

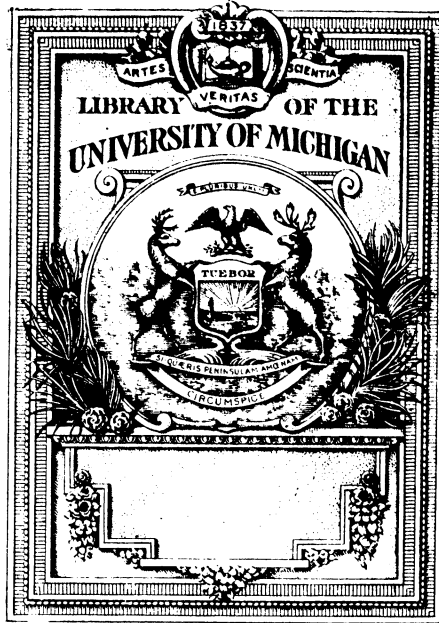
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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR JANUARY, 1917

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1917



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MONTHLY BULLETIN, 1917

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## INTRODUCTION.

The form of our Monthly Bulletin as adopted in 1907 and modified in 1914 will be retained. 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	Rufino de la Cruz	III
Isabela, Basilan	6 42	121 58	Inocencio Rodriguez	IV
Zamboanga	6 54	122 05	Pedro M. Asturias	II
Davao	7 01	125 35	Lamberto Garcia	III
Cagayan, Misamis	8 29	124 38	Juan Hernandez	III
Butuan	8 56	125 32	Generoso Copin	III
Dumaguete	9 18	123 19	Matias Ordiales	III
Tagbilaran	9 38	123 51	Francisco Burgos	II
Iwahig	9 44	118 38	Dionisio Crisanto	III
Surigao	9 48	125 29	Francisco Tiangco	II
Maasin	10 08	124 50	Aguedo Espina	III
Cebu	10 18	123 54	Domingo de los Angeles	I
Iloilo	10 42	122 34	Ricardo A. Luna	I
San Jose Buenavista	10 44	121 55	Teodoro Peñeiro	III
Cuyo	10 51	121 01	Roman Kabigting	III
Ormoc	11 00	124 36	Pedro Baltasar	I
Guiuan	11 02	125 44	Patricio Yabao	III
Tacloban	11 15	125 00	Ezequiel Reinoso	II
Capiz	11 35	122 45	Juan Lugod	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	IV
Sorsogon	12 55	124 08	Agustin Mendoza	III
Legaspi	13 09	123 45	Bernardino Costa	I
Sumay, Guam	13 24	144 38	Herbert Taylor	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
Batangas	13 45	121 03	Jose N. Cabrera	III
Lucena	13 56	121 37	Vicente Valderrama	III
Atimonan	14 00	121 55	Leon G. Guinto	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	Antonio Gaza	III
San Isidro	15 22	120 53	Bernardo Pecache	II
Tarlac	15 30	120 35	Valeriano Magat	IV
Baler	15 40	121 34	Santiago Palmero	IV
Dagupan	16 03	120 20	Jose M. Sison	I
Bolinao	16 24	119 53	Lorenzo Goli	III
Baguio	16 25	120 36	Pastor P. Daroy	I
San Fernando, Union	16 37	120 19	Estanislao F. Feraren	III
Echague	16 41	121 39	Benito Maramba	III
Candon	17 12	120 26	Luis Quismorio	IV
Vigan	17 34	120 23	Jose de Jesus	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	Fabian Velazquez	IV
Santo Domingo, Batanes	20 28	121 59	Claudio Castillejos	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 <sup>o</sup> or <sup>v</sup> 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.

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	Traspirencia 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 <sup>o</sup> o un <sup>2</sup> puestos como exponentes de los signos, indican respectivamente una muy débil o una muy fuerte intensidad en el meteoro que representan.



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**BULLETIN FOR JANUARY, 1917.**

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# METEOROLOGICAL BULLETIN FOR JANUARY, 1917.

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 moderately higher than that of the preceding year, although it differs but very little from the January's normal. That of Manila is only 0.22 mm. below the normal while it is 1.28 mm. above the monthly mean of January, 1916. The highest pressures were generally observed on the 10th in Luzon, and on the 5th or 9th in the Visayas and Mindanao. The lowest pressures occurred, with a few exceptions, on the 1st or 20th.

With only two or three exceptions in Luzon, the mean monthly temperature for the Philippines is almost identical with that of the preceding year. The absolute maximum and minimum temperatures for the month at Manila were 32.3° C. on the 1st, and 19.4° C. on the 31st. The extreme values for Baguio were 24.3° C., 11.7° C. on the top of Mirador, and 24.5° C., 10.7° C. in the valley.

### PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR JANUARY, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from Jan., 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Jan., 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga	758.56		761		757.06	18	26.1		34.3	13	21.8	8
Tagbilaran <sup>a</sup>	59.24	+1.56	61.96	5	57.41	20	25.2	-0.2	31.4	10, 25	21	6
Surigao	59.29	+2.01	62.12	5	57.65	18	25.7	+ .2	31.8	21	21.4	1, 26
Cebu	59.36		62.22	9	57.52	20	26.3		31.8	2	22.4	12
Iloilo	59.34	+1.32	62.20	9	57.63	20	25.7	0	32.9	2	22.2	31
Ormoc	59.58	+1.85	62.52	9	57.80	20	25.8	+ .4	32.4	2	20.3	31
Tacloban	59.67	+2.06	62.96	5	57.74	19	25.5	0	31.9	2	21.7	30
Capiz	60.16	+1.53	63.23	9	58.14	20	25.8	0	31.3	1, 2	22.4	6
Calbayog	60.04	+1.96	63.30	5	57.97	19	25.2	0	32.5	21	20.8	6, 8
Legaspi	60.46	+1.89	63.82	5	58.10	20	25.3	- .8	30.4	2	21.8	31
Atimonan	61.11	+1.53	64.97	10	58.72	1	24.8	- .4	29.8	2	21	28
Ambulong, Tanauan	60.03	+1.15	63.25	10	57.86	20	25	0	32.5	2	21	29
Paracale	61.21	+1.45	64.94	11	58.55	20	24.8	- .9	30.2	2	21.7	2
Manila	60.92	+1.28	64.62	10	58.70	1, 20	24.7	- .1	32.3	1	19.4	31
San Isidro	61.21	+1.21	64.92	10	58.67	1	24.7	+ .1	32.4	2	18.5	7
Dagupan	60.15	+1.02	63.61	10	57.84	1	25.9	+ .3	34.4	1	18.5	7
Bolinao	<sup>b</sup> 60.65	+1.27	<sup>b</sup> 63.98	10	<sup>b</sup> 58.15	1	<sup>b</sup> 26.5	+ .6	33.5	1	19.6	17
Baguio <sup>c</sup>	637.75	+ .87	640.58	10	636.11	20	16.4	- .1	24.3	20	11.7	12
Vigan	760.52	+ .99	764.70	10	758.13	1	26.1	+ .3	33.1	24	18.8	9
Tuguegarao	62.97	+1.38	63.37	11	59.53	1	22.7	- .5	30.6	23	18.3	12, 30
Laog	60.68		65.12	10	58.03	1	25.3				16.3	6
Aparri	63.41	+1.51	69.27	10	59.84	1	22	-1.4	28.2	7	18.4	7

<sup>a</sup> 28 days of observation.

<sup>b</sup> 26 days of observation.

<sup>c</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—The total rainfall of this month is for the majority of our stations greater than the normal for this month, particularly in Mindanao, the eastern Visayas and southeastern Luzon. Taking in consideration, however, the typhoons and floods of last year, it is not surprising to see that the same monthly rainfall is much below than that of January, 1916, in the Visayas and Mindanao. Some floods were observed also this year in some sections of northern Mindanao; but they were of little importance as compared with those of the preceding year.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF JANUARY, 1917.

Station.	Total.	Departure from Jan., 1916.	Departure from normal.	Rainy days.	Departure from Jan., 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Jan., 1916.	Departure from normal.	Rainy days.	Departure from Jan., 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	170.8	-103.1	+68.4	19	+3	41.4	18	Calapan	164.9	-62.1	+55.7	26	0	29.5	20
Isabela, Basilan	152.7	-145.5	+78.8	16	+3	38.1	11	Virac	573.1	+199.9	+348.4	28	+3	106.1	25
Zamboanga	81.8	-220.2	+25.4	12	0	27.2	18	Naga	286	+77.2	+157.8	22	+1	60.2	21
Davao	195.4	+12.7	+55.8	13	+3	61	7	Batangas	36.3	-52.6	+8.5	14	+1	9.4	3
Cagayan, Misamis	45			14		7.1	8	Lucena	450.7			25		97.1	20
Butuan	356	-170.6	+134.2	29	+4	57.1	24	Atimonan	699.8	+288.2	+467.9	23	-4	103.6	20
Dumaguete	122	-57.8		18	+2	22.3	11	Ambulong, Tanauan	69.3	+9.1		3	-8	39.3	25
Tagbilaran*	117.8		+36.6	10		31.5	17	Canlubang, Calamba	55.2			10		13.2	4
Iwahig	115.8	-72.6		12		49.7	21	Paracale	1,099.2	+731.9		27	-2	169.6	12
Surigao	739	-325.2	+325.5	27	0	176.5	3	Santa Cruz, Laguna	96.4	-22.4		22	+4	29.2	4
Maasin	286	-286.7	+103.1	12	-3	94.5	11	Manila	18	-20.2	-8.9	10	+3	9.7	3
Cebu	97.9		+6.2	17		39.6	11	Antipolo	23.4	-23.9		11	+1	4.6	26, 28
Iloilo	124.8	-29.2	+68.1	13	-4	35.1	13	Iba	6.9	-15.3	-6	2	-4	6.6	22
San Jose Buenavista	28.6	-139.7	-7.8	10	-7	11.2	4	San Isidro	6	-37	-10.2	7	-1	1.3	26, 31
Cuyo	2	-78.8	-12.2	1	-7	2	4	Tarlac	9.9	-12	+8	2	-3	8.1	2
Ormoc	112.6	-436.4	-72.8	18	-5	30.5	18	Baler	207	-75.1	+55.7	22	+4	35.3	12
Guiuan	378.2	-1,230.5		26	-1	66.1	18	Dagupan	45.5	+36.2	+33.7	3	-2	23.9	2
Tacloban	368	-467.9	+85.6	23	-4	61.3	24	Bolinao	19.8	+11.9	+9.1	4	-2	11.7	3
Capiz	144.5	-482.5	-22	25	0	30.5	19	Baguio	67.4	+44.2	+33.1	7	-2	38.3	3
Borongan	787.7	-422.8	+256.2	26	-3	137.1	19	San Fernando, Union	3.3	-23.3	-9	1	-2	3	27
Calbalogan	366	-271.4		26	+1	113.5	24	Echague	150.9	+1.5	+92.2	22	+1	49.5	1
Masbayog	309.4	-370.9	+131.2	22	-5	100.4	24	Candon	0	-38.7	-6	0	-5	0	0
Masbate	305	-206.9	+139.9	23	+1	92	11	Vigan	0	-14.2	-8	0	-3	0	0
Romblon	270.2	+43.5	+147.7	28	+12	35.3	25	Tuguegarao	32.9	-68.2	+1.8	4	-7	11.2	13
Batag	844.1	+98.4		30	+1	192.8	24	Laocag	0	-37	-4.7	0	-6	0	0
Sorsogon	1,259.9			27		108.2	25	Aparri	154.1	+2.3	-46.1	24	+2	28.2	17
Legaspi	788.6	+181.9	+396	27	0	134.6	25	Cape Bojeador	5			2		2.5	7, 8
Sumay, Guam	76.4	+18.1	+18.1	16	+4	16.5	11	Santo Domingo, Batanes	386.3	+242.4	+135.3	26	+6	98.5	14

28 days of observation.

DEPRESSIONS AND TYPHOONS.

There was no depression near the Philippines during this month; and even in the Far East we may mention only one which moved northeast between the Loochoos and the Bonins on the 1st and between the Bonins and Japan on the 2d.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes en Filipinas es regularmente mayor que la del año pasado, aunque difiere sólo muy poco de la normal de enero. La de Manila es solamente 0.22 mm. menor que la normal, al paso que es 1.28 mm. mayor que la media mensual de enero de 1916. Las presiones más altas se observaron generalmente el día 10 en Luzón, y el 5 ó 9 en las Visayas y Mindanao. Las presiones más bajas tuvieron lugar, con muy pocas excepciones, al día 1.º ó 20.

Con sólo dos o tres excepciones en Luzón, la temperatura media mensual de Filipinas es casi la misma que la del año pasado. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 32.3° C. y 19.4° C. registradas el 1.º y el 31, respectivamente. Las temperaturas extremas de Baguio fueron 24.3° C., 11.7° C. en la cumbre del Mirador, y 24.5° C., 10.7° C. en el valle.

**Precipitación acuosa.**—La lluvia total de este mes es en la mayor parte de nuestras estaciones mayor que la normal, particularmente en Mindanao, Visayas orientales y SE de Luzón. Teniendo en cuenta, sin embargo, los baguios e inundaciones del año pasado, no es extraño que la misma lluvia mensual es mucho menor que la de enero de 1916 en Visayas y Mindanao. También se observaron este año algunas inundaciones en algunas partes del N de Mindanao; pero fueron de poca importancia comparadas con las del año anterior.

## DEPRESIONES Y TIFONES.

Durante este mes no hubo depresión alguna cerca de Filipinas; y aun de todo el Extremo Oriente sólo haremos mención de una que se movió al NE entre las Islas Liukiu y Bonin el día 1.º y entre Bonin y Japón el 2.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.<sup>a</sup>

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

Day.	Air temperature. <sup>b</sup>				Underground temperature.					Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. <sup>b</sup>		
	Pressure (mean).	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.	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.				
1	758.70	25.7	32.3	21.3	26.6	27.7	27.4	27.6	28.2	28	85.6	20.8	19	53.7	2.8	2
2	59.35	26.1	31.2	22.1	27.1	28.2	27.1	28.2	28.3	28	82.9	20.6	20	51.8	3	2.1
3	30.12	25.4	30.6	22.4	27.3	27.7	27.8	27.8	28.3	28	84.8	20.3	20.7	52.2	1.9	1.7
4	62.11	24.3	28	22.5	27.2	27.5	27.8	27.9	28.3	28	85.6	19.2	20.9	40.9	1.5	1.3
5	63.83	24.4	29.5	20.9	26.7	27.5	27.7	27.8	28.2	27.9	77.2	17.3	20.4	51.6	3.7	2.9
6	63.94	23.3	28.3	19.7	26.4	27.2	27.6	27.7	28.2	27.9	79.6	16.7	17.3	51	3.3	2.7
7	63.16	23.6	29.8	19.7	26.3	27.2	27.5	27.6	28.3	28.1	81.5	17.5	17.2	50.7	2.4	2
8	63.83	24	29.5	19.5	26.2	26.9	27.2	27.5	28.3	27.9	80.8	17.7	17	46	3	2.5
9	64.56	24.6	29.3	21.8	26.4	27.3	27.2	27.4	28.2	27.9	78.7	18	20	49.3	4.3	3.2
10	64.62	24.1	26.7	22.2	26.4	26.7	27.3	27.2	28.2	27.9	75.2	16.8	21.1	38.9	3.7	3.1
11	64.03	24.3	29.8	21	26	26.7	27.2	27.2	28.1	27.9	69.9	15.6	19	56.5	5	3.9
12	62.45	24.5	30.6	20.5	25.8	26.8	26.9	27.1	28	27.8	77.4	17.4	18.3	50	2.7	2.2
13	61.69	25.1	30.5	21.5	26.2	26.9	27	27.3	28	27.9	80.9	18.8	20.5	52	3	2.3
14	61.13	24.6	30.5	21.4	26.2	27.4	27	27.4	27.9	27.9	86.4	19.7	19.3	55.5	2.4	1.7
15	60.64	24.6	31.3	20.8	26.4	27.5	27.1	27.4	27.9	27.9	79.9	18.1	19.5	52.2	3.2	2.6
16	60.41	24.7	31.5	20.3	26.2	27.5	27.3	27.4	27.9	27.9	77.4	17.6	17.8	55.3	3.6	2.6
17	60.23	24.8	30.3	19.9	26.1	27.3	27.3	27.4	27.9	27.9	79.9	18.4	17.5	52.1	3.8	2.3
18	59.61	25.1	30.5	22	26.6	27.5	27.3	27.5	28	27.9	79.1	18.5	19.8	53.2	3.7	2.5
19	59.35	24.6	28.3	22	26.5	27.1	27.4	27.4	28	27.8	82.2	18.8	20.1	47.3	1.8	1.5
20	58.70	24.9	30.2	21.7	26.3	27.2	27.2	27.3	27.9	27.8	79.8	18.5	19.9	47	3.4	2.5
21	58.82	24.8	30.8	21.3	26.2	27.2	27.3	27.4	27.9	27.8	80.8	18.6	19.2	48.7	2.7	2.1
22	59.09	24.5	29.8	21.5	26.2	27.2	27.2	27.4	27.9	27.8	81.3	18.4	19.3	49	2.6	2
23	59.14	25.1	30.5	21.3	26.3	27.6	27.2	27.4	27.9	27.8	80	18.6	19.4	55	3.4	2.5
24	59.45	25	29.6	22.1	26.5	27.3	27.2	27.4	27.8	27.9	82.9	19.4	20.2	45.7	2	1.8
25	60.13	23.6	28	21.2	26.5	27.2	27.4	27.4	27.9	27.8	88.4	19	18.8	42.8	1.2	1.1
26	60.23	24.6	30	21.3	26.3	27.2	27.3	27.4	27.9	27.8	84.5	19.2	19.3	49.2	2.2	1.7
27	59.91	24.7	29.5	22.2	26.5	27.5	27.3	27.3	27.8	27.9	85.2	19.6	21	48.7	2.7	2
28	59.48	25.6	31.5	21.3	27	27.9	27.4	27.6	27.8	27.8	78	18.8	19	53	3.9	2.8
29	59.94	24.7	29.8	20.4	26.7	27.8	27.5	27.8	27.8	27.8	79.7	18.3	18.2	46.2	3.2	2.5
30	60.22	24.3	28.5	21.6	26.7	27.5	27.6	27.6	27.8	27.8	78.6	17.6	20.1	44.6	2.7	2.2
31	59.54	24.6	30.6	19.4	26.2	27.7	27.5	27.7	27.8	27.8	78.9	17.9	17.1	56.2	3.7	2.8
Mean Total	760.92	24.7	29.9	21.2	26.5	27.4	27.3	27.5	28	27.9	80.7	18.4	19.3	49.9	3	2.3
Departure from normal	-0.22	-0.2	-0.2	+0.8							+2.5	+0.3				

Day.	Wind.				Amount (mean). 0-10.	Clouds.			Sunshine. h. m.	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	E quad.	133	14	W	4.1	Cl.-S.	Cu.	E	9 05			T p.	
2	SW WSW	170	15	WNW W	3.8	A.-Cu.	NE	Cu.	8 50			< p.	
3	NNE	101	11	NNE	4.2	A.-Cu.	E	Cu.	5 05	9.7	9.8	p p.	
4	NE quad.	103	8.5	E	9.9	Cl.-S.		S.-Cu.	0 00	.1	.1	d p.	
5	E	215.5	21.5	E	7.8	Cl.-S.		Cu.	3 40				
6	E	161.5	22	E	8.5	Cl.-S.		Cu.	1 00				
7	N quad.	146.5	18	NNW	4.9	Cl.		Cu.	5 50				
8	NNE	153	17	NNE	7.9	Cl.-S.		Cu.	3 45	.3	.3		
9	N, NNE	200.5	19	NbyW	8.5	Cl.-S.		Cu.	4 00	.5	.5	d a. p.	
10	N, NNE	290	23	NNE	10	Cl.-S.		N.-cf.	0 00	.9	.8	d a.	
11	NNE	301.5	27	NNE	7	A.-Cu.	E	Cu.	5 10				
12	NW, NNW	138.5	13	ENE	8.1	A.-Cu.	ESE	Cu.	2 20	1	1	d p.	
13	NE quad.	166	17	E	7.1	A.-Cu.	ESE	Cu.	5 20			d a.	
14	NNE, W	132	12	WSW W	5.8	A.-Cu.	NE	Cu.	6 20	.8	.6	d p.	
15	ENE, SW	117.5	14	ENE	6.9	A.-Cu.	E	Cu.	6 45				
16	SW quad.	133.5	13	NNE	5	A.-Cu.		Cu.	6 05				
17	W quad.	136.5	15	SW	4.6	Cl.		Cu.	7 55				
18	NNE	132	15.5	NNE	7.5	A.-Cu.	ENE	Cu.	4 20				
19	W quad.	110	8	SSW	9.3	Cl.	WSW	N.-cf.	0 55			d <sup>c</sup> p.	
20	N, NNE	170.5	18	N	8.8	Cl.-S.		N.-cf.	3 35			d <sup>c</sup> a. p.	
21	N quad.	126	10.5	NNE	9.1	Cl.-S.		S.-Cu.	0 40				
22	W quad.	113	9.5	W, WSW	8.7	Cl.-S.	WSW	Cu.	0 30				
23	NNE, NE	138	19	NNE	9.4	A.-Cu.	ENE	Cu.	2 15				
24	NE quad.	83	10	SW	8.8	A.-Cu.	ENE	S.-Cu.	2 45	.8	.8	d <sup>2</sup> p.	
25	SE quad.	109	12	S	9.8	A.-Cu.	ESE	Cu.	0 00	1.4	1.3	d p.	
26	E quad.	135	14.5	E	8.2	A.-Cu.		Cu.	3 50	2.5	2.5	d p.	
27	E quad.	146	11	SW	7.8	Cl., Cl.-S.		Cu.	4 10			d <sup>2</sup> a.	
28	SE, W	161	15	W	4.4	A.-Cu.	E	Cu.	9 15				
29	W quad.	135.5	13	W	6.7	A.-Cu.	ENE, ESE	Cu.	5 00				
30	E quad.	110.5	7.5	SSE	9.6	A.-Cu.	ENE	Cu.	0 55				
31	W quad.	159	16	W	5.1	Cl.		Cu.	8 50				
Mean Total		4,628	14.8		7.3				4 08	128 10	18	17.7	
Departure from normal			-663.1		+1.9				-57 48		-8.9		

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



METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.<sup>a</sup>

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

Day.	Pressure <sup>b</sup> (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. <sup>c</sup>	Free exposure (total).	Shelter (total).
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	636.48	18.4	23.6	9.10a.	15.4	3.30a.	24.5	10.25a.	14	6.40a.	87.2	13.7	13.8	56.7	1.6	
2	37.04	17.6	23.4	0.05p.	15.5	3.40a.	24	11.15a.	15.3	3.55a.	94.3	14.1	14.1	61	.9	
3	37.55	16.9	20.9	10.20a.	14.5	12m. n.	22.5	10.00a.	14.2	12m. n.	91.8	13.2	13.8	51.1	2.2	
4	38.60	16.2	22.5	1.40p.	13.7	10.30p.	22.5	2.00p.	12.7	4.30a.	78.2	10.6	12.6	53.6	6	
5	39.61	15.5	21.2	0.25p.	12.6	12m. n.	22.2	1.20p.	12	12m. n.	75.3	9.8	11.7	50	7.4	
6	39.59	14.8	19.5	0.50p.	12.1	5.35a.	20.5	0.20p.	11.5	6.35a.	74	9.2	11	46.2	5.7	
7	39.47	16	21.7	11.45a.	11.9	3.20a.	23	0.10p.	10.7	6.05a.	82.3	11	11.3	52.7	2.6	
8	39.96	16	21.7	10.40a.	12.9	1.30a.	23.1	11.00a.	12.2	3.55a.	83.7	11.2	13.3	52.3	2.1	
9	40.48	16.4	22.4	1.00p.	12.9	2.20a.	23.9	1.00p.	13.2	3.10a.	72.5	9.9	12.8	51.9	6.4	
10	40.58	16	21.8	0.25p.	12.4	3.30a.	22.9	2.15p.	11.9	6.20a.	70.3	9.4	12.4	53.2	7.8	
11	39.90	14.4	19.9	0.50p.	11.8	6.50a.	21.4	1.00p.	11.7	12m. n.	71.3	8.6	11	48.7	8.8	
12	38.90	15.4	19.8	1.40p.	11.7	0.05a.	22.3	3.00p.	11.7	0.05a.	73.5	9.6	10.7	49	8.7	
13	38.72	16.7	22.1	2.50p.	13.3	6.05a.	23.6	2.45p.	14	12m. n.	75.5	10.5	13.6	58.2	7.4	
14	38.38	17.5	23.8	11.20a.	14.2	0.45a.	24.4	11.35a.	13.6	0.55a.	78.8	11.7	12.7	55.5	2.2	
15	37.69	17	22.1	10.20a.	13.9	6.00a.	23.5	11.50a.	12.5	6.55a.	84.3	12	12	54.9	2.4	
16	37.52	16.8	23.3	0.55p.	13.2	6.20a.	23.2	1.30p.	12.2	5.45a.	82	11.5	11.8	53.9	3.9	
17	37.61	16.6	22.3	1.25p.	13.3	4.00a.	23.4	10.55a.	12	5.20a.	83.2	11.7	10.8	52.5	2.7	
18	36.87	16.6	22.8	0.20p.	12.8	6.30a.	24.4	1.40p.	11.8	5.25a.	80.2	11	11.4	53.4	4	
19	36.40	16.1	22.9	11.00a.	13.1	3.55a.	24.4	0.25p.	12.6	6.25a.	81.3	11.1	12.8	54.1	2.7	
20	36.11	17.4	24.3	1.55p.	13.1	5.50a.	23.8	0.30p.	12.4	5.50a.	74.5	10.8	11.7	58.7	5.2	
21	36.18	16.7	21.4	0.50p.	13.4	3.00a.	23.8	11.30a.	13	6.00a.	85.7	12.1	11.8	54	1.7	
22	36.13	16.2	22.4	0.25p.	13.4	6.40a.	23.3	1.30p.	12.5	6.00a.	80.8	11.1	12.5	56	4.6	
23	36.50	17.4	22.3	1.20p.	14	1.05a.	22.8	1.40p.	13.3	0.45a.	77.3	11.4	13	52	2.4	
24	36.51	16.2	23.8	0.20p.	13.1	11.30p.	23.5	0.20p.	12.2	-----	82.3	11.2	11.8	54.9	4.3	
25	36.82	15.8	22	11.45a.	12.8	0.30a.	23.2	0.15p.	12.1	5.00a.	78.2	10.5	11.8	55	4.6	
26	37.24	16.7	23.4	Noon	13.4	6.00a.	23.5	11.45a.	12.7	6.40a.	82.3	11.6	11.7	57.7	3.4	
27	36.97	16.4	19.7	2.20p.	14.5	5.00a.	21.5	2.45p.	14.2	4.50a.	90.2	12.5	13.7	43	.5	
28	36.74	16.2	20.9	0.55p.	13.3	6.55a.	22.8	2.00p.	14.2	2.40a.	94	12.9	13	57.4	.5	
29	36.79	16.3	21.3	11.00a.	13.1	6.40a.	22.6	11.30a.	12.6	4.10a.	82.8	11.3	11.6	54.9	4.1	
30	36.73	15.8	21.4	0.45p.	12.4	6.20a.	21.7	0.20p.	11.8	6.00a.	84.2	11.2	11.1	54.4	2.3	
31	36.31	16	20.8	2.20p.	13.1	8.15a.	21.9	3.10p.	13	3.35a.	83.2	11.2	11.7	55.3	2.8	
Mean	637.75	16.4	22	-----	13.3	-----	23	-----	12.7	-----	81.1	11.2	12.2	53.6	3.9	
Total	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	121.8	67.9

Day.	Wind. <sup>d</sup>				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.	Upper.			
		Km.	Km.		0-10.			h. m.	mm.	
1	E, SW	232.8	19.6	E	5.3	Ci.	Cu.	E	2 50	☉ a. p.
2	Variable	216.2	21.7	W	8	Ci.-S.	Cu.	E	2 00	☉ a. p.
3	E	311.7	24.4	E	6	Ci., A.-Cu.	Cu.-N.	ENE	0 10	☉ a. p. ☉ p.
4	E	508.9	28.7	SE	2.6	Ci.-S.	Cu.	ENE	4 25	☉ a. p. ☉ p.
5	E	606.4	30.4	E	.6	Ci., Ci.-S.	Cu.	-----	4 30	-----
6	E	492.2	27.7	E	3.9	Ci.-S.	Cu.	SE	0 00?	☉ a. p.
7	E	291.8	21.1	E	4.1	Ci.	Cu.	SE	4 35	☉ a. p.
8	E quad.	272	19.6	E	5.9	Ci.	Cu.-N.	-----	3 00	☉ a. p.
9	E	428.8	25.7	E	4	A.-Cu.	Cu.	E, ENE	5 00	☉ a. p.
10	E	553.2	28.4	E	3.1	A.-Cu.	Cu.	-----	4 35	☉ a. p.
11	E	727.3	40.8	E	0	Ci.	Cu.	-----	4 05	☉ a. p.
12	E	738.4	50.2	E	7.3	A.-Cu.	Cu.	ESE	1 05	☉ a. p.
13	E	603	49.4	E	7.4	A.-Cu.	Cu.	E	3 15	☉ a. p.
14	E quad.	345.3	23	E	6.9	A.-Cu.	Fr.-N.	ENE	1 40	☉ a. p. ☉ p.
15	Variable	269	22.5	E	6.1	Ci.	Cu.-N., Cu.	-----	3 05	☉ a. p. ☉ p.
16	E	377.2	25.7	E	3.1	Ci.-S.	Cu.	-----	5 00	☉ a. p. ☉ p.
17	Variable	251.8	21.2	W	4.4	Ci.	Cu.	-----	6 50	☉ a. p. ☉ p.
18	E	343.1	29.5	E	2.6	Ci.-S.	Cu.	SE	4 35	☉ a. p. ☉ p.
19	E	358.9	23.8	E	4.9	Ci., Ci.-S.	Cu., Cu.-N.	-----	2 30	☉ a. p. ☉ p.
20	E	416	24.9	E	2.3	Ci.	Cu.	ENE	6 25	☉ a. p. ☉ p.
21	E quad.	292.9	22.5	E	8.3	Ci.-S.	Cu.-N.	SSW	0 35	☉ a. p. ☉ p.
22	E	375.4	23.1	E	2.6	Ci., Ci.-S.	Cu.	SSE, S	3 20	☉ a. p. ☉ p.
23	E quad.	295.9	23	E	7.3	A.-Cu.	Cu.-N.	WNW	1 45	☉ a. p. ☉ p.
24	E	441.1	30.9	E	3.3	A.-Cu.	Cu.	ENE	3 45	☉ a. p. ☉ p.
25	E	476.6	32.2	SE	6.6	Ci.-S.	Cu.-N.	ENE	1 15	☉ a. p. ☉ p.
26	E	390.4	25.7	E	5.1	Ci.-S.	Cu.-N., Cu.	-----	2 30	☉ a. p. ☉ p.
27	SE quad.	275.3	24.9	E	9.7	A.-Cu.	N., Cu.-N.	SE	0 00	☉ a. p. ☉ p.
28	Variable	208.4	19.3	W	10	Ci.-S.	Cu.-N.	-----	1 15	☉ a. p. ☉ p.
29	E	313.6	22.8	E	5.6	Ci.-S.	Cu.-N.	SE	2 50	☉ a. p. ☉ p.
30	E	294.2	25.1	E	7.7	Ci.-S.	Cu.-N.	W	2 50	☉ a. p. ☉ p.
31	Variable	330.5	28.4	W	6.6	Ci.	Cu.	NW	4 20	☉ a. p. ☉ p.
Mean	-----	388.2	27	-----	5.2	-----	-----	-----	3 02	-----
Total	-----	12,033.3	-----	-----	-----	-----	-----	-----	94 00	67.4

<sup>a</sup> 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.  
<sup>b</sup> The barometric readings of this station are not reduced to sea level.  
<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.  
<sup>d</sup> 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, JANUARY, 1917.

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		0.5	7.1		11.7		19.6				0.5	0.5				0.3
Isabela, Basilan		18.5	6.4	0.5		3.6					38.1	9.4	2			
Zamboanga			11.7				11.7				4.8	2				
Davao				3.8	8.4		61	19	6.6	3.3	8	7.1				11.4
Cagayan, Misamis		2.5		2			3.6	7.1		3.5	3.8	4.6	1.3	2.9		
Butuan		.5	.8	4.6	.8	1.3	25.7	16	.5	32	35.8	47	14.2	15	6.3	2.8
Dumaguete			9.9	8.4	4.8	9.9	1.8	5.8		13.5	22.3	4.3		9.7	.5	1
Tagbilaran			19.8	2.8							15	20		2.8		
Iwahig	3.8	10.4		21.3	10.4											
Surigao		.5	176.5	16.3	10.2	25.4	1	16.3	6.9	49.2	49.3	41.4	31.9	41.5	40.9	19.8
Maasin			6.4	12.2	24.6	8.4				18	94.5	11.4				24.9
Cebu			1.8	.5	7.4					3	8.9	12.2				
Iloilo			9.6	24.9	2.8			.8	6.4		3.8					
San Jose Buenavista			3.6	11.2							.5		35.1			
Cuyo				2									3.3			
Ormoc		4.8	8.7	.8				.8	1.3	6.1	11.1			3	7.1	1.4
Guiuan	3.6		5.6	1.3	1.8	.5		3.6	4.8	44.4	42.9	1	7.7	24.9	7.6	6.9
Tacloban		2.3	36.5	9.9	1.7	.4		.5	4.8	24.4	53.9	.1	11.8	18.5	.6	15.3
Capiz		20.3	4.3	3.3	1.8	.6	.5	.6	.3	2.1	12.9			3.3	8.6	9.4
Borongan	8.6		13.5	38.3	5		7.6	1.3	18	38.6	52.4	11.7	48.5	17.8	3.6	41.1
Catbalogan		.3	27.1	2.3	.3	1		1.8	4.8	8.4	37.1	13.2	29.2	8.6	4.3	1.3
Calbayog	2	6.8	5.6	2				1.8	1.3	8.5	19.2	1	12.7	4.1	3.5	6.6
Masbate			3.8	5.3	2.1	3.8		6.4	1.3	12	92	1.5	31.8	3.3	1.8	
Romblon	2.8		6.4	9.2	6.1	2	4.1	5.3		11.4	27	13.2	6.2	5.9	2.5	.6
Batag	8.4	5.3	29.9	16		2	11.2	3.8	11.7	20.3	20.3	7.9	23.4	5.1	5.1	26.2
Sorsogon			38.1	49.4	26.4	26.7	26.7	64	28.4	76.9	78.4	59.5	84.8	54.4	.8	4.3
Legaspi	4.8		28.3	11.7	2.8	1.3		3	1.6	27.7	59.4	18.5	40.9	6.9	3.8	
Sumay, Guam	6.4	1.3		3.8	3.8		1.3	5.1	1.3	7.6	16.5		2.5			
Calapan	.5			9.4	2.3	6.6		6.1	15.2	2.3	.8		1		7.4	2.5
Virac	18.5		.8	6.6	1.3	1.5	.5	2.5	4.3	5.1	33.3	14.8	4.3	2.8	4.1	
Naga	.5		2.8	6.2				7.2		7.6	31	17.8	2.8		3.8	1.5
Batangas			9.4	4.3	1.3	1.6	.5		1.8	6.1	3.3	.3				
Lucena			21.3	91.9	7.6	5.6		4.8	28.7	56.9	5.1	11.2	1.3	4.3	.3	4.8
Atimonan			4.8	14.2	1			9.1	89	63.7	11.7	27.7		4.3		13.7
Ambulong, Tanauan			5.6	24.4												
Canlubang, Calamba		11.4	2.3	13.2	1.8	3.8			2.3	9.2		1				
Paracale			37.1	12.2	1.5	4.6		1.3	64.4	88.4	13.1	169.6	5.1		14	11.4
Santa Cruz, Laguna		.8	13.7	29.2	3.3	4.1	1.3	.3	1	8.3		8.6	.3			
Manila			9.7	.1				.3	.5	.9		1		.8		
Antipolo			1.3	1.5						3.1		2	.3			
Iba										.3						
San Isidro		1								.5						
Tarlac			8.1									.8	.8			
Baler	8.4	12.2	1.3	1.3	7.9	6.6	2	4.8				35.3	21.8	3.5	3.8	
Dagupan	21.1	23.9														
Bolinao			11.7												2	
Baguio		5.9	38.3										.5	8.7		
San Fernando, Union																
Echagüe	49.5	.8	2.1	1.3			.5	47.5	.5	2.6		6.1	9.4	1.3	19.9	.8
Candon																
Vigan																
Tuguegarao		10.9										3.6	11.2		7.2	
Laoag																
Aparri		23.4	14.7	8.7	1.6	2		13.7	9.6	2.1	.3	1.3	.6	1.8	11	.5
Cape Bojeador							2.5	2.5								
Santo Domingo, Batanes	34.8	7.2	10.4	3.2	15	3.3	61.5	2.8	3.4	1.5	4.4	8.7	67.8	98.5	4.7	1.5

Daily rainfall at the stations of the Weather Bureau, January, 1917—Continued.

Station.	Day of month.														Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.		31.
Jolo	0.8	41.4	1	0.5	38.4		13.7	4.6	4.6	2.5		0.5	21.1	1.5		170.8
Isabela, Basilan		31	8		.8	9.7	.5	4.8	5.8				14.7			152.7
Zamboanga		27.2	8.9	2.6		4.5		2.8			0.5	2.8	2.3			81.8
Davao	44.4	15.7				11.4								2.5		195.4
Cagayan, Misamis	2.8	1	4.1			2.8		3								45
Butuan	12.9	20.8	3	3.3	5.3	4.6	16.3	57.1		1	2.5	9.1	6.3	11.4		356
Dumaguete	2.8	1	1.8			10.2		12.4				1.9				122
Tagbilaran	31.5	6.1				8.6		6.6		*	*	*	4.6			117.8 <sup>a</sup>
Iwahig	43.4	45.7	8.3	1.5	49.7	1.5	12.7	17.5		3		.3			2.3	115.8
Surigao	11.9	8.4			2	17.5	2.5	6.6			9.4	53.7	12.2	5.8	4.8	739
Maasin	5.1	1.6	.3			38.1					7.1	27.2				286
Cebu		3.8		16	16.8	2.8		2.9					2.3			97.9
Iloilo			4.8		.5	2.3		.3				1				124.8
San Jose Buenavista												1.3	.8			28.6
Cuyo						7.4		15.3		1		3.3	.8			112.6
Ormoc	8.4	30.5					2.3	14	2.5	11.9	17.3	4.6		10.7		378.2
Guiuan	42.4	66.1	46	.8	3			61.3	.6	2.6	2	4				368
Tacloban	31.9	27.2	55	2.7				6.6	.5		5.9					144.5
Capiz	4	22.9	30.5	4.6	.3	.3	6.6	63.7	3.6	9.4	68.3	15		1.5		787.7
Borongan	77	70.4	137.1	8.1		9.1	18.5	63.7	3.3	2	13.5	3				366
Catbalogan	25.9	31.5	25.1	3.3		3.6	3.3	113.5	1.3	2	2			1.3		309.4
Calbayog	3.8	30.7	32.1			21.1		100.4	11.7	7.1	2.3	25.1				305
Masbate	10.9	12.2	53.3	34.8		4.1	1	6.4	9.1	5.8	.5	1.8				270.2
Romblon	3.8		3.6	9.2	30.2	13.7	28.4	5.1	35.3	9.7	2.8	15.5	5.3	1.8	4.8	844.1
Batag	29.2	29.2	156.2	11.2	16.8	1.8	10.2	192.8	96	57.2	5.3	1.8	26.4	2.3	11.1	1,259.9
Sorsogon	26.2	29.2	103.9	97			25.9	78.8	108.2	44.4	4.3	3	.3	92.2	27.7	788.6
Legaspi	6.9	12.2	107.9	106.4	1.6	63.2		48.2	134.6	31.3	4.6	3.3	20.1	27.4	10.2	76.4
Sumay, Guam	8.9					3.8	6.4	1.3	3.8		2.6					164.9
Calapan	5	2.5	.3	29.5	10.2	.5	5.1	1.3	9.1	8.9	13.7	24.6	.3	3.8	5	573.1
Virac	11.2	10.1	61.2	85.4	51.1	22.3	8.9	63.5	106.1	6.3	1.6		4.6	33.3	7.1	286
Naga	8.1	5.1	23.6	36.9	60.2	12.2		8.4	30.9	5.1		3	10.7		3.3	36.3
Batangas	.5							1.3	4.6				.5			450.7
Lucena		2.5	2.8	97.1	16.5	.5	.8	12.7	40.9			8.6	22.9		1.3	699.8
Atimonan	1.3	13.2	24.2	103.6	38.5	57.7	52.1	50.5	70.1		1.5		37.3	1.5	9.1	69.3
Ambulong, Tanauan																55.2
Canlubang, Calamba	1															18
Paracale	2.8	39.6	52.8	138	67.8	12.7	3.3	139.1	116.9	21.6	3.5	13.3	21.3	16.3	27.5	1,099.2
Santa Cruz, Laguna	.8		3	3.3	1.8	.3	.8	2.1	8.6	2	1.8				1	96.4
Manila								.8	1.4	2.5						23.4
Antipolo							.3	.8	4.1	4.6		.8	4.6			.9
Iba						.6										6
San Isidro										1.3		.3			1.3	9.9
Tarlac											1.8					207
Baler		6.1	2			3	3.8		13	31	31.3	.8	1.8		5.3	45.5
Dagupan											.5					19.8
Bolinao												5.1			1	67.4
Baguio					7.4						3.8				2.8	.3
San Fernando, Union											.3					150.9
Echagüe		1.3	.5	1.8	.8		.3			1.5		.5	1.1			0
Candon											.8					0
Vigan																0
Tuguegarao																32.9
Laoag																0
Aparri	28.2	3.1	.8	.3	3.8		2.6	1.8				2.5	7.2		12.5	154.1
Cape Bojeador																5
Santo Domingo, Batanes	4.4	4.2	1				40.6	1.5	.3	1.7	1		1.4	1.5		386.3

\* No observation.

<sup>a</sup> 28 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, JANUARY, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cagayan, Misamis.		Butuan.		Dumaguete.		Tagbilaran.	
	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	30.1	21.7	31.6	22.1	32.9	23.4	31.5	21.5	30.9	22.1	31.9	21.9	30.3	23.6	30.6	22.5
2	29.8	21.2	31.1	21.4	30.9	23	31.7	19.9	30.5	21	32	20.9	30.3	22.6	31.3	21.4
3	28.9	21.6	31.8	22.3	30	22.1	32.7	20.5	30.4	21.1	30.6	21.2	30.6	22.4	29.8	21.6
4	29.9	22.7	32.6	22.6	31.8	22.2	32.7	20.5	30.6	20.6	32.2	21.3	31.4	23.1	29.8	21.9
5	26.3	21	32.2	23.1	31.5	23.2	28.2	21.5	28.6	21.8	30.6	22.1	28.8	24	29.7	21.8
6	29.5	19.7	31.9	23.3	31.8	23.3	29.2	21	30.3	21.6	30.1	21.7	27.8	23.7	28.7	21
7	28.4	23.3	29.8	21.6	31.4	21.9	29.2	22	30.4	21.9	31.6	21.9	28.4	23.1	30.9	21.7
8	28.6	21.2	30	22.1	29.4	21.8	25.2	21	25	22.4	25.6	21.6	28.7	23.2	29.6	21.7
9	29.2	21.3	34	21.9	31.7	22	30.7	21	30.3	21.7	30.1	21.5	28.6	24.1	31.2	22.4
10	29.3	22.2	32.6	21.7	31.2	22.7	25.2	21.9	27.7	21.9	24.6	22.1	28.8	24.3	31.4	22.4
11	29.4	23	33.1	23.1	32.5	22.4	30.7	21.3	29.8	21	30.7	21.7	27.6	23.9	28.4	22.1
12	29.4	22.4	32.6	22.6	33	22.7	30.2	21.9	26.6	22.7	24.5	22.4	28.6	23.7	28.3	21.5
13	28.9	21.9	32.3	22.6	34.3	22.6	29.2	20.5	25.8	22	28.1	21.5	28.3	24.3	30.6	21.7
14	29	21.4	31.8	22.1	29.5	23	31.7	21.2	30.5	21.2	29.7	21.8	28.5	24	31.1	22.8
15	29.1	23.4	33.6	22.6	31	23.5	29.2	21.5	29.5	21.7	29.5	22.5	29	24	29.1	22.3
16	28.9	24.3	32.6	23.9	32	23.7	30.2	22	28.9	22.2	31.6	23.2	29.2	23.7	29.6	22.4
17	28.9	23.8	32.1	22.6	29.8	23.8	29.7	22	28.6	23.5	27.6	23.3	28.3	23.6	28.1	22.4
18	26.7	22.1	32.3	22.1	31.6	23	30.7	21.5	28.5	22.5	29.4	22.6	28.7	24.1	30.4	22.3
19	29.8	21.4	32.6	21.6	29.9	23.2	31.2	21.9	29.3	22.3	32.2	22.5	29	24.3	29.2	21.7
20	30.9	22.1	32.8	22.1	30.7	23.2	31.7	21.4	30.1	22.2	31.6	22.9	28.9	23.1	29.7	22.5
21	28.5	21	31.1	21.9	30	23	31.2	21.5	30.4	21.3	33.2	22.2	28.9	22.7	30.3	22.2
22	29.6	20.8	32.6	22.4	29.3	22.7	31.7	21.5	30.3	21.9	32	22.1	29.8	23.2	30	22.2
23	28.3	20.7	33.6	22.5	28.7	22.8	32.5	21.5	30	21.3	33.1	21.7	28.3	23	30.1	22.7
24	29.8	21.3	31.9	21.6	31.7	22.3	31.7	21.9	30.4	22	31.8	23.2	29.8	24.1	31	23.4
25	28.6	20.6	32.1	22.6	29.8	22.9	31.7	22.9	30	22.9	32.8	22.7	28.9	23.4	31.4	21.5
26	28.9	19.8	31.8	21.7	30	22.3	30.7	21	31.1	21.7	33.6	21.9	29.9	22		
27	27.8	20.4	32.4	22.1	30.2	22.2	32.2	20	30.4	20.1	31.4	21.3	29.6	23.5		
28	28.4	21.1	32.1	21.5	31.5	22.8	29.2	21.5	29	21	30.6	22.7	28.3	23.8		
29	29.4	21.4	32.6	23.1	30.2	22.4	31.7	21	31.3	21.6	31.1	22.9	28.5	24.5	30.5	23
30	28.2	21.3	29.6	22.4	28.9	22.8	30.5	21.6	30.5	20.6	29.9	21.2	29	24.1	30.5	21.6
31	28.2	21	32.6	22.6	29.1	22.5	29.2	21.1	29.9	21.6	31.6	20.8	29.6	22.7	29.5	21.5
Mean	28.9	21.6	32.1	22.3	30.8	22.7	30.4	21.3	29.6	21.7	30.5	22	29	23.5	30	22.1

Day.	Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.	
	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	31.9	22.1	31	21.4	31.3	23	30.4	24	31.2	24.4	32.2	23	29.7	23.3	31.2	20.4
2	31.2	22.9	30.5	22.3	33.5	23	31.8	24	32.9	22.7	32.7	21	30.2	23.4	32.4	21.4
3	32	18.8	29.5	22.8	30.5	23.6	31	23.9	28.5	23.5	32.2	22.5	29.4	23.9	31.6	21.4
4	30.3	21.9	30.2	22.7	33.2	22	29.1	24.2	29.4	23.4	32.2	21.8	28.7	25.9	31	22.4
5	30.3	21.6	29.2	24	29.2	22.3	28.5	22.5	27.2	23	32.2	21.3	28.6	24.8	29.6	23.8
6	29	23.2	28.6	23.8	29.8	22	27.7	22.7	27.8	22.8	30.7	21.5	26.7	24.6	30.2	23.1
7	30.9	20	28.9	23.5	30	22.2	28.5	24.2	29.2	22.5	34.2	21	27.8	25	30.9	22.9
8	30.6	20.5	29	23.3	30.5	21.8	28.2	22.7	29.2	22.9	33.3	20.4	28.5	25.2	31.8	20.9
9	30.4	21.2	30.1	25	29.5	21.8	29.2	22.9	29	22.7	33.6	23	28.4	25	31.2	22.9
10	31	20.8	27.6	23.4	29	22	28.9	23.5	29.6	23	33.7	23	28.3	25.5	31.6	22.8
11	30.6	21.7	28.6	23	31.8	22.2	27.5	22.5	27.7	23	32.7	23.5	27	24.1	28.8	23.1
12	29.7	23.5	28.9	22.8	30.9	22.4	28.3	22.4	29.5	23	34.2	22.6	27	24.1	30.6	22.4
13	31.2	21.5	30	23.2	30.9	22	29.3	23.6	29.6	24	34.7	23.1	29.2	25.6	32	22.9
14	31.8	21.2	27.4	23.1	31.4	23	28.5	24.4	28.8	23	31.7	22	28.9	25	27.3	22.2
15	31.6	21.5	26.9	23.1	30.5	22.5	29.5	23.8	30.2	23.5	32.2	21.1	28.7	25.3	30.9	21.2
16	31.1	20.5	30.9	24	29	22.2	29.5	24.2	29.8	23	33.7	21.5	28	25.1	28.8	20.9
17	31.6	21.3	30.6	23.6	29.6	22.5	29.7	24.2	29.6	23	30.4	21.5	28.5	25.2	29.8	23.4
18	32.1	21.9	29.5	23.5	30.5	21	29.8	24.6	29.5	23.2	30.8	22.7	28.3	25.4	30.2	23.4
19	29.7	22.3	28	23.4	31.5	22.2	30.2	23.6	28.2	22.7	31.4	22.6	28.4	25.2	27.8	22.6
20	30.4	23.4	31.5	22.9	32.5	22.4	29.6	23.7	30.3	23	31.7	22.6	28.5	25	31.8	21.9
21	27.8	23.6	31.8	22.9	33.8	22.8	29.7	24.3	30.1	22.4	31.2	22.6	28.7	24.6	32	21.6
22	30.1	22	30.5	23.3	32.5	22.5	30.1	23.2	29.4	23.2	31.6	22	27.8	24.7	32.1	21.4
23	30	22.8	30.1	22.5	33	22	30.1	23.8	30.6	23.4	31.8	23	30	24.9	32	22.4
24	30.7	21.9	29.5	23.5	32.5	22.6	30	24	30.5	23.5	32.3	21.4	28.8	25.3	31.5	21.9
25	30.1	22.9	30.3	23	32.8	22.5	29.1	23.8	29.1	24.2	31.5	23	28.5	25.3	30.9	23
26	29.7	22.9	31.5	21.4	32.6	22.2	29.8	23.5	29.1	23.5	32.2	20.1	30.1	24.9	31.4	21.1
27	29.7	21	30	22.2	32.4	22	29.6	23.7	29.3	23.3	32.8	21.5	28.5	25.2	32	21.4
28	31.1	20.9	31	23.3	31.8	23	29.2	24.2	29.5	23	33.1	22.1	29.3	24.9	30.6	23.7
29	30.8	21.9	28.4	23.9	31.5	22.6	29.4	24	29.5	23.4	32.7	21.5	29.1	25.3	31	22.8
30	28.1	23.5	30	22.6	32	20.8	30.1	23.6	30	23.2	32.7	20.1	28.4	25.2	30.8	20.6
31	30.3	21.1	31.5	21.9	31	21	30.2	23.6	29.5	22.2	32.7	21	28.5	24.8	30.3	20.3
Mean	30.5	21.8	29.7	23.1	31.3	22.3	29.4	23.7	29.5	23.1	32.4	21.9	28.6	24.9	30.8	22.1

METEOROLOGICAL BULLETIN.

Maximum and minimum temperatures at the stations of the Weather Bureau, January, 1917—Contd.

Day.	Guianan.		Tacloban.		Capiz.		Borongan.		Catbalogan.		Calbayog.		Masbate.		Romblon.	
	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	32.5	21.4	30.5	22.2	31.3	23.7	30.9	21.2	31.5	21.5	29.8	21.7	30	24.6	32.3	25.2
2	31	22.4	31.9	23.4	31.3	22.7	30.7	22.6	30.5	21.7	31.8	21.9	30.4	24	32.6	23.2
3	31	23.1	30.2	23.2	30.9	23.8	30.4	22.4	30.3	22.4	31.7	22.8	29.4	24.5	31.4	22.2
4	31.1	25.6	29.1	23	30.2	24.5	29.1	22.9	28.9	21.5	29.4	22.6	31	23.5	31	23.9
5	30.2	24.4	28.7	21.8	28	23.2	28.4	23.1	28	22.1	29.3	22.2	28.5	23.4	30.6	22.9
6	29.7	23.5	28.3	21.9	28.7	22.4	29	22.7	29.8	20.3	29.3	20.8	29	21.2	30.8	22.9
7	30.4	23.5	30.1	23	29	24	29.5	23.8	30	22.2	30.7	20.9	28.6	21.5	31	23.7
8	31.5	25.2	29.9	22	29.2	23.8	29.8	21.1	30	20.9	30.7	20.8	28.2	23.2	30.8	21.9
9	29.6	23.8	29.8	23	30.3	24.9	28.8	23.2	30.5	21.5	30.8	22.8	29	24.8	31.5	23.3
10	30.8	24.7	30.4	23	31.2	24.2	29.1	23.6	30.2	21.6	30.4	22.4	29.8	23.2	31.6	23.9
11	28.2	23.5	27.3	22.6	26.7	23.3	27.2	23	27.5	22.5	25.8	22.7	26.8	22.4	28	22.2
12	30	21.4	29.8	21.5	30.3	23.4	29.3	23.5	29.2	22.4	30.1	22.1	29.4	21.8	31.5	22
13	30.5	25.5	30.5	23	30.4	24.5	30.5	22.2	31	21.5	31.7	22.6	27.4	24.2	29.9	23.2
14	27.5	22.9	26.3	22.8	30.3	24	29.2	21.5	29	22.8	27	22.8	27	23.6	30.5	22.9
15	28.5	24.1	29	23	30.4	22.5	30	23.1	29	20	30.8	21.7	28.4	23.5	31.8	23.2
16	29.9	24.2	26	22.9	30.4	22.8	28.4	22.6	28.9	20	29.5	21.5	29.4	23.2	31.9	23.1
17	29.5	24.8	27.9	23.5	28.9	24.2	28.7	23.5	28.2	21.9	28.4	22.5	29	24.5	31.3	23.6
18	28.8	23.4	27.8	23.3	30.3	23.8	30	23	30	22.7	31.4	23.2	29	24	30.7	23.9
19	26.6	23.4	25.2	22.7	27.3	23.4	26.4	21.7	25	22	24.9	22.7	27.6	23.2	29.2	23.9
20	30.6	24.2	30	23.4	30	23.5	29.8	23.4	29.2	22.4	29.9	21.9	28.6	23.2	29.5	23.3
21	30.8	21.7	31	23.5	30.5	23.1	30	22.1	30.5	21.3	32.5	23	29	23.5	29.8	23.4
22	31	22.8	31	23	30.5	24.7	30	22.6	30.1	21.5	30.8	22.3	28.4	24.4	30	22.9
23	31.2	21.6	31.2	22.3	28	24	30.1	21.1	30.1	21.3	31.8	22.4	30.6	22.4	29	23.2
24	30.4	24.1	30.9	22.7	30.4	23.6	30.2	23.2	31	21.9	31.2	22.7	28.4	23.5	31.3	23.1
25	31.3	23.5	29.8	22	29.9	23.9	30	22	30.6	22	29.7	22.1	26.4	23.2	28.4	22.7
26	30.3	23.4	30.4	23.3	29.8	24.1	29.7	22.6	30.5	21.5	30.9	22.7	28	23	31.3	22.7
27	29.4	22.5	31.2	22.5	30.2	23.8	29.2	22.5	30.6	22.2	31.4	22.6	28.8	22.8	30	23.2
28	30.1	23.6	30.4	22.9	30.6	23.1	30.4	21.3	30.3	23	29.6	22.5	28	23.5	29.6	23.4
29	30.5	24.2	30.5	22.4	30.9	24	30.1	23	31	22.2	30.8	22.6	29.4	24	31	22.8
30	30.4	24.2	31.1	21.7	30.2	23.5	30.1	21.5	29.6	20.7	31.7	21.5	27.6	23	29.5	22.7
31	30.9	21.4	30.3	22.1	30.3	24.2	29.4	21.2	29.5	20.7	31.7	21.8	29	22.6	29.5	22.3
Mean	30.1	23.5	29.6	22.7	29.9	23.7	29.5	22.5	29.7	21.7	30.2	22.2	28.7	23.3	30.6	23.1

Day.	Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.		Virac.		Naga.		Batangas.	
	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	23.5	30.5	22.5	29.8	23.3	29.2	23.8	30.6	22.9	31.1	22.2	30.5	20.3	30.2	22.5
2	29.3	23.7	31.4	22.5	30.4	22.8	28.4	23.4	31.5	21.1	30.2	21	32.6	20.2	32	21.9
3	29.5	24	31.3	22.1	30.3	22.7	29.2	24	33.5	21.4	31.5	20.2	30.5	21	30.9	21.9
4	28.8	22.7	29.5	23	28.4	23.4	29.8	23.6	31.5	22	30	21.5	28.5	21	26.1	22.9
5	26.8	21.9	29	22.1	27.2	22.9	29.8	23.4	34	22.7	28	20.2	28	21	28.3	21.9
6	26	22.3	28.2	21.9	27.5	23	28.2	22	28.5	22.1	28.9	19.5	28.4	19.9	28	21.5
7	28	21.5			28.6	23.9	28	20.6	30.5	22	30.3	20.6	31	16.8	30.9	20.9
8	28	21.8	28.5	21.9	28.1	23.6	27.6	23.4	31.2	22	29.8	20.1	28.6	16.6	31.3	19.6
9	28.8	22.7	29	23.8	28.2	23.9	28.8	24.6	31.6	21.9	30.6	21.3	28.5	19.8	29.9	22
10	27.8	21.4	28.7	23.3	28.8	23.6	27.2	24.6	32	20	30	22	28.4	20.4	27.7	22.1
11	26.5	21.5	28	22	25.3	23.4	27.4	23.8	32.5		28.5	21	29.5	20.3	27.7	21.3
12	29	22.4	28.7	22	28.3	22.9	28.4	23.6	29	21	29	21.9	28	20.4	28.6	21.2
13	27.5	22.7	29	22.5	28.1	23	28	25.2	32.2	23.6	29.5	22.1	30.1	20.4	30.8	21.8
14	28.7	23.8	28.6	22	27.1	23.4	28.8	24.8	31.1	22.5	30.1	22.3	28.5	20.4	31.8	21
15	28.6	22.4	29.8	22.5	28.8	23.6	28.8	24.6	31.5	23	31.3	20	28.8	20.1	31.9	22
16	28.5	22	29.2	22.5	29.8	23.3	29.6	25.4	28.5	22.5	30.4	21	29	21	28.7	21.1
17	27	21.8	29.4	22.1	29	24.8	29.8	25	30.1	22.2	31.4	20.4	30	21.4	31	20.5
18	28.5	23.3	29.5	23	28.9	24	29.2	23.8	31.1	24	31.8	21.3	28.4	21.5	30	20.4
19	24	22.3	29	22.5	26.3	22.9	28.8	25.4	28.4	23	28.7	22.2	27.2	21.3	28.9	22.5
20	29.1	22.4	29	21.8	25.6	23.2	29	24.8	28.5	23.5	26	21.9	24.6	20.9	30	22.4
21	29.1	22	30.5	22.5	28.5	24	29.8	24	28.8	22.5	29.6	21.3	28.5	20.5	29.4	22.8
22	29	22.4	30.7	21.9	25.9	23.6	29.2	24	29.4	23.5	28.5	21.8	26.7	20.6	29.6	21.7
23	28.8	23.3	29.9	21.5	29.3	23.4	29.8	24.4	31	22.4	28.8	21.5	29.8	20.6	30.2	22.3
24	25.1	22.5	30.1	21	25.8	23	30	22.8	31.4	23	26.8	21	28.3	20.2	29.5	21.9
25	24.5	22	29	21	24.3	22.7	28.2	23	31.5	22.5	25.5	21.1	24.5	21	25.8	22.9
26	26	20.5			19	22.6	28.2	24	29.6	22	30	21.7	28.8	19.9	31.7	22
27	29	21.9	28.5	19	28.1	22.8	28.8	24.4	29.5	22.6	30.5	21.3	29	20.2	30.8	22.7
28	28.3	23.5	28.6	21	27.5	22.9	29.8	22.8	31	22	30.3	21.4	30.3	18.2	33	21.4
29	29	23.9	28.6	20.8	28.1	23.8	30.2	22.4	30	22	30.7	21.2	28.1	21	30.3	22.4
30	28.8	22.3	28.9	20.7	25.5	22.4	30.4	21.4	28.5	22.5	26.6	20.7	25.3	19.7	29	21.9
31	27.3	22.4	28.9	20	28.1	21.8	30	23	31	21	28.6	20		20.1	29.2	20.7
Mean	27.9	22.5	29.3	21.8	27.8	23.2	29	23.7	30.6	22.3	29.5	21.1	28.6	20.2	29.8	21.7

Maximum and minimum temperatures at the stations of the Weather Bureau, January, 1917—Contd.

Day.	Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.		Antipolo.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.5	23.2	28.9	24.1	32.2	22.2	30.4	22.4	29.9	22.2	30.7	21.9	32.3	21.3	32.6	20.3
2	31.2	21.3	29.8	22.3	32.5	22	31.4	20.4	30.2	21.7	30.8	23	31.2	22.1	30.3	20.9
3	30	21.6	27.2	22.7	31.5	23.5	29.2	21.6	28.9	22	28	22.3	30.6	22.4	31.1	21.3
4	26.9	22.4	27.2	23	24	22.5	25.4	21.9	27.8	23.2	25	22.6	28	22.5	27.9	21.4
5	28.3	21.4	26.8	22.8	26.7	22.2	27.8	21.2	27.9	22.7	25.8	22.1	29.5	20.9	28.2	20.3
6	28	21.1	26	22.8	26.8	22	27.2	20.4	28.4	22.2	26.3	20.7	28.3	19.7	27	19.7
7	29	20.9	28.8	22.5	29	21.3	20.6	29.6	23.3	23	27.9	21.1	29.8	19.7	29.5	18.6
8	29.5	21.3	28.3	23.5	29.5	21.3	29.2	19.2	28.8	22.7	28.6	20.2	29.5	19.5	29.9	18.4
9	26.1	21.2	25.9	22.7	28	22.1	28.1	21.2	27.1	23	25.3	22	29.3	21.8	29.6	20.3
10	25.4	21.5	24.8	21.8	26.2	21.9	25.4	21.6	24.9	22.5	24.9	22.4	26.7	22.2	28.3	20.5
11	26.1	20.6	25	21.9	27.1	22.2	25.6	21.2	24.6	22.3	25.6	21	29.8	21	28.7	19.6
12	24.3	21	24.6	22	25.5	22.4	27.6	21.6	24.4	22.7	24.6	22.2	30.6	20.5	28.7	20.5
13	28.7	22.1	27.4	23.3	30	22.9	27.8	21.2	28.4	23.1	28	22.7	30.5	21.5	30.5	20.3
14	30	22.5	27.7	24.2	31	23	29.2	22.8	28.9	24.5	29.1	22.2	30.5	21.4	31.2	19.9
15	29.4	22	27.3	23.7	30.3	23.1	30.1	20.1	28.4	23.8	29.1	22.4	31.3	20.8	30.9	20
16	26.9	22.6	25.8	23.1	29	22.6	28.4	22.1	27.5	23.3	26.9	23.2	31.5	20.3	30.8	18.9
17	28.2	22.1	25.9	23.9	30.2	22.9	29.2	21.4	28.2	23.8	28.4	22.7	30.3	19.9	31	19.6
18	29	22.6	26.3	23.4	29.6	22.5	29.5	21.4	26.9	23.6	27.8	21.7	30.5	22	30.9	20.4
19	26.6	22	25.7	23	27	23.2	28.9	22.2	25.8	23	26.4	22.8	28.3	22	28.6	20.6
20	27	22.5	25.2	22.9	29.6	23	28.6	22.4	24.6	22.9	26.9	22.7	30.2	21.7	30.6	20.7
21	25	22	24.5	22.5	28.3	23.1	29.1	22.2	24.5	22.8	26.8	22.4	30.8	21.3	28.5	20.3
22	27.4	21.8	25.2	22.3	27.3	23.2	26.8	21.2	25	22.8	25.8	22.8	29.8	21.5	29.1	20.3
23	29	22.1	25.8	22.4	30	22.6	28.8	21.4	26.9	23.7	27.5	22.2	30.5	21.3	29.2	20.3
24	27.6	22.6	26.8	22.5	28.7	23.2	28.9	22.1	27.7	22.4	27	23	29.6	22.1	30.5	20.3
25	24.2	21.5	24.2	22	24	22.2	27.4	21.4	24	22.2	24.1	22.1	28.6	21.2	26.2	20.4
26	28.4	21.6	25.8	22.8	28.3	22.8	26.8	21.8	27.2	22.2	27	22.3	30	21.3	28.8	20
27	29.4	22.6	27.8	23.6	29.1	22.5	29.8	21.4	27	24	28.1	22.6	29.5	22.2	30.6	20.8
28	30.9	21.1	28.3	21	30.5	21.9	28.4	22.1	28.2	22.5	29.5	21.1	31.5	21.3	30.8	20.7
29	28.2	22	25.8	22	28.6	21	29.8	20.1	26.6	22	28.1	20.9	29.8	20.4	30.6	18.5
30	26.6	20.9	24.7	21.9	26.4	22	27.2	21.4	24.6	22	26.2	22.1	28.5	21.6	29	19.9
31	29.4	21	26.8	22.6	30.1	21.4	28.2	20.4	26.6	22	28.9	20.4	30.6	19.4	29.2	18.3
Mean	28	21.8	26.5	22.7	28.6	22.4	28.3	21.4	27.1	22.8	27.3	22.1	29.9	21.2	29.6	20.1

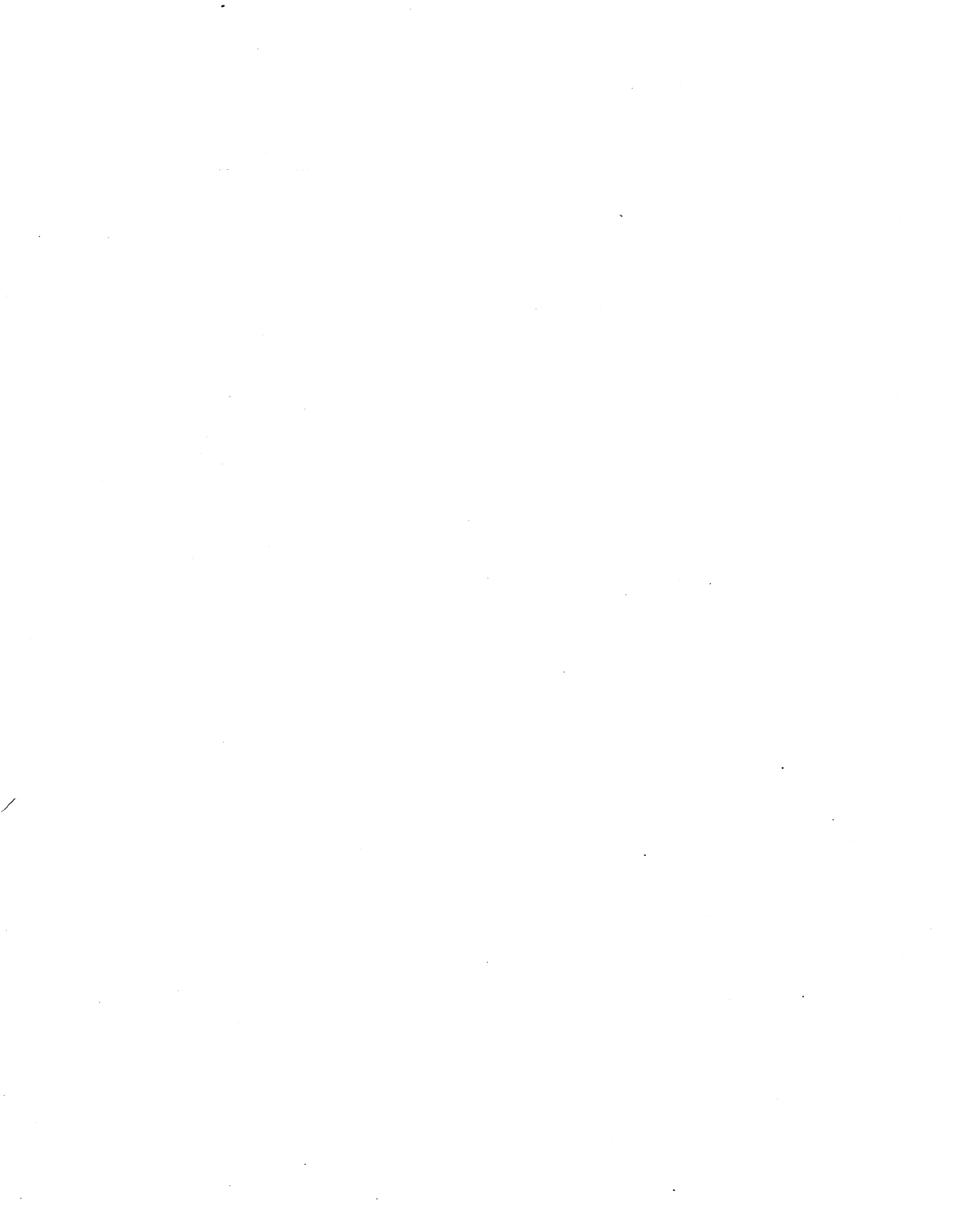
  

Day.	Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.		Bolinao.		Baguio.		San Fernando, Union.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.5	20.9	31.8	20.7	35	21.4	30.9	21.8	34.4	22.5	33.5	22.6	23.6	15.4	31.1	22
2	31.2	23	32.4	21.6	34.4	21.8	31.2	22.4	32.2	23.2	31.9	23.6	24.3	15.5	31.9	23.5
3	31.5	21.5	30.8	22.8	33.8	23	29.5	22.9	34.1	23.5	30.2	24	20.9	14.5	32	23.7
4	31.5	22.6	28.9	20.8	30.2	21	27.5	23.1	33.2	22.4	30.9	20.6	22.5	13.7	31.2	22
5	31.4	23.5	30	20.7	29.8	21.2	26	21.4	32.8	21.5	32.7	22.1	21.2	12.6	31	21
6	31.4	22	29	18.6	31.2	19	25.5	20.5	31.7	20.5	31.2	22.3	19.5	12.1	31	20.7
7	30.7	18.5	30	18.5	32.2	18.4	29.5	20.4	33.2	18.5	30.8	22	21.7	11.9	30.7	20.5
8	31.2	18	28.8	18.7	31.8	18	29.8	20.9	31.6	19.6	30.1	23.2	21.7	12.9	30.8	20.7
9	30.5	19.7	30.1	20	33.5	17.8	28.1	20.8	32.9	21.5	30.8	21.9	22.4	12.9	31	21.8
10	30.9	18.5	28.9	20.4	31.8	18.8	28.2	22.1	31.2	19.5	31.1	23.1	21.8	12.4	30.6	20
11	30.9	22	28.6	20.7	32.5	20.5	27.1	21.5	31.4	21.9	31.7	22.3	19.9	11.8	31	21.9
12	30.6	22.5	29.9	19.5	30.5	21.3	26.1	22.1	31.1	21.9	31.4	21.6	19.8	11.7	30	19.5
13	31.6	21.9	30.1	21.8	31.5	21.2	27.1	21.1	32.7	22	32	23	22.1	13.3	30.7	22.8
14	31.1	20.1	31.5	20.3	34	20.5	29	21.5	32.6	21	32.4	21.4	23.8	14.2	31.2	21
15	30.7	19.6	30.9	20.1	36	20.4	30	21.1	31.3	21.5	32.4	21.4	22.1	13.9	30	21
16	31.1	20.7	31	18.7	34.2	20.5	29.4	21.2	33.7	21.4	29.5	24.1	22.1	13.9	30	21
17	30.1	18.7	31.4	18.8	34	19	29.6	19.7	31.3	19.9	31.6	21.6	22.3	13.3	31	20.1
18	31.3	18.7	31.2	19.7	33	20.8	29.6	20.3	29.6	22.5	29.7	23.2	22.8	12.8	30.5	21.5
19	30.8	19.6	29	19.5	34	20.4	25.5	21.2	32.2	20.9	31.2	21.9	22.9	13.1	30	20.8
20	30.8	19.7	31.5	20	33.7	19.4	27.6	21.5	31.3	20.4	32	22	24.3	13.1	30.5	20.5
21	31.1	20.4	29.3	20	34.6	19	28.4	22.1	31.7	20.7	31.8	21.1	21.4	13.4	30.2	21
22	31.6	22.1	30.6	20.6	31.5	19.5	28.5	21.3	33.8	21.9	32	21.4	22.4	13.4	31.1	21
23	30.4	21.2	30.4	21.4	33	20.2	28	21.2	31.2	21.4	32.6	20.9	22.3	14	31.3	22
24	31.4	20.2	30.9	20.4	31.7	21	27	23	33.9	21.3	32.6	23.6	23.8	13.1	31.5	21.1
25	30.6	21.4	29.5	19.1	31	21.5	25.1	22.4	32.7	21.4	31.9	22.4	22	12.8	30.5	21
26	31.2	19.3	30.5	21	33.2	20	24.9	20.7	34.1	20.5	33.1	21	23.4	13.4	32	21
27	31.2	22.9	28.8	21.5	29.8	19.6	26.5	21.8	31.7	23	30.4	23.2	19.7	14.5	31	22.6
28	31.9	20.6	31.4	21.4	33.6	20.8	27.6	21.1	30.5	21.5	29	23.5	20.9	13.3	30.6	22.2
29	31.4	20	31.6	19.4	32.2	21.2	28.5	20	32.2	21.1	29.5	22.8	21.3	13.1	30.7	20.3
30	30.5	21	30	19	31.5	19.8	28	20.7	32.7	21.4	30	20.1	21.4	12.4	28.5	20.2
31	30.8	19.7	31.4	19.4	31.2	19.5	28.4	19.8	29.8	20.5	28.5	22.5	20.8	13.1	30.5	22
Mean	31.1	20.7	30.3	20.2	32.6	20.2	28	21.3	32.2	21.3	31.2	22.3	22	13.3	30.8	21.4

Maximum and minimum temperatures at the stations of the Weather Bureau, January, 1917—Contd.

Day.	Echagüe.		Candon.		Vigan.		Tuguegarao.		Laoag. <sup>a</sup>		Aparri.		Cape Bojeador.		Santo Domingo Batanes.	
	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	30.6	22.1	32.5	23	31.2	22.2	29.5	21.7	34.4	20.9	27.5	22.5	27.5	-----	23.8	21.1
2	31.1	22.8	32.4	24.9	31.2	23	29.8	21.8	32.1	22.5	26.4	21.4	27.8	-----	23.9	21.8
3	26.5	21.8	33.2	24	29.4	21.3	26.5	21.5	32.2	21	24	21.3	25.8	-----	23.1	19.6
4	25.6	19.5	33.5	23	32.8	22.1	25.1	20.2	32.1	18.8	23.4	20.1	24	-----	22.1	18.4
5	26.3	18.9	32	22.6	32.6	24.1	25.8	19.6	32.9	18.8	23.8	19.3	24.3	-----	22.1	17.8
6	25.8	18.5	30	21	32.4	22	27.2	19.4	33.6	16.3	24.8	19.2	27.4	-----	24.9	17.6
7	28	19.3	30	21.5	30.3	20.8	30.5	18.6	32.1	18.4	28.2	18.4	30.2	-----	22.6	19.9
8	24.7	19.9	31.7	22.8	28.2	20.6	25.6	19.9	30.2	22.3	23.8	19.6	22.4	-----	20.2	17.9
9	25.2	18.8	32.8	22	32.2	18.8	25.5	19	32.2	20.9	23	18.8	23	-----	20.2	16.6
10	25.2	19.2	33.6	22	30.9	19.5	25.2	19.4	30.3	20.9	23.3	19	24.4	-----	19.9	17.7
11	24.1	17.8	32.4	22.9	30	22.1	24	18.6	31.1	20.2	22.8	18.8	22.8	-----	19.6	16.6
12	23.5	17.9	31.5	21.7	32.9	22.9	25.6	18.3	34.1	18.5	23.4	19.2	25	-----	21.9	16.7
13	26	19.7	32.4	23.9	31.7	22.6	25.8	20.4	34.3	20.9	24.7	20.2	28	-----	22.4	19
14	28.6	21.6	32	23	32.3	23	30	21.7	34.1	22	27	21	27.2	-----	22.5	20.3
15	28.6	20.9	32.5	22	28.6	20.8	26	20.5	30.9	22	24.4	20.7	24	-----	21.4	19.2
16	27.5	19.3	31.4	22	32.1	22.5	26.3	19.5	34.9	18.9	25	19.8	24.8	-----	23.7	19.3 <sup>7</sup>
17	28.6	19.5	32.1	21.4	30.6	21.1	28.1	19.6	34.2	16.8	26.8	20	28	-----	24.5	20
18	27	20.3	32.1	20.9	28.8	19.7	26.5	20	32.3	19.9	24.9	20.3	26.8	-----	21.4	19.1
19	26.5	19.8	31	21.6	29.7	20.2	25.5	20	35.1	17.5	23.2	20.6	24	-----	21	17.8
20	26.5	19.7	33	22.4	31.8	20.8	26.6	20.1	35.8	19	25.4	20.6	25.4	-----	24.4	18.6
21	26.6	19.8	33	23.5	31	22	27	20.1	34.2	20	23.5	20.5	24	-----	24	19.5
22	25.3	19.6	32.2	22.5	31	22.5	26.4	19.9	34.4	18.5	23.5	20.6	25.4	-----	24.2	19.2
23	28.6	20.1	32.6	22.6	30.6	22.3	30.6	18.5	33.9	20.4	27.8	19.2	29.2	-----	25.9	20.2
24	26.4	19.9	31	22	33.1	20	27.3	20.6	34.3	21.8	22.6	20	22.8	-----	19.9	17
25	25.7	18.6	32	22.2	30.3	22.3	26.5	19	35.1	18.4	24.5	19.8	26	-----	24.3	18
26	28.1	19.8	32	22.2	29.6	21.7	30	18.4	34.3	18.6	26.6	18.6	29.3	-----	24.3	20
27	28	21.2	31	22.4	31.1	20.8	30.3	20.8	33.5	18.2	27.4	21	29.4	-----	25.4	19.9
28	30.5	20.4	32	23.4	28.8	21.1	29.9	21.5	31.7	21.6	26.7	21.3	26.4	-----	25.6	20.3
29	25.8	20	32	22.5	29.5	19.2	24.7	19.4	31.8	20.5	23.5	19	24.2	-----	23.2	18.6
30	26.5	18.4	32	22	31.6	21.6	26.5	18.3	33.2	18.1	24	19.5	26.4	-----	20.4	17.7
31	29.4	19.6	32.1	22	29.2	19.4	29.7	18.8	30.5	18.2	25.2	19.1	26.8	-----	23.9	17.4
Mean	27	19.8	32.1	22.4	30.8	21.4	27.2	19.8	33.1	19.7	24.9	20	25.9	-----	22.5	18.8

<sup>a</sup> The maximum temperatures of this station are not reliable: they seem to be too high.





## SEISMOLOGICAL BULLETIN FOR JANUARY, 1917.

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

### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

<sup>1</sup> 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<sup>h</sup>) insular time being added in brackets for the convenience of Philippine readers.

4, 9<sup>h</sup> 03<sup>m</sup> 49<sup>s\*</sup> [4, 17<sup>h</sup> 03<sup>m</sup> 49<sup>s</sup>]. **Borongan (E Samar).** Oscillatory earthquake of intensity III. Origin in the Philippine Deep.

10, 13<sup>h</sup> 21<sup>m</sup> 05<sup>s\*</sup> [10, 21<sup>h</sup> 21<sup>m</sup> 05<sup>s</sup>]. **Western Visayas.** Earthquake of intensity V; it originated in the northeastern part of the Sulu Sea near the meridian 121° E and the parallel 10° N. In this region exists a seismotectonic line, running in a NW-SE direction, where originate earthquakes of great extension, which commonly shake the islands of Cuyo, Panay, Negros, and western part of Mindanao. The meizoseismic area of this last earthquake must have been very much extended in the aforesaid direction, because while the shock reached intensity V at Cuyo and in southern Negros, it had but intensity III in Panay Island. It was not registered outside of the Archipelago.

17, 12<sup>h</sup> 13<sup>m</sup> [17, 20<sup>h</sup> 13<sup>m</sup>]. **Catanduanes Island (SE Luzon).** Earthquake shocks of intensity III to IV, duration 3 seconds. With rumbling noise apparently proceeding from the south.

18, 16<sup>h</sup> 13<sup>m</sup> [19, 1<sup>h</sup> 52<sup>m</sup>]. **Guam (Mariana Islands).** Earthquake of intensity III.

25, 3<sup>h</sup> 26<sup>m</sup> [25, 11<sup>h</sup> 26<sup>m</sup>]. **Panay Island.** Earthquake of intensity III, chiefly felt in the northern and western part of the island.

31, 4<sup>h</sup> 02<sup>m</sup> 42<sup>s\*</sup> [31, 12<sup>h</sup> 02<sup>m</sup> 42<sup>s</sup>]. **S Mindanao.** Very extensive earthquake, felt with destructive intensity, VIII-IX, in the Sarangani Bay. Its origin probably lay some distance south of this bay, in the Celebes Sea, W or SW of the volcanic islands Sarangani and Balut. In the post or town of Glan and its nearest barrios, on the east and south-east shore of the bay, wooden structures of the Constabulary and many native houses were destroyed; cracks and slides were also produced in the ground; one landslide killed seven persons in a barrio. The destroyed wooden structures we suppose to be of the temporary type used in such outlying posts, while the native houses are commonly a hut of bamboo and palm leaves, raised from one to three meters above the ground on bamboo or wooden poles very little driven into the soil. Such structures are not earthquake-proof, specially when the rocking lasts for nearly a minute, as it happened in this instance. To these unfavorable conditions of the structures must be added the soft and loose character of the soil, consisting of volcanic tuff, sand and ashes, lightly covered at places by alluvial material of the Glan River. From the island of Sarangani sparsely inhabited by pagans we have not any report.

Concerning the epicenter of this earthquake it seems nearly certain that it must be placed outside of the Sarangani Bay and of the Mindanao Island; the reported undulatory character of the earth tremors at Glan and their progressive increase in amplitude during nearly a minute tend to show that the origin was not under that place but some distance away. South of the Sarangani Bay, in the Celebes Sea, exists a zone which, passing near to the Sarangani Islands, seems to extend itself eastwards to the Philippine Deep; in this zone originate tectonic earthquakes of great extension. To this place belong, for instance, the two extensive earthquakes occurred on the 14th of March and 17th of August, 1913. Moreover the seismic records obtained from the island of Sarangani and published in this Bulletin, during the years 1910, 1911, 1912, and the first months of 1913, show that minor shocks are of very frequent occurrence in this region.

The earthquake of this year was not so extensive as the two mentioned above; reports received from Cotabato and Kabakan, in the Moro District, and from Davao, situated respectively NW, NNW, and NNE of Glan, show that the isoseismal VI-VII must be drawn at a distance of about 140 kilometers from the last place. All the region encircled by this line being exclusively inhabited by moros and some pagan tribes, it is impossible to obtain any data about the earthquake. Comparing the reports of Kabakan and Davao, placed nearly at the same distance from Glan, we are convinced that the shocks were stronger and of greater duration at the former than at the last station. The isoseismal II-III runs at a distance of more than 450 kilometers including the whole island of Mindanao and the eastern part of Sulu Archipelago.

A report published by Colonel Traub, United States Cavalry, chief of the Constabulary stationed at Glan, states that for days before the terrific shake minor oscillations of the affected territory, varying in intensity, had been felt but as this has happened time and again no particular attention was paid by the people. Aftershocks were also very frequent for some days but at irregular intervals. The senior inspector of the district reported latter that during the month of February eight heavy earthquake shocks were recorded in the Glan section; the one on the 14th was quite severe and shook down several houses that had been practically wrecked by the earthquake of January. The records of the Wiechert seismograph of Butuan, on the 31st, between 12<sup>h</sup> 40<sup>m</sup> and 23<sup>h</sup> 13<sup>m</sup>, show six disturbances originated at the Sarangani center. On the first and second of February there were registered eight from the same origin, and many others during the month. As the distance of Butuan is about 330 kilometers, such disturbances must have been fairly perceptible at Glan. The principal earthquake was registered throughout the world.

## RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0<sup>h</sup>. Instrument: Wiechert seismograph; 1,000 kilograms.  $A_N: T_0=5.1, \epsilon=2.634, \frac{r}{T_0^2}=0.048$ ;  
 $A_E: T_0=5.2, \epsilon=1.968, \frac{r}{T_0^2}=0.048$ . Alluvium. 2.40 meters above sea level].

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
1	1	Iv	eP F	h. m. s. 14 43 31 46				
2	4	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	9 08 49 05 00 05 09 05 13 17		4 3	21 22	Borongan (E Samar).
3	4	IIr	eP S L M <sub>E</sub> M <sub>N</sub> F	16 52 34 54 35 56 28 57 29 59 59 17 56		10 13	71 52	Formosa.
4	6	I	e F	18 10 32 27				
5	7	Ir	e L M <sub>E</sub> F	4 14 45 19 24 22 02 38		10	5	N of Formosa.
6	7	Iv	eP L F	21 45 25 46 43 48				
7	10	Iv	eP F	3 17 21 20				
8	10	IIv	eP L M <sub>N</sub> M <sub>E</sub> F	13 21 05 22 00 23 19 23 19 47		5 7	108 133	Western Visayas.
9	10	Iv	eP L M <sub>E</sub> F	15 26 00 26 47 27 44 37		6	8	
10	11	I	e F	11 49 37 12 09				
11	11	Iv	eP L F	16 10 44 11 06 14				
12	13	Iv	iM <sub>E</sub> F	20 58 09 59		1	8	
13	14	Iv	eP L M <sub>N</sub> M <sub>E</sub> F	16 17 11 17 27 17 40 17 42 24		2 3	37 27	
14	14	Iv	eP F	18 38 41 40				
15	17	Iv	eP S L M <sub>E</sub> M <sub>N</sub> F	2 42 51 ? 46 22 47 18 47 29 3 13		7 7	34 33	
16	19	Iv	eP F	23 46 56 50				
17	20	IIr	eP S L M <sub>E</sub> M <sub>N</sub>	23 17 00 21 07 24 42 26 42 26 57		8 7	152 78	Lombok and Bali Islands. End overtaken by following earthquake.
18	20 21	Ir	eP L F	23 54 30 0 00 16 25				

Records of the Microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
19	23	I <sub>v</sub>	eP L F	h. m. s. 12 47 29 47 50 50				
20	23	I <sub>v</sub>	eP L	18 34 44 35 10				End overtaken by following earthquake.
21	23	I <sub>v</sub>	eP L M <sub>N</sub> F	18 36 52 37 20 37 41 44	2	22		
22	24	I <sub>r</sub>	eP S L M <sub>N</sub> M <sub>E</sub> F	0 52 37 55 57 59 40 1 01 36 01 50 42	13 15	31		China.
23	25	I <sub>v</sub>	eP F	2 53 22 56				
24	25	I <sub>v</sub>	eP L M <sub>N</sub> M <sub>E</sub> F	3 29 24 30 14 30 33 30 40 36	4 3	22		18
25	26	I	e F	5 19 28 58				
26	27	I <sub>r</sub>	eP S L M <sub>E</sub> F	14 55 38 58 06 15 03 13 03 47 48	11			7 Formosa.
27	28	I	e F	10 17 43 43				
28	28	I	e F	13 57 45 14 23				
29	28	I	e F	23 20 38 42				
30	30	II <sub>r</sub>	eP S L iE M <sub>N1</sub> M <sub>E1</sub> M <sub>N2</sub> M <sub>E2</sub> M <sub>N3</sub> M <sub>E3</sub> F	2 54 54 3 01 36 08 16 09 04 10 42 10 49 16 13 17 36 21 17 24 24 5 37	7 11 15 16 17 17 16		135 87 135 126 120 196 341	
31	31	III <sub>r</sub>	eP S L M <sub>N</sub> M <sub>E</sub> F	4 02 42 05 30 06 10 06 56 07 55 5 43	5 5	373		429 S Mindanao.

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

4, 9<sup>h</sup> 03<sup>m</sup> 49<sup>s\*</sup> [4, 17<sup>h</sup> 03<sup>m</sup> 49<sup>s</sup>]. Borongan (E de Sámar). Temblor oscilatorio de intensidad III. Origen en el Abismo de Filipinas.

10, 13<sup>h</sup> 21<sup>m</sup> 05<sup>s\*</sup> [10, 21<sup>h</sup> 21<sup>m</sup> 05<sup>s</sup>]. Visayas Occidentales. Temblor de tierra de intensidad V. Su epicentro se hallaba en la parte NE del Mar de Joló hacia el meridiano 121° E y 10° N, donde existe indudablemente una línea en dirección NW-SE, en la cual se originan terremotos de grande extensión que suelen afectar las Islas de Cuyo, Panay, Negros y toda la región W de Mindanao. El último debió tener un área meizosísmica muy prolongada en la expresada dirección, pues se sintió con intensidad V en Cuyo y en la parte S de Negros mientras que en Panay no parece haber excedido del grado III. Registróse solamente en Manila y en Butúan.

17, 12<sup>h</sup> 13<sup>m</sup> [17, 20<sup>h</sup> 13<sup>m</sup>]. Isla de Catanduanes. Temblor de tierra de intensidad III-IV, duración 3 segundos; acompañado de ruido subterráneo procedente al parecer del sur.

18, 16<sup>h</sup> 13<sup>m</sup> [19, 1<sup>h</sup> 52<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad III.

25, 3<sup>h</sup> 26<sup>m</sup> [25, 11<sup>h</sup> 26<sup>m</sup>]. Isla de Panay. Temblor de tierra de intensidad III, sentido en toda la parte N y occidental de la isla.

31, 4<sup>h</sup> 02<sup>m</sup> 42<sup>s\*</sup> [31, 12<sup>h</sup> 02<sup>m</sup> 42<sup>s</sup>]. S de Mindanao. Terremoto de grande extensión, y de intensidad destructora, VIII-IX, en la bahía de Sarangani. Su origen se hallaba probablemente al S de la expresada bahía al W o SW de las islas volcánicas Balut y Sarangani, en la parte NE del Mar de Célebes. En el pueblo de Glan y sus vecinos barrios, situados en la parte E y SE de la expresada bahía de Sarangani el terremoto destruyó varias construcciones de madera pertenecientes a los constables y derribó muchas casas de los nativos. También se produjeron grietas y derrumbamientos en diferentes partes; uno de estos mató siete personas en uno de los barrios. Las construcciones derribadas suponemos eran de carácter provisional como suelen ser las de semejantes puestos militares pequeños y aislados; su escasa trabazón no es para resistir por largo tiempo los vaivenes de un terremoto; las casas de los naturales allí en uso no pasan de simples cabañas de caña y ramaje levantadas uno o más metros del suelo sobre cuatro pilares de caña o de madera, apenas empotrados. Así es que al repetirse los vaivenes como se hubieron de repetir allí, por ser el terremoto de larga duración, casi por precisión se habían de desorganizar y caer. El terreno de la localidad es de toba, arena y cenizas volcánicas recubiertas en parte por aluvión arrastrado por el río de Glan; es pues de carácter muy flojo y por consiguiente fácilmente agrietable y movable. De las Islas de Sarangani no poseemos *report* ninguno por ser muy poco habitadas.

Que el epicentro del terremoto no estaba en Glan ni en la bahía de Sarangani, parecen indicarlo el carácter amplio de las ondulaciones, el aumento progresivo de amplitud que se hace notar en los *reports* y su larga duración de cerca de un minuto. Al S de esa región, en la parte NE del Mar de Célebes existe una zona que pasando por cerca de las Islas de Sarangani parece prolongarse hacia el E en dirección al Abismo del Pacífico; en ella suelen originarse terremotos tectónicos de grande extensión. A esta zona pertenecen, por ejemplo, los del 14 de marzo y 17 de agosto de 1913. De la mucha frecuencia con que en esta zona se repiten pequeños movimientos sísmicos

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

puede formarse una idea con las observaciones obtenidas de Sarangani durante los años 1910, 1911, 1912 y los primeros meses de 1913, y publicadas en este Boletín.

No fué tanta la extensión del último terremoto como la de los dos citados, los cuales, sin embargo, desarrollaron menos intensidad en el extremo S de Mindanao. La isosisma VI-VII, según los datos recibidos de Cotabato y de Kabakan, en el Distrito Moro, y de Dávao, estaciones situadas respectivamente al NW, NNW y NNE de Glan, parece pasaba a unos 140 kilómetros de distancia de Glan; siendo imposible obtener datos de la zona por ella comprendida a causa de estar solamente habitada por algunas tribus salvajes y moras. Si se comparan las notas recibidas de las dos últimas estaciones citadas, se ve que a pesar de ser muy poca la diferencia en sus respectivas distancias de Glan, el terremoto fué mucho más fuerte en Kabakan que en Dávao y tuvo mucha mayor duración. La isosisma II-III abarcaba toda la Isla de Mindanao y parte del grupo de Joló, lo cual representa una distancia de más de 450 kilómetros de Glan.

