental Negros	20.8	1.8	110.2			4.1							10.4	13.7	26.9		860.8
Cadiz, Occidental Negros		.3	58.4										2.8	12.2	12.7		154.3
Hacienda Bilbao, Manapla, Occidental Negros			7.4		11.4			1.8					5.1	6.4	20.8		164.2
Ormoc		4.8	31.8	.8	.8	17.8	1	.3	7.4	2.5			25.1	17.5	6.9		193
Guiuan	10.9	33.5	19.6	3	45.5	55.7	9.9	.8	36.8	14	5.3	3	15.5	76	126.8		662.5

^a Voluntary or cooperative station.^b 15 days of observation.

Daily rainfall at the stations of the Weather Bureau, December, 1919.—Continued.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Bogo, Cebu	1	29.5	18.5	2.6				36.1				0.3				
Dueñas, Iloilo ^a		3.8	66													
Bitoaogan, Iloilo (Railroad Iloilo to Capiz) ^a	9.7	20.6	96.5	40.1		2.5				6.4		7.1				
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a	20.8	24.2	48.3	8.9					.5							
Tacloban	5.6	17.2	53.7	5.1	2	10.4				6.3		1.8				7.8
Dumarao, Capiz ^a		10.2	43.2	27.9			6.3			1.3	3.3					
Dao, Capiz ^a	18.6	3.8	24.4	58.7		8		4.8		14		28.5				1
Capiz	8.6	16	10.2	12.7			19.8			2.3		.3		.8		2.3
Borongon	19.3	33	44.2	54.9	5.3	9.1	.8			9.1	62.5	13	1.8		1	7.3
Catbalogan	2.3	20.1	18.5	3.8			15.7			1.3	1	15.8	4.8			22.6
Calbayog	8.4	24.7	14.4	7.2			.5	7.6	.8			16.8	11.4			
Masbate	2.3	2.1	14.2		.8					2.8						25.1
San Jose State, Tamaraw Plantation, Mindoro ^a			10.4	25.4	10.4	15		10.4						13.5	14.2	
San Jose Estate, San Agustin, Mindoro ^a				2.5	12.7	13.9	30.5							6.4	2.5	
San Jose, Mindoro ^a				2.3	5.8	23.6	30	3.3						8.6	7.7	
San Jose Estate, Tunnel D-12, Mindoro ^a				2.5	7.6	10.2	38.1	9.1						7.6	7.6	
Romblon	29.7	.3	39.9	1.6				16.8		17.5	13.2	.3			4.3	8.9
Batag	4.3	12.7	38.3	39.9	4.6				6.4	3.3	2.5	2	13.5	.8		53.3
Irosin, Sorsogon	13.7	32.2	47.3		2			3.6		3.6	5.6	13.5	2.5			136.9
Sorsogon	12.2	5.3	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Legaspi	7.3	21.1	20.9	81.7	5.6			1.8		.5	1.8	4.3	6.6			28.4
Sumay, Guam	2.5	7.6	2.5							7.6		3.8	2.5			
Calapan	3	2.3	12.4	9.4	22.6	5.6	4.4	.5	7.6	2	.3			3.3	6.4	21.1
Virac	4.8	8.1	36	35.8	4.3		12.2		1	13.7	7.1	12.7		.3		4.3
Naga	7	17.5	10	14.3	10.9		14.5			.5		2.1	25.6		4.1	8.9
Tigaon	2.1	42.7	22.3	71.9	22.9	1.8	1	.3	.5	5.1	1.8	.8	11.4	.3	.5	27.7
Batangas	1.5		4.8		2.1	.5	1.3			1					.8	.5
Lucena	26.2	4.3	22.1	2.8	19.8			2.8		3	9.4		2.5	13.7	16.3	3
Atimonan	12.9	6.6	27	.8	7.4	.3				7.4	12.5	1.3	4.1	51.1	31.8	5.3
Ambulong, Tanauan	1.3		7.1	1.3					1.5	3.3						
Canlubang, Calamba	1.5		11.4	10.4	1.8						.5				.5	
Silang, Cavite	.8	.5	5.1	8.7	2.3		5.6			4.1		.5				
Santa Cruz, Laguna	11.7		18.8	10.2	7.4		.3		.5	21.6	1.3					
Paracale	4.6	27.4	35.3	34.2		2.5	31.2	2.3	5.3	2.3	1	8.9	.5	110.2	74.2	13.4
Fort Mills, Corregidor ^{a, b}	4.6			.5	.3		28.2	7.4		5.6				(*)	(*)	
Ymus, Cavite	1		1.5	1.3		7.4	6.9									
Alabang, Rizal ^a			2.8	1.3			1.8									
Lamao, Bataan	2.5		3.3			8.9	1.5									
Manila	4.3		1.6		.5	1.9		.5								
Antipolo	10.2		2.6	3.5	11.7		.8									
Bosoboso, Rizal ^a	20.3	5.1	2.3	1.8	18.3	1										
Montalban, Rizal ^a	.8		3	4.8	10.7	3.3	3					3.3	.5			
Hacienda Pintong-Sapang, San Jose del Monte, Bulacan ^a	27.9		4.8		8.6			2.8	5.3				1.5			
Mabayuan Dam, Olongapo, Zambales ^a																
Pampanga Sugar Mills, Del Carmen, Pampanga ^a				.3	7.1	1		5.8						10.7	1.5	5.3
Iba				10.6	25.4	9.1	.8	4.8						1.5		
San Isidro	3.3		.5													
Hacienda Luisita, San Miguel, Tarlac ^a					15	14.5								5.6		
Tarlac				.3	16.7	7.1	7.6	5.3								
Baler	.5	11.4		57.2	85.4	26.6	9.4	12.7			5.1					
Paniqui, Tarlac ^a	18.		8.9	9.7	18	14.7			21.3					9.7		
C. L. A. S. Muñoz, Nueva Ecija ^a				4.3	19.3		1.5							1.3		
Dagupan					1.1	1.3	.5	1.5							36	
Bolinao				.3	.3		2							2	3.6	
Baguio					.5	1	4.3	.3						4.8	.3	
San Fernando, La Union						3.6		1								
Echagüe	11.7	5.3	6.8	11.5	16.5	1.1			3.3	1.3		.3	1.3		1	.4
Sagada, Mountain Province ^a						2.8		6.1	5.1			3.7	.5		.5	
Bontoc, Mountain Province ^a			1	.8			5.8	11.4	.8	2.5		21.1				
Candon						1										
Vigan				8.9	9.7	4.1					2.5					
Tuguegarao	28.4	16.5								1.5						
Laoag										6.6	8.7					
Aparri	4.6	7.9	10	7.1			2	12.7	3			1.8		2.3	3.8	.8
Cape Bojeador										5.1			1.5	.3		.3
Basco	5.6	.3	9.2	22.6	76.7	109.2	81.2	30.5	12.7	41.9	4.3	6.4			3.8	1.3

* No observation.

^a Voluntary or cooperative station.

^b Rain in 24 hours beginning 7 a. m.

Daily rainfall at the stations of the Weather Bureau, December, 1919.—Continued.

Station.	Day of month.															Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Bogo, Cebu			15.3			2	0.3						12.4	8.4	6.4	132.8
Dueñas, Iloilo ^a		2.5	33.3			16.5							13.5			135.6
Bitaoagan, Iloilo (Railroad Iloilo to Capiz) ^a		8.3	40.1			15.7		7.6					24.9	3.8	4.3	282.5
Lapus, Iloilo (Railroad Iloilo to Capiz) ^a			14			5						3.8	2.6	.8	.8	125.2
Tacloban		29.6	54.9	3.6	13.2	39.4	2		.8	3.8			13.2	122.5	37.5	430.4
Dumarao, Capiz ^a	27.9	1.8	67.3		3.8		1.3	19	2.5	1.3		1.3	33	11.5	8.9	271.8
Dao, Capiz ^a	1	71.1	39.4					7.1		2.5		20.8	30.4	4		332.9
Capiz	5.4	24.4	7.4			8.1			2.8	3.6		.8	4.1	1.3		130.9
Borongan	.8	15.8	54.7		12.2	65.8	40.4	3.8	8.4	80.3	3	6.4	87.1	118.9	31.5	790.4
Catbalogan		6.4	35.3			30		1.5	7.1	53.3			53.9	54.3	1.5	349.2
Calbayog	37.9	30.2	42.6			1.8	.3	1.5	12.7	49.8		20.4	39.9	34.8	.3	364
Masbate	40.2	.5	9.1			7.3		3.3	.8	8.1		22.1	41.9	4.1		184.7
San Jose Estate, Tamaraw Plantation, Mindoro ^a																99.3
San Jose Estate, San Agustin, Mindoro ^a																63.5
San Jose, Mindoro ^a	1.3		.5													78.1
San Jose Estate, Tunnel D-12, Mindoro ^a	5.1															87.8
Romblon	4.9	14.1	4.7	1		12.5			5.6		.8	6.3	1.8	1.8		186
Batag	16	25.7	17.8		3.3	20.1	14.5	23.4	2.8	24.6	11.4	10.7	33.3	8.2	7.1	400.5
Irosin, Sorsogon	113.3	99.3	23.8		10.9	12.4	7.7	5.8	.5	2.6		2.5	66.3	5.1	3.6	614.7
Sorsogon	(*)	(*)	190 ^c	1.3	8.1	19	9.4	10.2	5.6	5.1	12.9	18.3	102.9	27.9	8.1	436.3
Legaspi	43	40.1	36	.5	1.8	3.5	7.9	7.1		5.4	6.1	6.9	9.6			347.9
Sumay, Guam					38.1	15.2	34.3	2.5								116.6
Calapan	11	12.7	.6	1.3	.5	12.2	5.1		4.3	6.3	.3	2	2	1.1		160.3
Virac	31.2	71.7	53.3	.5	2	3.8		.5			.5	11.7	1.5	.3		317.3
Naga	.3	82.8	4.9					2.3	11		2.8	11.9	12.7	2.6		246.7
Tigaon	6.1	60.4	16					7.1	2.5		2.6	24.1	43.7	.5		376.1
Batangas		.8			.5					2.3		2.3	.8			19.2
Lucena	15	7.4			.8		3.3		1	.8			17.3		1.8	175.5
Atimonan	40.7	10	2.1	1.8	16.8	2.3	6.1	12.7	8.9	3.1	1.3	3.9	39.9	.8	3.1	322
Ambulong, Tanauan						4.6	.5					.5	2.3	1.8		19.1
Canlubang, Calamba						3.3	.5					4.8				35
Silang, Cavite						3.3	.5					4.9				36.8
Santa Cruz, Laguna	.8	.8	.5	.5	.5	7.1	1.3			.5	.6	2	1.6			88
Paracale	41.1	32.5	4.6	2.3		5.6	2.3	1.3	8.9	9.1	4.1	42.7	49.7	2.8	1	561.2
Fort Mills, Corregidor ^{a, b}					.3		9.9	(*)	(*)	(*)	(*)	4.1	4.1		(*)	d60.9
Ymus, Cavite					.5	1.5						1.5				21.6
Alabang, Rizal ^a						2.5						2				10.4
Lamao, Bataan ^a						3.6										19.8
Manila					13.2	2.9	.4					3				25.6
Antipolo					.5	3.3	.5					2.8	1.3			41.8
Bosoboso, Rizal ^a				1.3	2.5	4.8			3.6	.5						57.4
Montalban, Rizal ^a				2	2.5	2.3				2.3	2.3	.8				41.6
Hacienda Pintong-Sapang, San Jose del Monte, Bulacan ^a						3										53.9
Mabayuan Dam, Olongapo, Zambales ^a																0
Pampanga Sugar Mills, Del Carmen, Pampanga ^a																13.9
Iba				1.8			.2									23.1
San Isidro					.8		.8					1.3				58.9
Hacienda Luisita, San Miguel, Tarlac ^a																29.5
Tarlac				10.2					1.3							54.1
Baler				1.3	11.7	4.8	11.9	1	3.8	4.3	3					250.1
Paniqui, Tarlac ^a		16.5		40.6												158.2
C. L. A. S. Muñoz, Nueva Ecija ^a																26.4
Dagupan							9.9									50.3
Bolinao																7.9
Baguio				8.2	5.7		3.8	.8								80
San Fernando, La Union																4.6
Echagüe	.8	.4		.8	1	1	3.6	4.5	8.7	4.1		1.8	1.1	2.3		90.6
Sagada, Mountain Province ^a		1	1.3	.5	2.8	2.8	1.1	.3	.5			.3		.3		29.6
Bontoc, Mountain Province ^a						.8										44.2
Candon							4.8									5.8
Vigan																0
Tuguegarao		2			48.3	5.1	13.9									139.4
Laoag																1.5
Aparri			3	5.3	13.6	47.8	17.2	9.7	29	.3		7.7	11.8	1.3		197.6
Cape Bojeador				2.8	1.3			2.3				1.5	1.5	.1		34.4
Basco		2.8	29.5	28.1	.3	17.7	4.1	4.4	5.2	.5	1.8	1.8			.3	502.2