Según el *report* del Coronel Traub, *United States Cavalry*, jefe de los constables estacionados en dicho puesto, parece que días antes del gran terremoto se experimentaban ya frecuentes movimientos sísmicos, los cuales, sin embargo, no llamaban la atención por no ser cosa muy extraordinaria en esa región. Después del terremoto principal las réplicas fueron muy numerosas durante varios días y a intervalos irregulares. El *senior inspector* del distrito añade que durante el mes de febrero se sintieron ocho temblores fuertes: uno ocurrido el día 14 llegó a ser violento y acabó de derribar algunas casas dañadas por el terremoto de enero. Los registros de Butúan, que es la estación más cercana con sismógrafo Wiechert, presentan durante el día 31 desde las 12<sup>h</sup> 40<sup>m</sup> hasta las 23<sup>h</sup> 13<sup>m</sup>, seis movimientos sísmicos procedentes del mismo origen. Como Butúan dista de Glan unos 330 kilómetros dichos movimientos debieron ser en este último punto muy perceptibles. Los días 1.º y 2 de febrero el mismo sismógrafo registró ocho y varios otros durante el mes. Este terremoto se registró en todos los observatorios sísmicos del globo.







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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR FEBRUARY, 1917

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1917



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**BULLETIN FOR FEBRUARY, 1917.**



# METEOROLOGICAL BULLETIN FOR FEBRUARY, 1917.

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 in the Philippines is moderately higher than that of the preceding year, though it is somewhat lower than the normal for February. That of Manila differs from the normal by  $-0.75$  mm., and from the mean of February, 1916, by  $+1.66$  mm. The lowest pressures were generally observed on the 27th and 28th.

The mean monthly temperature is generally lower than that of February, 1916, the differences being greater than  $1^{\circ}$  C. in three of our first and second class stations. The highest and lowest temperatures of the month for Manila were  $33.3^{\circ}$  C. on the 27th, and  $18^{\circ}$  C. on the 24th. The extreme temperatures for Baguio were  $26.7^{\circ}$  C.,  $10.8^{\circ}$  C. on the top of Mirador, and  $27.6^{\circ}$  C.,  $9.6^{\circ}$  C. in the valley.

### PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR FEBRUARY, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from Feb., 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Feb., 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		$^{\circ}$ C.	$^{\circ}$ C.	$^{\circ}$ C.		$^{\circ}$ C.	
Zamboanga.....	758.66		760.30	7	756.05	27	26.1		33.9	27	21.3	3
Tagbilaran <sup>a</sup> .....	59.26	+1.23	61.14	6	56.62?	27?	25.1	-0.6	31.5	26	20.4	25
Surigao.....	59.34	+1.35	61.43	6	56.96	28	25.6	-1	32.3	20	22	12
Cebu.....	59.37	+1.31	61.51	6	57.06	28	26.1	-0.6	29.9	17, 19, 20	22.2	9
Iloilo.....	59.24	+1.19	60.90	6	56.76	28	25.6	-0.4	31.2	20	22.3	20
Ormoc.....	59.53	+1.18	61.47	6	57.24	28	25.6	+1	33	5, 15	19.5	25, 26
Tacloban.....	59.61	+1.43	61.84	6	57.24	28	25.4	-0.5	31.3	27	21.5	25
Capiz.....	59.94	+1.30	61.63	6	57.73	28	25.6	-0.4	31.7	28	21.8	20
Calbayog.....	59.94	+1.52	61.95	6	57.58	28	24.8	-0.6	33	27	20.5	6
Legaspi.....	60.37	+1.88	62.59	6	57.88	28	24.7	-1.8	29.9	26	21.1	12
Atimonan.....	60.82	+1.99	63.37	14	57.86	19	24.7	-0.8	29.2	28	21.2	14
Ambulong, Tanauan.....	59.83	+1.56	61.82	6	57.22	28	25.4	-0.2	33.4	18, 28	21.5	3, 6, 19
Paracale.....	61.04	+2.04	63.56	14	58.14	19	24.4	-1.2	29.2	8	21.2	1, 4, 13
Manila.....	60.48	+1.66	62.48	6	57.70	27	25	-0.3	33.3	27	18	24
San Isidro.....	60.78	+1.74	62.89	14	57.84	27	24.6	-1	33.6	17	17	23
Dagupan.....	59.79	+1.54	61.63	6	57.06	27	25.7	-0.4	36.2	27	18.7	23
Baguio <sup>b</sup> .....	637.28	+1.14	638.76	7	635.48	19	16.4	-0.2	26.7	27	10.8	14
Vigan.....	760.18	+1.56	762.21	9	757.50	27	25.4	+1	33.1	5	15.5	10
Tuguegarao.....	61.92	+2.38	65.86	14	57.96	27	23.3	-0.7	35.4	28	16.5	23
Laoag.....	60.44		62.90	9	57.62	27	24.6				12.3?	10
Aparri.....	62.44	+2.59	66.56	13	57.98	27	22.1	-1.6	30.3	27	17.3	11

<sup>a</sup> 27 days of observation.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—The total rainfall of this month is above the normal, and also above that of the preceding year, in a great majority of our stations of Mindanao, the Visayas and southeastern Luzon. In the rest of Luzon it is rather below that of February, 1916, and below the normal for this month.

## RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF FEBRUARY, 1917.

Station.	Total.	Departure from Feb., 1916.		Rainy days.	Departure from Feb., 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Feb., 1916.		Rainy days.	Departure from Feb., 1916.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo	198.6	+134.8	+107.2	18	+11	28	24	Sumay, Guam	47.1	-120.7	-29.9	10	-3	10.2	1
Isabela, Basilan	152	+89	+72.1	17	+10	64.3	14	Calapan <sup>b</sup>	78.4	-18.2	+0.6	18	+10	16.1	20
Zamboanga	99.8	+51.1	+47.5	13	+6	29.3	3	Virac	482.4	+276.9	+252.6	25	+12	104.6	5
Davao	45.2	-143.5	-76.1	8	-5	8.9	3	Naga	110.4	+75.8	+34.4	20	+14	33.5	3
Cagayan, Misamis	33.1	-----	-----	10	-----	12.4	18	Batangas	2.3	-38.8	-18.2	2	-4	1.3	12
Butuan	193.2	+55	-5.2	25	+8	41.2	15	Lucena	59.4	-1.1	-----	15	+5	11.7	9
Mambajao <sup>a</sup>	35.1	-----	-----	-----	-----	10.2	20	Atimonan	185.1	+105.5	+69.4	17	+3	42.4	19
Dumaguete	81.3	-179.9	-----	10	-1	21.1	9	Ambulong, Tanauan	8.6	-17.8	-----	3	-4	3.8	6
Yap, Western Car-	107.3	-338.6	-----	20	-2	15	15	Canlubang, Calamba	5.5	-----	-----	5	-----	2.9	6
lines	-----	-----	-----	-----	-----	-----	-----	Paracale	772.5	+622.9	-----	23	+12	202.7	3
Tagbilaran <sup>b</sup>	91.7	+1.4	-9	12	+5	21.3	9	Santa Cruz, Laguna	11.7	-46.7	-----	6	-4	4.3	17
Iwahig	159.5	+13.1	-----	14	+7	55.1	14	Manila	7	-16.6	-3.5	4	0	6.1	18
Surigao	384	+113.6	+34.1	25	+10	55.7	1	Antipolo	13.8	-44.3	-----	4	-7	10	12
Maasin	90.6	-133.9	-64.6	7	-1	19.8	13	Iba	5.5	-27.3	+5.3	1	-6	1.1	14
Cebu	102.2	-----	+37.7	12	-----	34.3	9	San Isidro	38.9	+23	+32.2	5	+3	30.7	17
Iloilo	124.9	-84.5	+85.7	15	+3	32.8	9	Tarlac	8	-26.9	+8.5	1	-4	8	19
San Jose Buenavista	34.1	-80.3	+13.8	11	+1	13	14	Baler	150.4	-93.8	+5.5	15	-2	69.8	6
Cuyo	17.4	-88.9	2	2	-4	10.2	19	Dagupan	22.3	-46.1	+2.1	3	-4	11.9	18
Ormoc	108.9	-144.6	+10.4	21	+8	17.8	12	Bolinao	1.3	-59.4	-9.2	2	-6	3.8	7
Guiuan	353	-98.6	26	+11	100.8	21	21	Baguio	12.7	-33.7	-2.6	4	-4	10.8	18
Tacloban	351.5	+110.2	-147.4	25	+10	57.8	13	San Fernando, Union	0	-34.5	8	0	-9	0	0
Capiz	152.9	+23.1	-52.9	22	+12	28.7	18	Echague	58.1	+13.5	+20.4	8	+5	37.8	19
Borongan	654.2	+318.3	+260	26	+12	167.6	21	Vigan	2.8	-60.8	-1.6	1	-5	2.8	18
Catbalogan	225.9	+41.7	-----	27	+16	28.2	21	Tuguegarao	12.8	-57.4	-6.7	3	-7	8.2	16
Calbayog	381	+260.2	+214.6	24	+11	58.4	23	Laog	0	-17.2	-7.4	0	-3	0	0
Masbate	185.9	+117.5	+51.5	18	+9	45.7	13	Aparrí	113	-137.5	+15.7	11	-5	28.2	7
Romblon	258.3	+160.1	+177.1	23	+13	56.4	14	Cape Bojeador	18.3	-----	-----	2	-----	11.4	12
Batag	894.5	+660.3	-----	24	+14	157.4	11	Santo Domingo, Bata-	-----	-----	-----	-----	-----	-----	-----
Sorsogon	953.4	-----	-----	22	-----	141.4	3	nes	139	+52.1	+22.4	16	0	51.2	11
Legaspi	736.8	+568.5	+449.8	24	+12	129.7	3								

<sup>a</sup> 24 days of observation.<sup>b</sup> 27 days of observation.

## DEPRESSIONS AND TYPHOONS.

There was no depression or typhoon near the Philippines during this month. As to distant depressions of the Far East, one may be mentioned which appeared to the southeast of the Loochoos on the 8th, and passed to the west of the Bonins on the 9th moving northeastward.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes en Filipinas es bastante mayor que la del año pasado, aunque es algo menor que la normal de febrero. La de Manila difiere de la normal en  $-0.75$  mm., y de la media de febrero, 1916, en  $+1.66$  mm. Las presiones más bajas se observaron generalmente los días 27 y 28.

La temperatura media mensual es generalmente menor que la de febrero, 1916, siendo las diferencias mayores de  $1^{\circ}$  C. en tres de nuestras estaciones de primera y segunda clase. Las temperaturas máximas y mínimas del mes en Manila fueron  $33.3^{\circ}$  C. y  $18^{\circ}$  C. registradas los días 27 y 24, respectivamente. Las temperaturas extremas en Baguio fueron  $26.7^{\circ}$  C.,  $10.8^{\circ}$  C. en la cumbre del Mirador, y  $27.6^{\circ}$  C.,  $9.6^{\circ}$  C. en el valle.

**Precipitación acuosa.**—La lluvia total de este mes es mayor que la normal, y mayor también que la del año pasado, en una gran mayoría de nuestras estaciones de Mindanao, Visayas y SE de Luzón. En el resto de Luzón es algo menor que la de febrero, 1916, y menor que la normal de este mes.

## DEPRESIONES Y TIFONES.

Durante este mes no hubo depresión o tifón cerca de Filipinas. Respecto a depresiones lejanas en el Extremo Oriente, puede mencionarse una que apareció al SE de Liukiu el día 8 y pasó al W de Bonin el 9, moviéndose al NE.

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. <sup>b</sup>			Underground temperature.				Relative humidity (mean)	Vapor pressure (mean)	Radiation.		Evaporation. <sup>b</sup>			
		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.	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	759.53	24.5	29.6	21	26.5	27.7	27.5	27.6	27.9	78.3	17.7	18.5	47.5	3.3	2.5	
2	59.74	24.1	28.6	20.4	26.5	27.5	27.5	27.6	27.9	81.1	17.9	17.9	49.2	2.7	2.1	
3	60.57	24.4	29.2	21.1	26.5	27.6	27.5	27.6	27.9	80.3	18.1	19	46.5	3.2	2.4	
4	61.49	24	28.5	20.4	26.4	27.3	27.5	27.6	27.9	82.9	18.3	18.3	43.1	2.5	2.1	
5	62.04	24.5	29.5	20.6	26.2	27.4	27.4	27.5	27.9	76.6	17.3	18	46.3	3.7	3	
6	62.48	24	29.3	19	25.7	26.9	27.4	27.3	27.9	79.3	17.4	16.3	42.1	3	2.3	
7	62.04	25.4	32.1	21.4	26	27.5	27.2	27.4	27.8	79.4	18.8	19.7	54.2	4.1	3.1	
8	61.34	25.7	31.5	20.9	26.2	27.6	27.5	27.6	27.8	78.7	19	19.6	52	4.3	3	
9	61.15	26.1	31.6	23.5	26.7	27.9	27.5	27.6	27.8	75.4	18.8	22.4	53.8	4.9	3.6	
10	61.45	25.1	31.5	21.4	26.6	28.1	27.5	27.8	27.9	70.5	16.3	21.2	53.8	5.5	4.1	
11	61.54	24.5	30.1	21.3	26.7	27.9	27.5	27.7	27.8	73.2	16.5	19.5	49.5	4.3	3.2	
12	61.94	24.8	30.1	20.4	26.3	27.9	27.4	27.6	27.8	76.3	17.7	18.4	54	3.5	2.6	
13	62	25.3	30.5	21	26.5	27.9	27.6	27.7	27.8	69.6	16.4	19.4	48.7	5.2	4.2	
14	62.32	24.8	30.7	20.2	26.2	27.7	27.4	27.6	27.8	63.8	14.6	17.3	58.9	5.9	4.5	
15	62	24.9	31.1	21.2	26.5	27.5	27.3	27.6	27.8	73	16.9	18.2	49.1	4.3	3.1	
16	60.69	26.1	31.7	22	26.5	28	27.5	27.5	27.8	73.5	18.3	19.7	52.7	5.4	3.7	
17	59.52	26.1	31.5	22.4	26.9	28.4	27.5	27.7	27.8	78	19.4	20.3	56.5	4.1	3	
18	58.36	25.5	30.8	22.4	27.1	28.4	27.7	28	27.8	80.6	19.4	20.9	51.5	2.9	2.2	
19	58.04	25.1	31	21.7	26.6	28.2	27.7	27.9	27.7	82	19.2	19.9	50	3.3	2.2	
20	59.83	24.8	29.8	21.5	27	28	27.8	28	27.8	78.3	17.9	19.9	43.8	3.7	3.1	
21	61.45	24.4	28.8	20.5	27.2	27.6	27.8	27.8	27.7	73.2	16.4	20.4	50.2	4.3	3.2	
22	61.45	24.5	31.3	19.9	26.2	27.5	27.5	27.7	27.9	72.1	16.1	17	53	4.7	3.6	
23	60.41	24.2	31.3	18.8	25.8	27.5	27.4	27.6	27.8	71.7	15.7	15.8	53.7	5.1	3.8	
24	59.33	24.4	31.5	18	25.8	27.5	27.3	27.6	27.8	72.4	16.1	15.2	52.4	5.2	3.8	
25	58.91	25.3	32.6	19.9	26.3	27.8	27.4	27.7	27.9	73	17.1	17.4	55.1	5.2	4.1	
26	58.32	25.7	32.9	20.7	26.5	27.8	27.4	27.7	27.8	76.7	18.5	18	48.4	4.6	3.7	
27	57.70	25.6	33.3	20.2	26.3	28.5	27.6	27.8	27.8	75.8	18.2	17.3	55	6.1	4.1	
28	57.87	26	33	20.9	26.6	28.3	27.6	27.9	27.8	72.8	17.9	17.9	53.3	4.9	3.7	
Mean Total	760.48	25	30.8	20.8	26.4	27.8	27.5	27.7	27.8	75.7	17.6	18.7	50.9	4.3	3.2	
Departure from normal	-0.75	-0.3	0	+0.5						+1.7	+0.1			119.9	90	

Day.	Wind.				Amount (mean). 0-10.	Clouds.			Sun-shine. h. m.	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.	mm.		mm.		
1	SW, WSW	117	13	WSW	8.5	A.-Cu. ENE	Cu. ENE	4	10			
2	W quad.	108	12.5	WSW	8.8	A.-Cu. ENE	Cu. ENE	3	35	0.1	0.1	d° p.
3	ESE	165	13	ESE	9.3	A.-Cu. SW	Cu. E	2	55			
4	W	133	13	WNW	9.3	A.-Cu. NE	S.-Cu. ESE	1	00			
5	N	147	17	N	7.8	A.-Cu. NE	Cu. ENE	1	50			
6	ENE	146	16	ENE	8.4	A.-Cu. NEbyE	Cu. ENE	3	35			d p.
7	ESE	190.5	15.5	WNW	3.7	Ci. SSW	Cu. SE	8	10	.5	.5	
8	NE, WNW	164.5	18	WNW	6.1	A.-Cu. SE	Cu. ENE	6	55			
9	N, NNE	261	21	N	7	A.-Cu. NW	Cu. N quad.	5	20			
10	E	208.5	18	E, ESE	3.4	A.-Cu. SW	Cu. ENE	9	05			
11	W quad.	175.5	18	NW, E	5.5	A.-Cu. SW	Cu. ENE	7	55			
12	SW, NNW	166	15	W, SW	7.2	A.-Cu. NE	Cu. ENE	5	40			
13	E quad.	176	20	NNE	7.2	Ci.-S.	Cu. ENE	3	40			
14	NNW	199	18	NE	5	A.-Cu. S	Cu. E	7	10			
15	NW quad.	149	17.5	E	8.8	A.-Cu. S	Cu. ENE	2	20			
16	SE	195	19.5	SE	6.1	A.-Cu. SW	Cu. E	7	45			
17	N quad.	190	15.5	NE	6.8	A.-Cu. SW	Cu. E	7	50			
18	NNW	169.5	16	NW	8.2	A.-Cu. W	Cu. E, SE	4	15	6.1	5.9	● p.
19	SW quad.	160.5	15	EbyS	6.4	A.-Cu. swbys	Cu. E	6	00			d° p.
20	NE quad.	170	18	NNE	9.5	A.-Cu. NNE	Cu. cu.-n. ENE	1	35	3	3	≡° d° a. d p.
21	E	172	16	E	8.4	A.-Cu. wsw	Cu. ENE	2	15			
22	E quad.	161	13.5	WSW	5.6	A.-Cu. W	Cu. ENE	6	45			
23	E quad.	208	18	ENE	1.3		Cu.	10	00			
24	SE	216	21	SE	.5		Cu.	10	20			
25	E quad.	197	17	E	1.7	Ci.	Cu. E	8	25			≡° a.
26	ESE, SE	226	22	SE	2.7		Cu. ENE	8	55			
27	ESE	269	29	SE	2.4	Ci.	Cu. E	10	55			
28	N, ESE	170	16	NNW	4.6	Ci.-S. SSE	Cu. E quad.	8	25			
Mean Total		178.9	17.2		6.1			5	59			
Departure from normal		5,010						167	45	7	6.8	
		-373.7			+1.2			-30	03	-3.5		

<sup>a</sup> All the mean values given in this table are deduced from hourly observations.

<sup>b</sup> These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.



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 <sup>b</sup> (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. <sup>c</sup>	Free exposure (total)	Shel- ter (total)
	mm.	$^{\circ}C$ .	$^{\circ}C$ .	$^{\circ}C$ .	$^{\circ}C$ .	$^{\circ}C$ .	$^{\circ}C$ .	$^{\circ}C$ .	$^{\circ}C$ .	Per ct.	mm.	$^{\circ}C$ .	$^{\circ}C$ .	mm.	mm.	
1	636.08	15.2	21.7	11.35a	11.7	6.20a	22.8	0.10p	11.4	6.50a	81.8	10.4	10.3	53.7	3.6	2.2
2	36.26	14.8	21.8	0.10p	11.9	6.30a	21.7	11.50a	11.3	2.20a	83.2	10.5	10.6	53.7	3.5	1.8
3	37.24	15.2	20.2	9.05a	12.2	5.00a	21.8	9.40a	11.7	5.15a	86.2	11.1	10.9	53	2.4	1.6
4	37.82	15.6	20.9	11.20a	12.9	7.00a	22.2	10.30a	12	6.15a	84.5	11	11.9	63	3	1.7
5	38.35	16	22.8	1.35p	12.6	6.25a	23.1	1.50p	11.9	6.40a	72.5	9.6	11.7	53.6	7.3	4.2
6	38.66	16.2	22.4	3.50p	12.6	5.30a	23.8	0.20p	12.3	6.20a	70.2	9.5	11.9	53	9.5	4.5
7	38.76	16.6	22.3	11.40a	14	5.10a	23.2	11.35a	13.5	5.15a	86	12.1	12.3	52.5	2.1	1.4
8	38.40	17.4	23.8	2.20p	13.9	3.40a	22.9	0.40p	13.2	4.05a	80	11.8	13.1	57.3	3.9	2.2
9	37.94	16.4	21.9	11.35a	13.3	11.40p	22.5	11.00a	12.5	12m.n.	81.3	11.2	13.2	57	2.6	1.7
10	37.42	15	22.8	0.45p	11.7	6.05a	22.7	0.40p	10.6	6.05a	76.7	9.6	10.7	54.5	5.9	3
11	37.64	15.2	21.5	Noon	11.4	1.50a	22.7	11.05a	11.3	1.25a	79.5	10.1	10.3	56.4	3.7	2.3
12	38.60	16.6	22.3	0.05p	13	0.50a	22.4	11.55a	11.2	6.25a	79.5	11.2	11.1	57.8	3.7	2.2
13	38.22	15.6	22.9	1.10p	11	12m.n.	23.2	0.20p	11	12m.n.	75.2	9.7	11.6	52.3	6.2	3.6
14	38.36	15.4	23.7	0.05p	10.8	4.15a	24	1.10p	10.3	4.50a	73.2	9.6	9.5	53	6	3.5
15	38.53	16	24.1	11.20a	12.2	0.05a	24.4	Noon	12.1	0.10a	79.8	10.7	11.3	55.9	3.6	2.3
16	37.73	16.4	22.4	10.30a	13.7	2.40a	22.4	9.50a	13.9	3.20a	85.7	11.9	12.8	58.4	2	1.4
17	36.88	17	22.6	2.15p	14.5	11.50p	22.2	2.00p	14	11.50p	80.8	13.1	14	51.2	1.4	.9
18	35.72	15.9	20.3	9.10a	14	12m.n.	21.4	9.00a	13.1	5.10a	83.3	12.6	13.1	56	.7	.4
19	35.48	16.5	21.9	0.05p	13.8	5.30a	22.5	1.05p	13.1	6.20a	86.2	12	11.5	57.5	1.6	1.1
20	36.52	17	23.3	1.10p	12.6	12m.n.	23.8	1.50p	12.8	12m.n.	79.5	11.4	12.8	58	4.2	2.5
21	37.57	15.6	21.7	10.35a	11.4	6.50a	21.7	1.20p	11.5	6.55a	79.2	10.3	10.7	55.4	3.6	2.3
22	37.74	15.6	21.8	2.50p	11	6.00a	22.5	2.25p	9.6	6.00a	74.5	9.6	9.5	56.7	4.5	3.1
23	37.27	17.6	24.3	11.20a	12.4	3.50a	24.8	Noon	10.7	5.50a	62.8	9.2	9.2	54.9	5.1	3.7
24	36.45	17.3	23.1	10.20a	13.2	5.15a	24.2	10.50a	12.1	6.00a	79.3	11.3	11.5	53.7	4.7	4
25	36.42	17.9	24.7	10.50a	13.8	2.25a	25	11.45a	12.4	6.00a	76	11.4	11.3	57.7	5.6	3.4
26	36.12	18.8	25.7	10.40a	14	4.20a	26.4	11.40a	13.3	2.30a	72.3	11.4	13.2	56.3	4.5	3.6
27	35.75	19.2	26.7	11.35a	14.8	4.40a	27.6	Noon	13.7	5.40a	71.3	11.5	13.5	55	5.9	4.4
28	35.84	18.6	25	10.50a	14.6	4.35a	26.4	11.35a	12.3	6.25a	70.5	11.1	11.5	58.1	5.5	3.7
Mean	637.28	16.4	22.8		12.8		23.4		12.1		79	10.9	11.6	55.6	4.2	2.6
Total															116.3	72.7

Day.	Prevailing direction. <sup>d</sup>	Wind.			Amount (mean).	Clouds.		Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.		
		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	E	440	26.6	SE	0-10.	4	Ci.		Cu.	h. m.	mm.	
2	E	428.1	32	E	6.9	6.9	Ci.-S.		Cu., Cu.-N.	3 20		≡ p.
3	E	365.8	24.6	E	6.4	6.4	Ci.		Cu.	1 20		≡ d° p.
4	E	343.7	24.4	SE	8.1	8.1	Ci.-S.	SbyE	Cu.-N.	1 35	0.3	≡ d° a. d° ≡ p.
5	E	533.1	36.2	SE	2.6	2.6	Ci.		Cu.	5 35		
6	E	645.2	45.4	E	1.8	1.8	Ci.		Cu.	6 00		≡ a.
7	E, SW	324	29.3	E	7	7	Ci.		Cu.	0 40		≡ a. ≡ p.
8	W quad.	253.3	24.7	W	4	4	Ci.		Cu.	5 20		≡ p.
9	W, E	312	23.1	W	3.7	3.7	Ci.		Cu., Cu.-N.	5 20		≡ p.
10	E	473.8	36.4	E	4.1	4.1	Ci.		Cu.	4 20		≡ a. ≡ p.
11	E	438.1	34.4	E	3.7	3.7	Ci.		Cu.	3 05		≡ p.
12	Variable	321.3	26.4	SE	3.6	3.6	Ci.		Cu.-N.	5 40		≡ a. ≡ p.
13	E, SE	610	33.2	E, SE	1.9	1.9	Ci.	SW	Cu.	4 20		⊕ a.
14	E	455.4	29.2	E	2.6	2.6	Ci.	SbyE	Cu.	4 00		⊕ a.
15	E	413.9	30.4	E	7.1	7.1	Ci., Ci.-S.		Cu.	2 30		⊕ a. ≡ p.
16	E quad.	288.7	22.5	W	8.1	8.1	A.-Cu.	SSW	Cu.	1 25	1.3	≡ p.
17	W	239	18.7	W	7.7	7.7	Ci.	SW	Cu.-N. s, ssw	0 35		≡ p.
18	E, W	262.3	15.9	E	4.1	4.1	Ci., A.-Cu.		Cu.-N. ENE	0 25	10.8	≡ d° a. ≡ p.
19	E quad.	221.6	21.9	NW	4	4	A.-Cu.		Cu., Cu.-N.	4 45	.3	≡ d° ≡ p.
20	E	375.5	25.7	W	6.1	6.1	A.-Cu.	SW	Cu.-N. N	4 50		
21	E	426.9	28.7	W	2	2	Ci.		Cu., Cu.-N.	4 15		
22	NE quad.	592.8	23.9	W	1	1	A.-Cu.		Cu. wsw, wbyN	6 00		
23	E quad.	317.9	22.2	W	2.6	2.6	Ci.		Cu.	6 30		
24	E, SW	284	24.4	SW	2.7	2.7	Ci.		Cu.-N. WSW	6 00		≡ a. ≡ p.
25	E	408.3	25.7	W	1.4	1.4	Ci.		Cu.	5 05		≡ a. ≡ p.
26	E	436.5	29.2	E	1.1	1.1	Ci.		Cu. W, EbyN	6 45		
27	E quad.	313.6	24.3	SSW	4	4	Ci.		Cu.	6 50		
28	E, SW	339.6	28.4	E	4	4	Ci.		Cu.-N. SE	4 55		≡ a. ≡ p.
Mean		380.7	27.4		4.2					4 02		
Total		10,659.4								112 45	12.7	

\* 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, FEBRUARY, 1917.

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.
Isabela, Basilan		8.9	15	1			13.7			0.3	0.8	27.7		12.2	3.5	
Zamboanga		3	6.6	8.4	6.9	0.5	10.4			5.1				64.3	.3	
Davao	8.4	8.9	29.3	4.8	5.2		28.7		1.6				6.9	11.5	4.6	
Cagayan, Misamis	1							1.3								
Butuan	5.4	17.2	27.7	.3		15.3	2.1	16.8	1.3	12.5	6.4		2.6	14.4	41.2	0.8
Mambajao	*			*		2			1				5.6	5.6		
Dumaguete	10.2	15.8	16.2			1			21.1			3.3		1		
Yap W. Carolines		8	2.3	10.7	6.6		12.4	2.5			10.2	16	4.1	1.5	15	1.1
Tagbilaran	9.1	7.4			4.1		1	5.6		21.3	2.5	1	1.3			
Iwahig	1	4.8		4.4	.1					27.2	.5			55.1	1.3	
Surigao	55.7	39.9	21.6	.8	3.1	8.7	7.4	22.4	40.4	9.2	3.5		26.4	28	9.1	.5
Maasin			7.6			10.9							19.8	10.4	14	
Cebu	.5	.5	25.9		2.3	3.3				34.3	7.7			11.5	4.8	
Iloilo	.5					.5	.8			32.8	.5	2.6	6.9	8.7	26.2	2.5
San Jose Buenavista	2			1.3								.3		1.5	13	3.3
Cuyo														7.2		
Ormoc	2.4	.8	1.3		2	10.1	1.6	2.9	5.6	11.2	.8	17.8	15.1	4.8	2.1	1.5
Guiuan	2.1	1.6	1.8	4.6	9.7	46.7	9.9	.8		4.3	.8	7.9	8.9	3.8	1.3	
Tacloban	19.9	3.8	9.1	.6		5.3	13.6	6.8	8.2	31.8	13.6	1.3	57.8	15.4	6.8	3
Capiz		11.9	12.7	7.4	2.8	2	5.4	.6		.3	14	16	6.4	9.6	2.3	
Borongan	55.6	15.7	1.6			12.2	8.4	4.3	.6	93.8	8.4	12.7	52.6	12.5	13.2	12.2
Catbalogan	12.5	14	.3	1.3		7.1	7.2	1.3	14.5	23.4	9.7	15.5	17.3	11.2	6.4	2.3
Calbayog	8.8	11.4	3.3	6.4	7.6	.3	2	31.5			6.1	27.5	14	16.2	10.4	49.3
Masbate	9.6	2.5	1.5			.3	1.3		31.2	1.8	9.1		45.7	27.7	9.4	13.5
Romblon	5.1	35.3	1.3	.8	6.9		4.2		.5		25.8	16.9	7.6	56.4	12.7	1.7
Batag	43.1	18.2	3.6	12.7			49.5	1.3		21.1	157.4	58.7	100.3	57.4	9.9	11.2
Sorsogon	75.9	99.1	141.4	101.5	29.1	28.4	37.9			46.7	49	42.8	56.6	17.8	19.3	11.7
Legaspi	42.4	83.8	129.7	93.6	14.5	18.9	8.2			33.7	27.6	76	9.7	28.9	71.2	24.7
Sumay, Guam	10.2	1.3		5.1	3.8		7.6									1.3
Calapan	1.8	2.1		4.1	.3		3.8				2.8	1.3	.8	2.5	4.3	.5
Virac	19.8	25.9	38.3	11.1	104.6	29.5	.8			13.2	14.2	56.9	14.8	4.8	10.4	22.9
Naga	.6	4.8	33.5	4.5	3.6	2.8				3		13.2	.3	6.9	2.8	3.5
Batangas				1									1.3			
Lucena	2.5	7.1	.3	3.8	3.6	10.4	4.3	5.1	11.7	2		2.8	3.3	1.5	.5	
Atimonan	19.3	18.6	2.3	6.8	17.5	13.5				2.8	2.1		14.5	4.3	5.1	4.3
Ambulong, Tanauan				3.3		3.8										
Canlubang, Calamba			1	1.3		2.5										.5
Paracale	35.8	98.9	202.7	77.9	100.3	7.8				5.1	12.6	37.9	14.4	12	14	9.4
Santa Cruz, Laguna						.8				1.8						4.6
Manila		.1				.5										
Antipolo				.3					2			10				
Iba															.5	
San Isidro						.8	.3									
Tarlac																
Baler	1.5	2.7	16.5	.5		69.8	14.7				3		5	2		
Dagupan			4.3													6.6
Bolinao							.8	.5								
Baguio			.3													1.3
San Fernando, Union																
Echague			.3			.3							1.3			4.1
Vigan																
Tuguegarao				3.3												8.2
Laog																
Aparri	2		19.9	15.3	2.4		28.2	7.6	27.3	1		3	5.8			
Cape Bojeador													11.4			6.9
Santo Domingo, Batanes	1.5		19.8	15	2	.3	1.4	.8	6.4			51.2	16.6	.3	8.4	3.4

\* No observation.

Daily rainfall at the stations of the Weather Bureau, February, 1917—Continued.

Station.	Day of month.												Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	
Jolo	15.5	3	8.6	25.1	1	mm.	mm.	28	6.9	2	mm.	25.4	mm.
Isabela, Basilan	25.7	2.5	5.3	4.1	0.5				7.4	.5			198.6
Zamboanga			3.8		2.3				.3		0.3		152
Davao	2.5				5.1								99.8
Cagayan, Misamis	1.5	12.4	1.5	1.5	5.8	2				5.1	1		45.2
Butuan		.5	2.8	.5	2.3	1.6	10.2	.3	.3	1.5	.8	8.4	33.1
Mambajao				10.2	9.9	.8							193.2
Dumaguete	3.3			6.1			3.3						35.1 <sup>a</sup>
Yap W. Carolines	.3		2.5	1		5.6			1.3	3.8	6.6	3	81.3
Tagbilaran					11.7	16.8	9.9					*	107.3
Iwahig	32	9.4	10.7	.8	2.3	9.9							91.7 <sup>b</sup>
Surigao	1.1	1.8			13.2	11	22.2	3.3	6.6	15	18.9	14.2	159.5
Maasin				8.9	19								384
Cebu		6.6	.5	4.3									90.6
Iloilo		11.2	2	19.3	.8		9.6						102.2
San Jose Buenavista	1.8	7.6		1	.3		2						124.9
Cuyo			10.2										34.1
Ormoc	.5				.5	6.7	17.4		2.8				17.4
Guiuan	72.9	14.2	2.8	4.8	100.8	20.1	5.6	.5	8.6	8.4	3.8	1	108.9
Tacloban	1.2	.2		44.4	51.7	17.7	15.5	.4	2.7	16.6		4.1	6.3
Capiz	3.8	28.7	6.6	6.6	9.2	3.4	1.6	1.1		.5			353
Borongan	15.5	.8	2.8	73.9	167.6	24.9	30.7	4.1	20.3	2.1	4.4	3.3	351.5
Catbalogan	.3	.3	2.5	2.8	28.2	16.2	21.6	1.3	2	.3	.8	5.6	152.9
Calbayog		26.2	.5	57.5	13.7	9.6	58.4	6.3	2.8	7.9		3.3	654.2
Masbate			6.6			7.1	5.1	11.7		1.3		.5	225.9
Romblon	1.1	2.3	45.7	23.1	.5	.3	7.2	2.3	2.3	.3		.3	381
Batag	1.3	1.5	3.8	72.4	104.1	78.7	14.5	42.2	4.1	17.8		9.7	185.9
Sorsogon		.6		18.8	47.4	3.2	52.6	28.7		24.1	20.8		258.3
Legaspi	6.1	2.1	1	1.1			2.1	21.1	8.9	16.5	4.1		894.5
Sumay, Guam	5.1					8.9	1.3	2.5					953.4
Calapan	7.6	9.4	13.8	16.1	6.1	.3	.8				*		736.8
Virac	1.3	34.5	8.9	15.5	.6		3	28.4	4.6	12.2		.8	47.1
Naga		.3	4.2	3.1	.3		14.2		1.8	9.4	.3		78.4 <sup>b</sup>
Batangas													482.4
Lucena												.5	110.4
Atimonan			42.4	1.3					13.8			8.6	2.3
Ambulong, Tanauan			1.5										59.4
Canlubang, Calamba				.5									185.1
Paracale	4.1	42.7	8.9	8.7	.8		30	31.2	12.4	.3			8.6
Santa Cruz, Laguna	4.3	2.3						1.5			1		5.8
Manila		6.1		.3									772.5
Antipolo		1.5											11.7
Iba													7
San Isidro	30.7	4.3	2.8										13.8
Tarlac			.8										.5
Baler	12.2	9.9	2.3						8.9	5.6			38.9
Dagupan		11.9											.8
Bolinao													150.4
Baguio		10.8	.3										22.8
San Fernando, Union													1.3
Echagüe	4.1	6.6	37.8	3.6									12.7
Vigan		2.8											0
Tuguegarao		1.3											58.1
Laoag													2.8
Aparri		.5											12.8
Cape Bojeador													0
Santo Domingo, Batanes			1.8	.6								9.5	113
													18.3
													139

\* No observation.

<sup>a</sup> 24 days of observation.

<sup>b</sup> 27 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, FEBRUARY, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga. <sup>a</sup>		Davao.		Cagayan, Misamis.		Butuan.		Mambajao.		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	29.1	21	32.6	22.6	31.2	22.3	32.2	21.5	30.2	21	30.6	22			28.9	23.67
2	29.6	22	33.1	22.5	32.9	22.9	27.2	21.5	30.5	21.3	28.6	22.4			27.5	23.7
3	28.2	21.9	32.8	23.1	30.5	21.3	29.2	21.6	30.4	22.3	28.8	22.3			28.4	23.9
4	29.9	20	32.9	22.6	32	22.7	28.2	21.5	30	22.3	30	21.9	28.1		28.8	23
5	29.1	20.6	32.6	21.9	31.3	22.6	29.2	21.6	29.1	20.8	30.6	21.8	29.4	23.2	29.8	23.7
6	28.5	21.4	30.2	22.7	33	22.8	25.2	21.5	29.2	20.6	27.6	21.7	26.9	24.2	28.5	23.1
7	28.9	21.7	33.1	22.6	32	22.4	29.2	21.3	29.2	21.2	30.8	22.1	28.6	23	29	25.1
8	28.8	21.1	32.6	22.1	32.8	22.4	29.2	21.3	29.3	21.5	30.6	22	28.1	22.9	29.9	23
9	28.4	20.6	32.5	23.3	32.9	22.5	30.7	21	29.1	21.2	28.6	22.4	28.6	21.5	29.5	23.7
10	28.9	21.1	32	22.1	33	22.1	32.2	21	30.4	20.9	29.4	21.8	29	23.9	27.8	22.1
11	29.4	19.6	31.2	21.4	29.2	22.8	31.6	22	31	20.8	32.5	21.7	30	23.4	29.5	24.1
12	28.9	20.8	32.6	22.6	30.1	22.6	30.7	20.4	30.9	22	32.1	21.3	29.3	23.9	30.3	23
13	28.9	22	32.3	22.1	33	22.4	32.6	21.4	31	22	30.8	21.6	29.4	23.6	29.4	23.8
14	28	21.5	32	21.4	29.3	22.8	29.7	23.3	31.1	22.5	29.1	22.7	28.4	24.2	28.4	25
15	27.2	20.8	30.8	22.1	28	22.1	27.2	21.5	29.9	21.1	31.2	22.4	29.2	23.2	29.3	24.2
16	28.9	20.7	31.1	22.6	30.2	22.4	28.7	21.3	30.5	22.3	31.7	22.2	29.8	23.9	30	23.1
17	28.1	20.4	28.6	22.1	28.9	23.8	31.7	21	30.9	21.1	30.1	21.9	29.4	22.7	29.8	24.8
18	28.4	20.2	29.1	22	29	22.4	32	21.5	30.9	22.9	33.8	22.8	29.7	24.2	28.6	23.1
19	28.5	19.7	31.1	21.1	30.2	22.1	32.7	20.9	30.5	20.9	32.4	22.5	29.7	21.8	29	22
20	27.7	20.3	31.6	22.1	29.3	23	32.7	21.5	30.5	21.1	34.1	21.9	29.9	21.9	29.4	22.2
21	28.4	20.3	32.3	22.7	30.2	22.6	32.7	20.5	29.3	22	32.6	22.2	28.8	22.4	29.4	22.2
22	29.9	19.7	32.1	22.5	31.2	22.6	32.2	20.8	29.4	20.6	31.7	21.9	28.5	23.5	29.7	23.8
23	30	20.9	32.4	22.4	32.3	22.9	32.7	21.1	30.5	21.6	31.4	22.2	29.2	24.2	30.3	24.1
24	28.7	21.9	32.6	22.6	32.9	23.1	32.2	21.5	31.5	21	33.3	22.4	30.2	24.6	28.6	23.6
25	29	19.9	34.1	22.1	32.9	22.6	31.7	21.3	31.5	21.2	33.4	20.4	30	22.7	29.7	23.2
26	28.1	21.6	32.6	23.4	33	23.1	31.2	21.5	31.6	21.2	31.6	22.2	30	23.6	30.2	25.2
27	29	20.8	33.1	22.6	33.9	23.4	31.2	20	29.5	19	32.4	21.2	29.6	23.9	29.7	22.9
28	29.7	20.7	31.6	21.6	33	23	32.2	21	31.2	19	33.4	21.9	30.1	23.6	30	24.3
Mean	28.8	20.8	32	22.3	31.4	22.6	30.6	21.3	30.3	21.2	31.2	22	29.2	23.2	29.3	23.6

Day.	Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.		Iloilo.		San Jose Buenavista.		Cuyo.	
	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	21	30.5	20.6	27.4	22.3	30	22	29.2	23.9	29.1	22.5	31.7	21.5	28	25
2	29.7	21.7	29	21.4	29.6	23.1	29.5	22.1	27.5	23.8	29.2	23	30.8	20.7	28.1	24.7
3	28.5	22.5	30.3	23	26.6	22.7	32.6	22.4	28.3	23.2	29.2	23.3	32.2	22.4	27.8	25
4	29.5	21.2	27.3	22.5	29.7	22.3	30.8	22.3	28.4	24	29.8	23.3	31.7	23.2	29.5	25
5	30.2	20.9	29.8	21	30.6	24	31.5	22	28.5	23.7	30.2	23.3	32.7	21.5	29.4	25
6	30.3	21.2	30.3	21.1	29	23.5	31.5	22.4	28.3	22.8	30.2	22.7	32.6	21.4	29.4	25
7	29.7	22.2	31.4	21.5	29.1	23.8	31.8	23	28.9	23.7	29.2	23.2	31.8	23	29	25.5
8	31.1	20.9	30.5	22.4	30.8	23.3	31	23.2	28.5	23.8	29.6	23.6	32.7	22	29.8	24.9
9	29.7	21.5	31.1	20.9	28.2	23	30.5	22.4	29.2	22.2	30.6	23	32.7	22	29.3	25.5
10	30.2	21.5	29.4	20.8	29.1	23	31.4	24	27.9	23	29.1	23.1	32.7	21.4	28.3	25.4
11	29.7	21.4	29.8	22.5	31.7	22.8	30.5	23.5	28.5	23	29.2	23	32.8	21.4	28.4	25
12	29.7	21.5	29.3	22	30.7	22	30	22.4	29.5	23.9	30.5	22.5	32.2	23.5	29.2	24.9
13	30.9	21.5	30.5	21.3	28.8	22.6	29.6	21.8	29.4	23.7	28.7	23	32.7	21.6	28.7	25.4
14	30.2	22.1	29.4	23.4	29.3	23.3	29	22.6	27.5	23.5	26.6	23	31.8	23	26.3	24.4
15	29.8	22.4	28.3	21.5	31.2	23.1	30	22.5	29.2	23.1	28.2	22.5	29.7	23	28.3	23.1
16	30.4	21.2	30.6	21.8	31.7	23.2	32.2	22	29.4	23.8	30.2	23.4	31.2	21	28.5	24.6
17	30.5	20.7	31	20.4	29.7	23.2	31	21.8	29.9	23.9	30.7	23	31.6	22.3	29.7	25.1
18	30.5	21.5	30.6	20.6	28.7	23.3	31.5	22.4	28.2	22.7	30.2	23	30.7	22	28.7	23.8
19	29.6	22.4	30.7	20.4	31.7	22.4	33	22.8	29.9	23.8	28.9	23.2	32.2	22	28.9	23.5
20	29.9	21.6	30.9	21.4	32.3	22.6	32.5	22.5	29.9	23.1	31.2	22.3	31.7	22	28.6	23
21	31.4	22.5	27.4	23.5	29.3	23.6	33.5	22.5	28.3	24	27	22.8	31.1	21.6	27.7	24.6
22	29.6	21.5	28.9	22.5	29.7	22.8	31.5	21	29.4	23.2	28.3	23	31.8	22.4	28.3	24.7
23	29.6	21.7	30.3	22.2	29.3	23	31.5	22.2	28.3	24	28.2	22.7	31.8	21.6	28.5	24.7
24	30	22.2	30.7	21.9	31.7	23	31.5	22.4	29.2	24.2	30	23.5	32.7	22.6	29	25.1
25	31.2	20.4	31	22.8	31.5	22.1	31.2	21	29.5	24.2	30.6	23.3	32.3	21.6	29.5	25.2
26	31.5	20.7	30.9	21.5	30.3	23.5	32	22	29	23.8	30	23.5	33.2	21.5	30.4	25.6
27	30.2	21.6	31.1	20.9	30.8	22.8	31.4	21	29.2	23.7	30.5	23.4	33.2	21.1	30.7	25.6
28			31.4	21.1	31.3	23	32.2	22	29.5	24.9	30.6	23.6	33.1	21.5	30.8	25.6
Mean	30.2	21.5	30.1	21.7	30	23	31.2	22.3	28.9	23.6	29.5	23.1	32	22	28.9	24.8

<sup>a</sup> The maximum and minimum temperatures of this station are taken from a self-recording instrument.

Maximum and minimum temperatures at the stations of the Weather Bureau, February, 1917—Continued.

Day.	Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.		Calbayog.		Masbate.	
	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	30.3	20.4	28.4	23	28.9	22.2	29.9	24.1	29.2	21.7	29.3	20.8	28.9	22.6	27.6	23.2
2	31	22.9	31	23.6	29.7	22.6	30.1	23	29.7	22.3	30.5	22.4	30.4	22.4	28	22.4
3	30.4	22.4	29.2	24.2	29	22.5	29.4	23.2	28	23	28.9	22.8	30.3	22.9	28	22.8
4	31.7	23.8	30.2	23.9	29.9	23.4	29.2	23.6	29	24.4	29.3	22.8	29.1	22	29.6	23.2
5	33	22.8	30.4	24.3	30.6	23	30.2	23.8	30	25	30.5	23.2	28.8	21	28.8	23.6
6	32	21.9	29.9	22.9	30.4	22.9	30.8	24	30	24.5	30	22.2	31.3	20.5	30.6	23.8
7	29.9	23	29.8	22.5	27.2	23	29.3	24.6	27.5	22.7	27	22.5	28.5	22.8	28.5	24.5
8	29.1	22	31	24.2	30.3	22.5	30.4	23.3	30	22.7	30.2	21	30.2	21.6	30	23.2
9	30.9	22.4	30.9	24.2	30	23	30.9	22.7	30.1	22.7	29.8	20.5	31.2	21.1	29.2	23.2
10	30	21.8	29.9	24.9	29.2	22.4	28.7	24	26.3	21.4	28	21	28.2	22.8	27.6	22
11	30.1	22.5	31.1	24.2	29.5	22.4	29.9	23.4	30	22.6	28	21.2	29.6	22	26.2	22.4
12	30.9	21.5	32.2	23.4	29.5	22	29.4	22.7	29.1	21.9	28.1	21	29.8	21.9	27.8	21.5
13	29.9	20.9	30.5	23.4	27.4	22.5	28.9	23.7	29.7	22.9	29	21.1	29.4	22.4	27.2	23.6
14	27.4	23.3	30.2	23.4	28	22.6	26.4	23.4	29	23	29.2	22.8	27	23.1	25.6	22.6
15	33	23.3	30	25.6	30.5	22.9	30.2	23.8	28.8	23.6	29.6	23.5	30.8	21.8	28	22.5
16	30.1	22.5	31.3	24.6	29.8	22.9	31	23.9	29.6	23.4	30.5	22.2	31.2	22.6	28	23.5
17	31	21.7	29.2	23.3	30.5	22.1	30.8	22.7	30.1	22.4	30.7	20.6	31.2	21.4	30	23.4
18	31.7	22.8	28.8	22.2	27.9	22.2	30.9	23.6	29.4	22.2	30.5	22.1	30.6	22.4	29.6	23
19	31.4	21.4	30.8	22.1	30.6	22.5	30.3	22.2	29.7	21.4	31.7	21.4	30.1	21.7	28.2	23.2
20	31.4	21.4	31.6	21.2	31	22.1	30.3	21.8	30.5	21.1	30.6	21.2	29.9	22	28.2	23.4
21	29.3	22.4	27.7	22.6	25.7	22.4	27.9	22.5	26.8	21	26	22.1	26.5	22.4	28.2	22.5
22	27.7	23.1	29.8	22.4	27.2	22.2	28.3	23.3	27.7	21.9	26.8	22.3	24.6	22.5	26.6	22.6
23	30.2	22.7	29.9	23.1	29.4	23	28.4	24	28.7	23	30	21.2	28	22.2	26	22.8
24	30.8	21.4	31.1	24.2	30.8	22.8	30.8	24.3	31.2	23.4	30.2	22.8	28.5	22.8	27.2	23.6
25	30	19.5	29.9	22.4	31.2	21.5	30.7	24.1	29.7	20.6	28.6	20.3	30.4	20.9	30.4	22.8
26	31.5	19.5	30.5	24.3	31	22.1	30.9	23.9	30.1	22.1	31	20.2	31.5	21	30	24.2
27	32	21.1	30.8	23.4	31.3	22.5	31.2	23.2	30.5	23	31.2	21.3	33	22.1	29.8	23.5
28	30.5	20.8	31.5	23.3	29.7	22.4	31.7	23.2	30.1	23.9	31.8	21.4	32.8	21.6	29.8	23.8
Mean	30.6	22	30.3	23.5	29.5	22.5	29.9	23.4	29.3	22.6	29.5	21.7	29.7	22	28.4	23.1

Day.	Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.		Virac.		Naga.	
	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	22.3	24.8	22	28.4	20	24.2	22.3	27.6	22.2	28	22	26.6	20.4	26.7	19.4
2	29	22	26.5	22.7	28	19	25.3	22.3	27.4	22	29.6	23.4	26.6	21.1	26	20
3	27.8	22.2	27.3	22.2	27.7	18.8	24.5	22.2	28.2	22	30	22.1	26.3	21	26.5	19.6
4	29	22.8	27	22.4	27.5	18.5	23.6	21.5	28	24.4	30.5	23	26.5	21.1	25.5	19.9
5	30.3	23.4	28.2	23	27.7	18	25.9	21.5	27.8	23	31	22.2	25.5	20.9	27.8	19.9
6	30.4	22.4	27.4	23.2	28	19.5	25.8	22.2	27.8	22.8	29	22.2	28.2	20.4	27.9	19.8
7	30	24.2	25.8	22.3	29.1	20	27.9	23.2	28.2	23.2	30	23	30	21.8	31.2	19
8	31.5	23.2	28.5	23.4	30.5	20.1	29.3	22.4	29.8	22.8	31.1	22	30.7	22	31.6	19.8
9	33	22	29.7	23	30.9	21	29.8	22.2	30.2	21.2	32.6	20.5	30	20.1	30.4	19.8
10	30.9	22.9	26	22.2	30	21.5	25.5	22.2	30	20.4	30.5	23	26.9	21	28.8	19.9
11	28.8	22.2	24.5	22.4	27.2	20	24.6	22	28.8	24	29.5	23	25.6	20.3	27.6	20.2
12	29.1	21.2	26.5	22	28	20	27	21.1	29.2	24.8	30.6	21.5	28.1	19.5	27.7	19.5
13	31.5	22.2	24.7	22	27.9	21.5	26.8	23	30.2	25	31	21.7	28.1	20.5	25.2	19.4
14	28.3	21.8	25	22	28	21	23.8	22.6	30	24.6	31	20.6	25.7	21	24.7	19.6
15	28.4	21.7	28	21.9	28.9	20.6	27.3	22.5	28.4	24.6	27.8	21.5	28.9	21.1	28.2	19.6
16	30.8	22.9	27.9	22.3	28.7	21	27.5	23.5	30	24.4	30.6	23.4	29.9	21.9	29.8	19
17	32	23.3	28.8	22.5	30.5	20.9	29.5	22.7	31	22.6	30.6	22	30.8	20.3	29.8	20.2
18	32	23	28.3	23.4	30	22	29.8	23.7	29	22.8	30	22	30.9	21.1	31.6	19.1
19	29.9	22.7	25	22.7	30.5	20.9	29	22.9	30.6	23.8	28	22	30.7	21	29.4	19.6
20	27.8	21.4	29.3	22.7	28.9	21	26.7	22.5	30	21.4	28.4	21.4	27.9	21.4	25.8	20.4
21	28.6	22.1	24.5	21.5	28.9	22.5	26.2	22.6	30.6	21	28.1	21.6	27.5	21	26.7	19.5
22	31.4	23	24.4	21.2	29	22.5	27.8	23.7	28.4	24.2	29.4	21.5	30	21.2	27.8	19.8
23	30	22.8	27	21.5	28.4	22	27.4	22.9	30.8	23	28.5	21.5	30.3	21.1	27.6	20
24	29.4	23.3	28.9	22.6	28.5	22.4	28.5	23.4	30.4	23.6	30.5	22.4	30.6	22	27.3	21
25	31	23.3	29	22.7	30	22.7	29.4	23.3	30.2	24.2	31.4	23	31	21.7	29	20.4
26	31.5	23.6	28.7	23.2	30.7	22.5	29.9	23.3	29.2	23.8			30.8	22	32	19.3
27	31.9	24	28.9	23.5	29.5	22.7	28.9	24.4	30	24.8			31.7	21	31	18.7
28	32.9	24.2	29.8	23.5	30.8	22.3	29.8	24	30.2	24	31.5	22.5	31.6	20.4	30	19
Mean	30.2	22.7	27.2	22.5	29	20.9	27.2	22.7	29.4	23.2	30	22.1	28.8	21	28.3	19.7

Maximum and minimum temperatures at the stations of the Weather Bureau, February, 1917—Continued.

Day.	Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.		Manila.	
	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	21.8	27.4	21.6	25.6	22.2	28.4	22	28.2	20.4	27.2	21.2	26.9	21.8	29.6	21
2	29	22	26	21.6	24.6	22	27.2	22	28.2	21.8	24.1	22	26.2	21.9	28.6	20.4
3	29.6	21.5	26.4	20.9	24.5	21.9	27.8	21.5	28	20.8	24.2	22	26.8	21.5	29.2	21.1
4	29.1	21.6	26.2	21.6	24.7	22	27.1	22	28.4	21.8	23.8	21.2	26.7	22.1	28.5	20.4
5	30.4	21.4	27.9	20.9	25.6	21.8	28.9	22.4	28.2	21.1	25.3	21.3	26.9	21.4	29.5	20.6
6	30.1	21.3	26.6	20.9	25.3	21.9	27.3	21.5	28.2	21.4	25.3	22	26.5	21.6	29.3	19
7	32.6	22.4	30.9	21.9	28.8	22	31.8	22	30.4	20.6	27.6	23	29.7	22.1	32.1	21.4
8	32.2	22.4	30.1	21.2	29	21.9	32.3	22	31.4	21.1	29.2	22	31	21.4	31.5	20.9
9	31.4	20.6	30.4	20.5	27.3	21.6	32.7	21.9	31.4	21	27.2	21.8	29.7	21	31.6	23.5
10	30.2	21.5	27	21	25.9	22.7	28.8	22.3	30.4	21.6	26.7	22.6	27.2	21.5	31.5	21.4
11	29.9	22.1	26.9	21.1	25.2	22	29.3	22.1	31	21.1	24.8	21.7	27.5	21.3	30.1	21.3
12	29.4	20.4	27.7	21.2	25.2	22.4	30.7	22.6	29.4	20.8	25.9	22.1	28.3	21.8	30.1	20.4
13	29.8	21.7	25.8	21.6	24.9	21.9	28.1	22.3	29.4	20.6	24	21.2	26.4	21.7	30.5	21
14	28.5	21.2	26.7	20.1	24.6	21.2	26.1	21.7	27.4	20.6	23.7	21.4	25.8	21	30.7	20.2
15	29.8	21.4	27.1	20.9	25.2	22	28.4	22.3	27.8	21.6	27.3	23	27	21.3	31.1	21.2
16	33.1	21	29.4	22.1	27.8	23.3	31.7	22.3	29.9	21.6	28.4	23	29.9	21.7	31.7	22
17	32.5	20.8	30.5	20.9	27.8	22.8	32.1	22	30.8	20.9	28.6	21.7	30.3	21	31.5	22.4
18	32.8	22.1	30.9	22.6	28.3	23.8	33.4	22.6	31.9	21.2	28.9	22.5	29.8	22.1	30.8	22.4
19	31.7	21	31	22.1	28.2	22	32.9	21.5	31.9	20.2	27.8	21.5	29.3	21.4	31	21.7
20	30.2	22.8	26.9	21.8	25.3	21.9	28.8	22	29.2	21.4	25.3	22.1	26.9	21.3	29.8	21.5
21	30.4	21.3	28.1	22.8	25.7	23.7	29.1	23.1	29.1	21.4	26.1	23.4	27.1	23.4	28.8	20.5
22	32.7	21.1	27.9	22.4	26.7	23.5	30.1	23	29.2	21.6	28	24	27.4	22.9	31.3	19.9
23	32.4	20	28.9	21.7	26.4	23.7	31	22.2	29.8	19.9	27.2	23.6	29.3	21.3	31.3	18.8
24	33.4	19.5	29.1	21.4	26.8	23.8	31.2	22	29.9	19.8	29.1	23.1	29	20.5	31.5	18
25	33.2	22	29.5	21.7	26.2	22.8	31.3	23.2	30	21.2	26.6	22.8	29	21.5	32.6	19.9
26	34.8	22.9	31.2	22.2	28.7	23.8	32.1	23.7	30.8	21.1	28.8	23.7	29.7	23.1	32.9	20.7
27	34.2	21.3	30.6	22.6	27.9	24.3	33.3	22.5	30.9	20.4	28.3	23.7	30.4	20.5	33.3	20.2
28	34.4	21.9	31.9	22.6	29.2	24.5	33.4	23.9	31.4	20.4	29.1	23.7	31.1	21.7	33	20.9
Mean	31.3	21.5	28.5	21.6	26.5	22.6	30.2	22.3	29.7	21	26.7	22.4	28.3	21.6	30.8	20.8

Day.	Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.		Bolinao.		Baguio.	
	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	30.2	19	29.4	17	30.2	20.2	33	20	27.3	19.6	33.6	19.4	30.5	19	21.7	11.7
2	30.4	19	30	18.3	29.4	19.2	32.2	19.8	24.4	21.1	31.2	20	30.6	20.8	21.8	11.9
3	31	19.4	30.4	19.3	28.8	19.5	30.7	19.9	25.5	20.4	31.7	20.1	29.8	21.7	20.2	12.2
4	29.5	20.2	31	19.7	29.4	19	32.2	20.5	26.4	21.5	32.4	20.3	29.3	22	20.9	12.9
5	30	19	30.4	19.3	30.1	19.4	32	20.5	27.4	20.5	33.1	20.5	31	20.9	22.8	12.6
6	30.3	19.3	30.9	21.2	29.1	17.6	31.2	20.4	25.5	20.6	31.9	20.5	30.7	22	22.4	12.6
7	31.6	20.2	30.6	20.2	30.3	21.2	31.5	21	26.6	21.3	33.2	20.7	31.8	21.4	22.3	14
8	32.5	19.8	30.8	19	33	19.7	28.6	21	29.1	20.4	32.7	20.5	31.2	21.5	23.8	13.9
9	31.6	20.2	30.9	19.4	31.4	23	30.7	23.6	30	22.2	28.7	22.9	27.7	24.6	21.9	13.3
10	30.6	20	32.2	17.9	30.5	19.8	31.3	20.5	27.4	18.7	33.6	19.5	32.5	19.7	22.8	11.7
11	30.3	19.8	30.3	19.7	30.1	19.4	30.3	20.1	25.9	20.4	32.1	19.8	30.3	21.5	21.5	11.4
12	30.6	19	30.6	18	31.9	19.4	32.3	18.6	28.9	20.4	29.7	18.8	30	20.7	22.3	13
13	29.5	19.3	30.3	17.4	30	20.2	30.2	19	26.7	20.9	33.4	20	30.2	24	22.9	11
14	29.4	20	32.5	21.6	29.8	17.6	29.8	19.4	26.8	20.8	33.7	20.3	32	22	23.7	10.8
15	29.9	20	30.6	21.8	29.9	20.3	30.8	21	27.1	20	33.7	21.8	31.3	21.8	24.1	12.2
16	32	20	31.6	20.5	32.1	20.6	32.3	20.1	27.6	21.2	32.5	21.7	29.8	25.2	22.4	13.7
17	31.6	20.1	31.5	21.1	33.6	21.6	30.4	20.8	30.6	21.3	30.2	23	28.6	24.2	22.6	14.5
18	30.7	21.5	31.2	20.9	27.6	21	31.3	21.8	25.2	21.2	31.8	22	29.4	20.7	20.3	14
19	31.8	19.8	30.7	20	32	21	33.5	19.8	28.9	21.2	30	20.8	30.5	21	21.9	13.8
20	31.2	20.2	32.8	22.2	28.6	22.5	33.3	19.8	27.2	22.2	34.2	22.4	29.9	24.1	23.3	12.6
21	29.9	22	31.4	25	28.7	19.9	30	20.5	27.4	21	33.7	21.4	30.9	22.2	21.7	11.4
22	30.7	19.8	33.9	22.2	29	18	31.5	18.6	27.9	19.1	33.9	20.4	30.4	22	21.8	11
23	31.8	17.7	30.2	20.7	30.4	17	32.4	18.6	28.9	20	31.9	18.7	29.7	20.7	24.3	12.4
24	32.8	17.3	31	17.3	31.4	17.5	33.2	18.1	29	19.2	32.9	19.1	31.4	19.4	23.1	13.2
25	32.7	19.6	32.7	19.1	31.2	19.2	33.5	19	32.6	20.9	35.4	21	31.8	20.8	24.7	13.8
26	33.3	19.8	32.7	19	31.5	19.7	33.4	19.4	29.6	22.4	34.2	20.4	34.2	23.6	25.7	14
27	33.5	19	32.1	19.7	32.5	20.3	33.5	19.5	33.8	21.5	36.2	21.4	32.7	22	26.7	14.8
28	33.6	20.3	32.5	19.5	31.8	19.7	32.8	19	29.6	20.8	34.5	20.5	32.5	23.4	25	14.6
Mean	31.2	19.7	31.3	19.8	30.5	19.8	31.7	20	28	20.7	32.7	20.6	30.7	21.9	22.8	12.8

Maximum and minimum temperatures at the stations of the Weather Bureau, February, 1917—Continued.

Day.	San Fernando, Union.		Echague.		Vigan.		Tuguegarao.		Laoag. <sup>a</sup>	
	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.
1	30.6	19.2	24.9	17.9	30.8	18.7	26.8	18.2	33.5	16.3
2	30.6	19.3	24.8	18	31.7	20.4	27.5	18.5	34.8	16.3
3	30.8	20.3	26.1	19.4	31.3	22.5	27.7	18.7	34.2	20
4	30.9	21	26.4	18.3	30.4	19.9	26.3	18.8	33.2	19.2
5	31	20.7	25	18.6	33.1	22.6	25.6	18.6	33.3	21.3
6	30.8	19.2	26.1	18.1	31.9	21.9	30.2	18.5	36.2	17.1
7	32.1	20.3	30	20.1	31	20.7	31.6	18.7	33.8	18.5
8	31.8	22.5	32	18.9	29.6	21.5	33	20.7	31.7	22.5
9	29.7	23	28.2	21.1	26.7	18.7	27.8	18.2	27.1	16.1
10	30.9	17	23.4	16.1	31.2	15.5	25.5	17.4	32.9	12.37
11	30.9	19	26	17	30.2	21.2	27.8	17.6	32.3	17.6
12	31	19	30.5	19.4	29.6	20.6	32.8	17.2	31.9	19.6
13	30.6	18.5	25.5	18.7	31.5	19	26.7	19.3	31.5	18.5
14	30.5	19	25.5	16.8	30.6	21.6	26.7	18.1	33.9	15.4
15	31.5	20	29.2	17.9	30.7	21.4	30.9	18.3	32.6	15.9
16	31.8	22.1	32	20.4	29.2	20.7	33.7	20.6	31.3	21.1
17	31.3	23.2	27	20.7	29.4	20.6	26.4	20.6	31.9	19.3
18	32.7	20	28	19.9	30.9	20.5	31.7	20.4	33.9	17.4
19	31.3	20.3	35	21	29.6	20.5	31.5	21.8	33.6	20.1
20	31.7	20.2	26.3	19.1	30.6	18.5	28.7	20.4	32.4	18.6
21	31	21.3	26.3	18.5	29.6	22	26.8	19.3	34.2	15
22	30.4	19.9	27.1	18.5	29.9	20.6	29.1	19	33.3	15
23	30.4	18.2	29.7	16.8	30.3	19.6	32.4	16.5	33.2	16.1
24	30.5	18.8	30.9	18.2	30	20.3	32.2	19	33.6	15.4
25	31.8	19.5	31	18.8	31.3	18.3	32.6	19.5	34.4	14.6
26	32.5	19.8	33	19.5	32.7	21	34.6	20.5	34.3	17
27	32.5	20.6	33.6	19.2	30.3	21.5	35.1	20	34.6	20
28	32.3	21.2	33	18	31.4	22	35.4	19.4	35.1	21.1
Mean	31.2	20.1	28.4	18.7	30.6	20.4	29.9	19.1	33.2	17.8

Day.	Aparri.		Cape Bojeador.		Santo Domingo, Batanes.		Yap. W. Carolines. <sup>b</sup>	
	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	22.9	18.6	27.4	15.4?	20.7	18.5	32.7	24.1
2	23.7	18.8	26.2	16.2?	22.3	17	32.2	23.5
3	23.4	19.5	27	20.2	23	18	31.7	23.7
4	21.1	18.6	24.6	17.4	18.8	16.3	32.5	23.4
5	21	18.2	23.8	16.4	19.4	16.1	31.9	23
6	23.9	18.1	27.3	18	22.6	17	32.2	24.7
7	29	19.4	29.8	21	27.4	19.5	31.7	23.5
8	27.1	21.6	26.5	23.2	24.8	21.6	32.7	23.4
9	23.9	19.7	24.6	18.8	21.7	19	32.2	21.5
10	22	18.1	23.7	17.8	22.2	16.5	30.7	22.5
11	25.4	17.3	29.2	18.5	21.1	17.5	30.7	24
12	28.6	18.3	29.7	22.6	20	18.2	27.7	23.6
13	22.1	18	23	15.5	19.1	16.3	32.3	23
14	22.7	18.1	23.8	16.4	19.9	17	31.8	23
15	27	18.2	29.5	19.2	24.1	18	33.2	24.5
16	27.6	20.1	28.3	22.8	25.4	20.7	32.2	23.3
17	24.8	20.7	25.6	19.6	26.4	19.2	33	24
18	27.3	19.8	29.8	19.8	25.5	19.1	32.7	24.5
19	27.4	20.6	29.8	22	26.9	18.4	32.8	23
20	25.3	20.8	26.2	19.2	20.8	18	33.2	23.3
21	23.2	19.7	25.8	18.8	22.4	17.4	32.7	24
22	25.8	19	28.8	19	24.8	18.5	32.7	25
23	27.7	19	29.2	19.5	26.4	19.8	31.5	22.9
24	28	19.8	28.4	20.2	27.8	17.6	32.7	23
25	28.1	20.8	30.4	20.8	27.5	17.4	32.7	23.5
26	29.8	20.1	30.8	21.8	28.6	22	32.7	23.6
27	30.3	21.7	29.6	22.8	29.6	23.4	33.2	24
28	29.8	20.9	30.8	22.8	28.3	22.3	32.7	24
Mean	25.7	19.4	27.5	19.5	23.8	18.6	32.2	23.6

<sup>a</sup> The maximum temperatures of this station are not very reliable; they seem to be too high.

<sup>b</sup> Received late.





# SEISMOLOGICAL BULLETIN FOR FEBRUARY, 1917.

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## EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

- 2, 17<sup>h</sup> 07<sup>m</sup> [3, 1<sup>h</sup> 07<sup>m</sup>]. Butuan (N Mindanao). Earthquake shock of intensity II-III.
- 4, 10<sup>h</sup> 30<sup>m</sup> 22<sup>s\*</sup> [4, 18<sup>h</sup> 30<sup>m</sup> 22<sup>s</sup>]. SE Mindanao. Earthquake of intensity IV-V at Davao, III at Butuan and V at Talacogon, about 50 kilometers further south. The origin was about 930 kilometers distant from Manila and 150 from Butuan, probably in the southern part of the Agusan Valley. It was also registered at Taihoku (Formosa).
- 10, 12<sup>h</sup> 25<sup>m</sup> [10, 20<sup>h</sup> 25<sup>m</sup>]. Butuan (N Mindanao). Oscillatory earthquake, direction SSW-NNE, intensity III, duration 15 seconds.
- 15, 19<sup>h</sup> 07<sup>m</sup> [16, 3<sup>h</sup> 07<sup>m</sup>]. Baguio (W Luzon). Earthquake of intensity II-III.
- 17, 22<sup>h</sup> 49<sup>m</sup> 22<sup>s\*</sup> [18, 6<sup>h</sup> 49<sup>m</sup> 22<sup>s</sup>]. Batanes Islands and Luzon. Earthquake of intensity IV at Basco (Batan) and III in the northern coast of Luzon. The epicenter lay between the two islands, but a little nearer to Taihoku (Formosa) than to Manila, presumably in the Balintang Channel, near to the parallel 20° N and to the meridian 122° E.
- 18, 1<sup>h</sup> 24<sup>m</sup> 34<sup>s\*</sup> [18, 9<sup>h</sup> 24<sup>m</sup> 34<sup>s</sup>]. Eastern Visayas. Extensive earthquake originated in the Pacific Deep, near 10.3° N and 126.5° E. It was felt through the eastern Visayas and NE Mindanao; the isoseismal VI comprised the NE end of Mindanao and SE of Samar and Leyte, while the isoseismal II-III inclosed the islands of Cebu, Bohol, Masbate, Samar, and Leyte, most of Mindanao Island and the SE part of Luzon with the neighbouring island of Catanduanes, to a distance of more than 500 kilometers from the epicenter. In the above said nearest regions of SE Samar and Leyte and NE Mindanao an aftershock was noticed at 5<sup>h</sup> 25<sup>m</sup> [13<sup>h</sup> 25<sup>m</sup>].
- 22, 16<sup>h</sup> 58<sup>m</sup> 41<sup>s\*</sup> [23, 0<sup>h</sup> 58<sup>m</sup> 41<sup>s</sup>]. SE Luzon. Earthquake of intensity IV, felt chiefly through the western part of Ambos Camarines and eastern of Tayabas Province.
- 24, 9<sup>h</sup> 31<sup>m</sup> 13<sup>s\*</sup> [24, 17<sup>h</sup> 31<sup>m</sup> 13<sup>s</sup>]. N Luzon. Earthquake of intensity III-IV in the northern part of Luzon, comprised by the provinces of Ilocos Norte and Cagayan and the subprovince of Apayao. It seemingly originated outside of Luzon in the Babuyan group.
- 25, 5<sup>h</sup> 21<sup>m</sup> 34<sup>s\*</sup> [25, 13<sup>h</sup> 21<sup>m</sup> 34<sup>s</sup>]. SE Luzon, Samar and Leyte. Earthquake of intensity IV-V; the seismographic records of Manila, Guam, Taihoku, and other Japanese observatories place its origin in the Pacific Ocean near 14° N and 126° E.
- At 5<sup>h</sup> 47<sup>m</sup> 10<sup>s\*</sup> [13<sup>h</sup> 47<sup>m</sup> 10<sup>s</sup>] occurred a second earthquake originated in the same place, which affected the same part of our Archipelago. An aftershock of less intensity was recorded at 10<sup>h</sup> 08<sup>m</sup> 19<sup>s\*</sup> [18<sup>h</sup> 08<sup>m</sup> 19<sup>s</sup>].
- 25, 10<sup>h</sup> 34<sup>m</sup> 38<sup>s\*</sup> [25, 18<sup>h</sup> 34<sup>m</sup> 38<sup>s</sup>]. N Luzon. Earthquake shock felt in the provinces of Cagayan, Apayao, and Ilocos Norte, with intensity III-IV. Its origin was in the Cordillera Central.
- 28, 2<sup>h</sup> 48<sup>m</sup> [28, 10<sup>h</sup> 48<sup>m</sup>]. Butuan (N Mindanao). Oscillatory earthquake, direction E-W, intensity III, duration about 9 seconds.

<sup>1</sup> 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<sup>h</sup>). Insular time being added in brackets for the convenience of Philippine readers.

## RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0<sup>h</sup>. Instrument: Wiechert seismograph; 1,000 kilograms.  $A_N$ :  $T_0=5.1$ ,  $\epsilon=2.634$ ,  $\frac{r}{T_0^2}=0.048$ ;  
 $A_E$ :  $T_0=5.2$ ,  $\epsilon=1.968$ ,  $\frac{r}{T_0^2}=0.048$ . Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
32	3	Iv	eP	<i>h. m. s.</i> 17 59 48				SE Mindanao.
			L	18 01 33				
			F	18				
33	4	Iv	e	9 49 49				
			F	56				
34	4	Iv	eP	10 30 22				
			L	32 03				
			M <sub>N</sub>	32 21	6	54		
			M <sub>E</sub>	32 36	5	76		
			F	11 09				
35	4	Iv	eP	17 59 01				
			F	18 01				
36	5	Ir	eP	12 21 18				
			S	23 09				
			L	25 24				
			M <sub>N</sub>	25 43	5	57		
			F	37				
37	7	Iv	eP	1 02 55				
			F	12				
38	12	Ir	e	9 12 48				
			L	21 00				
			F	46				
39	16	Iv	eP	7 18 08				
			F	20				
40	17	Iv	eP	22 49 22				Batanes Islands and Luzon.
			L	50 30				
			M <sub>E</sub>	52 20	4	79		
			F	23 22				
41	18	IIv	eP	1 24 34				Eastern Visayas.
			L	25 53				
			M <sub>E</sub>	27 37	5	332		
			M <sub>N</sub>	27 56	5	328		
			F	2 40				
42	18	Iv	eP	21 16 05				
			F	19				
43	19	Iv	eP	10 37 44				
			F	41				
44	20	I	e	15 17 49				
			F	33				
45	20	Iu	e	20 06 24				
			S	?				
			L?	58 31				
46	21	I	e	14 07 14				
			F	18				
47	22	Iv	eP	16 58 41				SE Luzon.
			L	59 11				
			M <sub>E</sub>	59 18	3	82		
			M <sub>N</sub>	59 34	4	179		
			F	17 12				
48	24	Iv	eP	9 31 13				N Luzon.
			L	32 06				
			M <sub>E</sub>	32 16	3	19		
			M <sub>N</sub>	32 35	3	31		
			F	44				
49	25	IIv	eP	5 21 34				SE Luzon, Samar and Leyte. End overtaken by following earthquake.
			L	22 39				
			M <sub>E</sub>	23 48	6	523		
			M <sub>N</sub>	24 02	8	812		
50	25	IIIv	eP	5 47 10				SE Luzon, Samar and Leyte.
			L	48 02				
			M <sub>E</sub>	48 51	5	788		
			M <sub>N</sub>	48 51	5	926		
			F	7 27				

## Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
51	25	I <sub>v</sub>	eP	10 08 19	-----	-----	-----	SE Luzon, Samar and Leyte. End overtaken by following earthquake.
			L	09 11	-----	-----	-----	
			M <sub>E</sub>	09 45	4	-----	92	
			M <sub>N</sub>	09 45	4	104	-----	
52	25	I <sub>v</sub>	eP	10 34 38	-----	-----	-----	N Luzon.
			L	35 14	-----	-----	-----	
			M <sub>N</sub>	35 27	2	-----	94	
			M <sub>E</sub>	35 29	3	-----	77	
			F	11 16	-----	-----	-----	
53	25	I <sub>v</sub>	eP	14 09 05	-----	-----	-----	
			L	10 44	-----	-----	-----	
			M <sub>E</sub>	11 11	4	-----	5	
			F	27	-----	-----	-----	
54	26	I <sub>v</sub>	eP	8 10 11	-----	-----	-----	
			L	10 46	-----	-----	-----	
			M <sub>N</sub>	11 18	4	-----	40	
			F	26	-----	-----	-----	
55	26	I <sub>r</sub>	eP	10 01 26	-----	-----	-----	
			L	05 04	-----	-----	-----	
			M <sub>E</sub>	05 47	7	-----	12	
			F	23	-----	-----	-----	
56	26	I <sub>v</sub>	eP	13 29 09	-----	-----	-----	
			F	34	-----	-----	-----	
57	26	I <sub>v</sub>	eP	15 28 54	-----	-----	-----	
			F	36	-----	-----	-----	
58	27	I <sub>v</sub>	eP	4 17 26	-----	-----	-----	
			F	26	-----	-----	-----	

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

2, 17<sup>h</sup> 07<sup>m</sup> [3, 1<sup>h</sup> 07<sup>m</sup>]. **Butúan** (N de Mindanao). Temblor de tierra de intensidad II-III.

4, 10<sup>h</sup> 30<sup>m</sup> 22<sup>s\*</sup> [4, 18<sup>h</sup> 30<sup>m</sup> 22<sup>s</sup>]. **SE de Mindanao**. Temblor de intensidad IV-V en Dávao, III en Butúan y V en Talacogon, 50 kilómetros más al S. El origen distaba unos 930 kilómetros de Manila y 150 de Butúan, seguramente estaría en la parte S del Valle del Agusan; fué también registrado en Formosa.

10, 12<sup>h</sup> 25<sup>m</sup> [10, 20<sup>h</sup> 25<sup>m</sup>]. **Butúan** (N de Mindanao). Temblor oscilatorio, dirección SSW-NNE, intensidad III, duración 15<sup>s</sup>.

15, 19<sup>h</sup> 07<sup>m</sup> [16, 3<sup>h</sup> 07<sup>m</sup>]. **Baguio** (W de Luzón). Temblor de tierra de intensidad II-III.

17, 22<sup>h</sup> 49<sup>m</sup> 22<sup>s\*</sup> [18, 6<sup>h</sup> 49<sup>m</sup> 22<sup>s</sup>]. **Islas Batanes y Luzón**. Temblor de tierra sentido con intensidad VI en Basco (Batán) y III en la costa septentrional de Luzón. El epicentro estaba entre Batán y Luzón, pero a menor distancia de Taihoku (Formosa) que de Manila, seguramente en el Canal de Balintang, hacia el paralelo 20° N y el meridiano 122° E.

18, 1<sup>h</sup> 24<sup>m</sup> 34<sup>s\*</sup> [18, 9<sup>h</sup> 24<sup>m</sup> 34<sup>s</sup>]. **E de Visayas**. Temblor de tierra de grande extensión originado en el Abismo del Pacífico al rededor de los 10.3° N y 126.5° E. Sintióse en todas las Islas Visayas Orientales y en Mindanao; la isosisma VI comprendía el extremo NE de Mindanao y SE de Sámar y Leyte, mientras que la de intensidad II-III encerraba la mayor parte de la Isla de Mindanao, las Islas de Cebú, Bohol, Sámar, Leyte, Masbate y la parte SE de Luzón con la Isla Catanduanes, lo que representa un radio de más de 500 kilómetros. En los extremos SE de Sámar y Leyte y NE de Mindanao más cercanos al origen se percibió una ligera repetición a 5<sup>h</sup> 25<sup>m</sup> [13<sup>h</sup> 25<sup>m</sup>].

22, 16<sup>h</sup> 58<sup>m</sup> 41<sup>s\*</sup> [23, 0<sup>h</sup> 58<sup>m</sup> 41<sup>s</sup>]. **SE de Luzón**. Temblor de tierra de intensidad IV, sentido principalmente en la parte occidental de Ambos Camarines y oriental de Tayabas.

24, 9<sup>h</sup> 31<sup>m</sup> 13<sup>s\*</sup> [24, 17<sup>h</sup> 31<sup>m</sup> 13<sup>s</sup>]. **N de Luzón**. Temblor de tierra de intensidad III-IV en la parte septentrional de Luzón comprendida por las Provincias de Ilocos Norte y Cagayán y la subprovincia de Apayao. El epicentro parece se hallaba hacia las Islas Babuyananes, fuera de Luzón.

25, 5<sup>h</sup> 21<sup>m</sup> 34<sup>s\*</sup> [25, 13<sup>h</sup> 21<sup>m</sup> 34<sup>s</sup>]. **SE de Luzón, Sámar y Leyte**. Temblor de intensidad IV-V; su origen según se desprende de los registros de Manila, Guam, Taihoku y otros observatorios japoneses se hallaba en el Pacífico cerca de los 14° N y 126° E.

A 5<sup>h</sup> 47<sup>m</sup> 10<sup>s\*</sup> [13<sup>h</sup> 47<sup>m</sup> 10<sup>s</sup>] ocurrió un segundo temblor originado en el mismo sitio y perceptible en la misma región del Archipiélago. Una repetición de menos intensidad tuvo lugar a 10<sup>h</sup> 08<sup>m</sup> 19<sup>s\*</sup> [18<sup>h</sup> 08<sup>m</sup> 19<sup>s</sup>].

25, 10<sup>h</sup> 34<sup>m</sup> 38<sup>s\*</sup> [25, 18<sup>h</sup> 34<sup>m</sup> 38<sup>s</sup>]. **N de Luzón**. Temblor de tierra sentido en las Provincias de Cagayán, Apayao e Ilocos Norte con intensidad III-IV. El origen se hallaba en el conocido foco de la Cordillera Central.

28, 2<sup>h</sup> 48<sup>m</sup> [28, 10<sup>h</sup> 48<sup>m</sup>]. **Butúan** (N de Mindanao). Temblor oscilatorio dirección E-W, intensidad III, duración 9<sup>s</sup>.

<sup>1</sup> 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<sup>h</sup>). 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

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BULLETIN FOR MARCH, 1917

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1917





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**BULLETIN FOR MARCH, 1917.**



# METEOROLOGICAL BULLETIN FOR MARCH, 1917.

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 slightly lower than that of the preceding year and than the normal for March. The mean for Manila is 0.28 mm. and 0.99 mm. lower than that of March, 1916, and that the normal for this month, respectively.

The mean monthly temperature does not differ much from the normal or from that of the preceding year, the differences being less than 1° C. in all our stations. The absolute maximum and minimum temperatures for this month in Manila were 33.8° C. on the 8th, and 19.6° C. on the 15th. The extreme monthly temperatures for Baguio were 26.3° C., 13.5° C. on the top of Mirador, and 27.4° C., 11.5° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR MARCH, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from March, 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from March, 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga.....	758		760.20	29	755.94	8	26.6		34.2	8	21	11
Tagbilaran <sup>a</sup> .....	58.78		60.44	29	56.70	8	26.1		33.4	28	21	25
Surigao.....	58.70	-0.27	60.50	28	57.01	8	26.4	+0.5	33	31	21.2	16
Cebu.....	58.73	-0.28	60.72	29	56.88	4	27.2	+0.4	31.5	31	23.5	29,31
Iloilo.....	58.46	-0.46	60.81	29	56.68	4	26.9	+0.3	32.3	31	23	24,31
Ormoc.....	58.94	-0.34	60.86	29	57.30	8	25.9	-0.4	34	28	20.4	30
Tacloban.....	58.98	-0.33	60.82	28	57.37	4	26.2	+0.1	32.8	11	21.1	28
Capiz.....	59.24	-0.47	61.04	28,29	57.47	4	27.1	+0.4	33	31	23.5	13
Calbayog.....	59.20	-0.37	60.91	29	57.57	4	25.8	0	34.5	11	21.1	1
Legaspi.....	59.51	-0.32	61.27	29	57.88	4	26.3	-0.7	31.3	31	22.4	9,11,30
Atimonan.....	59.71	-0.41	61.52	29	58.17	4	26.2	-0.4	31.8	25	22	23,25
Ambulong, Tanauan.....	58.85	-0.49	60.65	28	57.23	4	27.2	0	36	31	21.5	30
Paracale.....	60.03	-0.40	61.74	28,29	58.42	4	26.1	-0.3	31	22	22	28
Manila.....	59.52	-0.28	61.32	29	57.68	4	26	-0.4	33.8	8	19.6	15
San Isidro.....	59.60	-0.46	61.36	29	57.88	4	26.6	-0.4	36	31	19.4	1
Dagupan.....	58.75	-0.38	60.79	29	57.02	4	27.5	+0.2	37.6	13	20.5	1
Baguio <sup>b</sup> .....	637.04	-0.29	638.66	29	635.69	4	17.8	+0.1	26.3	12	13.5	26
Vigan.....	759.14	-0.38	761.25	29	757.33	4	27.2	+0.8	34.8	5	20.5	31
Tuguegarao.....	60.64	-0.10	63.75	29	58.53	9	25.4	-0.2	37.5	14	19.5	26
Laog.....	59.16		61.71	29	57.03	4	26.9				18.1	23,28
Aparri.....	61.16	+0.03	64.52	29	58.68	9	23.9	-0.8	32.5	3	20.2	28,31

<sup>a</sup> 24 days of observation.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—The total rainfall for this month is, with a very few exceptions, greater than the normal and than that of the preceding year, in Luzon; while in the Visayas and Mindanao it is for the great majority of our stations greater than the normal, but smaller than the monthly rainfall for March, 1916.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF MARCH, 1917.

Station.	Total.	Departure from March, 1916.	Departure from normal.	Rainy days.	Departure from March, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from March, 1916.	Departure from normal.	Rainy days.	Departure from March, 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	95	+ 20	- 21.5	14	0	38.1	4	Calapan	92	+ 55.5	- 17.8	18	+ 6	34	26
Isabela, Basilan	77.3	+ 46	- 26.2	10	+ 1	32	5	Virac	278.5	+ 165	- 130.3	26	+ 8	37.1	16
Zamboanga	75.5	+ 43.4	+ 46.3	10	+ 4	22.9	3	Naga	125.6	+ 16.6	+ 59.1	18	+ 9	26.7	29
Davao	145.9	+ 9.3	0	11	- 1	40.9	23	Batangas	15.5	+ 9.9	8.5	3	+ 1	11.9	25
Cagayan, Misamis	3.9	- 58.9		3	- 6	1.8	4	Lucena	76.3	+ 51.3		13	+ 5	22.9	19
Butuan	171.7	- 126.3	+ 9.8	22	+ 1	46.4	4	Atimonan	230.9	+ 176.2	- 147.6	17	+ 9	90.1	25
Mambajao	44.8			8			8	Ambulong, Tanauan	18	+ 4.5		4	+ 1	14.5	13
Dumaguete	37.4	- 29.9		2	- 5	35.6	31	Canlubang, Calamba	56.3	+ 51.4		9	+ 4	34	27
Yap, W. Carolines	173.1			18		50.6	25	Paracale	339	+ 160.6		24	+ 4	52.9	24
Iwahig	44.3	- 31.7		12	+ 3	12.5	5	Santa Cruz, Laguna	85.1	+ 66.9		15	+ 7	15.5	27
Surigao	240.6	- 347.9	- 31.3	27	+ 3	31.4	2	Manila	47.6	+ 18.5	- 29	9	+ 4	21.6	24
Maasin	101.7	- 277.8	- 6.1	8	- 5	25.7	29	Antipolo	29.1	- 2.9		9	+ 6	11.5	22
Cebu	39.2	- 38.2	- 14.9	10	0	9.7	1	Iba	51.3	+ 40.1	- 25.6	3	0	39.6	23
Iloilo	13.8	- 61.8	- 15.7	6	+ 1	5.12, 28	28	San Isidro	43.1	+ 41.1	+ 30.1	6	+ 3	37.8	31
San Jose Buenavista	5.1	- 10.9	- 10.3	5	+ 3	2	2, 29	Tarlac	22.9	+ 22.6	+ 3	4	+ 3	15.5	27
Cuyo	6.6	+ 6.1	+ 4.8	2	+ 1	5.3	24	Baler	264.5	+ 38.7	- 70	23	+ 1	119.4	16
Ormoc	134.1	- 6.6	+ 54.1	19	0	38.4	21	Dagupan	16.6	+ 14.5	- 9.9	3	+ 1	15.3	23
Guiuan	302.9	- 130		26	0	87.8	4	Bolinao	91	+ 89.5	- 75.2	5	+ 4	46.7	24
Tacloban	156.6	- 64.7	+ 29.9	27	- 6	25.5	4	Baguio	149.6	+ 47.3	+ 103.4	15	+ 7	43.4	17
Capiz	27	- 49.4	- 6	11	- 1	8.9	14	San Fernando, Union	13.2	+ 9.2	4.2	1	- 1	13.2	26
Borongan	417.8	+ 36.4	- 176.5	29	+ 6	85.6	4	Echague	107	+ 60.9	+ 66.3	16	+ 7	26	16
Catbalogan	158.9	+ 33.8		20	- 2	31.5	4	Candon	8.9	- 27.9	- 2.7	3	- 1	5.6	26
Calbayog	270.8	+ 184.7	+ 156.3	21	+ 4	46.5	4	Vigan	16.7	- 29.8	+ 10.8	2	+ 1	15.7	26
Masbate	51	- 44.6	- 9	12	- 3	20.6	25	Tuguegarao	83.7	+ 63.9	+ 53.1	10	+ 4	52.3	20
Romblon	56.8	- 12.6	+ 6.7	15	0	19.6	7	Laoag	20.4	+ 13.8	- 13.8	2	+ 1	11.5	26
Batag	104.7	- 189.9		21	- 2	24.9	6	Aparri	196.7	+ 174.9	- 139.3	20	+ 10	30.5	15
Sorsogon	687.4			27		161.5	26	Cape Bojeador	76			4	+ 10	66.1	27
Legaspi	459.7	+ 355.8	+ 284.1	29	+ 15	97.7	26	Santo Domingo, Batanes	221.4	- 184.5	- 100	25	+ 6	38	1
Sumay, Guam	42	+ 14.1	- 37.5	6	- 2	15.2	17								

DEPRESSIONS AND TYPHOONS.

We may mention only one depression which seemed to be situated west of the Batanes Islands at 6 a. m. of the 3d and south of Meiacosima at 2 p. m. of the same day. It probably moved eastward across the Pacific.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes es ligeramente menor que la del año pasado y que la normal de marzo. La media de Manila es menor que la de marzo, 1916, y que la normal de este mes, en 0.28 mm. y 0.99 mm., respectivamente.

La temperatura media mensual no difiere mucho de la normal ni de la del año pasado, siendo las diferencias menores de 1° C. en todas nuestras estaciones. Las temperaturas máxima y mínima absolutas de este mes en Manila fueron 33.8° C. y 19.6° C., registradas los días 8 y 15, respectivamente. Las temperaturas extremas del mes en Baguio fueron 26.3° C., 13.5° C. en la cumbre del Mirador, y 27.4° C., 11.5° C. en el valle.

**Precipitación acuosa.**—La lluvia total de este mes es, con muy pocas excepciones, mayor que la normal y que la del año pasado, en Luzón; al paso que en Visayas y Mindanao es para la mayor parte de nuestras estaciones mayor que la normal, pero menor que la lluvia mensual de marzo, 1916.

## DEPRESIONES Y TIFONES.

Sólo mencionaremos una depresión que parecía estar situada al W de las Islas Batanes a las 6 a. m. del día 3, y al S de Meiacosima a las 2 p. m. del mismo día. Probablemente se movió hacia el E a través del Pacífico.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.<sup>a</sup>

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

Day.	Air temperature. <sup>b</sup>			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.			Evaporation. <sup>b</sup>			
	Pressure (mean).	Mean.	Maximum.	Minimum.	0.25 meter.		0.50 meter.			1.50 meters.		Minimum on grass.	Maximum in sun. Black bulb in vacuo.	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 cent.	mm.	°C.	°C.	mm.	mm.	
1	758.39	25.7	32.7	20.8	26.6	28.3	27.7	27.9	27.8	75.2	18.2	18.1	54.7	4.6	3.2	
2	758.22	26.2	32.9	21.7	26.7	28.5	27.8	27.8	27.8	72.7	18.1	19.0	53.7	5.6	4.0	
3	758.35	26.6	33.3	20.4	26.5	28.6	27.7	28.1	27.7	72.0	18.2	17.8	54.5	6.3	4.5	
4	757.68	27.2	33.1	23.0	27.3	28.7	27.8	28.2	27.8	71.5	18.9	21.0	54.0	5.5	4.1	
5	758.25	26.8	32.5	22.8	27.4	28.5	27.8	28.3	28.0	74.7	19.4	20.1	53.0	4.5	3.5	
6	758.72	26.5	32.8	21.7	27.3	29.0	27.8	28.4	27.9	71.6	18.2	19.0	53.4	5.6	4.0	
7	758.85	26.3	32.2	20.4	26.6	28.4	27.8	28.3	27.9	68.3	16.9	17.6	52.0	6.5	4.8	
8	758.18	26.8	33.8	20.2	26.9	28.7	27.9	28.3	28.0	65.7	16.6	17.8	55.6	7.0	5.4	
9	758.17	26.6	33.0	21.8	26.9	28.6	27.9	28.3	28.2	71.9	18.3	19.0	55.5	5.7	4.0	
10	758.59	26.8	33.3	20.9	27.2	28.9	28.0	28.2	28.1	69.9	17.9	18.5	55.5	6.1	4.2	
11	758.78	26.6	33.4	21.5	27.2	29.1	28.1	28.3	28.1	70.1	17.6	19.0	56.5	6.3	4.7	
12	758.34	25.7	32.1	20.2	27.1	28.8	28.1	28.3	28.2	74.4	18.1	17.6	51.3	4.9	3.7	
13	758.32	25.2	30.7	20.0	26.9	28.3	28.0	28.2	28.1	79.4	18.7	17.2	48.0	2.9	2.6	
14	759.81	25.6	30.6	21.8	27.0	28.2	28.0	28.1	28.2	79.3	19.1	19.4	48.3	3.0	2.5	
15	760.84	25.4	33.4	19.6	26.4	28.2	27.9	28.1	28.1	73.1	17.2	17.1	53.0	5.3	3.9	
16	760.45	25.6	31.4	20.2	26.6	27.8	27.9	28.0	28.2	70.2	16.8	17.5	44.8	4.2	3.4	
17	760.31	24.5	29.6	22.2	26.6	27.6	27.8	28.1	27.7	88.5	20.1	20.8	47.8	1.9	1.3	
18	760.03	26.2	31.9	22.5	26.8	28.5	27.7	28.0	28.0	79.3	19.8	21.3	55.0	3.9	3.0	
19	759.55	26.1	31.6	21.7	27.0	28.4	27.8	28.0	28.0	79.8	19.8	19.5	56.0	3.0	2.6	
20	759.80	25.9	32.5	21.8	27.2	28.3	27.9	28.2	28.0	78.7	19.3	19.9	52.0	3.5	2.7	
21	760.45	26.0	32.4	20.8	27.2	28.6	27.9	28.2	28.0	74.7	18.4	19.0	54.5	4.8	3.7	
22	761.02	26.3	32.4	21.0	27.3	28.8	28.0	28.3	28.1	73.6	18.3	19.1	54.0	5.2	3.9	
23	760.41	24.5	30.0	21.4	27.5	28.1	28.1	28.2	28.1	83.3	18.9	18.7	50.3	1.5	1.5	
24	760.12	24.8	29.8	21.9	27.2	27.6	27.9	28.1	28.1	79.3	18.3	19.7	54.0	2.6	2.3	
25	760.44	24.0	28.5	21.5	26.7	27.7	27.8	28.1	28.1	84.8	18.7	19.0	47.2	1.7	1.6	
26	760.05	25.3	30.2	22.2	26.8	27.8	27.8	28.1	28.1	80.2	19.0	20.4	55.5	3.3	2.3	
27	760.29	26.5	32.7	22.3	27.2	28.5	27.8	28.2	28.0	76.9	19.5	20.6	52.6	4.6	3.5	
28	761.14	26.7	32.9	22.1	27.7	28.8	28.0	28.3	28.1	74.4	19.0	20.3	56.0	4.7	3.6	
29	761.32	26.6	32.8	21.7	27.7	29.0	28.2	28.5	28.1	75.3	19.2	19.4	53.2	4.8	3.7	
30	760.11	26.9	32.3	21.5	28.0	29.4	28.5	28.8	28.1	73.3	19.9	19.2	52.2	5.0	3.6	
31	759.61	27.1	32.6	22.5	28.3	29.5	28.6	28.8	28.2	76.7	20.1	20.2	53.2	4.8	3.8	
Mean Total	759.52	26.0	32.0	21.4	27.1	28.5	27.9	28.2	28.0	75.4	18.6	19.1	52.8	4.5	3.4	
Departure from normal	-0.99	-0.6	-0.5	+0.1						+3.8	+0.4				105.6	

Day.	Wind.				Clouds.				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.		Sunshine.	On the tower.	In the park.		
					Amount (mean).						
					Upper.	Lower.					
		Km.	Km.		0-10.		h.	m.	mm.	mm.	
1	W quad.	182	17	W, NNE	4.9	Ci.	7	25			
2	E quad.	200	22	ESE, SE	3.7	A.-Cu. E	10	15			
3	NE, SE	235.5	19	SE	2.7	A.-Cu. E	9	45			
4	E quad.	214.5	18	E	4.8	A.-Cu. E	7	25		☉ ☉ a.	
5	ESE	189	15	N	9.2	A.-Cu. E	1	50			
6	ESE	234	21	ESE	5.8	A.-Cu. NE	6	05			
7	ENE, E	226	20	SE	6.0	A.-Cu. E	6	00			
8	NE, ENE	249	25	EbyN	3.1	A.-Cu. E	9	45			
9	E, SE	229	21	SE	5.8	A.-Cu. SE	7	05			
10	E quad.	212.5	18.	W, ESE	4.6	Cl. A.-Cu. NE	8	55			
11	NE, ENE	236.5	22	E	6.6	A.-Cu. E	6	10			
12	E quad.	198	15	WSW, ENE	6.4	Ci.	6	00		d° p.	
13	E quad.	173	18	W	9.0	Ci.-S. NE	2	15	2.2	2.2	
14	E	154	14	NNE, ENE	9.1	Ci.-S.	0	05	1.5	1.3	
15	E	201	20	E	4.5	Ci.	8	25		☉ a. d° p.	
16	E	173	19	NE	7.5	A.-Cu. E	3	30	3.6	3.8	
17	N quad.	130.5	15.5	NW	9.2	A.-Cu. N.	0	05	7	7	
18	W quad.	147.5	15	WNW	7.1	A.-Cu. E	3	50	.1	.1	
19	E quad.	175.5	18	ENE	6.0	A.-Cu. E	5	50	2.1	1.9	
20	Variable.	145.5	15	W	6.1	A.-Cu. SE	6	55			
21	E, W	185	16	W	4.7	A.-Cu. E	8	25		☉ p.	
22	E, SE	192	20	SE	3.6	A.-Cu. E	9	25			
23	SW, E	136	13	SW	7.9	Cu. E	1	30	5.9	6	
24	E	179	21	NE	9.4	A.-Cu. s.-Cu. E	0	35	21.6	23.6	
25	ENE, ESE	157	17	ENE	9.4	Ci.-S. Fr.-N.	0	00	3.6	3.7	
26	NE, ESE	194	19	NW	8.4	A.-Cu. SE	2	25		d° a. ☉ p.	
27	SW quad.	202.5	15.5	SSW	3.9	A.-Cu. E	10	20		d° a.	
28	W quad.	160	12	NE, SW	5.7	Ci. Cu. NE quad.	7	25			
29	W quad.	161	16.5	NW	3.6	Ci. E	8	35			
30	W, WSW	190.5	15	WSW	2.8	Ci. ENE	8	30			
31	W quad.	195	15.5	SW, WSW	6.2	Ci.-S. S	7	15		☉ p.	
Mean Total		189	17.7		6		5	52			
Departure from normal		-986.5			+1.5		-54	13	+29		

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

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.<sup>a</sup>

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

Day.	Pressure <sup>b</sup> (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. <sup>c</sup>	Free exposure (total)	Shelter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	636.26	19	25.9	10.00a.	15.2	6.35a.	25.5	10.40a.	13.7	6.00a.	76.3	12	12.6	58	4	2.9
2	35.83	17.8	24.6	11.15a.	14.3	4.50a.	25.4	0.15p.	13.7	6.15a.	83.3	12.6	12.9	56	2.9	2
3	36.38	18.2	24.9	2.00p.	14.3	6.30a.	24.4	2.15p.	13.4	3.40a.	85.2	13	12.1	59.1	3.2	2.1
4	35.69	18.9	25.8	11.00a.	14.5	6.05a.	26.2	11.15a.	13.1	6.00a.	73.5	11.6	13.1	59.6	4	2.6
5	36.18	18.4	23.7	Noon	14.9	4.25a.	25.5	10.25a.	13.9	4.30a.	83.2	12.9	13.2	62.3	2.1	1.8
6	36.66	18.4	24	1.30p.	15.4	1.25a.	24.9	1.40p.	14	3.35a.	84.8	13.3	13.7	56.7	2.5	1.6
7	36.47	18.2	24.5	9.40a.	15.4	6.00a.	26.7	0.40p.	14	6.25a.	86.5	13.4	13.5	57.4	2.6	2
8	35.93	18.3	25.8	11.20a.	14.5	6.00a.	26.1	0.25p.	13.7	6.00a.	73.7	11.6	13	56.3	6.3	4
9	36.26	18.9	25.9	10.30a.	13.6	4.30a.	25.7	1.25p.	11.5	6.25a.	73.8	11.8	10.7	56.6	4.7	2.7
10	36.40	18.9	25.1	11.20a.	15.3	10.00p.	26.6	0.40p.	14.5	4.20a.	75.5	12.2	13.7	59	6.6	4
11	36.64	19.3	25.5	10.35a.	14.6	4.05a.	25.7	11.00a.	13.9	2.05a.	68.7	11.3	13.2	59.7	5.3	3.7
12	36.11	18.2	26.3	11.35a.	14.4	2.40a.	27	0.40p.	13	4.45a.	73	11.2	13.2	55.7	6	3.6
13	36.51	19.2	25.8	11.10a.	14.2	6.00a.	27.4	0.30p.	12.9	6.00a.	68.2	10.8	11.8	56.4	5.7	4
14	37.25	18.2	25.4	1.10p.	13.8	5.50a.	24.5	1.15p.	13.7	6.20a.	83.7	12.9	12.6	56.2	3.4	1.8
15	38.01	18.2	24.8	10.40a.	15	12m. n.	24.8	11.00a.	13.5	12m. n.	78.2	12	13.7	60.1	4.5	3.3
16	37.63	18	25.2	2.45p.	14.1	6.05a.	26.6	1.40p.	12.5	3.35a.	77.2	11.7	11.2	54.8	5.6	3.7
17	37.26	16.6	22.6	10.40a.	14.8	9.15p.	24.5	11.40a.	13.7	4.00a.	89.2	12.5	12.9	55.7	4.1	2.2
18	37.48	18.1	23.4	11.15a.	15.5	0.05a.	25.4	11.45a.	15	1.00a.	76.8	11.8	14.1	58.6	3.5	2
19	37.46	18.3	25	0.35p.	14.5	3.40a.	24.8	10.50a.	13.7	4.20a.	82.8	12.7	12.8	59	3	2.1
20	37.57	17.6	23.9	9.05a.	15.5	5.00a.	23.9	0.50p.	13.5	5.35a.	85.3	12.9	13	63	2.3	2.1
21	37.85	17.2	23.9	1.00p.	14	6.00a.	23.7	1.20p.	12.7	2.00a.	86.3	12.6	11.5	63.3	2	1.6
22	38.34	17.6	23.5	3.05p.	14.5	5.50a.	23.5	2.30p.	13.2	6.15a.	84.8	12.6	12.7	60	3.1	1.5
23	37.52	16.8	22.8	1.00p.	13.8	6.10a.	23.7	1.40p.	13.2	6.00a.	86.7	12.4	11.5	60	2.2	1.3
24	37.05	16.2	21.9	10.55a.	14.4	6.10a.	23.4	0.25p.	14.6	5.40a.	86	11.7	13.5	58	1.4	1.2
25	37.20	16.4	21.9	10.05a.	13.7	12m. n.	23.4	11.20a.	13.6	11.25p.	87.2	12	12.3	56.5	1.4	1.1
26	36.82	16.7	21.9	10.00a.	13.5	0.20a.	22.9	11.15a.	13.2	6.20a.	88.2	12.4	12.2	57.2	1.9	1.5
27	37.51	16.1	21.3	11.35a.	14.4	5.00a.	21.3	11.40a.	13.9	5.20a.	90	12.2	12.7	58.4	1.3	1.2
28	38.33	17	23.6	10.40a.	13.8	6.00a.	23	11.15a.	13.2	6.20a.	84.5	12.1	12.4	59.5	3.2	2.1
29	38.66	16.8	22.9	0.05p.	14	3.00a.	23.7	1.40p.	13.3	3.00a.	86.8	12.5	11.5	61.5	2.3	1.6
30	37.62	16.9	21.4	3.25p.	14.7	2.40a.	21.9	0.50p.	13.8	4.00a.	89	12.8	12.9	53	1.9	1.2
31	37.29	17.4	23.3	2.55p.	14.4	6.00a.	23.8	2.20p.	13.1	5.00a.	87.2	12.9	12.2	62	2.7	2
Mean	637.04	17.8	24.1		14.5		24.7		13.5		81.8	12.3	12.7	58.4	3.4	2.3
Total															105.7	70.5

Day.	Wind.				Clouds.				Sun-shine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. <sup>d</sup>	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.					
		Km.	Km.		0-10.	Upper.	Lower.		h. m.	mm.	
1	E	343.4	24.9	W	4.3	Ci.	Cu.-N. SW	5	10	5.1	☉ ☁ p.
2	E	405.1	28.2	E	5.1	Ci.	Cu.-N. SW	4	15		☉ p.
3	Variable	275.6	26.8	W	5.9	Ci.	cu. ESE, EbyS	4	40		☉ ☁ ☽ a. p.
4	E	358.8	24.1	E	3.9	A.-Cu.	Cu.-N. SE	4	50	.8	☉ ☁ ☽ a. p.
5	E, SW	334.7	22.5	W	5.9	Ci.	Cu. NE	2	25	6.9	☉ ☽ ☽ ☽ ☽ p.
6	E quad.	339.2	23.6	SW	7.3	Ci.	Cu.-N. E	2	00		☉ ☽ p.
7	E	329.2	20.3	E	5.7	Ci.	Cu.-N.	3	45	.8	☉ ☽ ☽ ☽ p.
8	E	489.9	31.1	SE	2.7	Ci.	Cu. S	4	25		☉ ☽ p.
9	E	313.3	24.4	E	3.7	Ci.	Cu. NW	6	00		☉ ☽ p.
10	E	330.5	22.2	E	2.9	Ci.	Cu. SE quad.	5	55		☉ ☽ a.
11	E	415.2	29.6	E	3.7	Ci.	Cu. ESE	5	50		☉ ☽ p.
12	E	363.8	28.2	E	3.3	Ci.	Cu. SSE	5	20		☉ ☽ ☽ a. p.
13	E quad.	338.6	30.4	SW	.9	Ci.	Cu. SSE	7	45		☉ ☽ p.
14	W quad.	318.5	27.4	W	5.3	Ci.	Cu. ENE	5	00	2.8	☉ ☽ ☽ a. p.
15	E	310.5	22.3	SW	4.9	Ci.	Cu. ENE	3	15		☉ ☽ p.
16	E	344.4	30.9	E	3.6	Ci.	Cu. SE	5	35		☉ ☽ p.
17	E	385.8	39.1	E	8	Variable	Cu.-N. ESE	0	45	43.4	☉ ☽ ☽ ☽ ☽ p.
18	E	425.7	37.2	E	8.9	A.-Cu.	Cu.-N. SE	2	00	4	☉ ☽ ☽ ☽ ☽ ☽ ☽ ☽ p.
19	E	306	26.9	W	4.9		Cu.	4	25		☉ ☽ ☽ ☽ p.
20	E quad.	216.7	20.3	W	6.6	Variable	Cu.-N. WNW	2	40	1.3	☉ ☽ ☽ ☽ p.
21	E quad.	279.8	26.6	W	5.3	Ci.	Cu. SE	5	05	6.6	☉ ☽ ☽ ☽ p.
22	W, N	354.9	25.4	W	4.9	A.-Cu.	Cu. NNE, W	4	25		☉ ☽ ☽ ☽ p.
23	E	349	20.6	SW	6.9		Cu. NbyE	2	20		☉ ☽ ☽ ☽ ☽ p.
24	E	292	22.5	E	10	Ci.-S.	Cu.-N. S, ENE	0	25	4.8	☉ ☽ ☽ ☽ ☽ ☽ p.
25	E	330.7	25.1	E	9.3	A.-Cu.	Cu. E	0	55	13.3	☉ ☽ ☽ ☽ ☽ p.
26	SE	296.8	22.3	SE	7.7	A.-Cu.	Cu. E	1	50	5.6	☉ ☽ ☽ ☽ ☽ ☽ p.
27	Variable	306.8	24.4	W	8.3	Ci.	S.-Cu. SW	2	45	21.9	☉ ☽ ☽ ☽ ☽ ☽ p.
28	E	422.7	24.4	E	5.1	A.-Cu.	N. S	2	45		☉ ☽ ☽ ☽ ☽ p.
29	Variable	332	22.5	W	6.4	Ci.	Cu. W	3	50	31	☉ ☽ ☽ ☽ p.
30	W, E	293.5	19.6	W	7.9	A.-Cu.	Cu.-N. NW	1	10		☉ ☽ ☽ p.
31	E, W	343.9	22.7	W, E	6.6	Ci.	Cu.-N. SE	4	20	1.3	☉ ☽ ☽ p.
Mean		340.2	25.7		5.7			3	44		
Total		10,547						115	50	149.6	

<sup>a</sup> 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.  
<sup>b</sup> The barometric readings of this station are not reduced to sea level.  
<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.  
<sup>d</sup> 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, MARCH, 1917.

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.
Isabela, Basilan	3.3	2.3	1.3	38.1	7.6	0.8				0.3	9.9	2.8				9.7
Zamboanga	3	.5	22.9		4.8		3.3			6.1	6.3	11.7				
Davao		3.8	2.5	8.9	11.7					13.5	13.2	6.4			25.4	8.3
Cagayan, Misamis				1.8						7.6	11.2					
Butuan		3.3	6.1	46.4	4.1	.6		2.8		8	.8	5	5.4		18.3	2.1
Mambajao					.8				11.4	.8			4.6	2		
Dumaguete		1.8										2				
Yap, W. Carolines	30.8	22.9	8.1	1	5.8			2.3						.3		
Tagbilaran	*	*	*			*	*									
Iwahig				2	12.5	.3						5.8	2.3			.1
Surigao	8.4	31.4	.9	24.2	1.8	18.6	3	1.8	.5	11.4	4.8		6.8	5.6	30.1	1.8
Maasin			5.6	22.9				4.6							14.2	
Cebu	9.7			4.8		6.6	3				1		.8	.8		
Iloilo		5.1					.3									
San Jose Buenavista	.3	2					.5									
Cuyo																
Ormoc	3.5	5.3	6.2	13.7	1.3		1	3			.5		13.2	8.2	1.6	9.9
Guiuan	14	21.3	.8	87.8	11.8	3.3	1	1		4.1	6.9	1	30.7	9.1	80.5	.8
Tacloban	19.2	2.8	4.8	25.5	11	3.7	.5	1.8	.8		3.2		10.8	9.1	3.3	12.4
Capiz	3.6		1	4.6	5.1	1.8	.3							8.9		.3
Borongan	43.2	7.2	5.8	85.6	5.6	7.4	3.8	3.1	4.6		10.2	3.6	20.6	24.7	17.8	9.2
Catbalogan	25.4			31.5	10		1.3		3.8		1.8	.3	7.1	10.7	13.7	
Calbayog	19.8	.5	10.7	46.5	4.1		5		16.3				1	1	1.3	7.4
Masbate						1.3	14.8	.3	4.1			1.8	1.3	.5	1.3	.5
Romblon					1	1.3	19.6	.3	1	2.5	.6		6.3			
Batag		2	2.3	1.3		24.9	1.5	9.1		3.6		4.8	1		2.5	12.7
Sorsogon			6.1	29.1	4.6	12.7	1.8	14.2	6.4	6.9	26.7	1	9.3	2.8	15	53.3
Legaspi	15.8	6.6	18.5	26.9	17.6	1	3	10.2	12.5	2.5	12.2	1.5	7.2	2.8	9.1	25.7
Sumay, Guam										1.3						
Calapan	.5			1.3				8.1	6.4	.8	9.7				1.8	3.6
Virac	15.3	3.3	17.8	17.2	17.8		9.9	10.2	8.4		21.1	1.8	9.7	1	12.5	37.1
Naga			11.2	.5	1		.5	1.3	1.3		.3		7.9			2.6
Batangas																
Lucena		2.3	1.5	5.3	1.5			6.4		1.8	.5	10.7	7.1			1.8
Atimonan								12.2		8.9		13.9	31.6		4.1	
Ambulong, Tanauan													14.5			2.5
Canlubang, Calamba									1.3		.8		8.1			6.6
Paracale		2.3	7.4	32.8	7.9			15.6	1.3	22.5		2.5	26.9	6.1		29.2
Santa Cruz, Laguna			5.6	6.6				9.1		1	1.3		12.4		1.8	6.9
Manila													2.2	1.5		3.6
Antipolo					2.5							.8	1.5			1.5
Iba														.8		
San Isidro																
Tarlac																
Baler		9.4		8.6	9.2	1.3	5.3			1		.8	15.5	3.8	3.3	119.4
Dagupan													.8			
Bolinao														17.3	5.6	
Baguio	5.1			.8	6.9		.8							2.8		
San Fernando, Union																
Echague		2.5			13	.8	5.4				.8					26
Candon																
Vigan																
Tuguegarao							3									3.8
Laoag																
Aparri	3.1	.5		1.9	.3		5.1	5.1							30.5	9.6
Cape Bojeador	2.8					2.8									4.3	
Santo Domingo, Batanes	38	.2	7	2.5	.2	2.6			1	10.7				27.1	3	.8

\* No observation.



Daily rainfall at the stations of the Weather Bureau, March, 1917—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.....			8.4	14.7				0.3	0.3				0.3	0.5		95
Isabela, Basilan.....			7.9										3.6			77.3
Zamboanga.....				3.3									6.4	1.5		75.5
Davao.....					3.8							40.9	21.8			145.9
Cagayan, Misamis.....												1.3				3.9
Butuan.....	0.6	0.3	1.5	8.2	21.6		0.5			9.4	0.3	27.7	4.8			171.7
Mambajao.....		8.4		2.3	14.5											44.8
Dumaguete.....															35.6	37.4
Yap, W. Carolines.....	4.1	7.9	2.8		5	4	.5	.8	50.6	5.8			13.5	11.4		173.1
Tagbilaran.....							3						4.1			9.1
Iwahig.....				6.3			.5					3.3	4.6	1.3	5.3	44.3
Surigao.....	18	6.6	.5	11.7	10.4	.3	4.6	.3		3.8	22.1		10.4	.8		240.6
Maasin.....				11.2	11.9							5.6	25.7			101.7
Cebu.....						3.6						1	7.9			39.2
Iloilo.....				1.5			.5	1.3				5.1				13.8
San Jose Buenavista.....								.3					2			5.1
Cuyo.....								5.3							1.3	6.6
Ormoc.....	3.9	.5		21.1	38.4		2.1		2.3			.5	1.6			134.1
Guiuan.....	4.1	3	6.4	1	2.6	1.8	5.9		1.5			3.6		.5	9.4	302.9
Tacloban.....	2.5	1.3	.6	2.2	13.5	.3	2.5	1.4	18.8	1.5	.2	.6	2.3			156.6
Capiz.....						.3							.3	.8		27
Borongan.....	5.5	7.3	2.5	22.1	9.9	28.2	1.8	.8	31.7	26.9	2.6	21.1	3		2	417.8
Catbalogan.....	2.1	1.8		1	.8		1.3		28.2	1			8.9	1.8	6.4	158.9
Calbayog.....	33.6	9.9	4.6	27.7	38.6			1.3	12.2	9.9	2.8	1	21.1			270.8
Masbate.....	2							2.5	20.6							51
Romblon.....	1.5	.6				1.3		2	10.4	.3					8.1	56.8
Batag.....	6.1	1.3		4.6	14.2	6.6	1.3	.8	1.3	1.5		1.3				104.7
Sorsogon.....	44	66	8.7	33.8	30.4	4.1	12.2	38.8	31.5	161.5	30.5	3	33			687.4
Legaspi.....	25.4	14	1.5	17	6.1	1		69.6	4.4	97.7	16.3	5.1	22.3		8.9	459.7
Sumay, Guam.....	15.2		1.3	3.8	14						6.4					42
Calapan.....	8.1	4.8	.5			5.8	.5		2.8	34	.8	1		1.5		92
Virac.....	15.7	22.9	4.4		2.3		3	11.7	1.8	6.4	12.7	5.8	8.4		.3	278.5
Naga.....	7.9	4.4			2			10.4	22.9	6.4		2	26.7		16.3	125.6
Batangas.....									11.9			1.8	1.8			15.5
Lucena.....		3.6	22.9			2	.5		2.8	8.6		7.6				76.3
Atimonan.....	3.8	3.6				2.3	29.2		90.1	17.3	1.8		1.5			230.9
Ambulong, Tanauan.....	.5								.5							18
Canlubang, Calamba.....		1.5	.5						5	3		34				56.3
Paracale.....	43.5	6.9		2.1		2.8	16.8	52.9	3.3	17.5	6.3	.5	13.7	7.3	10.9	339
Santa Cruz, Laguna.....	7.4		11.7	1				2.5	2		15.5	.3				85.1
Manila.....	7	.1	2.1					5.9	21.6	3.6						47.6
Antipolo.....	5.6		.8			11.5	3.8		1.1							29.1
Iba.....			1				39.6		10.7							51.3
San Isidro.....	1.1							.8	1.3	1.3					37.8	43.1
Tarlac.....				1.3				.5		15.5			5.6			22.9
Baler.....	10.7	1.8	4.6	15	.8	4.3	8.4	3.1	21.6	12.5	2.3	1.8				264.5
Dagupan.....							15.3		5							16.6
Bolinao.....								46.7	5.1	16.3						91
Baguio.....	43.4	4		1.3	6.6			4.8	13.3	5.6	21.9		31		1.3	149.6
San Fernando, Union.....									13.2							13.2
Echagüe.....	5			5.8	2.8		7.1	2.5	6.3	.3	25.9	2	.8			107
Candon.....	2						1.3			5.6						8.9
Vigan.....	1									15.7						16.7
Tuguegarao.....	3.3			52.3			5.3	1.8		1.5	7.4	1.5	3.8			83.7
Laog.....										11.5	8.9					20.4
Aparri.....	.8			12.2	12.9	20.4	1.5	12.2		9.7	16.6	4	12.4	29.3	8.6	196.7
Cape Bojeador.....										66.1						76
Santo Domingo, Batanes.....	6.7	.1	8.6	19.7		1	2.9	2.5	1.3	5.3	22.6	19.2	15.7	10.9	11.8	221.4

<sup>a</sup> 24 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, MARCH, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cagayan, Misamis.		Butuan.		Mambajao.		Dumaguete.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	29.4	20.6	33.6	21.1	29.9	23	33.2	21.3	31.6	22.6	30.9	22.7	28.9	23.9	30.6	24.8
2	29.6	21.4	33.8	22.7	32.9	22.6	31.7	21.5	31.2	21	31.1	22.3	29.6	24.6	29.2	25
3	29.5	21.4	34.1	23.6	32.9	23	30.7	21.3	30.2	22.4	30.4	22.7	29.9	24.6	30.4	24.6
4	29.6	20.9	34.1	23.3	32.5	22.7	34.2	20.4	32	21.8	33.3	22.2	29.8	23.6	30.5	24.2
5	29.1	21.3	32.1	24.1	29.2	23.8	32.9	22.5	30.2	23	33.1	22.5	29.1	24	32	24.3
6	29.5	21.6	33.6	23.1	33.9	22.9	32.7	22	32.6	23.4	33.4	22.7	30	24.2	30.7	24.6
7	29.9	21.7	34.1	22.6	30.2	24	33.2	20	33.6	21.6	33.7	22.7	30.4	24.6	28.7	25.1
8	30.1	21.4	31.6	22.7	34.2	23.4	33.2	21	33.7	21.5	-----	-----	30.4	24.2	29.8	24
9	29.9	22.1	34	22.6	30.2	24.1	32.2	21	31.6	21.2	33.7	21.9	30.3	22.5	29.8	25
10	29.9	21.8	34.1	22.8	30.5	21.1	32.7	22.5	32	21.1	30.9	21.8	29.2	23.9	29.3	24.7
11	28.5	22.4	33.1	22.7	28.7	21	32.2	22.5	31.8	22.8	32.1	22.3	30.5	24.5	28.9	25.6
12	27.2	20.5	32.2	23.1	27.7	22	31	21.5	31.9	22	32.7	22	30.6	24.6	29.5	25.4
13	28.2	21.3	32.2	22.1	30.2	21.4	31.2	21.4	29.9	21.2	31.9	22.3	29.6	23.9	29.6	24.8
14	30.4	20.4	34.1	23.3	31.6	22.4	29.7	21.5	30.5	21.5	32.7	21.6	29.6	23.5	29.4	24.7
15	31.1	21.6	33.1	23.1	33	23.8	26.2	19.5	31.4	21.5	31.3	22.5	29.2	24.2	29.4	24.7
16	29.4	21.7	34.2	23.8	31.9	23.5	32.2	21.1	32	22.9	32.9	21.2	29.6	23.5	30.3	25.7
17	29.5	21.3	33.6	22.5	32	22.8	33.7	20.5	31.5	22	33.6	22.1	30	25	29.8	25.8
18	29.7	20.6	33.1	22.1	30.9	23.4	32.2	21.5	32	21.9	33.6	20.9	30.5	24.2	29.7	24.1
19	29.4	20.5	30.4	22.3	30.2	23.3	33.2	21	32.2	22.4	32.6	22.7	30	23.6	29.8	25.7
20	31.4	21.4	33.6	22.9	29.2	24	32.7	20.5	31.4	21	31.4	21.3	30.5	23.4	29.5	24.7
21	29.2	21.6	34.1	23.4	31	22.6	33.2	21	31.5	22.4	33.3	22.2	30.2	23.2	31.2	25.2
22	29.5	20.9	34.6	22.6	32.4	22.1	33.7	21	32.6	22.1	33.1	21.9	30	23.2	30.8	25.2
23	29.5	22.3	-----	21.1	33	23	34.2	21	32.2	23	33.2	21.9	30	24.2	29.8	25
24	30	21.5	33.1	22.1	32	23.3	34.7	20.3	31.5	20.5	34.2	22.1	30.1	24.8	29.5	23.8
25	29	21.4	35.1	22.6	33	23.2	33.8	21.4	31.6	20.1	34.3	21.4	30.6	24.8	29.4	23.2
26	29.3	19.6	32.1	21.6	30.2	22.8	34.2	20.4	32.5	20.3	34.2	21.4	30.3	24.4	30.4	23
27	29.4	20.3	34.8	22.7	33	22.5	32	20	33.2	21.8	33.8	22.1	31.1	23.8	29.8	25.9
28	29.3	21.2	32.2	22.2	30.2	23	31.7	21	32.5	22.1	33.4	22.4	30.7	24.9	29.3	25.5
29	29.8	21.4	32.4	23.1	29.1	23.9	31.7	21	32.1	22.1	32.1	22.7	30.5	24.4	29.8	25.7
30	28.7	22.3	33.3	22.6	30.2	23	32.2	21.5	32	23	33.9	21.7	30.6	23.2	29.8	24.9
31	29.7	21.3	33.6	22.6	30.9	22.7	33	21.3	32.1	22.2	34.4	21.5	30.6	23.2	30.4	23.3
Mean	29.5	21.3	33.3	22.7	31.2	22.9	32.4	21.1	31.8	21.9	32.8	22	30.1	24	29.9	24.7

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.
1	32.2	22.5	-----	-----	31.1	21.5	28.7	22.8	31.4	22.1	29.7	24.6	30.6	23.9	33.3	22.5
2	32.9	22.5	-----	-----	30.2	22.6	30.3	24	32.4	23	29.2	23.8	30	24	31.9	22.1
3	32.2	22.6	-----	-----	31.6	21.8	29.3	23.5	31.1	23.3	29.4	25	30	24.1	32.2	22
4	33.1	25	-----	-----	30.9	22.9	31.8	22.8	30	22.3	29.1	24.4	30.7	23.9	33.7	22.4
5	32.2	24.9	-----	-----	29.3	23.7	31.8	23.2	30.8	22.4	29.9	24.4	30.2	24.1	33.2	23.5
6	32.8	25	-----	-----	30.7	22.8	31.2	23.5	32	22.6	30.3	24.8	31	24	35.9	23.4
7	33.2	25.1	-----	-----	31.5	21.4	31.3	23.1	31.6	23.2	29.3	23.9	30.3	24	33.2	22.5
8	32.8	25.7	32.4	21.6	31.1	22	32.2	25.6	33	23	29.9	25	30.6	23.5	34.2	20.5
9	32.4	24.7	32.1	22.4	31.7	20.9	32.1	22.7	32	22	29.9	24.9	30.7	23.8	33.7	20.5
10	33.1	24.6	31.4	22.4	30.7	21.5	29.2	23.6	32.4	21.4	29.3	24.8	30.2	23.5	33.7	22
11	32.8	24.6	32.8	22.6	32	21.5	31.7	23.5	32	23	29.2	24.8	30.8	24.2	36.1	21.6
12	32.9	24.6	31.4	22.7	31.5	21.6	31.7	22.5	32	22.5	29.2	24	30.3	24	33.4	22.5
13	32.8	25	30.6	22.4	29.6	22.4	32.7	23	31.5	22	30.6	24.6	30.2	23.3	32.8	20.4
14	33	24.7	30.7	22.4	31.4	21.8	32.3	22.1	32.3	23.2	30	23.8	30.5	23.6	34	22.8
15	33.2	24	30	22.7	31.2	22.9	29.9	22.3	31.4	21.6	29.5	23.8	29.9	23.5	34.3	22
16	32.7	24.8	31.7	22.2	30.6	22.5	31.9	21.2	32	21.6	30.5	25.2	31.1	23.6	34.2	22
17	33.6	25.4	31.4	21.8	31.3	21	30.7	23	31.5	21.8	30.2	24.9	30.7	23.7	34.2	23.5
18	32.8	23.5	31.3	21.2	31.6	21.9	32.3	22.5	33	22	30.1	24.6	31.2	23.7	34.6	23
19	33.2	23.2	31.4	22.3	31.6	21.4	32.3	22.8	32.6	22.2	30.1	24.8	31.6	23.2	34.2	23.4
20	33.2	23.2	31.2	21.6	31.2	21.9	31.8	22.5	32.5	22.5	30.8	24.8	31.5	24	34.8	22.4
21	33.2	24.5	31.9	22.6	31.5	21.1	31.8	23.2	32	22	31.3	25	31.5	24	33.8	24.4
22	33.6	23.5	31.9	23	31.4	22	31.8	23.3	31.9	22.4	30.6	23.7	30.8	23.5	34.2	22.5
23	33	23.1	30.9	21.6	32	20.6	32.2	23.2	30.8	22.1	30.3	24.2	30.7	23.2	34.3	21.5
24	33.5	24.7	30.7	21.3	31.9	21.4	32.2	23	33	21	29.8	24.1	31	23	34.7	22.5
25	32.2	24.7	32.1	21	31.5	21.1	32.8	23.2	34	21	30	24.1	31	23.2	34.2	21.5
26	33	22.6	31	21.7	32.2	20.7	32.7	23.2	33	22	29.9	24.5	31	23.8	34.2	21.9
27	32.9	23.7	32.7	22.8	32.4	20.5	32.7	22.9	32.8	21.1	30	24.4	31.5	24	34.6	22.5
28	32.2	24.1	33.4	21.1	32.9	20.4	30.7	23.2	32.5	21.8	30.5	24.9	31.6	23.8	34.6	22.4
29	32.8	24.3	30.8	22.6	32.4	21.4	32.3	22.5	32	23.1	28.6	23.5	31.6	23.6	34.6	22
30	31.8	23.3	32.2	21.6	32.4	20.6	32.7	22.1	32.4	22	30.5	24.6	32.1	24	33.8	22.6
31	32.7	23.3	31.5	21.5	32.9	22.1	33	22.2	33.3	22.2	31.5	23.5	32.3	23	34.2	23
Mean	32.8	24.1	31.6	22	31.4	21.7	31.6	23	32.1	22.2	30	24.4	30.9	23.7	34	22.3

Maximum and minimum temperatures at the stations of the Weather Bureau, March, 1917—Continued.

Day.	Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catalogan.		Calbayog.	
	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	30.7	26	28.2	22.3	28.8	23.8	25.9	22.2	31.4	24.2	29.2	23	29.5	21.4	30.6	21.1
2	30.6	26.4	32.1	22.6	31.7	24.3	32	22.5	31.3	25	30.5	22.8	31.5	21.6	33	22.6
3	30.5	26.1	31	23.3	30.8	23.8	30.9	23.4	30.2	24.4	30.6	23.8	31.6	22.8	31.3	23.2
4	31	26.1	30.4	22.4	30.1	23.6	27.9	23.3	31.7	23.8	29.1	22.7	30.7	22.2	32	22.8
5	31.4	26.1	28.2	23.2	28.6	22.4	27.5	22.5	30.5	23.6	29.1	22.3	28	22.6	27.8	23.2
6	31.4	26.1	32.6	20.6	30.4	25	32	22	31.8	24.2	30.5	22.5	32.1	20.7	33.2	21.4
7	30.2	26.6	32.5	23.4	30.8	25	31.3	23.4	30.4	24.6	30.5	23.2	30.9	22.7	32.5	23.5
8	30.7	25.8	32.8	21.6	30.9	25.4	31.8	22.8	31.9	23.7	31.2	23.8	32.6	22.2	34	21.8
9	31.4	26	32.7	22.1	31.5	24.3	31.3	23	31	24.2	30.7	23.3	31.1	21.4	29.9	22.1
10	30.5	25.9	32.2	21.3	30.8	24.3	31.4	23	31.5	23.8	30	23	32.1	21	30	21.7
11	31	26.3	33	24	30.8	23.9	32.8	23.5	32	24.8	31	24.1	32	22	34.5	22.1
12	31	26.3	32.4	22.5	31.7	23.5	32.3	23	30.5	24.8	31.1	23.4	32	21.5	33.7	23.1
13	29.3	23.9	32.5	21.6	31.9	24.7	31.1	23.2	31.6	23.5	30.9	22.9	32.6	22.2	32.2	22.8
14	30	23.6	30.1	22.8	30.5	22.5	29.7	22.7	30.9	24.8	30.6	22.1	32.4	22.2	33.6	22.4
15	31	26.1	29.9	22.5	29.4	23.3	28.3	23	31.6	23.9	30.5	21.7	28.5	21.8	29.8	22.8
16	30.5	25.9	30.6	21.4	31.2	23.4	31.7	23	31.5	24.1	30.4	22.7	31.5	21.5	31.4	22.7
17	31.9	25.8	30.6	21.8	31.1	25	31.2	22.8	32.3	25	30.7	22.5	31.4	22.6	30	22.6
18	31.9	26.2	31.4	21.3	31.9	22.6	31.6	22.4	32.2	24.9	30.6	23	31.9	21.2	31.4	22.5
19	32	26.2	31.6	21.4	31.8	23.2	31.4	23.2	32.6	24.7	30.6	22.7	32.3	21.7	31.9	22.5
20	32.8	26.4	32.1	20.9	31	24.3	29.6	23	32.7	24.6	30.5	23	30.9	21.5	32.7	21.8
21	31.5	26.5	31.1	22.6	31.3	23.3	31	23	32.2	24.9	29.2	22.9	29	22	28.7	22.2
22	31.7	26.6	31.6	22.2	31.5	24.1	31.4	22.9	32.2	24.5	30.9	22.1	30.3	21.2	34.2	21.6
23	31.7	26.4	30.6	21.4	30.8	24.3	29.8	22.7	32	24.5	30.6	22.1	31.8	-----	33.4	22.5
24	31	26.6	31	21.4	30.9	24.9	31.7	22.6	32.1	24.9	30.5	22	31.7	-----	32.7	21.6
25	31.8	26	30.1	21	31.6	25	31.4	22.3	32	24.6	29.5	21.2	30.5	-----	29.6	21.6
26	32.7	23.3	31.5	21.7	31.4	25.5	30.9	22.2	31.8	24.7	30.6	22.6	31	-----	30.1	21.4
27	32	26.3	33	20.9	31.6	25.2	31.7	23.2	32.5	24.5	30.1	22.9	31.3	-----	30.5	22.8
28	32	26.4	34	21.3	31.2	22.5	32.5	21.1	32.5	24.9	31.1	21.4	32.9	-----	32.1	21.4
29	31.9	26.3	30	22.3	31.5	24.5	30.3	23.5	32.5	25.1	31	23.1	32.2	23.1	31.3	22.3
30	31.5	26.4	32	20.4	32.8	22.2	31.9	22.9	32.1	24.3	31	21.7	31.5	20.8	32.1	21.6
31	32.6	26.4	32.2	20.6	32.7	22.8	31.7	22.6	33	23.8	31.5	22	31.1	21.5	31.8	22.4
Mean	31.3	26	31.4	21.9	31.1	24	30.8	22.8	31.8	24.4	30.5	22.7	31.3	21.8	31.7	22.3

Day.	Masbate.		Romblon.		Batag.		Sorsogon.		Legaspi.		Sumay, Guam.		Calapan.		Virac.	
	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	23.8	32.9	23.7	29.2	23	30.9	22.5	29.9	23.2	30.2	25	31.4	24.5	30.7	21.7
2	30	24.4	31.8	24.4	29.4	23	31.2	22.7	29.9	24.3	30.2	25	31.5	24.8	31.7	21.5
3	30.8	24	33.5	23.3	29.3	23.6	31.5	23	28.7	23.4	30.2	25	31.6	24	29.7	22
4	29.6	23.5	33.2	24.8	29.4	23.6	31	23.5	28.9	23.9	30.8	25.6	31.5	24.6	30	21.4
5	29.4	24.6	32.4	25.2	29.3	23.2	29.9	23.2	27.4	23.3	30.4	24.8	30.5	23.6	29	21
6	30.6	24.4	32.9	24.7	29.6	23.5	31.5	23.4	29.9	24.7	30.4	24.8	31	24.1	31.2	21.5
7	30	23.2	32.4	23.4	29.2	23	30.5	21.1	30.1	25	30.8	25	30.5	24.5	32	22
8	30.8	23.2	33	22.7	29.6	22.8	29.9	21	29.4	24	30.2	25	31.5	23.8	30.2	21.4
9	28.2	24.4	31.7	24.2	29.3	23	30.9	22	28.4	22.4	30.4	24	32.2	23.6	31.5	20.9
10	30.2	23.6	33.4	23.5	29.7	23	30.5	22.5	30.8	24	30.8	24.6	32	24	32.4	20.8
11	30.4	24.4	32.9	24.5	29.8	23.5	30.5	22.8	28.5	22.4	30.4	24.4	32	25	31.1	22
12	30.4	23.6	32	22.8	29.5	23.4	31.7	22.9	30.4	23.3	30.4	24.2	31.6	23	31.8	21.6
13	29.8	24	31.5	23	30	23	32.5	23.6	29.2	24.6	30	24	31	21.5	31.4	21.1
14	30.4	24.4	32.3	22.4	29.9	24	31.5	22.9	30.7	24.5	30.4	24	31	22.6	31.7	21.4
15	31	24.8	33	23.9	30.1	23	32.1	23	30.9	24.5	31	24.4	32.5	23.6	31	20.4
16	31	23.6	32.1	24.4	29.9	23.7	30.5	22.1	28.3	23.3	30.8	24.8	31	22.5	29	21.1
17	30.2	24.5	32.4	24.6	29.5	22.5	32	22.5	29.4	23.4	30.4	24.8	30.8	23	30	22
18	30.6	23.2	32.9	24	30	23	29.9	22	29	23.3	30	23.4	32.4	22.8	30	21.9
19	30.8	24.4	33.3	25.2	30.2	22.5	31.5	22	30.4	24.9	29.2	24.6	32.5	24	31.6	22.2
20	31.4	23.6	32.8	24.2	29.9	23	32.6	22.5	30.3	23.8	29.8	23.8	32	23.5	31.5	20.9
21	29.6	24.6	32.9	23.9	29	23	30.1	22.1	27.7	23.5	29.2	23	32	23.6	31.7	21
22	31.4	24.5	33.4	24.3	29.8	22	32	23.8	31.2	24.4	29.2	24.6	31.8	23.4	31.8	19.6
23	31	23.4	33.5	23.9	29.5	23	31	23.6	29.8	23.4	29.4	24.8	33	22.6	32	20
24	30.8	24.4	32.8	24.3	29.5	22.5	32.8	23.8	27.2	23	29.6	24.8	32.5	23	31.4	21
25	30.8	22.6	32.4	24.4	29.3	23.8	30.8	22.1	28.5	22.8	30.2	24.6	32	24.5	30.5	21.5
26	30	23.2	32.1	22.9	28.8	23.5	30	22.5	26.5	23.2	30.6	22	31.6	22.5	27.5	21.8
27	30.4	24.2	33	24	29.8	24	32	18.2	29.2	23	28.8	24.4	31	22.6	30.6	22.7
28	31.6	24.6	33.3	23.2	30.7	24	34.1	23.1	30.5	24.8	30.6	23.8	32.2	21.5	32.2	21.1
29	31.4	23.8	34.3	24	30.8	24	28.1	23	28.3	24	30	25	32.5	21.5	31.4	22.2
30	32	24.4	32	24.6	30.8	22.2	34.5	22.5	30.8	22.4	30.8	24.6	31.6	23.6	31.6	22
31	30.8	24.5	33.7	22.8	30.8	24	33.1	23	31.3	22.5	30.8	24.6	32.5	23	32	21.4
Mean	30.5	24	32.8	23.9	29.7	23.2	31.3	22.5	29.4	23.7	30.2	24.4	31.7	23.4	31	21.4

Maximum and minimum temperatures at the stations of the Weather Bureau, March, 1917—Continued.

Day.	Naga.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.	
	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	21.4	35	22.9	30.8	23.2	29.3	23.8	33.1	24.2	31.4	22.2	28.8	24.5	30.5	23.1
2	30.8	19.57	34	23.3	30.6	23	28.3	25	32	23.6	31.4	22.1	29.5	25.3	30.6	22.6
3	29.9	19.8	35	21.8	31.8	21.6	28.8	24.7	33.4	23.3	31.9	19.6	29.2	24.7	31.9	21.4
4	30	20	34.8	23.1	30.9	22.7	28.2	23.6	32.6	24.2	31.4		29.7	23.2	30.7	22.8
5	30.3	21.4	34.8	22.8	33	23.1	28.2	24.2	32.8	23.9	31.5		28	23.2	30	23.2
6	31.8	19.4	34.9	23.1	33	23	29.6	24.3	33.5	23.7	32.1		29.9	22.7	30.9	23.1
7	31.5	18.5	35	21.3	31.6	22.6	28.8	25.2	33.4	23.2	31.9	20.4	30.1	25	31	21.5
8	30.6	19	33.6	22.1	30.8	22	28.7	24.3	32.8	23.4	31.9	20.27	30	24	30.4	22.4
9	27.7	18.1	35.4	21.5	30	22.1	29.3	24.7	33.9	22.9	32.1	21.2	29.5	23.5	31	21.8
10	31	20.1	35.2	23.9	31.3	23.6	28.8	25.3	33.5	24	32.1	22.4	29.8	23.6	31.5	22.9
11	30.9	19.3	35	24.3	31	23	28.9	23.3	33	24	32.4	21.47	29.6	23.5	30.7	23.3
12	32.9	19	34	23	30	23	28.3	24.7	32.2	23.8	31.4	21.6	29.9	24.6	30.5	22.2
13	32	18.1	32.3	21.1	30	21.5	26.7	23.3	33.3	23	31.5	19.2	28.7	23	30	20.6
14	31.1	18.7	33.6	21.5	31.2	22.6	28.8	23.6	30.8	23.3	30.47	19.9	29.6	22.2	29.6	21.8
15	31.1	16.8	34.8	21.8	31.8	21.5	28.8	23.5	33	23.4		21	30	24.3	31	22
16	31.1	20.8	34.1	23.5	30	23.1	28.6	23.8	30.3	24.2	31.8		29.3	24.3	29.3	23.6
17	30.7	20.1	34.2	24	30.1	23.1	27.9	24.2	31.3	23	29.4	20.37	29	23.2	29	22.7
18	31.1	18.6	35.4	24.9	31.4	22.6	30.2	24.8	33	24.3	31.4		29.9	24	30.6	23.2
19	32.8	19.3	35.8	23.3	32.9	23	30.3	25.1	32	24.8	31.5	22.2	30	24.2	30.8	23.1
20	31.6	19.4	36.1	23.4	32.4	22.2	30.7	25.3	34.4	23	32.2	22.6	29.9	24.2	30.6	22.7
21	31.5	17.5	35.8	22.6	31.5	22.1	29.8	25.3	34	23.9	32.4	21.4	30.8	25.4	31.2	21.8
22	31.5	18.6	34.6	22.3	31.4	22.1	29.8	25.3	34.8	22.5	32.9	21.4	31	22.6	31.3	22.2
23	32.1	17.7	33.9	21.9	31.1	22.6	29	22	31.8	24.2	30.1	22	30.2	23.1	29.9	22.4
24	31.6	18.2	35.5	23.5	30.7	22.6	28.8	23.9	31	23.5	30	22.1	29	22.2	27.6	21.3
25	29.3	18.2	33.2	22.7	31.3	22.6	31.8	22	29	23.6	30.4	22	29.2	23	28.8	22.4
26	28.3	18.4	33.7	22.9	30.5	21.5	29.8	22.3	31.5	23.4	30.2	21.6	27.4	22.8	30.3	22.5
27	32	20.2	34.1	23.4	31.1	21.2	29.9	22.2	35	22.5	32.4	22	30.2	22.5	32	23
28	31	19.5	31.4	22.5	29	22.6	27.2	22.8	32.3	22.3	30.2	21.4	29.5	22	29.2	22.4
29	31.1	19.1	33.7	21.7	32	22.1	29.8	22.1	35.4	23	32.2	21.2	29	23	31.8	22.2
30	32.5	19.2	33.2	21.9	32	22.6	29.9	23.7	35.3	21.5	32.1	21.5	29.2	23	33	22.8
31	32.6	20.5	34	22.3	32.3	21.4	30.7	25	36	21.6	32	22	27.4	23.9	33.2	22.1
Mean	31	19.2	34.4	22.7	31.2	22.4	29.2	24	32.9	23.4	31.5	21.3	29.5	23.5	30.6	22.4

Day.	Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.		Bolinao.	
	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	32.7	20.8	34.3	20	32.8	18.3	32.6	19.4	35.1	18.7	30.4	20.1	36.7	20.5	31.3	22.1
2	32.9	21.7	33.1	21	32.4	20.3	31.4	21.3	32.8	21.4	28.7	21.9	36.7	23	31.5	22.2
3	33.3	20.4	33.6	21	32.4	20.2	33.4	20.4	33.5	21.1	30	21.1	34.5	22.8	33	24
4	33.1	23	33.7	21.2	32.9	20.3	33	21	33.2	21.4	30.5	21.3	32.7	22.4	31.2	25?
5	32.5	22.8	32	22.6	33.4	20.5	32	22.2	34	21.4	29.2	23.1	36.2	22.5	34.3	24
6	32.8	21.7	34.1	20.8	33.1	21	33.7	21.5	36	21.6	30	22.7	35.6	23	33.7	24
7	32.2	20.4	32.5	20.4	32.7	22.2	31.7	21.3	33.2	21.8	28.3	23.1	34.2	23	31.7	25.6
8	33.8	20.2	33.3	21	33	20.8	33	20.6	34.4	20.5	29.5	21.1	36.7	23.5	35	21.5
9	33	21.8	33.7	21.5	32.7	20	33.2	19.5	34.6	19.4	30	21.5	32.3	20.9	33.1	20.1
10	33.3	20.9	34.6	21.5	33.4	21.5	33.7	21	35	19.2	30.3	20	35.1	22.8	32.7	23.6
11	33.4	21.5	33.1	21.3	32.8	22.9	33.1	20.8	34.8	19.5	29.5	21.9	34.7	23.4	35	21.1
12	32.1	20.2	33.4	19.4	33.9	19.8	33.4	19.5	35.1	20	31	20.7	36	21.5	34.5	23.1
13	30.7	20	30.7	18.8	34.5	23.1	34.3	20.1	35.6	19.7	30.9	21.2	37.6	22.2	35.8	21.9
14	30.6	21.8	32.1	20.4	33	22.9	31.5	21.8	33.8	22	29.5	22.8	32.6	23.5	34.7	22
15	33.4	19.6	33.7	20	33	21.5	32.6	20.4	33.6	20.2	29.9	20.5	35.9	23.5	32.7	21
16	31.4	20.2	32	21.4	33.3	22.7	32.5	20.6	33.3	21.4	30	22.2	35.2	21.9	33.4	19.2
17	29.6	22.2	28.8	21	31.3	23.3	29.3	23	32.3	22.1	26.1	21.5	34.7	23.8	33.6	22.3
18	31.9	22.5	33.2	22.3	33.3	22.8	32.4	22.9	33.2	23.2	28.9	22.2	33.9	25	33.2	24.4
19	31.6	21.7	32.6	20.8	33	20.2	32.7	21.2	35.8	20.8	29.9	22.4	34.4	22	33.8	22.1
20	32.5	21.8	34.4	20.9	33	20.9	34.2	21.5	35.4	21.1	29.6	22.1	36.9	22.6	34.3	23
21	32.4	20.8	34.3	21	33.8	19.6	33.7	21.4	35.5	21	30.1	22.9	34.8	21.5	34.1	22
22	32.4	21	31.6	20.2	33	20.5	33.7	21.2	35.4	21	30	21.9	33.2	22.2	33.9	23
23	30	21.4	31.7	21.5	32.8	19.4	32.5	20.9	33.2	20.5	29	21.5	34.2	22.5	33.5	21.5
24	29.8	21.9	31.2	20.8	31.7	22.6	31	21.5	31	21.2	27	21.5	35	22.5	32.9	23.5
25	28.5	21.5	26.6	21	31.9	22	31.4	23	31	21.6	27.2	22.1	33.8	23.4	31	22.7
26	30.2	22.2	31.9	20.7	31.4	22.2	28.6	21.7	33.3	21.4	25.2	21.5	33.4	23	31.7	22
27	32.7	22.3	34.1	21.4	31.4	20.9	34.7	21	34.2	21.1	28.4	21.6	33.7	22.3	31	21.5
28	32.9	22.1	33.7	21.5	33.1	20.7	33.5	21.6	33.8	21	29.9	21.5	34.3	22	32	23.5
29	32.8	21.7	32.7	20.5	31.3	20.7	35.3	20.7	33.5	20.5	30.5	20.6	33.3	22.9	30.5	24.8
30	32.3	21.5	33.7	20.4	32.1	21.1	34.4	21.4	33.8	21.2	31	20.1	33.2	22.1	30.5	21.6
31	32.6	22.5	33.5	21	31.7	21.5	36	23.1	35.8	21.4	31.8	21.1	35	22.6	31	20.5?
Mean	32	22.5	32.7	20.9	32.7	21.2	32.9	21.2	34	20.9	29.4	21.6	34.7	22.6	32.9	22.5

Maximum and minimum temperatures at the stations of the Weather Bureau, March, 1917—Continued.

Day.	Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	25.9	15.2	32	23	33	19.1	32.1	23.5	31.3	22.1
2	24.6	14.3	32.7	22.7	27.9	19.5	32.5	23.2	34.4	22
3	24.9	14.3	33.7	23	33.3	20.7	32.9	23.4	32.8	23.2
4	25.8	14.5	33	22	33	22	33.1	23.1	31.9	21.8
5	23.7	14.9	33.5	23.1	30	22	33	24.5	34.8	23.2
6	24	15.4	33	23.7	33.7	21.6	33.2	24.6	31.4	23.3
7	24.5	15.4	33.2	22.5	28.5	22.3	33	23.5	22.6	21.4
8	25.8	14.5	33.4	23.1	32	21.5	33.2	24	31.1	23.3
9	25.9	13.6	33	22	33.5	18.9	33.5	24	31.6	23.5
10	25.1	15.3	33	23	33.5	20.8	33.3	24	32.7	22
11	25.5	14.6	33.2	22	27.4	20.3	34	24	32.1	23.7
12	26.3	14.4	32.4	22.4	33.5	19.5	33.5	23.9	31.7	23.8
13	25.8	14.2	35.3	22.6	34	18.6	33.2	24	31.7	23
14	25.4	13.8	32.8	23	34.4	21.4	33.7	24.6	31.7	23.2
15	24.8	15	33	24.2	32.5	21.6	33.5	25.6	31.6	22.9
16	25.2	14.1	33.5	23.4	30	20.9	33.1	25	33.4	22.6
17	22.6	14.8	34.8	22.9	25.6	21.5	32.6	24.5	31.5	22.8
18	23.4	15.5	34	24.5	29.1	21	33.5	24.1	31.1	22.2
19	25	14.5	33	22.6	33.4	19.5	33.8	23	31.4	22.7
20	23.9	15.5	33.3	22.5	33.9	21.2	33.2	23.6	32.8	23
21	23.9	14	33.5	23	31.4	21.2	33.6	24	31.6	23.3
22	23.5	14.5	33.5	22.3	31.4	21.8	33	24	31.7	23
23	22.8	13.8	33.5	22.4	28.8	21.8	33.4	24	31.8	23.1
24	21.9	14.4	32	23.7	27	20.9	33.5	24.1	31.6	24.3
25	21.9	13.7	34.1	24	26.5	20.1	33	23.5	32.6	22
26	21.9	13.5	32.5	21.8	29	19.3	31.6	23.5	33.5	22.1
27	21.3	14.4	33.1	22.3	32.5	21.5	32.5	24	30.2	21.7
28	23.6	13.8	33	21.7	30	20	33.4	22.5	31.6	20.7
29	22.9	14	32.8	22.4	27.2	21	33.5	23.6	30.6	21.3
30	21.4	14.7	33	22.6	27.5	20.1	33.2	24	30.2	21
31	23.3	14.4	33.1	22.5	28.8	20.6	33.4	24	30.6	20.5
Mean	24.1	14.5	33.2	22.8	30.7	20.7	33.2	23.9	31.9	22.5

Day.	Tuguegarao.		Laoag. <sup>a</sup>		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	34.4	21.6	36.9	20.2	27.3	20.4	28	22.6	21.5	19.4
2	29.1	20.5	33.8	22	25.5	20.3	27	18.4	23.8	17.8
3	35.6	21.5	35.3	20.5	32.5	21.2	32.6	22.4	28.4	21.4
4	34.1	23.2	39	19.7	26.3	22.5	27.6	22.2	22.2	19.9
5	31.7	22.5	37.9	22	26.1	21.8	27.4	21.2	26.1	18.9
6	35.4	20.5	35	21.2	28.7	21.1	27.8	21.7	23.4	20.1
7	32.2	22.5	37.8	21.8	28	22	27.8	21	25.1	20.4
8	33.4	21.8	33.7	20	27.8	22.1	31.4	22.4	27.1	21.4
9	36	20	35	21.4	31.7	21.8	32	23.8	29.8	22.6
10	35.1	21.6	36.8	19	29.2	22.1	29.4	22.8	22.5	20.5
11	33.2	21.4	35.2	20.3	30.8	22.6	33.2	23.2	27.8	20.3
12	35.1	19.7	34.3	20.9	30.1	22.3	33	24	29.2	22.6
13	36.6	20.8	34.3	20.5	31.6	22.6	32.3	23.8	30.1	24
14	37.5	21.9	34.3	21.7	31.1	23	31.8	23.8	31.3	24
15	35.2	21.8	36.3	19.3	28.3	22.6	28.2	22.6	22.4	19.5
16	28.9	21.3	36	21.4	24.2	20.8	26.6	20.2	21.9	18.6
17	26.2	21.6	38	19.8	26	21	30.2	20.3	27.1	19.9
18	33	21.6	34.9	20.5	29.2	21.3	31.4	23.4	28.5	22.4
19	36	20.7	34.8	20.6	30.8	22.2	32.4	24.2	30.2	24.3
20	36.6	21.5	35.3	21.1	30	22	30.5	23.1	25.8	22.5
21	31.6	21.7	37.1	19.7	27.9	23.3	29.8	23.4	25.7	21.5
22	30.5	22.3	34.8	18.3	26	22.2	29.2	22.6	27.7	20.1
23	28.2	21	35.9	18.1	26.1	21.6	28.5	22.2	27	20.9
24	27	21.6	36.9	21	23.8	20.8	27.8	21	23.8	20
25	27	20.6	37.1	21.1	24.4	20.8	28.3	19.8	22.4	18.7
26	29.3	19.5	36.4	20.8	25.7	20.7	28.2	20	21.9	18.3
27	32.2	20.4	30.9	19.5	28.1	20.6	27	19.6	21	18.4
28	30	20	35.9	18.1	25.8	20.2	26.6	19	22.4	19.2
29	24.4	20.8	33.1	21	22.9	20.5	25	18.2	22.5	18
30	27	20.5	32.9	21	22.6	20.4	23.8	18.5	20.4	17.6
31	28.1	20.6	36	20.6	24.2	20.2	25	19.2	23	18
Mean	32	21.2	35.7	20.4	27.5	21.5	29	21.6	25.2	20.4

<sup>a</sup> The maximum temperatures of this station are not very reliable: they seem to be too high.



# SEISMOLOGICAL BULLETIN FOR MARCH, 1917.

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

## EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

2, 2<sup>h</sup> 40<sup>m</sup> 11<sup>s\*</sup> [2, 10<sup>h</sup> 40<sup>m</sup> 11<sup>s</sup>]. **SE Luzon.** Earthquake of intensity V in Catanduanes Island: it was also fairly felt through the provinces of Sorsogon, Albay and eastern part of Camarines. The origin lay E of San Bernardino Strait.

2, 21<sup>h</sup> 58<sup>m</sup> [3, 5<sup>h</sup> 58<sup>m</sup>]. **Davao (SE Mindanao).** Earthquake of intensity III-IV. It was recorded and slightly felt at Butuan. The epicenter seems to have been in the southern part of the Agusan Valley.

3, 5<sup>h</sup> 46<sup>m</sup> [3, 15<sup>h</sup> 25<sup>m</sup>]. **Guam (Mariana Islands).** Earthquake shock of intensity II-III; apparently it originated within the island.

5, 4<sup>h</sup> 45<sup>m</sup> 41<sup>s\*</sup> [5, 12<sup>h</sup> 45<sup>m</sup> 41<sup>s</sup>]. **Basco (Batanes Islands).** Earthquake of intensity III. It repeated an hour latter with less intensity.

7, 16<sup>h</sup> 11<sup>m</sup> [8, 0<sup>h</sup> 11<sup>m</sup>]. **Butuan (N Mindanao).** Oscillatory earthquake, direction NE-SW, intensity III, duration 3 seconds.

9, 23<sup>h</sup> 03<sup>m</sup> 10<sup>s\*</sup> [10, 7<sup>h</sup> 03<sup>m</sup> 10<sup>s</sup>]. **Basco (Batanes Islands).** Earthquake of intensity IV, with subterranean rumbling. It originated some distance S of the Batan island in the Balintang Channel. The seismographs of Taihoku, Formosa, recorded it 28 seconds later than those of Manila.

11, 7<sup>h</sup> 48<sup>m</sup> 17<sup>s</sup> [11, 17<sup>h</sup> 27<sup>m</sup> 17<sup>s</sup>]. **Guam (Mariana Islands).** Earthquake shocks of intensity IV.

17, 23<sup>h</sup> 25<sup>m</sup> 18<sup>s\*</sup> [18, 7<sup>h</sup> 25<sup>m</sup> 18<sup>s</sup>]. **Eastern Visayas.** Extensive earthquake originated in the Philippine Deep, ENE of Samar near the parallel 13° N. It shocked with intensity V-VI Catanduanes Island and northern Samar; being perceptible through SE Luzon, the islands of Masbate, Samar, Leyte, and NE Mindanao.

19, 17<sup>h</sup> 38<sup>m</sup> 51<sup>s\*</sup> [20, 1<sup>h</sup> 38<sup>m</sup> 51<sup>s</sup>]. **Butuan (N Mindanao.)** Earthquake of intensity II-III. The seismographic records of Manila and Butuan place the origin in the Pacific, off the eastern coast of Mindanao.

20, 15<sup>h</sup> 02<sup>m</sup> 00<sup>s\*</sup> [20, 23<sup>h</sup> 02<sup>m</sup> 00<sup>s</sup>]. **NE Mindanao.** Earthquake originated near the eastern coast. It had intensity V in the province of Surigao and northern part of the Agusan Valley. A steamer felt the shocks in the sea while on her way to Butuan. Three hours latter at 18<sup>h</sup> 43<sup>m</sup> 37<sup>s\*</sup> [21, 2<sup>h</sup> 43<sup>m</sup> 37<sup>s</sup>] occurred a repetition of intensity IV. The first earthquake lasted more than 20 seconds, but the duration of the second hardly reached 10<sup>s</sup>.

22, 2<sup>h</sup> 56<sup>m</sup> [22, 10<sup>h</sup> 56<sup>m</sup>]. **Butuan (N Mindanao).** Oscillatory earthquake, direction E-W, intensity III.

23, 4<sup>h</sup> 50<sup>m</sup> [23, 12<sup>h</sup> 50<sup>m</sup>]. **Butuan (N Mindanao).** Earthquake shock of intensity II-III.

27, 9<sup>h</sup> 07<sup>m</sup> [27, 17<sup>h</sup> 07<sup>m</sup>]. **Samar and Leyte Islands.** Earthquake of intensity III, felt chiefly in southern Samar and northern Leyte: probably it originated in the northern part of San Pablo Bay.

<sup>1</sup> 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<sup>h</sup>). 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.  $A_N$ :  $T_0=5.1$ ,  $\epsilon=2.634$ ,  $\frac{r}{T_0^2}=0.048$ ;  
 $A_E$ :  $T_0=5.2$ ,  $\epsilon=1.968$ ,  $\frac{r}{T_0^2}=0.048$ . Alluvium. 2.40 meters above sea level].

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
59	1	Iv	eP F	<i>h. m. s.</i> 9 03 54 12				
60	2	Ir	e F	0 54 56 1 03				
61	2	IIv	eP L M <sub>N</sub> M <sub>E</sub> F	2 40 11 41 00 41 32 41 53 3 05	5 4	127 92		SE Luzon.
62	3	Iv	eP F	8 39 35 43				
63	4	I	e F	5 56 53 6 14				
64	4	Iv	eP L F	13 01 14 01 33 05				
65	5	Iv	eP F	4 45 41 56				Basco (Batanes Islands).
66	5	Iv	eP F	5 46 32 6 00				
67	5	Iv	eP F	7 36 42 39				
68	6	I	e F	3 25 09 42				
69	8	Ir	e F	16 40 02 17 03				
70	8	Iv	eP F	21 25 17 28				
71	9	Iv	eP S L M <sub>E</sub> M <sub>N</sub> F	12 03 45 05 14 07 24 07 29 07 42 25	3 4	36 25		
72	9	Iv	eP L M <sub>N</sub> M <sub>E</sub> F	23 03 10 04 13 05 02 05 21 17	3 3	16 8		Basco (Batanes Islands).
73	12	Iv	eP F	0 29 21 31				
74	12	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	9 08 00 08 25 08 50 08 52 17	3 3	34 43		
75	13	Iv	eP F	14 04 42 07				
76	15	Ir	e S L M <sub>N</sub> M <sub>E</sub> F	0 21 00 27 16 33 25 39 09 39 38 1 44	13 13	25 15		
77	16	Iv	eP L F	17 15 13 15 36 18				
78	17	IIv	eP L M <sub>N</sub> M <sub>E</sub> F	23 25 18 26 19 26 44 26 44 51	6 5	157 95		Eastern Visayas.



## Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								$A_N$ $\mu$	$A_E$ $\mu$	
79	19	Iv	eP F	<i>h.</i> 17	<i>m.</i> 38	<i>s.</i> 51			Butuan (N Mindanao).	
80	20	Iv	eP L F	15	02	00			NE Mindanao.	
					03	29				
						11				
81	20	Iv	eP L F	18	43	37			NE Mindanao.	
					45	05				
						52				
82	20	Iv	eP F	23	55	13				
						58				
83	21	I	e F	13	39	27				
					14	02				
84	22	Iv	eP F	19	37	06				
						43				
85	27	Iv	eP L M <sub>N</sub> F	0	55	29				
					56	04				
					56	08	3	67		
				1	02					

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

2, 2<sup>h</sup> 40<sup>m</sup> 11<sup>s\*</sup> [2, 10<sup>h</sup> 40<sup>m</sup> 11<sup>s</sup>]. SE de Luzón. Temblor de tierra de intensidad V en Catanduanes; sentido además en las provincias de Sorsogón, Albay y Camarines. El epicentro estaba en el mar, al E del estrecho de San Bernardino.

2, 21<sup>h</sup> 58<sup>m</sup> [3, 5<sup>h</sup> 58<sup>m</sup>]. Davao (SE de Mindanao). Temblor de tierra de intensidad III-IV. Registróse en Butúan y aun fué débilmente perceptible. El epicentro seguramente se hallaba en la parte S del valle Agusano.

3, 5<sup>h</sup> 46<sup>m</sup> [3, 15<sup>h</sup> 25<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad II-III, originado aparentemente dentro de la isla.

5, 4<sup>h</sup> 45<sup>m</sup> 41<sup>s\*</sup> [5, 12<sup>h</sup> 45<sup>m</sup> 41<sup>s</sup>]. Basco (Islas Batanes). Temblor de tierra de intensidad III. Repitió una hora después con menor intensidad.

7, 16<sup>h</sup> 11<sup>m</sup> [8, 0<sup>h</sup> 11<sup>m</sup>]. Butuan (N de Mindanao). Temblor oscilatorio, dirección NE-SW, intensidad III, duración 3<sup>s</sup>.

9, 23<sup>h</sup> 03<sup>m</sup> 10<sup>s\*</sup> [10, 7<sup>h</sup> 03<sup>m</sup> 10<sup>s</sup>]. Basco (Islas Batanes). Temblor de tierra de intensidad IV, acompañado de ruido subterráneo. Originóse a alguna distancia al S de la Isla de Batán, hacia el Canal de Balintang. Se registró en Taihoku, Formosa, 28<sup>s</sup> más tarde que en Manila.

11, 7<sup>h</sup> 48<sup>m</sup> 17<sup>s</sup> [11, 17<sup>h</sup> 27<sup>m</sup> 17<sup>s</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad IV.

17, 23<sup>h</sup> 25<sup>m</sup> 18<sup>s\*</sup> [18, 7<sup>h</sup> 25<sup>m</sup> 18<sup>s</sup>]. Visayas Orientales. Terremoto de grande extensión originado en el Abismo de Filipinas al ENE de Sámar, cerca del paralelo 13° N. Desarrolló intensidad V-VI en la parte N de Sámar y en Catanduanes; fué bien perceptible en el SE de Luzón, en las Islas de Masbate, Sámar y Leyte y en la parte NE de Mindanao.

19, 17<sup>h</sup> 38<sup>m</sup> 51<sup>s\*</sup> [20, 1<sup>h</sup> 38<sup>m</sup> 51<sup>s</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad II-III. Su origen, según los registros sismográficos de Manila y de Butúan parece estaba algo lejos al E de Mindanao.

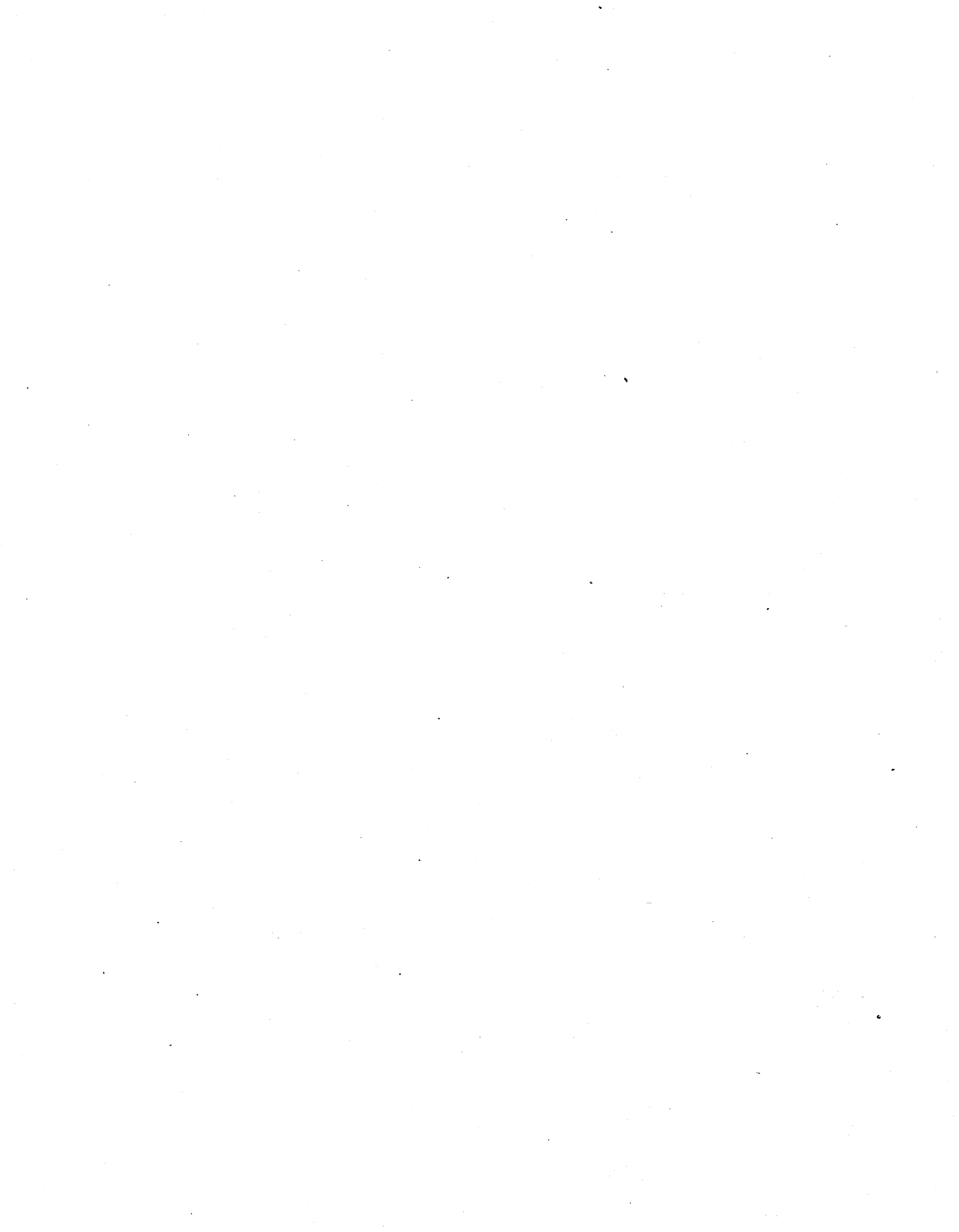
20, 15<sup>h</sup> 02<sup>m</sup> 00<sup>s\*</sup> [20, 23<sup>h</sup> 02<sup>m</sup> 00<sup>s</sup>]. NE de Mindanao. Temblor de tierra originado en el Pacífico, seguramente a poca distancia de la costa oriental de Mindanao. Sintióse con intensidad V en toda la parte NE de la isla, comprendida por la provincia de Surigao e islas adyacentes, y la parte N del Valle del Agusan. Percibiólo también en el mar un barco que se dirigía a Butúan. Tres horas después, a 18<sup>h</sup> 43<sup>m</sup> 37<sup>s\*</sup> [21, 2<sup>h</sup> 43<sup>m</sup> 37<sup>s</sup>] repitió con intensidad IV. La duración del primero pasó de 20<sup>s</sup>, mientras que la de este último apenas llegó a 10<sup>s</sup>.

22, 2<sup>h</sup> 56<sup>m</sup> [22, 10<sup>h</sup> 56<sup>m</sup>]. Butúan (N de Mindanao). Temblor oscilatorio, dirección E-W, intensidad III.

23, 4<sup>h</sup> 50<sup>m</sup> [23, 12<sup>h</sup> 50<sup>m</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad II-III.

27, 9<sup>h</sup> 07<sup>m</sup> [27, 17<sup>h</sup> 07<sup>m</sup>]. Islas de Sámar y Leyte. Temblor de tierra de intensidad III sentido en el S de Sámar y N de Leyte; originóse probablemente en la parte N de la bahía de San Pablo.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.





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# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR APRIL, 1917.

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1917



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**BULLETIN FOR APRIL, 1917.**





# METEOROLOGICAL BULLETIN FOR APRIL, 1917.

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 somewhat lower than that of the preceding year and than the April's normal. That of Manila is lower than the normal by 1.45 mm. The highest pressures of the month were observed on the 1st, while the lowest occurred on the 12th and 29th.

The mean monthly temperature is almost identical with, or slightly higher than, that of April, 1916. The mean of Manila differs from the normal of this month by only  $-0.2^{\circ}$  C. The absolute maximum and minimum temperatures recorded in Manila during the month were  $35.4^{\circ}$  C. on the 23d, and  $21.3^{\circ}$  C. on the 7th and 22d. The extreme monthly temperatures for Baguio were  $25.9^{\circ}$  C.,  $14.4^{\circ}$  C. on the top of Mirador, and  $25.7^{\circ}$  C.,  $13.7^{\circ}$  C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR APRIL, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from April, 1916.	Highest * mean.	Day.	Lowest mean.	Day.	Mean.	Departure from April, 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga	757.78		759.04	1	756.77	23	26.4		32.9	30	22.1	15
Tagbilaran	57.73		59.14	1	56.70	29	26.6		33.1	24	21	4, 13
Surigao	58	-0.29	59.27	1	57.01	30	<sup>a</sup> 26.8	+0.2	<sup>a</sup> 33.6	2	<sup>a</sup> 22	27
Cebu	57.70	-.66	59.07	1	56.52	29	28.2	+ .7	32.9	17	24.2	7
Iloilo	57.62	-.67	59.08	1	56.60	29	28	+ .5	34.6	28	23.5	4, 5, 8
Ormoc	58.14	-.43	59.58	1	57.09	29	26.6	+ .2	34.2	20	18.8	13
Tacloban	58.10	-.22	59.54	1	56.98	29	27.4	+ .4	34	28	22.1	4
Capiz	58.16	-.70	59.77	1	57.14	29	27.7	+ .2	34.2	18	22.9	4
Calbayog	58.20	-.35	59.62	1	57.13	29	26.6	0	34.7	24	20.8	4
Legaspi	58.20	-.51	59.80	1	57.07	30	27.9	+ .4	33.2	28	22.8	12
Atimonan	58.13	-.90	60.10	1	57.20	12, 29	27.5	+ .1	35.2	24	21.8	12
Ambulong, Tanauan	57.38	-1.04	59.16	1	56.30	12	28.5	+ .4	38	21	22.4	22
Paracale	58.38	-.92	60.12	1	57.40	30	27.2	+ .1	32.8	24	22.4	10
Manila	57.93	-.95	59.69	1	56.77	12	27.9	+ .6	35.4	23	21.3	7, 22
San Isidro	58.03	-1.05	59.82	1	56.79	12	28	+ .3	36.6	23	20.4	5
Dagupan	57.28	-.92	59.07	1	55.98	12	28.7	+ .4	37.6	19	22.3	7
Baguio <sup>b</sup>	636.24	-.68	637.52	1	635.19	12	18.6	+ .1	25.9	11	14.4	1
Vigan	757.58	-1	759.84	1	756.21	29	28.3	+ .6	34.6	25	21.9	14
Tuguegarao	58.12	-1.32	61.53	1	56.49	12	27.4	+ .1	37	6, 12	20.4	1
Laoag	57.55		59.40	1	56.33	12	28.3				20	1, 8
Aparri	58.31	-1.37	62.02	1	56.45	12	26.4	+ .2	33	20, 23	21.6	17

<sup>a</sup> 28 days of observation.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—The total amount of rainfall of this month is below that of April, 1916, and also below the normal in a great majority of our stations of the Visayas, Mindanao and southern Luzon; but it is almost without exception greater than the normal and than the monthly total of the preceding year, in all our stations of Luzon to the north of Manila. The amount of water collected during the month in the gauges of the Central Observatory is 11.9 mm. and 23.5 mm. above the total of April, 1916, and the normal of this month, respectively.

## RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF APRIL, 1917.

Station.	Total.	Departure from April, 1916.		Rainy days.	Departure from April, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from April, 1916.		Rainy days.	Departure from April, 1916.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo	316.1	+252.6	+199.5	20	+15	59.9	19	Sumay, Guam	33.1	-45.8	-8.5	4	-5	17.8	4
Isabela, Basilan	118.5	+86.7	+35.8	13	+10	39.4	20	Calapan	101.5	-14.6	-9.4	10	-3	32.2	8
Zamboanga	45.1	-18.8	+8.4	7	0	19.9	21	Virac	92.4	-26.6	-36	15	-4	23.2	10
Davao	107	-29.5	-55.1	9	0	50.8	4	Naga	117.3	+25.4	+12.7	9	0	33.2	8
Cagayan, Misamis	11.6	-29		4	-1	4.8	6	Batangas	20.9	+11.8	-9.3	8	-4	7.6	10
Butuan	158.1	+31.2	+35.6	17	+4	21.4	23	Lucena	17	-104		3	-7	10.1	8
Mambajao	11.9			3		5.8	5	Atimonan	84.5	-77.5	-8.9	12	-1	35.3	11
Dumaguete	66.8	+20		5	-2	44.4	6	Ambulong, Tanauan	69.2	-32.3		6	-2	46	21
Yap, Western Carolines	70.1	-124.7		16	-6	14.2	4	Canlubang, Calamba	122.8	+105		6	-3	46.7	16
Tagbilaran	38.1		-141.3	3		19.8	25	Paracale	94.1	-12.7		10	-6	26.4	8
Iwahig	78	+67.5		9	+5	52.4	13	Santa Cruz, Laguna	42.4	+15.7		7	-3	11.2	26
Surigao	78.9	-168.4	-167	11	-8	19.2	6	Manila	58.1	+11.9	+23.5	8	+3	19.3	8
Maasin	9.7	-176.5	-60.5	1	-9	9.7	4	Antipolo	67.4	+3.9		7	-1	34	13
Cebu	19.6	-82.8	-14.4	5	-10	11.2	6	Iba	65.4	+56	+15.6	4	-1	44.4	8
Iloilo	24	+7.2	-13.4	12	+10	6.8	17	San Isidro	77	-41.5	+36.1	9	-1	20.3	30
San Jose Buenavista	36.3	-60.4	+36.3	11	+6	27.9	8	Tarlac	102.9	-54.1	+31.9	11	+4	30.5	2
Cuyo	39.7	+37.6	+20.9	11	+9	14	7	Baler	107.4	-62.6	-175.2	15	-2	22.6	9
Ormoc	60.9	-142.4	-12	10	-7	21.8	6	Dagupan	83.8	+59.9	+8.7	12	+7	38.6	19
Guiuan	119.2	-152.7		12	-6	52.4	4	Bolinao	41.4	-26.9	+13.5	5	+3	23.9	13
Tacloban	95.6	-32.8	-37.2	13	-3	31	26	Baguio	167.9	-35.8	+49.9	18	+7	41.9	30
Capiz	88.9	+61.6	+38.9	14	+3	45.3	8	San Fernando, Union	43	+43	+26.2	3	+3	29.7	13
Borongan	118.3	-120.5	-108.9	16	-4	26.7	21	Echague	118.5	+73.5	+43.6	13	+5	70.6	18
Catbalogan	125.7	-14.9		16	+4	13	15	Candon	46.2	+26.4	+30.6	3	-2	36.8	13
Calbayog	112.2	-50.7		5	17	26.4	2	Vigan	60.3	+26.3	+39.3	5	+3	29.7	13
Masbate	17.5	-18.6	-20.8	4	-7	11.9	26	Tuguegarao	116.2	+5.9	+43.2	9	+5	63.5	17
Romblon	67.5	-49.6	+6.9	12	-1	22.1	1	Laoag	50.8	+50.8	+39.5	4	+4	33.3	30
Batag	29.8	-176.5		6	-9	6.4	4	Aparri	48.1	+47.2	+8.1	11	+9	40.6	30
Sorsogon	44.9			9		18.3	8	Cape Bojeador	77.4			3		50	30
Legaspi	64.1	-57	-88.2	10	-4	14.7	1	Santo Domingo, Batanes	201.1	+183.9	+81.9	15	+4	83	30

## DEPRESSIONS AND TYPHOONS.

There was no depression or typhoon during this month near the Philippines. Our weather maps showed several times depressions which formed apparently over the Eastern Sea and moved to the Pacific across the Loochoo Islands: but they were all of little importance and belong rather to the type of continental depressions.

## NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes es algo inferior a la del año pasado y a la normal de abril. La de Manila es menor que la normal en 1.45 mm. Las presiones más altas del mes se observaron el día 1, al paso que las más bajas tuvieron lugar el 12 y 29.

La temperatura media mensual es casi igual o algo mayor que la de abril, 1916. La media de Manila se diferencia de la normal de este mes en  $-0.2^{\circ}$  C. solamente. La máxima y mínima absolutas registradas en Manila durante el mes fueron  $35.4^{\circ}$  C. y  $21.3^{\circ}$  C.: la primera se observó el día 23, y la segunda los días 7 y 22. Las temperaturas extremas de Baguio fueron  $25.9^{\circ}$  C.,  $14.4^{\circ}$  C. en la cumbre del Mirador, y  $25.7^{\circ}$  C.,  $13.7^{\circ}$  C. en el valle.

Precipitación acuosa.—La cantidad total de lluvia de este mes es inferior a la de abril, 1916, y menor también que la normal en la mayor parte de nuestras estaciones de Visayas, Mindanao y sur de Luzón; pero es casi sin excepción mayor que la normal y que el total mensual del año pasado en todas nuestras estaciones de Luzón al N de Manila. La cantidad de lluvia recogida durante este mes en los pluviómetros del Observatorio Central es mayor que el total de abril, 1916, y que la normal de este mes, en 11.9 mm. y 23.5 mm., respectivamente.

## DEPRESIONES Y TIFONES.

No hubo durante este mes depresión o tifón alguno cerca de Filipinas. Nuestros mapas del tiempo indicaron varias veces depresiones que se formaron aparentemente en el Mar del Este y se movieron hacia el Pacífico a través de las Islas Loochoos, pero fueron todas de poca importancia y pertenecen más bien a la clase de 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. <sup>b</sup>			Underground temperature.						Rela- tive humid- ity (mean)	Vapor pres- sure (mean)	Radiation.		Evaporation. <sup>b</sup>		
		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.	Free expos- ure (total)	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.	8 a.m.	8 a.m.							
1.	759.69	27.4	33.1	22.4	28.5	29.7	28.8	29	28.3	27.8	70.6	18.8	19.5	53.5	5.4	3.7	
2.	59.14	27.5	33.7	22.2	28.5	30.3	28.8	29.3	28.3	27.8	74.6	20.1	19.8	55.9	5.1	3.5	
3.	58.81	27.4	34	22.4	28.7	29.8	29	29.3	28.3	27.8	73.9	19.7	20.2	53.5	5.2	3.7	
4.	59.02	27.1	32.7	22.4	28.7	29.8	29.1	29.4	28.3	27.8	72.3	18.9	19.9	50	5.9	4.2	
5.	59.12	27.3	33.7	21.5	28.4	29.7	29	29.3	28.3	27.8	72.3	19.1	18.9	54	5.8	4	
6.	58.69	27	33.7	21.7	28.4	29.5	29	29.2	28.3	27.8	70.9	18.5	19.5	52.9	5.9	4.2	
7.	58.31	27.2	33.4	21.3	28.3	30	28.9	29.2	28.5	27.8	74.5	19.7	18.7	55.8	5	3.3	
8.	58.03	25.8	32.2	23.3	28.8	29	29.1	28.4	27.8	77.8	21.3	21.3	56.5	1.6	1.4		
9.	58.13	27.6	34.2	22.9	28.3	29.6	28.8	29.2	28.4	27.8	78.2	21	21.4	56.6	5.2	3.6	
10.	58.35	27.7	33.7	23.5	28.8	30.1	29.1	29.4	28.3	27.9	77.8	21.2	22	56.8	4.1	3.4	
11.	57.09	27.7	33.6	22.8	29.1	30.1	29.1	29.5	28.5	27.9	74.8	20.4	20.9	56.5	5.6	4	
12.	56.77	28.6	34.6	22.9	29.1	30.7	29.3	29.7	28.5	27.9	72.9	20.9	20.8	57.5	6.7	4	
13.	57.79	28.1	34.8	23.4	29.4	31.4	29.5	29.9	28.5	27.9	76.8	21.2	21.1	57	4.6	3.5	
14.	58.58	27.8	33.7	23.8	29.5	30.9	29.7	30	28.5	27.9	80.2	22.1	22.5		4.4	3	
15.	58.01	28.1	32.4	23.5	29.6	31	29.8	30	28.5	27.9	78.2	21.8	21.8	52	4.8	3.2	
16.	57.28	28.6	32.7	24.4	30.1	31.4	30	30.4	29	28	78.6	22.6	22.4	53.7	5.1	3.5	
17.	57.63	28.3	33.6	24.3	30.1	31.6	30	30.5	29	28	75.4	21.2	22.2	55	4.5	3.3	
18.	57.85	28.2	34.5	23.7	30.1	31.6	30.2	30.6	29	28	78.7	22	22.3	55.1	4	3.4	
19.	57.81	28.7	34.4	24	30.4	31.7	30.5	30.9	29.1	28.1	74.6	21.3	22.7	55.7	5.9	4.2	
20.	57.51	28.4	34.7	24.2	30.5	31.5	30.6	31	29.2	28.1	72.5	20.5	22.7	55.4	5.3	3.9	
21.	57.26	27.9	34.3	22.9	30.1	31.3	30.5	30.7	29.2	28	72.9	20.1	20.7	54	5.1	3.5	
22.	57.16	28.8	34.9	21.3	30.1	31.5	30.4	30.8	29.3	28	70.8	19.5	18.9	55	6.1	4.5	
23.	56.99	28.9	35.4	23.2	30.1	31.7	30	30.8	29.3	28.1	71.1	20.6	20.8	54.5	6.2	4	
24.	57.91	28.7	35.1	24.5	30.5	31.9	30.6	30.9	29.3	27.9	73.2	21.1	22.3	57.6	5.3	3.7	
25.	58.24	28.3	34.2	24	30.5	31.7	30.8	31	29.3	27.9	76.8	21.8		58.2	4.1	3.3	
26.	57.73	28.4	33.7	23.9	30.2	31.5	30.8	31	29.3	27.9	76.4	21.7	21.6	59.5	5.1	3.8	
27.	57.66	28.4	33.1	24.3	30.5	31.5	30.8	31	29.5	28.1	76.8	21.8	22.8	52.4	4.4	3.1	
28.	57.32	28.3	33.3	24.7	30.3	31.6	30.8	31	29.5	28.1	76.9	21.6	22.3	54.1	4.7	3.5	
29.	56.90	28	33.6	24.3	30.4	31.8	30.8	31.1	29.5	28.1	77.8	21.5	21.7	53.7	3.7	2.8	
30.	57.11	28	34.3	23.6	30.2	32	30.8	31.1	29.4	28	75.7	20.9	21.7	55	4.8	3.6	
Mean Total	757.93	27.9	33.8	23.2	29.5	30.9	29.8	30.1	28.8	27.9	75.4	20.8	21.2	55.1	5	3.6	
Departure from normal	-1.45	-0.2	-0.1	+0.4							+5.5	+1.3			149.6	106.8	

Day.	Prevailing direction.	Wind.		Direction at the time of the maximum velocity.	Amount (mean).	Clouds.			Sun- shine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.	
		Total move- ment.	Maxi- mum hour- ly veloc- ity.			Form and direction.				On the tower.	In the park.		
						Upper.	Lower.	h. m.					mm.
1.	NE quad.	188.5	17	SW	3.6	Ci.-S.	Cu.	ENE	8 40				
2.	E quad.	166.5	13.5	WSW	5.8	A.-Cu.	ESE	Cu.	ENE	8 00		☉ p.	
3.	SE	204.5	18	SE	7.7	Ci.	SE	Cu.	E	7 00		☉ p.	
4.	ESE	219	23	ESE	5.8	Ci.	E	Cu.	ENE	8 45			
5.	ESE	214.5	20.5	ESE	5.9	Ci.		Cu.	E	9 50		☉ p.	
6.	SE	204.5	17.5	ESE	8.4	Ci.-S.		Cu.	EbyS	5 40		☉ a. ☉ p.	
7.	E quad.	173	16	WSW, W	4.8	Ci., A.-Cu.		Cu.	E	8 30		☉ p.	
8.	SW, W	108.5	18	NNE	8.8	Ci.-S.		Cu.-N.	E	3 35	19.3	18.8	☉ a. ☉ p.
9.	ESE	174.5	18	SW, SE	4.4	A.-Cu.	E	Cu., Cu.-N.	E	9 45			
10.	SE	180	12	SE, NE	4.8	A.-cu.	NNW	Cu., Cu.-N.	E	7 25	.8	.8	☉ a. ☉ p.
11.	ESE, SE	224.5	19	SE	4.7	A.-Cu.	E	Cu.	E, SE	8 25			☉ p.
12.	ESE	206	17	ESE	3.2			Cu.	E	9 35			
13.	E quad.	209	21.5	WSW	4.1	Ci.		Cu.	E	9 25	5.8	5.8	☉ p.
14.	WSW	191	18	SW	4.8	Ci.		Cu.	E	9 30			☉ p.
15.	SW	225.5	20	SW	4.3	Ci.		Cu.	E	9 40			
16.	WSW, SW	237	20	SW	4.6	Ci.		Cu.	E	9 35			
17.	WSW, NNW	178.5	15	WSW	5.5	Ci.		Cu.	E	8 00	8.6	7.9	☉ a. ☉ p.
18.	WSW	164	13.5	SSW, NW	4.5	Ci.		Cu.	E	9 35	14.7	13.7	☉ a. ☉ p.
19.	SE	159.5	14	SE	4	Ci.		Cu.	E	10 15			☉ p.
20.	SE	179.5	15	W, WSW	4.1	Ci.		Cu.	E	10 05			☉ p.
21.	ESE, WSW	184.5	15.5	WSW	4.4	Ci.		Cu.	E	9 40			
22.	E quad.	200.5	13	WSW	4.2	Ci.		Cu.	E	10 05			
23.	SW quad.	186	17	SW	2.7	Ci.		Cu.	SSE	11 15			
24.	E quad.	165	17	W	5.2	Ci.		Cu.	ENE	8 40			☉ p.
25.	E quad.	181	15.5	E	5.3	Ci.		Cu.	EbyN	8 00	2.1	1.8	☉ a. ☉ p.
26.	E quad.	168	15	ESE	5.8	Ci.		Cu., Cu.-N.	E	8 30	5.8	5.3	☉ a. ☉ p.
27.	W quad.	221	17	W	5.1	Ci., Ci.-S.		Cu.	E	9 05			☉ a.
28.	N, NNE	168	19	W	6.8	A.-Cu.	NNE	Cu.	NE	5 50			☉ p.
29.	NE, ESE	159.5	13.5	WNW, E	6.5	Ci.-S.		Cu.	E	5 25	1	1	☉ p.
30.	S quad.	173.5	20.5	S	4.7	A.-cu.	wsW	Cu.	E	9 00			☉ p.
Mean Total		187	17		5.2				8 40	259 45	58.1	55.1	
Departure from normal		-1,298.8			+1.1				-2 04	+23.5			

\* All the mean values given in this table are deduced from hourly observations.