^a Voluntary or cooperative station.

^b Rain in 24 hours beginning 7 a. m.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, DECEMBER, 1919.

Day.	Jolo.		Malamaui, Zamboanga.		Zamboanga.		Davao.		Cotabato.		Camp Keithley, Lanao.		Cagayan.		Butuan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.1	22.1	31.1	24	31.7	23.3	32.7	22.5	33.6	22.7	27.5	17.6	31.1	21.2	32.7	21.4
2	30.7	22.2	30.1	24.4	29.2	22.5	32.7	22.3	32.8	22.2	26.8	17.5	30.5	21.1	28.6	21.3
3	30.9	23.5	31.5	24	32.5	22.9	30.2	23	30.3	23	21.1	19.4	24.8	23.1	25.1	22.4
4	28.9	24.5	27.2	22.5	26.9	23	30.7	22.5	30.6	23	26.3	18.8	29.6	20.9	32.6	22.3
5	32.1	23.5	31.6	23	30.1	22.3	31.5	22.6	31.9	23	27.5	20	31.3	22	32.9	22.4
6	29.8	23.8	29.3	22.3	29.5	22.7	31.2	22.9	32.3	22.1	27.8	19.5	31.6	21.4	33.2	22.7
7	30	22.2	30.5	23.8	29.8	22.9	32.7	23.2	33.5	22	27.4	17.8	31.4	21.6	32.6	22.4
8	30.6	22.9	29.8	24	29	23.9	31.7	22.5	31.8	22.1	26.3	18.8	30.4	22	30.5	22.5
9	29.2	23.4	28.8	24	27.7	22.8	29.2	22.4	29.7	22.4	25.9	18.5	29.2	21.6	31.4	21.5
10	29.8	23	29.2	23	30.3	22.8	29.1	22.5	29	22.4	27.3	19.1	30.6	22	25.3	22.5
11	29.5	22	30.1	23	32.5	22.9	31.2	21.5	31.9	22.5	26.3	17.7	30.3	20.8	31.4	20.4
12	28.9	22.5	30	22.4	28.7	22.7	29.8	22.2	33.2	22	27	18.3	30.2	21.8	25.9	21.8
13	29.9	21.9	30	22.6	29.2	22.5	30.2	22.8	31	22.8	26.6	18.5	30.4	22	32.9	19.8
14	30.5	23.7	30.2	23.1	31.1	22.5	31.2	21.6	32.2	22	27.3	16	30.6	20.6	32.9	21.3
15	30.3	21.8	30	23	30.6	22.8	31.7	21.8	32.3	22	27.1	18.3	30.4	20.3	33.1	20
16	28.9	22.1	31	22.4	30	22.7	32.7	22.9	33.2	21.9	27.3	17.5	30.6	21.6	34	21.4
17	30.6	21.5	30.9	23.6	29.5	22.7	31.7	22.8	33.4	23.1	26.8	17.3	30.6	21.1	32.9	21.5
18	30.8	22.1	31	23.4	30	23.1	31.7	22	33.6	22.5	26.9	17	30.6	20.8	34.6	21.4
19	28.5	22.9	30	24	31	23.3	31.6	21.9	33.6	21.9	26.8	17.1	31.4	21.1	25.3	21.6
20	30.4	23	31.1	24	32	23.2	28.7	22.1	31.2	22	24.7	18.5	30.4	22.1	27.2	22.4
21	30.4	22.9	30.5	22.4	32.3	23	30.5	22.4	32.6	22.1	26.6	19.3	30.6	21.4	28.7	21.8
22	30.5	23.9	29.5	21.4	32.9	23	30.2	21.8	33.2	22.2	26.6	19.4	31	22	28.4	21.8
23	30.7	22.1	30.5	23.4	33	23.4	31.7	21.5	34	22.5	26.8	17.8	31.6	20.8	32.6	21.4
24	29.7	23.1	30	23.4	31.9	23.5	31.2	23	33.4	23	26.9	18.3	30.6	22.6	32.1	22.6
25	29.6	22.8	30.5	22.7	31.2	23.5	31.8	23.5	33.3	23.6	28.6	17.5	31.2	22.1	33.6	23
26	29.7	22	30.9	23	31	23.5	31.7	22.5	34	23.5	27.3	18.3	31.8	22.6	32.4	22.1
27	29.8	21.8	30	23.5	28.6	23	31.6	22.6	34.2	23	27.5	18.5	30.6	21.6	32.4	22.2
28	30.4	22.9	31.1	23.5	33.2	23.5	32.1	22.5	34.2	23	28.1	17.1	31.4	21.4	32.1	22.4
29	30.3	23.1	30.9	23.4	31.6	24	32.7	23.2	34.2	23.1	26.3	17.8	31.8	22	32.9	22.9
30	29.8	23.6	30.5	22.4	33	22.8	32.4	22	32.9	23	26.4	17.3	31.8	21	32.7	22.2
31	29.8	22.3	30.1	23	33	23.2	32.2	23	34.2	22.5	26.3	19.9	31.6	22	32.2	22.5
Mean	30.1	22.7	30.3	23.2	30.7	23	31.3	22.5	32.6	22.6	26.7	18.2	30.6	21.6	31.1	21.9

Day.	Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.		San Jose de Buenavista.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.4	23	30.7	22.3	31.1	23.3	28.8	23.3	30	22.4	31.5	25	29.7	24	31.1	21.4
2	28.8	24	31.2	22.5	31.5	22.4	27.2	22.9	30	23	31.1	24.6	30	23.2	32	21.7
3	30.2	26	26.2	22.7	32.6	21.7	24.8	22.9	26.2	22.4	28.4	24.1	29.1	23.3	30.3	21.7
4	29.9	25.5	30.4	23.4	30.4	22.2	27.8	22.5	30	23.8	30.5	24.1	28.9	23.3	27.3	22.6
5	31.2	25.7	30.5	23.4	26.6	22.6	29.4	23.2	30.4	23.4	30.9	24.1	30.8	23.5	28.6	23.4
6	30.7	26	31	23.6	30.1	22.9	30.4	23.5	31.5	23.8	30.4	24.5	29.3	24.3	31.1	23.8
7	30.4	24.6	31.3	22.7	31.6	21.7	30.3	23.1	31.6	23.5	33.1	24.6	31.3	22.8	31.3	22.3
8	30.5	25.4	30	23	31.6	20.5	28.8	24	31.9	23.2	30.6	24.8	23.3	23.9	29.2	22.6
9	30.6	25.6	29.7	23	29.8	21.1	25.4	23.4	23.8	22.8	27.6	24	29.5	24	30.2	21.7
10	30.7	24.5	29.3	22.4	30.7	21.3	29	22.2	31	22.4	29.3	25	29.7	24.3	31.8	21.8
11	30.7	26.2	31.2	21.7	31.3	21.3	30	23.6	31	22	30.3	23.8	29.8	23.3	33.1	21.2
12	30.4	23.8	31.3	22.4	30.6	21.7	26.7	22.6	30.9	22	28.5	24.5	29.9	23.7	31.2	20.1
13	31	23.4	31	22.1	31.2	20.9	28.7	22.6	32.6	21.2	29.8	23.5	29.9	23.4	30.8	21.7
14	29.4	22.5	31.2	21.7	31.2	21.2	30.3	22.2	31.8	21.5	29.6	24.5	30.7	23	30.8	20.7
15	30.9	23	30.9	20.8	31.5	20.7	29.8	21.8	31.1	20.5	31.2	24	30.2	21.6	30.7	19.9
16	30	23.4	31.8	21.2	31	22.7	31	22.7	32	20.8	31.6	24	30.8	21.3	31	19.8
17	30.1	24.7	31.9	21.5	29.4	22.4	22.4	22.2	32.2	21.2	30.5	25.1	30.5	23.5	30.8	20.1
18	31	24	31.4	21.1	30.4	23.3	32.4	22.4	30.2	22.4	30.2	24.7	31	23.8	31.4	22
19	30.1	23.6	29.1	22.7	26.1	22.7	28	22	27	24.4	24.4	28.3	23.2	29	21.6	21.5
20	27.7	22.4	30.7	23.1	27.5	23.1	28.8	22.2	28.2	21.5	28.5	23.6	28.8	24.4	33	20.3
21	29.2	24.1	29.3	22.3	28.2	23	28.2	22	28.1	23.6	28.1	23.6	28.8	23.2	31.2	22.8
22	30.2	24	30.8	21.2	26.8	22.8	28.2	21.5	28.2	21.5	28.5	23.6	28.8	23.2	31.7	21.4
23	31.2	24	31.6	22.5	30.3	23.5	32.4	22	29.3	24.3	29.3	24.3	29.8	23.8	31.2	21.6
24	29.7	24	30.5	23.4	28.3	23.8	31.4	22.1	29.4	24.5	29.8	24.5	29.8	23.9	31.2	21.9
25	29.8	24.5	31	22.7	29	23.8	32	22.2	31.3	24.3	29.8	24.3	29.8	23.8	31.3	21.3
26	31.2	24.4	30.5	23.5	28.6	24.3	32.6	22.4	30.5	25	30.1	23.8	31.3	23.7	31.3	22
27	30.7	25.4	30.7	23.2	29.8	23.8	32.4	22	31.1	25	30.3	23.7	30.9	23.8	31.2	21.9
28	30.5	25.4	31.8	23.7	30.1	24.2	33	22	30.4	24.7	27.5	28.8	23.6	32.8	21.8	21.8
29	30	25.9	30.5	22.9	29.9	24.1	32.5	22	30.4	24.9	28.3	23.6	22.8	32	23.7	22.7
30	30.2	24.8	30.7	22.6	30.2	23.8	32	22.1	29.3	34.1	27.5	22.8	23.8	32	23.7	22.2
31	29.7	24.4	29.3	22.4	28.2	23.3	29	22	27.2	23	27.2	23	26.5	21.9	31.9	24.5
Mean	30.2	24.5	30.6	22.5			28.7	23.2	30.9	22.2	29.9	24.3	29.6	23.3	31	21.8

Maximum and minimum temperatures at the stations of the Weather Bureau, December, 1919.—Continued.