<sup>b</sup> These values are taken from instruments mounted in the Observatory Park, 1.5 meters above ground.

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 <sup>b</sup> (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. <sup>c</sup>	Free exposure (total)	Shelter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	637.52	17.9	23.8	10.00a.	14.4	2.35a.	24.5	10.35a.	13.8	2.20a.	82	12.4	12.6	56.7	3.3	1.9
2	37.12	18.2	23.3	1.00p.	14.9	2.30a.	24.2	1.20p.	13.9	4.25a.	86.7	13.5	12	60	2.7	1.6
3	36.75	18.3	23.5	0.40p.	15.8	5.50a.	24.4	11.35a.	15.2	5.40a.	90.3	14.2	14.2	58	1.3	1.1
4	36.95	18.4	22.9	0.30p.	16	5.40a.	23.5	2.25p.	16.3	6.10a.	90.5	14.3	14.8	58.1	1.2	1.7
5	37.30	18.2	23.3	0.40p.	15.4	5.40a.	23.7	0.45p.	14.7	6.00a.	90.8	14.1	13.4	60.9	1	.9
6	36.87	17.5	23.4	1.00p.	14.9	4.05a.	23.9	10.20a.	14.7	5.50a.	89.5	13.4	13.6	58	2	1.7
7	36.50	17.8	22.9	1.20p.	15.4	4.05p.	23.4	1.10p.	13.9	5.45a.	85.8	13.1	12.8	60	2.4	1.8
8	35.98	18.2	25.7	1.20p.	15.3	4.15a.	25.6	1.10p.	13.9	5.00a.	80.3	12.5	12.6	59.7	4.6	3
9	36.30	18.5	23.8	9.40a.	15.8	0.05a.	23.9	11.20a.	14.7	6.10a.	80.7	12.9	13.3	57.2	1.7	1.5
10	36.51	18.4	24.1	1.00p.	15.6	6.20a.	24.5	1.05p.	15.1	4.00a.	86.7	13.7	13.9	58.7	2.1	1.5
11	35.46	19.1	25.9	10.40a.	14.9	5.30a.	25.7	11.25a.	14.5	4.15a.	83.5	13.6	13.6	62	3.2	2.1
12	35.19	19	24.7	3.00p.	15.4	5.50a.	25.4	0.40p.	15.4	5.20a.	87.8	14.2	14.3	60	2.7	1.5
13	36	19	24.7	0.40p.	15.6	5.25a.	24.8	0.50p.	15.4	5.30a.	86.7	14.1	13.9	62	1.7	1.3
14	36.74	18.5	24.6	0.20p.	15.5	12m. n.	24.7	1.40p.	15	12m. n.	91.5	14.5	14.2	62	1.9	1
15	36.23	19	24.4	11.20a.	15.2	5.35a.	24.4	11.05a.	14.5	3.00a.	83.5	13.6	13.6	60.5	2.8	1.7
16	35.77	18.2	23.3	11.35a.	15.6	6.00a.	23	11.40a.	13.7	5.10a.	90.3	14	13.2	60.5	1.5	1
17	35.92	18	23	9.15a.	15.2	1.35a.	23.5	2.25p.	15.2	2.40a.	92.2	14.1	13.5	57	.7	.9
18	36.30	17.8	24.8	1.20p.	15.4	3.00a.	24.2	11.35a.	14.5	3.20a.	91.5	13.9	13.6	59.9	1.3	1.2
19	36.28	18.8	23.9	1.55p.	16	2.25a.	25.3	1.40a.	14.5	5.30a.	86.8	14	13.3	56	1.5	1.2
20	36.18	18.6	24.5	10.20a.	15.9	5.10a.	24.2	10.30a.	14.9	5.00a.	85.2	13.4	13.5	59.9	1.3	1.2
21	35.75	18.5	24.1	2.15p.	15.7	5.10a.	24.4	2.00p.	14.2	4.15a.	90.3	14.3	13.6	62.5	2.1	1.7
22	35.62	18.6	23.6	2.25p.	15.4	6.00a.	23.8	2.05p.	14.4	6.00a.	87.3	13.9	12.7	62.5	2.4	1.5
23	35.73	19	25.2	0.45p.	15.5	6.00a.	24.9	1.00p.	15.5	3.20a.	87.2	14.2	13.3	60	2.7	1.6
24	36.50	19.1	25	1.10p.	15.4	2.20a.	25.2	1.20p.	14.2	5.20a.	86.5	14.2	13.6	60	2.5	1.6
25	36.66	19.5	24.6	1.00p.	16	4.20a.	24.5	1.15p.	15.2	4.40a.	80	13.4	13.7	58	4.3	2.1
26	36.26	19.3	24.8	1.00p.	16.5	6.00a.	24.8	1.20p.	15.5	6.00a.	83.7	14	13.7	60.1	2.1	1.3
27	36.12	18.6	23.9	0.40p.	15.5	3.50a.	24	1.10p.	14.9	5.35a.	85.7	13.6	13.6	56.2	2.5	1.7
28	35.91	19.5	24.8	1.40p.	16.2	1.20a.	24.9	1.10p.	14.7	5.55a.	85.2	14.3	13.2	56.4	3	1.9
29	35.39	19.6	25.4	2.00p.	16.1	5.40a.	24.9	3.05p.	15	5.35a.	82.2	13.7	13.3	60.5	3	2
30	35.38	17.6	24.8	1.10p.	15.2	11.50p.	24	1.15p.	14.8	12m. n.	89.7	13.4	13.5	60.4	1.4	1.2
Mean	636.24	18.6	24.2		15.5		24.4		14.7		86.7	13.8	13.5	59.5	2.2	1.5
Total															66.9	45.4

Day.	Wind.				Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. <sup>d</sup>	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.	Form and direction.				
					Upper.	Lower.			
	Km.	Km.		Amount (mean).	0-10.		h. m.	mm.	
1	E	375.1	23.5	E	6.9	Ci.	Cu.-N.	2 40	
2	SW, E	306.1	25.5	SW	4.7	Ci.	Cu.-N. SW	5 25	
3	Variable	259.4	19.6	SW	8.9	Ci.	Cu.-N. ESE	1 20	4.3
4	E	262.5	21.9	SW	9.3	Ci.	Cu.-N. SW	1 00	.3
5	Variable	262.2	22.7	SW	7.4	Ci.	Cu.-N.	2 00	1.1
6	E quad.	326	19.6	W	6	Ci.	Cu.	4 15	17.3
7	E quad.	267.9	20.6	W	6.3	Ci.	Cu.-N.	2 35	16.7
8	E	316.4	28.5	E	3.9	Ci.	Cu.-N. E	4 35	26.9
9	E, W	297.5	23.5	W	6.3	Ci.-S.	Cu.	3 05	1
10	E, W	281.3	21.7	W	6.4	A.-Cu., Ci.	cu.-N. variable	2 25	
11	E	354.9	33.3	SW	5.6	Ci.	Cu. E	4 55	1.5
12	E, W	345.6	28	W	6	Ci.-S., Ci.	cu.-N. E quad.	2 00	2.6
13	W quad.	285.9	32.8	W	7.7	Ci.-S., Ci.	cu.-N. ENE, E	2 30	5.9
14	W quad.	287.4	24.3	SW	8	Ci.	cu.-N. ENE, E	4 00	
15	W	278.8	25.7	W	5.9	Ci.	Cu.-N.	4 50	
16	W	279.3	28	W	7	Ci.	Cu.-N. NE, W	2 10	.3
17	Variable	208.4	20.3	W	6.7	Ci.-S.	Cu.-N. E	1 50	17.8
18	W quad.	304.1	23.5	W	6	Ci.	Cu.-N. ESE	3 50	15.5
19	W, E	280.7	29.5	SW	5.4	Ci.	Cu.-N. E	3 20	9.2
20	W, E	244.4	23.3	W	5	Ci.	Cu.-N., Cu.	3 20	4.3
21	Variable	256.1	21.5	SW	6.4	Ci.	Cu.-N. E	3 20	.3
22	W	291.2	23.3	W	6	Ci.	Cu.-N. E	2 20	
23	W, E	334.8	28.4	W	4.9	Ci.	Cu.-N. NW	5 45	
24	W quad.	313.2	24.9	W	6.1	Ci.	Cu.-N. E	5 55	
25	E, W	297.5	25.9	W	5.3	Variable	Cu. NW	5 10	
26	W	314.4	29.6	W	7.4	Ci.	Cu.-N. NNE	2 55	
27	W	267.3	23.6	W	4.1	Ci.-S.	Cu. WNW	1 55	
28	Variable	280.2	26.8	W	6	Ci.	Cu.-N.	4 30	
29	E	363	26.6	W	5.1	Ci.	Cu.	4 20	1
30	W quad.	493.1	37.8	W	6.1	Ci.-Cu.	Cu.-N. NNE	1 05	41.9
Mean		301.2	25.5		6.2			3 19	
Total		9,034.7						99 20	167.9

\* 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.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.

<sup>d</sup> 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, 1917.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Jolo	mm. 1.8	mm. 2.3	mm. 3.5	mm. 15.2	mm. ---	mm. ---	mm. 4	mm. 23.6	mm. 2	mm. 24.4	mm. 21.1	mm. 10.9	mm. 1.8	mm. 1	mm. ---	mm. 0.5
Isabela, Basilan	5.1	3.6	---	2.8	---	0.8	---	5	3.5	---	---	---	---	---	---	---
Zamboanga	10.2	5.3	---	1.8	---	---	1.3	---	---	---	---	---	---	---	---	---
Davao	---	9.7	3.8	50.8	---	8.1	---	---	13	---	3	---	---	5.1	---	---
Cagayan, Misamis	---	---	---	---	2.5	4.8	2.8	---	---	---	---	---	---	---	---	---
Butuan	5.8	10.2	---	10	16	14.3	2.8	11.9	14.2	6.9	7.2	---	---	---	---	---
Mambajao	---	---	---	---	5.8	---	---	---	---	1.5	---	---	---	---	---	---
Dumaguete	---	---	---	---	---	44.4	1.3	---	---	---	---	---	---	---	---	4.3
Yap, W. Carolines	---	3.6	2.3	14.2	6.1	2.8	---	3	---	---	3.8	5	3	---	---	---
Tagbilaran	---	---	---	16.8	1.5	---	---	---	---	---	---	---	---	---	---	---
Iwahig	---	1	---	8	---	---	---	---	---	---	---	2	52.4	2.6	---	---
Surigao	---	10.7	---	6.6	5	19.2	3	5	---	9.5	---	---	---	---	---	---
Maasin	---	---	---	9.7	---	---	---	---	---	---	---	---	---	---	---	---
Cebu	---	3	---	2	---	11.2	---	---	---	---	5.1	---	---	---	---	---
Iloilo	---	---	---	---	4.8	8	1.8	8	---	---	---	1.3	---	---	---	---
San Jose Buenavista	---	6.1	2.5	---	6.6	5.3	9.9	27.9	5	---	---	---	---	---	---	---
Cuyo	---	---	2.5	---	---	---	14	1.8	3.1	---	---	---	8	2.5	---	5.1
Ormoc	1.3	3.9	---	7.6	---	21.8	---	---	8	---	---	---	5.1	---	---	---
Guiuan	15.5	---	---	52.4	5	---	---	---	---	---	---	---	---	---	---	---
Tacloban	2.2	4.8	---	5.4	3.8	13.8	---	5.3	3	4.3	6.4	---	---	---	---	---
Capiz	3.3	8	1.5	---	3.6	1.1	2.3	45.3	2	18.5	1	---	---	---	---	---
Borongan	7.1	3.8	---	14.5	7.9	3.9	15.2	6.7	9.4	12.4	8	5.6	1	2.3	---	---
Catbalogan	9.9	7.6	---	9.7	5	---	6.1	---	---	9.1	2.5	---	---	7.1	13	12.7
Calbayog	1.5	26.4	2.3	22.6	5.9	4.6	2	6.9	2.3	1.8	5.3	---	---	---	---	---
Masbate	---	---	---	---	---	---	---	3	3.3	---	---	---	---	---	---	---
Romblon	22.1	7.2	---	5.3	---	---	5.2	7.7	---	4.3	2.3	1.5	---	---	---	---
Batag	5.6	6.3	---	6.4	4.1	6.1	---	---	---	---	---	---	---	---	---	---
Sorsogon	7.6	---	1.3	---	3	7.9	---	18.3	---	3	3	---	---	---	---	---
Legaspi	14.7	1.3	5	1	4.8	4.3	10.5	8.7	4.1	---	---	---	---	---	---	---
Sumay, Guam	5.1	---	---	17.8	---	---	---	---	6.4	3.8	---	---	---	---	---	---
Calapan	---	---	20.3	7.6	11.9	2.5	8.1	32.2	1.3	---	---	---	---	---	---	---
Virac	3	3.6	---	3.8	6.1	21.6	---	7.1	3.3	23.2	5	---	---	---	---	---
Naga	---	3.6	---	5	---	---	12.7	33.2	18	14.7	---	---	---	---	---	---
Batangas	7.6	1.5	---	---	---	---	---	---	7.6	---	---	---	---	---	---	---
Lucena	---	---	---	---	---	---	6.4	10.1	---	---	---	---	---	---	---	---
Atimonan	3.3	---	---	---	3.6	5	3.3	20.3	---	2.5	35.3	3	---	---	---	---
Ambulong, Tanauan	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---
Canlubang, Calamba	---	---	---	---	---	---	---	---	---	---	---	---	4.8	---	16.7	46.7
Paracale	12.2	14.3	---	3.6	---	---	9.4	7.6	26.4	3	---	---	---	---	---	---
Santa Cruz, Laguna	---	---	---	---	---	---	---	---	6.3	---	7.4	---	---	---	---	---
Manila	---	---	---	---	---	---	---	---	19.3	---	8	---	---	---	---	---
Antipolo	---	---	---	---	---	---	---	---	5.8	---	---	---	---	---	---	---
Iba	---	---	---	---	---	11.7	---	---	44.4	---	1	---	---	---	---	---
San Isidro	---	---	---	---	---	---	---	---	---	1.8	---	---	---	---	---	---
Tarlac	---	30.5	---	---	---	---	---	---	---	2.3	---	---	---	---	---	---
Baler	---	11.7	---	---	---	---	---	---	---	8	---	---	---	---	---	---
Dagupan	---	3	---	---	---	---	---	---	---	7.4	---	---	---	---	---	---
Bolinao	---	---	3	2.1	---	4.1	---	---	---	6	---	---	---	---	---	---
Baguio	---	---	4.3	3	1.1	17.3	16.7	26.9	1	---	---	---	---	---	---	---
San Fernando, Union	---	---	---	---	---	---	---	---	---	---	1.5	---	---	---	---	---
Echague	---	---	23.1	---	---	---	---	---	---	8	---	---	---	---	---	---
Candon	---	---	---	---	---	---	---	---	---	---	---	4.6	---	---	---	---
Vigan	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Tuguegarao	---	---	---	---	---	2.3	---	---	---	3.8	---	---	---	---	---	---
Laoag	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Aparri	1.8	5	5	---	---	---	---	---	---	---	---	---	---	---	---	---
Cape Bojeador	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Santo Domingo, Batanes	12.5	4	---	4	---	---	4.6	---	---	---	---	---	15	50.9	---	2.8

Daily rainfall at the stations of the Weather Bureau, April, 1917—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
Jolo	mm. 28		mm. 59.9	mm. 37.1	mm. 13.2	mm. 40.1	mm. 11.7						mm. 0.3	mm. 34.8	mm. 316.1
Isabela, Basilan	6.4			39.4	5.1			5.1						22.1	118.5
Zamboanga					19.9	5.8		.8							45.1
Davao					7.4	6.1									107
Cagayan, Misamis								1.5							11.6
Butuan	.5		19.3	2.1	12.2	2.8	21.4		0.5						158.1
Mambajao					4.6								14		11.9
Dumaguete					2.8										66.8
Yap, W. Carolines		9.1	5.1						5.3	11.4	.3		.8	1.5	70.1
Tagbilaran									19.8						38.1
Iwahig				3.6						.8					78
Surigao				10.4	18.6	2.3	.3								78.9
Maasin															9.7
Cebu								1							19.6
Iloilo	6.8				1.3			2.8		.3		1	1.8	.5	24
San Jose Buenavista						3	.3		.5	19.3				7.4	86.3
Cuyo	1.8				.8									4.3	39.7
Ormoc					1.5										60.9
Guiuan				.3	21.3		1.8	1.3	17.3						119.2
Tacloban					2.1				.5	31					95.6
Capiz		18.8	.8									1.3	.5	2.5	88.9
Borongan				.5	26.7				.5						118.3
Catbalogan	8.9		2.8						11.9	10.7		.8	12.4		125.7
Calbayog						1.3			21.6	.3			5.1		112.2
Masbate	2		2							11.9					17.5
Romblon	.5									1.3			4.5	5.6	67.5
Batag														1.3	29.8
Sorsogon					1.8								7.1		44.9
Legaspi													14.2		64.1
Sumay, Guam															33.1
Calapan								6.4				6.1	5.1		101.5
Virac					3.3	3.6			8.4		4.3		.8	2.5	92.4
Naga	11.4					8.7								14.5	117.3
Batangas								1.8	1.5	.3		.3		.3	20.9
Lucena												.5			17
Atimonan	2								2.8					1.3	84.5
Ambulong, Tanauan	11.5				46			2.8	.5	7.4					69.2
Canlubang, Calamba	14.7						1		38.9						122.8
Paracale	9.9								7.4				.3		94.1
Santa Cruz, Laguna		2								11.2			9.9	4.3	42.4
Manila	8.6	14.7							2.1	5.8			1		58.1
Antipolo	16.8							.8				2.3	7.4		67.4
Iba										9.2					65.4
San Isidro	9.4	2.8	16.8							19.3					77
Tarlac	.3		5.1		19				2.5	2.5	21.3		.8		102.9
Baler		3.8							2.5	1.5	13.2		9.4	2.3	107.4
Dagupan			38.6	1									16	8.6	83.8
Bolinao			10.7												41.4
Baguio	17.8	15.5	9.2	4.3	.3								1	41.9	167.9
San Fernando, Union														1.9	43
Echague	.8	70.6			1								7.9	.8	118.5
Candon			1.8											7.6	46.2
Vigan													6.2	10.6	60.3
Tuguegarao	63.5	1.8											9.7	2.5	116.2
Laoag							4.6								33.3
Aparri	1.3	.5	.5	.5											40.6
Cape Bojeador															50
Santo Domingo, Batanes		22.4	9.4				1.3			1.2	6.8	1.5	3.8	83	201.1

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, APRIL, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cagayan, Misamis.		Butuan.		Mambajao.		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	28.4	21.1	32.2	22.1	29.2	23.2	32.5	21	32	21.8	34.1	22.6	31	23.4	29.5	23.4
2	29.7	20.1	32.6	21.6	30.7	22.5	31.5	21.5	32.6	22	31.6	22.9	32	25.2	31.4	25.7
3	30	21	32.1	23.1	30.9	23.2	33.2	21.5	32	22.5	33.9	22.4	30.2	24.2	30.3	26.2
4	30	20.2	31.1	22.6	30.2	23.3	33.2	21.5	32.5	22.2	33.9	21	30.4	24.1	29.3	23.1
5	29.4	21	32.6	23.5	30.9	23.1	30.7	22.3	32	22.9	32.8	22.9	29.7	23.9	30.3	25.2
6	29.4	20.9	32	22.1	28.9	23.4	32.2	22	32	22.1	29.3	22.9	29.2	23.3	29.8	24.7
7	28.9	20.6	32.1	22.1	29.3	23.4	32.7	22	31.4	22.4	33.1	22.4	30.7	24.3	29.6	23.1
8	29.2	20.9	32.2	21.6	30.2	23.2	32.8	21	31.5	22.1	33.9	22.5	30.6	23.2	30	24.1
9	31.9	21.3	31.1	22.6	29.9	23.9	33.7	22.1	32.5	22.6	33.7	23.1	31.3	25.4	30.9	24.5
10	28.4	21.4	31.1	22.7	29.9	23.1	32.9	22.9	32.5	23	32.1	22.9	31.3	25.5	31.4	25.2
11	29	21.3	35.1	22.6	32	22.4	31.2	23.5	32.2	22.1	32.9	23	31.2	24.8	30.2	25.9
12	27.4	21.8	33.2	22.1	30.3	23.2	33.2	22	32.4	22.8	33.9	22.4	30.6	25.2	30	26.8
13	31.9	21.2	32	21.6	30.2	22.9	32.7	22.1	32.2	22.8	33.7	22.3	30.5	23.2	30	23.9
14	29.5	21	31.1	22.1	29.3	22.6	32.2	22	32.7	22.9	33.1	21.9	29.8	23.9	30.4	23.2
15	30.4	21	32.6	22.6	29.8	22.1	30.7	22.5	33.3	21.9	34.1	22.8	31	23.1	29.8	23.3
16	30.4	20.9	32.2	22.1	30.2	23.2	32.7	21.9	33.1	22.5	34.7	23.1	31.5	22.2	31.4	23.2
17	29.3	21.3	33.2	22.2	30.5	23.2	32.7	22.9	33.4	23.2	35.4	23.1	31.5	23.5	31.4	23.5
18	29.4	20.7	32.6	21.6	30.9	23.3	32.2	22.6	33	23	36.1	23.1	31.7	23.6	30.3	24.2
19	28.4	20.9	33.1	22.1	29.7	23.5	32.2	23	32.6	24	32.6	22.4	30	25.2	30.4	25.3
20	29.5	20.6	33.4	21.6	30.2	23.7	33.2	22.8	33.7	23	34.7	23.1	31.6	25.8	30.8	25.3
21	28.4	21.1	28.4	22.6	30.2	23.7	31.7	21.5	33.5	23.3	32.6	23.3	30.3	23.9	30.2	25.2
22	31.4	22	33.4	22.9	30.9	22.7	29.2	21.9	33.4	23	27.4	22.9	30.7	23.2	29.4	24.2
23	28.3	21.9	32.1	22.6	30.9	24.5	32.2	20.5	32.6	22.3	30.4	21.8	31.1	24.7	31.8	24.5
24	29.5	21.5	31.6	22.4	29.9	23.6	32.2	22.5	33	23.8	34.3	23.5	31.4	26.1	30.8	25.2
25	30	22.3	32.1	23.9	28.9	24.1	32.2	21.9	33.1	22.5	33.8	23.1	31.6	24.5	31.1	24.2
26	29.9	20.9	32.6	22.6	30.2	23.6	30.8	20.5	31.8	21.2	33.9	22.5	30.7	24.5	31.7	24.8
27	30.2	21	32.3	22.1	29.9	24	31.7	20	32.8	21.5	34.1	22	30.6	22.6	30.8	23.7
28	30.2	21.1	32.2	22.1	30.2	23	32.2	20	33.3	22.2	34.8	22.1	31.3	22.5	31.2	23.8
29	30.7	21.8	30.1	23.1	30.2	23.6	33.2	22	32.9	23	35.8	22.9	30.6	24.2	30.8	23.5
30	30.4	21.9	31.6	22.1	32.9	24	33.7	22.5	33.6	23.8	35.1	22.9	31.6	25.3	30.4	24.2
Mean	29.6	21.2	32.1	22.4	30.2	23.3	32.2	21.9	32.7	22.6	33.4	22.7	30.9	24.2	30.5	24.4

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	33.2	24	31.3	21.6	32	23	33.1	23.2	34.5	23	30.8	25.4	32.5	24.3	34.5	22.8
2	33.1	24.7	32.3	22.4	31.6	21.9	33.6	23.6	32.6	23.5	31.8	25.3	32.6	24.3	34.7	23.2
3	32.2	23.4	31.6	22.8	32.1	21.4	-----	-----	31.5	23.3	30.9	25.2	32	25	33.2	23.5
4	33.2	24.6	33	21	32.6	21.9	-----	-----	32.6	22.1	30.9	24.4	32	23.5	34.2	22.4
5	30.1	24.1	31	23.1	32	22.4	31.2	23.8	32.6	23	30.3	25	31.6	23.5	33.7	22.6
6	32.9	24	30.8	23.5	32.3	21.9	27.8	23.7	30.5	23.2	30.5	25.2	31.6	24.5	33.2	23.1
7	33.2	24.6	31.5	22.4	28.9	22.3	30.8	22.8	31.2	22.8	30.5	24.2	31.5	24.2	33.2	22.7
8	33.6	25.6	31.3	22.8	30.9	21.5	30.8	23.1	33.5	22.8	31.2	25.6	32.3	23.5	32.7	22.5
9	33.2	25.6	32.4	22.7	32.5	21.9	31.7	23.5	34	24	31.2	26	33.5	24	32.7	23
10	32.9	24.3	31.6	22.8	33.1	22.9	32.1	23.5	32.5	23.4	31.2	25.5	31.8	24.5	33.2	23.4
11	33.2	24.5	32	22.9	32.8	23.1	31.2	23.6	32	24.4	30.8	25	32.6	24.3	33.2	23
12	32.6	23.9	32.4	22.8	32.6	22.3	31.2	22.3	33.2	24	30.7	25.2	33.1	24.8	33.9	23.5
13	33.4	25.2	32.3	21	30.3	22.6	31.4	22.8	32	22.4	31.7	24.5	33.4	25.2	*	23.6
14	33	23.1	31.6	22.4	32.6	21	31.2	22.8	33.2	23.5	32.3	25.2	34.3	23.7	32.8	*
15	33.3	23.5	32	22.8	32.4	21.5	31.3	23.1	33	22.8	31.7	25.5	34.5	24.3	32.6	23.5
16	33.1	24	32.5	22	32.7	21.1	32.2	22.3	32.4	23.5	32.4	25.3	33.2	25	32.8	24.1
17	33.7	24.4	32.4	22.3	32.6	21.4	32	22.6	32	23.7	32.9	25.8	32.6	24.8	32.4	23.7
18	33.7	24.9	31.5	22.5	32.4	22.6	32.3	23.1	34	23.6	31.4	24.6	33.5	23.8	32.8	23
19	32.7	24	32.8	22.5	32.8	21.2	31.3	23.7	33	23.1	31.2	25.6	33	24.9	33.3	22.6
20	33.2	26.1	32.8	23.4	32.7	22.6	31.8	23.6	32.5	24.4	31.2	26	33.2	25.3	33.2	23
21	33.2	25	32	23.5	33.2	22.3	29.3	24	31.8	23.8	31.5	25.2	33.5	24.8	34	22.1
22	33.5	25.5	31.5	23	32.6	22.7	30.5	23.5	33	23.5	30.7	25.2	32.5	25.5	34.1	24.1
23	33.8	25	32.2	21.6	33.5	23.3	30.7	23.9	33	22.8	31.4	25.3	32.4	24.8	33.3	22.5
24	34.2	25.6	33.1	22.7	33.3	23	31.5	23.3	34.4	24	31.6	25.5	33.9	25	33.7	23.6
25	32.7	25.2	31.6	23.4	33.1	22.1	31.8	23.3	33.2	23.8	32	26	32.5	24.6	33.8	23.5
26	32.4	23.6	32	22.8	32.3	23.8	31.2	23.3	33	23.5	31.9	26	31.5	24.5	33.7	22.9
27	33	24.2	31.6	23.4	32.7	22.4	31.7	22	33.5	24.8	32.5	25.3	32.5	24.7	32.3	23.7
28	32.8	24.9	32.4	22.5	33.6	22.2	32.1	23	34	23.8	31.9	25.6	34.6	24	32.7	23.7
29	33.2	26.1	32.8	24	33.6	22.3	31.3	22.3	34.2	24.1	32.5	25	33	24.5	33.2	23.5
30	34.1	26	32	23.5	34.1	23.3	31.4	22.8	34	24.3	32.1	25.4	32.7	24.7	33.6	24
Mean	33.1	24.7	32	22.7	32.5	22.3	31.4	23.2	32.9	23.5	31.5	25.3	32.8	24.5	33.3	23.2

\* The temperatures on the 3d and 4th are omitted as the thermometer-shelter was in repair. The temperatures for 5-10 have been taken from the recording instrument.

\* No observation.



Maximum and minimum temperatures at the stations of the Weather Bureau, April, 1917—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.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.4	26.4	31.2	21.7	31	23.1	32.4	23.4	33.3	24.7	31.1	22.3	32.3	21.6	31.3	22.6
2	33	26.6	31.6	22.7	32	23.4	32.3	23.6	32.8	25.5	31.3	22.9	32.8	22.3	30.2	23
3	33.3	26.9	32.6	20.8	32.6	25	31.6	23.1	32.9	25	31.6	23.4	32.1	22.2	32.4	21.9
4	33.5	25.3	32.4	19.4	31.4	20.8	32.1	22.1	32.2	22.9	31.5	21	31	20.2	32.4	20.8
5	33	24	31.5	24	30.5	23.4	32.3	23.9	32.3	24.2	29	23.3	29.9	23	29.9	23.7
6	30.8	27.3	31.1	22.7	30.5	22.5	30.4	23.1	32.9	26	29.8	22.7	31.5	22.4	29.9	23.3
7	32.7	24.1	31.8	22.4	32.6	22.9	31.6	22.6	33	24.2	31.5	22.7	31.4	21.3	31.9	22.2
8	30.5	24.1	31.3	23.4	29.4	23.8	32.7	24.3	29.8	24.4	30.4	23.4	32.8	22.2	30.5	23.4
9	32.3	23.9	32.8	23.1	33.1	24.5	31.3	25.2	32.6	25.2	31.1	22.7	31.1	22.1	30.6	22.7
10	33.6	25.1	32.2	21.1	31.9	23.6	32.4	24.8	32.2	24.9	32.2	23.9	31.7	21.6	32.6	22.7
11	32.7	25	32.4	21.9	31.4	23.5	31.4	23.3	33.4	24.2	31.5	23.1	31	22.7	31.3	22.7
12	32.1	24.2	33.4	20.4	33.1	23.1	31.5	23.6	33.2	24.3	31.5	22.4	32.2	21.2	31.5	21.7
13	33.3	25	32.5	18.8	33	22.5	31.9	23	33.2	23.5	31.5	22.2	31.6	21.8	31.4	22
14	33.5	24.9	32.5	20.1	33.4	22	32.3	23.2	33.1	23.4	31.3	21.7	31.8	22.3	32.4	22
15	33.6	25.9	32	21.4	33.1	23.3	32	23.6	33.8	23.5	31.6	22.5	31.7	22.4	31.1	22.9
16	32.6	24.2	33	20.9	34.1	21.7	32.1	22.5	33.8	24.1	31.6	22	32.1	22	31.4	23
17	31.6	(a)	32.6	20.8	34.2	22.5	32.7	23.6	33.9	24.1	31.6	21.7	32.1	21.5	34.6	22.4
18	31.8		33.1	21.3	33.6	22.8	32.5	24	34.2	23.2	32	22.6	32	22.5	32.7	22.6
19	32.8		33.4	20.7	33.9	21.5	32.5	23.4	32.9	25	31.8	21.5	32.5	21	32	21.9
20	34.7		34.2	21.9	32.2	23.5	32.6	24	33.8	24.5	32.1	23.2	33.6	22.4	33.3	22
21	33.7		31.9	20.9	32.2	22.9	32.8	23.5	34.1	24.9	30.5	22.2	32.3	21.4	32	21.9
22	32.6		33.8	22	33.7	23.5	32.5	23.5	33.8	25.4	31.5	22.3	32.9	22.7	32.3	23.5
23	33.5		32.6	20.9	31.8	22.6	32.4	23	33.1	24.3	32	21.6	32.6	21.5	32.2	21.7
24	33.2		33	21.6	34.8	25	33	24.5	33.9	23.4	32.2	22.7	32.6	22.4	34.7	23
25	33.8		32.4	22.9	33.4	23.5	33.7	24.3	33.9	24.5	32.3	23.1	32.2	22.3	32.1	23
26	34.8		31.2	21.6	32	22.9	32	23.5	33.3	25.4	32	22.7	31	21.7	32.2	22.5
27	33.4		32.3	23.9	32.5	24.4	33.1	23.8	33.4	24.8	32.1	23.2	31.8	21.9	32.9	22.6
28	33.8	25.1	32.3	22.4	33.8	23.6	34	23.5	33.5	23.8	32	23.2	32	22.8	34.5	23
29	34	26.1	32.9	22.6	34.2	23.1	33	24.4	33.8	25.1	32.2	23.1	32.2	22.8	33	23.7
30	29.7	25.4	32.8	22	34.4	23.4	32.9	24.9	32.9	25.2	32.5	23.1	32.3	22.8	33.2	23.2
Mean	32.9	25.2	32.4	21.7	32.7	23.1	32.3	23.6	33.2	24.5	31.5	22.6	32	22	32.1	22.6

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.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.4	24.8	32.8	24	30.5	24	34.4	22.5	31.1	23.2	29.4	25	32.6	25	32.8	22.3
2	31.8	25.5	33.9	23.9	30.6	23.7	33.5	22.4	31.3	25.4	29.8	24.2	32.5	25.4	32.2	22.5
3	31.6	25.2	33.4	24.8	29.5	23.8	34.8	23.5	30.8	25.5	30.8	24.6	32.5	23.5	31.5	21.4
4	32.4	23.5	33.8	24.5	30.6	23.8	33.1	21.5	31.5	23	29.2	23	31.6	23.5	32.6	21
5	32	25.4	33.1	23.7	28	22.5	33.8	22.5	30.9	25.5	30.6	24.8	31.9	22	31.1	21.2
6	32.8	25.2	33.5	25.7	30.3	24	34.5	22.7	31.5	25	30	24.4	32.1	23.7	32	21.8
7	34.4	25.2	32.9	24	30.1	23.8	33.7	23.5	30.5	24.4	30.8	24.4	32.5	24.9	31.2	21.5
8	32	25.6	30.4	23.4	30.5	24	33.9	24	30	24	30.4	25.2	31.1	23.6	31.7	22
9	31	25.4	33.5	24.6	30.5	24	32.4	23.1	31.8	24.4	31.2	25	31	23.5	29.8	23.1
10	32.6	25	33.7	25.2	30.8	23.9	34.5	22.9	31.3	24.5	30.2	22.4	31.5	23	31.5	21.6
11	31.8	25.2	33.9	22.9	29.8	23.5	34	23.3	30.4	25.6	30.2	23.8	32.3	22	31.6	22
12	32.4	24.4	33.3	23.7	30.5	23.5	34.9	22.2	31.3	22.8	30.6	23.8	32.8	23.5	32.1	23.1
13	32.6	24.4	34.3	22.9	30.9	23.7	34	23.2	31.8	23.7	31	25.2	32.5	22.5	32	22.8
14	32.6	25.2	34.4	20.7	30.9	23.8	*	23.2	31.6	24	31.2	23	32.9	22.4	31.7	22.3
15	32	24.8	34.5	22.5	31.8	23.5	*	22.5	32.1	22.9	31.2	23.4	33	22	32	22.3
16	32.4	25.2	34.4	22.6	31.4	23.5	34	23.5	32.9	23.9	31.8	23.2	33.5	23	31.8	23
17	32.8	25	34.4	23	31.6	23.6	34	22.5	32.8	24.6	32	24	33.5	23.5	32.5	22
18	33.4	25	34.4	23.4	31.3	23.5	34	23	32.4	23.9	31.8	22.2	33.5	22.5	32.5	21.9
19	31.8	25.6	35	24	31.5	23.5	33.2	23.2	31.8	26.5	32	23.6	33.2	22.5	32	22.2
20	33	25.2	34.9	23.3	31.5	23.8	33	22.4	31.8	23.9	31.6	25	33.5	22.2	32.5	21.9
21	33.6	25.6	34.4	24.4	31.8	24	32.5	23.5	32.3	25.4	31.6	25	32.7	22.2	33	21
22	32.4	25.5	34.7	24.3	31.4	23.4	32.5	22.5	32	24.5	32	25.4	33.5	22.5	32.3	21.8
23	33.2	25.5	34.4	24.2	31.6	24	32.4	23	32.1	24.1	31.2	25.6	33	23	32.4	22.1
24	33.8	25.4	34.5	22.7	32.2	24	33.5	22.5	32.8	23.5	31.4	25.6	34.4	22	32.5	22
25	33.8	25.2	34.5	23.1	32.2	24.5	33.9	23	32.4	23.9	32.4	24.2	33	24	32.2	21.9
26	32.2	24.5	34	25.2	30.8	24	32.5	23	32.3	26.5	32.6	23.7	33.1	24	32	22.4
27	32.6	25.2	34.9	25	32.3	24	32.5	22.5	32.3	23.4	32.8	22.8	33.8	24.5	31.5	21.1
28	33	25	35.5	23.1	32.9	24	33.1	22	33.2	22.9	32.2	22.2	34	23	31.2	21
29	33.8	25.6	34.4	24.7	32.5	24.9	33	22.5	32.7	23.6	31.6	22.2	33	24.5	32.4	21.9
30	32.8	26.2	34.4	24.4	32.6	24.6	32.5	22.5	31.1	22.9	32	23.2	33.2	24.5	31.8	22.1
Mean	32.6	22.5	34	23.8	31.1	23.8	33.5	22.8	31.8	24.2	31.2	24	32.8	23.3	31.9	22

<sup>a</sup> The minimum temperatures from 18th to 27th are not reliable.

\* No observation.

Maximum and minimum temperatures at the stations of the Weather Bureau, April, 1917—Continued.

Day.	Naga.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.		Santa Cruz, Laguna.	
	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	32.4	21.3	34	21.1	31.5	23.4	28.2	24.6	35.3	24.8	32.1	22.1	30.2	24.7	31.4	23.2
2	31.5	20.7	33.4	22.6	32.1	23.6	29.3	24.7	34.8	24.2	33	21.8	28.7	23.3	31.6	22.3
3	31.7	20.1	33.6	23.1	31.7	23	30.6	25.7	34	23.3	33.1	22.4	30.2	22.5	33.1	22.6
4	32.1	18.1	35.4	23.2	32.7	23	31.3	23.3	36	24	33	21.8	31.2	22.7	32.7	23.2
5	32.2	19.7	35.9	23.2	31.9	23	30.5	26	35	23.1	31.8	21.5	30.7	24.3	32.3	22.5
6	33.6	21.4	36.3	24.3	31.7	23.4	32.2	25.5	34.9	25.2	32.1	22.2	30.4	24.5	31.6	23.7
7	31.8	20.9	35.3	23.5	31.5	23	31.3	25.9	35	23.9	32.4	21.5	29.9	24.5	31.9	22.9
8	31.1	21.3	35.5	23.9	31.5	23.2	30.8	24.3	34.2	25	33	21.6	29.7	23.9	31.6	23.2
9	32.1	21.1	35.1	23.5	32.5	22.6	30.8	24.5	34.6	23	33.3	22.2	30.2	23.2	32.5	23.2
10	32	19.8	34.1	23.7	32.1	22.7	31.2	23.1	35.1	24	32.2	22.8	30.9	22.4	31.5	22.9
11	33.4	20	34.9	23.3	33.4	22.8	31.2	22.5	34.8	24	32.8	22	31.6	23.3	32.2	23.2
12	34.4	20	35.7	23.9	32.7	22.6	31.8	21.8	34.8	22.8	33.1	22.2	31.8	23	33.3	23
13	33.9	20	34.9	23.5	32.2	22.1	32.8	22.2	35	23.6	34.2	21.8	32.2	23.3	33.8	22.8
14	33.3	20	34.9	22.7	33	21.9	33.2	23	33.8	22.6	34.2	21.4	32.2	23.5	33.6	22.8
15	34.1	19.8	33.8	22.9	33	22	34.1	22.9	35.1	23	33.9	21.8	31.8	23.7	33.6	21.9
16	34.1	21.2	34.3	24.5	33.1	22.6	34	23.7	34.1	24.3	33.4	22.6	32.6	24	33.7	23
17	34.6	21	35	24.3	33.3	21.8	33.1	23.6	35.2	23.9	33.5	23.4	31.2	24.6	32.4	22.5
18	34.4	20	36.5	23.5	33.4	22.6	32.8	23.1	34	23.8	33.3	22.6	32	23.5	34.2	23
19	34.9	20	35.9	23.9	33.2	23	32.7	23.9	36.2	24.5	33.2	22.8	32.7	24	33.9	24.1
20	34.1	19.1	36.2	22.9	33.5	22.7	33.3	23.5	36.6	23.5	33.4	22.6	32	23	34.3	22.8
21	33.4	18.6	36.5	22.9	34.5	22.4	32.8	23	38	23.5	33.2	22.3	31.8	23.3	33.8	23
22	33.2	19	36.1	23.6	33.7	22.9	32.8	22.8	35.5	22.4	33.4	22.6	32.2	22.6	33.9	22.7
23	33.2	19.8	36.2	24.5	33.3	23.4	33.7	23.2	35.1	23.9	34.4	22.6	32.6	23.3	35.1	23.5
24	34.6	20.5	36.2	22.8	33.1	22.6	35.2	23.1	35.2	22.8	34.9	22.2	32.8	23.6	35.1	22.8
25	33.1	19.6	33.6	24.4	33.3	23.6	31.5	24.3	35.3	25.3	34	23.8	32.5	23.9	32.9	23.7
26	32.8	21.8	33.9	24.3	33.9	24.4	32.8	26.6	33.8	25	33.6	22.9	31.4	24.5	30.8	23.7
27	33.1	19.4	35	24.3	32.6	23.5	32.8	24.9	34.3	24.3	33.4	23.6	31.6	23.2	33.6	24.1
28	33.4	19.7	33.9	23.5	33.3	23	32.6	23.3	33.7	24.1	33.2	22.8	32	23.5	33.5	23.1
29	33.5	20	35.2	24.1	33.7	23.6	32.6	25.5	34.7	24.9	32.6	22.4	32.2	24.2	32.8	24.3
30	34.1	21.3	35	24.6	33	23.7	30.8	24.5	33.8	24.2	32.4	23.4	31.7	24.9	32.8	22.8
Mean	33.2	20.2	35.1	23.6	32.8	22.9	32.1	24	34.9	23.9	33.2	22.4	31.4	23.6	33	23.1

Day.	Manila.		Antipolo.		Iba.		San Isidro.		Tarlac.		Baler.		Dagupan.		Bolinao.	
	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	33.1	22.4	35.3	21.3	31.9	22.1	33.6	22.7	36.2	21.5	31.1	20.9	33.8	24.1	32.2	21.5
2	33.7	22.2	34.7	21	32.8	21.4	34	22.8	36.2	21.8	31.2	22.9	34.3	23	32	21.5
3	34	22.4	34.8	21.3	32.9	23	35.4	23.4	35.6	23.3	32.1	23	32.4	24.7	32.3	25
4	32.7	22.4	35.5	21.4	32.6	23.2	33.1	22.6	36	23.4	30.1	22.1	34.7	24.5	31.7	24.7
5	33.7	21.5	35.7	21	32.9	21.3	34.6	20.4	36.2	21	31.2	19.5	36.7	22.6	33	24.5
6	33.7	21.7	35.4	22	32.3	21.4	33.6	21.9	36.5	22	30.8	22.4	35.6	23.1	32.8	23.1
7	33.4	21.3	34.7	21.5	32.3	21.7	35.4	22.1	36.2	23	31.5	21.2	35.2	22.3	33.8	22.7
8	32.2	23.3	34.3	21.8	33.4	21.7	32.9	22.4	33	22.8	31.1	22.4	37.1	23.4	32.4	24
9	34.2	22.9	35.3	21.3	32.3	21.4	35	21.9	35.5	21	31.4	22.1	37	23.5	33.9	23.1
10	33.7	23.5	34.8	22.4	32.3	23.3	34.6	23	36.1	23.5	31	22.5	36.5	23.9	33.8	22.5
11	33.6	22.8	33.8	21.7	32.1	23	34.1	22.4	35.5	22.4	30.8	22.4	37.2	22.6	34	21.6
12	34.6	22.9	36.7	23	32.4	24.2	36	24.6	*	*	30.7	22.5	36.6	23.5	34.5	22.6
13	34.8	23.4	36.6	22.7	32.3	22.6	36	24.6	*	*	32.2	23.4	35.9	24	34.5	22.5
14	33.7	23.8	34.7	22.6	32.2	22.1	36	23.2	35.8	*	33.1	23.4	34.8	24	32.4	23.6
15	32.4	23.5	33.9	22.8	32.2	22.9	34.9	22.4	35.6	22.6	33.3	22	34.8	23.5	32.2	24.4
16	32.7	24.4	34.4	23.9	32.2	22.2	35	22.7	34.4	22.8	34.4	22.7	33.9	23.8	32.5	23.9
17	33.6	24.3	34.6	23.3	32.8	21.9	35.9	23.4	34.6	23	31.7	22.5	34.2	24.6	33	26
18	34.5	23.7	35.4	23	32.8	22.3	35	22.6	35.3	22.5	31.4	22	36.6	23.4	34.1	24.5
19	34.4	24	35.1	23.3	32.9	22.9	33.9	23.9	35	24	31.5	22.2	37.6	23.4	34.5	25.4
20	34.7	24.2	35.4	22.1	33.1	24.5	34.4	23.4	34.8	23.3	31.7	22.3	36.2	23	33.8	23
21	34.3	22.9	34.7	21.8	33.3	22.3	35	22.9	35.5	23.1	32.1	21.8	34.1	23.5	33	23.7
22	34.9	21.3	35.5	20.5	33.3	21.9	35.1	22	35	23.3	33.1	21.2	35	23.4	33.4	22.8
23	35.4	23.2	35.7	21.5	33.8	22	36.6	23.4	35.3	23	33.8	22	36.7	24	34.8	25.2
24	35.1	24.5	35.7	23.6	34.3	22	36.2	25.1	35.5	23.3	33.7	22.2	34.2	27.6	34	27
25	34.2	24	35.3	22.5	34.5	23	35.3	23.9	35.8	23.4	32.2	23.8	33.8	24.5	34.1	24.3
26	33.7	23.9	35.2	23.2	34	23.5	35.9	24	35.4	24.4	31.8	24.3	37	25.5	33	24.5
27	33.1	24.3	33.7	23.4	32.7	23.4	33	24.1	34.4	24	32.3	23.9	34.7	24.9	34.1	23.5
28	33.3	24.7	33.4	23.3	33.4	22	34.4	24.5	34.5	23.4	32.4	22.9	32.9	26.5	33.5	25.9
29	33.6	24.3	33.4	22.5	33.3	22.1	33.9	23.6	35.7	23.4	29.7	23.6	36.9	23.3	34.3	21.5
30	34.3	23.6	34.9	21.9	33.5	24.2	35	23	34	23	29.6	23.7	34.7	23.3	33.1	23.6
Mean	33.8	23.2	35	22.3	32.9	22.5	34.8	23.1	35.3	22.9	31.8	22.5	35.4	23.9	33.4	23.7

\* No observation.

Maximum and minimum temperatures at the stations of the Weather Bureau, April, 1917—Continued.

Day.	Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.	
	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.
1	23.8	14.4	33	23.5	30.4	20.7	34	24	32.6	24.4
2	23.3	14.9	34	23.7	32.5	22.3	34.5	24.5	32.1	23
3	23.5	15.8	33.2	24.3	33.6	22	34.5	24.6	31.8	22.5
4	22.9	16	33.8	24.5	32.1	23.1	33.7	24.2	33	22.2
5	23.3	15.4	33.8	25	34	19.8	33.9	25.5	33.1	24.6
6	23.4	14.9	34.6	24.3	34.4	21	34	24.5	32.8	23.7
7	22.9	15.4	34.4	23.3	34.5	21.3	34.2	24.6	32.3	23.9
8	25.7	15.3	34.2	22.5	33.8	22.9	33.2	22.6	33.9	22.5
9	23.8	15.8	35	22.6	34.5	21.4	34.2	22.6	33.6	24.2
10	24.1	15.6	34.6	24	34	22.2	34.4	25.5	32.3	23.6
11	25.9	14.9	36	24.1	34	21.4	34.2	25.1	33.3	24.9
12	24.7	15.4	36.5	24.9	34.7	21.5	35.1	26.5	33.4	25.6
13	24.7	15.6	35.7	22.5	35.2	21.3	34.8	26	33.2	24.6
14	24.6	15.5	33.5	23.5	34.4	21.8	33.5	25.1	33.3	21.9
15	24.4	15.2	34	24.1	34.2	21.8	33.6	25.2	32.8	24.4
16	23.3	15.6	33.2	23.7	33.5	21.6	34.5	25	33.1	24
17	23	15.2	33.6	23.1	33.5	22.5	34.8	25.2	33	24.3
18	24.8	15.4	34.3	23.3	33.5	22.1	34.4	25.1	34.4	23.8
19	23.9	16	34.7	24	33.7	21.9	34.6	24.8	33.3	23.5
20	24.5	15.9	35.2	24.5	35	22.4	34.5	25.2	33.9	23.8
21	24.1	15.7	33.9	23.9	33.4	21.4	35.2	24.9	34.1	23.8
22	23.6	15.4	35	23.5	34.5	22.5	33.8	24.9	33.6	24.7
23	25.2	15.5	35	24	36	21.4	34.2	24.9	33.7	25.1
24	25	15.4	34.5	24.7	35	23.3	35.2	26.5	33.6	25.3
25	24.6	16	34.3	23	34	23.9	34.1	24.5	34.6	25
26	24.8	16.5	35.5	24	34	23.8	33.6	25.2	34.2	25.5
27	23.9	15.5	34.5	24.2	34.5	22.5	34.7	25.5	33.4	25
28	24.8	16.2	33.6	23.3	33.6	24.7	34.1	25.5	33.3	24
29	25.4	16.1	35.2	25	32.2	23.5	34.4	25.1	34.2	25.8
30	24.8	15.4	35.6	24.2	33	22.1	34.4	26.8	32.1	23.2
Mean	24.2	15.5	34.5	23.8	33.9	22.1	34.3	25	33.2	24.1

Day.	Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	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.
1	29.5	20.4	33.7	20	27.2	22.4	27.6	20.2	23.4	19.4
2	34	22.4	36.3	21	28.3	22.5	29.3	21.6	27.4	21.3
3	36.1	21.7	33.2	21	28.5	22.2	27.8	22.9	28.9	20.9
4	34	24.4	36.5	20.9	29.2	24	30.7	22.8	28.6	20
5	35.8	22	35.9	22.7	32	23.2	31.8	23.2	29.4	23.2
6	37	22.7	35.1	22.1	31.1	23.3	30.8	23.4	30.1	21.6
7	35.9	21.6	34.9	22	32.3	23	32.4	23.8	30.8	23.2
8	35.8	23.5	37.9	20	30.8	22.8	31.8	23.2	29.3	22.6
9	36.6	22	35.2	21.9	32.3	23.1	31.6	24.2	30.9	24.8
10	36.7	22.8	36.5	21	32.2	22.7	31.6	22.8	29	22.7
11	35.3	23.8	35.4	21.8	31.8	23.2	31.2	23.4	30.5	22.1
12	37	22.8	36.1	24.1	32.3	23.6	32	24.8	31.7	25.2
13	36.1	22.5	35.6	23	32.2	22.6	32.8	25	29.3	24.6
14	35.4	23.5	35.6	22	31.1	22.7	31	21.8	30.4	24.5
15	36.7	22.4	35.1	22.9	31.5	23.1	30.7	24.7	29.6	22.7
16	34.5	22.7	33.8	22.9	31	23.6	*	*	30	23.7
17	34.6	21.9	34.8	22	31.3	21.6	29.6	*	29.3	24
18	33.1	21.8	35.9	22.7	31.8	21.8	32	25.2	29.4	22.9
19	34.1	23	35.7	21.9	31.8	22.7	30.8	23.6	30	22.4
20	35	23.1	38.4	21.3	33	22.2	34	23.8	31.1	22.6
21	35.4	22	36.7	22.4	31.1	22.8	31.8	24.3	29	24
22	35.6	22.8	36.2	22	31	23.5	33.6	24.4	30.5	22.8
23	36	24	36.4	22.9	33	24	32.2	24.8	31.4	24.8
24	35.3	24.3	35.9	23.7	31	25	32.2	25.4	27.5	23
25	35.2	24.2	36.5	21.9	30.2	25	32.5	24.2	27.4	22.5
26	35.9	23.2	36.3	22.8	30.8	23.8	34.6	24.2	29.4	23.2
27	36.1	24.7	35.6	23.6	31.6	23.9	32.8	24.8	29.6	24.8
28	35.1	24.4	37.2	23.5	30.8	25.2	31.5	24.2	26.6	24.2
29	33.9	23.4	36.6	21.7	28.7	24.6	31	24.4	27	21.4
30	33.3	22.6	33.2	24.3	30.3	22	28.2	22.2	27.6	22.6
Mean	35.2	22.9	35.9	22.2	31	23.2	31.4	23.7	29.2	22.9

\* The thermometer-shelter was in repair.



# SEISMOLOGICAL BULLETIN FOR APRIL, 1917.

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## EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

9, 11<sup>h</sup> 12<sup>m</sup> 11<sup>s\*</sup> [9, 19<sup>h</sup> 12<sup>m</sup> 11<sup>s</sup>]. Ilocos Norte (NW Luzon). Earthquake of intensity V-VI, felt through the central part of the province. At 11<sup>h</sup> 22<sup>m</sup> 20<sup>s\*</sup> [19<sup>h</sup> 22<sup>m</sup> 20<sup>s</sup>] occurred a light aftershock, and at 15<sup>h</sup> 52<sup>m</sup> 30<sup>s\*</sup> [23<sup>h</sup> 52<sup>m</sup> 30<sup>s</sup>] a second earthquake of intensity IV-V. The meizoseismic area of these shocks comprised a zone of some 40 kilometers in the E-W direction from near the coast to the Cordillera Central. Their origin or cause seems to have been of a rather shallow or local nature, so that only the first shock was slightly perceptible in northern and southern parts of the province 30 kilometers distant.

10, 13<sup>h</sup> 34<sup>m</sup> 58<sup>s\*</sup> [10, 21<sup>h</sup> 34<sup>m</sup> 58<sup>s</sup>]. Western Visayas. Earthquake shock felt in the islands of Cuyo, Panay, and northern Negros; it showed intensity IV in the eastern part of Panay and western of Negros. The origin probably was in the sea between the two islands. At 16<sup>h</sup> 44<sup>m</sup> 10<sup>s\*</sup> [11, 0<sup>h</sup> 44<sup>m</sup> 10<sup>s</sup>] occurred an aftershock felt with intensity III in the proximity of the Iloilo Strait; some lighter shocks were also noticed at 19<sup>h</sup> 20<sup>m</sup> and 20<sup>h</sup> 10<sup>m</sup> [11, 3<sup>h</sup> 20<sup>m</sup> and 4<sup>h</sup> 10<sup>m</sup>].

10, 2<sup>h</sup> 07<sup>m</sup> [10, 10<sup>h</sup> 07<sup>m</sup>]. Basco (Batanes Islands). Subsultory earthquake of intensity III, with subterranean rumbling.

11, 22<sup>h</sup> 02<sup>m</sup> 06<sup>s\*</sup> [12, 6<sup>h</sup> 02<sup>m</sup> 06<sup>s</sup>]. N Luzon. Earthquake shocks which reached intensity V in the northernmost part of Cagayan, Apayao, and Ilocos Norte provinces. Their origin was about 420 kilometers distant from Manila, probably near to the volcanic island of Camiguin (Babuyan). The fact that they were neither felt in the central and southern part of the said provinces nor registered by the seismographs of Formosa tends to persuade their volcanic character.

14, 5<sup>h</sup> 22<sup>m</sup> [14, 13<sup>h</sup> 22<sup>m</sup>]. Butuan (N Mindanao). Oscillatory earthquake, direction E-W, intensity II-III, duration 2 seconds.

21, 14<sup>h</sup> 43<sup>m</sup> [21, 22<sup>h</sup> 43<sup>m</sup>]. Cuyo Island. Oscillatory shock, direction SW-NE, intensity III-IV, very short duration.

22, 3<sup>h</sup> 05<sup>m</sup> [22, 11<sup>h</sup> 05<sup>m</sup>]. Ormoc (W Leyte). Earthquake of intensity III.

23, 20<sup>h</sup> 33<sup>m</sup> 36<sup>s\*</sup> [24, 4<sup>h</sup> 33<sup>m</sup> 36<sup>s</sup>]. Eastern Luzon. Earthquake of intensity V at Baler, felt also in the Provinces of Nueva Ecija, Nueva Vizcaya, Isabela, and Benguet. It originated at a distance of 250 kilometers from Manila, probably in the Pacific, E of the Baler Bay.

24, 1<sup>h</sup> 41<sup>m</sup> 56<sup>s\*</sup> [24, 9<sup>h</sup> 41<sup>m</sup> 56<sup>s</sup>]. Butuan (N Mindanao). Earthquake of intensity II-III. Seemingly it originated in the Pacific near the eastern coast of Mindanao.

24, 17<sup>h</sup> 57<sup>m</sup> [25, 3<sup>h</sup> 36<sup>m</sup>]. Guam (Mariana Islands). Earthquake shock of intensity II-III. A stronger shock occurred four minutes later.

27, 9<sup>h</sup> 10<sup>m</sup> [27, 17<sup>h</sup> 10<sup>m</sup>]. Echagüe (E Luzon). Earthquake of intensity II-III; probably originated in Nueva Vizcaya.

27, 20<sup>h</sup> 39<sup>m</sup> [28, 6<sup>h</sup> 18<sup>m</sup>]. Guam (Mariana Islands). Earthquake of intensity III-IV.

<sup>1</sup> 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<sup>h</sup>). 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.  $A_N: T_0=5.1, \epsilon=2.634, \frac{r}{T_0^2}=0.048;$   
 $A_E: T_0=5.2, \epsilon=1.968, \frac{r}{T_0^2}=0.048.$  Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
86	1	Iv	eP	16 33 45				
			L	34 00				
			F	37				
87	2	Ir	eP	7 57 33				
			S	59 48				
			L	8 01 41				
			M <sub>N</sub>	02 14	6	8		
			M <sub>E</sub>	02 33	4		10	
88	3	Ir	e	12 42 13				
			F	13 22				
89	3	Iv	eP	15 41 58				
			F	44				
90	9	Iv	eP	5 16 28				
			L	16 46				
			M <sub>E</sub>	16 51	2		75	
			F	23				
91	9	IIIv	eP	11 12 11				Ilocos Norte (NW Luzon). Maxima and end in both
			L	12 47				components lost by the force of the shock.
92	9	IIv	eP	11 22 20				Ilocos Norte (NW Luzon).
			L	23 14				
			M <sub>N</sub>	23 18	4	54		
			F	33				
93	9	Iv	eP	15 52 30				Ilocos Norte (NW Luzon).
			L	53 23				
			F	16 00				
94	10	Iv	eP	13 34 58				Western Visayas.
			L	35 46				
			M <sub>N</sub>	36 02	4	12		
			F	50				
95	10	Iv	eP	16 44 10				Western Visayas.
			L	44 53				
			M <sub>N</sub>	45 14	2	10		
			F	56				
96	11	Iv	eP	22 02 06				N Luzon.
			L	02 52				
			M <sub>N</sub>	03 29	4	52		
			F	23 14				
97	12	Ir	e	3 01 16				
			S	06 18				
			L	10 55				
			M <sub>N</sub>	12 24	18	8		
			M <sub>E</sub>	12 29	17		12	
98	14	Ir	eP	11 12 34				
			L	15 00				
			M <sub>N</sub>	15 17	4	33		
99	16	Ir	e	18 51 00				
			S	55 50				
100	17	Ir	L	19 02 26				
			M <sub>E</sub>	02 52	15		4	
			F	26				
			M <sub>N</sub>	13 37 49				
101	17	Iv	eP	19 54 44				
			L	55 40				
			F	20 06				
102	18	Iv	eP	12 52 41				
			F	56				
103	19	Iv	eP	4 19 00				
			F	24				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
104	21	I <sub>r</sub>	e F	h. m. s. 0 58 36 41				
105	21	I <sub>v</sub>	eP F	11 58 43 12 02				
106	22	I <sub>r</sub>	e F	6 35 7 03				
107	23	I	e F	0 38 20 1 11				
108	23	I <sub>v</sub>	eP L M <sub>N</sub> M <sub>E</sub> F	20 33 36 34 04 34 07 34 07 42		2 2	108 78	Eastern Luzon.
109	24	I <sub>v</sub>	eP L F	1 41 56 44 51 2 02				Butuan (N Mindanao).
110	25	I <sub>r</sub>	eP S L F	7 48 22 51 14 53 09 8 16				
111	25	I <sub>v</sub>	eP F	14 19 38 26				
112	25	I <sub>v</sub>	eP F	21 18 26 26				
113	26	I <sub>r</sub>	e F	17 44 18 56				
114	26	I	e F	23 55 00 0 09				
115	28	I	e F	14 01 00 17				
116	29	I <sub>v</sub>	eP F	8 08 00 10				
117	29	I <sub>v</sub>	eP F	11 46 34 52				
118	29	I <sub>r</sub>	e S L M <sub>N</sub> M <sub>E</sub> F	12 03 29 09 36 18 52 22 38 23 16 58		14 15	9 9	
119	29	I <sub>r</sub>	e M <sub>E</sub> F	15 42 25 52 14 16 05		12	3	
120	30	I <sub>v</sub>	eP F	9 24 40 28				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

9, 11<sup>h</sup> 12<sup>m</sup> 11<sup>s\*</sup> [9, 19<sup>h</sup> 12<sup>m</sup> 11<sup>s</sup>]. Ilocos Norte (NW de Luzón). Temblor de tierra de intensidad V–VI sentido en toda la parte central de la provincia. A 11<sup>h</sup> 22<sup>m</sup> 20<sup>s\*</sup> [19<sup>h</sup> 22<sup>m</sup> 20<sup>s</sup>] ocurrió una repetición muy débil y a 15<sup>h</sup> 52<sup>m</sup> 30<sup>s\*</sup> [23<sup>h</sup> 52<sup>m</sup> 30<sup>s</sup>] un segundo temblor de intensidad IV–V. El área meizosísmica de todos estos movimientos comprendía una estrecha zona de unos 40 kilómetros de largo prolongada de E a W desde cerca de la costa hasta la Cordillera Central de Luzón; el origen o causa parece era de carácter muy superficial y local, puesto que en el N y S de la provincia a distancias de 30 kilómetros del epicentro, no se sintió más que el primer temblor y con intensidad II–III solamente.

10, 13<sup>h</sup> 34<sup>m</sup> 58<sup>s\*</sup> [10, 21<sup>h</sup> 34<sup>m</sup> 58<sup>s</sup>]. Visayas Occidentales. Temblor de tierra sentido en las Islas de Cuyo, Panay y en la parte N de Negros; tuvo intensidad IV en la parte oriental de Panay y en las próximas regiones de la Isla de Negros. Su epicentro se hallaba probablemente entre Panay y Negros, en el mar. A 16<sup>h</sup> 44<sup>m</sup> 10<sup>s\*</sup> [11, 0<sup>h</sup> 44<sup>m</sup> 10<sup>s</sup>] ocurrió una repetición de intensidad III en las proximidades del estrecho de Iloilo, y otras más débiles a 19<sup>h</sup> 20<sup>m</sup> y 20<sup>h</sup> 10<sup>m</sup> [11, 3<sup>h</sup> 20<sup>m</sup> y 4<sup>h</sup> 10<sup>m</sup>].

10, 2<sup>h</sup> 07<sup>m</sup> [10, 10<sup>h</sup> 07<sup>m</sup>]. Basco (Islas Batanes). Temblor de tierra susultorio, intensidad III, con ruido subterráneo.

11, 22<sup>h</sup> 02<sup>m</sup> 06<sup>s\*</sup> [12, 6<sup>h</sup> 02<sup>m</sup> 06<sup>s</sup>]. N de Luzón. Temblor de tierra de intensidad máxima V, sentido en la parte más septentrional de la isla y de las Provincias de Cagayán, Apayao e Ilocos Norte. Su origen distaba 420 kilómetros de Manila, se hallaría probablemente cerca de la isla volcánica de Camiguín (Babuyanes). El no haberse sentido en otras estaciones no muy distantes del S de Cagayán y de Ilocos, ni registrado en Formosa hace sospechar que este temblor era de carácter volcánico.

14, 5<sup>h</sup> 22<sup>m</sup> [14, 13<sup>h</sup> 22<sup>m</sup>]. Butúan (N de Mindanao). Temblor oscilatorio, dirección E–W, intensidad II–III, duración 2 segundos.

21, 14<sup>h</sup> 43<sup>m</sup> [21, 22<sup>h</sup> 43<sup>m</sup>]. Isla de Cuyo. Temblor oscilatorio, dirección SW–NE, intensidad III–IV, duración muy corta.

22, 3<sup>h</sup> 05<sup>m</sup> [22, 11<sup>h</sup> 05<sup>m</sup>]. Ormoc (W de Leyte). Temblor de tierra de intensidad III.

23, 20<sup>h</sup> 33<sup>m</sup> 36<sup>s\*</sup> [24, 4<sup>h</sup> 33<sup>m</sup> 36<sup>s</sup>]. Este de Luzón. Temblor de tierra de intensidad V en Baler, sentido además en las vecinas provincias de Nueva Écija, Nueva Vizcaya, Isabela y Benguet. Su origen distaba unos 250 kilómetros de Manila, probablemente en el Pacífico al E de la bahía de Baler.

24, 1<sup>h</sup> 41<sup>m</sup> 56<sup>s\*</sup> [24, 9<sup>h</sup> 41<sup>m</sup> 56<sup>s</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad II–III. El origen de este temblor parece se hallaba en el Pacífico muy cerca de la costa oriental de Mindanao.

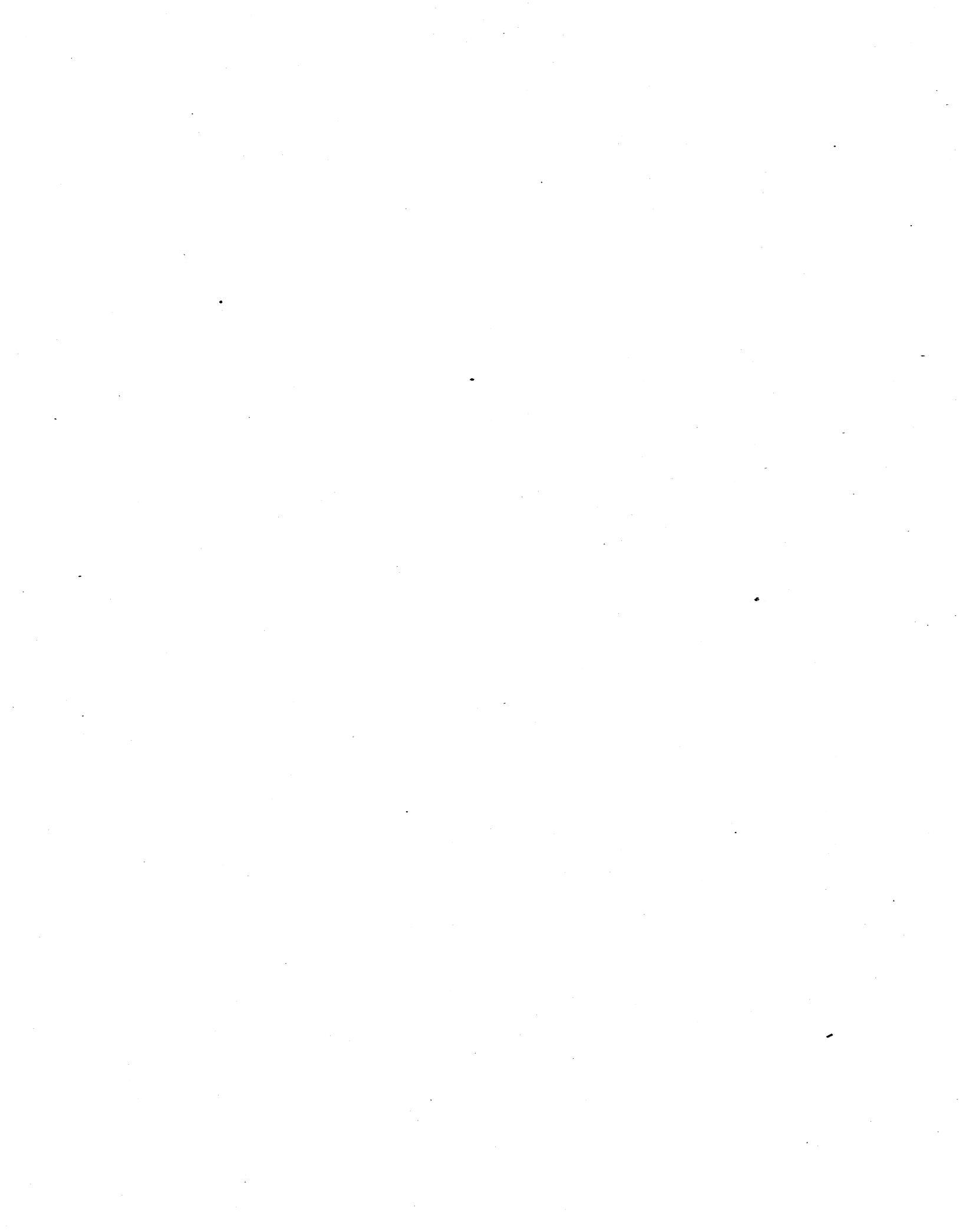
24, 17<sup>h</sup> 57<sup>m</sup> [25, 3<sup>h</sup> 36<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad II–III. Repitió 4 minutos después con alguna mayor intensidad.

27, 9<sup>h</sup> 10<sup>m</sup> [27, 17<sup>h</sup> 10<sup>m</sup>]. Echagüe (E de Luzón). Temblor de tierra de intensidad II–III. Probablemente originado al S, en Nueva Vizcaya.

27, 20<sup>h</sup> 39<sup>m</sup> [28, 6<sup>h</sup> 18<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad III–IV.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.







THE GOVERNMENT OF THE PHILIPPINE ISLANDS

# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR MAY, 1917

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1917



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**BULLETIN FOR MAY, 1917.**



# METEOROLOGICAL BULLETIN FOR MAY, 1917.

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 moderately higher than that of the preceding year, although it differs very little from the May's normal. The highest pressures were generally observed on the 15th or 18th, while the lower pressures took place on the 3d or 11th. The monthly mean for Manila differs by only  $-0.01$  mm. from the normal, and by  $+0.46$  mm. from the mean of May, 1916.

The mean monthly temperature is slightly lower than that of the preceding year in central and northern Luzon, and slightly higher in southeastern Luzon, the Visayas and Mindanao. The extreme monthly temperatures for Manila were  $36.0^{\circ}$  C. on the 15th, and  $20.7^{\circ}$  C. on the 19th. The highest and lowest temperatures of the month for Baguio were:  $25.9^{\circ}$  C.,  $15.0^{\circ}$  C. on the top of Mirador, and  $26.1^{\circ}$  C.,  $13.7^{\circ}$  C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR MAY, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from May, 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from May, 1916.	Highest.	Day.	Lowest.	Day.
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>		<i>mm.</i>		<i>°C.</i>	<i>°C.</i>	<i>°C.</i>		<i>°C.</i>	
Zamboanga	758.60		759.95	15	757.64	2, 20	26.3		32.9	17, 18	21.9	11
Tagbilaran	58.38	+0.81	59.72	15	57.22	3	26.9	+0.7	34.5	9	22	14, 15
Surigao	58.46	+ .91	59.97	15	57.46	3	27	+ .6	32.5	9	22.7	31
Cebu	58.41	+ .84	59.88	15	57.47	3	27.9	+ .4	33.6	7	21.9	20
Iloilo	58.37	+ .88	59.56	14	57.22	3	27.2	+ .3	34	5	22.4	24
Ormoc	58.70	+ .90	59.92	15	57.65	3	26.6	+ .3	34.5	16	20.8	4
Tacloban	58.54	+ .97	59.88	15	57.56	3	27.4	+ .6	33.7	1	22.7	13
Capiz	58.64	+ .81	59.91	15	57.80	3	27.1	+ .1	35.2	9	21.7	24
Calbayog	58.64	+ .86	60.09	18	57.61	3	26.6	+ .4	35	27	21.6	17
Legaspi	58.54	+ .69	60.03	15	57.35	11	27.9	+ .1	33.9	12	21.9	17
Atimonan	58.42	+ .44	59.94	18	57.14	11	27.4	+ .4	34.7	11	22.4	29
Ambulong, Tanauan	57.82	+ .49	59.12	18	56.84	3	27.4	— .2	36.3	1	22	21, 29
Paracale	58.61	+ .40	60.29	18	57.38	11	27.3	— .1	33.8	28, 31	23.1	9
Manila	58.34	+ .46	59.63	18	57.28	3	27.9	+ .5	36	15	20.7	19
San Isidro	58.47	+ .38	59.88	18	57.42	11	27.7	— .4	36	19, 20	21.3	19
Dagupan	57.69	+ .49	59.08	18	56.63	3	28.1	— .6	37.1	22	22.5	1
Baguio <sup>a</sup>	636.61	+ .35	638.08	18	635.62	3	18.4	— .4	25.9	30	15	1
Vigan	757.94	+ .46	759.56	18	756.71	11	28.3	— .5	34.3	30	22.6	6
Tuguegarao	58.30	+ .14	59.92	18	56.56	11	27.8	— 1	37.8	17, 30	22	14
Laoag	57.98		59.39	18	56.72	11	27.8				20.9	7
Aparri	58.47	+ .25	60.29	18	56.47	11	26.9	— .7	33.5	30	22.5	20

<sup>a</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—The total rainfall for this month, if compared with that of the preceding year, is smaller in most of our stations of Mindanao, the Visayas and southern Luzon, while it is greater in almost all the stations of central and northern Luzon. The same monthly rainfall is generally above the normal of May in the Visayas and Mindanao,

and below it in many stations of Luzon. The amount of rainfall collected in the gauges of Manila is 14.1 mm. and 51.4 mm. above that of May, 1916, and below the normal, respectively.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF MAY, 1917.

Station.	Total.	Departure from May, 1916.	Departure from normal.	Rainy days.	Departure from May, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from May, 1916.	Departure from normal.	Rainy days.	Departure from May, 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.			mm.			mm.	mm.	mm.			mm.	
Jolo	228.2	-197.9	+24.4	20	+5	57.9	5	Calapan <sup>a</sup>	161.7	-22.7	-0.6			66.8	1
Isabela, Basilan	267.5	+136.5	+131.9	21	+8	44.4	5	Virac	181.9	-95.2	+32.7	20	-8	27.4	18
Zamboanga	107.2	-55.4	+23.4	20	+7	15.1	7	Naga	265.6	-58.9	+140.5	17	-8	44.7	3
Davao	204.8	+47.4	-26.2	14	+8	31.5	25	Batangas	69.8	-22.6	-35	14	+1	27.7	19
Cagayan, Misamis	195.2	+88.8		20	+6	23.9	27	Lucena	88.8	-129.4		12	-4	47.5	25
Butuan	200.8	-101.7	+47.6	22	-1	38.8	19	Atimonan	64.1	-441.6	-99.1	14	-10	15.2	28
Mambajao	142.6			12		40.1	29	Ambulong, Tanauan	174.9	+107.6		15	+2	41.4	15
Dumaguete	261.5	+142.7		13	-2	55.4	22	Canlubang, Calamba	110.6	-16.5		15	-1	21.6	4
Yap, W. Carolines	311.1			19		54.1	18	Paracale	183.4	-174.2		15	-5	52.1	2
Tagbilaran	142.3	-53.1 <sup>?</sup>	+35.7	10		48.3	29	Santa Cruz, Laguna	180.3	-14.8		11	-11	63	6
Iwahig	261	+35.3		24	+4	44.7	7	Manila	53.9	+14.1	-51.4	13	-2	17.8	25
Surigao	44.9	-329.8	-89	11	-5	14	30	Antipolo	64.6	+2.8		12	-3	16.3	20
Maasin	299.5	-7	+158.8	8	-3	94.5	25	Iba	210	+77.6	-38.5	15	+3	54.4	22
Cebu	245.2	+57.5	+145.4	20	+8	44.1	29	San Isidro	177.4	+91.3	-12	13	+4	50.8	24
Iloilo	207.8	-38	+39.8	18	+3	51.1	17	Tarlac	170.6	+14.6	-11.6	21	+11	44.4	24
San Jose Buenavista	217.1	+10.8	+45.8	22	+9	43.4	14	Baler	296.5	+52.8	+8.5	16	-4	152.9	4
Cuyo	173.1	-115.1	+9	18	+4	30.7	22	Dagupan	247.1	+5.5	-18.2	16	+4	53.9	25
Ormoc	118.4	-141.6	+28.9	15	-1	50.5	11	Bolinao	218	+69.7	+40.1	16	+3	59.7	25
Guiuan	211.5	-335.1		20	-2	43.2	29	Baguio	295.6	-16.4	-124	22	+5	54.9	28
Tacloban	185.7	-154.4	+26.6	16	-4	42.7	12	San Fernando, Union	221.5	+4.6	+23.7	12	+4	53.8	27
Capiz	229.4	-97.8	+44.4	18	-1	44.9	3	Echague	224.9	+140.7	+59.5	11	+5	119.1	12
Borongan	119	-298.4	-109.7	12	-8	29	18	Candon	148.6	+17.6	-59.3	16	+8	31.7	8
Catbalogan	79.9	-86.5		16	-5	32.2	22	Vigan	131.1	+41.9	-4.5	14	+5	31.7	26
Calbayog	145.8	-69.1	-14.6	17	-2	27.4	5	Tuguegarao	119.6	+43.2	-4.3	13	+8	32.5	11
Masbate	96.2	-2.5	+12.3	16	+7	24.6	29	Loaog	139.3	-15.3	-77.2	15	+9	27.1	6
Romblon	224.4	+6.9	+92.5	18	-2	43.4	29	Aparri	153.7	+89.2	+43	18	+14	26.7	13
Batag	180.9	+11.2 <sup>?</sup>		8		66.8	19	Cape Bojeador	57.2			5		30	6
Sorsogon	143.8			12		52.6	22	Santo Domingo,							
Legaspi	63.5	-414.4	-78	10	-11	17.3	20	Batanes	247.8	+205.4	-2.7	18	+12	103.1	9
Sumay, Guam	71.9	-407	-39.3	13	-9	10.2	27								

<sup>a</sup> 29 days of observation.

DEPRESSIONS AND TYPHOONS.

There was no depression or typhoon of importance near the Philippines, although several shallow depressions were observed in our weather map of the Far East. There were two moving NE to the S of Japan on the 4th to 5th and on the 21st to 22d; another moved ENE across the Batanes Islands on the 5th; and a third one was noticed on the China Sea in the neighbourhood of the Paracels on the 7th to 9th. Finally, there was another shallow depression on the 10th to 12th, whose track was a little more defined than that of the preceding ones; it appeared near south Formosa on the 10th, and moving northeastward it passed to the W of Meiacosima in the morning of the 11th, and was situated on the 12th near southwestern Japan, where it probably filled up on the same day.



## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes es algo mayor que la del año pasado, aunque difiere muy poco de la normal de mayo. Las presiones más altas se observaron generalmente el día 15 o el 18, al paso que las más bajas se registraron el 3 o el 11. La media mensual de Manila difiere de la normal en solo  $-0.01$  mm., y de la media de mayo, 1916, en  $+0.46$  mm.

La temperatura media mensual es ligeramente menor que la del año pasado en el centro y norte de Luzón, y ligeramente mayor en el sudeste de Luzón, en Visayas y Mindanao. Las temperaturas extremas del mes en Manila fueron  $36.0^{\circ}$  C. y  $20.7^{\circ}$  C. observadas los días 15 y 19, respectivamente. Las máximas y mínimas temperaturas del mes en Baguio fueron:  $25.9^{\circ}$  C.,  $15.0^{\circ}$  C. en la cumbre del Mirador, y  $26.1^{\circ}$  C.,  $13.7^{\circ}$  C. en el valle.

**Precipitación acuosa.**—La lluvia total de este mes, comparada con la del año pasado, es menor en la mayor parte de nuestras estaciones de Mindanao, Visayas y sur de Luzón, en tanto que es mayor en casi todas las estaciones del centro y norte de Luzón. La misma lluvia mensual es generalmente mayor que la normal de mayo en Visayas y Mindanao, y menor que dicha normal en muchas estaciones de Luzón. La cantidad de lluvia recogida en los pluviómetros de Manila es mayor que la de mayo, 1916, en  $14.1$  mm. y menor que la normal en  $51.4$  mm.

## DEPRESIONES Y TIFONES.

No hubo ninguna depresión o tifón de importancia cerca de Filipinas, aunque se echaron de ver varias depresiones dilatadas en nuestro mapa del tiempo del Extremo Oriente. De estas hubo dos que se movieron al NE por el S de Japón los días 4 al 5 y 21 al 22; otra que se movió al ENE a través de las Islas Batanes el día 5; y otra que se observó en el Mar de China en los alrededores de Paracels los días 7 al 9. Finalmente, hubo otra depresión dilatada los días 10 al 12, cuya trayectoria es algo más definida que la de las anteriores; apareció cerca del S de Formosa el 10, y moviéndose hacia el NE, pasó por el W de Meiacosima la mañana del 11, y se hallaba el 12 cerca del SW de Japón, donde probablemente se deshizo el mismo día.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.<sup>a</sup>

[ $\phi=14^{\circ} 34' 41''$  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. <sup>b</sup>			Underground temperature.				Relative humid- ity (mean).	Vapor pres- sure (mean).	Radiation.		Evaporation. <sup>b</sup>			
		Mean.	Maxi- mum.	Mini- mum.	0.25 meter.		0.50 meter.				1.50 meters.	2.50 meters.	Mini- mum in sun. Black bulb in vacuo.	Maxi- mum in sun. Black bulb in vacuo.	Free ex- posure (total).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.								
	<i>mm.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>Per ct.</i>	<i>mm.</i>	<i>°C.</i>	<i>mm.</i>	<i>mm.</i>		
1.....	757.60	28.3	33.6	22.7	30.5	31.9	30.8	30.9	29.8	28.2	75.1	21.1	20.4	53	5.5	3.8
2.....	58.24	27.8	33.7	24	30.8	31.9	30.8	31.2	29.6	28.2	77	21.1	21.7	54.2	4.2	2.9
3.....	57.28	27.6	33.2	23.9	30.6	31.9	30.7	31.1	29.7	28.1	78.7	21.3	22.3	53.3	4.9	3.3
4.....	57.60	28.2	33.6	23.6	30.5	31.9	30.8	31.1	29.6	28.1	75.5	21.2	21.7	55.2	5	3.4
5.....	58.04	28	32.1	24.3	30.6	31.5	30.9	31.1	29.7	28.1	76.3	21.2	22.1	45.6	4	3.2
6.....	58.01	27.8	34.3	22.6	30.3	31.7	30.8	31	29.8	28.1	78.5	21.5	20.2	56.3	4.4	3.3
7.....	58.04	27	34.1	24	30.4	31.9	30.8	30.8	29.8	28.2	83.9	22	22	57.4	3.2	2.6
8.....	58.07	28.1	34	22.6	30	31.8	30.6	30.9	29.9	28.2	77.2	21.4	21	57.8	4.8	3.2
9.....	58.31	28.9	34.3	24	30.6	32.1	30.8	31.1	29.8	28.3	75.4	21.9	22	55.6	5.7	3.8
10.....	58.22	28	32.9	24.5	30.5	31.7	30.8	31.1	29.8	28.3	80	22.2	22.6	53.8	3.6	2.5
11.....	57.43	28.9	33.6	23.6	30.5	32.1	30.8	31.2	29.8	28.3	76.5	22.3	21.8	52.3	5.1	3.6
12.....	58.11	28.7	32.8	25.5	30.6	32.2	30.8	31.3	29.8	28.2	80.9	23.4	23.6	53.2	4.7	3.2
13.....	58.71	27.9	34.1	24.9	31.1	32.2	31.1	31.6	30	28.3	84.6	23.4	23.4	53.4	3.3	2.3
14.....	59.33	28.3	34.7	23.9	30.7	32.1	31	31.4	30	28.5	80.5	22.6	22	53.5	4	3.4
15.....	59.49	29	36	23.5	30.7	32.7	31	31.4	30.1	28.4	71.9	20.8	21.4	57.8	6.6	4.8
16.....	59.28	28.3	34.6	23.5	30.9	32.1	31.2	31.4	30.1	28.5	72.7	20.5	22.3	54	5.5	4
17.....	59.46	28.2	35	21.1	30.5	32.1	31	31.3	30	28.3	68.2	19	18.6	53.8	6.9	4.7
18.....	59.63	28.9	35.1	23.5	31.1	32.6	31	31.6	30.2	28.5	68.2	19.8	22	57	7	4.9
19.....	59	27.7	35.8	20.7	30.8	32.5	31.1	31.4	30.1	28.4	70.2	19	17.3	55.8	5.7	4.4
20.....	58.05	27.8	34.7	23.4	30.7	31.9	31.1	31.3	30	28.3	76.3	21	21.5	58.5	5.1	3.6
21.....	57.76	28.3	35.1	23.5	30.9	32.6	31.1	31.6	30.2	28.5	75.1	21.1	22.3	56	5.6	4.3
22.....	58.36	28	35	23.5	30.9	32.4	31.2	31.4	30.2	28.5	75.2	20.8	21.5	57	5.2	3.8
23.....	59.22	25.9	31.3	23.8	30.8	30.7	31	31.1	30.3	28.5	83.9	20.6	22.1	46.9	1.8	1.5
24.....	58.64	27	33.6	22.8	29.8	31.1	30.6	30.9	30.2	28.4	80.1	20.9	21.1	48.2	4.1	2.8
25.....	57.90	26.7	33.3	23.7	29.8	31.4	30.6	30.9	30.2	28.5	84.5	21.8	22.3	53.3	2.5	1.8
26.....	58.28	26.8	32.7	23.9	29.6	30.9	30.7	30.9	30.1	28.5	84.4	21.9	22.7	54.7	2.4	1.9
27.....	58.75	27.7	34	23.3	29.8	31.3	30.5	30.8	30.1	28.6	80.2	21.8	21.2	57.6	3.7	2.5
28.....	58.16	27.9	33	23.7	29.9	31.2	30.6	30.8	30.2	28.5	81.1	22.3	22.1	49	3.2	2.9
29.....	57.55	28.2	34	23.4	30.1	31.7	30.6	31	30.2	28.6	79.8	22.4	21.6	54.5	4.1	3
30.....	57.71	28.3	33.3	24.3	30.5	31.8	30.8	31.1	30.2	28.6	81.8	23.1	22.9	58.5	3.3	2.4
31.....	58.27	27	33.7	24.5	30.5	30.9	30.9	30.8	30.3	28.7	86.8	22.8	22.7	55.8	1.6	1.6
Mean	758.34	27.9	33.9	23.6	30.5	31.8	30.9	31.1	30	28.4	78.1	21.5	21.7	54.3	4.4	3.2
Total															136.7	99.4
Departure from normal	-0.01	-0.5	+0.3	-0.3							+2	-0.1				

Day.	Wind.				Clouds.				Rain, 24 hours 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.		Sun- shine.	On the tower.	In the park.	
						Upper.	Lower.				
		<i>Km.</i>	<i>Km.</i>		<i>0-10.</i>			<i>h. m.</i>	<i>mm.</i>	<i>mm.</i>	
1.....	W quad.	194	19	W	3.2	A.-Cu. NE	Cu. NE	9 35			
2.....	W quad.	176.5	17.5	WNW	6.8	Ci.	Cu. E	6 45			
3.....	W quad.	204.5	19	W	5.4	A.-cu. wsw	Cu.-N. S	7 55			
4.....	W quad.	173.5	17	WNW	7.2	Ci.-S.	Cu.-NNE, NR	6 30			
5.....	SE	135.5	12	WNW	8.9	Ci.-S.	Cu. E	0 00			
6.....	SSE	155.5	20	WNW	7.4	Ci.-S. NE	Cu. SSE	6 45			
7.....	WSW	150.5	17	WSW	7.8	Ci.-S.	Cu.-N. E	6 05	6.4	7.1	
8.....	SW	174	18	WSW	6.8	Ci.	cu. SE quad.	9 50			
9.....	SW quad.	262	26	SW	7.6	A.-cu. ENE	Cu. SE	8 25			
10.....	WSW	156	19.5	W	9.4	Ci.-S.	Cu. ESE	1 30			
11.....	SW	290	29	WSW	5.3	A.-Cu. NE	Cu., Cu.-N.	9 40	4.6	4.3	
12.....	SW quad.	257	22	SSW, SW	7.2	ci.-cu. ESE	cu.-N. wnw	7 40	4.6	4.8	
13.....	SW quad.	168	16.5	SW	6.9	Ci.	Cu. NE	6 20			
14.....	SW quad.	211.5	23	SSW	5.5	Ci.-Cu.	Cu. E	9 10	1	1	
15.....	SE	169.5	18	SSE	5.8	Ci. E, NE	Cu. E	9 55			
16.....	SE	207	17	SE	5.4	Ci. NE	Cu. E	8 55			
17.....	WNW	194	17	W, WNW	3.2	A.-Cu. NE	S.-Cu. NE	10 30			
18.....	ESE, SW	189.5	18.5	SE	4.1	Ci. ENE, E	Cu. E quad.	9 20	7.4	7.4	
19.....	ESE	210.5	20	NNE	4.6	A.-Cu.	Cu.-N. NE	9 50			
20.....	NE, ESE	196	20	ENE	5.5	A.-Cu. E	Cu.-N. ENE	9 10	.2	.2	
21.....	E quad.	197.5	19.5	SW	5.7	Ci.	Cu. E	9 15	.8	.8	
22.....	SE, ESE	187.5	16	ESE	7.1	A.-Cu.	Cu. E	7 35			
23.....	NE	145.5	21	N	9.3	A.-Cu. E	Cu. ENE	2 40	.6	.6	
24.....	SE, W	170.5	17	WNW	7.8	Ci.	Cu. E	6 25	.5	.5	
25.....	N, S	156	16	S	9.1	A.-Cu. ESE	Cu.-N. E	3 45	17.8	17.6	
26.....	SW	159	20.5	SW	8.5	Ci.-Cu. Nby*	Cu.-N. S quad.	4 40	1	.8	
27.....	ESE	124.5	13.5	WNW	5.8	Ci.-S.	Cu. ESE	7 05			
28.....	SE	173.5	19	SE	7.5	A.-Cu. N	Cu. E	5 10			
29.....	W, SW	218.5	22	SW	5.6	Ci.-S.	Cu. SE	9 30	4.4	4.8	
30.....	E quad.	138	14	SW	8.9	Ci.-S. SW	Cu.-N. SE	4 20			
31.....	W quad.	108.5	15	WSW	6.9	Ci.	Cu. E	5 00	4.6	4.4	
Mean		182.4	18.7		6.7			7 06			
Total		5,654						220 15	53.9	54.3	
Departure from normal		-1,296.1			+0.9			-9 44	-51.4		

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



## DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, MAY, 1917.

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		19.3	25.4	5.1	57.9			10.7	0.8	2.5	3.3	0.5		13.3	3.5	38.1
Isabela, Basilan	12.9	30.7	5.3	10.4	44.4	21.6	3.3	14.5	3.6	6.9	9.4	17.3				5.1
Zamboanga	.8	2.3	9.8		6.4		15.1	10.4	.5	4.7	10.8	13.2		.5	3.1	
Davao					30.2	5.8				13	5.6		28.2	4.3		
Cagayan, Misamis	5.8	2.5	1.3		3.8	4.1	15.7	4.3	14	.5	14.7		.5	3		
Butuan	4.6	7.7			30.7	1.8	6.3	4.8	.8	.5	3		.3			
Mambajao		.5			26.2				7.1		5.1					
Dumaguete		44.4	6.1		9.5				24.4						16.9	
Yap, W. Carolines		.8	47.5	25.6	14.7	3	26.2	1.8	50.3			.3		25.4		
Tagbilaran		3.8			2				1.5					4.6		
Iwahig	14.2		.5	.8	2.8	7.4	44.7		20.1	.5	7.9	12.8		7.4	4.3	
Surigao						2.8					2.5					
Maasin											87.4					
Cebu	1	14.2			22.9			5.8	.8		5.3	15.3	.5	40.9		.5
Iloilo			7.1		13.2		7.6	28.4	9.9	.3		1.5	1.8		.5	
San Jose Buenavista		.5	3		.3		.5		42.9		10.4	3.6	.3	43.4	3.3	3.6
Cuyo			19	1.3					9.4		4	6.8	2.3	5.6		
Ormoc		1.3				.3				.8	50.5	1.3	.5			
Guiuan	.3	6.6	2.3		1.5	1.3			1			.5				
Tacloban	16.6	6.2							5.3		24.4	42.7				.5
Capiz			44.9	.3			1		21.1		1.5					
Borongan	.3	7.4														
Catbalogan	3.8	.5	.3		5.1	.3			1						13.2	
Calbayog		14.5			27.4	2.5					2.8	1.5			1	
Masbate				2.8		2.5				14	10.2	.8		1	.8	
Romblon			17	8.3					6.4	1.1		2.3			14.1	20.6
Batag		3.3														
Sorsogon			7.1							12.2	11.7	17.3				
Legaspi		1	6.4					1				8.2				
Sumay, Guam	6.4						.8						2.5			3.8
Calapan	66.8			5.6	3.8		.5	3.3	3.8							.3
Virac		3					16.8	2.8	.5		12.2	.8		1	2	
Naga	43.2		44.7	12.7							5.3	.3	.8			1.8
Batangas	6.9	.5				.5	.3									
Lucena			.5		.8		.3							1		
Atimonan		1	1.3					1.3				1		1.8		6.9
Ambulong, Tanauan		8.1			31.5	.5	15.7	2								41.4
Canlubang, Calamba		17		21.6		17.8	1.8			5.1	9.9	1		5.6		
Paracale		52.1	11.4	11.7			1.3	.5	5	17.3			21.1			
Santa Cruz, Laguna					63	.3		.8					28			
Manila							6.4				4.6	4.6		1	3.3	
Antipolo						1	3									
Iba						23.9	.5			24.1	1.1		14.7			
San Isidro		41.4				9.9	.5					26.2				
Tarlac		24.6	17.8	.8			3.8	.8	3.8	2.5	6.9		.8	3	15.7	3
Baler	9.7	27.7		152.9	1.5		1.8	1.6				12.7	.8			
Dagupan							7.1	38.1	4.6	5.8	1.3			15.7	26.4	.5
Bolinao					6.9		10.9	3	15.5	42.5	5.8	2.3			6.1	
Baguio						5.6	29.2	7.8	9.1	3	6.6	6.6	16.8	.3	2.8	
San Fernando, Union					6.1		48.8	1.8	.1	19		15.5			14.7	
Echague		2.3	1	29.5				2.3	4.8		.5	40.1	119.1	.5		
Candon					6.4	4.6	10.2	31.7	5.3	1.3				1	3.3	
Vigan					3.6	3.1	30.7		27	4.7		14.6		4.7	3.3	
Tuguegarao			11.4			3.8		3.8	1.3	2.5	32.5			5.6	1.8	
Laoag						27.1	16.7	1.5	20.3	9.6	1.5	7.4	15.4	1.3		
Aparri	4	.5			.5	5.1	7.3	17.5	13.5	1.8	1.8	1.3	26.7	22.4		2.5
Cape Bojeador						30	12.7		9.7	2.8						
Santo Domingo, Batanes	.3					19.3	10.2	3	103.1	34.5	25.6			3.6	.5	

Daily rainfall at the stations of the Weather Bureau, May, 1917—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.....	4.9		6.1		16.5				4.1		3		6.6	0.5	6.1	228.2
Isabela, Basilan.....	9.9			10.1	35.5	13.4					9.9	0.5	2	.8		267.5
Zamboanga.....	2.1		3.8	.5							7.1	9	.8	.3	6	107.2
Davao.....			5.6	16				11.2	31.5	4.3	15	3.6	30.5			204.8
Cagayan, Misamis.....				8.6		17.3	15.5		13.2		23.9	19.8	15.5	11.2		195.2
Butuan.....			38.8	1	.5	29.2	8.7		11.7	3	12.9	11.5	8.6	12.4	2	200.8
Mambajao.....			8.1		5.8	7.6			9.4	4.6	17.7		40.1	10.4		142.6
Dumaguete.....	37.3			3.3		55.4			11.9		24.9	3.3	8.9	15.2		261.5
Yap, W. Carolines.....		54.1	25.6		9.4	4.8	.3	7.2	2.5			1.3	13			311.1
Tagbilaran.....	7.4	24.4	1.5			32.5						16.3	48.3			142.3
Iwahig.....		3.8		13.2	1.3	39.4	5.4	30.3	1.9	26.7	.5		13.2	1.1	.8	261
Surigao.....		1.8	3.9		1.3	8.4	3.3	.5		2.3			4.1	14		44.9
Maasin.....				10.2		5.6	14		94.5				55.1	14.2	18.5	299.5
Cebu.....			1.3	5.6	.3	41.7			5.8	14	16.5		4.1	14	.8	245.2
Iloilo.....	51.1		.5	3.8	3.6	44.2	11.4					7.6	12.8	2.5		207.8
San Jose Buenavista.....		5.3	12.2		5.8	25.4	7.7	11.4	17.3			2.6	6.9	9.9	2.8	217.1
Cuyo.....				19.4	5.3	30.7	18.8	.5	10.9			1.3	28.2	4.6	3	173.1
Ormoc.....	2.3		3	1.3	22.3	26.4	2.5				2.8		2.3	.8		118.4
Guiuan.....	39.1	3.3	34.8	16.2	21.9	12.7		11.2	5.9		5.1	3.3	43.2	.8	.5	211.5
Tacloban.....		5.2	2.5	16	9.4	12.9			1.3		4.8		8.7	2.5	26.7	185.7
Capiz.....	8.6	3.3	10	14.6		32	34.6	16	10.4	.8	1.3		8.4	15.8	4.8	229.4
Borongan.....		29	12.2		11.2	25.9	4.3		4.6	6.1	1.5		3.8		12.7	119
Catbalogan.....	.5	4.6		1.8	3.6	32.2	.3				6.4		6	.3		79.9
Calbayog.....	8.1	11.5		3.3	15.7	17.2			.5	1.3	13.8		2.3	7.4	15	145.8
Masbate.....				18.5	.3	2.3		3	3	1			24.6	7.7	9.1	96.2
Romblon.....	1.7			13	.3	20.6	3	12.1	15.2		38.9	2.3	43.4		4.1	224.4
Batag.....		33.5	66.8	29.2	3.8	30.8					1.8		2.5		11.7	180.9
Sorsogon.....		11.9		3		52.6					4.8		1.9	17.8	1	143.8
Legaspi.....		10.7		17.3							.8	1.8		16	.3	63.5
Sumay, Guam.....	2.5				7.6	2.6	7.6		7.6	7.6	10.2			8.9	3.8	71.9
Calapan.....		17.3	25.7	.3		2.5	.6	11.4	9.1	10.7			*			161.7 <sup>a</sup>
Virac.....		27.4	2	23.8	2.8	.3			11.9	11.2	15.5	21.1	22.4	2.6	1.8	181.9
Naga.....		31	31	2		2.8	31.5	28.1	1		1.4		27.2	.8		265.6
Batangas.....			27.7	.3		6.1	1.8	3	.5		8.7	.8		.3	12.4	69.8
Lucena.....				6.1		3.8	8.9	1.8	47.5			10.2	2.3	5.6		88.8
Atimonan.....						5.6	5.8	2.1	11.9	4.3	2.3	15.2			3.6	64.1
Ambulong, Tanauan.....			23.4			15.5	11.7	2.8	2	2.6	7.6	3			7.1	174.9
Canlubang, Calamba.....						3.3	1	20.8	1.3		2.1	.5			1.8	110.6
Paracale.....		35.5		1		1.3	4.3		4.3	19.1		2				183.4
Santa Cruz, Laguna.....								15.7	5.1	2.5	1	4.3	1		58.6	180.3
Manila.....			7.4	.2	.8		.6	.5	17.8	1			4.4		4.6	53.9
Antipolo.....		12.7		16.3		5.1	10.7	3.3	1.3	1.3			1		5.6	64.6
Iba.....			.5	1.3	54.4	1.3		26.2	11.7	.3	3	5.1			45	210
San Isidro.....				3.3	1			50.8	8.9	2.3	27.2	5.3	.3	.3		177.4
Tarlac.....				2.5		18	.3	44.4	6.4	1.5	1	7.9	5.1			170.6
Baler.....			.8	1.8	18	5.4	2.5	16.3	1.3						41.7	296.5
Dagupan.....				5.6		14	22.9		33.9	.5	49.6	3			8	247.1
Bolinao.....								5.1	59.7	11.2	2	5.6	1	29.2	11.2	218
Baguio.....	19	22.9	4.1	5.3	11.2	18.9	.8	22.1	18	8.2		54.9			22.4	295.6
San Fernando, Union.....							2.3		22.4	15.5	53.8	21.5				221.5
Echague.....				3				21.8								224.9
Candon.....							15.2	5.3	14.2	10.4	25.7		3.3	4.3	6.4	148.6
Vigan.....							1		31.7		.5	.8	4.3		1.1	131.1
Tuguegarao.....				12.7					8.4	4.3	10.2					119.6
Laoag.....						5.8		21.3		.5	12.4	9.6			.3	139.3
Aparri.....	12.4		2.8						7.9		10.7			15		153.7
Cape Bojeador.....																57.2
Santo Domingo, Batanes.....	13.6	2.4	2.3		.2	.2			.3	.5	26.9	1.3				247.8

\* No observation.