Day.	Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.		Calbayog.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.....	30	25.7	32	28.9	30	24.1	29.2	23.5	31	24.6	28.7	23.2	28.9	22.3	28.6	21.8
2.....	30	26.6	30.8	22	30.8	23.9	29	22.9	30.9	24.2	29.5	23	29	21.5	28.5	21.7
3.....	29.5	25.3	27.2	22.4	29.6	22.3	26	22.8	30.5	25.3	27.9	21.9	27.2	22.4	27.8	22
4.....	27.1	24	31	23.6	29.2	22.3	27	23.5	29.2	24.1	28.5	23	28.4	22.5	28.5	22.2
5.....	27	23.8	32.2	23	29.7	24.1	30.4	23.9	31.4	23.7	27.2	23.6	30.7	23.9	29.7	22.8
6.....	30	23.5	32.8	22.8	31	23.2	32	23	32.4	23.5	31	22.5	31	22	29.8	22
7.....	29.5	24.4	33.2	22.4	31	23.2	31.7	23.5	32.1	23.2	31	22.9	31.1	22	30.5	21.8
8.....	29.7	24	32	21.9	32	23.2	32	22.5	31	23.6	31	22.5	30.9	22.1	30.1	22
9.....	30	24.7	31.2	22.4	31.8	24.2	30.8	23.5	30.4	24.9	31.2	23	31.3	20.6	30.6	21.5
10.....	30.4	26.1	32.2	22.9	32.4	25.4	31.1	21.5	30.4	25	30.7	25.6	30.4	21.2	30.5	21.1
11.....	30.6	24.3	32	23.4	31.8	25.2	32.2	22.5	30.9	24.5	31.5	25.4	31.5	21.1	31.5	21.5
12.....	30.2	25.9	31.9	22.8	30.4	24.2	27.1	23.2	31.3	23.8	30	22.6	29	22.1	28.6	21.5
13.....	29.9	26.2	32.5	19.4	31	22.3	31	22.5	30.5	24	30.1	22.6	30	21	30.6	21.5
14.....	29.7	24.9	32.9	20.2	32	21.3	31	22.2	30.9	23	30.5	21.2	30.3	20.2	29.6	20.7
15.....	29.5	25	32.8	18.8	31.7	21.4	31.5	22	31	22.3	30.5	20.6	30.9	19.6	30	20.8
16.....	29.7	23.8	33.1	19.2	31.3	22.7	29.4	22.9	31	22.3	30.5	21.5	30	22.4	30.8	21.8
17.....	29.8	25.4	33.2	20.6	31.7	21.7	31.4	22.9	29.7	23.2	30.6	22.8	30.1	21.9	28.3	21.8
18.....	29.3	25.6	33	20.9	31.9	22.5	30	23	30.9	24.5	30.7	22.2	31	23.4	30.3	22
19.....	29	25.3	31.4	21.4	30.9	23.1	27.1	23	27.3	24.3	30.8	25.8	29.8	23.4	28.7	22.6
20.....	29.4	25.7	30.4	22.7	31.5	23.8	29.5	22.2	30.3	24.4	30.2	25.4	30.3	22.6	29	21.9
21.....	30	25.5	31	23	31.5	24	28	23	31.4	24.9	30	25.8	30.3	22.9	30.2	22.1
22.....	29.1	25.6	30.2	23.2	31.7	22.1	27	21.6	30.4	24.6	27.4	23.5	26.7	22	25.5	22.2
23.....	29.7	25.6	30.8	22	32	22.3	31	21.7	31.2	23.8	30.2	23.2	29.8	21.2	29.6	21.7
24.....	30	25.4	31.4	22.7	29.4	23.1	29.4	23.5	31.8	24.4	28.2	23.5	28.6	22.7	30	22.7
25.....	29	25.9	33.2	21.3	31	24	31.5	23	30.4	24	31.3	22.3	30	21	29.7	21.6
26.....	29.7	25.7	32.9	21.5	32.2	24.5	28.5	23.8	30.9	24.3	28.1	23.8	25	23.3	26.4	22.6
27.....	30	25	32.8	22.5	31.2	23.7	32	22.5	31.3	23.9	31.1	23.1	30.4	22.5	30.5	22.6
28.....	29.7	26.2	33	22.4	31.6	24.1	32.5	23.5	31.4	25.5	31	23.1	31.2	22	30	22.2
29.....	29.6	26.4	30.7	22.6	31.8	24.8	28	23.9	31.3	25	28.6	24.8	29.1	22.1	27	22.8
30.....	27.7	24.4	29.2	23.2	31	24.2	25.2	22	26.8	23.5	25.5	23.8	24.5	23	25	22
31.....	27.4	24.3	27.9	22.1	29	22.6	26.4	21.7	27.2	23	26.6	23.6	27.3	22.4	27	21.8
Mean.....	29.4	25.2	31.6	22	31.1	23.3	29.6	22.8	30.6	24	29.7	23.3	29.5	22	29.1	21.9

Day.	Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.		Virac.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.....	30	22.6	29.9	24.2	27.5	23.6	29	23.1	29.8	24	29.8	25.4	30.5	24	29.8	22.4
2.....	30	24.5	30.4	23.9	29	24.2	29.5	23	29.3	23.3	29.6	25.2	31	24	30.4	23.1
3.....	29	23.5	30.4	24.4	29	23.8	22	29.5	29.5	23.3	29.2	24.8	31.5	24.5	29.4	22.5
4.....	30.4	23.6	28	22.7	27	22.3			26.8	23.8	29	24.6	30	23.5	28	23
5.....	29.8	24.6	31.4	24	29	23.4			29.8	24.9	30	24.6	28.5	24.5	28.2	22.8
6.....	31.6	24	31.5	23.3	31	23.2			31.5	23.2	30	24.6	29.1	24	31	23.4
7.....	30.6	24	31.5	22.2	31	23.5			31.1	22.7	30.2	24	30.5	23	31.5	22.2
8.....	31	24.2	31.4	23	30	23.5			31.1	23.2	30	23.2	30.4	22.5	30.7	22
9.....	30.4	24.2	30.3	23.7	30.7	24.1			30.8	25	30	23.4	31.6	24	30.2	22.9
10.....	30	24.5	30.6	23.4	30.2	23.4			31	25.6	29.2	23.8	31.4	23.5	31.1	22
11.....	30.6	22	30.5	23.3	30.5	24.1			30.2	23.4	29.2	23.4	30.5	23.5	31.4	22.2
12.....	29.8	24	31.4	23.9	29.6	23.4			29.9	23.4	28.4	24.4	31	23	29.6	22.9
13.....	30.6	23	30.9	23.9	29.5	22.5			31.1	21.3	28.2	24	30.5	21.9	31	21
14.....	30.4	24.5	29.7	23.2	30	22.5			30.6	21.6	29	25	28.2	23	31.4	20.7
15.....	30	23.6	28.9	23.1	30.2	22.1			31.8	21.6	29.6	25.2	30	24	30.3	21.2
16.....	29.6	23.4	29.4	23	30.1	23			29.7	22.2	30.6	24	29.5	23.6	29.3	22.7
17.....	28.6	22.5	28.5	23.4	28	23.3			27.5	23.4	30.4	24.4	29	22.5	30	28.4
18.....	28.8	23.8	29.9	24	30	23.6			27	23.9	30.4	25	29.5	23.1	26.6	22.5
19.....	27.4	23.2	27.7	23.1	29	23			26.6	22.6	30.2	25	27.6	22.8	26.3	22.8
20.....	30	23.2	30.3	22.7	29.5	22.6	30	20.3	29.2	23.7	28.2	25	30.2	22	29.5	23
21.....	30	23	30.1	23.6	29.7	23.6	30.5		29.5	24.5	28	24.6	30.5	23	29	22.9
22.....	28.2	23.8	30.5	23.2	26.3	22.8	28.9	22.5	29.1	23.9	28	23.4	30.2	22.9	29.3	23.2
23.....	29.6	23.6	30.1	23.7	29.6	22.5	30	22.7	30.8	24.1	28	24	30	23	29.5	23.5
24.....	29.6	24.8	31.3	23	29.2	23.7	29.7	21.3	29.7	23.4	28	23.8	30	23	29.7	22.2
25.....	28.8	24	30.5	23.2	30	23.5	29.5	20.6	30	23.6	29	24.2	29.5	22.1	29.1	23
26.....	29	24.4	29.5	23.6	28.3	23.4	29.6	23.5	30.8	24.6	30.2	23.8	30.4	22	29.4	22.7
27.....	28.8	24.5	29.3	22.8	28.7	23.7	28.5	24.4	28.3	25.1	30.2	24.8	30.2	22.5	27.8	23
28.....	30.6	24.4	30.4	24.2	30	23.1	31.1	22.9	30.5	25	29.6	24.8	30.6	23	28.9	22.8
29.....	28.6	23.2	29.4	23.9	27	23.1	30	23.1	29.1	23.8	29.8	24.6	26.5	22.3	29	22.6
30.....	26.4	21.2	29.3	22.8	25	22.7	26.8	22	26.3	25	29.4	24.8	27	22.5	27.5	22.5
31.....	26.6	22.6	28.1	21.7	25.8	21.3	27.3	21.2	26.6	23.2	28.4	25	29	21.5	28	23.1
Mean.....	29.5	23.6	30	23.4	29	23.2			29.5	23.4	29.3	24.4	29.8	23.1	29.4	22.6

Maximum and minimum temperatures at the stations of the Weather Bureau, December, 1919.—Continued.