<sup>a</sup> 29 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, MAY, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cagayan, Misamis.		Dapitan.		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	30.7	20.9	31.6	23.1	30.2	24.2	32.7	22.5	33.8	24.4			34.9	23.2	31.2	23.9
2	27	22.1	31.6	23.6	29.9	24.4	33.2	22	32.5	22.9			34.2	23.6	31.7	25.6
3	28.6	22.6	30.1	24.1	29.4	22.9	30.2	22.5	32.2	22.3			33.7	23.4	31	25.1
4	28.3	21.3	29.1	23.6	29.4	22.7	32.2	21.1	33.2	23			34.8	22.5	32.5	23.2
5	26.5	21.5	29.8	23.1	29.8	23.6	33	22.5	33.3	23			35.6	23.5	31.7	25
6	29.1	21.6	31.8	22.5	31.5	23.3	30.7	22	32	24			29.6	23.7	28.4	23.2
7	29.8	20.7	31.4	21.6	30.8	24	31.7	22.9	32.5	22.2			34.5	23.8	31	22.7
8	31	21	31.6	21.9	31.9	24	32.7	22	32.1	22.5			33.2	22.9	31	23.7
9	29.9	22	31.3	22.8	29.2	23.5	33.2	21.9	33.5	22.6			34.9	23.1	31.3	23.3
10	28.9	22	32	22.5	28.9	22.9	31.8	22.5	31.7	22.4			34.2	23.5	31.7	23.4
11	29.9	21.4	30.6	22.8	28.9	21.9	32.5	22.1	32	23.4			33.9	24	33.1	23.7
12	28.2	22.1	31.4	22	28.1	22.8	30.2	22.3	32.2	21.6			32.3	23.2	30.6	23.3
13	31.3	21	33.2	23.1	31.5	22.9	29.7	22.6	31.6	23			32.7	23.8	29.6	24.3
14	31	21.5	32.8	22.1	30.2	23.9	32.7	22	31.8	22.9			35.6	23.2	31.1	23.6
15	29.1	20.9	28.6	22.8	27.5	23	31.7	21.5	31.2	21			35.3	22.7	30.5	23.5
16	28.6	20.3	33.3	21.6	29.3	23.1	32.2	22	32.2	22	34.1	22.3	35.1	23.1	31.1	24.7
17	30.3	21.3	34.1	22.1	32.9	23.8	32.7	22.3	32.7	23.1	32.4	22.8	32.9	23.4	31.3	25.2
18	32	21.3	34.1	23	32.9	23.9	32.7	21.6	33.8	23	33.9	22.7	33.9	24	31	24.4
19	30.3	21.9	33.1	23.6	29.9	23.3	29.7	22	33.2	22.8	32.3	22.8	34.6	23.6	31.1	25.6
20	28.4	22	30.6	23.5	29.7	23.7	31.7	22.1	32.2	22.2	31.8	23.6	32.1	23	30.1	22.5
21	28.5	20.9	31.3	22.6	28.9	23.2	32.7	22.5	32.1	23.2	31.9	22.4	34.7	23.1	31	25.2
22	30.4	20.3	32.2	22.1	29	23.3	31.7	21.5	31.8	23	32.1	22.3	33.6	23.3	31.6	23.1
23	29.5	21	31.8	22.6	29.4	22.3	31.7	21.5	31.1	22.1	31.9	22.2	33.8	22.3	30.1	22.9
24	30.5	20.9	32.6	22.1	30.8	22.8	32.2	20.8	32.2	21.9	32.1	22	33.6	22.2	30.7	23.5
25	29.8	20.5	33.1	21.6	28.8	24.1	31.7	20.6	31.4	22.9	33.6	22.7	33.4	23.2	31.5	23.7
26	29.8	20.6	32.2	22.6	29.5	23.1	30.2	21.4	31.5	22.4	33.5	22.5	34.3	23.1	30.3	22.8
27	29.4	21.3		22.1	28.9	22.5	31.7	22	31.2	22.9	32.9	23.6	33.1	22.6	30.3	23.5
28	29.4	22.3			29.2	22.1	29.2	22.4	31	21.4	31.7	22.7	32.4	23.1	31	22.9
29	30	21.7		23.1	29.1	23	31.2	22	31.3	22.2	32.9	22.2	32.8	23.6	30	23.4
30	29.4	21.7		23.6	29.5	23.5	31.2	22	30.9	22.8	31.7	21.7	32.4	23.7	28.7	23.5
31	31.7	22.1		22.5	30.9	24.1	31.2	22	31	22	34.3	21.6	35.4	22.7	31.5	22.3
Mean	29.6	21.4	31.7	22.7	29.9	23.3	31.7	22	32.1	22.6	32.7	22.5	33.8	23.2	30.9	23.8

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	31.3	25.2	34.1	25.1	32.3	23.9	33.5	22.3	31.2	23.8	34.2	23.8	32.9	26	33	24.4
2	31.3	25.2	34.2	24.9	32.7	23.8	33.6	23	31.1	24.6	33	23.8	31.7	24.9	32.6	24.5
3	30	23.4	34	25.2	32.1	24	31.3	22.4	32	24.3	34	24	30.7	24.9	33	24.5
4	31.5	23.2	32.9	24	33	23.4	31.5	22.8	30.4	23	34.2	23.9	32.2	26	32	23.6
5	30.8	23.9	33.7	23.8	33.3	23.7	26.8	22.4	31.3	23.6	33.5	25.1	32.4	26	34	24
6	29.2	22.8	32.5	23.5	30.9	23.4	32.4	20.9	29	24	33.6	24.6	30.8	22.6	32.3	24
7	31.6	23.7	31.3	24.2	32.4	23.6	32.2	22	30.7	23.4	34.5	23.5	33.6	24.8	32.5	23.3
8	31	23.7	33.6	25	32.9	24.4	32.8	21.9	32	23.6	35	24.5	33.2	25	33.5	23
9	31.4	23.7	33.7	25	34.5	24.2	33.2	22.4	32.5	23.6	35.2	23.5	32.2	24.5	31.7	23.6
10	31	23.5	32.8	23.5	33	24.1	30.2	22.4	31.4	24	34.2	24.5	30.8	25.6	30.6	23.6
11	31.8	23.4	33.6	24	33.3	23.5	32.1	21.5	31	23.9	34	24	31.5	24.9	31.6	23.5
12	30.9	23.8	33.2	24	32.7	24.4	30.9	21.9	30.7	23.6	33.8	22.8	31.5	23.4	31.2	24.6
13	29.2	22.8	33.7	23.6	31.5	23.5	31	22.8	31.5	23.6	34	23.4	30.9	24.5	32	23.5
14	30.4	23.8	33.8	25.6	32.2	22	30.6	21.9	31.6	23.2	34.6	22.9	32.2	22.3	32.3	24.6
15	30.7	24.1	33.4	23	31.1	22	31.6	21.3	30.6	23.3	33.4	24.5	31.5	23.6	32.5	23.5
16	30.4	23.7	33.4	23.6	32.7	22.6	32.4	21.4	31.4	23	33.3	24	32.1	25.4	32.7	23.7
17	30.2	25.2	33.7	24	33.3	23.2	32.1	22.6	30.7	23.8	34	24.5	32.6	25.2	33	23
18	31.2	23.5	33.2	24.9	31.8	23.6	33.2	22	31	24.5	34.4	24.8	31.7	25.9	32.4	23.5
19	30.5	26.4	28.2	23.2	32.7	23.5	32.8	23.4	32.1	23.8	32.4	24.5	32	26.1	32.3	25.5
20	30.3	25.2	33.7	24.5	31.7	23.5	32.3	22.9	29.3	24.3	33.2	24	32	21.9	32.5	23.6
21	30	23.2	32.9	24	32.1	23.3	31.6	20.8	31.1	23.2	32	24.6	30.6	25.2	31.9	23.6
22	30	23.8	27.7	23.6	31.9	22.5	30.6	22.8	31.3	23.2	31.5	24.5	30.6	22.2	30.9	23
23	30.2	22.4	33.7	23.1	31.3	23.2	29.9	21.5	31.5	23	33.4	24	31.9	24	31.5	22.6
24	30.9	22.5	31.3	24	30.5	23	31.2	21.9	31.3	23	32.5	23.8	30.6	24.3	31.4	22.4
25	31.7	21.7	33	23.2	31.8	23.3	29.6	22.8	30.9	23.7	32	23.6	30.5	23.9	31.4	23.9
26	30.8	23.4	33.2	25.5	31.9	22.7	31.2	21.9	31.4	23.2	33.8	23.5	32.7	24.4	31.5	23
27	30.4	24.2	32.3	25.2	32.3	22.7	31.6	21	30	24	32.2	23.5	32	24	32	23.8
28	30.4	23.6	31.7	24.1	32.2	22.7	31.6	21.3	31.7	23.5	32.8	23.6	31.2	23.3	28	23.5
29	31.3	23.4	31.6	24.1	31.7	22.6	32.1	21.1	31.7	24.4	34.4	23.6	33	23	32	24.4
30	29.4	23.4	32.1	23.2	30.5	22.8	28.3	22.3	29	23.4	33.5	23.4	29.5	23.5	29.7	24.5
31	29.7	23	33.5	25.4	31.5	23.5	31.4	22	31.4	22.7	34	23.3	32.1	24.5	31	24
Mean	30.6	23.7	32.8	24.2	32.2	23.3	31.5	22.1	31.1	23.6	33.6	23.9	31.7	24.4	31.9	23.7

Maximum and minimum temperatures at the stations of the Weather Bureau, May, 1917—Continued.

Day.	San Jose Buonavista.		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	32.2	23.5	32.7	24.2	33	21.2	34.1	23	33.7	23	33.9	24.8	32.4	22.5	32.9	22.2
2	33.3	23.2	32.3	25.4	29.6	22.7	32.7	24.3	31.3	24.3	34	24.6	30.6	23.6	31.5	22.5
3	32.8	23.1	29.3	27.8	32	22.8	33.1	23	32.1	23.3	32.6	22.5	31.4	22.5	31.9	22.5
4	32.2	23.1	29.8	24.8	32.5	20.8	33.3	23.2	32.5	22.9	33.7	23.4	32.5	22.1	32.5	22.2
5	33.1	24	31.3	24.3	33.4	21.9	33	22.9	32.9	25	33.9	24.7	32.6	22.3	33.3	22.7
6	32.7	24	31.7	24.9	31.5	22	32.8	23.4	33	24.9	34.3	24.5	32.9	22.8	32.7	21.9
7	33.2	23.4	32.2	24.3	32.8	22.9	34.1	23.4	33.5	24.4	33.5	24.2	33	23.2	32.3	23.5
8	33.3	23.5	33.4	24.9	32.9	23.4	34	24.2	33.6	24.4	33.2	23.8	33.1	23.2	33	22.7
9	33.5	24.5	33.7	25.1	32.7	22.8	34.2	24.3	33.1	24.3	35.2	22.7	33.1	23.2	32.5	23.3
10	31.2	22.5	31.7	23.8	32	22.9	33.9	24.3	32.7	24	32.8	23.2	33.1	23.9	32.4	23.5
11	32.2	23.5	32	24.4	32.4	22.2	33.9	23.9	32.9	24.1	32.8	23.8	32.8	23.1	32	22.7
12	31.6	23	31.2	24.7	31	23.4	33.5	25.7	32.3	23	33.8	24.1	33.6	23.5	31.6	22.9
13	33.1	23	31.2	24.2	32.3	22.4	34	24.9	32.7	22.7	34.5	23.7	32.9	22.7	33	22.5
14	30.2	24	28.2	24	32.8	22.3	35.1	23	33.2	24.6	32.7	24.8	33	22.8	31.9	22.7
15	31.6	21.9	31	23.9	32.5	21.9	33.5	23.2	32.9	24.3	33.6	24.3	32.7	22.5	34	22.6
16	32.3	22.6	32.2	24.8	34.5	21.4	33	21.9	33	23.6	33.8	23.7	32.4	22	34.1	21
17	32.1	22.8	33.5	23.9	33.2	22.6	32.2	23.4	31.8	23.9	34.2	24.5	31.9	22	32.6	21.2
18	32.9	24.5	33.1	26.2	34	22.3	32.2	23.7	33.3	24.4	33	24.2	31.3	23.1	32.7	23.2
19	32	24.2	31	26.9	31.9	22.9	31.4	24.7	33.4	24.6	32.2	23.5	30.6	23.6	32.7	23.5
20	33.3	23.1	30.5	27.3	32.6	22.4	29.3	24.3	29.6	23.5	31.2	24.4	29	23.5	31.2	22.5
21	32.2	23.2	31.4	22.6	29.6	22.5	31.7	23.5	29	30.4	31.8	23.2	30	22.5	30.7	21.9
22	30.8	23.5	30.2	24.2	31.6	21.9	29.9	23.6	31.7	23.1	32.1	23.5	29.2	22.4	29.7	22.9
23	30.2	23.5	29	25.9	32.2	21.8	32.5	22.6	32.9	23	31.3	22.7	31.1	21.7	31.8	21.6
24	31.7	22.4	31	23.4	31.9	22.1	32.7	22.7	32.9	23.5	32	21.7	31.5	21.9	32	21.5
25	31.7	23	32.3	23.8	32.2	22.2	32.8	23.6	33.1	24.1	32.3	23.2	31.8	22.9	31.9	22.2
26	32	23	31.8	23.1	31.7	21.9	33.7	23.4	33.5	23	33.8	22.5	32.4	23.1	32	22.3
27	31.7	23.4	32.2	24.3	32.1	23.3	31	23.5	33	23.9	32.6	24	31.5	23.1	32.3	23
28	29	23.1	28.9	26.4	32.8	22.3	33.5	23.4	33.1	23.9	32	24.2	32.1	23.5	32	23
29	32	23.2	32	23.9	33	23.2	32.3	23.6	33.4	24.3	32.7	24.2	32.2	23.2	31	22.5
30	30.7	23.5	31.1	23.6	32	24.3	32.3	23.6	30.9	23.4	31.4	24	32	23.9	31.2	23.1
31	32.2	23.4	28.3	24.2	32.5	23.4	33.5	26.8	32.6	23.6	31.8	24	32.5	22.9	32	23.7
Mean	32	23.3	31.3	24.7	32.3	22.5	32.9	23.7	32.6	23.8	33	23.8	32	22.9	32.2	22.5

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	32.7	23.3	33.8	24.6	35.5	23.6	32.8	23.8	33.5	23	32.9	23.8	30.6	25.6	34.5	23
2	31.3	23.4	35	25.6	35.1	24.9	32.5	24.8	33	22.9	32.7	24.4	31.6	25.2	32.5	23
3	32	23.6	32	26.2	32.4	24.2	31	23.8	32.5	23.2	31.8	24.8	31.2	25.6	32.6	23.4
4	30.7	22.8	32	25.8	33.9	24.4	32.5	24	34.1	23.7	33	24	31.6	25.8	32.7	22
5	32	23	33.4	25.6	34.6	23.8	31.5	24.5	34.5	23.9	32.8	26.7	32.2	25	31.1	23.6
6	32.3	22.5	32.8	25.8	34.5	23.7	32.8	24	33.6	23	32.5	24.5	32	25.6	31.1	22
7	32.5	23.8	33.8	25.2	33.9	24.3	31.8	24	33.7	22.9	32.3	25	32	25.2	32	23
8	32.4	23.4	34.2	24.6	33.5	23.6	31.5	24.2	34	22.4	32.4	23.3	31.8	24	33	22.5
9	32.8	23.7	32.8	25.6	35	23.7	32	24	33.2	22	33.3	24.1	31.8	25.2	33	22.5
10	31	24.1	31.8	24.8	34.4	23.3	33.2	24	33.7	24.5	32.8	24.5	31.4	22.8	33	23
11	33.8	23.8	32.6	25.4	35.4	23.7	32.8	24.5	33	22.9	33.3	23.6	31.2	24.8	33.3	23
12	33.3	23.5	31.2	24.8	34.9	25.3	33.8	23.4	33	23.5	33.9	24	31.6	25.6	32.8	23
13	31.7	23	32.8	25.4	32.9	24	32.8	23.6	33.6	23.5	32.9	24.5	31.6	22.6	33.4	23
14	32.1	24.2	34	25.4	34.4	23.1	32.8	23.3	34.6	23.3	32.9	25.9	31	22.8	34.4	23.1
15	32.5	22.8	33.6	25.5	34.4	23.3	32.8	23.8	33.9	23.5	33.2	24.3	33	22.87	33.6	24
16	32.9	21.8	33.6	25.6	33.7	23.3	32.8	24.2	33.3	22.1	32.8	23.5	31	24.8	33	23
17	33	21.6	33.4	25.5	34.9	23.1	32.5	23.5	33.5	21.1	32.4	21.9	31.2	24.6	34	22
18	31.6	23	31.8	27	35.8	24	32.5	25	33.7	23.8	33	26.2	32	26.4	34	22.5
19	34.2	23.7	32.8	26.4	35.3	25.6	29.4	22.2	33	23.5	31.4	24.4	32.2	25	33.5	22.1
20	31.6	23.8	33.6	26.5	35.8	25.7	30.7	23.7	32.5	22.9	29.3	24.4	31.4	26	33.4	22.8
21	30.6	22.3	31.8	24	34.4	22.8	29.8	22.6	32.5	22	31.7	23.3	32	26	33.5	23
22	33	22.6	32	24.4	33.7	23.3	30.2	22.6	31.5	21.5	30.3	23.4	31.2	23.8	33.1	22.5
23	31.1	22.6	30.4	24.5	32.9	23	30.8	22.6	32.5	21.8	32.1	23	31.6	24.4	29.8	22.2
24	31.2	22.8	31.6	25	33.3	23.4	30.5	23.5	31.5	21.5	31.3	22.8	31.2	23.8	32.4	21.5
25	31.4	23.2	31.8	24.6	31.9	24.2	31.3	23.8	32.5	21.5	32.2	23.4	32	25.8	31.5	22.9
26	31.1	22.8	32.6	24.8	34.1	23.2	31.5	23.9	33.6	22.5	32.5	23.5	30.6	25.6	32.6	21.9
27	35	23.8	33	24.6	35.1	23	31.3	23.8	32	22.4	31.9	23.7	28.4	25.8	33	22.5
28	31.4	23.5	32	26	32.4	23	31.4	23.8	31.9	22	30.8	24.7	30.4	24.8	32.4	23
29	30.6	22.9	33.6	26.2	33.9	23.1	31.4	24.2	33	23.2	32.9	24.6	30.8	25.6	32.4	23
30	32.3	23.9	31.8	24.5	32.9	23	30.3	24.3	33.2	23.5	31.5	26.3	30.2	24.6	32	23.1
31	31.6	23.4	31.6	25.4	33.3	23.9	31.4	24.5	32.5	23	32.3	24	30.8	23.8	34	23
Mean	32.1	23.2	32.7	25.3	34.1	23.8	31.8	23.8	33.1	22.8	32.3	24.2	31.3	24.8	32.9	22.7

Maximum and minimum temperatures at the stations of the Weather Bureau, May, 1917—Continued.

Day.	Virac.		Naga.		Batangas.		Lucena.		Atimonan.		Ambulong, Tanauan.		Canlubang, Calamba.		Paracale.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	32.5	21.9	35.5	20.8	33.8	23.9	34	22.6	34.1	23.5	36.3	23.2	33.8	22.6	33	23.6
2	33.5	22	32.9	20.7	33.6	24.5	34.7	23.4	32.2	24.7	36	24.4	33.1	23.4	32.8	25
3	32.6	23	33.4	21	34.2	23.5	32.5	23.6	31.2	24.5	33.2	23.3	33.1	22.9	30.9	23.7
4	32.3	23.5	33	21.6	33.2	23.3	33	22.6	33	23.4	32.5	24.7	32.2	22.7	32.1	23.2
5	33	23.4	33.3	21.2	34.8	24.6	33.1	24.4	32.7	24.2	31.3	24.2	33	22.4	31.6	24
6	32.7	23.8	34.9	21.4	34.6	23.9	33.5	23.5	33.4	23.5	32.8	23.5	33.1	22.8	32.2	24
7	32.3	22.5	33.7	20.7	35.2	24	31.5	24.4	30.3	23.7	31.3	23.3	30.6	24.4	31.9	23.8
8	31.9	22	33.8	20.7	35	23.2	33.8	22.6	32.3	22.8	34.1	22.6	33.2	22.1	31.4	23.7
9	32.5	22.8	34.9	20.7	34.7	24.3	33.4	23.4	34.5	23.7	34.1	23.9	33.4	22.2	32.8	23.1
10	32	23.3	32.6	21.9	34	24.1	32.4	22.5	33.7	23.7	32.7	23.9	30.2	23.2	31.2	24.5
11	33.3	22.5	34.5	21.1	34.6	23.5	33.8	21.8	34.7	23.7	32.3	23.4	30.5	22.2	32.8	23.9
12	33.7	22	33.8	22	34.5	24.7	35	21.7	34.2	23.6	33	24	33.3	23.2	33.7	24.4
13	32.5	23	35	22	36.2	25.2	33.5	23.4	34.6	24.9	33.7	25	33.4	23.3	33	24.6
14	32.8	22.1	35.6	21.6	36.1	24	34.5	23	34.2	24.1	33	24	33.8	22.4	33	24.5
15	33.4	21.8	35.7	20.3	36.5	24.6	33.8	22.8	34	24.1	34.3	24.9	33.5	23.1	33.2	23.9
16	32.8	22	34.8	18.2	36.2	24.1	34.7	23.6	32.9	23.1	33.7	23	33.2	23.2	32.8	23.2
17	33.1	20.1	34.7	18.6	36.8	22.8	34	23.5	33.8	23.5	34.2	22.7	34	22.1	32.6	23.7
18	33.5	21.5	32.5	18.6	37.6	23.8	34.7	22.9	32.3	22.8	34.2	23.3	33.6	22.3	32.6	23.2
19	31	21.8	33.7	19.9	34.6	23.7	34.9	24.9	31.3	25.7	34.5	24.5	33.2	23.2	30.7	23.9
20	30.9	21.7	32.2	20	34.8	23.4	34.5	23.6	34.3	24.2	33.2	23.8	34	22.8	32.5	23.8
21	32.2	20.1	33.6	20	33.9	23	34	22	32.8	22.9	34	22	33.1	21.4	32	23.5
22	31.2	22.1	31.7	20.2	34.7	23.8	33.7	23	32.8	23.3	33.1	24.1	32.8	22.3	31.8	23.5
23	32.6	22.3	32.1	20.1	29.3	22.5	29.5	23.1	27.8	23.1	30.3	23.8	32	22.8	31.6	23.5
24	32.7	22.5	32.6	20.1	31.8	23	33.6	22.6	32.2	22.9	29.9	24.4	32.3	21.6	31.5	23.8
25	32.6	22	33.3	19.2	31.9	23.2	33	22.6	29.9	23.8	30.7	23.8	33.1	22.6	32.6	23.5
26	32.3	22.7	32.9	20.8	32.4	23.1	31.7	22.2	31.5	23.5	31.8	23.4	32.2	22.2	33	23.5
27	31.8	22.2	32.2	20.6	32.6	23.1	33.3	23.1	32.8	23.1	31.8	23.4	32.4	22.6	32.3	23.6
28	31	22.4	32.5	21.8	33.1	24	32.6	23.5	31.9	23.2	32.5	23.5	32.2	22.4	33	24.3
29	32.5	22.7	34	20.6	33.6	22.7	32.5	21.7	32.6	22.4	32.6	22	33.4	22.4	33.8	24.1
30	30	22.1	33.5	21.5	32.2	24.3	31.6	23.9	31.6	24	31.5	24.4	31.4	21.6	32	24
31	32.5	22.5	33.6	22.7	31.7	23.8	32.5	24.1	32.7	24	30.4	24	31.3	22.6	33.8	24.5
Mean	32.4	22.3	33.6	20.7	34.1	23.7	33.3	23.1	32.7	23.7	32.9	23.7	32.8	22.6	32.4	23.8

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.
1	34.2	22.9	33.6	22.7	34.8	21.9	33.3	21.5	33.4	21.7	34.1	22	32.6	21.1	31.6	22.5
2	32.8	23.7	33.7	24	35.8	22.3	33.3	23.3	34.6	23.1	35.5	23.3	31.5	23.8	33.3	24
3	33.1	23.3	33.2	23.9	34.7	22.2	33.2	22.3	33	23	34.2	23.4	31.1	23.7	34.7	23.1
4	33.2	22.6	33.6	23.6	34.1	23	33.8	22	33.5	22.5	34.5	22.5	32.2	22.8	33.6	23.4
5	32.6	24.2	32.1	24.3	35.3	23	33.3	24.5	32.4	24.2	33.4	24.3	30.6	23.2	36	24.9
6	34	22.9	34.3	22.6	35.1	22	33.7	24.4	34.6	23.3	35.2	22.8	32.2	21.4	36.5	24.2
7	30.5	23	34.1	24	35	22.5	33	23.1	33.4	24	33.8	24.3	32	23.5	36.7	24.5
8	32	22.6	34	22.6	35.8	21.4	32.4	23.6	33.6	23.4	33.8	23.5	31.9	22.3	35.7	23.5
9	34.2	23	34.3	24	35.2	22.7	32	24.3	34	23.4	33.8	22.5	33.4	22.7	34.3	23.9
10	32.7	22.8	32.9	24.5	34.2	23	30.5	23	33.6	24	32.3	22.7	33.3	23.3	29.1	24.2
11	33.9	22.9	33.6	23.6	34.3	22.7	32.5	23.4	34.9	23.5	34.5	22.5	35.5	22.5	34.3	23.3
12	33.3	23.4	32.8	25.5	34.3	23.4	31.9	23.2	35.1	24.4	35.5	23	34.1	25	33.6	24.9
13	33.6	24	34.1	24.9	35.7	24.2	32.9	24.3	34.4	24.2	35.8	22.8	34	23.7	34.5	25
14	34.5	22.7	34.7	23.9	35.7	22.7	32.6	23.5	34.6	23.6	35.9	23.5	34.3	24.4	35.1	23.1
15	33.2	23.5	36	23.5	36	22.5	32.9	23.9	34.6	23	35.6	22.8	33.2	24.3	37	22.8
16	32.7	23.7	34.6	23.5	36.2	22.4	33.5	23.7	34.5	23	35.2	23.2	33.2	22.6	35.7	23.5
17	32.6	23.8	35	21.1	36	21.2	33.6	22	35.2	21.9	35.5	23.2	34.2	21	35.7	24
18	32.3	22.9	35.1	23.5	36.9	22.1	33.8	22.3	35.4	23	35.7	23.3	35	22.7	36.8	24.6
19	32.9	23.3	35.8	20.7	34.9	20.8	33.5	22	36	21.3	36	23	33.8	20.7	36.4	23.6
20	33	23.9	34.7	23.4	33.6	21.6	33.7	21.5	36	22.5	36	22.4	33.2	20.9	34.8	23.2
21	33.5	22.3	35.1	23.5	34.8	21.5	33	22.3	34.9	22.7	33.8	22.4	32.9	22.4	35.2	22.8
22	30.7	22.9	35	23.5	34.5	21.9	33.4	23.4	34.2	23.1	35.2	22.5	31.8	22.8	37.1	23.1
23	29.4	23	31.3	23.8	36.2	22.5	32.1	22.1	32.4	23.4	33.9	23.1	30.6	22.1	34.5	23.5
24	33.2	22.9	33.6	22.8	32.9	22	32.3	22.9	34.5	22.8	33.5	23	34.1	22.8	34.7	23.2
25	31.3	22.7	33.3	23.7	33.3	22.5	31.3	21.7	32.6	23	35	22.4	32.4	23.3	36.2	23.7
26	30.7	23.5	32.7	23.9	33	21.5	30.9	23.6	32.5	23.4	33	23.2	31.8	24	35.1	23.4
27	32.9	22.2	34	23.3	34.7	22.1	32.1	23.5	33.4	23	34.4	23.8	32.5	22.7	35.8	23.6
28	32	23.2	33	23.7	33.7	22.6	33.3	24	33.4	23.8	34.5	24	33.1	22.8	36.3	24.6
29	33.3	22.4	34	23.4	35	22	31.9	23.2	33.3	23.6	34	24.3	33	22.9	36.1	24.5
30	31.9	23.8	33.3	24.3	33.2	22.8	32.6	23.3	33.4	24.2	35.4	24.4	33.7	23.3	37	25.1
31	31.8	23.8	33.7	24.5	33.5	22.8	32.6	23.9	34.4	24.8	35.7	24.6	33.6	24.2	35.6	25
Mean	32.6	23.2	33.9	23.6	34.8	22.3	32.7	23.1	34.1	23.3	34.7	23.2	32.9	22.9	35.1	23.8



Maximum and minimum temperatures at the stations of the Weather Bureau, May, 1917—Continued.

Day.	Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	32.3	24	23.9	15	32.5	23	32.5	22.1	33.7	24.9	30.6	22.8
2	33.3	22.8	24.9	15.7	34	24.5	33	22.5	33.5	25.5	33.4	24.2
3	33.1	22	24.5	15.4	33.9	23	33.7	23.6	34	25	33.3	24.8
4	34	24.1	23.5	15.4	35.1	23.8	32.6	21.9	34	25.5	32.1	23.8
5	33.2	22.6	24.8	16.1	35.5	24.9	32.8	23.1	34.7	25	33.7	25.5
6	32	23	24.5	16	34	25.4	35	21.4	34.4	26	32.5	22.6
7	34	23.5	22.9	15.7	34.8	23.7	32.9	22.5	34.4	24.4	33	22.8
8	33.8	22.9	23.1	15.5	33.7	22.7	35	22.4	34.1	25	32.5	24
9	32.9	23.6	23.8	15.9	33.7	24.5	33.9	22.9	33	24.5	31.7	24.3
10	28.7	23.5	17.5	15.4	29.8	24.2	34.9	23.1	29.6	25	29.1	23.3
11	32.9	24.5	22.8	15.5	33.8	23.4	35.5	23.7	33.5	24.5	32.7	24.5
12	32.3	23.6	23.4	15.7	34	24.6	34.3	23.5	33.5	26.5	33.3	24.9
13	33.3	22.8	24.4	16.2	33.4	24.8	35	21.8	35.2	27.5	33.1	23.8
14	32.5	26	23.7	16.4	34	25.2	35	22.8	35.2	26.1	34.1	24.4
15	33.9	23.9	25.5	16.4	33.5	25.1	35.5	21.9	35.4	24.4	33.9	24
16	33.4	24.8	24.2	16.2	33	24.7	35.2	22	34.9	26	33.1	24.8
17	33.5	23.5	23.4	15.5	33	25.3	35.6	20.3	35.2	25.5	33	24.6
18	33.2	25.5	24.9	15.7	33.5	23.2	35.1	23	35.4	24.5	34	24
19	34	24.6	23.7	16.1	33.9	24.1	35.1	21.6	35.4	25	33.7	24.5
20	33.3	23.7	23.9	15.5	33.3	24.1	35.1	21.5	35.5	24	33.2	24.1
21	33.1	24.9	24	15.2	33.5	22.9	35.5	21.8	35.7	25.6	33.8	25
22	33.5	24	22.7	15.7	33.6	24	33.6	22.5	35.5	26.5	34	25
23	33.7	23.5	24	15.6	33	23	34.2	21.6	35	25.5	33.6	24.2
24	33.1	25.2	21.7	15.8	33.3	23.7	34.7	22.2	34.5	24.6	34.1	24.1
25	33.2	23.9	23.5	15.6	34	24.5	34.1	23.1	34.1	25.5	33.8	25
26	32.5	22.6	23.7	16	32.5	24	34.5	23.5	33.5	25.6	33.1	23.3
27	33.1	23.8	24	15.9	33.3	23.3	34.6	22.2	33.4	24.5	32.6	23.8
28	33	24.6	25.6	15.9	32.8	24.5	35	23.2	33.5	26	33.3	25.3
29	32	24	23.9	15.8	33	23.2	22	22	33.7	26	33.1	25.2
30	33.8	25.3	25.9	16.4	34	24.5	36.5	23.9	33.9	25	34.3	24.8
31	33.5	24.5	25.6	16.8	33.5	24.4	36.5	24	34	24.8	34	24.4
Mean	33	23.9	23.8	15.8	33.5	24.1	34.6	22.5	34.2	25.3	33.1	24.3

Day.	Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	31.5	22.5	31.1	22.1	28.1	22.7	28.4	23.4	25.1	21.5
2	33.5	23	33.8	22.2	28.2	23.5	30	22.8	27.8	22.3
3	35.3	22.7	34.5	22.5	29.5	23	30.8	22.8	28.5	21.5
4	32.1	23.2	33.9	22.1	29.8	24.8	29	23	28.3	21.4
5	34.6	23.6	35.3	22.3	31.7	23.5	32.8	22.8	29.1	23.6
6	36.4	22.4	31.8	22	28.1	23.4	27	22.3	28.5	24
7	32.8	22.3	33	20.9	28.8	23.1	31.2	21.2	26.6	21.2
8	36	23.2	33.2	22.7	31.2	23.7	31.2	22.8	30	23.5
9	34.6	23.6	32.3	22.7	31.2	23.2	29.2	24.6	27.6	23.4
10	34.2	23.8	30.6	23.3	29.8	23.8	29.2	23.2	27.7	23.4
11	37.4	24	33.1	22.9	32	23.8	30.5	23.4	28	23.8
12	36.5	24	34.4	23.9	33	23.7	31.2	24.2	30.2	25.9
13	35.6	22.2	33.6	23.5	31	23.8	31.4	24.2	30.4	26.3
14	36.2	22	34.6	22.8	31.9	23.1	32	25.3	31	24.6
15	35.8	22.1	34.3	23.8	31.8	23.2	32.4	25.6	31.8	24.7
16	36.7	24.2	35.9	23	33	24.5	33.6	25.2	32.5	24
17	37.8	24.4	35.2	23.5	31.8	24.3	33.2	24.8	31.5	23.5
18	36.8	23.7	35.9	22.5	32.3	23.6	31.8	24.4	29.3	24
19	37.1	24.4	35.9	23	31.9	23.3	32	24.2	29	24
20	36.5	22.8	35.8	21.8	31.1	22.5	31.2	23.6	29.5	23.7
21	35.7	22.8	36	23.1	31.8	23	33.6	24.8	29.5	22.8
22	35.7	23.5	36.8	23.1	32.3	22.8	33.3	25.1	31.6	24.5
23	36.4	22.4	35.2	22.9	32.8	23.4	33.8	25.2	31.6	26.4
24	36	22.7	35.9	23	31.1	23.3	34	24.7	31.5	25.5
25	34	23.3	36.2	22.6	31.6	23.8	34	24	30	24.2
26	35	23.8	34.2	22.8	32.3	23.6	34	24.5	32	23.2
27	35.1	22.8	34.8	21.8	32.2	22.8	34.5	25.2	31.9	24.4
28	35.7	23.8	35.1	25	32	24.8	34.8	25.8	32.2	24.9
29	37	25.4	35.7	24.6	32.7	25.2	34.6	25.6	31.9	24
30	37.8	25.3	36.9	24	33.5	24.3	35	25	31.9	25
31	37.5	25.3	35.3	23.4	31.8	24.3	33.8	25.8	32.4	25
Mean	35.6	23.4	34.5	22.9	31.3	23.6	32	24.2	30	23.9



## SEISMOLOGICAL BULLETIN FOR MAY, 1917.

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### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

4, 0<sup>h</sup> 14<sup>m</sup> 24<sup>s\*</sup> [4, 8<sup>h</sup> 14<sup>m</sup> 24<sup>s</sup>]. **N Luzon.** Earthquake shocks felt over the northern provinces of Ilocos Norte, Ifugao and Cagayan with intensity IV. The epicenter probably lay in the western portion of the Central Cordillera near the parallel 18.2° N.

5, 12<sup>h</sup> 20<sup>m</sup> 21<sup>s\*</sup> [5, 20<sup>h</sup> 20<sup>m</sup> 21<sup>s</sup>]. **Laoag (NW Luzon).** Earthquake of intensity III, duration 10 seconds. It originated under the China Sea, to the NW of Luzon at about the parallel 21° N. Recorded at Taihoku (Formosa) and Zikawei.

6, 22<sup>h</sup> 57<sup>m</sup> [7, 8<sup>h</sup> 36<sup>m</sup>]. **Guam (Mariana Islands).** Earthquake of intensity III-IV. It was recorded by all the seismographs of the Far East; the origin must be placed at a short distance to the S or SE of the island of Guam.

7, 17<sup>h</sup> 58<sup>m</sup> 38<sup>s\*</sup> [8, 1<sup>h</sup> 58<sup>m</sup> 38<sup>s</sup>]. **NW Luzon.** Earthquake of intensity III-IV along the Ilocos Sur, La Union and western part of the Mountain Provinces. It originated under the China Sea, near the Luzon coast at about the parallel 16.8° N.

9, 15<sup>h</sup> 58<sup>m</sup> [10, 1<sup>h</sup> 37<sup>m</sup>]. **Guam (Mariana Islands).** Earthquake of intensity V-VI. It was recorded all over the world; the origin seems to have been very near to the island of Guam, probably in the Challenger Deep.

13, 6<sup>h</sup> 20<sup>m</sup> [13, 14<sup>h</sup> 20<sup>m</sup>]. **Butuan (N Mindanao).** Oscillatory earthquake, direction N-S, intensity III, duration 3 seconds.

24, 21<sup>h</sup> 28<sup>m</sup> [25, 5<sup>h</sup> 28<sup>m</sup>]. **Butuan (N Mindanao).** Earthquake shocks of intensity III-IV; the direction of the principal movements was apparently NW-SE; duration about 6 seconds.

26, 21<sup>h</sup> 16<sup>m</sup> 39<sup>s\*</sup> [27, 5<sup>h</sup> 16<sup>m</sup> 39<sup>s</sup>]. **Samar Island.** Earthquake of intensity III, felt all over the central and NW portion of the island.

27, 20<sup>h</sup> 04<sup>m</sup> 48<sup>s\*</sup> [28, 4<sup>h</sup> 04<sup>m</sup> 48<sup>s</sup>]. **Laoag (NW Luzon).** Earthquake shocks of intensity III-IV, duration 4 seconds.

28, 12<sup>h</sup> 02<sup>m</sup> 26<sup>s\*</sup> [28, 20<sup>h</sup> 02<sup>m</sup> 26<sup>s</sup>]. **SE Luzon.** Earthquake of intensity IV-V throughout the provinces of Laguna, Tayabas, Ambos Camarines, Albay and the islands of Marinduque and Romblon.

28, 20<sup>h</sup> 31<sup>m</sup> [29, 4<sup>h</sup> 31<sup>m</sup>]. **La Union (W Luzon).** Earthquake of intensity II-III.

<sup>1</sup> 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<sup>h</sup>). Insular time being added in brackets for the convenience of Philippine readers.

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0<sup>h</sup>. Instrument: Wiechert seismograph; 1,000 kilograms. A<sub>N</sub>: T<sub>0</sub>=5.1, ε=2.634,  $\frac{r}{T_0^2}$ =0.048; A<sub>E</sub>: T<sub>0</sub>=5.2, ε=1.968,  $\frac{r}{T_0^2}$ =0.048. Alluvium. 2.40 meters above sea level].

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
121	1	Iv	eP F	<i>h. m. s.</i> 10 52 08 56				
122	1	Iv	eP F	11 14 04 19				
123	1	Iv	eP F	16 28 01 32				
124	1	III <sub>u</sub>	eP S L M <sub>E1</sub> M <sub>N1</sub> M <sub>N2</sub> M <sub>E2</sub> M <sub>E3</sub> M <sub>N3</sub> M <sub>E4</sub> M <sub>N4</sub> M <sub>E5</sub> M <sub>N5</sub> M <sub>E6</sub> M <sub>N6</sub>	18 32 12 38 21 49 09 19 01 07 01 48 02 48 05 02 05 13 07 49 12 48 13 53 17 41 20 28 22 47 23 29 26 40				Near Tonga Island. End overtaken by following earthquake.
						17	55	
						20	52	
						23	49	
						22	34	
						19	59	
						19	31	
						17	38	
						23	39	
						16	48	
						15	39	
						16	37	
						16	31	
125	1	I	e	20 36 17				End overtaken by following earthquake.
126	1	Ir	e F	21 03 19 22 20				
127	4	Iv	eP L M <sub>N</sub> F	0 14 24 15 05 15 10 26	4	78		N Luzon.
128	4	Ir	e F	0 54 49 1 39				
129	5	Iv	eP L M <sub>N</sub> F	12 20 21 21 05 22 28 34	4	42		Laoag (NW Luzon).
130	6	Ir	eP S L M <sub>N</sub> F	23 00 49 04 51 07 57 08 36 0 02	9	72		
131	7	I	e F	8 18 21 43				
132	7	Iv	eP F	11 34 31 37				
133	7	II <sub>v</sub>	eP L M <sub>N</sub> F	17 58 38 59 08 59 14 18 19	2	418		NW Luzon.
134	7	Iv	eP L F	21 01 59 02 36 08				
135	8	Iv	eP L M <sub>E</sub> F	9 07 31 07 46 07 54 19	3	87		
136	8	Iv	eP F	16 15 49 18				
137	9	III <sub>r</sub>	eP S L M <sub>N</sub> M <sub>E</sub> F	16 00 00 04 06 06 15 07 34 07 37 18 04	8 7	1,172 533		Guam (Mariana Islands).
138	9	Iv	eP F	21 53 42 58				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
139	9	Iv	eP F	<i>h. m. s.</i> 22 00 32 08				
140	11	Iv	eP F	15 23 43 27				
141	12	Iv	eP L M <sub>E</sub> F	4 31 48 32 37 33 35 56	4	141		
142	13	Iv	eP F	14 45 57 49				
143	14	Ir	eP S L M <sub>N</sub> F	22 10 51 15 05 19 15 21 00 54	9	8		
144	15	Iv	eP L M <sub>N</sub> F	9 04 37 05 06 05 15 15	2	12		
145	16	IIv	eP L	8 55 36 55 51				Maxima and end lost by the pens thrown off by the force of the shock.
146	17	I	e F	19 12 16 19				Japan.
147	18	Iv	eP L M <sub>E</sub> F	23 25 43 25 57 25 58 28	2	51		
148	23	IIv	eP L M <sub>N</sub> M <sub>E</sub>	13 20 44 21 07 21 11 21 17	3 3	185 130		End overtaken by following earthquake.
149	23	Iv	eP	13 28 50				End overtaken by following earthquake.
150	23	Iv	eP F	13 30 06 39				
151	23	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	14 11 07 11 29 11 32 11 39 23	2 2	131 185		
152	23	Ir	eP S L M <sub>N</sub> F	21 50 18 54 07 22 00 05 01 54 28	8	9		
153	23	Iv	eP L M <sub>E</sub> F	23 21 25 21 46 21 49 32	2	71		
154	24	Ir	eP F	10 14 48 34				
155	24	Iv	eP L M <sub>N</sub> M <sub>E</sub> F	18 31 02 31 20 31 23 31 23 40	2 2	198 256		
156	24	I	e F	19 31 40 20 12				
157	25	I	e F	7 10 29				
158	25	Iv	i F	10 12 22				
159	26	Iv	eP L M <sub>N</sub> F	21 16 39 17 33 18 08 35	6	29		Samar Island.

## Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A <sub>N</sub> μ	A <sub>E</sub> μ	
160	27	I <sub>v</sub>	eP	h.	m.	s.			Lacag (NW Luzon).	
			L	20	04	48				
			M <sub>E</sub>		05	19				
			M <sub>N</sub>		05	26	2	85		
		F		05	38	2	87			
				15						
161	28	I <sub>v</sub>	eP	8	32	27				
			F		37					
162	28	III <sub>d</sub>	eP	12	02	26			SE Luzon. Maximum and end in E-W component lost by the force of the shock.	
			L		02	53				
			M <sub>N</sub>		03	06	3	1,364		
		F		28						
163	28	I <sub>r</sub>	eP	13	40	53				
			S		43	00				
			L		44	33				
			F		56					
164	29	I <sub>r</sub>	eP	6	13	10				
			L		21	00				
			F		59					
165	29	I <sub>v</sub>	eP	8	32	02				
			F		35					
166	31	II <sub>u</sub>	eP	8	58	55				
			S	9	08	22				
			L		21	20				
			M <sub>N1</sub>		23	34	23	41		
			M <sub>E1</sub>		24	42	21	29		
			M <sub>E2</sub>		26	39	23	32		
			M <sub>N2</sub>		32	12	23	28		
		F	10	58						
167	31	I <sub>v</sub>	eP	13	51	36				
			F		55					

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

4, 0<sup>h</sup> 14<sup>m</sup> 24<sup>s\*</sup> [4, 8<sup>h</sup> 14<sup>m</sup> 24<sup>s</sup>]. N de Luzón. Temblor de tierra sentido en todas las provincias más septentrionales de la isla con intensidad IV. Su epicentro probablemente se hallaría en la parte W de la Cordillera Central cerca del paralelo 18.2° N.

5, 12<sup>h</sup> 20<sup>m</sup> 21<sup>s\*</sup> [5, 20<sup>h</sup> 20<sup>m</sup> 21<sup>s</sup>]. Laoag (NW de Luzón). Temblor de tierra de intensidad III, duración 10 segundos. El origen de este temblor estaba situado dentro del mar de la China hacia el NW de Laoag cerca del paralelo 21° N. Registráronlo los aparatos de Taihoku y de Zikawei.

6, 22<sup>h</sup> 57<sup>m</sup> [7, 8<sup>h</sup> 36<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad III-IV. Registróse en todo el Extremo Oriente; su origen se hallaría a poca distancia de la Isla de Guam hacia el S o SE.

7, 17<sup>h</sup> 58<sup>m</sup> 38<sup>s\*</sup> [8, 1<sup>h</sup> 58<sup>m</sup> 38<sup>s</sup>]. NW de Luzón. Temblor de intensidad III-IV en las provincias de Ilocos Sur, La Unión y parte W de la Montañosa. El origen se hallaba en el Mar de la China hacia el paralelo 16.8° N, no lejos de las costas de La Unión.

9, 15<sup>h</sup> 58<sup>m</sup> [10, 1<sup>h</sup> 37<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad V-VI. Este terremoto fué registrado en todo el globo; su origen se hallaba cerca de la Isla de Guam, probablemente en el Abismo de Challenger.

13, 6<sup>h</sup> 20<sup>m</sup> [13, 14<sup>h</sup> 20<sup>m</sup>]. Butúan (N de Mindanao). Temblor oscilatorio, dirección N-S, intensidad III, duración 3 segundos.

24, 21<sup>h</sup> 28<sup>m</sup> [25, 5<sup>h</sup> 28<sup>m</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad III-IV, la dirección de los principales movimientos parecía ser de NW-SE, duración 6 segundos.

26, 21<sup>h</sup> 16<sup>m</sup> 39<sup>s\*</sup> [27, 5<sup>h</sup> 16<sup>m</sup> 39<sup>s</sup>]. Isla de Sámar. Temblor de tierra de intensidad III, sentido en toda la parte central y NW de la isla.

27, 20<sup>h</sup> 04<sup>m</sup> 48<sup>s\*</sup> [28, 4<sup>h</sup> 04<sup>m</sup> 48<sup>s</sup>]. Laoag (NW de Luzón). Temblor de tierra de intensidad III-IV, duración 4 segundos.

28, 12<sup>h</sup> 02<sup>m</sup> 26<sup>s\*</sup> [28, 20<sup>h</sup> 02<sup>m</sup> 26<sup>s</sup>]. SE de Luzón. Temblor de tierra de intensidad IV-V sentido en las provincias de la Laguna, Tayabas, Ambos Camarines, Albay y en las islas de Marinduque y Romblón.

28, 20<sup>h</sup> 31<sup>m</sup> [29, 4<sup>h</sup> 31<sup>m</sup>]. La Unión (W de Luzón). Temblor de tierra de intensidad II-III.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.





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JAN 20 1918

THE GOVERNMENT OF THE PHILIPPINE ISLANDS

# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR JUNE, 1917

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1917



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**BULLETIN FOR JUNE, 1917.**



# METEOROLOGICAL BULLETIN FOR JUNE, 1917.

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 almost identical with the normal but higher than that of the preceding year, especially in Luzon, where the differences are greater than one millimeter. The greatest pressures of the month were generally observed on the 20th while the lowest took place on the 26th.

The monthly mean temperature is, with a few exceptions, either identical with, or somewhat higher than, that of the preceding year. The absolute maximum and minimum temperatures for Manila were 35.8° C. and 22.6° C.: they were registered on the 14th and 23d, respectively. The extreme monthly temperatures for Baguio were 26° C., 14.9° C. on the top of Mirador and 26° C., 14.4° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR JUNE, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from June, 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from June, 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga.....	758.33		759.60	19	757.06	3	26.2		32.3	1	21.9	25
Tagbilaran <sup>a</sup> .....	58.10	+0.85	59.36	20	56.85	3	26.4	-0.2	32.5	1, 2, 7	21.4	23
Surigao.....	58.13	+ .94	59.45	19	57.07	26	26.5	- .4	31.8	20	22.7	18
Cebu.....	58.11	+ .97	59.62	20	57	4	27.6	+ .1	33	15	22	14
Iloilo.....	58.01	+ .84	59.40	20	56.78	3	26.9	0	33.4	1	22.7	13
Ormoc.....	58.35	+ .89	59.53	20	57.35	26	26.5	0	33.8	2, 3	21.4	23
Tacolban.....	58.26	+1.17	59.52	20	56.80	26	27	- .1	33.6	29	22.2	26
Capiz.....	58.28	+1.10	59.46	20	56.83	26	26.9	+ .1	33.6	12	22.5	19, 23
Calbayog.....	58.31	+1.07	59.52	20	56.74	26	26.1	- .7	34.1	20	21.9	23
Legaspi.....	58.23	+1.25	59.35	20	56.17	26	27.9	+ .4	32.9	19	22.7	21
Atimonan.....	58.05	+1.36	59	9	56.07	26	27.4	+ .3	33.9	17	22.6	23, 27
Ambulong, Tanauan.....	57.51	+1.28	58.50	20	55.68	26	27.5	+ .5	35.3	11	22.8	25
Paracale.....	58.22	+1.35	59.23	9	55.82	26	27.4	+ .2	34.2	18	22.5	22
Manila.....	57.97	+1.20	59.03	20	56.10	26	27.8	+ .7	35.8	14	22.6	23
San Isidro.....	58.22	+1.31	59.14	20	56.47	26	27.2	+ .1	34.9	15	22.3	23
Dagupan.....	57.29	+1.34	58.38	20	55.33	26	28.1	+ .3	37.2	15	22.8	27
Baguio <sup>b</sup> .....	636.27	+1.20	637.11	15, 29	634.05	26	18.6	+ .2	26	11	14.9	23
Vigan.....	757.44	+1.36	758.53	20	755.43	26	28.3	+ .6	35.7	12	22.3	26
Tuguegarao.....	57.67	+1.26	58.70	29	55.79	26	28.5	+ .5	39.8	17	22.8	20, 23
Laoag.....	57.43	+1.43	58.56	9	55.38	26	27.4	- .3			21.4	21, 22
Aparrí.....	57.73	+1.48	58.82	29	55.82	27	27.7	0	34.2	15	22.8	23

<sup>a</sup> 27 days of observation.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—In spite of the lack of typhoons experienced during this month, the monthly amount of rainfall has not been so small as it might have been anticipated. The number of stations giving a monthly rainfall smaller than that of the preceding year or than the June's normal is almost equal to the number of stations giving a greater

amount. The Manila rainfall for the month is 46.1 mm. and 36.4 mm. above that of June, 1916, and above the normal, respectively, while that of Baguio is 14.4 mm. below the total rainfall for June, 1916, and 112.2 mm. below the normal of this month.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF JUNE, 1917.

Station.	Total.	Departure from June, 1916.	Departure from normal.	Rainy days.	Departure from June, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from June, 1916.	Departure from normal.	Rainy days.	Departure from June, 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	389.2	+291.6	-180.8	19	+4	66.3	18	Sumay, Guam	156.1	-110.7	+25	16	-1	43.2	30
Isabela, Basilan	261.2	+87.4	+54.9	21	+4	45.4	18	Calapan	269.6	+101.4	+37.4	20	+1	88.4	11
Zamboanga	123	+45.7	+21.8	18	+5	28.9	29	Virac	180.1	+42.5	-36.3	20	+1	37.3	22
Davao	320.1	+81.3	+64.5	19	+5	88.9	22	Naga	186.4	+6.8	+4	14	-5	51.1	30
Cagayan, Misamis	172.9	+71.6	24	+3	74.9	18	Batangas	171.6	+25.9	+46	20	+3	42.7	29	
Butuan	187.8	+10.6	-21.6	24	+1	34	18	Lucena	208	+89.7	14	-3	105.1	30	
Mambajao	197.6	12	12	12	51	8	Atimonan	169.5	-124.8	-5.3	17	+3	41.1	30	
Dumaguete	293.2	-152.3	17	+2	40.6	8,30	Ambulong, Tanauan	159	16	16	+3	32.2	26		
Yap, Western Carolines	200.6	-200.6	24	-2	44.4	5	Canlubang, Calamba	192	+52.8	20	+4	46.6	26		
Tagbilaran	159.4	+10.9	18	-1	42.7	21	Paracale	220.5	+16.8	14	-3	44.7	26		
Iwahig	103	-194.1	18	-1	19.8	9	Santa Cruz, Laguna	204.4	+7.1	18	-6	53.3	23		
Surigao	82.7	+2.6	+40.1	20	+8	11.9	9	Manila	270.7	+46.1	+36.4	15	+2	53.4	26
Maasin	135.4	+82.6	+18.4	6	58.4	18	Antipolo	191.9	-287	17	+4	29.2	18		
Cebu	253.1	+58.5	+76.4	19	+5	49.3	25	Iba	423.1	+284.2	-20.7	20	+2	82.2	27
Hoilo	246.2	-124.8	+16.1	20	0	76.5	2	San Isidro	233.3	+39.4	+36.1	22	+3	54.1	26
San Jose Buenavista	192.4	-138.6	-145	24	+2	53.8	12	Tarlac	147.7	-146.7	-73.6	14	-6	46.7	18
Cuyo	273.7	+25.2	5.5	23	0	51.1	12	Baler	253.6	-194.2	-38.8	22	+2	71.1	26
Ormoc	149.2	-176.3	-39.9	18	+2	52.3	24	Dagupan	162.8	-2.3	-133.8	17	-1	33.5	1
Guiuan	263.7	+99.8	25	+9	31.5	25	Bolinao	173.4	-216.2	-212.4	18	-5	29.5	27	
Tacloban	148.2	-24.5	-47.9	22	+10	46.4	25	Baguio	271.7	-14.4	-112.2	23	+1	44	3
Capiz	318.3	+29.4	55.1	15	59.9	15	San Fernando, Union	305.8	+139.2	+20	20	-3	44.7	19	
Borongan	369.3	+170.3	+112.4	23	+6	59.9	7	Echague	85.2	-39.2	-18.2	9	-5	47	22
Catbalogan	192	+7.1	21	+3	37.5	25	Candon	377.4	+221.9	+73.2	15	-3	80.3	21	
Calbayog	281.7	+4.3	+88.6	21	+4	36.4	25	Vigan	302.2	+11.7	+15.1	17	-5	44.9	21
Masbate	117.1	-87.6	9	11	48	26	Tuguegarao	171.4	-27.6	+43	12	0	54.9	1	
Romblon	236.9	-211.3	+31.1	23	0	67.7	22	Laoag	537.8	+310.3	+278.5	20	0	140.9	21
Batag	146.8	-45	15	+1	27.7	14	Aparri	176.9	-9.3	+54.8	10	-1	63	23	
Sorsogon	64.3	13	16	25	16	25	Cape Bojeador	233.9	+106.2	9	-7	68.6	21		
Legaspi	105.8	-110.5	-79.8	15	+1	25.1	3	Santo Domingo, Batanes	264.2	+52.9	+102.7	17	-2	102.3	22

1 27 days of observation.

DEPRESSIONS AND TYPHOONS.

There has been only a shallow depression of little importance during this month. It appeared to the east of Luzon in the early morning of the 26th; it traversed in a WNW direction the northern part of Luzon, to the S of Vigan, during the night of the 26th to 27th; and, inclining northward in the China Sea, it entered China between Amoy and Swatow on the 28th.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes es casi la misma que la normal, pero mayor que la del año pasado, especialmente en Luzón donde las diferencias son mayores de un milímetro. Las presiones más altas del mes se observaron generalmente el día 20, al paso que las más bajas tuvieron lugar el 26.

La temperatura media mensual es, con pocas excepciones, casi la misma o ligeramente mayor que la del año pasado. Las temperaturas máxima y mínima absolutas de Manila fueron 35.8° C. y 22.6° C. registradas los días 14 y 23, respectivamente. Las temperaturas extremas del mes en Baguio fueron 26° C., 14.9° C. en la cumbre del Mirador, y 26° C., 14.4° C. en el valle.

**Precipitación acuosa.**—A pesar de la ausencia de tifones experimentada durante este mes en Filipinas, la cantidad mensual de lluvia no ha sido tan poca como se podía temer. El número de estaciones que han dado cantidad de lluvia mensual menor que la del año pasado o que la normal de junio es casi igual al de las que han dado una cantidad mayor. La lluvia caída en Manila durante este mes es mayor que la de junio, 1916, en 46.1 mm., y mayor también que la normal de este mes en 36.4 mm., al paso que la de Baguio es 14.4 mm. y 112.2 mm. menor que la lluvia total de junio, 1916, y que la normal de este mes, respectivamente.

## DEPRESIONES Y TIFONES.

Durante este mes sólo hubo una depresión dilatada de poca importancia. Apareció al E de Luzón en la madrugada del 26; se movió hacia el WNW, atravesando la parte septentrional de Luzón, por el S de Vigan, durante la noche del 26 al 27; e inclinándose hacia el N en el Mar de China, penetró en China entre Amoy y Swatow el día 28.

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.	Air temperature. <sup>b</sup>				Underground temperature.				Relative humidity (mean)	Vapor pressure (mean)	Radiation.		Evaporation. <sup>b</sup>			
	Pres- sure (mean).	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.	Free exposure (total)	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a.m.	8 a.m.				
					$^{\circ}$ C.	$^{\circ}$ C.	$^{\circ}$ C.	$^{\circ}$ C.			$^{\circ}$ C.	$^{\circ}$ C.				
1	758.29	27.4	33.6	23.9	30.6	31.5	30.6	30.9	30.2	28.6	84.9	22.8	22.7	54.2	2.6	2.2
2	57.92	26.6	32.8	23.4	29.8	31.1	30.6	30.8	30.3	28.6	86.6	22.1	23	49.7	2.3	1.8
3	57.37	27.4	32.6	23.5	29.7	30.8	30.6	30.8	30.2	28.7	80.9	21.7	21.9	54.8	3.5	2.6
4	57.43	28	34.1	23.3	29.7	31.1	30.6	30.8	30.1	28.7	78.1	21.7	21.6	53	4	2.9
5	58.05	29.3	35	24.4	30.2	31.7	30.6	31.1	30.2	28.7	75	22.3	22.8	54.5	5.4	4
6	58.51	29	34.8	24.7	30.9	31.9	31	31.2	30.2	28.9	75.4	22.1	22.7	55.5	4.1	3.6
7	58.22	28.7	35.1	23.6	30.5	31.8	30.9	31.3	30.2	28.7	73.9	21.1	21.2	54	5.7	4.2
8	58.38	28.9	35.5	24.1	30.9	32.5	31.1	31.4	30.2	28.7	74.7	21.6	21.4	56.3	4.6	3.8
9	58.68	28.6	34.6	23.9	30.8	32	31.1	31.5	30.2	28.6	74.9	21.4	21.8	55	5.6	4.4
10	58.60	28.3	33.7	23.3	30.9	31.8	31.1	31.5	30.3	28.7	74.9	21.1	20.8	52.5	4.6	3.5
11	57.86	28.3	34.1	23.1	30.5	32.3	31	31.3	30.3	28.7	73.6	20.5	20.9	53	5.7	4.3
12	57.57	29	35.1	23.6	30.5	32.1	30.8	31.3	30.3	28.7	70.1	20.3	20.8	54.5	7	4.9
13	57.27	29.1	35.4	22.8	30.8	32.5	31	31.4	30.3	28.7	67.4	19.6	20.2	56	7.7	5.5
14	57.82	29.3	35.8	23.2	31.1	33	31.2	31.5	30.3	28.8	67.2	19.7	20.5	55.6	7.4	5.6
15	58.92	28.4	34	23.3	31.2	32.5	31.2	31.7	30.3	28.7	75.1	21.1	21.3	56.3	5.5	4
16	57.76	29.3	35.3	24.2	31.3	32.5	31.3	31.5	30.4	28.8	72.2	21.5	21.5	56.5	5.7	3.9
17	56.95	28.7	33.9	24.2	31.5	32.7	31.4	31.8	30.3	28.7	78.2	22.6	21.5	54.2	5.3	3.5
18	57.29	27.6	34.1	24.1	31.6	32.7	31.5	31.8	30.4	28.9	84.2	22.9	22	53.7	3.2	2.9
19	58.74	27.1	32.1	24.1	30.8	32	31.2	31.6	30.3	28.9	85.3	22.5	21.7	54	2.6	2.1
20	59.03	28.3	33	23.6	30.5	31.5	31.1	31.4	30.3	28.9	78.8	22.3	22	53.7	4.4	3
21	58.42	27.9	33.2	23.3	30.8	32.3	31.2	31.5	30.3	28.9	81.6	22.4	22.3	51.6	3.9	2.8
22	57.73	26	31.9	22.9	30.5	31.2	31	31.3	30.3	28.9	88.6	21.9	21.6	56	1.7	1.4
23	57.50	26.8	31.6	22.6	29.9	30.7	30.9	31	30.4	28.9	83.5	21.5	20.6	52.7	3.4	2.3
24	58.03	26.4	33.1	23.6	29.9	30.8	30.8	31	30.4	28.9	87	22	21.8	56.8	2.1	1.7
25	57.12	26.6	32.6	23	29.6	30.5	30.6	30.8	30.4	28.9	84.1	21.6	21.2	55.5	2.3	1.8
26	56.10	25.7	31.1	23.4	29.5	30.1	30.5	30.5	30.4	28.9	90.2	22	22.5	48.6	1.8	1.5
27	57.57	25.1	29.2	23.2	29	29	30.2	30.1	30.3	28.7	92.4	21.9	22.2	44.6	.5	.8
28	58.95	27.2	31.6	22.9	28.8	29.6	30	30	30.3	28.9	84.5	22.4	21.7	51.5	2.6	1.9
29	58.82	27.8	34.1	24	29.3	30.6	29.9	30.2	30.3	28.9	84.2	23	22.2	55	3.5	2.6
30	58.17	26.6	31.4	23.5	29.7	30	30.2	30.2	30.3	28.9	87.8	22.6	22	53	1.2	1.2
Mean Total	757.97	27.8	33.5	23.6	30.4	31.5	30.8	31.1	30.3	28.8	79.8	21.7	21.7	53.7	4	3
Departure from normal	-0.05	-0.1	+1	-0.3						-1	-0.6			119	90.7	

Day.	Prevailing direction.	Wind.			Amount (mean). 0-10.	Clouds.		Sun- shine.	Rain, 24 hrs. beginning 6 a. m.		Miscellaneous.					
		Total move- ment.	Maxi- mum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.			On the tower.	In the park.						
		Km.	Km.			Upper.	Lower.		h. m.	mm.		mm.				
1	NE, SW	140	17.5	SSW	8.7	A.-Cu. ENE	Cu., Cu.-N. SE	4	30	4.1	3.6	[ $\square$ ] < [ $\bullet$ ] p.				
2	N quad.	139	13	NE	9.2	Ci.-Cu. E	Cu.-N. SSE	2	15	16.3	15.3	[ $\square$ ] p.				
3	W, NW	145.5	14	NE	6.6	Ci.-S. SSE	Cu. SE	6	40			[ $\square$ ] p.				
4	E quad.	134.5	19	ESE	6.6	A.-Cu. SE, ESE	Cu. E	5	45			[ $\square$ ] p.				
5	SE	151	15.5	SE	6.2	Ci.	Cu. SSE	8	15			[ $\square$ ] a. < p.				
6	ESE, WNW	163	11	SE, WNW	5.8	A.-Cu.	Cu. E	8	20			[ $\square$ ] p.				
7	E quad.	193	15.5	WNW	4.3	A.-Cu. EbyN	Cu. E	8	55			[ $\square$ ] p.				
8	SE	198	15	SE	5.3	A.-Cu. ESE	cu., cu.-N. E, ESE	9	10	7.5	7	[ $\square$ ] p.				
9	ESE	186	16	SE	4.8	A.-Cu. ESE	Cu. ESE	9	05			d a. < p.				
10	SE	142	16	SE	6.4	Ci.	Cu. E	6	25			[ $\square$ ] a. < p.				
11	E, ENE	214	21	ESE	7.7	A.-Cu. E	Cu. E	5	25			[ $\square$ ] p.				
12	ESE, SE	212	21	ESE	6.2	Ci.	Cu. E, ESE	8	55			[ $\square$ ] p.				
13	ESE	233	20.5	SE	4.9	Ci.	Cu. E	9	10			[ $\square$ ] p.				
14	ESE	234	19.5	SE	3.7	Ci.-Cu.	Cu. E	8	45	1.8	1.8	< d p.				
15	SE	187.5	17	W	6.6	Ci.	Cu. E	8	05			d <sup>2</sup> [ $\square$ ] a. < p.				
16	SE	179.5	17	WNW	4.9	Ci.-S. A.-S.	Cu. E	9	15			[ $\square$ ] p.				
17	SW	236	25	SW	5.5	Ci.	Cu.-N. SE	8	10			[ $\square$ ] p.				
18	SW quad.	218	20	WSW	7	A.-Cu., ci.-cu.	Cu.-N. E	5	35	18.6	17.8	d a. [ $\square$ ] p.				
19	SW quad.	197	26.5	SW	8.9	Ci.-Cu.	Cu.-N. S	5	55	.8	.9	[ $\square$ ] a. d <sup>2</sup> a. p.				
20	SW	192	22	SW	5.8	A.-Cu.	Cu.-N.	7	40			[ $\square$ ] p.				
21	SW quad.	198	22	SW	7.3	Ci.-S.	cu., cu.-N. SW	7	55	31.7	30	[ $\square$ ] a. [ $\square$ ] p.				
22	SE quad.	161.5	20	NNW	9.3	A.-Cu. E	Cu.-N. SW	1	40	13.2	15.5	[ $\square$ ] p.				
23	SW	212.5	22	SW	9.7	Ci. ENE	Cu. S	4	40	25.9	29.7	[ $\square$ ] p.				
24	S quad.	135	15.5	NE	8.3	Ci.-S.	Cu. ENE	5	05	44	44.4	d <sup>2</sup> [ $\square$ ] a. [ $\square$ ] p.				
25	NE quad.	85	14	NE	8.9	Ci.-S.	Cu. SE	4	10	15	14.7	[ $\square$ ] d <sup>2</sup> < p.				
26	SW	177	18.5	SW	9.6	Ci.	Cu.-N. SW	2	15	53.4	47	[ $\square$ ] a. a. p.				
27	SSE	151.5	15	S	10	Ci.-S.	N. WSW	0	00	14.4	14.2	[ $\square$ ] a. p.				
28	SW quad.	100	9.5	W	9.6	A.-Cu. SE	S.-Cu. SSW	2	15			[ $\square$ ] p.				
29	SE quad.	147	13.5	SSE	6.7	A.-Cu. SE	Cu. ESE	7	25	13.8	14.5	[ $\square$ ] p.				
30	NE quad.	82.5	12	WSW	6.9	A.-Cu. E, ESE	cu., cu.-N. E	5	00	10.2	10.8	pa. [ $\square$ ] < p.				
Mean Total		171.5	17.5		7			6	13	186	40	270.7	267.2			
Departure from normal		-1.575			0			-14	16	-36.4						

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







Daily rainfall at the stations of the Weather Bureau, June, 1917—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.
Jolo	4.3	66.3				38.4	0.5		2.5				0.3	59.4	389.2
Isabela, Basilan	33	45.4	0.5	18.5	.8	11.4			.5	0.8			1.5	15	261.2
Zamboanga	7.6	13.5			1	.3			8.6	8.1		5.6	22.9	1.9	123
Davao	45.7	7.4		2.8		88.9	13.5		12.7		2.5		24.9	10.2	320.1
Cagayan, Misamis		74.9		2		1.3	1.3	0.5	6.6	10.5			1.5	7.4	172.9
Butuan	1.3	34		.5	1.3			.3	3.6	1.5			9.9	2.5	187.8
Mambajao		25.9			.8			1			1.3		2.5	17	197.6
Dumaguete	2	19.2					14.5		1.6			16.5	28.2	40.6	293.2
Yap, W. Carolines	7.6	42.6	10.2	.3	16.5	.3			.3			1.5	1.6	6.4	200.6
Tagbilaran		22.3		1.3	42.7		32	*	*	*			3.1	2.3	159.4 <sup>a</sup>
Iwahig	.3	10.9	9.4	3.8		4.2	.1		14		.3	2			103
Surigao	7.1	11.9		.8			10.2	7.8	6.2	.5			4.6	2.8	82.7
Maasin	17.3	25.9				7.2	36.1	2.8	11.2	8.9			34	14.7	135.4
Cebu	25.1	17.3												6.1	253.1
Iloilo	3.6	.5	16		27.7	12.7	3		15.3	15.2		8.1	.8	10.1	246.2
San Jose Buenavista	.8	8.4	.8		2.3	8.4	.5		9.7	9.2				4.1	192.4
Cuyo	7.1	13.9	1			13.2		51.1	23.3	35.5				6.9	16.8
Ormoc		7.5			3.6		3.3	3.6	52.3	13.2				5.1	18.6
Guiuan	8.6	30.2		6.6	.8	1.8	8.9	6.4	31.5					.5	5.1
Tacloban	3.8	2.5				.3		.5	46.4		1	1	2.3		148.2
Capiz	21.9	*	*	*	4.9	36.6	2.8	3.8	1.3	28.7	7.6	20.3	32.3	4.87	318.3 <sup>a</sup>
Borongan	1.8	11.7	.5		4.3			1.6	31.5	.3			11.4	6.4	369.3
Catbalogan		9.4			24.1			11.2	37.5	.8				19.6	4.1
Calbayog	4.6	7.9			33.5			28.2	32	36.4		1.3			28.2
Masbate		7.9		1.3		48		1	13	10.4		20.8			4.3
Romblon	5.8	15.5	.3		3	67.7	1.4	10.1	12.4	36	.5	.5	.3	41.7	236.9
Batag		1.5			3.8		2		5.3		22.9			1.5	10.2
Sorsogon				5.1				3.6	16	.3				4.8	6.4
Legaspi			.3	22.6				.3	2.3	5.4				3.6	6.6
Sumay, Guam			11.4	7.6		2.5	17.8		12.7	14	20.3	1.3		8.9	43.2
Calapan		1.3	21.9					4.8	.8				1	21.6	269.6
Virac	13					37.3		6.6	19.6	24.2			.8	1.3	180.1
Naga	5.8	1		.3	6.9	3.3		4.8		49.8				51.1	186.4
Batangas	2.5	16.5	2.5	5.3		20.8	.5	22.3			3.3	3	42.7		171.6
Lucena		10.2	5.3	11.2	1.3			14.7	2	32.5				105.1	208
Atimonan	11.9	17.6	1	1	3				12.7	18.8	1.8		3	41.1	169.5
Ambulong, Tanauan	1.3	5.1	11.2		15.5		8.9	16.1	2.5	32.2	9.4	1			159
Canlubang, Calamba	17	1	16	1.5	14.2	17.2	1	-1.3		46.8	7.6		1.5	23.4	192
Paracale		8	42.2	5.6	18.5		5.8		21.6	44.7				38.9	220.5
Santa Cruz, Laguna		2.5	5.1		8.6	3.6	53.3	1.8	5.3	1.5	23.9		7.4	1.3	204.4
Manila		18.6	.8		31.7	13.2	25.9	44	15	53.4	14.4		13.8	10.2	270.7
Antipolo	25.4	29.2	1.3		22.6	12.2	21.6	3.6	8.4	18.8	4.1			14.2	191.9
Iba	9.4	1	19.2	.6	33	21.1	14		52.6	5.4	92.2	16.5		13.7	423.1
San Isidro		7.1	5.6		1.5	11.9		1.3	17.8	2.5	54.1	27.1		20.6	7.3
Tarlac		46.7	3			2.5				1.8	29.8	1.5	2	.8	147.7
Baler		.3		5.1	15.5	5.3		15.7	27.7	71.1	3.1			4.8	253.6
Dagupan	3.8	2	14.2	3.5	9.1	19.3		.8	1.6	7.9	17.3	24.4			162.8
Bolinao	.3	3	5.1	11.2	.5	17.6	18.6		1.3	7.6	29.5	11.2			173.4
Baguio		7.9	14	29.7	10.7	22.1	1.5	2.3	11	38.1	12.2	13.7			271.7
San Fernando, Union	26.3	44.7	1.5	19.4	28.7	40.6	23.6	2.3	27.3	29.7	2			13.7	305.8
Echague			.8	.3	9.9	47	11.9		1.3	6.6	.3				85.2
Candon	1		19	2.8	80.3	20.3	54.6	31.7	10.2	62.7	17.5	35.6			377.4
Vigan		.8	39.1	19.5	44.9	18.6	36.7	.6	4.3	43.4	39.3	15.8		2.3	302.2
Tuguegarao			21.8	10.2	7.6	1.3	2.8			5.3	36.3				171.4
Laog		7.6	21.8	46.7	140.9	4.8	53.6	9.9	19	9.4	108.6	86.3	6.1		537.8
Aparri			21.1		7.6	14.4	63		9.1	19.4	10.6				176.9
Cape Bojeador			9.9	3.8	68.6		2.5	6.6		15.5	66	44.2			253.9
Santo Domingo, Batanes	4.5	3.6	.7	25.4	46.7	102.3		1	3.8	15.2	41.3	1.8			264.2

\* No observation.

<sup>a</sup> 27 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, JUNE, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cagayan, Misamis.		Dapitan.		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	30.2	22.4	23.6	23.6	32.3	24.4	32.7	22.5	31.7	23.4	33.9	22.4	34.5	23.2	31.6	23.3
2	28.4	22.9	24.1	24.1	29.7	24	31.5	22.5	32.5	23.1	34	23.2	33.6	23.5	31.6	26.2
3	29.9	21.5	24.1	24.1	28.9	22.8	32.2	21.8	31.6	22.1	24.3	22.3	33.9	22.6	30.3	23.9
4	29.2	21.2	23.6	23.6	29.3	24	31.7	21.2	32.1	22.6	33.8	21.9	32.7	23.8	30.6	24.1
5	28.8	21.3	23.1	23.1	28.9	24.2	31.8	21.9	32.2	22.6	33.7	22.3	32.7	23.4	31.2	23.6
6	29.9	22	22.6	22.6	29.8	23.8	29.7	22	31.8	23.2	34.5	22.4	32.4	22.9	30.2	24
7	28.7	20.9	23.1	23.1	29	23.5	31.7	22	31.8	22.4	32.3	23.5	32.3	22.9	31	24.4
8	29.9	21.3	22.1	22.1	29.2	23.5	31.7	22.5	31	23.5	31.8	22.3	32.2	23.2	31.2	23.6
9	30	21.9	22.5	22.5	29.3	22.5	31.5	21.5	29.1	22	32	22.2	31.9	22.3	30.6	22.7
10	28.2	21.5	30.1	30.1	23.1	28.9	31.2	22	31.8	22.1	31.9	21.7	33.2	22.3	29	23.4
11	29.7	20.6	33.1?	33.1?	30.9	23	28.7	22	31	21.6	33	20.8	33.4	22.8	29.9	22
12	31.4	21.8	30.5	30.5	22.1	29.9	30.6	21.1	32	21.6	33.3	22.1	32.6	23	30.1	23.6
13	30.9	21.3	33.6?	33.6?	22.2	29.2	30.7	22	30.8	22.4	31.3	21.8	33.4	22.9	29.6	23.5
14	29.9	21.2	31.6	31.6	20.6	30.2	31.7	21.3	31.4	22.5	33.6	22	33.6	22.5	29.7	23.5
15	30.1	20.5	33.1	33.1	22.1	29.2	29.2	21.5	32	22.9	34.1	23	33.5	22.3	30.3	22.6
16	30.4	21.9	32.1	32.1	23.1	29.5	24.2	28.6	22.3	32	33.8	22.1	32.7	22.8	30.8	23
17	28.9	21.5	31.6	31.6	22.9	28.4	30.7	21.5	32.1	22.1	32.4	22	32.6	22.9	30.6	23.9
18	28.5	20.9	29.1	29.1	22.3	28	32.2	27.2	22.5	31.5	22.1	31.8	22	33.4	23.4	31.3
19	28.8	18.9	30.6	30.6	20.9	29.2	22.1	29.2	21.5	30.9	22.3	30.5	20.4	31.1	22.5	29.1
20	31.1	21.1	31.6	31.6	22.1	30.2	31.2	21	31.4	23.1	34.3	21.7	32.4	23	30	22.6
21	29	21.2	31.1	31.1	22.4	28.6	30.8	21	31.3	20.8	32.8	22.9	33.7	22.9	31.1	23.6
22	28.9	21.1	31.6	31.6	22.1	30.2?	30.7	21.9	31	22.8	30.6	23.2	33.4	22.7	31.7	23.6
23	29.8	20.9	30.9	30.9	22.6	31	31.1	21.1	30.1	21.8	32.4	21.9	31.8	23.1	32.3	22.2
24	29.2	20.9	31.6	31.6	22.7	28.5	22.1	27.7	21	28.5	22.5	31.9	21.9	28.2	22.7	28.2
25	29.4	20.3	31.1	31.1	21.6	28	21.9	31.2	21.7	30.5	22.8	30.7	22.3	29.9	22.6	28.6
26	29.4	21.5	31.7	31.7	21.1	28.2	23.3	29.2	21.5	31.2	21.4	30.1	21.4	31.9	22.3	31.5
27	31.9	21.9	33.1	33.1	22.6	32	31.2	21.9	32.3	21	34.4	19.9	33.2	23.2	30.6	22.3
28	32	23	33.1	33.1	21.7	30	30.7	21.5	32.1	22.5	33.3	22.6	34.1	23.7	29.9	23.2
29	31.6	22.6	32.3	32.3	23.1	28.8	31.5	22.2	31.9	22.6	32.4	22.8	34.6	22.8	30.6	25.6
30	27.9	20.9	31.1	31.1	22.4	28	30.1	21.4	32.2	22.5	30.5	22.5	31.7	22.7	31.1	22.7
Mean	29.7	21.4	31.6	31.6	22.5	29.4	23.3	30.6	21.7	31.4	22.4	32.6	22.1	32.7	22.9	30.5

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.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	30.8	24.1	33.2	25	32.5	24.3	31.9	22.4	30.9	23.8	34.5	24	32.1	25	33.4	24.6
2	31.2	24	31.7	24	32.5	24	32.8	22.6	29.7	24.3	33.4	23.5	32.7	23	32.5	24.2
3	30.4	23.8	33.1	25.5	32	23.6	32.6	22.6	31	23	33.5	23.8	32.3	24.2	32	24.2
4	31.3	23.5	32.4	24.4	31.8	23.4	32.8	22.5	31.1	24.5	32.5	23.8	31.7	25.2	31.3	24.5
5	30.8	21.7	33.2	25	31.6	23.6	31.5	22.3	31.4	24	32	24.4	31.7	25.9	31.8	25.1
6	30.7	23.2	31.7	23	31.7	23.3	32.1	22.5	30	23.6	31	23.9	30.7	25.2	31.8	24
7	30.3	25.4	32.8	23.7	32.5	23.4	32.9	22.3	27.5	24.5	34	23.2	31.8	25.3	31.4	24.3
8	29.4	23.4	32.8	25	30.9	22.6	30.1	23.5	30.9	23.5	33.2	24	31.8	24.5	31.6	24.4
9	30	21.6	33.3	25	30.7	23.3	29.9	22.2	29.3	22.8	31.5	23.4	29.5	23.8	32.2	23.8
10	30.3	22.4	32.6	25.7	31.6	23.4	31.4	21.5	30.6	22.8	33	23.8	31.4	24.6	31	23.5
11	29.7	23.4	32.8	24	31.6	23.2	30.9	22.5	29.5	23.6	33.4	23.2	31	23.6	31.5	23.9
12	30.5	24	33.7	24.1	31.2	23.2	28.7	22.5	30	23	32.8	23.5	31	26.5	33	23
13	29.4	21.3	33.2	24.6	31.3	23	31.1	20.8	29.5	23.2	32.8	23.6	32.6	24	31	22.7
14	29.2	22	30.7	25	31.5	21.5	30.4	21.6	29.6	23.4	33.4	23.8	30.6	22	30.7	24.5
15	30.4	24.1	32.3	24	31.5	22.6	32.1	21	30.9	23.7	34.5	23.5	33	24.4	32.5	24.5
16	30.5	24.3	29	23.9	31.7	23.5	33.6	20.3	30.5	23.6	33	23.9	31.4	24.8	32	24.7
17	30.2	23.6	31.8	24	30.9	22.7	32.6	21	30.8	23.2	33.6	24	32	25.2	31.4	24.5
18	30.9	24.3	29.9	23.2	30.9	22.4	30.3	21.6	31	22.7	32.4	23.1	30.2	22.8	30	23.5
19	29.7	22.6	31.2	22.9	30.5	22.8	31	23.1	29.7	22.9	32.8	23.4	31.2	24.5	30	23.8
20	30.2	23.2	33.7	23.3	31.4	22.6	31.8	21.9	31.8	23.1	32	24.2	32.8	25	32	23.7
21	30.4	23.9	32.7	25	31.3	22.7	33.1	22.1	31	24.3	32.5	24	32.9	25.5	32	23.2
22	31	23.1	31.7	23.8	30.5	22.4	31.6	22.8	30.5	22.9	31.5	23.5	31.2	25	30.9	23
23	30.8	22	32.1	25.7	31.7	21.4	32.3	21.3	30.6	23.4	31.9	23.7	32	23.8	31.5	23.7
24	30.7	21.3	31.7	26.2	-----	-----	32.8	21.2	27.3	23.5	32	23.6	28.5	23.8	30.5	23.3
25	29.8	22.8	32.1	23.5	-----	-----	31.6	21.4	26.5	23.5	28	23	29.2	24	30.5	23.3
26	30.1	22	32	23.8	-----	-----	31.9	22.2	31	23.3	30.4	22.7	29.4	23.4	27	23.5
27	30.5	22.4	32.6	25.5	31.3	24	31.7	20.4	31	23.3	33	22.4	31	24	29.7	24.5
28	30.8	23	21.7	24.3	31.6	23.2	32.5	22.3	31.5	23.8	33.5	24	31.5	24.8	32.2	23.5
29	31.1	20.7	31.8	23.5	32.1	23.5	33.1	22.1	31.4	23.7	34	22.5	31.6	25.6	31.5	23.8
30	30.1	22.7	32.2	24.5	31.2	23	32.1	21.4	31.3	23.9	33	23.2	32.5	23	32	24
Mean	30.4	23	32.2	24.4	31.5	23.1	31.8	21.9	30.3	23.5	32.6	23.6	31.4	24.4	31.4	23.9

Maximum and minimum temperatures at the stations of the Weather Bureau, June, 1917—Continued.

Day.	San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz. <sup>a</sup>		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	33.6	24	32	23.9	32.4	23.9	32.8	27.1	32.2	24.2	32.8	24.3	30.9	24.3	32.5	24.4
2	32.7	23.7	32.8	24.8	33.8	22.9	32.5	24.3	32.6	24.7	33.1	24.5	31.9	23.7	33	22.6
3	32.2	23.8	32.8	25.5	33.8	22.9	32.5	23.4	32.8	23.6	33.2	24.6	31.9	22.7	32.9	22.7
4	32.7	22.6	33.2	25.1	32.8	23.4	32.7	24.3	32.1	23.9	32.7	24.5	31.8	22.8	32	23.5
5	32.1	24.1	32.3	25.1	33.2	24.4	32.2	26.1	31.2	24.7	32.9	23.9	31.9	24.5	31.8	23.2
6	32.1	23.5	32.3	24.5	32.5	22.9	31.6	23.5	32.1	23.4	33.2	24.3	32	22.7	32.7	23
7	32.3	23.5	33.5	24.7	31.3	22.3	33.5	24.3	32	24.1	32.9	24.8	31.3	23	32	22.4
8	31.7	23.6	30.9	24.8	31.6	22.8	32.4	24.1	32	24.5	32.8	24.8	31.5	23.1	31.6	23.2
9	31.7	23.6	30.8	23.8	31.4	21.9	31.7	23.8	31.9	24	32.3	23.7	31	22.6	31.4	22.5
10	29.7	23.5	27.4	23.8	31.8	21.9	31.3	23	31.4	22.8	31.7	24.3	31.2	22.9	30.8	22.5
11	32.4	22.9	32.7	23.9	31.5	22.4	31.4	23.4	30.5	22.9	32.7	23.7	31	22.9	30.1	22
12	33.1	24.1	28.8	22.9	32.8	22.8	31.9	25.1	31.4	23.4	33.6	24.8	31.8	23	32.3	21.3
13	30.7	23.5	28.8	22.5	31.8	23.4	32.1	25	31	23.3	31.5	23.2	30	22.7	31.5	23.3
14	30.2	24.1	28.3	23	30.1	22.5	27.7	22.8	28.3	23.1	31.9	24	28.6	22.4	29.2	22
15	31.7	23.6	31.5	23.8	31.2	22.7	31.8	23.3	32.6	23.5	32.7	23.3	31.1	22.3	31.6	22.2
16	32.8	23.5	33.3	24.4	31.8	22.4	32.1	23.4	32.4	24.1	33	23	31.1	23	32.3	22.7
17	32.3	23.9	31.3	25.9	33.5	21.7	33.1	23.5	32.9	24.3	33.2	23.4	31.8	22.5	32.5	22.5
18	30.5	23.5	31.2	26.4	31.9	23.7	31.8	23.7	31.9	23.5	32	22.7	30.7	23.9	31	23.6
19	31.2	23.1	30	23.9	31.9	24.2	31.9	23.5	31.9	23.4	31.2	22.5	33.3	22	32	22.5
20	32.7	23.4	32.7	23.6	32.8	22	33.2	25.7	32.9	24	32.9	23.7	32.1	22.5	32.6	22.7
21	32.7	22.9	33	24	31.2	21.7	31.9	23.4	32.4	23.5	31.9	22.8	31.1	22.7	31	22.7
22	31.7	22.8	32.8	24.3	31.6	22.9	32.3	23.6	32.1	23.1	32.9	23	31.1	23.1	31.5	22.9
23	31.4	22	30.4	23.3	31.6	21.4	32	22.5	31.9	22.9	31.4	22.5	32.4	21.9	30.7	21.4
24	30.6	22.4	30.7	24.2	29.4	22.6	29.3	23.6	31.6	24.1	30.7	23.8	31.6	23	31.2	22.5
25	30.6	22.5	31.4	22.6	28.7	22.7	28.3	23	30	22.9	31.5	23.7	30.1	22.9	29	22.6
26	26.7	22.4	26.4	23.1	30.2	22.4	29.7	23.4	32	22.2	30.5	22.8	32.4	21.5	30.9	22.2
27	32	22.9	31.1	23.9	32	24.1	33	26.7	32	23	30.6	23.3	31.5	22.6	32	23
28	31.7	22	30	23.6	32.9	22.3	33.3	25	32.5	24.3	32	23	31.7	22.6	32.6	23
29	32.8	24	31.5	23.9	33	21.9	32.9	23.2	33.6	23	32.4	22.9	32	22.8	32.1	22.9
30	31.2	23.8	30.5	23.6	32.4	22.4	31.6	23.6	32.3	23.5	31.9	23.6	31.5	22.8	30.6	22.2
Mean	31.7	23.3	31.1	24.1	31.9	22.7	31.8	24	31.9	23.6	32.3	23.6	31.4	22.8	31.6	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.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31.8	23.8	31.8	24.5	33.5	24	29.4	24.2	31.5	22.8	32.3	23.6	31	24.8	33	24
2	30.9	23.8	32.2	25.2	34.6	24.4	31.2	25.3	32.5	22.9	32.3	25.1	31.2	26	32.5	24
3	31.9	22.7	32.6	25.6	34.9	25.7	30.7	24.5	33.2	22.8	32.1	26.8	31.2	25	33.5	22.5
4	31.5	24.1	31.6	26.5	35	25.6	30.9	23.7	32.8	22.5	31.8	25.1	28.4	25.8	33	23.3
5	31.4	23.7	32	26.4	33.9	25.2	31.4	23.5	33	23	32.1	26	31.2	26.4	33.8	23.6
6	30.6	23.5	33.2	26.8	34.5	24.4	30.7	24.2	33.2	23.4	32.8	26.4	31	25.8	34	24.5
7	32.8	23.2	33.8	26.2	35.3	24.2	30.4	23.8	32	23	32.3	25.8	31.8	25	34	24
8	30.7	23.3	31.8	25.8	34.9	24.3	30.6	23.8	32.5	23	31.5	25.8	30.4	24.4	34	23.5
9	31.3	22.8	32.8	25.2	35.3	22.7	29.7	23.8	33	22.5	31.8	23.3	31	25.6	33	23.5
10	31.5	23	33.2	24.6	34.4	23.2	30.9	24.1	32.9	22.3	32.1	25.2	31.4	25.2	33.6	23.5
11	30.3	22.8	32.6	26.2	34.4	23.3	29.6	23.6	32	22.1	32.3	24.6	31.4	26.4	34	22.8
12	31.6	22.5	33.6	26.4	34.4	24.8	30.4	24	32.7	22.9	31.9	23.9	31.4	23.8	32.5	23.6
13	31.4	23.5	33	25	35	23.3	29.9	24	32.9	23	31.8	25.3	31.4	24.8	32.5	23.1
14	29.9	22.7	32	26.4	34.5	23.9	29.7	24	32.9	22.9	31.8	25.7	31.2	25.8	35.1	23.4
15	30.7	23	33.8	24.8	35.4	23.4	29.9	24.1	32	22.7	32.4	24.9	31	25.8	33	23.5
16	32.3	23.3	34.8	26.5	35.4	24.2	30	24	32.7	23.7	32.4	26.5	31	24	33.5	23.5
17	31.6	22.7	33.6	25.8	34.3	24.1	30.6	23	33.5	22.9	32.7	24.6	29.6	23.2	33.5	23.5
18	31.3	22.7	29.6	24.8	32.5	23.7	30.3	24	31	22.5	31.3	24.4	32.2	23.6	33.1	23
19	31.5	22.5	32.4	24.4	32.6	24	30.3	22.5	33.5	24.4	32.9	24.3	29.6	25.6	33.2	23.5
20	34.1	23.5	33.6	25.2	34.8	23.8	30	22.6	33.9	23.5	32.8	23.1	29.4	24.4	33	22.6
21	30.8	22.7	34.4	25.4	34.7	23.9	30.6	23	33.5	21.8	32.3	22.7	31	24.4	33.5	23
22	31	23.1	34.4	24.8	34.1	22.8	31.6	24	33	22	32.3	23.3	30.4	23.8	34	23
23	31.4	21.9	32.4	23.4	33.4	22.2	31.8	23	31.1	21.8	31.9	23.4	29.6	23.4	32.4	22.5
24	29.8	23.9	31.6	25.2	34.4	23.1	31.8	23.6	31.2	22.2	31.6	23.9	31.4	23.8	32.5	22
25	27.8	22.5	30.2	24.5	33.8	23.4	29.5	22.8	30.7	21	29.9	23.6	30	23.8	33.1	23
26	28.3	23.2	28	24	30.9	23.2	29.8	22	29.8	20.5	27.3	23.8	30.2	23.2	32.8	23
27	30.8	23.6	31.6	24.5	33.3	23.1	30.4	22	30.5	22	32.6	23.5	29.4	23.2	29.8	23.1
28	31.9	23.8	31.8	24.4	33.5	23.2	30.4	22	33.1	22.8	32.4	23.9	30.6	23	34	23
29	31.7	22.9	31.8	25.5	34.9	23.4	31	23.2	33.2	22.9	32.4	23.9	30.4	23.8	33.5	23
30	30.8	22.8	33.4	26.2	33.6	23	31.5	23	32.7	22.7	32.1	24.9	28.8	22.4	33.5	24
Mean	31.1	23.1	32.5	25.3	34.2	23.8	30.5	23.5	32.4	22.6	31.9	24.6	30.6	24.5	33.2	23.3

<sup>a</sup> The temperatures on the 18th to 21st of this station have been taken from the self-recording instrument.

Maximum and minimum temperatures at the stations of the Weather Bureau, June, 1917—Continued.

Day.	Virac.		Naga.		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	32	23	32.8	21.6	32.9	23.9	31.7	23.6	33	23.4	31.8	24.6	31.6	22.8	33	24.2
2	32.6	23.9	33.7	21.2	33.1	24.7	32.1	23.6	31	24.6	31.8	24.3	30.9	23.2	32	24
3	32	22.5	33.2	21.3	32.6	24.6	32.9	24.5	32.7	24.2	32	24.8	32.3	23.1	32.2	24
4	32.1	23.2	33.4	20.4	35.2	23.3	33	23.5	32.9	24.2	34.3	23.9	32.1	22.8	32.6	23.5
5	32.4	24	34	21.7	35.8	24.3	33.5	24	32.6	24	34.4	24.8	33.4	24	32.7	24.8
6	32.6	23.5	33.5	21.3	35.1	25	33	25.4	32.8	24	34	24.8	34.2	24.1	33	24.5
7	32.5	23	32.5	20	37.2	24.7	32.4	23.5	32.9	23.2	34.9	24	34.2	23.2	33.2	23.9
8	31.7	23.5	34.1	21.5	34.6	24.4	33.4	23.9	33.6	23	34.7	24.5	34	23.4	33.5	24
9	31.6	22.4	34.1	20.9	33	23.6	32.5	23	32.9	22.7	33.1	23.5	34	22.8	33	23.7
10	32.8	22.2	33.5	20.4	33.8	24	32.5	23.7	33.3	23.3	32.3	23.9	32.6	23	33	24.7
11	32.6	22.4	32.9	19.9	34.1	23.1	33.8	23.4	33.7	23	35.3	24.1	33.2	22.6	32.8	23.3
12	32.7	22.7	34.1	20.7	32.6	24.5	32.3	24.4	32.1	23.6	34.4	24.8	33.4	23.4	32.4	24.1
13	32.1	23.2	34.2	20	33.2	23	32.9	22.7	33.4	23.6	34.8	23.8	34	23.2	33.3	24.4
14	31.2	22	34.1	20.2	35.2	23.9	32.8	23.6	32.9	23.2	35.2	22.9	34.1	23.8	33	23.8
15	31.6	22.1	32.6	20.7	34.8	23.1	33.4	22.9	32.6	23.6	34	22.9	33.4	22.1	31.7	24.1
16	32.8	22.3	34.8	20.4	35.8	24.3	33.4	23.7	33.4	25.1	34.7	24.7	33.2	24	32.6	24.1
17	32.9	22.4	34.5	20.8	33.8	24.4	33	24.2	33.9	24.7	33.2	24	33.1	22.3	32.3	24.3
18	31.8	22	33	21.3	33.9	23.6	33	23	33.1	23.7	33	23.5	34	22.2	34.2	24.2
19	31.9	22.7	32.9	21.1	32	23.5	31.2	22.6	31.7	23.4	31.3	23.7	32	22.3	33.4	23.8
20	32.5	23	33	22.7	33	24.6	32	23.6	32.8	23.9	33.6	23.7	33.2	22.3	32.3	23.3
21	32.9	22.9	34.4	20.5	33.5	24	32	23.1	32.8	23.5	33.6	24	33	22.2	32.2	23.2
22	31.7	22.8	33.6	19.5	32.5	24.7	30.8	23.6	32.4	23.1	31.1	23.9	31.2	22.4	31.6	22.5
23	31.8	22.2	33.7	20.3	31.6	23.1	32	22	33.2	22.6	32	23.3	32.1	21.8	32.2	23.2
24	31.7	21.8	32	20.7	33.9	23.5	31.9	22	32.7	22.9	33.1	23	33.2	22.2	31	22.8
25	28.5	22.1	30.1	19.6	32.6	23.1	32	22.1	29.8	22.8	32.5	22.8	31.4	22.1	31.5	23.8
26	29.5	22	28.4	20.1	32	23.4	30.6	21.6	30.7	23.2	30	22.9	30.8	22.4	27.8	23.8
27	31.6	22.9	31.5	19.9	28.1	23.9	29.4	22	29.1	22.6	27.2	23	30.4	21.8	32.3	23.4
28	31.8	23.9	31.5	20.5	32.8	23.4	31.4	23.1	32.1	23.5	32.3	23.1	32.2	22.3	33.2	23.8
29	32.5	23.3	34.5	21.5	35.1	23	32.4	22.1	33.2	23.5	33.3	24	33.8	22.4	32.9	23.5
30	32.3	22.5	32.8	21	32.2	23.7	28.5	23	31.7	23.8	32.5	24.6	32.1	23.1	32.9	24.3
Mean	32	22.7	33.1	20.7	33.5	23.9	32.2	23.2	32.5	23.5	33	23.9	32.8	22.8	32.5	23.8

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	31.1	23	33.6	23.9	33.2	22.6	31.8	23.2	33	23.8	34.4	24	33.2	23.9	36.1	23.7
2	30.2	24.2	32.8	23.4	32.2	23.2	32.3	23.4	32.3	23.2	32.6	23.3	31	23.7	34.4	23.3
3	32.9	23.3	32.6	23.5	33.2	22	32.9	23.9	33.4	23.4	32.7	23	33.2	23	35.1	23.7
4	31.8	23.6	34.1	23.3	34.2	22.5	33.5	23.4	34	22.7	34.7	22.8	33.2	22.7	36	23
5	33.5	24	35	24.4	35.2	22.8	33.3	23.5	33.4	23.6	35	24	32.8	24.1	36.3	24.2
6	33.8	24	34.8	24.7	35.3	22.8	32.9	23.6	34.2	24.7	35.8	24	33.1	23.9	36.8	24.9
7	32.8	24.1	35.1	23.6	36	22.5	32.9	23.2	34	23.8	35	24.4	33.5	23.5	36.4	24.5
8	32.9	24.3	35.5	24.1	35.7	22.5	33.4	23.6	33.7	23.7	34.5	23.3	32.8	22.8	37	24.1
9	33	23.2	34.6	23.9	35.1	22.9	32.9	22.7	34	23.4	34.4	23.5	34.7	23.6	36	24
10	32.5	24.1	33.7	23.3	34.2	22	32.8	23	34	22.4	34.2	23	33	22	35.1	24
11	32.8	23.4	34.1	23.1	34.6	21.6	33.8	22.5	32.5	23.1	34.1	23.3	33.2	22.8	37	24
12	32.1	24.2	35.1	23.6	35.6	23.5	35.4	24.6	33.3	24.4	33.2	22.8	34.1	22.9	34.8	24.9
13	32.5	22.9	35.4	22.8	35.5	22.7	35.4	24	34	23	33	22.8	33	22.6	36.7	23.5
14	33	23.6	35.8	23.2	35.7	22.8	33.8	22.9	33.3	22.5	33.8	22.5	33.2	22.4	36.7	24
15	32.8	22.6	34	23.3	34.7	22	32.6	23.9	34.9	23.5	35.4	24	34.1	22.2	37.2	24.2
16	33.3	24	35.3	24.2	35.3	22	33.3	24.2	34.4	22.9	35.2	23.8	34.2	22.5	34.7	23.4
17	34.2	24.2	33.9	24.2	35.7	22	32.4	23.5	34	24.9	35.4	24	33.8	23.1	35.9	25.4
18	33.4	22.9	34.1	24.1	34.4	22.8	32.5	23.5	34.6	23.4	35.3	23.3	34	23.8	35.4	23.6
19	32	22.7	32.1	24.1	32	22.6	31.5	23.2	33.1	22.7	33.3	23.4	32	23.8	35.7	23.6
20	33.2	22.5	33	23.6	33.5	22.5	31.9	23.5	33	23.1	33.5	23.4	34	23	34.7	23.6
21	33.4	22.9	33.2	23.3	33	23.2	31.9	23.7	33.9	24	34.7	23.5	33.9	22.8	34.7	24.1
22	31.3	23.7	31.9	22.9	32.3	21.5	31.8	23	32.5	23.3	33.2	23.5	33.9	22.8	33.8	24
23	31.9	22.2	31.6	22.6	31.7	21.2	31.4	22.4	32.5	23.3	33.9	23.5	32.7	21.6	34.6	23
24	32.1	22.2	33.1	23.6	33.3	22.3	31.1	22.5	32.9	22.7	34	23.8	32.5	22.2	33.7	23.7
25	31	22.9	32.6	23	32	21.7	31.5	23.2	32	22.8	32.8	23.5	30.7	23	34.9	23.5
26	30.3	23	31.1	23.4	30.2	22	31.2	21.3	32	22.6	32.6	22.8	31.5	22.9	33.4	23
27	27.8	22.9	29.2	23.2	27.7	21.6	27.5	23.2	28.2	22.6	33.6	22.5	30.8	22.4	31.9	22.8
28	32.2	22.8	31.6	22.9	32	21.7	31.4	22.6	30.5	22.6	34	23	32.4	22.6	32.7	23.4
29	33.8	23.3	34.1	24	34.7	22.8	31.5	23.4	33.1	23.1	34.4	23.2	34.2	22.7	34.7	23.5
30	31.8	23.3	31.4	23.5	33.4	22.1	31.7	23.7	32.7	23.5	34.6	23.4	33.1	23	34.2	24
Mean	32.3	23.3	33.5	23.6	33.7	22.3	32.4	23.3	33.1	23.2	34.1	23.4	33.1	23	35.2	23.8

Maximum and minimum temperatures at the stations of the Weather Bureau, June, 1917—Continued.

Day.	Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.	
	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	33.4	24.2	23.7	16	33.8	24.9	36.1	24	34.4	25.4	33.6	25
2	32.5	25	23.4	15.8	33.8	23.5	33.6	23.4	33.5	25.5	34.1	23.6
3	33	23.9	22.5	15.6	34	24.5	34.2	23.1	34	25	33.2	24
4	34	23.7	25.3	15.6	34.5	22.6	35.2	23.1	34	24.5	33.7	24
5	33.9	24.5	25.6	16.7	35.5	24.1	35.4	22.5	34.4	25	34.4	25.5
6	33.5	23.9	24.3	16.6	35.4	24	35	23.5	35	24.9	34.8	25.6
7	33.1	24.1	25.2	16.6	34.5	24	36.5	23.5	34.6	25	34.3	25
8	34	24.8	24.8	16.2	35.6	24.4	35	21.6	34.7	25	33.8	24.7
9	33.2	23.1	25.2	16.1	36.1	24.4	36.1	21.8	34.4	25.8	33.5	26
10	34	25.5	24.5	15.8	33.6	24.3	35.3	21.2	33	24.8	34	24.4
11	34	23.2	26	15.9	34	23.3	35.2	21.9	35.1	25.9	34.3	25.5
12	34.1	26.3	25	15.9	36	23.7	35.5	21.7	35.4	26	35.7	25.5
13	34.9	24.5	24.8	16	34.9	23.5	35.9	20.3	34.4	25	34	24.1
14	35.1	24	24.2	15.8	36.1	23.5	36.2	21	35.3	26	34.6	26
15	32.5	25.4	24.8	16.5	35.5	25	37.1	21.3	35.2	26.5	33.9	23.8
16	33.5	23.6	24	16.3	34.5	22.8	38	22	34.5	25	33.8	24.6
17	32.7	26	24.7	16.7	34.2	25.4	38	21.6	35.5	26.9	34.3	25.7
18	33.1	24.1	24.6	16.1	35.5	24.6	38	23.7	34.5	26.9	34.2	26
19	33.5	23.3	24.8	16	33.5	23.2	35.5	22.8	35.4	26.5	33.4	22.8
20	32.2	24.9	23	15.5	34.3	22.8	37.4	22.4	34	24.9	32.6	23
21	33.6	24.8	23.9	15.9	34	23.9	37.7	23.4	34.4	25	32.2	23.3
22	32.1	24.1	23.5	15.2	33.1	23.1	36.8	23	33	24.5	31.4	22.5
23	32.4	24	23.5	14.9	33	23	34.7	21.9	33.5	24.2	31.6	22.8
24	32.6	23.5	23.6	15.1	33.2	23.1	34.3	22.5	33.2	24.8	33.1	22.8
25	32.7	24.6	24.6	15.9	33	23.5	33.4	23.3	33	25	31	23.8
26	32	25.4	22.8	15	32.5	23	32	22.8	33	23.9	32	22.3
27	31	23.1	21.1	15.2	32.5	22.6	32	22.8	32.5	24.4	29.2	23.2
28	29	23.9	20.7	15.3	31	23.5	33.7	22.4	32	24	29.6	23.2
29	33.5	23.9	24.4	15.4	32.3	23.2	35.8	22.8	33	25	32.4	23.2
30	33.3	24.5	23.8	16.2	33.3	24	34.8	23	34	24.9	33.2	23.5
Mean	33.1	24.3	24.1	15.9	34.1	23.7	35.5	22.5	34.1	25.2	33.2	24.2

Day.	Tuguegarao.		Laoag. <sup>a</sup>		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	38.6	23.5	36.3	23.8	33.5	24.3	34.8	25.6	33.1	25.4
2	35	23.2	33.8	22.2	32.3	23.6	34.8	23.8	32.5	26
3	33.6	23	34.2	23	31.6	23.8	33.6	25.8	31.4	25
4	36.2	23.7	35.8	22.8	32.7	24.1	35	24.8	32.6	25.2
5	36.5	23.2	36.2	23.1	33.1	24	35.2	24.5	31.8	24.9
6	36.5	24.4	37.1	23.7	31.8	24.3	35.4	26.2	31.7	25.1
7	36.1	24.2	35.9	23	33.2	24.2	36	25.8	32.4	24.9
8	36.4	24	36	23.2	33.2	24.6	35.2	23.8	32.7	25.6
9	37	23.5	35.6	24.1	33	24.1	34.8	25.3	33.2	25.5
10	36.2	24.3	37.1	22.4	32.2	24.8	35.4	25.5	33.4	26.1
11	36.6	23.9	37.3	23.7	32.4	24.3	35	25	32.9	26.3
12	37.1	22.9	36.4	22.7	33.5	23.8	35.6	25.8	33	26.6
13	37.2	23.9	36.1	22.3	33.4	24.8	34	22.8	33.1	26.7
14	36.6	23.3	36.3	23.5	34	24.8	34.8	26.4	33.8	27
15	38.6	24	36	24.7	34.2	25.4	35.4	26.6	33.8	27
16	39.1	24.5	36.2	23.2	34	25.3	34	25.4	33.2	27.2
17	39.8	25.2	36	24	32.5	24.8	35.2	26.2	32.5	25.5
18	39.4	24.7	35.9	24.6	33.3	24.8	34.8	26	32.7	25.6
19	37.2	24.9	34.9	23	33	24.1	34.5	25	33.1	24.9
20	36.7	22.8	34.1	22.1	32.5	23.6	33	23.6	31.6	25
21	36	23.6	32.9	21.4	31.6	24.2	31.8	23.2	30.4	24.3
22	34.7	23.2	31	21.4	32.3	23.6	30.6	21.8	28.5	23.2
23	33.8	22.8	32.7	22.4	31.5	22.8	31.6	24.6	29.5	22.9
24	33.6	23	32.8	21.8	30.4	23.8	33.4	23.7	32.1	24
25	34	23.2	32.4	22.8	30.9	24	31.2	23.6	32.1	25.5
26	33.7	23.3	32.9	22.5	30.3	23.3	31.4	24.8	31.5	25.2
27	32.3	23.2	27.9	21.9	27.7	23.2	25.8	23.2	28.1	23.8
28	33.6	23.5	31.2	22.1	30.8	23.1	28	22.2	32	23.5
29	36.6	23.2	32.3	23.1	32	23.5	31.6	23	32.6	25.8
30	35.2	24	34.8	23.3	31.8	23.8	32	24.6	32.5	23.7
Mean	36.1	23.7	34.6	22.9	32.3	24.1	33.5	24.6	32.1	25.2

<sup>a</sup> The maximum temperatures of this station are not very reliable: they seem to be too high.





# SEISMOLOGICAL BULLETIN FOR JUNE, 1917.

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## EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

4, 4<sup>h</sup> 03<sup>m</sup> [4, 12<sup>h</sup> 03<sup>m</sup>]. **Samar Island.** Earthquake shock of intensity II–III in the central part of the island: it was slightly recorded by the seismograph at Butuan, about 300 kilometers distant.

5, 20<sup>h</sup> 58<sup>m</sup> 33<sup>s\*</sup> [6, 4<sup>h</sup> 58<sup>m</sup> 33<sup>s</sup>]. **Samar and Panay Islands.** Earthquake of intensity III felt in the NW portion of Samar and N of Panay. The epicenter lay at a distance of some 360 kilometers from Manila; seemingly to the S of Masbate Island. It must have been perceptible in this island but with intensity not greater than at Calbayog, Samar, and Capiz, Panay. Recorded also at Butuan.

6, 9<sup>h</sup> 31<sup>m</sup> 58<sup>s\*</sup> [6, 17<sup>h</sup> 31<sup>m</sup> 58<sup>s</sup>]. **Butuan (N Mindanao).** Oscillatory earthquake of intensity II. The origin of the disturbance was in the Pacific to the W of the Philippine Deep, at a distance of about 930 kilometers from Manila and 380 from Butuan.

9, 6<sup>h</sup> 33<sup>m</sup> 19<sup>s\*</sup> [9, 14<sup>h</sup> 33<sup>m</sup> 19<sup>s</sup>]. **N Luzon.** Earthquake of intensity IV–V, felt through the provinces situated N of the 17° N parallel. It probably originated near the northern end of the Cordillera Central: both in Ilocos Norte and in the northern stations of Cagayan Province the principal movements gave the impression of being in a E–W direction.

10, 20<sup>h</sup> 05<sup>m</sup> [11, 4<sup>h</sup> 05<sup>m</sup>]. **Calbayog (NW Samar).** Oscillatory earthquake of intensity II–III.

13, 15<sup>h</sup> 33<sup>m</sup> 31<sup>s\*</sup> [13, 23<sup>h</sup> 33<sup>m</sup> 31<sup>s</sup>]. **Baguio (W Luzon).** Earthquake shock of intensity II–III: the origin apparently was toward the east, some 210 kilometers distant from Manila, probably in Nueva Vizcaya.

14, 21<sup>h</sup> 03<sup>m</sup> 39<sup>s\*</sup> [15, 5<sup>h</sup> 03<sup>m</sup> 39<sup>s</sup>]. **N Luzon.** Earthquake of intensity III–IV in the northernmost portion of the island, apparently it had the epicenter in the same place as that felt on the 9th; but its intensity and extension were less.

18, 16<sup>h</sup> 32<sup>m</sup> [19, 2<sup>h</sup> 11<sup>m</sup>]. **Guam (Mariana Islands).** Earthquake of intensity IV–V: there were experienced two very distinct series of shocks. The origin of these disturbances lay to the NNW of the island at an approximate distance of 265 kilometers. It was recorded at 16<sup>h</sup> 34<sup>m</sup> 28<sup>s</sup> in the Osaka Observatory and at 16<sup>h</sup> 34<sup>m</sup> 44<sup>s</sup> at Manila. The time of Guam is only approximate.

20, 17<sup>h</sup> 18<sup>m</sup> [21, 1<sup>h</sup> 18<sup>m</sup>]. **Butuan (N Mindanao).** Oscillatory earthquake, direction NE–SW, intensity III, duration 5 seconds.

20, 21<sup>h</sup> 27<sup>m</sup> [21, 5<sup>h</sup> 27<sup>m</sup>]. **Cabo Bojeador (NW Luzon).** Earthquake shock of intensity II–III.

27, 5<sup>h</sup> 36<sup>m</sup> 48<sup>s\*</sup> [27, 13<sup>h</sup> 36<sup>m</sup> 48<sup>s</sup>]. **SE Luzon, Samar, and Leyte Islands.** Earthquake of intensity III, felt over the provinces of Albay and Sorsogon and in the islands of Samar and Leyte. The epicenter was in the Pacific at a distance of about 560 kilometers from Manila, to the ENE of Samar.

<sup>1</sup> 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<sup>h</sup>) 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. AN:  $T_0=5.9$ ,  $\epsilon=-2.340$ ,  $\frac{r}{T_0}=20.024$   
 $A_E: T_0=5.3$ ,  $=1.783$ ,  $\frac{r}{T_0^2}=0.092$ . Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
168	1	I <sub>r</sub>	e F	<i>h. m. s.</i> 8 31 22 9 34				
169	1	I <sub>v</sub>	eP F	16 45 12 48				
170	3	I <sub>r</sub>	eP S? L? F	14 38 36 41 58 44 19 15 15				
171	4	I <sub>r</sub>	e F	1 41 00 2 14				
172	4	I <sub>v</sub>	eP F	5 46 04 49				
173	4	I	e F	7 55 36 8 22				
174	5	I <sub>v</sub>	eP L F	20 58 33 59 23 21 07				Samar and Panay Islands.
175	6	I <sub>v</sub>	eP L M <sub>N</sub> F	9 31 58 33 39 34 30 52	4	17		Butuan (N Mindanao).
176	6	I <sub>v</sub>	eP F	22 39 25 44				
177	7	I	e F	16 11 32 24				
178	7	I	e F	19 35 50 57				
179	8	I <sub>u</sub>	e S? L M <sub>N</sub> M <sub>E</sub> F	1 11 29 20 2 01 52 03 29 05 00 3 04	22 23	5 4		
180	8	I <sub>v</sub>	eP F	20 16 37 19				
181	9	II <sub>v</sub>	eP L M <sub>N</sub> M <sub>E</sub> F	6 33 19 34 07 34 18 34 22 47	3 3	170 139		N Luzon.
182	9	I <sub>v</sub>	e F	17 09 34 24				
183	10	I	e	4 55				End overtaken by following earthquake.
184	10	I <sub>v</sub>	eP L F	5 47 02 47 21 52				
185	13	I <sub>u</sub>	eP S L M <sub>E</sub> M <sub>N</sub> F	6 53 40 7 03 50 21 28 27 50 28 15 8 44	18 19	13 14		
186	13	I	e F	9 04 20 46				
187	13	I <sub>v</sub>	eP L M <sub>N</sub> F	15 33 31 33 54 34 14 42	2	70		Baguio (W Luzon).
188	13	I	eP F	17 10 48 31				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
189	14	I	eP F	<i>h. m. s.</i> 21 03 39 06				N Luzon.
190	18	Iv	eP F	0 09 24 13				
191	18	Iv	eP F	1 25 00 34				
192	18	Iv	eP F	13 07 50 11				
193	18	IIv	eP L M <sub>N</sub> F	15 50 42 50 56 50 58 58	2	349		
194	18	Ir	eP L F	16 34 44 38 51 55				
195	18	I	e F	22 16 56 46				
196	19	Iv	eP F	23 34 49 37				
197	21	I	eP L F	17 48 20 50 11 18 06				
198	24	Iv	eP F	2 25 58 32				
199	24	Ir	eP S L M <sub>E</sub> M <sub>N</sub> F	20 00 12 05 08 10 54 11 02 11 05 21 02	7 9	16 47		
200	26	IIIu	eP S L M <sub>E1</sub> M <sub>N1</sub> M <sub>E2</sub> M <sub>N2</sub> M <sub>N3</sub> M <sub>E3</sub> F	6 01 03 10 34 25 10 26 21 28 45 29 01 34 38 36 36 40 08 11 30	25 19 21 19 18 18	282 167 128 144 136 84		
201	27	IIv	eP L M <sub>N</sub> M <sub>E</sub> F	5 36 48 37 50 37 58 38 37 6 04	2 2	54 77		

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

4, 4<sup>h</sup> 03<sup>m</sup> [4, 12<sup>h</sup> 03<sup>m</sup>]. Isla de Sámar. Temblor de tierra de intensidad II-III en la parte central de la isla; fué débilmente registrado por el sismógrafo de Butúan distante 300 kilómetros.

5, 20<sup>h</sup> 58<sup>m</sup> 33<sup>s\*</sup> [6, 4<sup>h</sup> 58<sup>m</sup> 33<sup>s</sup>]. Islas de Sámar y Panay. Temblor de tierra de intensidad III sentido en la parte NW de Sámar y N de Panay. El epicentro estaba situado a unos 360 kilómetros distante de Manila, seguramente al S de la Isla de Masbate donde debió ser asimismo perceptible. No parece tuviese en el epicentro mucha mayor intensidad que la del grado III con que se sintió en Calbayog, Sámar y en Cápiz, Panay: fué también registrado en Butúan.

6, 9<sup>h</sup> 31<sup>m</sup> 58<sup>s\*</sup> [6, 17<sup>h</sup> 31<sup>m</sup> 58<sup>s</sup>]. Butúan (N de Mindanao). Temblor oscilatorio de intensidad II. El origen de este temblor se hallaba en el Pacífico hacia la parte W del Abismo de Filipinas, a unos 930 kilómetros de distancia de Manila y 380 de Butúan.

9, 6<sup>h</sup> 33<sup>m</sup> 19<sup>s\*</sup> [9, 14<sup>h</sup> 33<sup>m</sup> 19<sup>s</sup>]. N de Luzón. Temblor de intensidad IV-V sentido en todas las provincias situadas al N del paralelo 17° N. Su origen parece estuvo hacia el extremo de la Cordillera Central: tanto en Ilocos Norte como en las estaciones más septentrionales de Cagayán se tuvo la impresión de que los principales movimientos eran en la dirección E-W.

10, 20<sup>h</sup> 05<sup>m</sup> [11, 4<sup>h</sup> 05<sup>m</sup>]. Calbayog (NW de Sámar). Temblor oscilatorio de intensidad II-III.

13, 15<sup>h</sup> 33<sup>m</sup> 31<sup>s\*</sup> [13, 23<sup>h</sup> 33<sup>m</sup> 31<sup>s</sup>]. Baguio (W de Luzón). Temblor de tierra de intensidad II-III; originóse al parecer hacia el E a 210 kilómetros de distancia de Manila, probablemente en Nueva Vizcaya.

14, 21<sup>h</sup> 03<sup>m</sup> 39<sup>s\*</sup> [15, 5<sup>h</sup> 03<sup>m</sup> 39<sup>s</sup>]. N de Luzón. Temblor de tierra de intensidad III-IV en las provincias más septentrionales; parece que el epicentro estaba en el mismo sitio que el del día 9, pero tuvo menor intensidad y extensión.

18, 16<sup>h</sup> 32<sup>m</sup> [19, 2<sup>h</sup> 11<sup>m</sup>]. Guam (Islas Marianas). Temblor oscilatorio, dirección N-S, intensidad IV-V: notáronse dos grupos principales de movimiento separados por un intervalo apreciable de tiempo. Este terremoto se originó hacia el NNW de la Isla de Guam a unos 265 kilómetros de distancia. Registróse en Osaka, Japón, a 16<sup>h</sup> 34<sup>m</sup> 28<sup>s</sup> y en Manila a 16<sup>h</sup> 34<sup>m</sup> 44<sup>s</sup>. La hora de Guam es solamente aproximada.

20, 17<sup>h</sup> 18<sup>m</sup> [21, 1<sup>h</sup> 18<sup>m</sup>]. Butúan (N de Mindanao). Temblor oscilatorio, dirección NE-SW, intensidad III, duración 5 segundos.

20, 21<sup>h</sup> 27<sup>m</sup> [21, 5<sup>h</sup> 27<sup>m</sup>]. Cabo Bojeador (NW de Luzón). Temblor de tierra de intensidad II-III.

27, 5<sup>h</sup> 36<sup>m</sup> 48<sup>s\*</sup> [27, 13<sup>h</sup> 36<sup>m</sup> 48<sup>s</sup>]. SE de Luzón, Sámar y Leyte. Temblor de tierra de intensidad III sentido en las Provincias de Albay y Sorsogón y en las Islas de Sámar y Leyte. El epicentro estaba de Manila unos 560 kilómetros: se hallaba por consiguiente en el Pacífico algo distante al ENE de la Isla de Sámar.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.





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FFP 23 1918

THE GOVERNMENT OF THE PHILIPPINE ISLANDS

# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR JULY, 1917.

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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

MANILA  
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**BULLETIN FOR JULY, 1917.**



# METEOROLOGICAL BULLETIN FOR JULY, 1917.

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 lower than that of the preceding year and than the normal for July, the differences being much greater in northern Luzon. The highest pressures were observed in all our stations on the 23d, and the lowest on the 12th to 17th.

The mean monthly temperature is generally lower also than the normal and than the average for July, 1916, especially in northern Luzon. The absolute maximum and minimum temperatures of the month for Manila were 32.7° C. on the 14th, and 22.3° C. on the 14th and 25th. The extreme temperatures for Baguio were 23.8° C., 14.4° C. on the top of Mirador, and 24.7° C., 14.1° C. in the valley.

### PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR JULY, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from July, 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from July, 1916.	Highest.	Day.	Lowest.	Day.
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>		<i>mm.</i>		°C.	°C.	°C.		°C.	
Zamboanga	758.08	-----	760.30	23	756.76	14	26.2	-----	31.3	various	21.7	16
Tagbilaran <sup>a</sup>	57.79	-----	59.50	23	56.44 <sup>b</sup>	5	27	-----	33.4 <sup>b</sup>	27	22.7	19
Surigao	57.34	- 0.33	59.32	23	55.89	15	26.7	- 0.3	33	10	22.3	23
Cebu	57.51	- .14	59.54	23	56.24	15	27.6	- .1	32.7	14	22	11, 26
Iloilo	57.37	- .24	59.36	23	56.17	15	26.9	- .2	31.5	various	22.5	28
Ormoc	57.56	- .36	59.60	23	56.38	15	26.7	+ .3	32.9	14	21.4	30
Tacloban	57.11	- .57	59.22	23	55.68	15	27.2	+ .1	35.4	30	22.5	28
Calbayog	57.18	- .62	59.42	23	55.83	16	27.2	+ .5	34.2	31	22.7	1, 13, 26
Legaspi	56.75	- .85	59.20	23	55.21	16	27	- .9	32.6	3	23	26
Atimonan	56.44	- .99	58.96	23	55.04	5	27	- .3	33.7	9	22.1	22, 26
Ambulong, Tanauan	56.48	- .70	58.72	23	55.09	13	26.6	- .1	32.6	14	22	25
Paracale	56.42	- 1.21	59.11	23	54.82	5	27	- .6	34.3	8	22.8	25
Manila	56.80	- .33	59.36	23	55.46	17	26.1	- .8	32.7	14	22.3	14, 25
San Isidro	56.87	- .96	59.52	23	55.16	17	25.4	- 1.4	32.2	16	21.7	28
Dagupan	55.91	- .99	58.64	23	54.16	17	25.9	- 2.1	34	2	22	15
Baguio <sup>b</sup>	634.54	- 1.33	637.03	23	632.56	12	17.1	- 1.3	23.8	3	14.4	14, 25
Vigan	755.58	- 1.51	758.88	23	753.27	13	26.4	- 1.2	32.8	2	21.9	14
Tuguegarao	55.47	- 2.07	58.83	23	51.81	12	27	- .8	38.8	6	22.5	15
Laoag	55.48	- 1.66	58.82	23	52.41	13	26.1	- 1.5	-----	-----	21.8	22
Aparri	55.48	- 2.02	58.93	23	51.52	12	26.5	- 1.3	33.3	5	22.8	27

<sup>a</sup> 22 days of observation.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—With a few exceptions, the total rainfall for this month in the Philippines is greater than the normal and than the monthly rainfall for last year, particularly in the central and northern part of Luzon. The differences between this year's rainfall and that of July, 1916, are very remarkable in all the stations of the western part of Luzon: they are all greater than 400 mm. The total amount of rain collected this month in the gauges of the Manila Observatory is 426.1 and 206.7 mm. above that of July, 1916, and the normal, respectively, while the monthly rainfall for Baguio is 903 mm. above that of the preceding year, and 218.5 mm. above July's normal.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF JULY, 1917.

Station.	Total.	Departure from July, 1916.	Departure from normal.	Rainy days.	Departure from July, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from July, 1916.	Departure from normal.	Rainy days.	Departure from July, 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	195.7	+ 92.9	+ 23	19	- 11.2	88.6	15	Virac	136.5	- 81.3	-127.2	15	- 8	37.9	16
Isabela, Basilan	184.4	+ 89.6	- 11.2	15	- 11.2	49.6	16	Naga	281	+ 41.6	+ 31.6	28	+ 7	73.9	16
Zamboanga	96.9	+ 64.7	+ 10.5	15	- 10.5	41.4	16	Batangas	246.6	+123.5	- 13	19	+ 1	73.7	16
Davao	265.6	+ 67.1	+ 61	20	+ 10	50.9	4	Lucena	210.1	+121.4		22	+ 4	44.2	18
Cagayan, Misamis	236.1	+ 43.3		21	+ 3	57.1	12	Atimonan	164.8	-246.8	- 60.7	19	+ 3	33.1	16
Butuan	153.7	+ 51	+ 23.5	18	- 6	46	1	Ambulong, Tanauan	292.8	+ 71.8		19	+ 3	61.5	16
Mambajao	195.1			11		80	24	Canlubang, Calamba	452.1	+192.3		25	+ 6	83.9	16
Dumaguete	83.9	+ 5.5		11	+ 2	30	30	Paracale	344.9	+196.1		21	0	74.4	1
Yap, W. Carolines	352.3	+ 113		22	+ 1	55.6	13	Santa Cruz, Laguna	230.1	+ 37.5		26	+ 4	38.6	16
Iwahig	343.3	+ 147.5		24	+ 1	74.4	23	Manila	606	+426.1	+206.7	29	+ 4	107.6	11
Surigao	120.4	+ 22.9	- 25.3	11		37.3	16	Antipolo	711.6	+543.6		31	+ 7	140.8	11
Maasin	274.8	+ 135.7	+ 18.1	10	+ 1	59.9	20	Iba	1,180.3	+940.5	+189.4	31	+ 7	102.4	18
Cebu	182.1	+ 44.8	+ 10	12	+ 1	49.7	15	San Isidro	603.2	+449.1	+247.6	30	+ 9	71.1	16
Iloilo	600.6	+ 2.4	-203	18	+ 5	25.7	21	Tarlac	560.6	+351	+148.1	29	+ 8	45.2	27
San Jose Buenavista	223.8	+ 341.8	+ 35.1	27	+ 6	122.6	28	Baler	280.6	- 20	- 17.9	14	3	175.3	16
Cuyo	213.7	+ 186.4	+185	19	+ 6	66.6	26	Dagupan	784.5	+634.4	+196.4	26	+12	152.4	17
Ormoc	436.9	+ 256.4	+134.5	25	+ 9	111.5	30	Bolinao	739.6	+449.5	+ 84.7	24	0	611.0	11
Guluan	169.8	+ 46.4		14		57.2	15	Baguio	1,179.9	+903	+218.5	29	0	160.8	11
Tacolban	111	+ 11.9	- 72.3	16	2	26.6	30	San Fernando, Union	810.5	+631.6	+232.2	30	+11	113.1	11
Borongan	199.2	+ 57.9	1.9	21	0	26	19	Echagüe	285.3	+ 62.3	+ 77	19	+ 3	49	17
Catbalogan	190	+ 57.7		19	3	51.6	23	Candon*	378.3	+ 234	-242.9			82.3	28
Cabayog	385.9	+ 294.8	+176	22	+ 4	117.2	12	Vigan	1,063.3	+714.4	+463.1	29	- 7	209.7	12
Masbate	123.5	+ 79	- 66	18	0	35.5	17	Tuguegarao	242.5	+166.6	+ 20.4	14	+ 4	48.2	30
Romblon	200.8	+ 9.5	- 89.5	21	- 1	56	16	Laoag	754.8	+469.7	+124.6	26	+ 2	188.4	29
Batag	110.7	+ 2.4		11	- 1	31.7	18	Aparri	213.2	+155.1	+ 44.4	22	+ 9	64.2	12
Sorsogon	353.7	+ 109.2		23	+17	52.1	15	Cape Bojeador	447.6	+293.2		15	+ 2	130.8	12
Legaspi	200.9	+ 27.5	- 41.9	24	+ 9	36.6	16	Santo Domingo, Batanes	645.6	+557.3	+354.5	25	+ 9	159.3	13
Sumay, Guam	347	+ 150	+ 17.3	24	0	43.2	8								
Calapan	92.6	- 178.4	-146.4	17	- 3	37.6	1								

\* 29 days of observation.

DEPRESSIONS AND TYPHOONS.

There were at least two depressions and three typhoons during this month in the Far East, but the last one will be left for the next monthly bulletin of August as it did not reach Japan until August 3.

Two depressions in the region of the Ladrões and the Bonins.—These depressions were probably of little importance. The first appeared on July 1 about 200 miles west of the northern part of the Ladrões and seems to have moved NNW on the 1st, 2d, and 3d, probably filling up on the 4th to the west of the Bonins. The second was probably formed on the 27th to 28th, in about 20° latitude N and 142° longitude E, and moved north-eastward on the 29th and 30th.

A typhoon across southern Formosa, July 13, 1917.—This was a severe typhoon, it having caused the following damages in Formosa according to the official statistics a copy of which was kindly sent us by the Director of Taihoku Observatory:

Persons killed.....	18
Persons missed.....	1
Persons wounded.....	18
Houses destroyed.....	1,250
Houses partly destroyed.....	1,030
Houses injured.....	1,598
Houses flooded.....	75



Besides much damage was inflicted also upon the plantations, railways, telegraphic lines, bridges, etc.

The typhoon was probably formed on the 10th to 11th about 300 miles east of the northernmost part of Luzon between  $18^{\circ}$  and  $19^{\circ}$  latitude N and between  $126^{\circ}$  and  $127^{\circ}$  longitude E. For two days Manila Observatory had been announcing a low-pressure area extending from the China Sea to the Pacific across the Balintang Channel with a probability of a typhoon forming later in this area, until in the afternoon of the 11th the following definite typhoon warning could be issued and distributed throughout the Archipelago:

July 11, 5.30 p. m. There are signs this afternoon of a typhoon over the Pacific about 300 miles east of northern Luzon; its direction cannot yet be ascertained.

The typhoon moved northwestward since the 11th and reached Formosa in the morning of the 13th, its center passing very close to Taito where the barometer fell to 728.8 mm. (gravity correction not applied) at 10 a. m. of that day. Shortly after midnight of the same day the typhoon entered China near to the north of Amoy; then it inclined somewhat westward on the 14th; and once in the interior of China it began to fill up gradually on the 15th.

A shallow depression crosses Luzon and develops into a typhoon in the China Sea, July 13 to 23, 1917.—This is a clear case of an atmospheric disturbance which was nothing else but a shallow depression while crossing the Philippines, and yet it developed in a short time into a real and well-developed typhoon in the China Sea. The barometric minimum observed in our stations on the 17th, when the depression center was over Luzon was no lower than 753 mm., while on board the steamer *Nikko Maru* in the China Sea the barometer was as low as 744.71 mm. at 2 p. m. of the 19th.

According to the observations received from Yap it would seem that the depression formed to the WNW of Yap on the 13th to 14th not far from  $134^{\circ}$  longitude E and  $11^{\circ}$  latitude N. It moved WNW on the 15th and 16th and traversed the central part of Luzon on the 17th in a NW direction.

The following typhoon warning was issued by Manila Observatory in the morning of the 17th:

The depression is crossing the central part of Luzon to the north of Manila moving apparently at present to NW by W. It is now only a shallow depression, but may increase in intensity in the China Sea.

That in fact the typhoon increased in intensity in the China Sea was clearly seen in our weather map of the 18th. Hence the following typhoon warning sent out by Manila Observatory in the morning of that day:

July 18, 10.10 a. m. The Luzon depression is now in the China Sea west of northern Luzon moving apparently WNW and increasing in intensity.

In the following table we publish the observations taken on board the steamer *Nikko Maru* while under the influence of this typhoon in the China Sea:

METEOROLOGICAL OBSERVATIONS MADE ON BOARD THE STEAMER "NIKKO MARU" ON HER TRIP FROM HONGKONG TO MANILA, JULY 18 TO 20, 1917.

(Captain TAKEDA).

Date and hour.	Position.		Pres- sure.	Wind.		Remarks.
	Latitude north.	Longi- tude east.		Direction.	Force.	
	° /	° /	<i>mm.</i>		<i>0-12</i>	
July 18:						
2 p. m. -----	22 03	114 30	754.62	NE	3	4 p. m. Moderate breeze, fine cloudy weather, sea moderate, ship labouring and shipping spray at times.
10 p. m. -----	21 02	115 40	53.60	NE	4	12 mdt. Fresh breeze, cloudy weather, sea rough, ship labouring heavily and shipping seas and spray frequently.
July 19:						
2 a. m. -----	20 35	116 08	50.81	NE	5	Strong breeze, overcast weather, sea rough, ship labouring and straining on Ely ground swell, shipping much water continuously.
4 a. m. -----			49.29	NE	6	
6 a. m. -----	20 13	116 41	47.51	ENE	6	Fresh breeze, rather rough sea, cloudy weather, ship labouring slightly, shipping spray on fore-castle frequently.
8 a. m. -----			47.51	E	5	
10 a. m. -----	19 40	117 01	45.98	SE	4	Moderate breeze, rainy weather with rather rough sea, ship labouring and shipping seas and spray at times.
Noon -----			44.71	SSE	4	
2 p. m. -----	19 06	117 21	44.71	SW	5	Strong breeze, rainy weather, ship labouring and straining heavily on rough seas, shipping much water fore and aft.
4 p. m. -----			45.48	SW	6	
6 p. m. -----	18 31	117 39	47	SW	6	Moderate gale and overcast rainy weather, sea high, ship labouring heavily and taking much water and spray continuously.
8 p. m. -----			50.30	SWbyS	7	
10 p. m. -----	17 57	117 51	51.06	SSW	6	
July 20:						
6 a. m. -----	16 58	118 32	53.35	SSW	5	8 a. m. Fresh breeze and rather rough sea, rainy weather, ship labouring moderately and taking spray at times.
2 p. m. -----	15 50	119 36	56.40	SSW	5	4 p. m. Gentle breeze, rainy weather, sea moderate, ship rolling slightly.

The track followed by this typhoon in the China Sea was rather queer and unexpected. It inclined very much to the W on the 18th but soon to recurve suddenly northward on the 19th; then it moved NNE on the 20th; and on the 21st while near the China coast in the southern part of the Formosa Channel it inclined again northwestward thus entering the China coast between Swatow and Amoy in the afternoon of the 21st. Once in China it began to fill up as it was the case in the preceding typhoon.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes en Filipinas es menor que la del año pasado y que la normal de julio, siendo mayores las diferencias en el N de Luzón. Las presiones más altas se observaron en todas nuestras estaciones el día 23, y las más bajas del 12 al 17. -

La temperatura media mensual es generalmente menor también que la normal y que la media de julio de 1916, especialmente en el N de Luzón. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 32.7° C. observada el día 14, y 22.3° C. los días 14 y 15. Las temperaturas extremas en Baguio fueron 23.8° C., 14.4° C. en la cumbre del Mirador, y 24.7° C., 14.1° C. en el valle.

**Precipitación acuosa.**—Con pocas excepciones, la lluvia total de este mes en Filipinas es mayor que la normal y que la lluvia mensual del año pasado, singularmente en la parte central y N de Luzón. Las diferencias entre la lluvia de este mes y la de julio de 1916 son muy notables en todas las estaciones de la parte occidental de Luzón; todas son mayores de 400 mm. La cantidad total de lluvia recogida este mes en los pluviómetros del Observatorio de Manila es 426.1 y 206.7 mm. mayor que la de julio, 1916, y que la normal, respectivamente, al paso que la lluvia mensual de Baguio es 903 mm. mayor que la del año pasado, y 218.5 mm. mayor que la normal de julio.

## DEPRESIONES Y TIFONES.

Durante este mes hubo, por lo menos, dos depresiones y tres tifones en el Extremo Oriente; pero el último se dejará para el siguiente boletín mensual de agosto ya que no llegó a Japón hasta el día 3 de dicho mes.

**Dos depresiones en la región de las Islas Ladrões y Bonins.**—Estas depresiones fueron probablemente de poca importancia. La primera apareció el 1.º de julio a unas 200 millas al W de la parte septentrional de las Islas Ladrões y parece haberse movido al NNW los días 1, 2 y 3, y probablemente se deshizo el 4 al W de Bonins. La segunda se formó probablemente del 27 al 28 en los alrededores de 20° latitud N y 142° longitud E, y se movió al NE los días 29 y 30.

**Un tifón a través del S de Formosa, julio 13, 1917.**—Este fué un tifón intenso, habiendo causado en Formosa los siguientes daños, según estadísticas oficiales, una copia de las cuales nos ha sido facilitada por el Director del Observatorio de Taihoku:

Personas muertas.....	18
Personas desaparecidas.....	1
Personas heridas.....	18
Casas destruídas.....	1,250
Casas parcialmente destruídas.....	1,030
Casas dañadas.....	1,598
Casas inundadas.....	75

Además, se tuvieron que lamentar también muchas pérdidas en las plantaciones, caminos de hierro, líneas telegráficas, puentes, etc.

El tifón se formó probablemente del 10 al 11 a unas 300 millas al E de la parte más septentrional de Luzón entre 18° y 19° latitud N y entre 126° y 127° longitud E. Durante dos días el Observatorio de Manila había estado anunciando un área de baja presión que se extendía desde el Mar de China hasta el Pacífico a través del Canal de Balintang con probabilidad de que se formase más tarde un tifón en esta área, hasta que la tarde del día 11 publicó y distribuyó en todo el Archipiélago el siguiente aviso de tifón:

Julio 11, 5.30 p. m. Hay esta tarde indicios de un tifón en el Pacífico a unas 300 millas al E del norte de Luzón; su dirección no se puede aún precisar.



El tifón se movió hacia el NW desde el 11 y penetró en Formosa la mañana del 13, pasando su centro muy cerca de Taito donde el barómetro bajó a 728.8 mm. (no corregido por gravedad) a las 10 a. m. del citado día. Poco después de media noche del mismo día el tifón entró en China por el N y cerca de Amoy; luego se inclinó algo al W el 14; y una vez en el interior de China empezó a deshacerse gradualmente el día 15.

Una depresión dilatada atraviesa Luzón y se convierte en tifón en el Mar de China, julio 13 al 23, 1917.—Este es un caso evidente de una perturbación atmosférica que no era más que una depresión dilatada mientras cruzaba las Filipinas, y sin embargo en breve tiempo se convirtió en un verdadero y bien desarrollado tifón en el Mar de China. La mínima barométrica observada en nuestras estaciones el día 17 cuando el centro de la depresión se hallaba en Luzón era sólo 753 mm., en tanto que a bordo del vapor *Nikko Maru* en el Mar de China el barómetro había bajado a 744.71 mm. a las 2 p. m. del 19.

Según las observaciones recibidas de Yap, parece que la depresión se formó al WNW de Yap del 13 al 14 no lejos de 134° longitud E y 11° latitud N. Se movió al WNW los días 15 y 16 y atravesó la parte central de Luzón el 17 en dirección al NW.

El Observatorio de Manila dió el siguiente aviso de tifón la mañana del 17:

Julio 17, 11.45 a. m. La depresión está cruzando la parte central de Luzón por el N de Manila, moviéndose al presente al NW½W. Es sólo una depresión dilatada por ahora, pero puede aumentar de nuevo en intensidad en el Mar de China.

Que el tifón aumentó efectivamente en intensidad en el Mar de China se vió claramente en nuestro mapa del tiempo del 18. De ahí el siguiente aviso de tifón dado por el Observatorio de Manila la mañana de dicho día:

Julio 18, 10.10 a. m. La depresión de Luzón se halla ahora en el Mar de China al W del norte de Luzón, moviéndose aparentemente al WNW y aumentando en intensidad.

En el texto inglés damos las observaciones hechas a bordo del vapor *Nikko Maru* mientras se hallaba bajo la influencia de este tifón en el Mar de China.

La trayectoria que siguió este tifón en el Mar de China es algo rara e inesperada. Se inclinó mucho al W el día 18, pero para recurvar súbitamente al N el 19; luego se movió al NNE el 20; y el 21, estando cerca de la costa de China en la parte meridional del Canal de Formosa, se inclinó de nuevo al NW penetrando así en la costa de China entre Swatow y Amoy la tarde del 21. Una vez en China comenzó a deshacerse como sucedió con el tifón anterior.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.<sup>a</sup>

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

Day.	Air temperature. <sup>b</sup>					Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.		Evaporation. <sup>b</sup>		
	Pressure (mean).	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.	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.				
1	757.72	26.3	30.9	23.5	29.5	30	30.3	30.2	30.2	30.2	86.5	21.8	21.9	50.5	1.8	1.5
2	57.47	27.2	32	23.4	29.5	30.3	30.2	30.4	30.3	30.3	82.2	21.9	22	54.5	3.7	2.4
3	57.13	27.9	32.2	23.8	29.9	30.8	30.2	30.6	30.2	30.2	81.6	22.5	22	52.1	3.4	2.7
4	56.53	26.7	31.2	24	29.9	30.8	30.5	30.6	30.2	30.2	86.9	22.5	22.4	54.8	1.6	2.1
5	55.74	27.5	31.4	24.5	29.7	30.3	30.5	30.5	30.2	30.2	82.5	22.4	22.4	54.5	2.9	2.8
6	55.79	26.6	31.4	23.5	29.7	30.6	30.5	30.6	30.3	30.3	86.9	22.3	22.8	54	2.5	1.7
7	56.37	25.8	30.2	22.7	29.2	29.8	30.3	30.2	30.3	30.3	89.1	21.5	21.3	49.5	2.1	1.9
8	56.16	26.2	30.9	22.5	29.1	30	30.1	30.2	30.3	30.3	85.5	21.9	21.3	54	2.9	2.3
9	56	26	30.6	23.6	29.6	29.8	30	30.1	30.3	30.3	88.9	22.1	22.3	52.8	1	1.2
10	56.19	26.1	31.4	23.7	29.2	30.1	29.8	30.1	30.2	30.2	88.5	22.1	22.7	54	1.6	1.5
11	56.26	24.9	29.7	23	29	28.5	29.8	29.6	30.2	28.9	94.5	22.1	22.8	40.5	0	0
12	55.66	25.4	28.7	23.1	27.5	27.9	28.9	29	30.2	28.9	89.5	21.5	22.1	41	.9	1.1
13	55.75	24.9	30.2	22.7	27.4	28	28.6	28.5	30.2	28.9	92.2	21.6	21.8	45	1	1.1
14	56.02	26.2	32.7	22.3	27.1	28.8	28.5	28.6	30	28.9	85.6	21.3	21	55.7	2.7	2
15	56.54	26.4	30.6	23	28.4	29.4	28.9	29	30	28.9	85.2	21.6	22.6	53.3	2	1.8
16	55.97	25.9	30.4	22.8	28.5	29	29	29.1	29.8	28.9	89.1	22	22.5	45.9	1.1	1.3
17	55.46	24.9	27.3	23.1	27.5	28	28.8	28.7	29.7	28.8	91.9	21.5	22.6	41.6	.4	.8
18	55.90	25	27.8	23.7	27.5	27.8	28.6	28.5	29.5	28.8	93	21.8	22.8	41	.4	.7
19	56.68	25.4	29.3	23.3	27.3	28.1	28.4	28.5	29.6	28.9	89.5	21.5	22.1	42.8	1	1
20	57.72	25.6	31.5	22.8	27.5	28.6	28.4	28.5	29.5	28.9	90.1	21.9	21.8	54	1.8	1.2
21	55.79	26.4	31.8	22.5	27.6	28.5	28.5	28.5	29.4	28.9	86.6	22	20.8	53.2	2.2	1.8
22	58.78	27.1	32.1	22.6	28.2	29.3	28.8	28.8	29.5	28.9	83	21.9	21.5	54.5	3.3	2.5
23	59.36	25.9	31.5	23	28.9	29.8	29.1	29.3	29.4	28.7	88.1	21.8	22.5	54.4	2.1	1.5
24	58.91	26	31	23	28.5	29.5	29.1	29.3	29.3	28.9	85.3	21.2	22	53.2	2.3	1.8
25	57.76	26.5	31.4	22.3	28.5	29.8	29.2	29.4	29.3	28.9	84	21.4	21.8	53.7	2.9	2.1
26	57.38	25.9	30.5	22.5	28.7	29.8	29.3	29.6	29.3	28.9	88.2	21.7	21.6	49	2.3	1.7
27	56.61	26.6	30.4	23.1	28.5	29.4	29.4	29.5	29.3	28.8	86	22.1	22.2	52.5	3.4	2.1
28	56.20	25.7	29.4	23.8	28.7	28.8	29.4	29.3	29.3	28.9	90.3	22.1	23	51	1	1.1
29	56.54	25.5	27.8	24.3	28.2	28.1	29	29	29.3	28.9	92.7	22.4	24.3	41	0	.8
30	57.03	27.1	31.3	24	27.7	28.9	28.8	29	29.3	28.9	84.5	22.4	23.4	56.5	2.7	2.5
31	57.28	26.2	29.8	23.5	28.4	28.9	28.8	29	29.3	28.8	86.8	21.9	22.5	49	1.6	1.7
Mean Total	756.80	26.1	30.6	23.2	28.5	29.3	29.3	29.4	29.8	28.9	87.6	21.9	22.2	50.3	1.9	1.7
Departure from normal	-0.43	-0.9	-0.4	-0.5							+2.7	-0.5				

Day.	Wind.				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.						
	Km.	Km.	Km.		0-10.		h.	m.	mm.	mm.		
1	N quad.	110	12	WNW	9.2	A.-Cu. SE	Cu. ENE	2	45	2.1	1.5	● a. d. a. p.
2	SW quad.	222	23	SW	7.7	Ci.-S. EbyN	Cu., Cu.-N. E	7	05			□ a. p.
3	WSW	332	28.5	WSW	5.8	Ci.-S. W	Cu. SW	8	20	20.8	20.1	□ a. ● p.
4	SW	337	26	SW	9	Ci.-S.	Cu.-N. wsw	4	35	23.9	25.1	□ a. ● a. p.
5	SW, WSW	443.5	34	SW	8.1	A.-Cu. ESE	S.-Cu. WSW	5	45	5.4	6.1	● a. d. p.
6	SW	333.5	31	WSW	8.7	A.-Cu. WNW	Cu. WSW	3	20	33	36.8	d <sup>2</sup> a. □ a. p.
7	SW quad.	243	28	SW, W	9.6	A.-Cu. WNW	S.-Cu. W, WNW	1	30	1.3	1.5	□ a. d <sup>2</sup> p.
8	SW	280	33	SW	9.9	A.-Cu. WNW	Cu. WSW	3	40	.5	.5	□ a. d <sup>2</sup> p.
9	NNE, NW	144.5	14	NW	8.8	A.-Cu. W	S.-Cu., Cu.-N. wsw	3	40	12.9	14.6	□ a. ● a. p.
10	W quad.	145.5	26	W by S	9	A.-Cu. W	Cu. SW	2	55	27.8	27.6	□ a. p.
11	SW, WSW	290.5	33.5	SW	10	A.-Cu.	N. W	0	00	107.6	107.5	● a. p. ● p.
12	WSW, SW	449.5	35	WSW	10	Ci.-S.	N. W	0	00	33.4	37.6	● a. p. ● p.
13	SW, ESE	245.5	34	SW	9.9	Ci.-S.	N.-cf. SW	0	20	12.7	14.2	d <sup>2</sup> a. p. p.
14	E quad.	139.5	20	NW by W	8.9	ci.-s., ci.-cu.	Cu.-N. S	5	35	.4	.4	□ a. d. p.
15	NNE	74	9.5	wsw, WNW	9.4	A.-Cu. N	Cu.	2	25			□ a. p.
16	NNW	150	21	WNW	7.5	Ci.-Cu. NNE	Cu.-N. NNE	3	00	83	93.2	● a. □ a. p.
17	S quad.	291	25	SW	10		N.-cf. WSW	0	00	9.4	8.1	● a. d. p.
18	SE quad.	171	21	WSW	10	Ci.-S.	N., N.-cf. SSW	0	00	11.4	10.9	● a. ● a. p. □ a. p.
19	S quad.	232	29	SSW	9.8		Cu., N.-cf. sw	0	00	12.8	13.9	● a. d <sup>2</sup> p.
20	E quad.	170	15	ESE	9.7	A.-Cu. SSW	Cu. SSW	2	30	54.3	55.6	● a. ● a. p.
21	SW	188	27.5	SW	8.5	A.-Cu. wsw	Cu. SSW	4	15	2.8	3.3	□ a. p.
22	SW, WSW	242	26	SW	7.5	A.-Cu. W	Cu., Cu.-N.	6	50	1.3	1.5	□ a. p. d <sup>2</sup> p.
23	W quad.	175	20.5	NW	9.2	A.-Cu. NE	S.-Cu. W	4	40	13.5	13.5	p d. p.
24	W quad.	221	28	WSW	9	A.-Cu. NE	N.-cf. SW	3	05	1.6	2	□ a. d. p.
25	SSW	171	30	SW	8.8	A.-Cu. W	Cu. WbyN	4	45	8.1	8.9	□ a. p.
26	WSW, SW	245	29	W	8.1	A.-Cu. W	Cu. WSW	4	10	30.4	31.2	□ a. p.
27	SW	358	28	SW	8.8	A.-Cu. W	Cu. WSW	4	10	14.1	15	● a. p.
28	SSW, WSW	386	25	WSW	9.9	A.-Cu.	N. W	0	25	39.2	42.8	● a. p.
29	WSW, SW	340	36	SW by W	10	Ci.-S.	cu.-n. wsw	0	00	16.7	16.6	● a. d <sup>2</sup> p.
30	SW	408.5	33	SW	9.1	A.-Cu. W	Cu. WSW	2	50	19.9	20.6	● a. ● p.
31	SW, WSW	486.5	41	WSW	8.8	A.-Cu. W	N., Cu. wsw	3	25	5.7	6.3	● a. p.
Mean Total		258.9	26.5		9			3	06	606	636.9	
Departure from normal		-155.6			+1.2			-47	56	+206.7		

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

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.<sup>a</sup>

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

Day.	Pres- sure <sup>b</sup> (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. <sup>c</sup>	Free ex- posure (total)	Shel- ter (total)
	mm.	°C.	°C.		°C.		°C.	°C.		Per ct.	mm.	°C.	°C.	mm.	mm.	
1	635.94	18.4	23.4	2.00p.	15.5	1.55a.	24.7	3.00p.	15.2	0.30a.	87.7	13.6	13.9	58.9	1.8	1.2
2	35.54	18.7	23.5	2.20p.	15.6	5.40a.	24.5	1.50p.	15.6	6.00a.	90.7	14.5	14.7	59	1.2	1
3	35.30	18.7	23.8	0.50p.	15.4	5.50a.	24.1	0.20p.	15.3	5.50a.	90.3	14.4	14	58	1.7	1.1
4	34.52	17.2	22	11.20a.	15.2	10.05p.	22.1	10.45a.	15.6	9.55p.	97.2	14.2	14.3	55.2	0	0
5	33.68	16.9	21.5	0.35p.	14.6	5.25a.	22.4	11.20a.	15	4.15a.	96.3	13.8	14	54	.6	.1
6	33.71	16.7	20.5	0.20p.	15.4	3.45a.	20.6	Noon	15.5	8.15p.	96.8	13.7	14.7	49.9	.5	0
7	34.11	17.1	21.7	11.30a.	14.6	5.55a.	21.5	11.00a.	14.9	5.20a.	94.2	13.6	13.8	58.7	1.5	.9
8	34.28	18.2	22.4	2.40p.	15.3	4.50a.	23	2.35p.	14.1	4.40a.	86.8	13.4	14.1	57.2	2.1	1.4
9	34.26	17.6	21.9	10.40a.	15.2	3.20a.	22	10.30a.	14.5	5.30a.	89	13.3	14	59	1	.7
10	34.30	17	19.6	10.00a.	15.3	5.05a.	20.2	10.30a.	14.7	5.30a.	95	13.7	13.9	44.1	0	0
11	33.93	16.6	18	0.15p.	14.9	3.25a.	19.2	0.10p.	15.1	3.00a.	98.8	13.9	13.5	34.1	0	0
12	32.66	16.2	17.2	3.05p.	15.1	3.15a.	17.8	2.10p.	15.2	2.30a.	99.2	13.6	14	33.9	0	0
13	32.73	16	16.9	10.30a.	14.9	4.30p.	18	10.30a.	15.2	4.45a.	99	13.4	13.7	34	0	0
14	33.97	16.2	20	10.55a.	14.4	1.50p.	21	10.40a.	14.8	1.10p.	91	12.5	13.5	50	0	0
15	34.83	18.2	22.5	1.50p.	15.1	0.15a.	23.2	1.35p.	15	5.40a.	83.8	13	14.1	47.5	4.3	1.4
16	34.42	18.4	23	9.30a.	15.4	5.05a.	23.7	10.00a.	14.4	3.30a.	91.5	14.4	14	62	2.4	.7
17	32.83	16.6	17.9	0.05a.	14.9	7.15p.	18.8	0.05a.	15.3	7.00p.	96.5	13.6	14	25.1	0	0
18	32.97	16.4	17.4	9.50a.	15.1	0.05a.	19.2	8.40a.	15.3	0.05a.	98.5	13.7	13.5	34.5	0	0
19	33.95	16.7	17.4	5.05p.	15.7	7.05a.	18.3	1.00p.	15.9	7.00a.	96.5	13.6	13.8	25.4	0	.6
20	35.11	16.6	19.4	11.45a.	15.3	4.40p.	22	11.40a.	15.8	11.40p.	96.7	13.6	15.1	39	.1	.2
21	35.54	17	21.4	1.30p.	14.8	4.15p.	22.6	1.10p.	14.7	11.15p.	88.7	12.7	14.5	52	2.1	1.6
22	36.30	17.3	22	1.20p.	14.8	0.35a.	22.8	1.05p.	14.5	1.30a.	98	13.6	13.9	57.2	2	.8
23	37.03	17.3	22.1	0.40p.	15.3	3.50a.	21.7	0.35p.	14.5	5.30a.	92.7	13.6	13.9	58.5	1.6	.8
24	36.41	16.8	21.4	1.05p.	14.8	11.20p.	21.7	1.00p.	14.5	6.10a.	94.8	13.5	13.7	52.5	1.6	.5
25	35.56	17.4	21.9	11.05a.	14.4	0.55a.	21.9	11.10a.	14.5	4.30a.	89.2	13.1	13.1	55.9	2.3	.6
26	35.23	16.2	19.4	11.30a.	15	9.20p.	19.7	11.50a.	14.8	11.50p.	98.3	13.5	13.8	47.3	0	0
27	34.49	16.8	19.7	10.50a.	15.7	0.05a.	20.7	11.40a.	14.9	0.05a.	99.3	14.2	14	47	.1	.1
28	33.86	16.7	19.5	9.55a.	15.5	4.25a.	20.7	9.50a.	15.7	4.20a.	98.7	14	14.6	40.8	0	0
29	34.20	16.3	17.8	0.10p.	15.2	5.55p.	18.6	Noon	15.3	6.00p.	98.8	13.6	15	30	0	0
30	34.72	16.6	19.8	11.40a.	15.4	6.10p.	20.3	11.35a.	15.6	6.05p.	98.7	13.9	15.2	45.2	0	0
31	34.71	16.9	20.3	1.20p.	15.4	5.45a.	20.9	1.10p.	15.4	4.35a.	98.7	14.2	14.7	50.6	.2	0
Mean	634.54	17.1	20.5		15.1		21.2		15.1		94.4	13.7	14.1	47.6	0.9	0.4
Total															27.1	13.5

Day.	Wind.				Clouds.		Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.	
	Prevailing direction. <sup>d</sup>	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maxi- mum veloc- ity.	Amount (mean).	Form and direction.				
						Upper.				Lower.
1	Variable	243	18.2	NW	0-10.	Ci.-S.	Variable	h. m. 2 35	d° a. ≡ d p.	
2	Variable	288.1	23.8	W	7.7	Ci.	Cu. ESE	4 25	d° a. ≡ d p.	
3	W	285.4	26.4	W	4.9	Ci.	Cu.-N. NE	8 10	≡ a. ≡ d p.	
4	W	486.2	43.3	SW	9.4	Ci.-S.	Cu.-N. WSW	2 45	d a. ≡ a. p. ≡ d° p.	
5	W	473	37.3	SW	8.9	Ci.-Cu., Ci.	Fr.-N. SW	3 20	d ≡ d p.	
6	W, SW	474	30.8	W	9.9	Ci.-S., Ci.	Fr.-N. w, wsw	1 30	d° a. p. ≡ d p.	
7	SW	500.9	41.3	SW	9.7	Ci.-S.	S.-Cu. W	3 40	d° a. p. ≡ d p.	
8	W	358.3	31.9	SW	9.3	Ci.-S.	Variable	4 50	d° ≡ p.	
9	W	359.7	33.2	W	9.1	A.-Cu.	Fr.-N. W	3 10	d ≡ d p.	
10	W	422.1	33.8	SW	10	Ci.-S.	Fr.-N. W	0 15	≡ a. p. ≡ d p.	
11	W	738.8	57.7	W	10	N.	N.	0 00	≡ a. p.	
12	SW	1,124.4	78.4	SW	10	N.	N.	0 00	≡ a. p. ≡ d° p.	
13	SW	1,106.5	67.1	SW	10	N.	N.	0 00	≡ a. p.	
14	SW, E	550.1	46.7	SW	10	Ci.-S.	N.	1 35	d° a. p. ≡ d p.	
15	E	280.3	25.4	E	10	A.-S.	S.-Cu.	1 35	d° ≡ p.	
16	NE, W	229.2	17.7	W	9.3	Ci.-S.	Cu., Cu.-N.	4 45	≡ a. p.	
17	SE quad.	261.7	27.6	SW	10	N.	N.	0 00	≡ a. ≡ d p.	
18	SE, E	495.2	31.2	E	10	N.	N.	0 00	≡ a. ≡ a. p.	
19	S, SW	571.7	45.7	SW	10	N.	N.	0 00	d a. ≡ a. p. ≡ d° p.	
20	S quad.	460.3	43.8	SW	10	A.-Cu., A.-S.	Fr.-N. S	0 00	≡ a. p.	
21	SW	476.1	37.5	SW	10	Ci.-S.	Variable SW	2 50	d ≡ d p.	
22	W	335.7	28	W	10	A.-Cu.	Fr.-N. SW	2 30	p ≡ d p.	
23	W	433.1	31.1	W	8.9	Variable	Cu. SW by W	4 40	d p.	
24	W	426.4	39.1	W	9	Ci.-Cu.	Fr.-N. SW	3 05	≡ d p.	
25	W	397.4	30	SW	9.7	Variable	Fr.-N. SW	4 55	≡ d p.	
26	W	502	48.3	W	10	Ci.-S.	Fr.-N., N.	0 50	≡ d a. ≡ a. p. ≡ d° p.	
27	W	483.8	41.2	W	10	N.	N.	0 05	p a. ≡ d a. p.	
28	W	687	48.1	W	10	Ci.-S.	N.	0 10	≡ d a. p. ≡ d° p.	
29	W	819.2	47.5	W	10	N.	N.	0 00	≡ a. p. ≡ d° p.	
30	W	651.2	48.3	SW	10	N.	N.	0 15	≡ a. ≡ d° p.	
31	W	511.5	32.4	SW	10	N.	N.	0 35	≡ a. ≡ a. p.	
Mean		497.7	38.5		9.5			2 01		
Total		15,427.3						62 30	1,179.9	

<sup>a</sup> 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.  
<sup>b</sup> The barometric readings of this station are not reduced to sea level.  
<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.  
<sup>d</sup> 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, 1917.

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	6.9	5.1	2	3.8	1.3	10.4	2	6.9	2.3				16	88.6		
Isabela, Basilan	21.6	36.8	.8		.5		.8		14.5	15.2		16.5	5.9	16.5	8.1	49.6
Zamboanga	13.4		.5		.5			4.3		8.9		5.1	4.1	8.6		41.4
Davao				50.8		3.8			5.6	15.2	12.7	16	2.5	15.2		13.7
Cagayan, Misamis	1	1		7.6	1.5	.8		3.6		5.8		57.1	1.5	23.1		35.1
Butuan	46		.3					1.8		21.8			.3	1	4.3	12.7
Mambajao	5.8									8.4		1		2	15.7	45
Dumaguete								11.4						3.8	11.7	16
Yap, W. Carolines		18.3	3.8	19.1	39.1	19.9	3.1	11.9	19.8	1.6	.5	.5	55.6	54.6	.5	5.9
Tagbilaran								*	*	*	*	*	*	*	*	*
Iwahig	14.7	3.8	2.7	13.7	4.7	2.1	8	13.9								62.7
Surigao										15.6		3.5	1.3			53.1
Maasin									5.3	10.2	15.2					37.3
Cebu	11.7									20.8				5.6		48.8
Iloilo	24.5	9.2	3.6	1.3	4.8	24.9	1.3			32		4.6				49.7
San Jose Buenavista	3.3	9.4	32	30	4.3	15.3	1	6.4	4.1		5.6	17				31
Cuyo	7.6	4.8	3		1	1.3				2.3		1.8				27.9
Ormoc	26.7		.5	8	8.9	14.5		1		22.6		6.6		3.8		47.2
Guiuan		3.6					1.3			1.3						66.8
Tacloban	1	4.8				3.8	1.1		26.6	1.3		2		20.1		102.6
Borongan	8.6	8.1	7.6				9.9	9.2	11.2	23.4	.5	1.8		5		39.6
Catbalogan		13.5				19.3	3	4.6	.3	1.8		2.8	.3	20.3		57.2
Calbayog		5.6	4.3		5.6	9.4	16.5	3.3		1.8		117.2		8.1		21.3
Calbatae	6.1	1.5		7.1		.5		18.8		3.8		8.7		28.4		35.1
Romblon	18.6		1.8	10.7			3.3	2		23.2	2.1			3		26.7
Batag	10.4								11.2	6.4				10.7		5.3
Sorsogon	5	2	27.9	48.2	10.4	2		2.8		25.1	5.1	10.4	5.1	5.3		6.3
Legaspi	3.6			11.5	23.1			8	19.3	1.3		2.3		2.3		14.5
Sumay, Guam	25.4	1.3		16.5	26.7		6.4	43.2	8.9	1.3	7.6					46
Calapan	37.6	15.7					8	3.8		3.3	14.2	2.1	.3			36.6
Virac	3		11.2	3.3												2
Naga	4.1	1	.3	2	29.7	1	1.3	.8	18.8	1.5	28.2	.5	14.7	.3	3.3	37.9
Batangas	22.6	.5	14.5				10.2	.5	.3	38.4	26.4	5.1	3.6	13.5	16.3	73.9
Lucena	1.6			.5		2.8	5.6		9.4	3	3	25.7	1.3	4.8	5.1	73.7
Atimonan	10		1.8				1.8	1.8	3.3	8.9	3.8	9.1	15	1	4.1	33.1
Ambulong, Tanauan	5	19.6	8.4							1.5	31		2.3	1.8	3.6	61.5
Canlubang, Calamba		14	6.1	3.8	1.5	2.5	2.5		11	16.5	32.2	2	.8	63.2		83.9
Paracale	74.4	31.5	2.5			.5	31.5	1.5	1	37.3		1.8	12.7	15	15.2	39.8
Santa Cruz, Laguna	5		5.8	4.1	12.2	9.4	13.2		1.8	9.7	38.3	6.8	6.6	.8	1.3	38.6
Manila	2.1		20.8	23.9	5.4	33	1.3	.5	12.9	27.8	107.6	33.4	12.7	.4		83
Antipolo	10.6	1	7.4	16.3	21.1	35.6	10.2	6.6	8.1	7.4	140.8	89.1	7.1	40.9	7.6	48.8
Iba	7.1	10.7	4.8	43.1	37.6	80.3	2.5	9.2	30.2	9.6	88.1	100.4	66	41.9	4.3	22.3
San Isidro	20.3	38.9	1.3	14.2	19.3	3.6	11.2	.5	28.7	47.2	8.6	53.5	39.2	10.7	1.3	71.1
Tarlac	5	1.3		9.9	10.1	37.3	.5	.8	.8	1.3	28.2	16	39.6	36.3		30
Baler	9.2	.3								.5		2.8	6.9	23.4		175.3
Dagupan		4.4		3.8	31.2	53.1		7.9	.8	26.7	37.4	55.9	53.1	28	34	23.8
Bolinao		19.3	20.8	.5	25.6	45.2			4.1	13	110.2	87.1	19.9	10.2		2
Baguio		11.5	24.3	45.3	51.3	27.9	6.3		4.1	26.4	160.8	156.1	77.7	24.7	.8	43.1
San Fernando, Union	3.3	40.4	33.7	14.2	14.5	3	5.3		41.1	.9	113.1	96	55.1	18.3	5.3	40.1
Echague		11.7		2.3	21.1	11.7		38.6		1.3			5.4	1		27
Candon		1		11.4	5.3	1			13.2	20.1	21.6			24.1		2.5
Vigan		4.8	22.4	51.5	12.7	21.7	2	21.6	.5	.6	111	209.7	123.2	1	11.6	.3
Tuguegarao						26.2				14.7	2	12		7.3		19.4
Laoag		5.5	2.1	7.1	18.5	6.4			4.1	1.5	127.5	82.1	63.2	7.4		11.4
Aparri		1.8			34.5	5.3	1	1.6	3.3		9.2	8.9	1.8	.5		10.9
Cape Bojeador					9.9	27.4		2.8	7.6		46.8	130.8	87.9			
Santo Domingo, Batanes		8.1			.2	3	4.6	5.6	7.6	1.9	16.1	130.6	159.3	58.4	2.5	

\* No observation.

Daily rainfall at the stations of the Weather Bureau, July, 1917—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.		
Isabela, Basilan	2.8	1			0.5	.5								2		37.6	0.5	195.7
Zamboanga	.8	3.1			1.3	.3	1.3											194.4
Davao	2.8	7.9	13.7	5.5	21.3	4.1		16.8			13.5	18.8	16					96.9
Cagayan, Misamis	3.3	11.4	2.3	2.8				8.1		5.8		15.5	5.1	33.3	10.4			265.6
Butuan		.5	5.8	6.3	1.8		7.1		0.5	13.7		.3		1.3	28.2			236.1
Mambajao			15.2		11.4		8.1	80	2.5									153.7
Dumaguete	2	3			30	1	2			6.4				6.6				195.1
Yap, W. Carolines	12.2	39.7	29.2	.5				2.5	6.9		2.3							93.9
Tagbilaran			47.2				45.2			1								352.3
Iwahig		8.9	6.1	2.3	6.6	.5	74.4	14.5	3.6	5.3	3.6	1.3					36.8	93.4 <sup>a</sup>
Surigao			20	1.8	2.3			1.3	1.3		23.3							343.3
Maasin				59.9	13.5			37.6			38.1	13.2						120.4
Cebu					14.3	2.3					30.5	5.3						274.8
Hoilo		4.6		2.5	25.7					1.8		14.4	19.3	3.6	25.2			182.1
San Jose Buenavista	8.9	3	40.6	.6	2		11.7		5.1	29.9	51	122.6	54.3	11.4	26.7			223.8
Cuyo		1.3	26.4	2	8.6		3	2.8			1.5	27.4	10.9		15.8			600.6
Ormoc	.5	.8		.5	20.6	4.3	3	3.8	4.8	.8	8.6	22.6	.5	14.5	111.5	15.5		213.7
Guiuan	1.8		21	4.8	11.4	18	5.3				11.8	5						436.9
Tacloban			4.1		15.2	2.6	2.1	1.5										169.8
Borongon		18.3	4.9		8.6	2.5	7.9	.5		.3						4.6		111
Catbalogan			1		12.4	21.1	51.6	5.1	1	4.8						2.3		199.2
Calbayog	6.6	24.4	1	.8	41.2	12.8		15.7	1	38.4				5.3	1.8			190
Masbate	35.5	5			14.7	18	.3									.5	1.3	395.9
Romblon	2	7.1	4.3		3.3	7.1	8.2	3	4.3							.6	4.6	129.5
Batag		31.7			6.6	11.2	2						14	20.1				200.8
Sorsogon	4.6	5			42.4		8.6	1	4.3	28.9	5.8	5.3	17.5					110.7
Legaspi	10.9	5.8		7.4	2	2.3		4.9	6.9	20.8	1.1	8.9	14	2.6	.3			353.7
Sumay, Guam	7.6	3.8	3.8	31.7			26.7	7.7	8.9	29.2	7.6	6.4	8.9	1.3	24.1			200.9
Calapan	4.4	3.8	.5			.3						1.8	.6					347
Virac	11.4	6	.5	.5	2.8	4.8	20.4	7.4	19.8	4.9	1.8	.5						92.6
Naga	26.2	8.1						3.1	4.8	14.4	1	14.7	7.4	.3				136.5
Batangas	22.8	3.3						3.3		5.1	8.1	2.8	.3					281
Lucena	36.3	44.2	1.3	4.1	7.1		2.3	1	21.3	1		3	12.2					246.6
Atimonan	1	2	28.4	.5			18		4.1				17.1					210.1
Ambulong, Tanauan	38.4	7.6	3.3			5.1	19.8	30.2		20.1	22.9	8.3	6.9					164.8
Canlubang, Calamba	28.9	4.6		4.1	24.4	2.5	3.8	55.4	31.7	14.3	24.9	15	2.5					292.8
Paracale	7.1	1.3			34.5	4.6		6.6	.3			23.8	2					452.1
Santa Cruz, Laguna	24.6	5.9		.5	1.5	.8	5.3	4.5	4.1	3	2.8	13.2	14.8					344.9
Manila	9.4	11.4	12.8	54.3	2.8	1.3	13.5	1.6	8.1	30.4	14.1	39.2	16.7	19.9	5.7			250.1
Antipolo	14.3	3.5	16	55.1	8	10.2	4.8	9.4	17.5	32	12.7	25.9	22.4	10.9	14.5			606
Iba	78	102.4	51.5	95.5	36.6	23.6	6.6	15.7	32.3	39.8	25.2	34.8	27.7	30.4	22.1			711.6
San Isidro	45.2	26.1	4.1	17.5	10.1	8.4	11.2	5.8	34		10.7	52.9	2.3	1	4.3			1,180.3
Tarlac	40.1	41.1	13.5	30.2	16.5	33.8	13.8	17.8	2	34.3	45.2	26.7	15.7	12.7	4.6			603.2
Baler	23.9	4	1.5	18.3				8.6		5.6								560.6
Dagupan	152.4	40	24.7	10.7	4	27.9		6.9	1	5.6	41.3	18.2		37.4	4.3			280.6
Bolinao	86.4	98.8	26.7	29.7	9.9	.3	18.3		1.3	2.3	7.4			79	21.6			734.5
Baguio	69.6	26.2	13.2	10.1	15	53.9	32.2	44.4	5.1	29.5	34.8	46.9	50.5	55.1	33.1			739.6
San Fernando, Union	68	25.1	27.2	20.8	4.8	3.6	21.8	7.9	16.4	8.9	13.6	35.1	37.4	32.3	3.3			1,179.9
Echagüe	49						5.3	11.4	3.8	.3	19.6	18.8	3.6	31	22.4			810.5
Candon	30	22.6	12.7	11.7	8.6		12.2	4.6	3.3	1	14.2	82.3	10.4	51.8	12.7			285.3
Vigan	16.4	16.9	16	31.9	21.2		4.1	3.4	.3	1.1	10.6	148.1	47.5	31.4	5.5			378.3 <sup>b</sup>
Tuguegarao	18.8						20.8	7.1	1.5	12.2		42.4		48.2	9.9			1,063.3
Laoag	10.8	20	25.7	4.1	9.9		50.8	32.9	12.4	2.5	23.5	30.2	188.4	5.3	1.5			242.5
Aparri	64.2	.3	.5	1.3			2.3	1	3	59.2	.3		1.8					754.8
Cape Bojeador	20.6		9.4				5.6	13.2		6.9	18.8	41.9	18					213.2
Santo Domingo, Batanes	7.6	29.5	60.6	.3	18.2		17.4	21	40.6	24.6	1.9	6.6		15.2	4.2			447.6

<sup>a</sup> 22 days observation.

<sup>b</sup> 29 days observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, JULY, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cotabato.		Cagayan, Misamis.		Dapitan.		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	29.3	21	29.1	22.3	28.3	22.7	29	21.4	27	31.5	21.5	31.4	20.8	32.9	22.1	
2	30.7	21	32.6	21.1	29	21.8	30.6	20.5	30.6	23.5	31.6	21.9	33.3	21.7	33.2	21.8
3	30.4	20.1	31	20.9	29.3	22	30.3	20	32.1	23	32.5	21.9	32.4	22.8	33.9	22.3
4	29.6	21.7	31.1	21.6	29.7	23.4	30.3	21.5	29.5	22.8	31.4	21.4	32.3	22.3	32.6	22.3
5	30.4	21.5	30.7	22.1	29.7	23.9	30.1	21.8	29	23	31.8	21.5	32.9	21.2	33.4	22.4
6	28.3	21.3	31.1	22.1	29	23.8	31.1	21.9	30.5	22.5	32	21.5	32.5	21.2	33.8	22.8
7	29.4	22	31.6	20.6	29.5	23	30.9	21.4	31.1	23	32.7	21.5	34.2	21	33.6	22.6
8	29.2	20.8	32.1	22.6	29.1	23.6	31.4	22.2	31.7	24.1	32.6	22.2	33	22	34.4	23.7
9	29.4	21.4	30.4	22.1	29.7	22.9	31.2	21.5	30.6	22.6	33.2	22.9	34	22.7	34.5	22.7
10	29.3	21.1	32.1	22.4	29.7	22.5	30.7	22.5	32.2	23.6	33.7	23.1	33.4	22.3	35.1	23.1
11	30.1	20.9	31.8	22.6	31.3	23.4	30.7	22.1	32.6	23.1	32.8	22.9	33.8	22.8	32.6	23.2
12	29.4	21.1	31.5	21.7	31.3	23.7	31.7	21.5	32.9	23.4	33.2	22.5	31.7	22.9	34.3	23.2
13	29.9	21.6	30.1	22.6	31	22.6	26.8	22.8	31.1	23.8	31.9	22.2	32.7	22.5	32.1	23.4
14	29	22.1	31.6	22.1	29.8	24	30.4	22.5	31	23.9	31.3	22.9	33.1	22.7	33.6	23.2
15	28.7	21.6	31.1	22.1	28.6	23	30.8	21.5	30	22.8	29	22.4	31.4	22.7	30.3	22.9
16	28	20.4	28.1	22.1	27.7	21.7	30.2	22.2	27.9	23.1	30.8	22.6	27.6	22.5	32.4	22.2
17	30.2	23	32.6	22.6	29.3	22.2	30.3	20.9	31	21.8	31.2	21.2	31.9	21	31.3	22.7
18	30.6	20.8	34.6	21.8	29.6	22.8	30.6	23.5	31.5	23	32.2	22	32.6	20.8	33.6	24
19	29	22.7	32.1	23.1	29.5	23.1	30.4	22	29.8	22.5	32	22	32.5	22.3	33.2	22.7
20	30.1	21.5	32.6	23.6	31.3	23.5	26.8	22.4	27.5	22.4	30	22	32.3	22.6	30.1	22.9
21	29.9	21.9	32.5	23.1	30	23.5	30.2	22	30.5	22.9	31.5	22.3	33	22.2	32.4	22.7
22	30.5	22.5	33.1	23.3	31.3	23.3	30.2	22.4	31.7	23.5	30.8	22.8	31.3	21.9	30.3	22.6
23	27.9	21.1	32.6	22.6	29.3	22.5	30.7	21.7	29.4	23.1	32.1	22.1	33.2	22.5	33.1	22.3
24	30	20.6	31.6	21.1	31	22.5	30.1	21.5	29	22.5	32.1	22.5	32.3	21.5	31.6	22.8
25	30.1	20.8	32.1	21.6	29.3	23.4	30	21.8	30.1	22.5	31.9	22	33.4	22.5	30.8	22.9
26	30.8	21.4	32.6	22.1	29.3	23	31.5	21.3	29.8	23	32.3	22.2	32.6	21.9	33.8	22.6
27	31.5	21.2	33.6	21.6	29.8	24.1	31.1	21.5	30	22.7	32.1	22	33.3	22.3	32.9	22.9
28	31.5	23.3	33.1	22.6	30.4	23.8	30.7	22.4	30.3	22.5	32.6	23.1	32.8	22.4	33.1	23
29	31.1	23.1	33.3	23.1	30.5	24.2	31.3	21.9	30.5	22.2	34.1	22	32.8	22.5	33.8	23.3
30	29.9	22.3	30.3	22.1	29.5	24.2	30.2	21.9	31.5	22.6	32.5	21.9	32.4	21.5	34	22.1
31	29.9	21.9	32.1	22.4	29.6	23.4	30.8	21.9	31.5	22.1	32.9	21.4	34	22.4	34.1	21.9
Mean	29.8	21.5	31.8	22.2	29.8	23.1	30.4	21.8	30.4	22.9	32	22.1	32.6	22.1	32.9	22.8

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		22.1	30.4	21.5	31.7	24.1	30.8	22.5	29.9	21.6	30.2	23.3	32.8	22.4	30.4	23.9
2	31.7	23.2	32.8	22.3	32.2	24.7	31.4	23.6	32.1	22.1	31.9	23.3	33.4	23.9	30.7	24.1
3	31.3?	23.7	30.7	22.5	33.2	23.2	31.4	22.6	31.6	20.9	31.5	23	33.5	22.5	31	23.4
4	31.6	23.4	30.4	22.6	31.7	24.1	32.5	25.4	32.1	20.7	30.6	23.5	33.7	25	30.6	23.2
5	32.5	25.2	31.8	23.6	29.2	23	32.7	25.5	31.6	21.5	31.9	25	30.6	24.4	30.6	26.5
6	33.6	24.1	32.5	22.5	30.2	22	31.3	23.5	32.3	21.4	31.4	24.3	33	24.5	30.5	26
7	32.3	23.3	31.4	22.5	29.7	23	31.4	23.6	31.6	22.4	30.5	23.5	32	24	31.5	25
8	32.5	23.3	31.5	23.5	28	24			32.1	21.6	31.5	23.3	30.8	23	31.6	25.5
9	32.3	23.9	31.4	22.8	32.3	24.5			32.8	22.2	31.8	23.3	32	23.5	31.5	25
10	33.5	23.9	32	22.6	32.7	23.5			32.5	21.9	33	24	33.5	24	30.9	25.6
11	29.7	23.5	30.9	23.8	32.5	24.2			33.5	22.4	30.3	23.8	33	23.6	30.7	22
12	30.3	23.6	32.1	23.7	29.3	24.2			33.5	22.5	31.5	24.1	32.5	24	30.7	25.8
13	31	23.5	30.7	23.5	32.7	25.6			33.5	22.3	30.4	23.8	33.1	23.8	31	25
14	30.3	23.2	31.2	23.5	32.5	22.1			32.1	22.5	31.4	23.6	32.2	23.8	32.7	24.5
15	30.1	23.4	30.4	23.5	30.5	23			31.8	22.1	29.7	23.3	32.5	23.5	29.8	23.8
16	30.2	23.1	29.1	23.2	33.1	24.6			29.9	22.5	29.6	23	29	23.2	28	23
17	30.1	23.4	29.5	22.3	32	23.7	30.2	23	30.9	22.9	30.4	23	32	25	30.5	24.7
18	31.6	22.2	30.5	21.9	33.3	23.1	31.5	22.6	32.6	21.3	31.7	22.9	32.8	23.2	31.2	24
19	30.5	23.3	31.3	23.1	30.2	23.3	31.6	22	32.9	22.2	30.3	23.7	31.6	23.1	30.2	25.4
20	28.3	22.6	29.4	23.2	29.7	24	29.4	22.4	30.9	22.8	28.9	22.8	29	23	31.1	24.5
21	30.6	23.5	30.3	23	32.2	24.1	31.1	23.1	33.1	22.7	29.7	22.8	31	23.2	32	23.5
22	28.5	22.5	29.3	22.4	33.2	24.3	30.4	22.9	31.1	22.9	28.2	22.7	30.5	23	29.5	23.8
23	31.5	22.7	31.1	22.5	32.4	25.7	31.8	23.4	32.8	21	31.3	22.3	32	22.8	31	25.1
24	30.7	22.6	30	22.5	31.2	24.1	30.4	22.2	32.6	20.6	29.9	23.4	31.8	23.5	29	25
25	29.3	22.7	30.8	21.7	30.7	23.5	31.9	22.4	32.1	21.2	29.7	23.5	33	22.8	30.9	25.2
26	32.6	22.2	31.6	21.6	31.6	24	32.8	22.8	30.8	21.3	31.7	22.6	33.5	23.5	31	22
27	32.9	26.2	32.2	22	31.6	24.2	33.4	25.2	32.1	21.8	31.8	25	32.8	23.8	30.8	24.6
28	32.4	24	32.5	23.6	31.8	24.2	32.5	25.3	32.1	21.6	31.3	23	33.5	22.8	31.5	26.4
29	31.6	24.5	33	23.5	32.2	24.5	32.4	25.4	33.1	23.2	31.4	25.3	33	24	30.5	25.4
30	33.1	26	32.8	22.7	32.2	23.2	32.6	25	30.7	23.5	32.3	25	32.8	24.4	31	25.1
31	31.6	24.7	31.6	23.9	33.2	24.4	31.1	24.4	32.3	22.5	32.9	24.3	33	24.5	30.5	26.3
Mean	31.2	23.5	31.1	22.8	31.6	23.9	31.6	23.6	32	22	30.9	23.6	32.3	23.6	30.7	24.6

Maximum and minimum temperatures at the stations of the Weather Bureau, July 1917—Continued.