Day.	Naga.		Tigaon.		Batangas.		Lucena.		Atimonan.		Ambulong-Tanauan.		Canlubang-Calamba.		Paracale.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.2	23.1	30.1	20.9	31.5	22.8	28.7	23.4	28.2	24.8	31.3	24.4	30	22.1	29.2	26.7
2	29.1	23.4	29.2	21.4	31.8	22.4	28.6	23.4	28.2	24.2	30	25	30.2	22.4	29.8	24.5
3	30.5	23	28.2	20.4	31.7	21.9	28	23.2	27.2	24	30.2	24.1	30	22.4	29	24.1
4	25.5	23.2	28.3	21.2	29.2	22.2	28	23	26.8	24.9	28.7	23.9	28	22	26.3	24
5	30.7	23	28.4	21.9	29.8	23.8	29.5	23.6	28.8	24.1	29.8	24.7	29.4	22.2	29.2	25
6	32.1	22.7	29.9	20.9	30.3	24.1	28.7	23.4	31.6	23.5	30.2	24.6	31	22.2	30.2	28.8
7	33.4	22.5	30.3	20.3	31.7	23.9	29.2	22.6	30.4	22.7	30.8	23.2	30.6	22	30.6	22.8
8	32	22.1	30.3	20.3	32.4	22.5	29.4	22.6	29.6	23.2	31.2	22.6	31	21.6	30.3	22.9
9	32.1	21.4	30	19.3	32.9	23.9	29.6	23.1	30.5	25.5	31.7	24.3	31.2	22.2	29.8	24.9
10	30.7	20.7	30.2	19.4	30.7	23	29.6	22.6	29.6	23.5	29	24	31.2	22.4	28.9	24.1
11	30	20.5	30.4	19.7	31.3	22.8	28.3	22	28.1	23.2	30.1	22.8	30.2	20.4	30	24.8
12	32.1	20.1	30.2	19.6	32.1	20.7	29.6	22.3	29.2	25.1	30.4	23	30.8	20.2	29.8	28.7
13	30	21.1	30.6	19.1	30.6	21.2	28.2	21.1	27.7	24	31.5	22.8	30.4	20.6	29.4	22.7
14	30.4	21.4	30.2	19.3	28.1	21.4	26.5	22.4	26.2	23.4	28.7	24.3	29.8	21.9	28.2	23.5
15	29.5	22.5	29.2	21.4	28.7	20.9	25.9	22.4	25.3	23	29.3	23.5	29.4	22	25.2	23.7
16	26	21	29.7	19.1	29.5	22.4	27	22.3	27.1	23.2	29.4	24	29.9	21.9	26.5	23.5
17	30	20.4	29.2	20.9	30.6	22	26.5	23	26.1	23.2	30	24.2	29.8	22	26.2	23.4
18	25.4	23.6	28.8	21.9	30.3	23	27.3	22	26.2	23.5	29.4	23.9	29.9	22.2	26.4	24.5
19	25.6	21.5	28.7	19.8	29.8	22.5	27.6	21.9	27.1	23.5	30	24.2	28.4	21.9	27.3	23.5
20	31.5	21	28.9	19.8	32	20.5	28.9	22.2	28.3	24.3	30.2	23	29.2	21.5	28.6	23.3
21	32	20	29.1	19.1	31.6	21.4	29	21.4	29.1	23.2	30.2	23.3	29.2	21.2	30	23.7
22	31.5	21.4	30.7	20.3	31.3	21.1	28.2	21.5	27.6	22.8	30.2	23.3	29.4	21.2	29.7	23.5
23	33	22.6	30.4	20.7	31.5	20.6	28.7	22.1	27.6	24	30.3	23	29.6	21.5	29.6	24.8
24	31.9	20.3	30.5	18.6	30.6	20.8	29	21.1	28.1	23.7	32.7	22	31	19.9	29.8	23.7
25	28.9	23.4	29.9	21.7	31.1	19.9	28.2	20.5	26.8	23.9	31.3	21.3	30.8	20	27.5	24
26	30.5	21.2	30	20.5	28.1	19.9	28.1	22.9	27.4	24	30.3	23.8	30.4	20.2	27.8	24.3
27	27.4	22.2	29.7	20.2	31.8	21.6	28.9	22.4	28.2	23.5	32.4	23	31	20.6	29.3	24
28	32.5	23.3	30.3	20.8	30.7	21	28.1	23	27	24.6	31.3	23.6	29.9	20.4	29.3	23.6
29	28.3	22.4	30.2	20.4	27.4	22.6	25	22.5	25.3	22.5	25.4	22.9	29.2	21	25	22.7
30	26	21.8	29.6	19.8	27.5	21.4	25	20.6	25.1	22.5	26.7	22	27.8	19.8	24.4	21.5
31	27	19.5	29.2	19.4	29.1	20.7	25	21	24.7	22	27.6	21.7	29.4	20	25.8	21.5
Mean	29.9	21.8	29.7	20.3	30.5	21.8	28	22.3	27.7	23.7	30	23.4	29.8	21.4	28.3	23.7

Day.	Santa Cruz, Laguna.		Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	29.7	23.9	31	22.8	31.2	21.7	31	23	30.4	21.8	33.6	18.6	31.2	22.3	32.5	22.8
2	30.1	23.9	30.9	21.8	31.9	20.5	32	22.6	31.1	21.3	33	18.8	29.7	22.5	34	21.8
3	30.1	24.1	30	21.9	29.3	21	31.9	20.6	31.4	20.4	32.2	18.8	30.7	21.9	32.1	20.6
4	29.2	23.1	28.1	22.5	29.7	21	31.3	22	29	22.4	32.2	18.2	30.5	22.9	31.8	21.5
5	30.6	24.5	30.8	23.2	30.7	22	27.8	24	26.9	22.8	28.6	20.4	29.5	23.3	28.6	23.4
6	32.6	24.5	31.9	23.2	31.3	22.2	33	23.6	30.6	23.2	31	20.4	28.6	23.1	31.8	23.5
7	32.3	21.9	32.5	23.2	31.9	21.8	31.2	21.8	31	22.7	32.5	21.6	28.9	22.8	34.2	23.1
8	31.5	22.8	32.5	22.7	31.8	21	30.3	22.8	31.2	23	32.8	21.4	31	22.7	33.8	22.6
9	31.4	23.2	31.1	22.6	32.7	21.5	29.8	23.1	30.4	22.1	30.8	20.2	29.7	22.7	33.8	23.4
10	29.2	23	30	21.8	30	21	30.3	20.1	29.8	21	31.6	20.2	29.1	21.4	34.1	21.8
11	30.2	22.2	32.1	20.9	31.2	20	31	20.2	31.9	20.1	33.4	19.2	31.9	20.7	32.3	21.4
12	31.3	21.1	30.6	20.6	31.3	19.1	30.7	20.5	31.4	20.8	33.6	19.6	31.1	21.6	31.6	21.2
13	29.6	21.3	31.5	20.9	30.8	20	31.5	20.2	31.1	20.9	33.6	20.2	32.3	20.8	31	22.3
14	28.1	23.5	29.4	23.3	30.7	21.8	30.2	22	29.9	21.8	32.6	19.8	32.5	21.2	32.5	22.3
15	28.9	23.2	29.5	21.2	28.6	21	29.8	21.4	30.4	20	33	19.4	29.6	19.8	29.9	21.5
16	28.6	23.7	28.6	21.8	30.7	20.8	29.7	20.3	30.1	20.5	33.2	19.4	29.2	21	31.6	21.8
17	29.1	23.7	29	22.2	31.5	21	30.5	21.1	30.7	20.3	33.4	19.4	30.6	22.3	31.5	20.9
18	28.5	23.5	29.9	22.5	30.7	20.6	30.3	21.3	30.3	20.4	33.6	19.2	30.3	21.9	31.4	21
19	29.1	23.2	29.4	21	30.4	20	30.5	22	30	19.8	32.2	19.9	29.2	21.5	33	21.5
20	29.8	21.6	29.7	20.5	30.5	20	30.5	20.8	30.4	19.8	32.8	19.2	29.8	21.2	32.3	20.6
21	28.5	22.1	29.4	21.4	29.7	21	30	21.1	30.4	21	32	18.4	28.2	21.4	33	21.7
22	28.9	21.5	31.5	20.5	30.2	19.9	29.5	20.7	29.4	19.7	31.2	19.4	27.2	21.1	31.6	21.9
23	29.4	22.1	30.1	21.4	30.6	20	30.1	20.6	30.2	20.8	32.6	19.6	26.4	21.7	31.7	20.5
24	31.3	21.7	30.1	20.3	30.9	19.5	30.2	20	31.3	19	32.8	18	29.2	19.2	30	21.2
25	30.1	21.5	30.5	20.9	28.2	19.5	30.2	21.4	31.5	20.9	33.5	18.6	29.5	20.8	31.1	22.3
26	29.7	23.4	30.5	21.3	29.3	20	30.6	21.2	30.6	20.5	34	19.2	28	22	32.4	21.9
27	30.4	22	30.1	22	29.2	20.3	30.5	21.5	32	20.6	34	19.8	29.3	22.4	30.6	21.5
28	28.4	23.2	31.2	22.4	28.8	20.7	31.5	21.2	32	21.8	33.5	19.9	29.4	22.1	29.5	24.2
29	26.6	22	28.6	22.4	27.7	21	30	22.8	29.4	22	32.8	20.6	28.7	22	30.8	22.6
30	25.6	22.1	28.4	19.6	27.8	20	29.4	22.3	29	19.5	30.5	20.2	27	19.3	31	20
31	26.6	21.1	28.8	18.5	28.5	18.8	30.4	20.8	28	16.5	30.2	16.2	29	19.2	30.2	18.8
Mean	29.5	22.7	30.2	21.7	30.3	20.6	30.5	21.5	30.4	20.9	32.5	19.5	29.6	21.6	31.8	21.8

Maximum and minimum temperatures at the stations of the Weather Bureau, December, 1919.—Continued.

Day.	Bolinao.		Baguio.		San Fernando, La Union.		Echague.		Candon.		Vigan.		Tuguegarao.		Laoag.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.	31.5	23.4	23.1	15.4	32.4	23.3	27.4	21.2	31.5	24.2	34.3	24	28.8	21.5	33.9	22.6
2.	32.3	22.5	24.3	14.3	32	22	29.4	21.5	32	23	32.1	24.6	27.4	22.1	32	21.3
3.	30.5	21	24.1	12.9	32	21	28.6	21.6	31	21.5	33.1	22.7	28.4	21.5	34	20
4.	30.5	21.5	24.8	15.4	31.8	21	29.1	21.6	31.6	23	33	22.6	28.9	22.4	33.7	20
5.	30.7	24.5	20.3	15.9	31	24	26.1	22	32	24.6	33.3	25.9	27.8	22.5	33.9	24
6.	31.5	24.2	22.3	16.3	32	24.8	29.4	22.3	30	26	30	25	27.2	25.2	32.2	23.6
7.	32	23.2	24.1	16.1	31.4	23.3	31.4	21	31	24	31.1	24	31	25.2	32.5	23.6
8.	30.8	23.2	23	15.6	31.9	22.2	32.4	21.9	31.5	24	30.9	24.5	32.1	24	31.9	23.5
9.	31.6	23.2	22.5	15.5	32	22.3	31.5	22.5	31.6	24	31.8	22.7	28.5	22.7	31.4	22.2
10.	31.1	22.5	24	14.3	31.6	21.6	30.2	22.2	30.5	22.8	32	22.1	28.8	21.5	33.6	20.2
11.	31.3	21.6	25	14.4	31.5	21	30.4	21.4	30.5	22.9	33	21.9	30	21.9	32.6	19.7
12.	30	21.5	22.8	14.1	31.6	20.9	31.5	20.8	31	22.5	30.3	22.1	31	21.8	31.3	21.3
13.	29.1	25.7	23.7	14.5	31.5	21.6	29.3	22.1	31.5	23	30	21.9	28.5	22.5	30.6	21.1
14.	31	23.2	21.8	14.2	31.1	21.6	26.2	20.4	30	22	30.5	21	27.3	21.3	32.4	18.7
15.	29	23.6	22.6	13.8	31.1	22.7	27.9	20.1	30	22.5	29.5	21.5	28.4	20.3	31.1	18.9
16.	30.7	24	23.6	14	31.3	20.4	27.4	20.6	30	22	30.4	20	26.3	20.1	32.1	18
17.	31.4	22	24.6	14.3	31	21	27.6	20.2	29.5	22	30.9	20.6	24.5	20.4	33	17.4
18.	29.1	22	24.1	14	31	22	28.2	20.4	30.5	22.7	30.5	20.9	27.5	20.9	32.3	18
19.	32	23.2	22.6	13.8	31.3	21.9	27.9	20.5	30.4	22.5	30.6	21	27.4	21	32	19.5
20.	30.7	22.7	23.5	13.8	31.4	21.6	29.8	19.5	30	23.1	30.8	22.4	31.2	22	30.8	19.8
21.	30	25.1	22.2	14.5	31	21.5	29.5	21.5	30	21.5	31.7	20.1	25.6	20.4	31.9	21.6
22.	30.2	22.7	22.5	13.7	30.8	21.9	25.9	19.5	29.5	22.4	31.4	21.4	24.5	20.3	32	22.4
23.	30	20.9	23.5	13.7	30.7	21.3	26.6	20.5	30.5	22	32.5	21.1	25.4	20.8	33	20.5
24.	29.9	21.3	21.8	14.9	31	21.6	29.5	21	30	23	29.8	21.7	27.3	21.3	30.3	21.2
25.	30	23.8	22.8	14.8	31.5	22.6	29.6	21.6	30.5	23	30.7	20.6	27.8	21.5	31.8	19
26.	31.5	22.4	24.1	14.9	31.5	21.2	28.2	20.8	30	22	31.5	20.5	27.8	21.5	32.5	18
27.	30.1	22.2	23.4	13.9	31.5	21.5	30.4	21.5	30.1	23.5	30.9	21.7	30.9	20.8	31.1	19.6
28.	28.3	25.5	22.7	14	29.5	21.8	28.9	21.7	29.5	20.7	28.7	20.6	27.9	21	30	18.2
29.	28.8	23.5	23.5	13.2	30.5	20.8	25	19.1	30.5	22	28.5	18.9	23.6	17.8	29	21
30.	29.2	22.6	21.4	10.7	30.5	22	21.8	16.9	30	21	29	18.6	23.6	17.2	27.4	17
31.	30.1	20	21.1	10.2	29.9	20.2	25.6	16.2	30	19.2	30	20.5	24.8	15	29.2	12.9?
Mean	30.5	22.9	23.1	14.2	31.3	21.8	28.5	20.8	30.5	22.7	31.1	21.8	27.7	21.1	31.8	20.2

Day.	Aparri.		Cape Bojedor.		Basco.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.	28.1	22	27.2	22	25	23
2.	29.3	22.2	27.5	20.1	27.1	21.4
3.	28.4	21.5	27	19	28.9	23.4
4.	29.7	22	27.1	23	27.4	23.3
5.	28	22.3	27.5	23.2	24.9	23.5
6.	29.3	22.3	25.5	23.9	23.6	22
7.	29.5	23	24.6	22	23.1	21.6
8.	29.6	23.2	25.5	22.6	23.7	20.8
9.	25	22.8	23.4	21.9	23.8	20.9
10.	27.7	21.7	26.4	21.8	23.6	21.3
11.	29.5	21.8	29.2	22.6	26.7	20.8
12.	30.8	20.4	28.2	24	25.1	21.5
13.	27.7	22.5	25.5	21	25.2	20
14.	25.7	21.1	25	21	24.9	19
15.	27.2	20	25.1	21.1	25.2	18.7
16.	25.5	20.7	24.5	21.6	21.6	17.8
17.	26.1	20.8	24.1	24.2	24.2	18.5
18.	28.2	20.5	24.3	26.2	24.2	18.3
19.	28.5	20.6	25.9	28.4	23.4	19.8
20.	30.3	19.7	28.4	23.8	23.8	20.9
21.	24.6	20	25.5	22.5	22.5	17
22.	23	20	23.5	22.6	22.6	17.5
23.	25.6	20.6	26.5	24.8	24.8	19.4
24.	26.5	21.1	25	25.1	25.1	20.9
25.	26.3	21.2	24.2	25.1	25.1	19.4
26.	26.8	21	25.4	26.2	26.2	18
27.	27.8	20.6	27.8	28.4	28.4	21.3
28.	29.1	20.5	27.1	26	26	19.2
29.	21.5	17.5	23.9	19.1	19.1	14.2
30.	20.8	17	22.2	19.2	19.2	14.2
31.	23.7	16.5	24	23.4	23.4	14.6
Mean	27.1	20.9	25.7	24.4	24.4	19.9

SEISMOLOGICAL BULLETIN FOR DECEMBER, 1919.

By REV. MIGUEL SADERRA MASÓ, S. J.,
Chief, Seismic and Magnetic Divisions, Weather Bureau.

EARTHQUAKES FELT IN THE PHILIPPINES.¹

3, 12^h 30^m [3, 20^h 30^m]. **Camp Kalaw** (E Mindanao). Earthquake shock of intensity III.

3, 14^h 24^m 20^{s*} [3, 22^h 24^m 20^s]. **Naga** (SE Luzon). Oscillatory earthquake, direction E-W, intensity III, duration 8 seconds.

4, 19^h 06^m [5, 3^h 06^m]. **Murcia** (W Negros). Earthquake of intensity III.

6, 8^h 41^m [6, 16^h 41^m]. **SE Luzon**. Earthquake shocks of intensity III-IV felt in the Provinces of Albay and Sorsogon. Probably of shallow or volcanic origin.

15, 16^h 49^m 30^{s*} [16, 0^h 49^m 30^s]. **SE Mindanao**. Earthquake of intensity IV-V felt in the Province of Davao. It was recorded at Manila, Butuan, and Batavia: the origin seems to have been towards the eastern part of Celebes Sea.

16, 0^h 49^m 32^{s*} [16, 8^h 49^m 32^s]. **Candon** (NW Luzon). Earthquake of intensity III, short duration.

23, 1^h 19^m [23, 9^h 19^m]. **Irosin** (SE Luzon). Local shock of intensity III-IV. It repeated at 15^h 43^m [23^h 43^m] with the same intensity and character. Probably originated in adjoining Bulusan Volcano, active since October, 1918.

23, 15^h 29^m 27^{s*} [23, 23^h 29^m 27^s]. **E Mindanao**. Earthquake of distant origin in the Pacific, lightly felt through eastern Mindanao. Recorded also at Batavia.

23, 22^h 33^m [24, 6^h 33^m]. **Legaspi** (SE Luzon). Local shock of intensity III, short duration.

24, 6^h 00^m [24, 14^h 00^m]. **Camp Keithley** (N Mindanao). Oscillatory earthquake of intensity III, duration 5 seconds.

28, 7^h 52^m 39^{s*} [28, 15^h 52^m 39^s]. **SW Luzon**. Earthquake lightly felt in the western portion of the Cavite Province and originated in the China Sea, some 160 kilometers from Manila.

29, 4^h 10^m [29, 12^h 10^m]. **E Mindanao**. Earthquake of intensity IV, felt chiefly in the central and southern portion of the Agusan Valley, and eastwards in the neighboring Pacific coast. Its origin very likely lay within the island. The seismograph at Butuan recorded an aftershock at 4^h 41^m [12 41^m].

30, 1^h 55^m 05^{s*} [30, 9^h 55^m 05^s]. **N Luzon**. Earthquake of intensity VI-VII in the northernmost provinces, Ilocos Norte, Apayao and Cagayan: it must have been felt with the same or greater intensity in Babuyan. The records of Manila place the epicenter near to this group of islands.²

¹ The intensity of earthquakes is given in the notation known as the Rossi-Forel scale. The time is that indicated by the seismograph at the Central Observatory whenever the disturbance has been registered by them. This fact is denoted by an asterisk (*). Otherwise the time is that noted by the observer who sent the report. All time indications are in Greenwich mean time (midnight=0^h), insular time being added in brackets for the convenience of Philippine readers.

² See "Bulletin for November, 1919."

RECORDS OF THE MICROSEISMOGRAPH.

(Time: Greenwich mean. Midnight=0^h. Instrument: Wiechert seismograph; 1,000 kilograms. A_N : $T_0=6.25$, $\epsilon=2.906$, $\frac{r}{T_0^2}=0.053$;
 A_E : $T_0=6.18$, $\epsilon=2.393$, $\frac{r}{T_0^2}=0.042$. Alluvium. 2.40 meters above sea level).

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A_N μ	A_E μ	
404	1	Iv	eP F	h. m. s. 0 49 26 51				
405	1	Iv	eP L M _N M _E F	18 58 32 58 47 58 49 58 49 19 01	2 2	73	92	
406	3	Iv	eP F	14 24 20 27				Felt at Naga (SE Luzon).
407	9	I	e F	20 30 50 56				
408	12	I	e F	3 50 08 4 11				
409	15	Iv	eP F	16 49 30 59				Felt at Davao (SE Mindanao).
410	16	Iv	eP F	0 49 32 55				Felt at Candon (NW Luzon).
411	16	I	e F	11 45 44 12 12				
412	17 18	I	e F	23 39 0 06				
413	20	IIv	eP S L M _N M _E	19 36 41 38 26 38 53 38 58 39 07	8 6	482	258	End overtaken by the following earthquake.
414	20	IIIv	eP S L M _E M _N F	20 39 39 41 24 41 46 42 16 42 22 22 22	10 12	1,364	890	
415	23	Ir	eP S L M _N M _E F	15 29 27 32 27 33 07 33 29 33 30 16 13	6 5	95	45	Felt very lightly at Butuan (N Mindanao).
416	27	Ir	eP L M _E F	19 33 27 37 19 37 25 46	6		59	
417	28	Iv	eP L M _E M _N F	7 52 39 52 57 52 59 53 09 56	2 2	155	145	Felt lightly at Cavite (SW Luzon).
418	29	Iv	eP F	13 23 05 26				
419	29	Iv	eP F	18 10 40 13				
420	30	IIv	eP L M _E M _N F	1 55 05 56 07 56 14 56 27 2 08	4 4	236	131	Northern Luzon.