Day.	Iloilo.		San Jose Buenavista.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Borongan.		Catbalogan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	29.2	23.6	30.2	23.0	30.3	23.4	31.3	22.2	33.1	23.2	33.1	22.6	31.8	22.0	31.5	21.8
2	30.5	23.3	31.6	23.5	30.9	23.3	31.9	22.8	31.8	27.4	32.3	23.5	34.0	22.7	32.1	23.0
3	30.9	25.0	32.2	23.5	31.5	25.1	32.5	23.1	31.3	25.5	32.9	23.3	34.0	22.6	32.3	23.4
4	29.4	23.6	31.7	22.5	30.9	25.3	31.4	23.5	31.2	27.9	32.2	23.8	32.0	24.1	31.5	23.7
5	30.0	24.0	31.7	22.5	31.0	25.5	32.1	23.4	31.2	28.0	33.3	24.1	33.9	24.4	32.5	24.8
6	29.6	23.5	28.8	23.5	31.0	25.1	32.0	23.8	30.9	27.8	32.4	24.0	32.9	23.9	32.1	24.7
7	30.3	24.5	30.2	24.0	30.6	25.1	32.0	24.1	32.2	26.2	33.0	24.1	31.9	23.9	31.5	23.3
8	30.7	24.3	31.7	23.8	30.0	25.2	32.5	22.9	33.4	26.4	33.1	23.5	31.6	22.4	32.5	23.2
9	31.2	24.0	31.7	23.5	32.5	24.5	32.4	23.2	33.2	25.6	33.5	23.0	34.3	21.7	33.0	22.6
10	31.5	25.3	31.7	23.6	30.8	24.5	32.2	22.9	32.2	27.7	33.2	23.1	33.7	22.8	32.5	23.3
11	31.0	25.5	32.1	23.5	31.8	24.6	31.9	23.4	30.0	25.3	33.0	24.4	32.4	23.3	31.2	24.3
12	31.5	24.8	31.2	23.2	32.4	26.5	31.4	23.9	32.9	27.7	33.0	24.3	32.2	23.2	31.1	24.3
13	31.5	24.2	31.2	23.9	32.5	24.3	31.2	23.0	33.3	25.1	32.4	23.8	31.8	22.7	32.7	23.5
14	31.5	24.5	32.2	23.5	32.4	24.6	32.9	22.4	31.9	23.5	34.3	24.0	31.7	22.7	31.5	22.5
15	31.5	23.2	31.7	23.1	29.9	24.4	30.5	23.2	29.1	23.4	31.6	23.4	31.0	23.2	29.8	22.6
16	28.1	23.8	28.2	23.2	27.0	23.6	28.2	23.2	31.4	23.8	29.4	22.9	30.8	23.4	28.6	23.0
17	30.3	23.5	30.1	23.0	29.5	23.4	31.4	23.2	31.5	24.4	32.5	23.4	31.9	22.5	31.9	23.3
18	30.0	24.0	31.3	22.9	31.4	24.3	31.8	22.6	32.8	25.4	33.2	24.1	32.4	23.0	32.4	23.7
19	29.7	22.6	30.1	22.0	27.4	22.6	31.1	23.4	32.1	23.6	32.0	23.0	31.1	21.8	31.2	22.5
20	31.1	22.6	31.0	23.1	32.4	24.1	30.8	22.3	31.4	24.4	33.5	23.7	31.2	23.7	31.8	23.0
21	29.4	23.3	30.4	23.0	29.6	22.4	28.2	23.2	29.7	23.6	30.2	23.1	30.0	23.3	30.0	22.9
22	30.8	23.8	32.3	23.9	31.7	24.8	31.8	22.2	33.0	24.3	34.0	22.8	31.3	22.7	31.0	23.2
23	30.0	24.5	30.7	23.0	30.3	24.2	29.8	23.4	30.9	23.5	31.3	23.8	32.2	23.5	30.7	24.0
24	31.0	24.2	32.2	23.9	31.3	24.1	31.9	22.8	30.1	24.5	32.2	23.5	31.7	23.5	30.5	23.0
25	30.8	25.8	31.2	24.4	31.0	25.5	32.5	23.2	31.3	25.3	33.8	22.7	34.3	22.2	31.7	24.0
26	30.6	24.7	30.4	22.7	32.6	25.5	32.2	22.0	31.4	22.6	34.2	23.0	34.1	23.4	31.8	22.4
27	30.0	22.5	26.2	23.1	25.3	25.4	32.2	22.6	31.6	26.5	35.0	22.5	34.1	24.4	32.5	24.1
28	30.3	23.5	30.7	22.3	32.0	23.1	32.8	24.9	32.1	27.8	34.0	23.8	33.9	23.2	31.8	25.7
29	30.5	23.0	30.7	23.2	30.2	23.4	32.4	21.4	32.2	27.6	35.4	23.7	34.4	23.0	32.8	23.6
30	30.3	23.0	31.2	23.4	28.8	26.5	32.1	22.3	30.7	27.6	34.7	23.9	34.0	23.1	33.0	23.0
Mean	30.5	23.9	30.9	23.3	30.7	24.5	31.6	23.0	31.7	25.5	33.0	23.5	32.5	23.0	31.7	23.4

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	31.9	22.7	31.4	24.2	31.5	22.9	31.8	22.9	31.7	22.6	31.9	23.8	27.4	23.4	29.0	23.0
2	32.4	23.8	31.0	24.5	33.4	23.7	31.4	23.3	31.9	22.5	32.4	23.4	30.6	23.4	32.5	22.2
3	32.8	24.4	32.0	25.2	34.4	24.3	31.0	24.0	32.0	23.2	32.6	24.5	31.0	24.0	33.5	21.6
4	30.6	24.0	30.0	26.5	32.5	24.3	27.8	24.0	29.8	23.2	28.4	24.8	29.2	23.6	32.8	23.6
5	31.1	25.6	31.0	25.2	33.5	22.8	30.9	24.4	30.0	20.1	31.8	23.7	28.2	24.2	33.4	23.0
6	30.6	25.7	30.6	25.6	32.6	25.7	30.7	24.2	29.5	22.1	30.8	25.0	28.6	24.2	32.0	24.0
7	30.9	24.4	31.6	24.6	32.8	25.2	32.4	24.0	31.5	23.5	31.5	25.4	29.8	25.8	32.5	24.0
8	32.2	24.5	30.0	24.5	32.7	25.0	32.7	23.4	31.0	24.5	31.0	23.9	30.0	23.4	31.7	23.5
9	32.6	23.8	32.8	24.6	34.8	24.5	33.3	23.2	31.7	23.4	32.3	23.6	29.9	23.0	33.0	23.1
10	30.6	24.2	31.6	25.2	33.0	24.6	31.4	23.0	31.5	23.6	31.8	25.0	30.4	23.6	33.5	23.5
11	31.0	25.8	31.0	25.4	32.8	22.8	29.6	23.5	30.2	24.0	30.4	24.4	30.4	25.0	33.5	23.1
12	30.5	23.8	31.2	25.6	32.7	23.3	29.9	23.5	29.8	24.5	29.8	24.7	30.4	24.2	31.1	23.5
13	31.5	22.7	32.0	24.6	34.0	25.4	31.0	23.0	32.5	24.1	32.0	25.1	30.8	24.6	33.5	23.1
14	32.4	23.5	32.0	25.4	34.4	24.4	30.9	23.2	33.1	23.0	32.4	24.3	31.2	24.0	32.6	22.7
15	28.9	23.5	30.4	25.6	32.4	24.2	28.6	22.9	31.6	23.2	30.0	24.4	29.4	25.2	31.7	22.6
16	27.7	23.3	28.6	24.8	31.3	23.3	27.3	23.3	29.6	22.1	28.3	23.9	29.4	23.4	33.9	22.5
17	30.2	24.3	30.4	23.8	30.4	22.8	30.4	23.3	30.0	22.0	28.3	23.1	31.2	24.4	27.7	23.8
18	31.0	23.8	31.6	23.8	32.9	23.9	31.6	23.2	31.8	22.1	31.7	23.9	30.6	23.0	31.6	22.5
19	31.2	24.1	34.0	25.8	32.9	23.2	30.5	23.0	31.9	23.0	31.8	24.3	30.8	23.4	32.5	23.5
20	31.0	23.9	31.0	25.0	34.0	23.0	30.3	23.0	32.6	21.6	32.0	23.7	29.2	23.6	33.5	23.6
21	29.9	22.9	32.8	24.0	34.5	23.7	30.8	23.5	31.7	22.2	31.6	23.6	30.0	23.4	33.0	23.0
22	29.4	23.5	30.0	23.6	31.4	23.3	29.9	23.4	30.5	22.0	31.6	23.5	30.2	25.0	33.5	23.6
23	32.2	23.6	31.4	24.2	33.1	22.7	31.3	23.0	31.3	22.0	31.3	24.4	30.8	25.8	32.4	23.5
24	31.0	23.9	30.4	24.5	32.1	23.0	28.8	23.4	30.0	22.5	28.9	24.3	28.8	23.4	32.2	23.1
25	31.0	23.0	33.0	24.0	33.4	23.6	30.8	24.0	30.5	23.1	29.8	24.4	28.8	23.4	32.5	22.9
26	32.3	22.7	31.4	26.2	34.0	25.4	31.3	23.0	30.3	24.0	30.5	23.0	26.2	23.6	33.4	22.5
27	32.1	23.1	31.4	25.5	34.8	25.3	31.4	23.1	31.0	23.0	31.8	23.8	28.4	24.0	34.5	23.9
28	31.1	27.2	31.4	26.4	30.8	25.0	31.8	23.2	30.7	24.2	30.5	23.9	30.0	23.6	33.5	24.0
29	33.8	26.1	32.8	26.4	31.7	24.3	32.8	24.5	31.4	24.5	30.5	24.0	30.0	24.4	31.0	23.8
30	33.9	26.6	33.4	25.6	32.8	25.0	32.6	24.5	31.8	23.0	30.8	24.0	29.2	23.6	33.5	24.0
31	34.2	25.7	32.6	26.5	33.9	23.1	32.8	24.6	31.5	24.5	32.0	25.1	29.8	23.8	33.5	24.5
Mean	31.4	24.2	31.4	25.1	33.0	24.0	30.9	23.5	31.1	23.0	31.0	24.2	29.7	24.0	32.5	23.3

Maximum and minimum temperatures at the stations of the Weather Bureau, July, 1917—Continued.

Day.	Virac.		Naga.		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.....	31.7	22.3	31.5	21.7	30.9	23.9	28.3	22.8	27.4	23.6	31	23.3	31	23	28.6	23.6
2.....	32.6	22.1	32.4	21.6	32.2	22.5	30.8	22.2	31.9	23.1	32	22.5	32	22.2	33.3	22.9
3.....	33.5	23	32.9	22.1	33	22.9	31.1	21.2	32.4	23.1	31.8	22.8	31	22.1	33.2	24
4.....	27.9	22	30.4	22	31.2	23.7	30.8	24.6	31.8	23.4	29.8	24.2	31.4	22.2	30.4	24
5.....	32.4	23.5	32.3	22	32.8	24.6	32.2	25	32.9	23.8	30.5	23.7	32.1	22.3	33.5	24.2
6.....	32.7	23.5	32.3	21.7	33	24.5	32.2	24.2	32.7	24.8	31	24.7	32	22	34.2	23.9
7.....	32.7	23.1	31.5	22.8	32.2	25	30	24.1	31.5	23.9	31.1	24.4	31	22.1	33.4	24.6
8.....	33	22.6	32.5	21.4	30.7	23.4	31	23	32.1	23.4	30.3	23.4	31.4	21.2	34.3	23.9
9.....	33.5	22.3	32.8	21.9	33.2	22.7	32	22	33.7	22.4	31.9	22.7	31.8	21.8	33.8	23.9
10.....	33.3	23	32.2	21.8	33.2	24.5	32.5	22.6	33.2	23.2	32	23.9	31.8	21.7	34	24
11.....	32	23.5	31.1	22.4	32.9	23.1	31.1	24.1	30.9	23.7	31	23.4	30.4	21.8	32.2	24.1
12.....	31.3	24	29.9	22	30.3	23.2	29.7	23	28.8	23.5	29.7	24.8	29.8	22.2	30.5	24.1
13.....	32.3	23.3	31.6	23.6	31.8	23	31.4	23.1	31.7	22.4	30.7	23.8	30.2	22	32.1	23.8
14.....	31.7	22	34	22	32.1	22.5	32.3	22	32.8	22.2	32.6	22.4	31.6	21.1	32.2	23.1
15.....	30.9	22.4	27.9	21.5	31.6	23.5	31.5	22.2	30.7	22.8	31.1	22.8	31.8	21.4	30.8	24
16.....	27.5	22.6	28.9	22	30.7	22.3	29.5	22.2	28.1	23.7	32	23	31	22	28.1	24.3
17.....	28.8	22.6	27.8	21	27	23.1	27.9	22.6	28.8	23.1	26	22.8	31.2	21.9	28	23.5
18.....	31.5	22.5	31.6	21.9	29.4	22.8	30.2	22	31.3	22.9	27.4	22.6	29.9	22.2	32.7	23.1
19.....	31.4	22.6	31.5	21.2	31.9	23.4	30.9	22.6	31.5	24.2	30.6	23.8	30.8	22.8	32.8	24.5
20.....	32	22.5	32.8	20.6	31.4	22.7	30.4	23.6	31.6	23.4	31.2	22.4	32.4	21.4	33.8	24
21.....	31.4	22.6	32.8	20.9	32.4	22.8	32.2	23.3	33.1	23.8	32.4	22.5	31.9	21.1	32	24
22.....	30.8	22.4	31.5	20.7	32.3	23.4	30.7	22.6	32.1	22.1	32.3	23	31.4	21	31.8	22.8
23.....	31.3	22.2	32.5	22.1	32.2	23.8	30.6	23.4	32.2	23.1	30.6	23.4	31.2	22.2	31.8	24.2
24.....	28.6	22.5	29.2	22	31.2	23.9	29	23	29.6	22.5	29.2	22.6	29.7	22.1	29.8	23.8
25.....	32	22.3	31.5	21.5	32.6	22.4	30.7	22.4	32.5	22.4	30	22	30.6	21.2	33.7	23.5
26.....	32.3	21.5	31.5	20.8	31.4	23.6	31	22	31.3	22.1	31.2	23.8	31	22.3	32.8	23
27.....	32.7	22.3	32	21	30	24.1	31	22.6	32.8	23.3	30	23.6	31.2	22.1	33.9	24.7
28.....	32	23.4	32.3	22.6	32.4	24.6	31.5	24.4	32.2	25.5	31.4	23.4	30.1	22.3	33.8	24.3
29.....	32.2	22.9	31.5	21.5	31	24.4	29.6	22.6	30.3	23.3	29.9	24.5	30.2	22.1	32.9	24.8
30.....	32.6	24	31.1	22.6	32.1	24.5	31.3	24.5	32.7	24.5	29.7	24.6	30.6	23.2	33.4	24.8
31.....	33.9	23.5	31.5	22.6	31.7	25.3	31.3	24.8	32.5	25.8	29.8	25.5	31.8	22.4	33.9	25
Mean.....	31.7	22.7	31.5	21.8	31.6	23.6	30.8	23	31.5	23.4	30.7	23.4	31.1	22	32.3	23.9

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.....	28.9	23.7	30.9	23.5	30.1	22.1	31.3	22.2	31.2	23.1	34.2	22.8	32	23.5	33.3	23.6
2.....	32	22.5	32	23.4	31.7	22.2	30.8	23	31.6	23.4	34.4	23.1	31.9	23.8	34	23.7
3.....	31.7	22.4	32.2	23.8	31.2	22.6	30.9	23.4	31.4	23	35	23.3	33.8	22	33.5	23.4
4.....	29.3	22.9	31.2	24	29.7	22.5	31.3	22.9	31.7	23.6	33.6	23.5	34.9	24.2	32.6	24.5
5.....	30.9	23.6	31.4	24.5	30.2	22	29.5	22.7	30.7	23.2	33.9	23	33.9	24.7	31	23.3
6.....	32.1	23.3	31.4	23.5	29.7	21.6	27.3	22.5	29.4	23.2	32.7	23	33.2	24.5	31.4	23.2
7.....	30.2	23.9	30.2	22.7	29.5	21.8	29.3	22.6	31.1	23	32.5	23	32.1	24	32.4	23.3
8.....	30.5	23.1	30.9	22.5	29.4	21.2	30.4	23.6	30	23	31.5	22.6	34.6	23.5	32.7	23.2
9.....	31.6	22.5	30.6	23.6	29.6	22.2	29	22.5	29.2	23.3	31.6	23	33.3	23.2	33.3	23.3
10.....	30.5	23.7	31.4	23.7	30.3	22.5	27.8	23.2	30.4	23	30.4	23.2	34.1	23.4	33	23.9
11.....	28	23	29.7	23	27.2	21.7	26.2	22.3	28.9	22.6	30	21.6	31.8	24.3	27.2	23.4
12.....	28.7	23.1	28.7	23.1	27.9	21.8	27.9	22.3	28.2	22.5	31.2	21.4	31.1	24.6	25.8	23.1
13.....	30.5	22.7	30.2	22.7	30.2	21.2	29.1	22	25.8	21.9	31.6	22.4	30.2	23.5	26.2	22.5
14.....	30.8	21.6	32.7	22.3	32.1	20.8	29.6	22.8	30.1	22.5	30.5	22.6	32.4	22.5	30.7	22.3
15.....	31.2	22.2	30.6	23	30.3	20.5	30.6	22.5	31	22	30.8	21.6	31.7	21.5	29.6	22
16.....	28.4	22.4	30.4	22.8	29.7	21.4	31.6	22.4	32.2	23.2	33.5	22.8	32.5	22.3	31.8	23.9
17.....	25.9	22.7	27.3	23.1	27.7	21.6	25	22.5	26.6	22.8	25.8	22.8	27.9	22.9	26.6	22.9
18.....	29	22	27.8	23.7	28.3	22	25.7	22.6	26.4	23.2	26.8	22.6	29	22.2	25.7	23.4
19.....	31.3	23.5	29.3	23.3	29.4	22.3	25.7	22	27.1	22.8	26.8	22.5	29.1	22.8	25.8	23
20.....	32	22.2	31.5	22.8	30.7	21.6	28.4	22.5	30.6	22.6	29.3	23	31.9	22.5	29.7	22.7
21.....	31.4	23	31.8	22.5	30.7	20.9	31.3	22	30.7	23	31.4	22.3	32.7	22.6	32.7	22.7
22.....	31.6	22.6	32.1	22.6	31.3	21.4	30.3	22.8	31.6	22.4	31.6	22.5	32.7	22.1	33.3	23.1
23.....	30.9	23.6	31.5	23	31.4	22	31	21.6	31.9	22.4	32.5	22.4	33	23.1	32.7	23
24.....	30.4	22.5	31	23	29.2	21.5	29.9	22.6	30.9	22.9	32.8	22.5	33	22.2	31.4	23.2
25.....	31.1	22.5	31.4	22.3	30.7	21.4	30.6	22.4	30.6	22.7	32.9	22.4	31.7	22.5	33.5	22.7
26.....	30.1	23.4	30.5	22.5	29.5	21.2	28.9	23	30.9	23.2	31.2	23	33.2	23.1	31.6	24
27.....	29.9	22.9	30.4	23.1	28.8	21.6	29.7	22.3	30.6	23.5	31.6	23.1	32.8	22.1	32.2	23.5
28.....	28.9	23.1	29.4	23.8	27.7	21.9	29.9	23	29.4	21.7	30.2	23.4	32.9	24	29.8	23.7
29.....	29.5	23	27.8	24.3	25.9	22	29.6	22.9	30.4	23.2	31.2	23.1	32.3	25	31.4	24.4
30.....	31	23.9	31.3	24	29.2	22.6	28.3	22.8	30.7	23.8	28	23.2	33.6	24.8	31.2	23.4
31.....	31.2	24.1	29.8	23.5	28.5	21.3	29.3	22.8	31.4	23.4	32.2	23	33	23.8	31.8	23.2
Mean.....	30.3	23	30.6	23.2	29.6	21.7	29.2	22.6	30.1	22.9	31.3	22.7	32.3	23.3	30.9	23.3



Maximum and minimum temperatures at the stations of the Weather Bureau, July, 1917—Continued.

Day.	Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.		Vigan.	
	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	32	25	23.4	15.5	32.5	24	32	23.9	32.5	25	32.6	24
2	32.9	24.6	23.5	15.6	34.1	23.8	33	22.8	33.5	25.4	32.8	23.8
3	32.2	24	23.8	15.4	33.8	23.9	35	21.8	33.7	25.2	32.7	23.8
4	30.5	23.7	22	15.2	33.5	24.2	35.5	22.8	34	26	31.2	24
5	31.3	23.6	21.5	14.6	32.8	23.8	35.5	22.9	32.6	25	31.2	22.4
6	29.5	23.3	20.5	15.4	32	24.2	35.7	22.1	30	25	29.9	23.2
7	31	22.6	21.7	14.6	33.5	23.3	35.6	22.5	32	25.5	30.4	24.2
8	32.7	24	22.4	15.3	32.7	24.5	35	23.2	32.8	25	31.1	24
9	32.3	24	21.9	15.2	32.8	23.6	33.6	23.4	34	25.5	31.6	23.8
10	29.5	23.6	19.6	15.3	31.5	22.3	34.5	23.1	32.3	25.5	27.8	23.8
11	26	23	18	14.9	30.7	23.3	31.5	22.9	30	25	29.6	23.2
12	25.5	22.9	17.2	15.1	26.5	23.3	32.5	23.5			26.3	23.2
13	29.3	23.6	16.9	14.9	27	23.7	32	22			26.4	22.4
14	30	22.3	20	14.4	32	23	33.5	22	30	25	30.2	21.9
15	30.3	22	22.5	15.1	29.6	22.5	30.4	21.5	30.5	25.4	31.5	23
16	32	22	23	15.4	32.5	23	30.5	22	30.5	24.5	30.6	22.5
17	31.9	23.6	17.9	14.9	26.4	23.1	25.5	22.7	29.1	25.9	30.5	23
18	26	22.6	17.4	15.1	28.7	23	30.5	22.3	27.6	24	27.2	23.3
19	26	23.2	17.4	15.7	29.4	23.5	32	22.4	27	24.2	27.5	23.1
20	27.5	23	19.4	15.3	31.4	23.9	32	22	30.6	24.5	29	23.2
21	30.4	22.5	21.4	14.8	33.3	23.5	33.6	22	31	24.5	30.5	22.7
22	31.3	23	23	14.8	32.5	23.5	35.1	22.4	32	23.5	30.6	23
23	32.2	23.8	22.1	15.3	33.5	22.6	32.1	22.9	32.5	24.5	32.6	23.5
24	31.1	23.5	21.4	14.8	31.4	22.8	32.5	22	31.4	24.5	30.3	23.5
25	31.6	23.8	21.9	14.4	33.2	22.7	33.5	22.4	31.4	24	30.8	23.1
26	30.5	24	19.4	15	32.2	23.3	33.5	22.3	31.1	25.2	30.5	24.8
27	31.3	23.5	19.7	15.7	32.1	24	32.7	23.6	31.7	25	29.8	23
28	28.1	23.2	19.5	15.5	29	23.8	33.9	22.3	27.8	24	30.3	22.8
29	29.5	23.8	17.8	15.2	28.7	24.2	34	22.7	28.3	24.5	28.2	23
30	31	23.6	19.8	15.4	32.4	23.5	34.6	23	30	24.9	29.1	23
31	30.6	22	20.3	15.4	32.5	23	34.5	23	31	24.5	30.1	23.1
Mean	30.2	23.3	20.5	15.1	31.4	23.4	33.1	22.6	31.1	24.9	30.1	23.3

Day.	Tuguegarao.		Laoag. <sup>a</sup>		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	34	23.5	36	23.4	32	25.3	31.2	25.4	32.5	22.5
2	33.8	23.1	33.9	23.2	31.5	24	33	24.6	32.8	22.6
3	36.8	23.3	33.8	23.1	31.8	23.7	31.6	24.8	31.7	23.6
4	37.4	24.1	32	23.7	32	24.5	29.8	24.6	31.8	24.4
5	37.8	23.4	30.5	24	33.3	24.1	29.6	24	31.9	27
6	38.8	23.7	32.2	22.9	32	24.2	30.4	23.4	30.2	26.6
7	36	24	32.2	23	31.5	24.2	30	23.3	30.6	26.4
8	35.3	24	32.6	23	29.3	24.8	30	24.6	30.1	25.5
9	34.2	24.5	34	23	26.4	24	30	23.4	31.4	23.9
10	36.4	23.6	32.1	23.1	30.8	23.7	30	23	31.4	24.5
11	30.6	22.8	32.2	23.1	30	23.2	30	23.5	31.4	25.7
12	30.7	23.9	25.4	23.2	27.1	23.8	26.6	22.8	28.2	24.3
13	30.2	23.4	25.5	21.9	26.6	23.4	25.6	22.6	27.7	23.5
14	33.5	22.7	31.9	21.9	31	24.3	29.5	21.8	31.3	23.2
15	31.2	22.5	33.4	22	30.6	23.3	31.8	24.2	30.6	23
16	30	23.4	34.6	22.9	31	23.8	30.8	24	31	25.2
17	26	24.3	26.6	23.4	25.3	23.5	25.4	23.3	28.5	25.2
18	28.7	23.4	26.6	22.8	28.8	23.3	29.2	23.3	28.8	24
19	29.3	24	26.2	22.9	28.1	23.8	27	23.2	27.3	24.3
20	31.2	23.8	29.2	22.1	29.5	23.5	27.8	23	28.5	24.7
21	32.5	23.7	31.4	22.9	30.8	23.3	30.6	23.8	30.9	25.7
22	32.5	25	32.3	21.8	31.8	23.8	30.4	23.2	29.8	24.5
23	31.4	24.7	33.5	23.5	30.3	23.6	31	24.6	31.2	24.5
24	31.3	24.2	32.1	22.8	31.8	23.1	29.8	23.4	30.2	23.6
25	32.5	23.9	32.2	22.4	31	23	29.8	23.2	30.5	24
26	32	23.3	32.1	23.8	30.1	23.1	29.4	23	27.6	22.9
27	32.2	23.2	26.3	23.2	28.5	22.8	27.4	22.8	28.9	23.5
28	34	23.5	29.9	23.1	30.2	23.3	28.3	23	30.8	24.5
29	31.3	22.8	28.9	22.7	31	23.8	29.2	23.2	30	25
30	34	23.2	29.7	22.4	31.8	23.7	29.3	23	31.7	25.4
31	33.2	23	31.4	23.5	31	23.8	29.5	23	30.2	24.8
Mean	32.9	23.6	31	22.9	30.2	23.7	29.5	23.5	30.3	24.5

<sup>a</sup> The maximum temperatures of this station are not very reliable; they seem to be too high.



## SEISMOLOGICAL BULLETIN FOR JULY, 1917.

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### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

4, 0<sup>h</sup> 41<sup>m</sup> 06<sup>s\*</sup> [4, 8<sup>h</sup> 41<sup>m</sup> 06<sup>s</sup>]. Aparri (NE Luzon). Oscillatory earthquake, intensity II, duration 10 seconds. The oscillations experienced at Aparri by some persons seem to correspond to a submarine earthquake originated SE of Naha, Liukiu Islands, Japan, and recorded throughout the world. Aparri being situated at a distance of more than 1,000 kilometers from the origin of this earthquake, some local circumstances must have helped to make the movements felt there by some persons.

11, 17<sup>h</sup> 35<sup>m</sup> [12, 1<sup>h</sup> 35<sup>m</sup>]. Iloilo (E Panay). Earthquake of intensity III, duration 5 seconds.

16, 5<sup>h</sup> 12<sup>m</sup> 14<sup>s\*</sup> [16, 13<sup>h</sup> 12<sup>m</sup> 14<sup>s</sup>]. SE Luzon. Earthquake of intensity IV-V felt in the provinces of Ambos Camarines and Albay. The epicenter lay at a distance of about 340 kilometers from Manila, probably in the Pacific, N of the said provinces and near to the northern end of the *Philippine Deep*.

19, 16<sup>h</sup> 59<sup>m</sup> [20, 0<sup>h</sup> 59<sup>m</sup>]. Butuan (N Mindanao). Oscillatory earthquake, direction ENE-WSW, intensity III, duration about 4 seconds.

22, 4<sup>h</sup> 35<sup>m</sup> 42<sup>s</sup> [22, 14<sup>h</sup> 14<sup>m</sup> 42<sup>s</sup>]. Guam (Mariana Islands). Earthquake shocks of intensity IV-V felt over the whole island and recorded at Manila and at Osaka, Japan; its epicenter seems to have been some distance to the S of Guam probably near the *Challenger Deep*.

29, 21<sup>h</sup> 58<sup>m</sup> 15<sup>s\*</sup> [30, 5<sup>h</sup> 58<sup>m</sup> 15<sup>s</sup>]. Butuan (N Mindanao). Earthquake of intensity I-II. The origin of this disturbance recorded all over the world was far away in the Pacific: the seismographic records of the Philippines and Japan place it between the Eastern Caroline and New Britain Archipelagos.

30, 1<sup>h</sup> 45<sup>m</sup> [30, 11<sup>h</sup> 24<sup>m</sup>]. Guam (Mariana Islands). Earthquake of intensity III-IV; insular origin.

<sup>1</sup> 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<sup>h</sup>). 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.  $A_N$ :  $T_0=5.9$ ,  $\epsilon=2.340$ ,  $\frac{r}{T_0^2}=0.024$ ;  $A_E$ :  $T_0=5.3$ ,  $\epsilon=1.783$ ,  $\frac{r}{T_0^2}=0.092$ . Alluvium. 2.40 meters above sea level].

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
202	1	I	e F	h. m. s. 0 50 1 22				
203	2	Iv	eP F	1 52 25 54				
204	2	Iv	eP L M <sub>N</sub> F	21 36 17 36 33 36 35 40	2	129		
205	4	IIIr	eP S L M <sub>N1</sub> M <sub>E1</sub> M <sub>N2</sub> M <sub>E2</sub> F	0 41 06 44 04 45 55 46 10 46 36 47 24 48 14 3 20	8 10 8 10	1,106 987 1,144 1,192		Aparrí (NE Luzon); distant earthquake.
206	4	IIr	eP S L M <sub>N1</sub> M <sub>E1</sub> M <sub>E2</sub> M <sub>N2</sub> F	5 39 18 42 56 44 35 45 06 45 48 46 44 48 44 7 22	13 12 12 12	189 179 192 144		
207	4	Ir	eP S L M <sub>E</sub> M <sub>N</sub> F	22 15 00 19 02 23 26 24 14 24 34 23 12	14 10	19 23		
208	5	I	e F	0 41 00 1 14				
209	5	Iv	eP F	9 59 20 10 01				
210	7	Iv	eP F	6 02 57 05				
211	8	I	e F	17 42 18 06				
212	9	Iv	eP F	9 36 10 39				
213	12	Iv	eP F	12 43 34 46				
214	14	Iv	eP F	20 11 37 14				
215	16	Iv	eP L M <sub>N</sub> M <sub>E</sub> F	5 12 14 12 52 12 55 12 56 23	2 2	58 56		SE Luzon.
216	17	Iv	eP F	19 16 39 20				
217	17	Iv	eP F	20 25 45 30				
218	18	Ir	e M <sub>N</sub> F	7 59 8 07 18 42	11	17		
219	19	Iv	eP F	11 04 12 06				
220	20	Iv	eP F	15 28 24 30				
221	21	Iv	eP F	7 28 28 37				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
222	22	I <sub>r</sub>	e L? F	h. m. s.				Near Guam (Mariana Islands).
				4 40				
				45 28				
				5 02				
223	24	II <sub>v</sub>	eP L M <sub>E</sub> M <sub>N</sub> F	9 27 49				
				28 09				
				28 20	2		129	
				28 26	2	217		
				37				
224	25	I	e F	14 48				
				16 00				
225	27	I <sub>u</sub>	eP S L M <sub>E</sub> M <sub>N</sub> F	1 20 42				End overtaken by following earthquake.
				27 45				
				35 27				
				37 00	11		10	
				37 48	10	11		
226	27	I <sub>v</sub>	eP F	2 59 51				
				3 02				
227	27	I <sub>u</sub>	e F	3 12				
				5 20				
228	27	I <sub>v</sub>	eP F	12 59 11				
				13 01				
229	27	I <sub>r</sub>	e S L M <sub>N</sub> M <sub>E</sub> F	23 43				
				47 28				
				50 40				
				55 15	8	51		
				55 24	8		29	
	28			0 53				
230	29	I <sub>v</sub>	eP F	12 11 24				
				14				
231	29	I <sub>u</sub>	e S L M <sub>E</sub> M <sub>N</sub> F	14 39 16				
				46 00				
				52 11				
				53 28	18		13	
				54 58	15	19		
				16 04				
232	29	I <sub>v</sub>	eP F	18 25 27				
				27				
233	29	III <sub>r</sub>	eP S L M <sub>N</sub> M <sub>E</sub> F	21 58 15				Distant earthquake.
				22 03 40				
				05 08				
				05 20	7	1,167		
				06 05	6		737	
	30			0 25				
234	30	I	e F	0 36				
				1 10				
235	30	I	e F	8 52				
				9 22				
236	30	I	e F	13 56				
				14 25				
237	30	I	e F	16 29				
				17 03				
238	30 31	II <sub>r</sub>	e S L M <sub>E1</sub> M <sub>N1</sub> M <sub>N2</sub> M <sub>E2</sub> F	23 58 55				
				0 02 44				
				04 30				
				05 42	8		250	
				08 00	10	326		
				10 12	10	439		
				10 40	10		562	
	1 24							
239	31	I <sub>r</sub>	e S L M <sub>E</sub> M <sub>N</sub> F	3 19 12				
				25 06				
				32 32				
				33 06	6		167	
				34 33	7	144		
				4 58				
240	31	I	e F	8 52				
				9 31				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

4, 0<sup>h</sup> 41<sup>m</sup> 06<sup>s\*</sup> [4, 8<sup>h</sup> 41<sup>m</sup> 06<sup>s</sup>]. Aparri (NE de Luzón). Temblor oscilatorio, intensidad II, duración 10 segundos. Este temblor parece corresponder a un terremoto submarino originado al SE de Naha, Islas de Liukiu, Japón, registrado en todo el globo. Debe atribuirse a circunstancias locales de la estación de Aparri el que fuese perceptible para algunas personas a una distancia de más de 1,000 kilómetros.

11, 17<sup>h</sup> 35<sup>m</sup> [12, 1<sup>h</sup> 35<sup>m</sup>]. Iloílo (E de Panay). Temblor de tierra de intensidad III, duración 5 segundos.

16, 5<sup>h</sup> 12<sup>m</sup> 14<sup>s\*</sup> [16, 13<sup>h</sup> 12<sup>m</sup> 14<sup>s</sup>]. SE de Luzón. Temblor de tierra de intensidad IV-V en las Provincias de Ambos Camarines y Albay. El epicentro distaba de Manila unos 340 kilómetros, seguramente se hallaba en el mar Pacífico al N de las expresadas provincias, hacia el extremo septentrional del *Abismo de Filipinas*.

19, 16<sup>h</sup> 59<sup>m</sup> [20, 0<sup>h</sup> 59<sup>m</sup>]. Butúan (N de Mindanao), Temblor oscilatorio, ENE-WSW, intensidad III, duración 4 segundos.

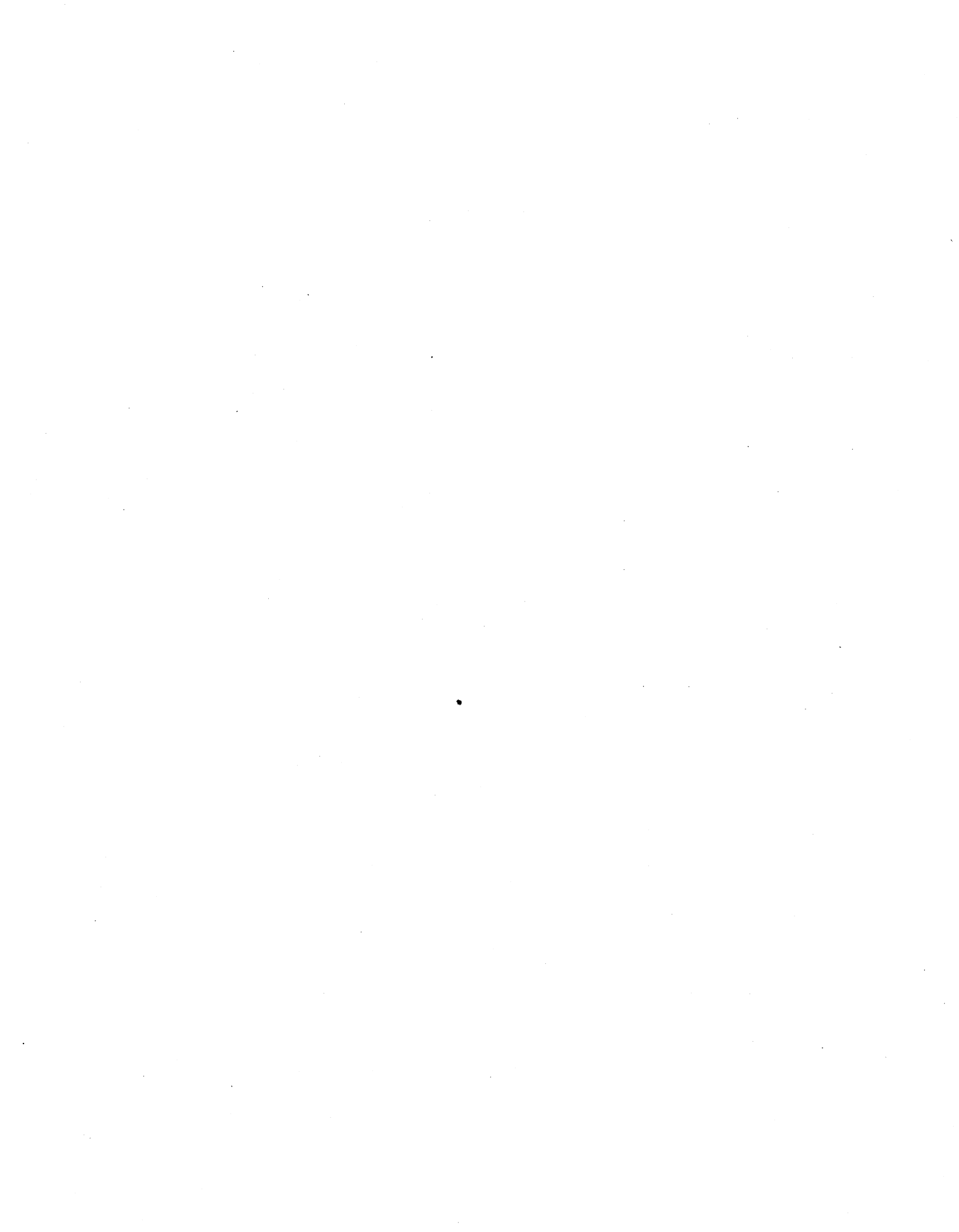
22, 4<sup>h</sup> 35<sup>m</sup> 42<sup>s</sup> [22, 14<sup>h</sup> 14<sup>m</sup> 42<sup>s</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad IV-V, sentido en toda la isla y registrado en Manila y en Osaka, Japón; su origen parece se hallaba a poca distancia al S de Guam, probablemente cerca del *Abismo Challenger*.

29, 21<sup>h</sup> 58<sup>m</sup> 15<sup>s\*</sup> [30, 5<sup>h</sup> 58<sup>m</sup> 15<sup>s</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad I-II. El origen de este temblor de tierra estaba muy lejos en el mar Pacífico: los registros de Manila y de los observatorios japoneses lo colocan entre los Archipiélagos de las Carolinas Orientales y de Nueva Britania. Registróse en todo el globo.

30, 1<sup>h</sup> 45<sup>m</sup> [30, 11<sup>h</sup> 24<sup>m</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad III-IV, de origen probablemente insular.

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<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.







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# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

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BULLETIN FOR AUGUST, 1917.

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

MANILA  
BUREAU OF PRINTING  
1917



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**BULLETIN FOR AUGUST, 1917.**



# METEOROLOGICAL BULLETIN FOR AUGUST, 1917.

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 somewhat lower than that of the preceding year, especially in the Visayas and Mindanao. That of Manila differs from the normal of this month by only  $-0.04$  mm. and from the monthly mean of August, 1916, by  $-0.47$  mm. The highest pressures were observed on the 24th, and the lowest on the 17th and 18th in Luzon, and on the 16th and 17th in the Visayas and Mindanao.

The mean monthly temperature differs but slightly from that of August, 1916, and is almost identical with the normal for this month. The extreme monthly temperatures for Manila were  $33.7^{\circ}$  C. and  $22.4^{\circ}$  C.; they were registered on the 22d and 30th, respectively. The absolute highest and lowest temperatures for Baguio were  $25.0^{\circ}$  C.,  $14.9^{\circ}$  C. on the top of Mirador, and  $25.7^{\circ}$  C.,  $13.6^{\circ}$  C. in the valley.

### PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR AUGUST, 1917.

Station.	Pressure.					Temperature.						
	Mean.	Departure from Aug., 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Aug., 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga	758.29		760.41	24	756.98	16	26.3		31.9	5	22	4
Tagbilaran	57.77	-0.61	59.98	24	55.46	16	26.9	-0.3	33.2	2	22.4	4, 24, 25
Surigao	57.72	-0.69	60.10	24	55.23	16	27	-0.6	33.1	1	22.3	25
Cebu	57.92	-0.49	59.99	24	55.29	16	27.7		33.9	10	22.5	4
Iloilo	57.75	-0.58	59.96	24	55.01	16	27	-0.4	33.1	14	21.9	4
Ormoc	57.95	-0.67	60.06	24	55.24	16	26.7	-0.7	33.4	13	21	8
Tacloban	57.63	-0.72	59.96	24	54.51	16	27.3	-0.2	35.7	14	22.1	8
Capiz	57.47	-0.83	59.71	24	54.53	17	27.1	+0.3	35.4	11	23	21
Calbayog	57.69	-0.68	60.05	24	54.36	17	27	-0.8	34.3	1, 14	22	8
Legaspi	57.37	-0.43	60.09	24	53.16	17	27.4	-0.6	34.3	15	22.6	7
Atimonan	57.15	-0.23	59.91	24	52.39	17	27.8	-0.2	35	16	22.9	5, 10
Ambulong, Tanauan	56.80	-0.42	59.32	24	52.54	17	27.4	+0.1	35	29	22.5	7, 10, 30
Paracale	57.16	-0.31	60.06	24	51.89	17	27.9	-0.7	34.8	2	22.8	6
Manila	57.29	-0.47	59.91	24	52.94	17	26.9	-0.3	33.7	22	22.4	30
San Isidro	57.37	-0.40	60.12	24	52.76	17	26.9	0	33.8	23	22.6	26
Dagupan	56.51	-0.42	59.24	24	51.89	17	27.7	+0.4	35.8	30	21.6	8
Baguio <sup>a</sup>	635.42	-0.28	638.01	24	631.11	17	18	+0.3	25	23	14.9	Various
Vigan	756.53	-0.28	759.51	24	751.04	18	27.2	+0.7	33.2	30	22.7	4
Tuguegarao	56.23	-0.13	59.82	24	49.01	18	27.4	-0.3	33.3	28	22.3	22
Laoag	56.39	-0.27	59.61	24	49.98	18	26.8	+0.5	35.4	8	21.8	20
Aparri	56.20	+0.04	59.89	24	48.09	11	27.5	0	35.5	2, 21	22.5	22

<sup>a</sup> The barometric readings of this station are not reduced to sea level.

Rainfall.—The total rainfall of this month is smaller than the normal for a great majority of our stations of the Visayas and Luzon, while it is greater in almost all the stations of Mindanao. The greatest differences are those for our stations on the western coast of Luzon where the monthly rainfall is remarkably below the normal; and also those for Jolo and Isabela de Basilan where, on the contrary, the total amount of rain for this month is extraordinarily above the normal.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF AUGUST, 1917.

Station.	Total.	Departure from August, 1916.		Rainy days.	Departure from August, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from August, 1916.		Rainy days.	Departure from August, 1916.	Greatest rainfall in a single day.	Day.
		mm.	mm.							mm.	mm.				
Jolo	433.4	+ 24.9	+249.5	28	+ 5	98.6	25	Sumay, Guam	470.1	+152.5	+ 85.6	23	+ 3	61	9
Isabela, Basilan	396.5	+107.8	+184	28	+ 6	58.9	31	Calapan	110.1	+ 36.2	+ 8.8	10	- 1	41.1	22
Zamboanga	134	+ 19.5	+ 40.7	19	+ 5	25.7	31	Virac	180.6	+ 83.1	+ 57.5	12	+ 2	33	7
Davao	123.1	- 53.9	- 74	14	+ 4	33.3	14	Naga	146.1	+ 31.1	- 4.6	17	+ 1	41.4	4
Cotabato	257.6			17		42.2	14	Batangas	103.1	+ 70	- 35.6	17	+ 4	18.8	18
Cagayan, Misamis	250.2	+ 59.2		17	+ 3	58.4	16	Lucena	101.4	+ 46.7		15	+ 5	29.3	18
Butuan	169.8	+ 20.8	+ 63.2	20	- 4	39.9	24	Atimonan	129.9	+ 66	- 14.3	11	+ 0	36.6	4
Mambajao	127.6			14		37.1	6	Ambulong, Tanauan	61.6	-182.8		16	+ 2	10.9	30
Dumaguete	112.2	- 50.5		8	- 4	26.7	12	Canlubang, Calamba	115.9	+ 37		19	+ 2	32.5	21
Yap, Western Carolines	229	- 19		25	0	32.8	28	Santa Cruz, Laguna	128.3	+ 47.3		10	+ 3	46.7	3
Tagbilaran	172.8	+68.27	+ 44.2	8	-27	63	4	Manila	359.4	+ 77.1	- 1.7	24	0	79.8	3
Iwahig	195.5	- 12.4		13	+ 6	49.8	29	Antipolo	305.7	- 91.4		25	0	54.9	3
Surigao	116.2	+ 40.4	+ 25.1	10	+ 1	35.3	31	Iba	556	-219.4	-385.1	21	- 5	102.6	4
Maasin	207.4	- 62.4		3	+ 1	53.6	3	San Isidro	251.4		- 35	20	0	78.2	25
Cebu	140.4	- 29.1	- 9.4	15	+ 4	28.4	3	Taliac	245.8	+ 25.7	-102.6	26	+ 8	30.4	3
Iloilo	375.3	+122.8	+ 45.6	15	- 1	119.8	18	Batayan	98.9	+ 77.2	- 41.1	16	+ 5	23.1	6
San Jose Buenavista	386.4	+107.2	- 95.4	21	- 1	97	31	Dagupan	230.9	-355.8	-241.4	19	+ 5	76.7	8
Cuyo	273.3	+ 21.1	- 91.8	18	- 1	55.4	16	Bolinao	354.5	- 283	-205.8	21	- 2	106.7	19
Ormoc	159	+ 24.1	-106.6	17	+ 1	38.2	4	Baguio	677.4	-657.8	-446.3	25	- 2	214.1	11
Guiuan	43.6	- 76.3		9	- 6	24.1	28	San Fernando, Union	318.8	-718.5	-363.6	17	- 6	74.2	10
Tacloban	115.9		- 22.7	17	- 1	21.3	1	Echague	200.1	+ 33.9	+ 7.2	14	- 3	51.3	3
Capiz	167.1	- 53.3	- 90.3	18	- 1	46.5	1	Candon	414.3	-1526.7	-294	15	- 8	151.4	11
Borongan	182.1	- 31	+ 50.8	17	+ 3	74.2	10	Vigan	475.6	-1388.4	-213.6	15	+ 3	124.8	11
Catbalogan	136.8	+ 66.9		13	+ 1	52.6	7	Tuguegarao	277	+103.8	+ 83.1	14	+ 3	93.7	10
Calbayog	237.5	+ 86.4	+ 61.1	19	- 2	66.3	4	Laoag	874.6	-423.7	+ 26.2	16	+ 7	268.2	11
Masbate	179.5	- 57.5	+ 29.7	14	- 2	42.7	25	Aparri	251.8	+ 9.3	+ 23.2	16	+ 1	63.8	10
Batag	114.3	-140.1		19	- 2	26.47	19	Cape Bojeador	181.5	-451.3		9	-13	87.2	11
Sorsogon	185.4	- 44.6		15	+ 9	47.8	4	Santo Domingo, Batanes	281.2	- 79.3	- 94.7	15	- 9	113.9	18
Legaspi	112.4	- 33.8	- 52.7	15	+ 6	21.2	8								

\* 28 days of observation.

DEPRESSIONS AND TYPHOONS.

Four typhoons were observed during the month in the Far East, two having passed across or very near the northernmost part of the Philippines on the 11th and 18th respectively. Another crossed the southern part of Japan on the 3d, and the last one recurved northeastward between the Ladrone and the Bonin Islands on the 19th and 20th. Besides, on the 3d and 4th there seemed to be something like a depression or typhoon over the Pacific northeast of Luzon: but the data on hand are not enough to trace its track with sufficient accuracy.

THE TYPHOON OF JULY 27 TO AUGUST 5, 1917.

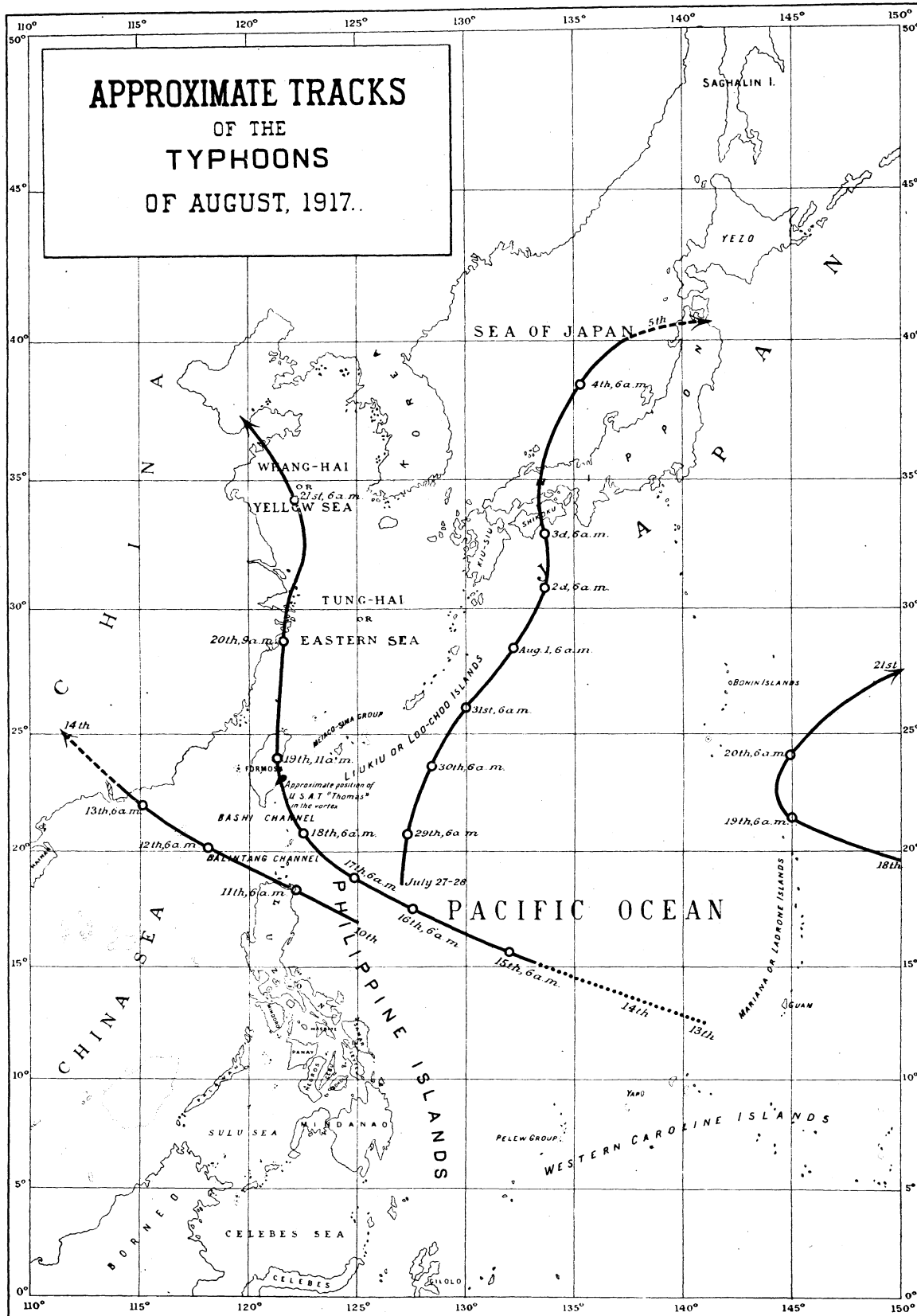
This typhoon was probably formed on the 27th to 28th of July about 300 miles to the east of northern Luzon between 18° and 19° latitude N and near 127° longitude E. It moved N on the 28th, NNE on the 29th, and NE on the 30th and 31st; but it inclined again northward on August 1 and 2, thus crossing the western part of Japan in a northerly direction across Shikoku Island on the 3d. Once in the Sea of Japan it recurved again northeastward on the 4th, and filled up on the 5th near 41° latitude N and 141° longitude E.

THE TYPHOON OF AUGUST 10 TO 14, 1917.

Judging from our weather maps of the 9th and 10th it would seem almost certain that this typhoon belongs to the type of those which form very near the Philippines and give hardly sufficient time for a proper forecasting. Although a very slight falling of the barometers had been observed along the eastern part of Luzon in the morning of the 10th, yet the first clear signs of a depression or typhoon were not shown on our weather maps until the afternoon of that day when the following warning was sent out by Manila Observatory:

August 10, 4 p. m.—There are signs this afternoon of a depression forming over the Pacific east of Luzon.

Plate II.



The typhoon was at the time but about 200 miles east of northern Luzon; and as it was moving WNW at a moderate rate of progress, it appeared at 6 o'clock next morning near the northeastern end of Luzon approaching Aparri to the north. In fact it passed a few miles north of Aparri at about 9 a. m. of the 11th, the barometric minimum 734.7 mm. having been recorded there at 8.30 a. m.

The following typhoon warnings were issued by Manila Observatory on the 11th:

August 11, 9.30 a. m.—The typhoon is situated at present near 122° longitude E, between 18° and 19° latitude N, moving WNW close to the northern coast of Luzon.

August 11, 4.15 p. m.—The typhoon was situated at 2 p. m. to-day close to the northern coast of Luzon near 121° longitude E and 19° latitude N, moving WNW with a velocity of 11 to 12 miles per hour.

In the China Sea the typhoon inclined slightly to the northwest on the 12th, and hence its center entered China a few miles to the northeast of Hongkong on the 13th.

THE "THOMAS" TYPHOON: AUGUST 13 TO 21, 1917.

We call this typhoon the "Thomas" typhoon on account of the U. S. A. T. of that name having been caught in the vortex on August 18, as we shall see further on. It might be called also the Formosa typhoon as it crossed the northern part of that Island on the 19th.

According to the observations made at Guam and Yap, the origin of this typhoon was in the neighbourhood of 141° longitude E, between 12° and 13° latitude N, the first definite signs of its formation having appeared on the afternoon of the 13th. It moved WNW up to the 15th when it began to incline gradually to the N. It was in the evening of the 17th that the Manila Observatory could announce as certain that the typhoon was no more dangerous for Luzon but that it was moving toward the Batanes Islands and Formosa. The typhoon warning then issued read as follows:

The typhoon is now northeast of Aparri in about 20° latitude N and 123° longitude E moving NW or NNW. There is no danger for Luzon as the center of the storm is advancing at present toward the Batanes Islands and Formosa.

In the table given below we publish some of the observations made at Santo Domingo, Batanes Islands, during this typhoon. The barometer was as low as 736.6 mm. at 5 a. m. of the 18th, the cyclonic center being then a few miles to the northeast of that station.

METEOROLOGICAL OBSERVATIONS MADE AT SANTO DOMINGO, BATANES ISLANDS, AUGUST 16 TO 20, 1917.

Date and hour.	Pressure.	Wind.		Rainfall.	Date and hour.	Pressure.	Wind.		Rainfall.
		Direction.	Force.				Direction.	Force.	
	mm.		0-12	mm.		mm.		0-12	mm.
Aug. 16:					Aug. 18:				
6 a. m. ....	754.48	NW	2	1.7	4 a. m. ....	737.01	WNW	8	*28.4
2 p. m. ....	52.45	NNW	4	27.7	5 a. m. ....	36.65	WbyN	8	3.0
Aug. 17:					6 a. m. ....	37.21	WbyN	8	6.4
6 a. m. ....	49.85	N	5	0.4	7 a. m. ....	38.26	NWtoW	7	3.8
8 a. m. ....	49.40	N	5	0.8	8 a. m. ....	39.58	WbyS	7	2.7
10 a. m. ....	48.36	N	5		10 a. m. ....	39.90	WSW	7	12.6
Noon. ....	46.87	NNW	6	1.1	Noon. ....	41.01	WSW	6	27.6
2 p. m. ....	45.62	NNW	6	9.1	2 p. m. ....	40.89	WSW	6	7.8
4 p. m. ....	44.56	NWbyN	6	1.8	4 p. m. ....	41.32	SWbyS	7	5.5
6 p. m. ....	44.37	NW	4	2.0	6 p. m. ....	41.89	SWbyS	6	4.8
8 p. m. ....	43.73	NNW	6	0.8	8 p. m. ....	43.77	SWbyS	5	6.4
10 p. m. ....	42.35	NWbyW	7	4.8	10 p. m. ....	45.65	SSW	5	8.1
Midnight. ....	39.61	NW	8	3.0	Aug. 19:				
Aug. 18:					6 a. m. ....	48.62	SSW	6	34.6
1 a. m. ....	38.18	WNW	8		2 p. m. ....	49.57	SSW	5	11.7
2 a. m. ....	38.00	WNW	8		Aug. 20:				
3 a. m. ....	37.61	WNW	8		6 a. m. ....	53.30	SSW	4	

\* Rain since midnight.



In order that our readers may easily follow by themselves the path of this typhoon from the Pacific to the Batanes and Formosa, we reproduce in Plate III the isobars for 6 a. m. of the 17th, 6 a. m. of the 18th and 11 a. m. of the 19th.

It was during the night of the 18th to 19th that the U. S. A. T. *Thomas* was caught by the typhoon near the eastern coast of southern Formosa. Through the courtesy of Colonel Bellinger, Chief Quartermaster, Manila, we have been able to include in Plate III the barographic record obtained on board the transport during this typhoon. The fury of the elements as experienced by the *Thomas* for two or three days was such, that it was considered next to a miracle that the steamer was not a complete wreck. It may be of interest to our readers to have reproduced here a vivid description of the storm written by one of the passengers on the *Thomas*. The description is taken from a letter which appeared in The Manila Times September 8:

\* \* \* \* \*

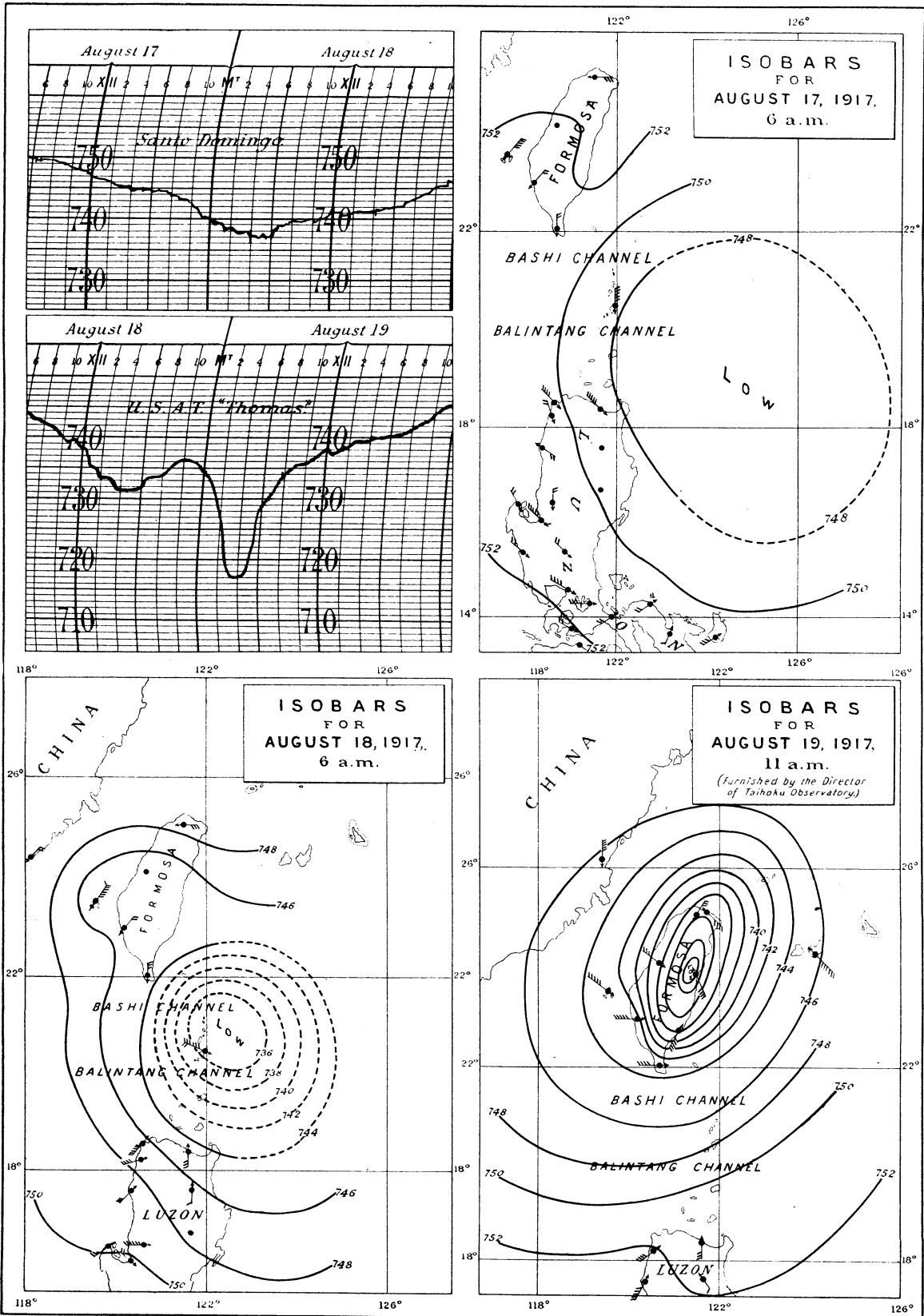
\* \* \* On the next day, Friday, August 17, we were well into the typhoon. The wind was violent and the sea both magnificent and awful. In a typhoon the wind blows the surface of the water right off into flying clouds of foam and spray. For all the world it looks like a snow storm at sea. \* \* \* That night the storm was at its height and it was an anxious, trying night with the wind howling and the rain coming down in sheets. Very few went to sleep that night. The water could not be kept out. It came in through the ports and through seams in the cabin roofs. On the top deck stateroom doors were forced and the rooms flooded. Beds were wet and some cabin floors awash. The boat hove to and kept its nose into the wind. I later heard that we made some 8 miles in 15 hours under steam, but we knew not how far from our course we had drifted. After about eight nerve-racking hours the wind began to abate and by Saturday, the 18th, although the wind and sea were both high and the weather thick and rainy, we were convinced that we were running out of the typhoon. That night after drifting in heavy squalls and thick weather all day, I dozed away miserable in a wet bed. Later I was awakened by the rising wind howling through the ship's passageways and superstructure. We were running into the typhoon again. No more sleep that night. From experience mariners know that the way to get out of typhoons is to keep the wind on the starboard bow and side, and gradually work out and get blown out. This our ship's master did not dare to do as from the position he thought we were in, the chances were extremely good of the ship being cast upon one of the many islands. He therefore elected to keep the wind on the port side and run through the typhoon. The wind and sea soon became more violent than the night before. It was awe inspiring. For the space of a couple of hours, I should say, it blew very hard and then there suddenly came a lull with no air stirring and a calm sea, the barometer having fallen with nearly a perpendicular curve.<sup>1</sup> The pressure on the ear drums was intense. It was plain that we were in the very center of the typhoon with our most severe trial with the elements just ahead. Some time around 4 a. m. the wind again suddenly arose and the fight was on. It soon became terrific and well over 100 miles an hour—estimated by the first officer as between 125 and 130 miles—the worst thus far we had experienced. This officer had been on the *Sheridan* when that ship went through the center of a typhoon in 1915 and when the wind recording device was put out of action at 110 miles per hour. Now ensued a time of desperate peril that even a landlubber could appreciate. Many a prayer went up that night from lips that had not uttered one since the days of "Now I lay me down to sleep" at a mother's knee. Many a rough nature felt stirring within him thoughts and feelings that had been strangers many a year.

The awful force and roar of the wind, the violent pitching and rolling, the absolute darkness outside, the puny efforts of the big powerful ship and its apparent helplessness, added to the fact that all were aware we were in an unknown position in a sea which in many places is uncharted and dotted with coral reefs and islands,—all convinced us that we were in the immediate presence of the Great Adventure and that only the guidance of the Divine Hand could succor us. The immediate scenes were enough to inspire terror. The big steam whistle could be only faintly heard above the wind when it blew to call the deck hands to clear away the wreckage caused by the fall of the top of the front mast with the wireless antennae. In the galley right outside my door, the pots and pans and dishes and glassware were thrown in continuous din and confusion from one side of the galley to the other. In staterooms trunks, water bowls and loose articles were flying around. It was dangerous to be about. The thick glass of a port was broken to bits by a wave and a woman near

<sup>1</sup> According to another letter from the same passenger of the *Thomas* the barometric minimum was 710.7 mm., it having been recorded at 3.30 a. m. If that be true, the barograph of the transport (see Plate III) was not sufficiently sensitive, at least at the time of the minimum.

ISOBARS AND BAROGRAPHIC RECORDS  
TYPHOON OF AUGUST 13 TO 21, 1917.

Plate III



N.B. The barometric readings for the isobars have been reduced to standard gravity.

by so cut by the glass as to require many stitches for her wounds. Many bones were broken and many persons bruised. In the troop decks many bunks were broken and fell to the floor. Several soldiers suffered broken legs and arms and collar bones. \* \* \* The first streak of dawn showed about 5.30 a. m. and though welcome, revealed an awful sea and thick driving sheets of rain. This violence kept up most of the day (Sunday, Aug. 19) until late in the afternoon it appeared that the wind and sea were somewhat abating. The barometer was slowly and steadily rising and it was plain that we were running out of the typhoon. But night was upon us and the master had not had an observation of the sun since Thursday noon, Aug. 16. The situation was perilous. \* \* \* We were destined for our third successive sleepless night. The wind and sea were still high. Sometime before midnight I was brought to my feet in the middle of the cabin with a bounce by a severe hard metallic blow on the side of the ship. \* \* \* To this date I have not satisfactorily settled what caused this blow. It may have been the violent impact of one of our lost life boats against the hull or one of the parts of a broken iron davit hitting the side. \* \* \* From some reason or other, misery or what not, the next event of which I speak was unknown to me until after the happening. I therefore now relate what I have heard from dozens of others. All I was conscious of was the ship listing at a severe angle and the trunks sliding across the room. About 11 p. m. the ship struck something lightly twice and in turn was struck on the starboard side by two big waves. The vessel remained rigid for several minutes (estimates vary from 5 to 25 minutes), not rolling in wave action but taking the seas over the fore-castle. During this time a soldier was swept overboard and his cries for help were heard by passengers as the wave swept him past. A life preserver was thrown toward him in the darkness,—all that could be done for the poor fellow. About this time the lookout up ahead saw a steep black shape close at hand but thought it was a low hanging cloud and said nothing or at least before he could, the first officer saw it from the bridge and immediately signalled to the engine room the emergency. We were merely drifting and the engines were immediately reversed. The ship drew away carefully. \* \* \* All this must have occurred between 10.30 p. m. and midnight. It is the universal belief of passengers borne out by talks some of them have had with ship's officers, that the dark black shape just ahead was in reality a steep high cliff. The further inference is that while drifting under little or no headway the ship struck a bank or bar of sand close to this cliff and while struck there took two big waves on the starboard side. Then when the engines reversed she pulled off and made away. \* \* \*

During all this time though I had not noticed the two jars, being one of the few that did not, I was conscious in my bunk that something serious had happened. A ship's officer went by the state-room and said to someone "I'm going to see if that wireless won't work." I have learned since that the master wanted to send the S. O. S. and say that he would try to keep his ship afloat until daybreak. In as much as he could not give our position this was but a last desperate chance to take and I was not so sick but that I could comprehend that in a flash. The wireless was out of commission. When the top of the mast went Saturday night, the antennae went with it. This latter was roughly secured again to the main mast but the violent wind had driven the rain through the cabin and short circuited the sending apparatus.

\* \* \* \* \*

Going down the hall on my side of the ship—starboard—I met perhaps eight officers and no women. The latter were in the cabins, some with life preservers on. Things were flying around loose and it was dangerous to be up. \* \* \* I had learned the situation by this time and was convinced in my own mind that it was our last hour. Since then I have found that that belief was universal amongst all except the very few who were in ignorance of conditions. So I went back to my cabin to await events or orders which promised to be immediate.

\* \* \* \* \*

During the rest of the night we tossed about the ocean by some chance avoiding the shoals and reefs of the Ryukyu group in the vicinity of Iriomote Island as later determined. There was a reaction and many people who had been awake more or less for three days dropped off into the sleep of exhaustion. After a while the passageways cleared and no one was to be seen. \* \* \* Dawn showed about 5.30 a. m. to show a foggy air but without rain for the first time since Thursday night. The sun was necessary for us to locate our position and danger was imminent until this could be known. With what anxiety on that Monday morning (my first on deck since previous Thursday) did the officers gather up forward and watch the master on the bridge with his sextant ready to take a "shot" on the wary sun should it show itself! At various times it would almost break through and finally at 2 p. m. it came out and an observation was made. In the meantime when the fog had lifted temporarily a little, a low lying coral reef not a mile away was seen off the port bow. Our course was changed to avoid it and about noon we passed an island of some size on the port side showing dimly through the mist. Still the land could not be identified. The wind was still gusty and strong. When the sun came out for an instant there was a sigh of relief. That night for the first time since Thursday no serious apprehension was felt. On Thursday evening the master of the ship left his regular course and

steered eastward with the idea of getting away from the chain of islands and into larger sea room. The typhoon increased in intensity but the ship's position was known until 8.30 p. m. Friday, the 17th. From then until he got his next observation of the sun at 2 p. m. on August 20th he did not know where he was. After the latitude and longitude had been determined from this observation he found his ship was near the island of Iriomote or some 100 miles northeast of where he guessed the ship might be. \* \* \*

During the 19th the typhoon crossed the northern part of Formosa moving northward. Its center passed near and to the west of Keelung at 2 o'clock in the afternoon. The following table shows the lowest barometer and highest wind during the typhoon as observed at several stations in that Island:

Station.	Baro- meter.	Day.	Hour.	Wind.		Day.	Hour.
				Velocity.	Direction.		
	<i>mm.*</i>			<i>m. p. s.</i>			
Koshun .....	733.9	August 18 .....	6.30 p. m.	23.9	W	August 18 .....	10.30 p. m.
Taito .....	729.7	do .....	8 p. m.	24.9	SSW	August 19 .....	9 a. m.
Takao .....	733.1	do .....	7 p. m.	37.7	W	do .....	7 a. m.
Tainan .....	735.1	do .....	8 p. m.	22.3	W	do .....	8 a. m.
Hokoto .....	737.4	do .....	midnight	36.8	NNW	August 18 .....	midnight
Karenko .....	725.0	August 19 .....	7 a. m.	26.4	NNW	August 19 .....	5 a. m.
Taichu .....	734.1	do .....	1 a. m.	10.1	W	do .....	4 p. m.
Taihoku .....	734.0	do .....	11 a. m.	19.3	{ ENE	do .....	2 a. m.
Keelung .....	733.2	do .....	2 p. m.	28.0	{ WSW	do .....	10 p. m.
					E	do .....	7 a. m.

\* Reduced to standard gravity.

The official statistics of the damage done by this typhoon in Formosa are as follows:

Persons killed .....	9	Houses destroyed .....	123
Persons missed .....	20	Houses partly destroyed .....	137
Persons wounded .....	10	Houses injured .....	140
		Houses drowned .....	77

The typhoon continued moving in a northerly direction until it inclined again northward in the Yellow Sea during the evening and night of the 20th. It probably filled up on the 22d near or over the Shantung peninsula.

#### THE TYPHOON OF AUGUST 18 TO 21, 1917.

This typhoon appeared on the 18th to the east of the northern part of the Ladrone Islands near 150° longitude E and 20° latitude N. It moved WNW until the morning of next day the 19th when it recurved northeastward to the north of the Ladrone and southeast of the Bonins.

## NOTAS GENERALES DEL TIEMPO.

Presión y temperatura.—La presión atmosférica media de este mes es algo más baja que la de agosto del año anterior, especialmente en las Visayas y Mindanao. La de Manila difiere de la normal de este mes en  $-0.04$  mm. y de la media mensual de agosto, 1916, en  $-0.47$  mm. Las presiones más altas se observaron el 24, y las más bajas tuvieron lugar los días 17 y 18 en Luzón, y los días 16 y 17 en las Visayas y Mindanao.

La temperatura media mensual difiere ligeramente de la de agosto, 1916, y es casi idéntica con la normal de este mes. Las temperaturas máxima y mínima absolutas fueron para Manila  $33.7^{\circ}$  C. y  $22.4^{\circ}$  C., las cuales se registraron los días 22 y 30, respectivamente. Las máximas y mínimas absolutas para Baguio fueron  $25.0^{\circ}$  C.,  $14.9^{\circ}$  C. en la cumbre del Mirador, y  $25.7^{\circ}$  C.,  $13.6^{\circ}$  C. en el valle.

Precipitación acuosa.—El total de lluvia de este mes es menor que la normal para la gran mayoría de nuestras estaciones de las Visayas y Luzón; mientras que es mayor para casi todas las estaciones de Mindanao. Las mayores diferencias corresponden a las estaciones de la costa occidental de Luzon, donde la precipitación acuosa mensual es notablemente menor que la normal, y asimismo a las de Joló e Isabela de Basilan, donde, por el contrario, la cantidad total de lluvia de este mes es extraordinariamente mayor que la normal.

## DEPRESIONES Y TIFONES.

Cuatro tifones se observaron durante el mes en el Extremo Oriente, dos de los cuales pasaron a través o muy cerca de la parte más septentrional de Filipinas los días 11 y 18, respectivamente. El otro cruzó la parte meridional de Japón el día 3, y el último recurvó hacia el NE entre las Islas Ladrones y Bonins, los días 19 y 20. Además, hubo los días 3 y 4 una especie de depresión o tifón en el Pacífico al NE de Luzón; pero los datos que poseemos no son bastantes para trazar su trayectoria con suficiente exactitud.

## TIFÓN DE 27 DE JULIO A 5 DE AGOSTO, 1917.

Este tifón se formó probablemente del 27 al 28 de julio a unas 300 millas al E del norte de Luzón, entre  $18^{\circ}$  y  $19^{\circ}$  latitud N y cerca de  $127^{\circ}$  longitud E. El 28 se movió hacia el N, el 29 al NNE, y los días 30 y 31 al NE; pero los días 1 y 2 de agosto se inclinó otra vez al N, viniendo así a cruzar el día 3 la parte occidental del Japón en dirección al N a través de las Isla Shikoku. Una vez en el Mar del Japón recurvó de nuevo el 4 al NE y se deshizo el 5 cerca de  $41^{\circ}$  latitud N y  $141^{\circ}$  longitud E.

## TIFÓN DE 10 A 14 DE AGOSTO, 1917.

A juzgar por nuestros mapas del tiempo de los días 9 y 10, parece casi cierto que este tifón pertenece al tipo de los que se forman muy cerca de Filipinas y que dan apenas tiempo para ser pronosticados con la debida anticipación. Aunque la mañana del 10 se había ya observado un descenso muy ligero de los barómetros a lo largo de la parte oriental de Luzón, con todo nuestros mapas del tiempo no dieron señales manifiestas de depresión o tifón hasta la tarde de aquel día, cuando el Observatorio de Manila envió el siguiente aviso de tifón:

Agosto 10, 4 p. m.—Hay esta tarde indicios de una depresión que se está formando en el Pacífico al E de Luzón.

El tifón se hallaba en este tiempo a unas 200 millas al E del norte de Luzón; y como se movía al WNW con una velocidad moderada, apareció a las 6 de la mañana

siguiente cerca del extremo NE de Luzón, acercándose a Aparri por el N. De hecho pasó unas pocas millas al N de Aparri a eso de las 9 a. m. del 11, habiéndose registrado allí la mínima presión de 734.7 mm. a las 8.30 a. m.

El Observatorio de Manila envió los siguientes avisos de tifón el día 11:

Agosto 11, 9.30 a. m.—El tifón está situado al presente cerca de 122° longitud E, entre 18° y 19° latitud N, moviéndose al WNW cerca de la costa N de Luzón.

Agosto 11, 4.15 p. m.—El tifón se hallaba a las 2 p. m. de hoy próximo a la costa N de Luzón cerca de 121° longitud E y 19° latitud N, moviéndose al WNW con una velocidad de 11 a 12 millas por hora.

En el Mar de China el tifón se inclinó ligeramente al NW el día 12, y de ahí que su centro entrase en China unas pocas millas al NE de Hongkong el día 13.

#### EL TIFÓN DEL "THOMAS" 13 A 21 DE AGOSTO, 1917.

Llamamos a este tifón el tifón del *Thomas* por haberse encontrado en el vórtice del mismo la noche del 18 al 19 el transporte americano de dicho nombre, según veremos más adelante. Podría llamarse también el tifón de Formosa por haber cruzado la parte N de dicha isla el día 19.

Según las observaciones hechas en Guam y Yap, este tifón se formó en los alrededores de 141° longitud E, entre 12° y 13° latitud N, habiéndose notado las primeras señales definitivas de su formación la tarde del 13. Se movió al WNW hasta el 15, en que empezó a inclinarse gradualmente al N. La tarde del 17 el Observatorio de Manila pudo ya anunciar como cierto que el tifón dejaba de ser peligroso para Luzón y que se movía hacia las Islas Batanes y Formosa. El aviso de tifón enviado entonces es como sigue:

El tifón está ahora al NE. de Aparri cerca de 20° latitud N y 123° longitud E, moviéndose al NW o al NNW. No hay peligro para Luzón, pues el centro del bagoio está avanzando por ahora en dirección a las Islas Batanes y Formosa.

En la tabla que puede verse en el texto inglés damos las observaciones hechas en Santo Domingo, Islas Batanes, durante este tifón. El barómetro había bajado hasta 736.6 mm. a las 5 a. m. del 18, hallándose entonces el centro ciclónico a unas pocas millas al NE de dicha estación.

A fin de que nuestros lectores puedan seguir fácilmente por sí mismos la trayectoria de este tifón desde el Pacífico hasta las Batanes y Formosa, reproducimos en la Lámina III las isobaras de 6 a. m. del 17, 6 a. m. del 18 y 11 a. m. del 19.

Fué durante la noche del 18 al 19 cuando el U. S. A. T. *Thomas* se encontró en el vórtice del tifón cerca de la costa oriental del S de Formosa. Debemos a la amabilidad del Coronel Bellinger, *Chief Quartermaster*, Manila, el poder insertar en la Lámina III la curva barográfica obtenida a bordo del transporte durante el tifón. La furia de los elementos que sintió el *Thomas* por dos o tres días fué tal, que se consideró casi un milagro que el vapor no se perdiese. Los que tengan interés en saber más pormenores sobre los efectos del tifón en el *Thomas* pueden leer en el texto inglés la descripción que de él hizo uno de los pasajeros.

Durante el 19 el tifón cruzó la parte N de Formosa, moviéndose al N. Su centro pasó cerca y al W de Keelung a las 2 de la tarde. La tabla siguiente de la mínima barométrica y la máxima velocidad del viento durante el tifón conforme a las observaciones hechas en varias estaciones de aquella isla:

Estación.	Barómetro.	Día.	Hora.	Viento.		Día.	Hora.
				Velocidad.	Dirección.		
	<i>mm. <sup>a</sup></i>						
Koshun .....	733.9	Agosto 18 .....	6.30 p. m.	<i>m. p. s.</i> 23.9	W	Agosto 18 .....	10.30 p. m.
Taito .....	729.7	id .....	8 p. m.	24.9	SSW	Agosto 19 .....	9 a. m.
Takao .....	733.1	id .....	7 p. m.	37.7	W	id .....	7 a. m.
Tainan .....	735.1	id .....	8 p. m.	22.3	W	id .....	8 a. m.
Hokoto .....	737.4	id .....	media noche	36.8	NNW	Agosto 18 .....	media noche
Karenko .....	725.0	Agosto 19 .....	7 a. m.	26.4	NNW	Agosto 19 .....	5 a. m.
Taichu .....	734.1	id .....	1 a. m.	10.1	W	id .....	4 p. m.
Taihoku .....	734.0	id .....	11 a. m.	19.3	{ ENE	id .....	2 a. m.
Keelung .....	733.2	id .....	2 p. m.	28.0	{ WSW	id .....	10 p. m.
					E	id .....	7 a. m.

<sup>a</sup> Corregido por gravedad.

Las estadísticas oficiales de los daños causados por este tifón en Formosa son como siguen :

Personas muertas .....	9	Casas destruídas .....	123
Personas desaparecidas .....	20	Casas destruídas en parte .....	137
Personas heridas .....	10	Casas perjudicadas .....	140
		Casas inundadas .....	77

El tifón siguió moviéndose en dirección al N hasta que se inclinó otra vez al NW en el Mar Amarillo durante la noche del 20. Probablemente se deshizo el 22 en o cerca de la península Shantung.

EL TIFÓN DE 18 A 21 DE AGOSTO, 1917.

Este tifón se formó el 18 al E de la parte N de las Islas Ladrones cerca de 150° longitud E y 20° latitud N. Se movió al WNW hasta la mañana del 19, en que recurvó al NE por el N de las Islas Ladrones y SE de las Islas Bonins.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.\*

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

Main meteorological data table with columns for Day, Air temperature (Mean, Max, Min), Underground temperature (0.25, 0.50, 1.50, 2.50 meters), Radiation (Min, Max), Evaporation (Free, Shelter), Wind, Clouds, Rain, and Miscellaneous. Includes a 'Departure from normal' row at the bottom.

\* 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.



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 <sup>b</sup> (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. <sup>c</sup>	Free exposure (total).	Shelter (total).
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1	635.01	16.3	18.8	10.55a.	14.9	9.35p.	20.2	10.40a.	15.5	9.00p.	99.2	13.7	14.5	43.3	0.6	0.1
2	35.40	17.2	18.9	2.20p.	15.4	0.05a.	19.7	2.20p.	15.7	0.05a.	99.2	14.5	14.4	44	0	0
3	35.34	17.5	20.8	0.20p.	15.8	11.15p.	21	10.40a.	16.2	11.45p.	97.8	14.6	16.2	54.1	0	0
4	34.78	16.9	19.9	10.20a.	15.4	2.25a.	20.4	10.20a.	15.7	8.40p.	97.5	14	15.3	42.5	.2	.1
5	35.40	16.8	20.5	2.50p.	14.9	8.10p.	20.9	3.50p.	15.2	8.10p.	94	13.4	14.6	55	1.8	1
6	36.40	18	22.3	11.30a.	15.8	0.35a.	23.5	3.35p.	15.4	0.40a.	87.2	13.4	14.3	60	1.1	.9
7	35.86	17.8	21.9	0.30p.	15.5	6.00a.	23.2	10.10a.	15.1	3.30a.	93.7	14.2	14	53.5	.9	.5
8	35.51	18.3	24.9	Noon	15.2	12m.n.	25.7	2.25p.	15.2	2.00a.	89.5	14	14	58.7	2.4	1.9
9	35.84	18.2	22.8	2.40p.	15.1	2.50a.	22.7	0.15p.	14	6.00a.	88.8	13.8	12.5	53.2	1.6	.7
10	35.46	17.9	22.8	9.30a.	15.9	5.50a.	23.7	2.00p.	15.5	5.45a.	94.5	14.4	14.7	56.7	.6	.5
11	33.12	16.5	17.5	10.20a.	15.5	8.10p.	19.5	10.15a.	15.8	1.25p.	99	13.9	15.4	25.5	0	0
12	35.57	18	22.5	0.20p.	16	2.05a.	23.8	0.25p.	15.4	12m.n.	88.3	13.5	15.1	54.2	2.4	1.3
13	36.45	18.7	23.9	1.00p.	15.5	3.10a.	24.5	2.15p.	13.6	5.50a.	77.8	12.6	12.1	58	2.8	1.8
14	35.86	19.3	24.3	0.55p.	16.2	3.10a.	25.1	0.50p.	15	0.45a.	82.2	13.7	13.5	59.2	2.8	1.3
15	35.06	18.8	23.6	1.05p.	15.8	6.05a.	25.2	2.00p.	14.5	6.10a.	84.3	13.6	13.5	57.3	3.2	1.5
16	33.25	17.1	21.5	10.35a.	14.9	5.55a.	23.6	11.50a.	14.6	5.50a.	93.3	13.6	13.4	53.9	1.1	.9
17	31.11	16.6	17.5	10.10p.	15.2	5.00a.	18.4	10.05a.	14.6	6.00a.	94.5	13.3	13.4	30.5	0	0
18	31.23	16.6	18.2	1.55p.	14.9	0.05a.	19.2	11.10a.	14.5	2.30a.	98.2	13.8	14.7	48.9	0	0
19	33.77	16.9	17.8	9.55a.	16.3	2.15a.	18.9	9.45a.	16.7	2.30a.	98	14	15.2	33	0	0
20	35.56	17.5	20.1	2.05p.	16.1	10.05p.	20.5	2.15p.	16	12m.n.	92.8	13.8	15.8	36.8	.6	.7
21	37.19	18.6	23.4	2.55p.	15.8	12m.n.	24.7	1.40p.	15.5	5.00a.	88.3	13.9	14.3	56.8	1.7	1.2
22	37.61	19	24.2	0.35p.	15.7	1.10a.	24.8	10.20a.	15	3.20a.	83.5	13.7	13.2	63.2	2.9	1.3
23	37.64	18.6	25	9.30a.	16.1	7.40p.	25.1	10.30a.	15	5.30a.	85.3	13.7	13.2	61.7	2.5	1.6
24	38.01	19	24.3	1.15p.	16.1	4.35a.	24.5	10.40a.	14.3	5.40a.	78.8	12.8	12.4	59.9	2.2	1.5
25	37.40	17.6	23.3	9.10a.	15.8	3.00a.	24	1.45p.	14.6	5.45a.	88.8	13.4	13	58.7	.8	.6
26	36.36	18.7	23.3	0.45p.	15.9	2.50a.	24.7	1.50p.	15.5	4.20a.	90.8	14.6	14	61.2	1.5	1
27	36.39	19.2	24.8	2.05p.	16.3	5.55a.	25.2	2.05p.	16	5.50a.	89.5	14.8	14.3	60.1	1.5	.8
28	36.97	18.8	24.4	1.20p.	16.5	4.30a.	24.5	1.00p.	16.1	6.00a.	92.2	14.9	14.5	58	1	.9
29	35.64	18.8	24.3	1.50p.	15.9	5.40a.	23.7	11.20a.	15	4.50a.	91.8	14.9	13.9	57.5	1.7	.6
30	34.63	19.2	24.5	10.40a.	16.4	5.25a.	24.7	10.35a.	16.5	2.25a.	90.3	14.8	15.3	61.4	1	.9
31	34.15	18.9	23.8	10.55a.	16.2	5.55a.	25.3	11.55a.	15.2	5.50a.	92.2	15	14	58	1	.9
Mean	635.42	18	22.1		15.7		22.9		15.3		91	13.9	14.2	52.7	1.3	0.8
Total															38.9	24.5

Day.	Prevailing direction. <sup>d</sup>	Wind.			Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
		Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Form and direction.				
						Upper.	Lower.			
1	SW, W	Km. 603.2	Km. 50.1	SW	0-10.	Ci.-Cu.	Fr.-N. SW	h. m.	mm.	☉ ☁ a. ● p.
2	W, SW	640.9	45.3	W	10		N.	0 00	34.3	d2 a. ☁ 2 a. p. ● p.
3	W	548.3	29.3	W	10		N.	1 40	63.2	☁ a. ☁ 2 p.
4	W	380.5	31.2	W	10		N.	0 50	38.8	☁ a. p.
5	SW	367.2	37	SW	10	A.-S.	Fr.-N.	1 20	23.8	☁ a. ☁ 2 p.
6	W	274	25.7	W	10	A.-Cu.	S.-Cu., Fr.-N.	5 10	5	☉ ☁ p.
7	W, E	285.5	20.4	W	9.9	Variable	Fr.-N. NNW	3 20	17.8	☉ ☁ ☁ ☁ ☁ ☁ p.
8	E	329.5	31.1	E	9.1	Ci.	W Cu. ENE	6 20	16.5	☉ ☁ a. ☁ ☁ d ☁ p.
9	E quad.	208.8	16.3	NE	9.4	Ci.-S.	Cu.	4 15		☉ ☁ a. ☁ 2 p.
10	W, NW	361.5	25.1	W	10	Ci.-S.	S. NNE	2 05	19.5	☁ 2 a. p. ☁ ☁ ☁ p.
11	SW, W	1,251.4	85.3	W	10		N.	0 00	214.1	☁ 2 a. p. ☁ ☁ ☁ p.
12	SW	427.4	38.1	SW	9.6	Ci.-S.	Fr.-N. SSW	4 05		d ☁ a. ☁ p.
13	W	256.4	22.3	W	9.7	Ci.-S.	Cu.	6 15		d ☁ a. ☁ 2 a. p. ☁ p.
14	W quad.	244.3	22.5	W	5.7	Ci.	Variable	7 30		d ☁ a. ☁ ☁ p.
15	N, NW	436.9	31.7	W	6	Ci.	Fr.-N. N	9 05		d ☁ a. ☁ p.
16	N	444.8	26	NW	9.9	Ci.-S.	Fr.-N. N	3 00	9.9	d ☁ a. p.
17	W, NW	869.8	52.8	W	10	A.-S.	Variable	0 00	62.7	☉ ☁ a. ☁ 2 a. p. ☁ 2 p.
18	SW, W	1,192.5	61.2	SW, W	10	A.-S.	N. W	0 00	52.3	☁ 2 a. p. ☁ 2 p.
19	SW	834.4	48.9	SW	10		N. WSW	0 00	18.3	d ☁ a. ☁ ☁ a. p.
20	SW quad.	387	36.4	SW	10	Ci.-S.	N., Fr.-N. SW	0 00	1	☉ a. d ☁ 2 p.
21	W	289.1	25.2	W	9.9	Ci.-S.	Cu.-N. SW	4 15	5.6	d2 a. ☁ ☁ ☁ ☁ p.
22	Variable	319	21.7	W	7.1	A.-Cu.	Cu. NE	6 05		☉ a. d ☁ ☁ ☁ ☁ p.
23	W, NE	316.4	28.5	NE	6	Ci.	Cu.	6 10	39.1	d2 a. ☁ ☁ ☁ ☁ p.
24	W quad.	206.6	24.6	W	5.6	Ci.	Cu.	6 45	1.3	d ☁ a. ☁ ☁ d2 ☁ p.
25	W	257.9	22.2	W	7	Ci.	N. SE	3 35	5.1	d ☁ a. ☁ ☁ ☁ p.
26	Variable	255.9	19.9	W	8.3	A.-Cu.	Cu.-N.	6 20	1.8	☉ ☁ ☁ p.
27	E quad.	279.1	20.9	W	6.1	Ci.	Cu. SSE	6 30	3	d a. d ☁ ☁ ☁ ☁ p.
28	Variable	260.8	20.6	W	8.4	Variable	Cu.-N. ESE	5 05	1.3	d a. ☁ ☁ ☁ ☁ p.
29	Variable	256.5	20.9	W	7	Ci.	Cu.-N. N	5 10	13.8	d2 a. ☁ ☁ ☁ ☁ p.
30	W, E.	309.1	20.6	W	6.9	Ci.-S.	Variable	5 15	7.8	d2 a. ☁ ☁ ☁ ☁ p.
31	Variable	234.7	19.5	SW	7.1	Ci.	SSE Cu.	5 25	2.5	d2 a. ☁ ☁ ☁ ☁ p.
Mean		430	31.7		8.7			3 44		
Total		13,329.4						115 45	677.4	

<sup>a</sup> 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.