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.¹

3, 12^h 30^m [3, 20^h 30^m]. Camp Kalaw (E de Mindanao). Temblor de tierra de intensidad III.

3, 14^h 24^m 20^{s*} [3, 22^h 24^m 20^s]. Naga (SE de Luzón). Temblor oscilatorio, dirección E-W, intensidad III, duración 8 segundos.

4, 19^h 06^m [5, 3^h 06^m]. Murcia (W de Negros). Temblor de tierra de intensidad III.

6, 8^h 41^m [6, 16^h 41^m]. SE de Luzón. Temblor de tierra de intensidad III-IV sentido en las provincias de Albay y Sorsogón. Su origen parece fué superficial o volcánico.

15, 16^h 49^m 30^{s*} [16, 0^h 49^m 30^s]. SE de Mindanao. Temblor de tierra de intensidad IV-V, sentido en la provincia de Dávao. Registróse en Manila, Butúan y Batavia; su origen al parecer se hallaba al E del Mar de Célebes.

16, 0^h 49^m 32^{s*} [16, 8^h 49^m 32^s]. Candón (NW de Luzón). Temblor de tierra de intensidad III, duración muy corta.

23, 1^h 19^m [23, 9^h 19^m]. Irosin (SE de Luzón). Temblor local de intensidad III-IV. Repetió a 15^h 43^m [23^h 43^m] con la misma intensidad y carácter. Su origen probablemente se hallaba en el vecino volcán Bulusan en actividad desde Octubre de 1918.

23, 15^h 29^m 27^{s*} [23, 23^h 29^m 27^s]. E de Mindanao. Temblor de tierra de origen algo lejano en el Pacífico, sentido débilmente al E de Mindanao. Registrado en Batavia.

23, 22^h 33^m [24, 6^h 33^m]. Legaspi (SE de Luzón). Temblor local de intensidad III, duración corta.

24, 6^h 00^m [24, 14^h 00^m]. Camp Keithley (N de Mindanao). Temblor oscilatorio de intensidad III, duración 5 segundos.

28, 7^h 52^m 39^{s*} [28, 15^h 52^m 39^s]. SW de Luzón. Temblor de tierra sentido débilmente en la parte occidental de la provincia de Cavite; originado en el Mar de la China, a unos 160 kilómetros de distancia de Manila.

29, 4^h 10^m [29, 12^h 10^m]. E de Mindanao. Temblor de tierra de intensidad IV sentido principalmente en la parte central y meridional del Valle del Agusan y hacia al E en las vecinas costas del Pacífico. El origen parece haber sido insular. El sismógrafo de Butúan registró una réplica a 4^h 41^m [12^h 41^m].

30, 1^h 55^m 05^{s*} [30, 9^h 55^m 05^s]. N de Luzón. Temblor de tierra de intensidad VI-VII en las provincias más septentrionales, Ilocos Norte, Apayao y Cagayán: debió sentirse con igual o mayor intensidad en las Babuyanés. Los registros de Manila colocan el epicentro cerca de este grupo de islas.²

¹ La intensidad de los terremotos se indica conforme a la conocida escala de Rossi-Forel. Cuanto a la hora de su ocurrencia, adoptamos la indicada por los sismógrafos de este Observatorio siempre que los hayan registrado, distinguiéndola por medio de un asterisco (*). En caso contrario copiamos la apuntada por los observadores que nos envían las notas. Todas las indicaciones del tiempo se refieren al tiempo medio de Greenwich (medianoche=0^h). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

² Véase "Bulletin for November, 1919."



**APPENDIX TO THE MONTHLY BULLETINS
FOR 1919.**

**ANNUAL SUMMARY OF METEOROLOGICAL DATA FOR MANILA
DEDUCED FROM TWENTY-FOUR DAILY OBSERVATIONS
DURING THE YEAR 1919.**

Month.	Pressure.		Air temperature.									
	Mean.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Departure from normal.	Mean minimum.	Departure from normal.	Absolute maximum.	Day.	Absolute minimum.	Day.
	mm.	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.		°C.	
January	762.64	+1.47	24.3	-0.5	30.8	+0.7	19.2	-1.2	32.7	26	16.3	24
February	62.19	+0.94	25.2	0.0	32.0	+1.2	19.6	-0.6	33.9	22	16.7	3,4
March	61.06	+0.54	26.7	+0.1	34.2	+1.7	20.3	-1.0	36.2	25	17.1	6
April	59.36	0.0	29.0	+0.9	36.1	+2.1	23.0	+0.3	37.7	16	19.8	17
May	58.09	-0.25	29.1	+0.7	35.6	+1.9	24.1	+0.2	37.7	12, 13	21.1	1
June	57.20	-0.67	27.6	-0.3	32.0	-0.5	24.4	+0.5	35.0	1	22.9	3
July	57.15	-0.06	26.6	-0.4	31.0	0.0	23.3	-0.4	33.9	12, 13	20.8	2
August	55.73	-1.57	25.9	-1.1	28.5	-2.2	23.9	+0.2	31.8	22	22.5	25
September	58.37	+0.90	26.5	-0.3	31.1	+0.4	23.2	-0.4	32.9	21	20.8	24
October	58.65	+0.05	26.2	-0.4	30.9	-0.2	23.3	+0.2	32.5	16	21.6	1, 24
November	59.11	-0.26	25.5	-0.3	30.9	+0.4	22.4	+0.3	33.3	4	19.2	26
December	60.23	-0.08	25.1	0.0	30.2	+0.2	21.7	+0.5	32.5	7, 8	18.5	31
Annual	759.15	+0.08	26.5	+0.1	31.9	+0.5	22.4	-0.1	37.7	IV, 16 V, 12, 13	16.3	I, 24

Month.	Prevailing direction.	Wind.			Direction at the time of the maximum velocity.	Relative humidity.		Vapor pressure.		Cloudiness.	
		Total.	Departure from normal.	Hourly maximum.		Mean.	Departure from normal.	Mean.	Departure from normal.	Mean.	Departure from normal.
		Km.	Km.	Km.		Per ct.	Per ct.	mm.	mm.	0-10.	0-10.
January	NE quad.	4,902.0	-421.0	26.0	ESE	78.4	+0.3	17.5	-0.6	4.4	-1.1
February	E quad.	5,124.0	224.0	27.0	ENE	72.8	-1.2	17.0	-0.5	3.7	-1.2
March	E quad.	6,957.5	153.0	28.0	SE by E	66.6	-4.9	16.9	-1.2	3.1	-1.3
April	SE	6,239.5	606.0	26.5	SSE	65.5	-4.3	19.0	-0.4	3.4	-0.7
May	SE quad.	6,000.5	897.8	33.0	NE	73.1	-2.8	21.4	-0.2	5.7	0
June	SW, WSW	7,141.5	+409.0	42.5	NW by N	82.4	+1.5	22.4	+0.1	6.5	-0.5
July	NE, SW	5,189.5	-3,059.2	40.0	SW	85.5	+0.5	21.9	-0.6	7.5	-0.3
August	SW	12,896.0	+3,307.9	54.0	WSW	90.1	+4.9	22.2	-0.2	9.5	+1.6
September	W quad.	3,786.5	-3,320.1	30.0	WSW	83.6	-2.2	21.4	-1.0	6.8	-0.9
October	NE	3,599.5	-1,797.5	24.0	SW	87.0	+3.0	21.8	+0.2	6.7	-0.1
November	NE	3,423.5	-1,413.9	20.5	W	84.9	+2.2	20.4	+0.1	6.2	-0.1
December	NE quad.	3,212.5	-1,590.1	19.0	NE	83.4	+1.9	19.6	+0.4	6.4	+0.2
Annual		68,377.5	-10,059.7	54.0		79.4	-0.1	20.1	-0.3	5.8	-0.4

Month.	Evaporation.		Sunshine.		Rainfall.					
	Free exposure, total.	Under shelter, total.	Total.	Departure from normal.	Total.	Departure from normal.	Greatest in a single day.	Day.	Rainy days.	Departure from normal.
	mm.	mm.	h. m.	h. m.	mm.	mm.	mm.			
January	114.2	77.7	206 25	+22 05	6.6	-19.5	3.6	4	5	0
February	141.4	92.6	226 30	+30 13	10.7	+4	10.7	8	1	-2
March	206	133.9	268 50	+32 20	1.9	-16.6	1.5	31	2	-1
April	228	144.6	285 55	+24 16	9	-32.6	.9	9	1	-3
May	184.4	119.5	235 15	+4 45	144.3	+38.7	44.4	27	9	-1
June	95.6	63	169 00	-1 51	265.7	+31	182.6	10	21	+5
July	67	47.6	132 40	-9 41	810.1	+399.3	293.5	29	20	-1
August	36.4	35	46 35	-92 06	176	-190.3	34	15	16	-5
September	83.6	54.1	147 40	+12 54	1,933	+1,590.2	227.9	25	30	+8
October	65.6	42.8	120 40	-43 22	176	-184.2	39.4	15	14	-5
November	72.2	46.5	153 45	-9 12	138.5	+10.3	39.4	19	27	+10
December	75.8	50.5	131 00	-23 43	25.6	-35.8	13.2	10	9	+2
Annual	1,370.2	907.8	2,124 15	-53 22	3,920.6	+1,939.3	293.5	VII, 29	155	+12

CATALOGUE OF PHILIPPINE EARTHQUAKES, 1919. ^a

Date.	Time of occurrence. (Greenwich mean time.)	Place.	Probable origin or epicenter.		Approximate extension of the shaken area.		Intensity (Rossi-Forel.)	Remarks.	
			ϕ	λ	Longer axis.	Shorter axis.			
Jan. 1	h. m. 1 36	E Mindanao	8.0 N	127.0 E	Km. 850	Km. 600	VII	Registered over the world. Four aftershocks, intensity III-IV. Many light aftershocks. Probable origin in the Pacific. Aftershock at 14 ^h 20 ^m , intensity III-IV.	
1	6 08	E Mindanao	8.0 N	127.0 E			V		
2	22 27	Butuan (N Mindanao)					III		
4	2 35	NE Mindanao					IV		
5	14 20	Davao (SE Mindanao)					III		
9	0 10	Ambos Camarines (SE Luzon)					III		Origin in the Isarog volcanic region.
13	12 01	Davao (SE Mindanao)					IV		
15	7 30	Davao (SE Mindanao)					III		
16	13 28	Iloilo (SE Panay)					III		
25	11 22	Butuan (N Mindanao)					IV		
29	18 48	Ormoc (W Leyte)	10.7 N	124.5 E			VI	Repetition at 20 ^h 06 ^m , intensity III. Probably rockfall origin.	
30	11 29	Butuan (N Mindanao)					III		
Feb. 1	7 46	Ormoc (W Leyte)					III	Repetition, intensity III on the 9th.	
3	19 26	Guam (Mariana Islands)					IV		
4	13 06	Cape Bojeador (NW Luzon)					IV-V		
8	13 28	Vigan (NW Luzon)					III		
8	16 04	Ormoc (W Leyte)	10.7 N	124.5 E			V		
13	22 05	E Visayas and Mindanao	11.0 N	127.0 E	800	500	III-IV		
15	10 45	Camiguin Island (N of Mindanao).					III		Recorded at Butuan.
17	3 42	E Mindanao					III		Origin far off in the Pacific.
18	21 05	Guam (Mariana Islands)					III-IV		
22	17 12	Butuan (N Mindanao)					III		Probable origin in the Pacific. Philippine Deep. Repeated one hour later. Local origin.
24	21 26	Butuan (N Mindanao)					III	Origin in the Pacific.	
Mar. 3	2 37	E Mindanao					III	Origin in the Pacific. Several aftershocks.	
6	7 23	E Mindanao					III		
7	1 12	S Mindanao					III-IV		
7	12 56	Catbalogan (W Samar)					III		
8	11 00	Antique (W Panay)					III		
11	4 48	Cotabato (SW Mindanao)					III		
11	8 33	Camiguin Island (N of Mindanao)					III-IV		Registered at Manila.
15	14 08	N Luzon	18.8 N	121.0 E	300	200	IV		
16	7 35	E Mindanao and Visayas	6.5 N	127.0 E	700	400	V		Repeated with the same intensity at 15 ^h 06 ^m , numerous aftershocks during the three following days. Registered over the world.
21	1 03	SE Luzon and Visayas	13.6 N	121.9 E	700	500	VII-VIII		Registered over the world.
21	17 23	E Mindanao and Visayas			600	300	IV	Origin in the Pacific, Philippine Deep. Registered over the world.	
22	1 40	Legaspi (SE Luzon)					III	Recorded in the Far East. Registered at Manila.	
23	22 53	E Mindanao and Visayas	11.7 N	126.4 E	600	300	IV-V		
25	14 23	Cotabato (SW Mindanao)					III		
25	18 45	Antique (W Panay)					III		
29	2 23	Atimonan (E Luzon)					III		Recorded at Manila.
Apr. 3	2 52	Ambos Camarines (SE Luzon)					III		Aftershock at 6 ^h 07 ^m . Volcanic origin.
8	15 59	Butuan (N Mindanao)					III-IV		Origin in the Pacific, Philippine Deep. Registered at Manila.
12	12 14	Paracale (SE Luzon)					III		Recorded at Manila.
16	16 42	E Mindanao			500	200	V		Origin probably in the Pacific. Registered in the Far East.
21	13 49	Ambos Camarines (SE Luzon)					V		Registered at Manila. Epicenter in the Isarog volcanic region.
23	17 20	Catbalogan (W Samar)					III	Numerous aftershocks to May the 1st. Registered over the world.	
27	0 23	Tablas Island			500	350	VII-VIII		
28	1 57	Baguio (W Luzon)					III		

^a See explanation in Monthly Bulletin of the Weather Bureau for December, 1910, page 445.

Catalogue of Philippine earthquakes, 1919.—Continued.

Date.	Time of occurrence (Greenwich mean time.)	Place.	Probable origin or epicenter.		Approximate extension of the shaken area.		Intensity (Rossi-Forel.)	Remarks.
			ϕ	λ	Longer axis.	Shorter axis.		
May 4	k. m. 22 02	N Luzon and Batan Islands	19.8 N	121.6 E	Km. 500	Km. 400	V	Registered at Manila and Taihoku.
5	12 22	Irosin (SE Luzon)					V	Volcanic origin.
6	19 48	Butuan (N Mindanao)					III	Origin far off in the Pacific. Registered over the world.
15	18 30	Masbate Island					VI	
21	23 46	E Mindanao					III-IV	Origin far off in the Pacific near to the parallel 7° N. Registered at Manila and Batavia.
24	5 45	Camiguin Island (N of Mindanao).					III	Volcanic origin. Registered at Manila.
25	11 39	Samar and Leyte Islands			400	200	V	Origin in the Philippine Deep. Registered at Manila.
31	0 20	Baguio (W Luzon)					IV	
June 4	6 00	Port Lebak (SW Mindanao)					IV	
4	11 11	Cape Bojeador (NW Luzon)					III-IV	Aftershock at 13 ^h 40 ^m .
5	17 52	W Mindanao	7.0 N	123.0 E	400	400	V-VI	Registered at Manila and Batavia.
13	8 55	SE Luzon, Samar and Leyte.	12.6 N	125.2 E	600	300	IV	Registered at Manila.
13	17 30	Ambos Camarines (SE Luzon).					III	Origin in the Isarog volcanic region.
14	20 51	Butuan (N Mindanao)					III	
15	14 37	W Mindanao	7.0 N	123.0 E	400	400	V	Registered at Manila and Batavia.
17	07 15	Tablas Island					IV	Some other shocks were felt on the 19th, 28th, and 30th.
20	4 47	N Luzon	17.3 N	120.5 E	350	200	IV	Probable origin in the China Sea. Registered at Manila. Aftershock at 22 ^h 50 ^m .
20	13 25	Aparri (NE Luzon)					IV	
21	11 06	Leyte Island					III	Origin SE of Masbate. Registered at Manila.
22	7 30	Ormoc (W Leyte)					III-IV	
22	16 18	W Luzon	16.4 N	119.5 E			IV	Registered at Manila.
24	18 35	N Luzon	17.3 N	120.5 E	300	250	VI-VII	Registered over the world. Strong aftershocks at 19 ^h 37 ^m , 19 ^h 53 ^m , 21 ^h 08 ^m and 23 ^h 19 ^m .
24	19 36	Zamboanga (W Mindanao)					III	
30	21 24	Panay and Negros Islands	10.3 N	122.5 E			III-IV	Registered at Manila.
July 2	22 39	Butuan (N Mindanao)					III	Registered at Manila. Origin far off in the Pacific.
3	9 30	Candon (NW Luzon)					II-III	
4	1 38	Panay and Negros Islands	10.3 N	122.5 E			III-IV	Registered at Manila.
4	18 55	Maasin (S Leyte)					III	Registered at Manila.
5	2 45	Port Lebak (SW Mindanao)					IV-V	Probable origin in the Celebes Sea. Repetition at 7 ^h 30 ^m .
6	6 14	Surigao (NE Mindanao)	9.5 N	125.2 E			III	Aftershock at 7 ^h 00 ^m .
6	19 11	Camp Keithley (N Mindanao)					III	
7	12 00	San Joaquin (S Panay)					IV	Aftershocks at 13 ^h 30 ^m and 15 ^h 35 ^m .
8	12 02	Panay and Negros Islands	10.3 N	122.5 E			III-IV	Registered at Manila.
13	17 00	Tablas Island					III	
15	22 48	Guiuan (SE Samar)					III-IV	
16	11 37	Cape Bojeador (NW Luzon)					III	
17	4 48	Butuan (N Mindanao)					III	
17	7 25	Tablas Island					III-IV	
19	20 00	Camp Keithley (N Mindanao)					III	
24	19 38	Ambos Camarines (SE Luzon)					III-IV	Origin in the Isarog volcanic region.
25	28 19	Camp Keithley (N Mindanao)					IV	
Aug. 2	6 56	Butuan (N Mindanao)					III	Local origin.
4	9 31	Tigaon (SE Luzon)					III	Aftershock at 9 ^h 50 ^m . Volcanic origin.
5	2 00	Cape Bojeador (NW Luzon)					III	
6	5 38	S Mindanao			300	300	V-VI	Origin Celebes Sea. Recorded at Manila and Batavia.
6	18 00	Davao (SE Mindanao)					IV-V	Origin E Celebes Sea. Registered at Manila and Batavia.
11	8 04	Central Mindanao					V-VI	Volcanic origin.
13	4 02	Davao (SE Mindanao)					III	Insular origin.
14	8 00	Tablas Island			400	250	VI-VII	Four preliminary shocks, intensity IV-V, at 22 ^h 08 ^m , 22 ^h 28 ^m , on the 13th and 5 ^h 11 ^m on the 14th. Two aftershocks at 15 ^h 00 ^m and 15 ^h 58 ^m . Registered at Manila. Origin, Butuan Bay.
14	20 22	Surigao (NE Mindanao)					III	
18	4 15	Borongon (E Samar)					III	
19	14 22	N Luzon	18.8 N	121.0 E	300	200	V-VI	Registered at Manila and Taihoku.
21	4 04	Ormoc (W Leyte)					IV	Aftershock some minutes latter.
22	5 25	Davao (SE Mindanao)					III	
23	11 50	Isabela (W Negros)					III	
29	5 49	Guam (Mariana Islands)					III	Registered over the world.
Sept. 7	23 21	Surigao (NE Mindanao)					III-IV	Origin, Butuan Bay.
10	4 40	Paracale (SE Luzon)					III	Origin in the Pacific. Registered at Manila.
12	5 55	Cape Bojeador (NW Luzon)					III	
14	11 22	Cape Bojeador (NW Luzon)					III	
16	3 25	Antique (W Panay)					III	
19	9 46	W Luzon			400	150	III-IV	Origin in the China Sea. Aftershock at 10 ^h 05 ^m .

Catalogue of Philippine earthquakes, 1919.—Continued.

Date.	Time of occurrence. (Greenwich mean time.)	Place.	Probable origin or epicenter.		Approximate extension of the shaken area.		Intensity (Rosis-Forel.)	Remarks.
			ϕ	λ	Longer axis.	Shorter axis.		
Sept. 21	<i>k. m.</i> 4 04	Davao (SE Mindanao) -----	o	o	<i>Km.</i>	<i>Km.</i>	IV	Origin, Davao Gulf. Registered at Manila and Batavia. Origin S Agusan Valley. Origin in the China Sea. Numerous aftershocks. Registered over the world. Seventeen shocks of varying intensity during the interval of eleven hours. Registered over the world. Seven moderate shocks between 6 ^h and 14 ^h .
22	23 50	Veruela (E Mindanao) -----					III	
23	18 47	W Luzon -----			250	100	III-IV	
26	9 08	NW Luzon -----	17.3 N	120.5 E	500	350	VII	
26	19 42	W Mindanao -----	6.3 N	123.2 E	500	400	VI	
28	6 00	NW Luzon -----	17.3 N	120.5 E			III-IV	
30	19 17	Cape Bojeador (NW Luzon) -----					II-III	
Oct. 1	13 55	Candon (NW Luzon) -----					III	
2	1 08	Butuan (N Mindanao) -----					III	
3	2 13	Port Lebak (SW Mindanao) -----					III	
5	8 24	Candon NW Luzon -----					III	
6	5 58	Port Lebak (SW Mindanao) -----					III	
8	5 11	SE Luzon, Masbate and Samar -----	13.0 N	124.5 E	550	300	IV	
13	5 38	Central Mindanao -----	4.5 N	125.8 E	400	300	V	
15	19 22	Surigao (NE Mindanao) -----					III	
16	21 30	Candon (NW Luzon) -----					II-III	
23	5 07	Yap (Western Carolines) -----					III	
23	11 20	Port Lebak (SW Mindanao) -----					III	
Nov. 3	13 18	Irosin (SE Luzon) -----					III-IV	Volcanic origin. Aftershock at 15 ^h 57 ^m . Origin, E of Celebes Sea. Registered in the Far East. Rockfall character. Registered at Manila, Taihoku, and Osaka. Several aftershocks on the 6 th , 7 th , and 11 th . Repetitions at 17 ^h 38 ^m and 18 ^h 36 ^m , and at 5 ^h 29 ^m on the 11 th . Volcanic character.
3	14 44	NE Mindanao -----	10.0 N	127.0 E	400	100	IV	
4	11 32	Cape Bojeador (NW Luzon) -----					III-IV	
4	13 32	Davao (SE Mindanao) -----					III	
6	16 44	NW Luzon -----	18.7 N	120.6 E			VI-VII	
10	15 45	Camp Keithley (N Mindanao) -----	7.6 N	124.5 E			IV	
11	20 21	NE Mindanao -----	9.2 N	125.4 E	250	150	V-VI	
16	3 08	E Mindanao -----					III	
17	22 39	Vigan (NW Luzon) -----					III	
18	4 04	Butuan (N Mindanao) -----					II	
27	7 30	Fort Pikit (SW Mindanao) -----					III	
Dec. 3	12 30	Camp Kalaw (E Mindanao) -----					III	Insular origin, S of Agusan Valley. Probably volcanic origin. Volcanic origin. Origin, E of Celebes Sea. Registered at Manila and Batavia. Repetition intensity III-IV at 15 ^h 43 ^m . Volcanic origin. Registered at Manila and Batavia. Origin in the China Sea. Registered at Manila. Origin S of Agusan Valley. Registered at Manila.
3	14 24	Naga (SE Luzon) -----					III	
4	19 06	Murcia (W Negros) -----					III	
6	8 41	SE Luzon -----			150	100	III-IV	
15	16 49	SE Mindanao -----					IV-V	
16	0 50	Candon (NW Luzon) -----					III	
23	1 19	Irosin (SE Luzon) -----					III-IV	
23	15 29	E Mindanao -----					III	
23	22 33	Legaspi (SE Luzon) -----					III	
24	6 00	Camp Keithley (N Mindanao) -----					III	
28	7 53	SW Luzon -----					III	
29	4 10	E Mindanao -----					IV	
30	1 55	N Luzon -----	18.8 N	121.0 E	200	200	VI-VII	

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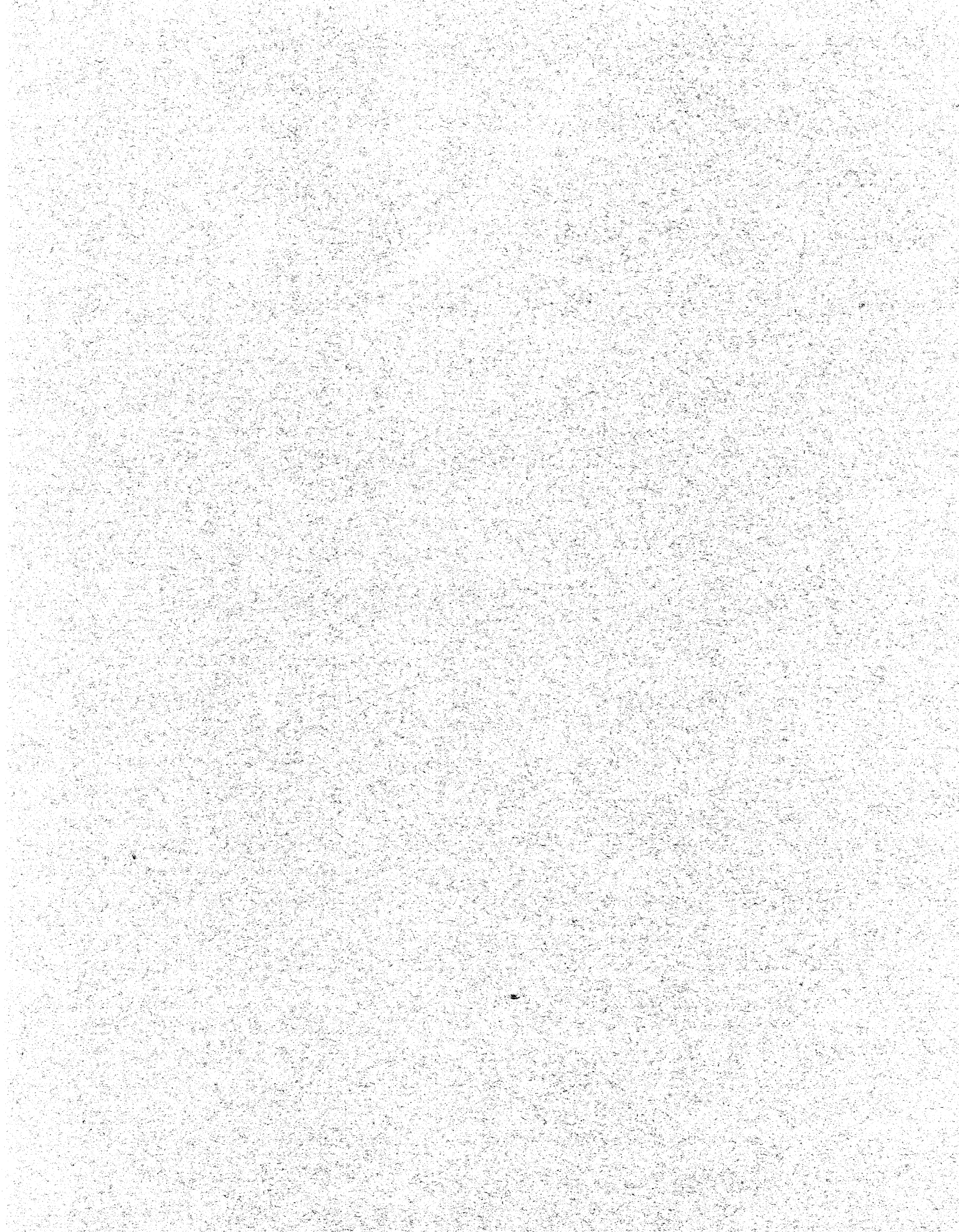
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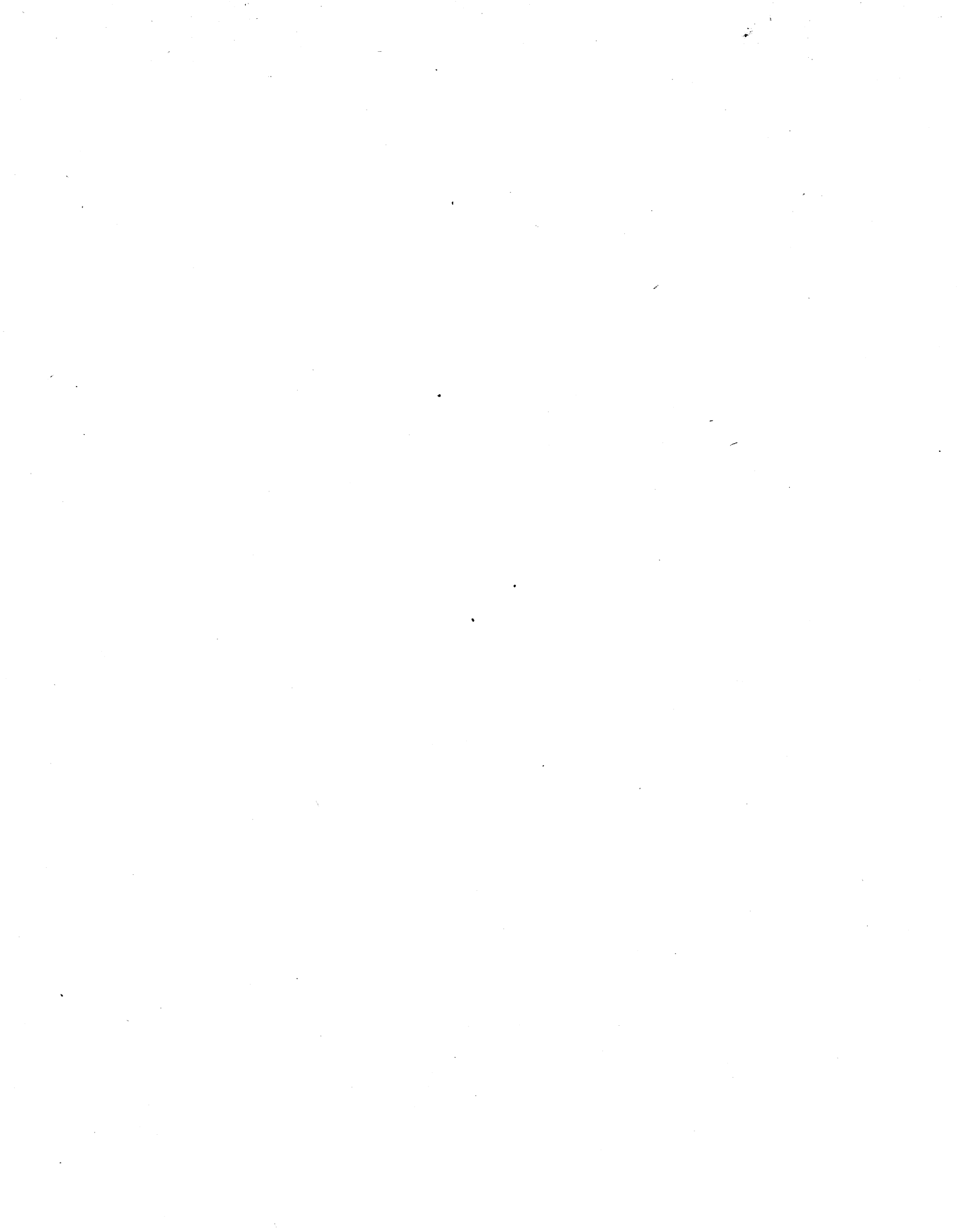
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