<sup>b</sup> The barometric readings of this station are not reduced to sea level.

<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.

<sup>d</sup> 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, 1917.

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	3.1	0.5		1		3.6	9.1	39.1	0.3	6.9	1.3	4.6	0.3	4.5	11.7	
Isabela, Basilan	25.1	19.5	1.5	3		6.9		18.3	1	22.9	2.5	23.6		.8	18.5	11.5
Zamboanga		5.3	7.4	12.2		3.8				3	3.8	10.9				
Davao		19	2.5				20.8	2.5				2.5			33.3	9.9
Cotabato		2.3	5.6					5	3				29.5	42.2		7.6
Cagayan, Misamis	1.3		7.4	13.2				6.1				15.2			17.8	58.4
Butuan			.5	5.9				7.4	.8	.3	2.8	8.9	.5			2.8
Mambajao			6.9	3.3		37.1			3.8	1.8		4.8				
Dumaguete												26.7				
Yap, W. Carolines			4.1	.8	1	10.7	2.5	.3	2				21.6	7.1	6.1	16
Tagbilaran			33.8	63			32.5					16.3				
Iwahig	14	5.8	4.2					.3	1.3			.3			20.8	
Surigao			9.9	2.3				3.6	.3						23.3	
Maasin		12.7	53.6					7.1		5.6					11.2	
Cebu			28.4	16.3				.8	2.3		3.6					
Iloilo			5.1	34.6				3.8	24.1	.8		6.8				
San Jose Buenavista	8.4		2.1	20.1	.3			13.7				1.5			28.7	37.1
Cuyo	2.8		8.6	10.2					38.3			.8			4.5	55.4
Ormoc			33.5	38.2				17.3						.3	9.6	13.5
Guiuan		1.8	6.6	.3				2.3								
Tacloban	21.3	.5	3	4		2.6	12.5	6.1	7.6	9.1				15		.3
Capiz	46.5				2.8	16.8	25.7		2.5	2.3		.3	5.8			.5
Borongan	6.6	10.7	55.4	.3		.3	2.6	1.8	2.5	74.2		1.3		1.3		
Catbalogan			6.6	7.7		1	52.6									11.7
Calbayog			26.5	66.3		1	12.5			19						.5
Masbate			2.8	21.8			23.6		7.1	.5		20.3			3.8	.3
Romblon	1.3		1	4.1												
Batag			3.8	22.9		4.3	23.4				5.8	2.8				
Sorsogon			32.8	47.8	1.3		6.4	2.5	4.1				1.8		15	14
Legaspi			11.1	19.6	9.1		1.8	21.2	.3	1			3.9		7.1	5.3
Sumay, Guam	7.6	12.7		30.5	16.6	46.9	10.2	10.2	61	8.9			2.5	53.4	1.3	14
Calapan				6.1			.8		34.8							
Virac			25.9	27.7		29.2	33	20.9		1.5					17.9	
Naga	5.6		17	41.4	5.1		14.2	2.8								
Batangas			13	4.1			14.8	6.6						1.3	1.3	4.1
Lucena				12.7	.8		2.5	8.9	8.9		11.5			2.8		
Atimonan	9.7			36.6			27.4	9.9	4.1	8.9						
Ambulong, Tanauan				6.1	.5		3		3.1		1.3					
Canlubang, Calamba			1.3	16.7			5.8			.5	3.5	21.8	2	6.6		
Paracale			1	32.3			18.5	46.7	3.1						14.2	
Santa Cruz, Laguna			2	27.5			2.3	2.1	4.3		.3	12.4				2.3
Manila	6.5	5.1	79.8	10.2			57.6	37.9	3	.1	11.2			1	1.1	.4
Antipolo	9.4	31	54.9	24.3	1.3		8.4	10.2	3	10.9	18.5			12	11.7	2.8
Iba	27.9	17.3	65	102.6	14.5		6.5	14.5	1.8	20.6	27.7	2.3				2.5
San Isidro	1.8	2.9	7.3	5.3	1		11.5		.8	3	6.6				1.3	
Tarlac	3.6	2.1	30.4	3	.5	4.6	7.1	3	.8	2.3	13.2	2.3	27.9			2.3
Baler	1		1.8	2.3		23.1	6.6		5.3	9.1	2.1				14	3.3
Dagupan	18.5	3.3	.6	65.8	1.8			76.7		.6	23.3					10.2
Bolinao	1.8	7.6	.3	38.6	9.9			21.6				30.5	54.6	15.2		2.8
Baguio	13.9	34.3	63.2	38.8	28.8	5	17.8	16.5		19.5	214.1					9.9
San Fernando, Union	20.1	11.2	14.2	5.5	14.2			2.5		74.2	36.7					19.3
Echague		16.8	51.3					.3	1.1	6.4	25.7					
Candon	1.8		47	8.1	2.8			25.4		3.8	151.4					8.6
Vigan	22.9	13.2	63.5	42.4	.8			18.3		16	124.8					54.4
Tuguegarao	13.8	10.7	18.6	6.9	4.6	25.6	9.4	2.8		93.7	36.1	2.8				
Laog	1.8	44.7	216.8	7.9	.8	3.6		1.5		146.1	268.2					29.1
Aparri	2.3	15.9	27.2	2	8.7		2.3	2.8	11.7	63.8	32					16.8
Cape Bojeador	10.2	2.5	25.4	5.1						10.2	87.2			16.5		
Santo Domingo, Batanes	1	16.3		38.5	1.7		1.5	2.3	.3	.2	2.5				1.7	28.1

\* No observation.

Daily rainfall at the stations of the Weather Bureau, August, 1917—Continued.

Station.	Day of month.															Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
Jolo	3	1.8	5.1	1.8	78.3	21.3	3.3	11.7	98.6	27.5	8.6	2.3	55.4	4.3	24.4	433.4
Isabela, Basilan	7.1	8.9	2.8	38.1	12.2	5.1	6.4	24.4	29	1.3	1	8.1	13.2	24.9	58.9	396.5
Zamboanga	19.8		.5	5.3		3.9	5.6	2.1	1.8		.3	1.1	3.1	18.4	25.7	134
Davao	3.3		9.9	2.5	3			2.5		3.8						123.1
Cotabato			28.4		27.9	11.9	17.5	3.9	32	1.6	.8	8.4		17.6	20.1	257.6
Cagayan, Misamis		1.8	9.7	2				38.9	2.5	1.5		1	29.2	15.7	30.5	252.2
Butuan			.3		3	23.4		39.9	2.8	.3		22.9	18.5	30.2	.3	169.8
Mambajao			4.6	2.5			6.1	6.6			31.2	2.5	1.6		14.8	127.6
Dumaguete	13		6.6				23.9	13	5.8					16.1	7.1	112.2
Yap, W. Carolines	3	8	8.4	5.6	2.8	12.4	8.4	15	20.6	30.5		32.8	4.3	8.9	3.3	229
Tagbilaran			7.1				1.3	13.7			5.1					172.8
Iwahig	2.3	13	21.6	.8				.5		19.9	.3	12.7	49.8	25.2	2.7	195.5
Surigao	10.2							27.4	.8					3.1	35.3	116.2
Maasin		26.7						46.5					5.1		38.9	207.4
Cebu					.5		22.9	6.9	3.3	4	6.1	10.2	1.6	8.9	24.6	140.4
Iloilo	50.7	119.8	4.3			1.3		2.3		1.3		.5		.5	119.4	375.3
San Jose Buenavista	38.9	83.8	15.8	1.3		9.4	7.9	.3	.3	4.8	.3	.5		14.2	97	386.4
Cuyo	44	43.2	5.6				8.4		12.4	4.8	1.8	1.5	8.9	6.6	15.5	273.3
Ormoc	4.6		.5				7.4	5.3	.8	.5	1.3	9.4	.5	13.2	3.1	159
Guiuan							.3	1.3			3.6	24.1	3.3			43.6
Tacloban	.8						5.4		2.1		3		17.8	4.8		115.9
Capiz		4.6	22.9	16		7.6	4.6	2.5	8.9	.3	.5			1.8		167.1
Borongan	1.8							8.1	5.6							2.8
Catbalogan	7.4	4.3				6.6	7.4	8.9			3		1		19.3	136.8
Calbayog	2.3	1.3	18		8	4.8	15.5	1.3	7.2	.5	1	13.8	2.3		42.9	237.5
Masbate	22.6		6.1						42.7	9.1	17.5				1.3	179.5
Romblon	12.2	41.4	15.9			.3	3.8	27.2	1.3	3.8		.3	1	7.1	23.1	144.6 <sup>a</sup>
Batag	20.3		26.4												4.6	114.3 <sup>b</sup>
Sorsogon	10.9		7.4				5.3		6.9	25.9				3.3		185.4
Legaspi	14.2	11.4				1			6.9	4.6					8	112.4
Sumay, Guam		13.9	8.9					45.7	1.3	10.2	24.1	22.9	40.6	7.6	19.1	470.1
Calapan	1	21.6	.3			41.1		.3	2.8		1.3					110.1
Virac	1.8	4.6					1.1	1.8					15.2			180.6
Naga	7.1	5	30				1.8	.9	3.6	.1	1.3	3.6		1.8	4.8	146.1
Batangas	5.1	18.8	2.8		7.4	1.3		.9				.3	1.5	5.3	6.3	103.1
Lucena	1	29.5	1.3			2.8	.3		9.1		.8	4.1			13.5	101.4
Atimonan		6.1	25.7			.5		.5								129.9
Ambulong, Tanauan	4.1	7.4	1.3		6.4	1	2		3.3		.5	1.5		10.9	3.6	61.6
Canlubang, Calamba	5.3	10.2	.5		32.5	1.3	1	.8	1.3		1.3	3	.5			115.9
Paracale		2.1				6.6	1.8								.5	115.9
Santa Cruz, Laguna	3.8	4.6			4.3			1		9.4		7.4	8			85.3
Manila	10.7	62.7	3.3		17	1.1	21.2	2		3	.5	7.4	8			359.4
Antipolo	5.5	45.7	.8	1.3		2.5	3	16		3		1.3	3	6.3	19.3	359.4
Iba	50.2	63.8	87.3	32			3.3	9.9	1.5		3.6	3.8	15.2	6.8	5.8	305.7
San Isidro	2.3	14.9	42.5			.8	8.9	15.3	78.2	36.6	8.9	1.5				556
Tarlac	3	15.7	13.2	6.4			5.6	12.7	22.4	5.6	2	26.4	16.5	13.2		251.4
Baler		5.1	6.1			8.4	.3					4.8	5.6			245.8
Dagupan	2.6	4.1	8.1	.5	1			.5	5.9		.5		5.1	.3	2	98.9
Bolinao	4.8	3.8	106.7	4.1			2.8	.5	1.3	3		5.8	1	37.8		230.9
Baguio	62.7	52.3	18.3	1	5.6		39.1	1.3	5.1	1.8	3	1.3	13.8	7.8	2.5	354.5
San Fernando, Union	2	38.6	68.8	1			4.1	2.3	2.3			1.8				677.4
Echagüe	2.8				22.6	3	12.7		44.7	5.6	1			6.1		318.8
Candon	11.7	70.9	40.9				8.1	23.1	4.1						6.6	200.1
Vigan	6	54.7	52.3	2				2.5	1.8							414.3
Tuguegarao	40.9	3														476.6
Laosg	20.3	44	81.9		6.4					8.1						277
Aparrí	44.7	7.9						.8	11.9	1						874.6
Cape Bojeador		18.6	5.8													251.8
Santo Domingo, Batanes	61.2	113.9	11.7											3		181.5
															3	281.2

<sup>a</sup> 26 days of observation.

<sup>b</sup> 28 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, AUGUST, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cotabato.		Cagayan, Misamis.		Dapitan.		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	30.5	21.5	32.1	22.3	29.6	23.9	31.2	21.4	31.5	22.6	32.2	21.8	34.8	22.6	32.9	21.5
2	31	21.9	33.1	22.6	29.8	23	31.2	21.5	32.3	23.1	32.6	22	34.4	23.1	33.5	22.2
3	30.5	21.6	31.1	22.1	29.2	23.2	31	22.7	32.5	23.8	31.6	21.8	33.8	21.8	33	22.2
4	28.1	22	31.6	21.6	30.3	22	29.2	22.4	31.5	22.9	29.3	22.8	31.7	22.6	31.9	22.6
5	31.9	20.3	34.6	22.6	31.9	23	31.2	21.6	32	23.1	30.4	21.9	33.2	21	32.6	21.9
6	30.9	21.4	32	22	30	22.2	31.7	21.5	32.5	23.6	31.3	22.3	35.4	22.4	33.7	23.1
7	28.5	20.9	30.1	22.1	28.3	23.5	32	22.5	31	24.2	31.9	22	34.1	21.8	34.3	22.7
8	29.9	20.7	30.6	22.6	29.7	23	30.2	22	31.3	23.6	32.1	21.9	31.9	22.6	33.6	22.5
9	30	20.5	31.1	22.4	30.5	23.5	31.3	22.5	32.5	23.1	31.6	22	32.8	22.5	34.1	22.3
10	30.4	20.8	31.6	22.1	29.8	23.8	31.9	20.8	32.5	22.6	32.3	21.8	33.1	22.5	33.9	21.7
11	30.5	21.3	32.9	21.5	30.1	23	30.9	22	32.4	23.2	31.2	22	33	22	33.1	22.9
12	30.4	21	33.1	22.6	29.6	23.5	31.4	22.2	32.8	24.2	32.2	22.7	34.1	23.3	34.6	23.6
13	30.2	21.7	32.1	22.7	28.5	23	32.7	22.9	34.3	24	33.8	22.3	33.4	22.6	34.1	22.7
14	29.7	20.8	32.6	22.4	29.3	23.6	31.8	22	31	21.9	34.8	23	34.5	22.3	35.1	23.4
15	30.4	20.9	32.1	23.1	29.1	24.1	31.7	22.5	30.2	23.2	32.6	22.6	32.4	22.6	34.4	22.9
16	30.9	21.4	32.6	22.6	29.2	22.5	31.4	22	30.7	22.9	34.8	22	32.7	22.3	35.4	23.6
17	31.8	21.4	31.1	22.4	30.3	24	31.7	21.9	31	22.9	33.6	22.4	32.3	23.3	34.5	23.1
18	30.9	22.9	30.1	22	29.9	23.7	31.3	22.7	31.7	23.6	32	22.5	32.5	22.6	35.5	23.7
19	30.4	21.7	31.6	22.1	29.6	23.2	30.8	22.5	32.8	23.3	32.2	22.9	33.3	22.7	35.2	23.9
20	29.2	21.8	33	21.6	29.5	23.1	31.3	20.8	31.7	21.6	32.5	21	32.3	21.8	34.1	22.4
21	30.6	22.4	32.1	21.7	31	22.8	29.5	21.5	33	23.2	33.9	21.4	33.1	21.8	35.9	22.2
22	29.5	20.4	32.5	22.1	28.8	24	32.2	21.5	33.5	21.3	34.4	21.6	33.2	22.6	33.9	22.7
23	28.4	21.7	33.6	22.4	29	23.9	30.8	21.5	31.9	22.7	34.1	21.8	33	22.7	34.8	22.4
24	30.3	21.4	33.3	21.6	31.5	22.8	30.7	21.9	31.9	23	32.3	22.5	33.9	22.7	33.6	23.2
25	29.8	20.9	30.6	22.6	30.3	23.3	32	21.7	32.4	23.1	34.1	22	33	22.6	34.1	22.5
26	28.9	20.7	33.4	22.7	29.3	22.9	31.6	22.5	31.2	22.3	33.9	21.5	33.2	22.5	35.1	22.2
27	29.5	20.3	33	22.3	29.3	23.2	32	22.5	31.5	23.6	34.6	21.8	33.4	22.4	34.3	23.1
28	28.5	21.1	29.1	23	27.5	23.7	31.7	22.5	31	22.9	33.4	22.5	32.6	23	34.9	23.7
29	29.5	20.7	30.8	22.3	28.5	23	32.3	22	30.7	23.1	34.6	21.9	31.7	22.2	33.1	22.4
30	28.9	21.8	28.6	22.5	28.5	23.8	32	21.9	29.5	22.6	35.2	22.2	31.8	21.8	33.4	22.7
31	30.9	23	29.3	21.3	28.5	23.1	31.2	21.8	28.4	23	30.8	22.7	30.5	22.2	32.1	21.9
Mean	30	21.3	31.8	22.3	29.6	23.2	31.4	22	31.7	23	32.8	22.1	33.1	22.4	34	22

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao.		Maasin.		Cebu.	
	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	30.7	25	32.6	22.9	33.4	23.1	32	24.5	31.7	21.9	33.1	24.3	32.7	23.5	31.1	25.9
2	32	22.9	31.6	22.6	29.4	23.5	33.2	23.9	32.6	22.4	32.3	23.1	32.4	23.6	31.6	25.2
3	30.2	22.8	30.8	22.9	30.4	24.5	30.8	23.2	33.2	20.7	29.5	23.5	28.5	22.4	30.6	23.4
4	28.6	22.2	29	23.6	31.2	25	27.6	22.4	30.6	22.9	27.4	23.4	30.3	22.5	28	22.5
5	29.7	22.6	29.8	22.3	34.2	24.6	32.2	22.6	32.4	22.5	31.2	23	33	23	31	25.5
6	31.3	22.4	30.8	22.5	30.7	24.5	32.6	22.5	32.6	22.4	32	23.4	33.4	23.2	32.9	24.5
7	31.4	22.7	30.7	23.1	32.2	24	32.9	23.3	32.5	22.1	30.8	23.5	34	23.5	31.5	24.3
8	30.3	24.1	30.8	22.7	33.2	25.2	30.3	23.4	32.2	21.9	29.6	23	32.4	23	31.6	24
9	31.1	24.2	33.5	23.4	34.2	24.2	31.7	23.5	32.1	22.1	31.2	23	33	23.5	31	24.4
10	31.4	22.6	31.9	22.8	31.8	23.5	32.3	22.7	33.1	21.6	32	23	33.2	23.6	33.9	24.6
11	30.4	23	31.3	22.9	32.7	24.5	31	24	33.4	21.4	30.4	23.4	32.8	24	31.5	24.5
12	31.2	23.2	32	22.6	32.2	24.2	32.5	23.9	31.6	22.6	32.3	23.4	32.5	23.5	32	25.5
13	31.1	22.7	30.9	22.5	31.7	25.2	31.9	23.5	31.3	21.8	31.3	23.6	35.5	24.5	33.1	25.5
14	32.1	23.6	31.8	24.5	31.9	23.6	32.5	23.5	33.6	21.3	31.9	23.6	34	24.4	32	25.5
15	33.3	23.2	33	24.5	31.1	23.7	32.2	24.3	32.9	21.9	32.2	24.2	32	24.1	30.6	25.5
16	33.1	25.6	32.1	23.5	32.7	23.4	32.6	25	33.8	21.4	32	23.8	34	23.6	31	25.8
17	32.6	26.7	31	23.7	33.2	25.9	32.2	25.5	32.5	22.4	31.9	25.2	32.6	23.9	29.9	27
18	32.1	27.1	32.8	24.3	33.6	25.1	31.8	25.5	30.1	22.4	31.4	24.2	34	25.4	31.5	26.8
19	31.6	23.2	32.3	24	33.2	24.1	32.5	23.6	31.8	21.5	31.5	23.6	33.4	24.5	30.6	26.1
20	31.3	22.1	30.8	21.6	32.7	24.1	30.7	22.6	31.5	22.1	30.9	22.8	33	24	30.5	25
21	31.2	22.6	31.2	23	33.5	25.3	32.4	23	31.5	22.7	31.6	23.3	33.3	23.7	32.2	24.7
22	31.5	23	31.4	24	32.2	23.5	32.6	23.5	32.3	21	32.4	23.2	33.8	23.8	33.3	24
23	31.1	21.7	31.5	23.2	31.2	25	32.3	22.6	33.1	21	31.7	22.8	33.5	23.5	33	25.5
24	30.4	23.2	31.4	22.5	33	24.5	31.7	22.4	30.5	22.6	31.6	23	35	24.5	32	22.7
25	31.1	22.4	31.7	22.7	32.6	23.2	32.4	22.4	32.2	21.6	30.4	22.3	35	23	32.6	24.2
26	30.7	23.3	31	22.2	31.3	23	31.7	23.2	31.3	21.6	31.3	24	33	23.4	32	24
27	32.1	23.5	30.9	23.5	32.5	23.1	31.6	22.7	31.9	21.2	31.2	23.3	34.5	23.7	31.5	24
28	32.2	23.8	30.9	23.5	32.5	23.8	31.4	22.5	31.8	21.8	31.3	24	31	23.2	32.8	24.9
29	31.2	23.5	31.4	22.5	32.2	22.6	30.2	23.5	31.8	21.3	30.9	24.2	30.8	23.5	30	24.5
30	32.6	23.2	31.9	22.6	26.7	24	29.7	23.4	32.2	21	31.7	23.4	30.2	24	30.5	24.5
31	29	23.6	30.8	23.2	33.2	23.3	31.4	24.4	29.6	22.4	26.4	23.8	28.8	23.2	30.1	22.8
Mean	31.2	23.4	31.4	23.1	32	24.1	31.7	23.5	32.1	21.9	31.1	23.5	32.8	23.7	31.5	24.7

Maximum and minimum temperatures at the stations of the Weather Bureau, August, 1917—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	30.2	23.3	30.8	23	30.8	24.5	32.4	23.3	33.8	27.2	34.3	23.6	34	23.1	33.6	22.7
2	31	24.5	32.2	23.5	31.8	25.1	32.4	23.8	32.6	27.5	33.9	23.3	33.9	23.3	33	22.7
3	30.5	25.2	30.9	23.4	32.4	25	30.4	23.4	29.9	25.5	32.6	23.9	33.9	23.4	32.2	23
4	26.2	21.9	31.2	23	26.9	23.8	27.6	22.4	29.4	24.6	27.2	23.5	27.2	24	28.8	22.9
5	31	24	29.7	23	30.4	23.9	31.7	21.8	32.9	24.8	32.6	23.4	33.6	23.2	32.1	22.1
6	32	24.2	31.7	22.5	32	23.3	32.1	21.7	33.9	23.4	33.7	23.3	33.6	23.2	32.4	22.4
7	33	24	32.3	23.1	32.5	24.4	32.2	21.9	32.3	23.1	33.6	22.7	33.2	23.2	32	21.4
8	30.7	23.5	31.6	23.3	31.3	24.8	32	21	31.7	22.5	32.4	22.1	32.6	24.1	31	20.9
9	30	23.8	30.2	23.6	30.6	23.6	32.2	22.9	32.4	25.5	32.7	23.6	33	23.9	33.1	22.6
10	31.5	25.3	32.2	23.5	32.7	24.7	32.8	23.4	33.6	25.3	33	22.9	33.9	24.1	34	22.3
11	31.3	25	32.6	23.1	31.7	24.3	32.4	22.8	33.8	27.6	31.7	23.3	35.4	24.7	32.1	22
12	31.5	23.4	32.2	23.7	31.8	24.6	32.6	22.1	33.8	25.8	33.1	25	33.5	23.8	32.1	22.8
13	32.1	24.4	32.4	23.9	32.5	25	33.4	22.2	34.5	24.4	33.7	24.6	34	23.7	32.8	22.7
14	33.1	24.2	32.2	24	33.4	24.3	32.7	22.4	34.3	23.1	35.7	24.2	33.8	24	32.8	22.5
15	31.3	24.5	31.5	23.9	32.4	24.9	32.2	23.9	32	24.8	33.5	23.9	34.2	24.3	34.6	22.6
16	31	23.6	31.7	23.1	32.7	26.1	32.2	23.8	31.9	24.8	32.9	23.9	35	23.6	32.6	24
17	27.5	23.5	29.4	23.5	28	23.9	30.9	26	31.1	27.9	32	24	32.6	23.8	31.8	23.5
18	26.9	22.9	27.7	23.5	29.2	23.9	32.2	26.4	34.1	27.6	34.6	24.4	28	24.1	33.6	23
19	30.5	23	31.4	23.4	30.1	24.5	32.9	25.2	34.4	27.4	33.8	24	33.3	24.1	33.7	23.4
20	30.7	24.3	31.3	23.6	29	25.1	32	24.3	34.3	27	33.4	24.5	32.4	23.5	32.1	22.9
21	31.3	23.9	31.7	23.5	31.8	24.3	32.8	22.3	34.4	24.7	34.9	23.9	33.3	23	32	22.4
22	32.2	24.5	31.7	23	32.4	23.5	33.2	21.1	34.9	22.5	34.4	23.5	34	23.6	32.4	22.5
23	32.2	24.8	31.2	23.5	32.2	26.4	32.8	21.7	31.4	22.5	33.6	23.7	33.6	24.2	31.4	22.3
24	32.6	24.6	31.9	23.5	31.4	24	33	21.4	33.6	22.6	33.2	22.9	33.2	24.3	31.4	21.9
25	31.2	23.8	31.3	23.2	30.5	24.4	31.6	23.9	34.2	25.2	34.4	23.1	31.9	24	32	22.6
26	31.2	24	31.4	23.5	31.7	24.2	31.4	23.4	32.8	23.7	34.8	24.4	33.5	23.7	32	22.6
27	31.4	23.4	30.7	23	31.8	24.7	32.2	22.1	34.3	23.6	34.7	24.1	33.4	23.4	32.1	22.3
28	30.8	23.4	30.9	23.1	32.3	24.4	32.4	23.5	33	24.5	35.1	24	33.7	24.8	33	23.2
29	31.5	24	31.2	23	30.8	25.9	31.6	23.1	32.4	23.6	34.7	23.5	33.6	24.4	32.6	22.5
30	30.5	23.7	31.2	22.5	30.4	23.7	31.6	22.1	32.3	24.1	33.6	23.3	34.1	23.7	32.5	22.2
31	29.3	23.5	28.2	23.6	29.4	23.2	31.2	22.5	32	24.7	33.1	23.6	33.5	23.6	33.1	22.2
Mean	31.2	23.9	31.2	23.3	31.2	24.5	32	23	33	24.9	33.4	23.7	33.2	23.8	32.4	22.5

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	32.5	23.3	34.3	25	32.4	25.2	33.7	23	33.4	24	31.6	24.5	32.3	25.3	28.8	23.8
2	32.8	23.5	34.1	24.4	32.4	25.2	33.8	23.9	32.9	24	32	23.5	32.5	24.9	29.2	22.4
3	30.5	23.2	32	24.1	31	25.5	33.7	26.1	31.5	24	30.5	23.3	30	23.9	29.8	23.6
4	27	22.5	26	23.3	31.4	22.6	28.5	23.1	29	22.4	28.4	22.5	25.3	23.3	30.8	23.6
5	31.5	22.7	30.7	23.5	31.6	24.2	-----	23.1	31	23.1	31.5	21	31.4	23.3	28.6	25
6	32.7	23	32.6	23.3	33.4	24	-----	-----	32.4	22.9	32.5	22	31.8	23.5	27.4	24
7	30	21.2	30.4	22.6	31.4	24	-----	-----	28.9	23.9	31.5	21.4	31.8	22.6	28.4	22.8
8	31.5	21.4	31.9	22	30.6	24.4	-----	-----	30.1	22.6	30.1	22.2	30	24	28.2	23.4
9	31.5	22.6	32.2	23.4	31.6	24.5	-----	-----	31.6	23.9	32	21	32	23.5	28	23.2
10	31.7	23.5	30.5	24.7	31.4	24.6	-----	-----	31.4	24	30.5	22	29.8	24.5	28.2	22.8
11	32.2	23.8	32.6	24.6	32.8	25.2	34.5?	22.8	31.8	23	32.6	24	32.8	25.1	31	22.8
12	32.6	22.9	32.8	23.3	31.4	24.8	34.5	24.3	31.3	23.6	32.3	23	32.5	24.3	29.8	25.2
13	32.7	23.2	32.6	23.7	31.8	25	35.4	23.5	33.3	24	32.5	22	33.1	23.9	30.6	24.8
14	32.6	22.4	34.3	23.3	31.8	25.6	34.3	23.5	-----	-----	33	22.5	32.9	24.4	28.2	24.6
15	32.5	23.4	33.6	23.8	32.6	25.8	34.2	24.3	-----	-----	32.5	22	34.3	23.5	29.2	23.2
16	31.6	27.3	32	27.4	31.4	25.5	35	23.2	-----	-----	31.5	21	32.8	24.1	28.2	23
17	31.8	25.7	30.2	26.6	31.4	27	33.7	25.3	-----	-----	31.5	24	30.4	25.4	28.6	23
18	33.5	24.8	31.2	26.3	30.4	24.5	33.5?	24.1	30.8	22.9	30.8	23.9	28.3	23.7	28.4	25.2
19	32.7	24.4	34.1	25	31.6	26.5	32?	22.9	32	24.4	31.7	24.2	31.6	24.8	28.8	26.8
20	32.5	23.7	31.1	24.8	31	24.6	33.4	25.3	29.4	23.5	31.9	23.5	32.3	25.2	30.6	24.6
21	32.7	22.7	33	23.5	33	24.8	33.8	24	31.4	23.8	32.4	23	33.9	24.3	30.6	24.6
22	32.4	22.3	33.8	22.9	33	25.2	35.7	22.8	33.1	23.9	33.5	22	32.9	23.6	31	25.6
23	30.5	21.6	30	23	32.4	25.6	34.8	23.9	30.8	23	32.5	21.5	32.8	24.5	31	23.2
24	31.6	21.2	32.6	22.5	32.6	25.2	34.3	23.2	31	23.5	33	22.5	31.8	23.9	28.8	23.8
25	31.3	22.8	33.4	22.9	31.6	24.4	33.8	23.1	32.4	23	33	22	33	23.5	30	24.8
26	31.5	21.9	33.4	23.2	31	24.5	34.4	23.3	32.7	23	32.5	22	33.4	23.6	29.4	24.6
27	32.5	22.5	33.5	22.3	31.8	24.6	34.4	23.2	33	22.9	32.5	21.1	32.9	24	27.4	23.2
28	31.5	22.3	32.3	23.2	31.8	23.8	35.2	24.2	32.5	24	32.7	21.6	32.9	24.5	29.4	23.6
29	31.5	22.1	31.7	22.6	31.8	25.4	34.8	24.2	32.9	24	33.1	20	33.3	23.7	31	23.8
30	31.5	22	31.8	22.8	31.8	24.8	34	23.4	33.3	23.7	33	22	32.3	23.9	30	23.8
31	32.1	22.3	32.6	22.9	32	24.8	34	23.1	33.7	23.2	32	21.2	32.4	23.7	30	23.8
Mean	31.8	23	32.2	23.8	31.8	24.9	34?	23.7	31.8	23.5	32	22.3	31.9	24.1	29.3	24

Maximum and minimum temperatures at the stations of the Weather Bureau, August, 1917—Continued.

Day.	Calapan.		Virac.		Naga.		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	33.5	24.5	33.4	24.2	32.5	23.7	32.8	24.4	32.5	24.6	32.9	24.5	30.6	24.4	32.4	22.3
2	33.5	22.5	33.6	22.7	32.4	22.6	33.6	22.2	32.2	22.8	33.4	23.3	31.7	22.6	33	21.4
3	33.5	23.5	32	23.1	31.4	22.9	31.4	22.6	31.5	24.2	32.4	23.9	30.2	24.4	31	22.4
4	30.5	23.6	26	22	27.4	21.5	29.5	23.2	29	24.1	29.9	23.4	28.2	23.7	29.8	22.6
5	31.7	23	31	21.8	32.6	20.9	31.9	23.3	30.3	22.7	31.6	22.9	32.3	23.4	31.2	22.6
6	32.7	22.6	31.5	22.3	33.5	20.8	31.2	23.1	31.5	23.9	33.6	23	33.1	23.6	32.2	22.5
7	33.9	22.5	30.9	21.5	32.8	20.6	32.4	21.6	33	21.5	31.1	23.1	33.9	22.5	32.2	21.6?
8	33	23.6	31	22	31.9	21.2	31	22.2	31.3	21.5	30.4	24.3	32	23.5	31.8	22.2
9	32	23.5	32.5	22.8	33.5	21.9	31.1	23	31.5	21.3	31	24.5	32	23.7	32	22.6
10	31.6	22.5	31.3	23	31.2	22.3	31.6	22.4	32.4	21.7	32.2	22.9	31.6	22.5	31.8	22.1
11	33	23.2	32.9	24	32.5	23.3	32.2	25.8	31.7	24.6	32.4	24.4	30.2	24.6	32.2	23.2
12	33	23	32	24.5	33.9	22.3	33.4	22.2	31.8	22.1	32.4	23.8	32.9	23	32.4	23
13	33	22.5	34.3	22.7	33.8	21.6	32.6	22.8	33	22.6	34.6	23.8	32.4	23	31.2	21.2
14	32.5	23	33.5	22.8	34.9	22.3	33.4	22.6	33.3	22.3	33.4	23.5	34.4	23.4	33.8	22.5
15	34.2	23.8	35	22.4	34	21.1	32.6	23.8	34	23.6	34.8	24.9	33.2	24	32.5	23.2
16	33.6	25.8	32.5	22.2	33.5	23	32.5	25.9	34.5	23.1	35	24.6	34.7	24	32	23.1
17	34.5	23	32.4	24.7	31.6	23.7	30.9	24.2	31.7	25.5	32.2	26.1	30.9	25.2	30.9	24
18	28.8	23.8	30	23.8	29.5	23.7	29.6	24.4	28.5	24.1	29.9	25.6	27.8	26	30.4	24.2
19	32	23.5	33	23.5	29	22.8	29.6	23.2	29.6	23.3	31.5	25.5	29.7	25.2	30.1	23.4
20	32.5	23.4	32	24	31.2	22.6	31.2	23.6	31.4	23.4	32.2	24.6	30.5	24.8	31	22.8
21	33.5	23.5	32.7	23.5	35.4	22.9	33.3	23.4	32	24.1	32.9	24.2	34.2	24	32.5	22.5
22	33.5	22.4	32.9	22.5	34.7	21.2	33.5	22.4	33.1	22.1	32.7	23	34.6	23.5	33.5	22.1
23	34.5	23	29.4	22.3	33.3	22	32.5	23.2	33	23.8	32.4	25.8	33.9	22.8	33.1	22
24	33	24.4	32.4	22.5	31.8	21.8	33.7	22.9	32.9	24	33.4	24.5	32.8	23.2	33.4	22.5
25	31.5	23.5	33.2	22.2	34.4	20.8	30.9	23.1	32.5	22.4	34.2	23.4	32.2	23.4	31.6	22.2
26	32.1	22.5	32.7	22	33.2	21.2	32.4	22.1	33	22.3	34.4	23.1	32.3	22.9	32.2	22.2
27	33.3	22.9	32.4	22.1	34.2	21.5	32.8	23.3	33	22.8	33.8	23.4	33.3	23.5	33.2	22.3
28	33.5	23.6	31.9	22.7	34.3	21.8	32.5	24.5	32.9	23.2	33.4	24	34.1	24.4	34	22.2
29	33.5	23.3	32.6	22	34	21.4	32.6	22.4	33	22.5	34.5	23.8	35	23.6	34.1	22.2
30	33.6	23.6	33.8	22	33.7	21	32.7	22.1	33	23.3	34	23.7	34.1	22.5	33.8	22
31	34.5	23	32.6	22.1	33.5	21.1	33.6	23.2	32	23.6	32.9	23.9	32.7	23.6	33.4	23
Mean	32.9	23.3	32.2	22.8	32.8	22	32.1	23.2	32.1	23.1	32.8	24	32.3	23.7	32.2	22.5

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	34.4	25	31.8	23.9	31.3	23.7	30.8	22.2	27.5	22.5	28.1	23.4	30.2	23.3	34.2	24
2	34.8	24.5	32.7	22.5	31.7	23	30.9	22	30.9	23	29.6	23.2	29.6	23	33.7	24.1
3	31.2	25	29.9	23.8	29.9	24.5	28.8	23	30.7	23.6	29.8	23.7	32.4	24	32.9	25
4	28.8	23.3	28.1	23.1	28.2	22.7	26.7	22.8	29.1	23.8	28.6	23.9	29.8	24.2	31	23.7
5	31.5	23.8	31.7	23.1	31.7	22.5	32.9	21.2	30.5	22	30.6	22.9	31.2	23.3	33.2	23
6	32.7	22.8	30.9	23.3	32.6	23.5	31.9	22.2	31.4	22.6	32.4	23.1	33.5	22.8	34.2	22.1
7	31.7	23.4	31.9	22.4	31.6	23.5	30.9	22.6	31.4	22.8	32.1	24.2	34.5	22.8	33.8	22.4
8	32	24.6	31.1	23.1	31.7	23	32.3	22	32.4	23.1	32.1	23.4	34.7	24.2	32.8	22.3
9	31.2	24	32.1	23.6	31.4	23.1	31.4	22	31.9	22.5	31.9	24	33.5	23	33	23
10	31.6	24	31.5	22.5	31.1	23.3	29.7	20.8	30.9	23.2	32.4	24	33.7	23.5	33.9	23.4
11	34	25.6	31.4	24.7	31	25.1	29.4	23.3	28.5	23.9	27.7	24.5	25.8	23.8	28.7	24.5
12	32.6	23.6	31.9	22.3	32.2	23	32.4	22	31.6	23.6	32.4	23.9	31.2	23.2	34	22.7
13	33.5	24.4	31	23.2	31.6	23.6	31.1	22.3	31.5	22.5	32	23.4	34.2	22.2	33.3	22.3
14	33.8	24.1	32.9	24.3	33.6	23.5	32.8	22.3	32	22.2	33.6	25.3	35.4	23.3	33.2	23.7
15	32.6	24.5	32.3	24.2	32.5	24	32.2	22.3	32.3	22.7	33	23.9	34.4	23.2	34.5	23
16	33.3	24.5	32.5	24.3	32.9	24.2	31.7	21.8	32.2	25.4	32.4	24.7	33	24.8	34	22.6
17	31.9	26.4	31.3	25.4	31.7	24.3	29.7	23	28.8	23.8	29.6	24.4	30.4	23.4	32	25.2
18	32.1	26.2	30.4	24.9	30.6	24.7	28.2	23	30.4	23.1	31.2	23.9	31.2	23.4	34	25
19	32	25.2	30.5	24	30.4	24.4	28	22.4	29.4	23.8	29.1	23.6	28.2	23.5	29.5	23.5
20	32.8	25	30.2	24	31.4	24.7	29.4	22.9	27.4	23	29.5	24.4	28.3	24	31.4	23.8
21	34.6	25	33	23.5	33.1	23.5	32.6	22.8	30.5	22.5	32.3	23.9	33.5	23.7	33.4	23.1
22	33.6	24.1	34.2	22.6	33.7	23	32.7	21.5	32	22.7	33.5	22.7	35.2	23	34	22.1
23	32.8	25	33.5	24.1	33.2	23.1	33.2	22.2	32.8	22.9	33.8	23.2	36.2	23.3	32.7	22.8
24	32.5	24.5	33.8	24	31.7	23.1	31.7	21.6	32	21.6	33.2	22.8	35.2	22.7	32.8	22.5
25	33.2	23.8	32.3	22.8	31.6	23	32	21.5	31.4	22	32.5	23	34.8	22.9	34.4	23.4
26	33.1	24	33	22.8	32.4	23.6	32.8	22	31.8	23	32.1	22.6	34.4	23.5	32.6	23
27	33.2	24	33	22.8	33	24.6	32.9	23	32.1	23.5	32.9	23.6	35.7	24.8	34.1	24
28	32.8	24.5	33	23.6	32.8	24.3	32.1	23.3	32.8	24.5	33.2	24	36	24.5	33.2	24.1
29	33.4	24	32.7	23.3	32.6	23.6	31.8	21.6	33.3	22.7	33.4	24.4	35.8	23.2	33.1	23.7
30	33.8	24	33.3	23.2	33.1	22.4	32.3	21.8	32.4	23	33.2	23.9	34.2	23.3	33.1	23
31	33.2	24.6	32.7	23.4	32.7	22.6	32.7	21.3	32.4	23.4	33.1	23.6	34.4	23.6	33.2	22.5
Mean	32.7	24.4	32	23.5	31.9	23.6	31.2	22.2	31.1	23	31.7	23.7	32.9	23.5	33	23.3

Maximum and minimum temperatures at the stations of the Weather Bureau, August, 1917—Continued.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.	
	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	30.8	24	29.6	23.5	18.8	14.9	31	24.5	33.5	23.5	31.4	25
2	31.7	24	31.3	23.6	18.9	15.4	32.1	24	35.6	23.1	32.1	25
3	32.4	24.5	31.4	23.1	20.8	15.8	32.7	24.7	33	23.5	32	25
4	32	23.4	31.2	23.6	19.9	15.4	32.6	24	30.5	22.9	31.5	26
5	30.7	23.3	30	22.5	20.5	14.9	32	23.5	33.5	23	31.2	24.6
6	33.6	23.4	31.9	23.6	22.3	15.8	32.4	22.7	33	23.1	30.2	24
7	32.4	25.2	32	23	21.9	15.5	33	24	32.5	23.1	32	24
8	33.9	21.6	31.7	25	24.9	15.2	32.1	24.5	33	23.7	33.8	24
9	33.7	23.2	32.5	22.5	22.8	15.1	33	22.7	32	23.5	32	24.2
10	32.3	25.2	32	24	22.8	15.9	33.3	24.7	32.6	23.6	31.8	24.8
11	27.6	24.2	28.8	23.5	17.5	15.5	28.1	24	26	22.8	30	25
12	34.3	24.2	31.3	23.6	22.5	16	33.5	24.2	35	22.1	32	24.5
13	34.3	24.3	33	23.2	23.9	15.5	33	23	34.5	22.4	32	24.5
14	33	26	32.3	22.7	24.3	16.2	33.1	23.5	35	23.8	32.2	24.4
15	31.7	26.8	32.2	26	23.6	15.8	32.9	23.5	34	25	32.5	25.5
16	31.2	26.8	31.7	26.3	21.5	14.9	33.2	24	33.5	21.9	32.6	25
17	30.8	24.3	31.6	25.5	17.5	15.2	32.2	24.4	31	23	28.2	25.2
18	32	24.5	30.5	24.5	18.2	14.9	31.3	24.5	31.6	21	29.5	25.5
19	28.4	24.1	27.8	23.1	17.8	16.3	30.1	24.4	30.5	23	28.5	25
20	30.4	24.4	31	23.8	20.1	16.1	32.5	24	31.6	23	30	24.8
21	33	24.5	31.3	22.6	23.4	15.8	32.5	25.3	35.9	22.5	30.5	24.7
22	34.8	23.8	32	23.5	24.2	15.7	33.7	23.6	34.9	21.7	32.5	25.5
23	33.8	25	32.8	24.7	25	16.1	33.3	24	34.7	22.9	32.6	25.7
24	35.2	23.6	33	23.9	24.3	16.1	32.5	23	34.5	22	32.6	24
25	34.4	23.7	33	24	23.3	15.8	33.3	22.7	34.5	23	32.8	24
26	33.4	24.5	32.6	23.6	23.3	15.9	32.6	24	33.7	23.2	32.2	25
27	34.5	25.5	33	24.5	24.8	16.3	33.5	24.5	34.5	23.6	32.5	26
28	33.6	24.8	33.6	27	24.4	16.5	33.8	25.5	35	24	32.6	26.9
29	33.1	24.5	33.5	25	24.3	15.9	33.5	24.5	35	23.5	32.9	26
30	35.8	24.5	33.2	24.5	24.5	16.4	34	24.8	35.2	23	33.1	26.4
31	35.2	24.3	33.1	24.1	23.8	16.2	34.2	24	34.6	23.9	33	25.2
Mean	32.7	24.4	31.8	24	22.1	15.7	32.6	24	33.4	23	31.7	25

Day.	Vigan.		Tuguegarao.		Laoag. <sup>a</sup>		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	30.1	23.8	34.4	24	31.7	23.6	35.1	23.7	29.6	24	29.8	24.6
2	30	24.2	33.6	24.2	31.6	23.2	35.5	23.8	29.8	23	29.8	25.5
3	29.1	22.8	32.7	23.8	28.4	22.9	30.4	24.2	27	23.8	29.9	24.2
4	29.9	22.7	32	23.3	31.1	22.4	32.1	23.8	29.6	22.6	29.5	23.9
5	29.8	23.2	33.7	23.6	31.9	23.1	33.9	23.1	29.6	23.2	30.6	23.7
6	31.2	23.6	34	23.4	32	22.5	32.3	23.5	30.2	23.6	31.8	23.4
7	32.1	23.8	32	23.1	33.9	22	32.3	23.3	31.6	23.8	32.2	23.4
8	32.6	23.5	32.5	24	35.4	23.3	31.7	24.1	31.2	23.6	31.6	24.8
9	31.3	23.6	32.4	24	32.8	23.9	29.5	23.8	30.3	24.3	31.9	26.2
10	32.4	24.1	30	23.6 <sup>a</sup>	30	23.8	30.6	24.7	31.5	24.2	31.1	26.2
11	27.1	23.1	26	22.5	25	22.6	27.8	23.2	26.8	23.5	30	24.8
12	30.1	23.5	34.5	22.7	29.9	23.3	34.3	23	28.2	22.7	31.4	25.4
13	29.7	24.1	34.8	24	30.9	22.9	35	24.1	30.4	24.8	32.2	24.7
14	33	23.3	34	24	33.8	21.9	34.3	24.1	31.4	24.5	31.1	25.4
15	31.6	23.8	33.9	24.6	32.7	23.5	32.5	24.1	32.4	25	31.6	25.7
16	30.3	23.5	33	23.5	32.3	23.9	31.5	24.3	30.2	24.4	30.4	24.4
17	29.5	23.6	30.2	24	30.2	24	28.7	24.2	28.6	25.6	28.6	24.8
18	27.2	26.8	23.8	27.1	24.3	26.8	23.5	27	24.3	28.6	24.2	24.2
19	26	23.5	30	24.3	27	23	29.5	24.3	26.8	23.2	28.9	24.4
20	28.1	23.6	31	24	29.9	21.8	31.1	24.3	28.6	23	29.5	24.8
21	31.6	24.3	36.5	22.4	32.3	23.3	35.5	24.2	30.8	24.8	32.9	25.4
22	32.5	24.3	34	22.3	33.3	23.7	34.6	22.5	31.8	24.2	31.7	25.5
23	31.6	23.7	35.6	24.4	33.3	23.1	34.8	24.4	32.5	25.2	32.1	25.7
24	32.3	23.6	36	23	33.1	22.9	34.9	23.8	31.6	25.4	32.3	26
25	32.2	23.5	35.5	24.7	34	22.9	35.1	24.5	32.4	24.6	32.5	25.6
26	32.5	24.1	35.9	24	33.5	22.9	35.2	24	32.5	24.3	32.5	25.2
27	32.3	23.8	37	25.3	33.2	23	34.7	24.4	32.6	24.2	32.5	24.3
28	32.1	24.7	38.3	25.1	33.6	23.8	34.8	24.4	31.2	24.2	32.7	24.3
29	31.5	24.5	36.5	25.1	33.1	23.4	34.3	24.8	31.6	24.4	32.6	23.8
30	33.2	25.2	38.1	25.1	34.8	23.9	35.2	24.4	33.2	24.7	32.6	23.4
31	33	24.5	37.5	23.5	34.1	22.3	34.5	23	34	24.2	32.4	23.5
Mean	30.8	23.8	33.6	23.8	31.8	23.1	32.9	23.9	30.5	24.1	31.2	24.7

<sup>a</sup> The maximum temperatures of this station are not very reliable: they seem to be too high.





## SEISMOLOGICAL BULLETIN FOR AUGUST, 1917.

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

### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

- 1, 6<sup>h</sup> 00<sup>m</sup> [1, 14<sup>h</sup> 00<sup>m</sup>]. Calbayog (NW Samar). Earthquake of intensity II-III.
- 3, 18<sup>h</sup> 35<sup>m</sup> 51<sup>s\*</sup> [4, 2<sup>h</sup> 35<sup>m</sup> 51<sup>s</sup>]. Butuan (N Mindanao). Oscillatory earthquake, direction E-W, intensity III. It originated in the Philippine Deep of the Pacific.
- 3, 22<sup>h</sup> 57<sup>m</sup> [4, 6<sup>h</sup> 57<sup>m</sup>]. Cape Bojeador (NW Luzon). Earthquake of intensity III, duration 5 seconds.
- 7, 10<sup>h</sup> 29<sup>m</sup> [7, 18<sup>h</sup> 29<sup>m</sup>]. NE Mindanao. Earthquake shocks felt through the Surigao Province and in the northern part of the Agusan Valley. Their intensity reached only degree III-IV; the origin was apparently in the Butuan Bay.
- 9, 11<sup>h</sup> 56<sup>m</sup> 25<sup>s\*</sup> [9, 19<sup>h</sup> 56<sup>m</sup> 25<sup>s</sup>]. SE Luzon and N Samar. Earthquake felt with intensity V in the Catanduanes Island, and with III-IV through the province of Albay and the northern part of Samar. It was accompanied with subterranean rumbling in Batag Island, N of Samar. The epicenter was some 500 kilometers distant from Manila, in the Philippine Deep, NE of the San Bernardino Strait.
- 10, 2<sup>h</sup> 24<sup>m</sup> [10, 10<sup>h</sup> 24<sup>m</sup>]. Butuan (N Mindanao). Subsultory and oscillatory shocks of intensity III-IV, duration 4 seconds. Very near origin; the Wiechert seismograph recorded, at 11<sup>h</sup> 55<sup>m</sup> (19<sup>h</sup> 55<sup>m</sup>), a light disturbance from the same origin.
- 13, 16<sup>h</sup> 54<sup>m</sup> [14, 0<sup>h</sup> 54<sup>m</sup>]. Butuan (N Mindanao). Earthquake shock of intensity II-III; it had the same near origin.
- 14, 23<sup>h</sup> 08<sup>m</sup> 07<sup>s\*</sup> [15, 7<sup>h</sup> 08<sup>m</sup> 07<sup>s</sup>]. N Luzon. Oscillatory earthquake, direction N-S, intensity III-IV, duration 10 seconds; its origin was in the Pacific; probably this corresponds to disturbance which was recorded at Zikawei Observatory at 23<sup>h</sup> 12<sup>m</sup> 24<sup>s</sup>. It was also slightly felt at Cape Bojeador, NW Luzon.
- 25, 1<sup>h</sup> 39<sup>m</sup> [25, 9<sup>h</sup> 39<sup>m</sup>]. Tacloban (NE Leyte). Earthquake shock of intensity II-III. Recorded by the Wiechert seismograph at Butuan, the origin lay east of Tacloban in the San Pablo Bay.
- 27, 1<sup>h</sup> 51<sup>m</sup> [27, 9<sup>h</sup> 51<sup>m</sup>]. Camiguin Island (N of Mindanao). Earthquake of intensity II; recorded by the Wiechert seismograph at Butuan.
- 30, 4<sup>h</sup> 12<sup>m</sup> 15<sup>s\*</sup> [30, 12<sup>h</sup> 12<sup>m</sup> 15<sup>s</sup>]. Butuan (N Mindanao). Oscillatory shock of intensity II-III from a rather distant origin in the Pacific; it was recorded by some Japanese stations, and apparently also in America.
- 30, 4<sup>h</sup> 28<sup>m</sup> [30, 12<sup>h</sup> 28<sup>m</sup>]. Ambulong (S Luzon). Light shocks of local and volcanic origin, intensity II-III.

<sup>1</sup> 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<sup>h</sup>), 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.  $A_N$ :  $T_0=5.9$ ,  $\epsilon=2.340$ ,  $\overline{T_{02}}=0.024$ ;  
 $A_E$ :  $T_0=5.3$ ,  $\epsilon=1.783$ ,  $\overline{T_{02}}=0.092$ . Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
241	3	Iv	eP F	<i>h. m. s.</i> 10 10 47 13				
242	3	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	18 35 51 37 21 37 52 38 31 58	5 7	103 109		Butuan (N Mindanao).
243	3	Iv	eP F	19 03 06 08				
244	3	Iv	eP F	19 29 53 34				
245	5	Iu	eP S L M <sub>E</sub> M <sub>N</sub> F	16 01 24 11 46 29 48 31 28 31 45 17 40	18 18	4 5		New Zealand ?
246	5	Ir	eP S L? M <sub>E</sub> F	18 41 05 43 05 46 00 46 26 19 17	9	25		
247	7	Ir	eP S L M <sub>N</sub> M <sub>E</sub> F	15 59 45 16 04 23 07 38 09 03 09 06 45	11 11	5 15		
248	8	Iv	eP F	20 56 02 58				
249	8	Iv	eP F	23 25 55 30				
250	9	Iv	eP L M <sub>E</sub> F	11 56 25 57 20 57 41 12 08	5	73		SE Luzon and N Samar.
251	10	Iv	eP S L F	22 09 36 12 32 32				
252	11	Iv	eP F	4 54 51 57				
253	12	Iv	eP F	7 31 38 35				
254	12	Iv	eP F	19 35 07 37				
255	14	Iv	eP L M <sub>N</sub> F	23 08 07 09 00 09 32 25	4	173		N Luzon.
256	15	Iv	eP F	0 17 24 20				
257	17	Iv	eP L M <sub>N</sub> F	0 15 28 15 50 15 59 20	3	167		
258	17	Iv	eP F	4 33 05 35				
259	17	Iv	eP F	9 49 42 52				
260	17	Iv	eP F	13 25 55 28				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						A <sub>N</sub> μ	A <sub>E</sub> μ	
261	18	Iv	eP F	<i>h. m. s.</i> 6 49 19 52				
262	18	Iv	eP F	19 41 00 43				
263	18	Iv	eP F	19 44 47 46				
264	18	Iv	eP F	20 06 32 12				
265	21	Ir	eP S? L? M <sub>E</sub> F	15 27 53 30 00 31 54 31 56 49	4		51	
266	21	Iv	e F	17 20 52 29				
267	23	Iv	eP F	2 31 30 33				
268	25	Iv	eP F	20 50 14 52				
269	27	I	e F	0 12 48 36				
270	30	IIIv	eP L M <sub>N</sub> F	4 12 15 13 33 13 49 ?	5	1,076		Butuan (N Mindanao). Maximum in the E-W component lost by the force of the shock; also the end in both components.
271	31	Iv	eP F	5 46 48 51				
272	31	IIv	eP L M <sub>N</sub> M <sub>E</sub> F	10 13 02 13 24 14 15 14 24 48	5 5	651	487	
73	31	I	e F	11 56 29 13 52				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

1, 6<sup>h</sup> 00<sup>m</sup> [1, 14<sup>h</sup> 00<sup>m</sup>]. Calbayog (NW de Sámar). Temblor de tierra de intensidad II-III.

3, 18<sup>h</sup> 35<sup>m</sup> 51<sup>s\*</sup> [4, 2<sup>h</sup> 35<sup>m</sup> 51<sup>s</sup>]. Butuan (N de Mindanao). Temblor oscilatorio, dirección E-W, intensidad III. Su origen se hallaba en el Pacífico en el Abismo de Filipinas.

3, 22<sup>h</sup> 57<sup>m</sup> [4, 6<sup>h</sup> 57<sup>m</sup>]. Cabo Bojeador (NW de Luzón). Temblor de tierra de intensidad III, duración 5 segundos.

7, 10<sup>h</sup> 29<sup>m</sup> [7, 18<sup>h</sup> 29<sup>m</sup>]. NE de Mindanao. Temblor de tierra sentido en la Provincia de Surigao y en la parte N del valle del Agusan. Tuvo intensidad III-IV y su epicentro parece se hallaba en la Bahía de Butuan.

9, 11<sup>h</sup> 56<sup>m</sup> 25<sup>s\*</sup> [9, 19<sup>h</sup> 56<sup>m</sup> 25<sup>s</sup>]. SE Luzón y N de Sámar. Temblor de tierra sentido con intensidad V en la Isla de Catanduanes y III-IV en la Provincia de Albay y en la parte septentrional de la Isla de Sámar. Fué acompañado de ruido subterráneo en la Isla de Batag al N. de Sámar. El origen distaba unos 500 kilómetros de Manila y estaba en el Pacífico al NE del estrecho de San Bernardino, en el Abismo de Filipinas.

10, 2<sup>h</sup> 24<sup>m</sup> [10, 10<sup>h</sup> 24<sup>m</sup>]. Butuan (N de Mindanao). Temblor de tierra susultorio y oscilatorio, de intensidad III-IV, duración 4 segundos. De origen muy cercano; el sismógrafo Wiechert registró una repetición muy débil a 11<sup>h</sup> 55<sup>m</sup> [19<sup>h</sup> 55<sup>m</sup>] procedente del mismo centro.

13, 16<sup>h</sup> 54<sup>m</sup> [14, 0<sup>h</sup> 54<sup>m</sup>]. Butuan (N de Mindanao). Temblor de tierra de intensidad II-III. De carácter local como los del 10 y originado en el mismo centro.

14, 23<sup>h</sup> 08<sup>m</sup> 07<sup>s\*</sup> [15, 7<sup>h</sup> 08<sup>m</sup> 07<sup>s</sup>]. N de Luzón. Temblor de tierra oscilatorio, dirección N-S, intensidad III-IV, duración 10 segundos. Su origen se hallaba en el Pacífico; probablemente es el mismo registrado en Zikawei a 23<sup>h</sup> 12<sup>m</sup> 24<sup>s</sup>. Sintióse también débilmente en Cabo Bojeador, NW de Luzón.

25, 1<sup>h</sup> 39<sup>m</sup> [25, 9<sup>h</sup> 39<sup>m</sup>]. Tacloban (NE de Leyte). Temblor de tierra de intensidad II-III, duración 3 segundos. Registrólo el sismógrafo Wiechert de Butuan; su epicentro probablemente estaba hacia el E de Tacloban en la bahía de San Pablo.

27, 1<sup>h</sup> 51<sup>m</sup> [27, 9<sup>h</sup> 51<sup>m</sup>]. Isla de Camiguín (N de Mindanao). Temblor de tierra de intensidad II; registrado por el sismógrafo de Butuan.

30, 4<sup>h</sup> 12<sup>m</sup> 15<sup>s\*</sup> [30, 12<sup>h</sup> 12<sup>m</sup> 15<sup>s</sup>]. Butuan (N de Mindanao). Temblor de tierra de intensidad II-III. El origen se hallaba algo lejos en el Pacífico. Registróse en algunas estaciones japonesas y al parecer también en América.

30, 4<sup>h</sup> 28<sup>m</sup> [30, 12<sup>h</sup> 28<sup>m</sup>]. Ambulong (S de Luzón). Temblor de origen local, de intensidad II-III.

<sup>1</sup> 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<sup>h</sup>). 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

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BULLETIN FOR SEPTEMBER, 1917

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

MANILA  
BUREAU OF PRINTING  
1918





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**BULLETIN FOR SEPTEMBER, 1917.**



# METEOROLOGICAL BULLETIN FOR SEPTEMBER, 1917.

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 September's normal, especially in northern Luzon. The highest pressures were observed on the 22d in Mindanao, the Visayas, central and southern Luzon, and on the 19th in northern Luzon, while the lowest pressures took place generally on the 11th in northern Luzon, on the 1st in southern Luzon, and on the 25th in the Visayas and Mindanao.

The monthly mean temperature is slightly higher than that of September, 1916, in Luzon, and slightly lower in the Visayas and Mindanao. The extreme monthly temperatures for Manila were 33.3° C. on the 13th, and 22.1° C. on the 20th. The absolute highest and lowest temperatures for Baguio were 25.7° C., 14.5° C. on the top of Mirador, and 25.7° C., 14.0° C. in the valley.

### PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR SEPTEMBER, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from Sept., 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Sept., 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga.....	758.41	.....	759.40	22	757.50	4	26.1	.....	32.3	13	21.4	1
Tagbilaran.....	57.86	+ 0.63	59.20	22	56.72	25	26.7	+ 0.1	33.5	26	20.9	8
Surigao.....	57.94	+ .73	59.12	22	56.69	25	26.5	-.5	33	27	22.1	22
Cebu.....	58.01	+ .78	59.41	22	57.02	25	27.4	-.2	32.6	23, 30	21.8	17
Iloilo.....	57.90	+ .79	59.30	22	56.64	25	26.6	-.1	33	15	21.5	2, 20
Ormoc.....	58.11	+ .68	59.36	22	57.03	25	26.4	-.1	33.8	17	20.4	15
Taloban.....	57.82	+ .76	59.05	22	56.60	5, 25	26.7	-.1	34.6	28	21.8	15
Capiz.....	57.65	+ .51	58.95	22	56.44	1, 8	26.3	-.1	34.1	8	21.9	15
Calbayog.....	57.93	+ .77	59.24	22	56.63	5	26.5	-.4	33.3	17	21.7	14
Legaspi.....	57.58	+ .83	59.15	22	56.24	5	26.6	-.2	33.3	12	22.7	10
Atimonan.....	57.46	+ 1.10	59.12	19	55.89	1	26.7	0	33.4	13	22.4	6
Ambulong, Tanauan.....	57.04	+ .82	58.57	22	55.27	1	26.5	+ .6	33.1	13, 15	22.4	20, 23
Paracale.....	57.45	+ .88	59.20	22	55.96	10	26.7	-.2	33.6	1	23	23
Manila.....	57.55	+ .87	59.09	15	55.68	1	26.5	+ .5	33.3	13	22.1	20
San Isidro.....	57.64	+ .86	59.23	22	55.73	1	26.1	+ .2	32.4	1	22.4	22
Dagupan.....	56.76	+ .94	58.44	19	54.69	1	27	+ .3	35	1	23	8
Baguio <sup>a</sup> .....	635.55	+ .92	637.28	19	633.56	11	17.8	+ .1	25.7	1	14.5	11
Vigan.....	756.81	+ 1.09	758.62	18	754.10	11	27.3	+ .4	33.5	1	22.8	11
Tuguegarao.....	57.05	+ .93	59.45	19	52	11	26.8	0	36.8	3	21.7	4
Laoag.....	56.82	+ 1.08	58.61	22	53.04	11	26.7	.....	35.87	17	21.1	15
Aparri.....	57.10	+ 1.22	59.70	19	49.80	11	27.2	+ .5	35.2	3	22.4	15

<sup>a</sup> The barometric readings of this station are not reduced to sea level.

**Rainfall.**—With a few exceptions, the total rainfall for this month has been throughout the Philippines smaller than that of the preceding year and than the September's normal. The amount of rain collected in the gauges of the Manila Observatory is 109.4 mm. and 107.2 mm. below that of September, 1916, and the normal of this month, respectively. The monthly rainfall for Baguio is 215.1 mm. below the normal, but only 22.9 mm. below the total rainfall for September of the preceding year.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF SEPTEMBER, 1917.

Station.	Total.	Departure from Sept., 1916.	Departure from normal.	Rainy days.	Departure from Sept., 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Sept., 1916.	Departure from normal.	Rainy days.	Departure from Sept., 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	213.3	- 34.1	+ 41.6	24	+ 5	37.3	30	Sumay, Guam	684.8	+ 98.2	+303.6	23	- 2	88.9	1
Isabela, Basilan	191	- 3.7	- 8.9	19	- 2	27.4	11	Calapan <sup>a</sup>	220.6	- 87.2	- 24.7	1	0	58.1	16
Zamboanga	87.6	+ 6.9	- 9.6	20	+ 8	24.1	12	Virac	204.8	- 78.6	+ 36.5	18	- 1	51.3	23
Davao	176.8	- 70.6	- 12.4	14	+ 3	47.3	7	Naga	479.5	+ 61.1	+208.8	22	+ 2	69.8	27
Cotabato	132.2		-104.8	16			25	Batangas	130.7	-186.5	-182.2	25	+ 1	36.1	1
Cagayan, Misamis	198	+ 5.5		18	- 1	50.8	19	Lucena	138.8	-121.9		17	- 5	27.9	1
Butuan	187.7	- 18	+ 35	21	0	29.8	18	Atimonan	200.6	- 86.7	- 72.5	23	+ 7	25.7	21
Mambajao	164.2			11	0	49.5	27	Ambulong, Tanauan	215	-130.2		23	0	39.4	2
Dumaguete	220.5	+ 65.9		14	- 2	38.9	20	Canlubang, Calamba	232.5	- 71.1		26	+ 0	34.3	13
Yap, W. Carolines	445.7	- 2.8		24	- 2	51.5	1	Paracale	430.6	+139.6		22	+ 5	73.1	18
Tagbilaran	160.7	- 62.4	- 18.4	11	- 1	50.5	4	Santa Cruz, Laguna	229	- 69.9		27	+ 4	35.8	24
Iwahig	288.6	+ 75.1		22	+ 1	63.5	9	Manila	263.2	-109.4	-107.2	23	- 2	35.1	5
Surigao	64.2	+ 54.3	- 84.7	12	- 2	16	4	Antipolo	259	-382.3		28	+ 1	48	5
Maasin	306.3	+119.1	+ 32	12	- 5	58.4	21	Iba	499.7	-308.6	-312.7	24	0	79	11
Cebu	301.7	+ 70.8	+120.5	19	+ 4	62.7	20	San Isidro	165.2	-208	-155.9	21	- 7	50.8	9
Iloilo	262.3	- 59.6	- 61.6	18	0	86.8	1	Tarlac	270.9	-186.5	- 73.6	22	- 2	50.8	5
San Jose Buenavista	302.4	- 333.2	-214.7	24	+ 3	61.5	28	Baler	271.2	-198.4	- 51.1	21	- 1	51.8	25
Cuyo	330.8	- 88.2	- 51.9	26	+ 3	49.3	6	Dagupan	364.6	-255.9	-100.8	20	- 3	68.1	26
Ormoc	191.5	- 87.3	- 85.5	21	+ 1	36.8	28	Bolinao	358.9	-543.3	-192.7	19	- 4	72.9	11
Guiuan	216.6	- 68.3		22	+ 4	45.7	28	Baguio	625.5	- 22.9	-215.1	27	+ 3	137.4	10
Tacloban	175	+ 42.7	+ 21.5	20	- 2	82.8	10	San Fernando, Union	512.1	+ 59.3	+ 59.6	21	0	140.5	10
Capiz	220.8	+ 42.4	- 72	24	+ 3	49.5	19	Echagüe	124.1	- 38.8	- 60.3	17	- 1	33.8	28
Borongan	138	- 85.3	- 58.9	19	0	25.4	10	Candon	469.3	+ 40	- 13.2	20	+ 2	149.1	11
Catbalogan	281	- 58.5		23	+ 3	49.3	3	Vigan	299	-175.2	-219.9	24	+ 3	62.8	29
Calbayog	248.7	-122.4	- 29	26	+ 5	58.9	16	Tuguegarao	299.8	+ 49.6	+ 29.3	7	- 8	74.5	3
Masbate	213.3	-102.7	+ 21.7	20	- 1	52.6	8	Laosag	936.2	+162.9	+238.5	22	+ 2	201.4	11
Romblon	224	-178.4	+ 2.3	21	0	67.4	19	Aparri	237.2	-235	- 50.1	18	+ 1	62	11
Batag	129.4	-123.4		14	0	55.6	19	Cape Bojeador	314.1	-213.4		11	- 5	75.9	30
Sorsogon	234.7	- 321.4		17	- 2	62	27	Santo Domingo, Batanes	186.9	-286.2	-159.9	21	0	66	11
Legaspi	351.4	+ 33.2	+ 90.5	23	+ 4	62.3	5								

<sup>a</sup> 27 days of observation.

DEPRESSIONS AND TYPHOONS.

There were three typhoons formed during this month over the Pacific and two depressions or typhoons over the China Sea. Two of the Pacific typhoons recurved northeastward after entering China; the other moved northward almost from the beginning, and recurved NE toward central Japan when it was near the northern part of the Loochoos. See the tracks of all these depressions and typhoons in Plate IV. Another depression appeared in the China Sea, near the Paracels on the 8th and 9th, but on the 10th it seemed to have filled up almost on the spot.

Two depressions or typhoons in the China Sea; September 2 to 4 and 28 to 30, 1917.—The first of these depressions or typhoons appeared on September 2 near 115° longitude E and 16° latitude N. It moved W by N until the afternoon of the 3d, when it inclined NW toward the southern part of the Gulf of Tongking. Then it moved westward again and entered Indochina between 106° and 107° longitude E and near 18° latitude N.

The other depression formed probably on the 28th in about 114° longitude E and 15° latitude N, and moved almost due west entering Indochina on the 30th. It was of less importance than the preceding one.

Typhoon of September 2 to 12, 1917.—The observations from Guam and Yap gave some slight indications of a depression or typhoon forming probably to the west of Guam and N of Yap near 13° or 14° latitude N and 139° longitude E. If this supposition be true, then the typhoon moved almost due west until the 3d or the 4th when it began to incline northward. It was on the morning of the 6th that the Manila Observatory was able to announce this northward direction of the typhoon, thus dispelling any fear of danger for the Philippines. The typhoon warning issued read as follows:

September 6, 11.50 a. m.: The depression or typhoon of the Pacific seems to be moving northward, its center being probably situated at 6 a. m. to-day between 17° and 18° latitude N and in about 127° longitude E. There is no more danger for the Philippines.

The typhoon showed a tendency to recurve on the 7th, but contrary to all expectations, it inclined westward on the 8th threatening the China coast in the neighbourhood



of Shanghai. In fact it entered China in the early hours of the 10th; but it recurved almost immediately to the N and NE to the west of Shanghai. The following warnings were sent out by Manila Observatory on the 9th and 10th:

September 9, 11.50 a. m.: The typhoon of the Loochoos has inclined westward since yesterday, its center being situated at 6 a. m. to-day over the Eastern Sea between  $28^{\circ}$  and  $29^{\circ}$  latitude N and in about  $125^{\circ}$  longitude E moving apparently NW toward Shanghai.

September 10, 11.55 a. m.: The typhoon of the Eastern Sea has entered China to the south of Shanghai moving NW or WNW; its center was situated at 6 a. m. to-day a few miles southwest of Shanghai.

The typhoon of September 10 to 17, 1917.—This typhoon was probably formed near the Philippines on the 10th not far from  $18^{\circ}$  latitude N and  $125^{\circ}$  longitude E. It passed through the Babuyan Islands on the 11th moving northwestward; it inclined more to the north on the 12th, and entered China near, and to the S of, Amoy on the night of the 12th to 13th. Once in China the typhoon recurved northeastward and passed to the north of Shanghai in the early morning of the 14th in the form of a depression of no great importance. From Shanghai it moved eastward crossing the southern part of Japan on the 15th.

The following warnings were issued by Manila Observatory on the 10th to 14th:

September 10, 11.30 a. m.: A depression or typhoon appears this morning about 200 miles to the east of northern Luzon; its center could be situated at 6 a. m. to-day near  $125^{\circ}$  longitude E and  $18^{\circ}$  latitude N. Its actual direction cannot yet be ascertained.

September 10, 9 p. m.: The typhoon seems to be situated now near  $124^{\circ}$  longitude E and  $18^{\circ}$  latitude N moving westward at present.

September 11, 9.30 a. m.: The typhoon was situated at 6 a. m. to-day between  $18^{\circ}$  and  $19^{\circ}$  latitude N, between  $122^{\circ}$  and  $123^{\circ}$  longitude E moving WbyN toward the northern coast of Luzon. It is an intense typhoon but not of great extension or diameter; its actual velocity 6 to 9 miles per hour.

September 12, 9.50 a. m.: The typhoon has inclined northward since yesterday, its center being situated at 6 a. m. to-day to the west of Bashi Channel, between  $119^{\circ}$  and  $120^{\circ}$  longitude E and near  $21^{\circ}$  latitude N, moving apparently northwestward.

September 13, 11.50 a. m.: The typhoon entered China last night, probably between Amoy and Swatow, moving NWbyN: its center was situated at 6 a. m. to-day between  $116^{\circ}$  and  $117^{\circ}$  longitude E and near  $25^{\circ}$  latitude N.

September 14, 11.50 a. m.: The typhoon in China seems to have recurved northeastward since yesterday, its center being situated at 6 a. m. to-day northwest of Shanghai near  $120^{\circ}$  longitude E and  $32^{\circ}$  latitude N moving northeastward.

The Japan typhoon, September 24 to October 2, 1917.—This typhoon seems to have been formed on the 23d to 24th to the WNW of Yap near  $134^{\circ}$  longitude E and  $12^{\circ}$  latitude N. It moved northward from the 26th until it reached near the northern part of the Loochoo Islands where it recurved northeast toward the central part of Japan. The cyclonic center passed to the nearest distance from Tokio during the night of September 30 to October 1. The storm was one of the severest ever felt in Tokio as can be judged from the following cablegram received in Manila by The Daily Bulletin on October 8:

Tokio, October 7: A hundred thousand people are homeless and several hundred more have lost their lives as a result of a typhoon which swept Tokio bay on Monday last. The disaster is unprecedented in the history of Tokio. The city is still without electric light and railroad and street car services are both crippled.

Although the typhoon passed at the considerable distance of 450 miles to the east of Luzon, yet Manila Observatory was able to send the following warnings to the foreign Observatories of Tokio, Zikawei, Taihoku, Hongkong and Phulien on September 27 to 30:

September 27, 6.15 p. m.: Typhoon E of Luzon, more than 300 miles distant, moving NNW or N.

September 28, 11 a. m.: Typhoon in about  $130^{\circ}$  longitude E,  $20^{\circ}$  latitude N, moving N.

September 29, 2.30 p. m.: Typhoon near  $130^{\circ}$  longitude E,  $26^{\circ}$  latitude N, moving N.

September 30, 1.10 p. m.: Typhoon near  $133^{\circ}$  longitude E,  $30^{\circ}$  latitude N, recurving northeastward.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes en Filipinas es algo mayor que la del año pasado y que la normal de septiembre, especialmente en el N de Luzón. Las presiones más altas se observaron el día 22 en Mindanao, en las Visayas y en el centro y S de Luzón, y el 19 en el N de Luzón, al paso que las más bajas tuvieron lugar generalmente el día 11 en el N de Luzón, el 1.º en el S de Luzón, y el 25 en las Visayas y Mindanao.

La temperatura media mensual es ligeramente mayor que la de septiembre de 1916 en Luzón, y algo menor en las Visayas y Mindanao. Las temperaturas extremas del mes en Manila fueron 33.3° C. y 22.1° C. observadas los días 13 y 20, respectivamente. Las temperaturas máximas y mínimas absolutas del mes en Baguio fueron 25.7° C., 14.5° C. en la cumbre del Mirador, y 25.7° C., 14.0° C. en el valle.

**Precipitación acuosa.**—Con pocas excepciones, la lluvia total de este mes en todas las Islas Filipinas ha sido menor que la del año pasado y que la normal de septiembre. La cantidad de lluvia recogida en los pluviómetros del Observatorio de Manila es 109.4 mm. y 107.2 mm. menor que la de septiembre de 1916 y que la normal de este mes, respectivamente. La lluvia mensual de Baguio es 215.1 mm. menor que la normal, pero sólo 22.9 mm. menor que la lluvia total de septiembre del año pasado.

## DEPRESIONES Y TIFONES.

Hubo tres tifones que se formaron durante este mes en el Pacífico y dos depresiones o tifones en el Mar de China. Dos de los tifones del Pacífico recurvaron hacia el NE después de haber penetrado en China; el otro se movió hacia el N casi desde el principio, y recurvó al NE hacia el centro de Japón cuando estaba cerca de la parte septentrional de Loochoos. Véanse las trayectorias de todas estas depresiones y tifones en la Lámina IV. Otra depresión apareció en el Mar de China, cerca de Paracels, los días 8 y 9, pero el 10 parecía haberse deshecho casi en el mismo sitio.

Dos depresiones o tifones en el Mar de China; septiembre 2 al 4 y 28 al 30, 1917.—La primera de estas depresiones o tifones apareció el 2 de septiembre cerca de 115° longitud E y 16° latitud N. Se movió al W $\frac{1}{4}$ NW hasta la tarde del 3, en que se inclinó al NW en dirección a la parte meridional del Golfo de Tongking. Luego volvió a moverse hacia el W y entró en Indochina entre 106° y 107° longitud E y cerca de 18° latitud N.

La otra depresión se formó probablemente el día 28 en los alrededores de 114° longitud E y 15° latitud N, y se movió casi directamente al W entrando en Indochina el día 30. Fué de menos importancia que la anterior.

**Tifón del 2 al 12 de septiembre, 1917.**—Las observaciones de Guam y Yap dieron algunas ligeras indicaciones de una depresión o tifón que se estaba formando probablemente al W de Guam y N de Yap cerca de 13° ó 14° latitud N y 139° longitud E. En caso de ser verdadera esta suposición, el tifón hubo de moverse casi directamente al W hasta el día 3 ó 4, en que empezó a inclinarse al N. En la mañana del día 6 el Observatorio de Manila pudo anunciar ya esta dirección del tifón hacia el N, disipando así todo temor de peligro para Filipinas. El aviso de tifón publicado era de este tenor:

Septiembre 6, 11.50 a. m.: La depresión o tifón del Pacífico parece moverse hacia el N, hallándose probablemente su centro a las 6 a. m. de hoy entre 17° y 18° latitud N y cerca de 127° longitud E. No hay más peligro para Filipinas.

El tifón mostró una tendencia a recurvar al NE el día 7, pero contra todo lo que se esperaba, se inclinó al W el día 8 amenazando la costa de China en las cercanías de Shanghai. En efecto, penetró en China en las primeras horas del día 10, aunque recurvó casi inmediatamente al N y al NE por el W de Shanghai. El Observatorio de Manila despachó los siguientes avisos de tifón los días 9 y 10:

Septiembre 9, 11.50 a. m.: El tifón de Loochoos se ha inclinado al W desde ayer, hallándose su centro a las 6 a. m. de hoy en el Mar del Este entre 28° y 29° latitud N y en los alrededores de 125° longitud E, moviéndose aparentemente al NW en dirección a Shanghai.

Septiembre 10, 11.55 a. m.: El tifón del Mar del Este ha penetrado en China por el S de Shanghai, moviéndose al NW o WNW; su centro se hallaba a las 6 de esta mañana a pocas millas al SW de Shanghai.

El tifón del 10 al 17 de septiembre, 1917.—Este tifón se formó probablemente cerca de Filipinas el día 10 no lejos de 18° latitud N y 125° longitud E. Pasó a través de las Islas Babuyanés el día 11, moviéndose hacia el NW; se inclinó más al N el día 12, y entró en China cerca y por el S de Amoy la noche del 12 al 13. Una vez en China el tifón recurvó hacia el NE y pasó por el N de Shanghai la madrugada del 14 en forma de una depresión de poca importancia. Después se movió hacia el E atravesando la parte meridional de Japón el día 15.

Los siguientes avisos de tifón fueron publicados por el Observatorio de Manila del 10 al 14 de septiembre:

Septiembre 10, 11.30 a. m.: Una depresión o tifón aparece esta mañana a unas 200 millas al E del norte de Luzón; su centro podía situarse a las 6 de esta mañana cerca de 125° longitud E y 18° latitud N. Su dirección actual no se puede aún precisar.

Septiembre 10, 9 p. m.: El tifón parece hallarse ahora cerca de 124° longitud E y 18° latitud N, moviéndose hacia el W al presente.

Septiembre 11, 9.30 a. m.: El tifón se hallaba a las 6 a. m. de hoy entre 18° y 19° latitud N y entre 122° y 123° longitud E, moviéndose al W½NW hacia la costa septentrional de Luzón. Es un tifón intenso pero no de gran extensión o diámetro; su velocidad actual es de 6 a 9 millas por hora.

Septiembre 12, 9.50 a. m.: El tifón se ha inclinado al N desde ayer, hallándose su centro a las 6 de esta mañana al W del Canal de Bashi, entre 119° y 120° longitud E y cerca de 21° latitud N, moviéndose aparentemente hacia el NW.

Septiembre 13, 11.50 a. m.: El tifón entró en China la noche pasada probablemente entre Amoy y Swatow, moviéndose al NW½N; su centro se hallaba a las 6 a. m. de hoy entre 116° y 117° longitud E y cerca de 25° latitud N.

Septiembre 14, 11.50 a. m.: El tifón de China parece haber recurvado hacia el NE desde ayer, hallándose su centro a las 6 a. m. de hoy al NW de Shanghai cerca de 120° longitud E y 32° latitud N, moviéndose hacia el NE.

El tifón de Japón, septiembre 24 a octubre 2, 1917.—Este tifón parece haberse formado del 23 al 24 de septiembre al WNW de Yap cerca de 134° longitud E y 12° latitud N. Se movió al N desde el 26 hasta que llegó cerca de la parte septentrional de las Islas Loochoos en donde recurvó al NE en dirección a la parte central de Japón. El centro ciclónico pasó a la menor distancia de Tokio durante la noche del 30 de septiembre al 1.º de octubre. Fué este uno de los tifones más intensos sentidos hasta el presente en Tokio, a juzgar por el siguiente cablegrama recibido en Manila por *The Daily Bulletin* el 8 de octubre:

Tokio, octubre 7: Cien mil personas están sin hogar y varios centenares más han perdido sus vidas como consecuencia de un tifón que barrió la bahía de Tokio el lunes último. El desastre es sin precedente en la historia de Tokio. La ciudad permanece aún sin luz eléctrica y los servicios de tranvías y vías férreas están ambos todavía inutilizados.

Aunque el tifón pasó a la considerable distancia de 450 millas al E de Luzón, sin embargo el Observatorio de Manila pudo enviar los siguientes avisos de tifón a los Observatorios extranjeros de Tokio, Zikawei, Taihoku, Hongkong y Phulien del 27 al 30 de septiembre:

Septiembre 27, 6.15 p. m.: Tifón al E de Luzón, distancia mayor de 300 millas, moviéndose al NNW o N.

Septiembre 28, 11 a. m.: Tifón en los alrededores de 130° longitud E y 20° latitud N, moviéndose al N.

Septiembre 29, 2.30 p. m.: Tifón cerca de 130° longitud E y 26° latitud N, moviéndose al N.

Septiembre 30, 1.10 p. m.: Tifón cerca de 133° longitud E y 30° latitud N, recurvando al NE.



METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.\*

[φ=14° 34' 41" N; λ=120° 53' 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.	Free ex- posure (to- tal).	Shelter (total).
					8 a.m.	2 p.m.	8 a.m.	2 p.m.			8 a.m.					
	<i>mm.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>°C.</i>	<i>Perct.</i>	<i>mm.</i>	<i>°C.</i>	<i>°C.</i>	<i>mm.</i>	<i>mm.</i>	
1	755.68	26.6	32.4	23.4	29.8	30.7	30.6	30.7	29.5	28.6	87.5	22.4	21.8	52.2	2	1.5
2	56.09	26.1	32.1	24	29.5	30.5	30.6	30.6	29.7	28.6	88.6	22	22.5	53.2	1.4	1.4
3	56.34	27.7	32.8	23.4	29.3	30.6	30.3	30.4	29.5	28.5	79.2	21.5	21.9	54.5	4.6	3
4	56.75	27.1	31.6	24.4	29.6	30.7	30.5	30.4	29.6	28.6	83.2	22	23.1	53.8	2.8	2.2
5	57.05	26.4	31.2	24.1	29.5	30.5	30.3	30.4	29.7	28.6	87.5	22.3	22.8	51	2	1.5
6	57.31	26.7	30.4	23.6	29.3	30.2	30.2	30.3	29.6	28.6	85.6	22.1	22.5	51.7	2.8	1.8
7	56.81	27.2	31.8	23.6	29.5	30.6	30.3	30.3	29.6	28.7	83	22	22	53.2	3.4	2.1
8	56.26	27.3	32.1	24.4	29.6	30.9	30.2	30.5	29.6	28.6	83	22.2	23.2	50.6	2.9	1.9
9	56.93	26.8	29.8	24.5	29.6	30.3	30.3	30.4	29.7	28.6	87.2	22.7	23.3	43.3	1.8	1.4
10	56.81	27.4	31.2	23.6	29.4	30.4	30	30.3	29.6	28.6	82	22.1	22.1	54.3	5.5	3.4
11	56.92	26.5	28.3	24.3	29.6	29.6	30.2	30.2	29.7	28.5	85.2	21.9	23.5	40.5	.9	1.5
12	58.02	26.6	31.2	23.9	28.7	29.8	29.9	29.9	29.4	28.5	87.2	22.5	23.2	51.2	2.1	1.6
13	58.49	27.1	33.3	22.6	29.1	30.6	29.8	30	29.8	28.6	84.9	22.4	21.7	57	2.8	2
14	58.90	26.4	30.6	24.2	29.6	30.1	30	30.2	29.8	28.5	86.9	22.1	23.2	55.3	1.9	1.4
15	59.09	26.8	31.9	22.8	29.3	30.4	30	30.2	29.7	28.6	84	21.7	21.5	52.7	3	2.1
16	58.12	26.6	30.9	23.8	29.7	30.3	30.2	30.2	29.7	28.6	87.4	22.4	22.4	49	1.7	1.4
17	58.09	25.4	27.9	23.8	29.5	29.4	30.1	30.2	29.6	28.6	91.5	22	22.7	41.5	.5	.5
18	58.98	26.5	31.2	23.5	28.7	29.8	29.8	29.8	29.6	28.6	86.3	22	22.2	53	2.4	1.8
19	59.06	25.6	30.5	23.4	29.3	29.9	29.8	30	29.6	28.6	90.7	22	22.8	52.5	1.3	1.3
20	58.19	25.3	31.4	22.1	28.7	29.5	29.8	29.7	29.5	28.6	89.7	21.3	21	56.4	1.5	1.2
21	58.73	26	29.7	22.7	28.6	29.3	29.7	29.7	29.6	28.6	88	21.9	21.3	46.1	2	1.5
22	59.07	25.6	31.3	23.4	28.6	29.5	29.7	29.8	29.5	28.6	91.4	22.1	22.5	51.7	1.2	1
23	57.99	26.9	31.3	22.9	28.9	29.6	29.6	29.7	29.7	28.5	82.9	21.6	21.3	52.2	3.2	2.3
24	57.52	26.8	31.4	23.7	29.1	30.2	29.8	29.9	29.6	28.6	86.4	22.4	22.3	54.3	2.6	1.9
25	56.52	25.9	30.4	23.5	29.5	30.1	29.8	30	29.5	28.5	91.4	22.5	23	49.1	1	.8
26	56.85	26	31	23	29	29.9	29.8	30	29.4	28.5	89	22.2	21.6	52.5	1.6	1.2
27	57.31	26.2	31	23.3	28.8	29.7	29.8	29.7	29.5	28.6	88.8	22.3	21.8	53	1.7	1.4
28	56.95	26.2	30.3	24	29.1	29.6	29.8	29.8	29.5	28.5	88.8	22.4	23.1	51.2	1.3	1.3
29	57.57	25.7	29.9	23.1	28.4	29.1	29.5	29.4	29.4	28.4	90.7	22.2	22	50	2	1.3
30	58.20	26.3	30.9	23.8	28.5	29.4	29.5	29.4	29.5	28.6	87.2	22.1	22.6	49.2	1.9	1.7
Mean	757.55	26.5	31	23.6	29.2	30	30	30.1	29.6	28.6	86.8	22.1	22.4	51.2	2.2	1.6
Total														65.8	49.4	
Departure from normal	+0.12	-0.3	+0.3	0							+1	-0.3				

Day.	Wind.				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.	Amount (mean).	Form and direction.		Upper.		Lower.	On the tower.		In the park.
						0-10.							
1	E quad.	175.5	19.5	SSW	8.5	Ci. ENE	Cu. ESE			h. m.	mm.	mm.	☉ ☉ p.
2	S quad.	129	19.5	S	8.8	A.-Cu.	cu.-N. s, ssw			4 20	10.6	12	☉ a. ☉ p.
3	SW	200.5	24	SW	7.8	A.-Cu. wsw	cu. SW, wsw			4 00	29.7	31.1	☉ a. ☉ p.
4	SW, WSW	328	38	SW	9.4	A.-Cu. W	s.-cu. wsw			5 25			☉ ☉ a. ☉ p.
5	SW quad.	206.5	26	SW	9.2	Ci.-S.	cu.-N. NNW			1 15	2.5	2.9	☉ ☉ a. ☉ p.
6	SW	247	34	SW	7.8	A.-Cu. wnw	cu.-N. w, wnw			2 35	35.1	35.4	☉ ☉ a. ☉ p.
7	WSW	199.5	24	W by S	6.6	A.-Cu. SW	Cu., Cu.-N.			4 50			☉ ☉ a. ☉ p.
8	SW	156	15	WSW	8.9	Ci.-S. E	Cu. SSE			6 30			☉ ☉ a. ☉ p.
9	W quad.	155	21	WNW	9.9	Ci.-S.	s.-Cu. wsw			5 00			☉ ☉ a. ☉ p.
10	SW by W	432.5	34	SW by W	9.3	A.-Cu. NNW, N	Cu. W quad.			0 00	8.6	9.1	☉ ☉ a. ☉ p.
11	SW	557.5	38	SW	10	Ci.-S.	N. SW			3 20			☉ ☉ a. ☉ p.
12	SW	234.5	27	SW	9.2	Ci.-S.	s.-Cu. SW quad.			0 00	23.3	24.8	☉ ☉ a. ☉ p.
13	NNE	85	10	WSW	6.7	Ci.	cu., cu.-N. E			2 30			☉ ☉ a.
14	SW quad.	137	10	N	9.3	Ci.-S.	cu. NNE			8 05	1	1.3	☉ ☉ a.
15	W quad.	169.5	15	W quad.	4.8	Ci.	cu. E			1 10	11.4	9.7	☉ ☉ a. ☉ p.
16	W quad.	94	11	W by N	8.7	Ci.-S. NE	cu.-N. ENE			9 10			☉ ☉ a. ☉ p.
17	NE quad.	54	7	WNW	10	Ci.-S.	N. E			2 20	.3	.3	☉ ☉ a. ☉ p.
18	NW	135	18	nw by w, wnw	8.8	Ci.-S.	cu. E			0 00	5.6	5.5	☉ ☉ a.
19	SW	79	13	W	8.9	Ci.	cu. E			5 10	.4	.4	☉ ☉ a. ☉ p.
20	WNW, NW	109	14	WNW, W	9.3	A.-Cu. E, ENE	cu.-N. E			2 40	8.6	8.6	☉ ☉ a. ☉ p.
21	SE	92	9	W	9.1	A.-Cu. ESE	cu. E quad.			2 10	24.8	24.8	☉ ☉ a. ☉ p.
22	E quad.	85	9	W, NNE	9.3	A.-Cu., Ci.	cu.-N. ESE			0 25	.2	.2	☉ ☉ a. ☉ p.
23	WSW	187	17	SW	5	Ci.-S. WbyN	cu.-N. ESE			4 25	11.4	11.7	☉ ☉ a. ☉ p.
24	SW	204.5	18	SW	8	A.-Cu. ESE	cu.-N. w			8 55	6	6.1	☉ ☉ a. ☉ p.
25	SW quad.	89.5	13	SW	9.4	A.-Cu. NNE	cu.-N. SW			5 05	20.8	19.3	☉ ☉ a. ☉ p.
26	SW	110.5	14	SW	8.7	Ci.-S.	cu.-N. s, SSE			1 05	3.8	3.3	☉ ☉ a. ☉ p.
27	SW quad.	108.5	15	SW, SSW	8.7	Ci.-S. E	cu. SSE			1 15	25.6	26.4	☉ ☉ a. ☉ p.
28	SW, SSW	360.5	33	SW	9.3	A.-Cu. NNW	cu., N. wsw			3 05	5.3	5.8	☉ ☉ a. ☉ p.
29	WNW, WSW	201.5	29	SW	10	Ci.-S.	N. WSW			0 15	22.6	24.7	☉ ☉ a. ☉ p.
30	SW	222	29	SW	8.8	Ci.-S.	cu. WSW			0 00	1.3	1.4	☉ ☉ a. ☉ p.
Mean		184.8	20.1		8.6					3 18			☉ ☉ a. ☉ p.
Total		5,545								98 45	263.2	270.1	
Departure from normal		-2,300.7			+0.8					-35 21	-107.2		

\* 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.

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 <sup>b</sup> (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 vac- uo. <sup>c</sup>	Free ex- posure (total)	Shel- ter (total)		
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.			
1	634.12	18.6	25.7	11.25a.	16.6	4.10a.	25.7	11.45a.	16.2	4.50a.	91	14.4	15.2	61.9	1.2	0.7		
2	34.06	18.4	24.3	Noon	16.4	3.40a.	24.9	1.20p.	16.3	5.00a.	90.5	14.1	15.4	58.7	1.6	1.3		
3	34.73	17.5	22.1	11.50a.	16.4	1.05a.	22	0.25p.	16.4	0.40a.	94.3	14	15.5	59.8	0	.6		
4	34.85	18.3	23.2	11.00a.	16.3	5.00a.	22.7	11.20a.	16	11.40p.	88.7	13.8	15.4	56	.1	.3		
5	35	17.6	21.4	11.45a.	15.8	2.10a.	21.8	Noon	15.5	1.20a.	96	14.3	14.9	50	0	.3		
6	35.11	17.2	22.4	11.00a.	15	2.20a.	23	0.15p.	14.5	3.35a.	97.2	14.2	12.9	60	.6	.4		
7	34.85	18.4	22.8	Noon	15.9	3.00a.	23.5	11.40a.	16	2.20a.	93.7	14.8	14.8	60	1.1	1		
8	34.83	18.4	23.6	Noon	16.1	4.50a.	23.5	1.00p.	16.4	4.25a.	92	14.5	15.5	58.3	.7	.6		
9	35.06	17.5	22.6	0.20p.	15.4	6.20a.	22.4	10.00a.	15.2	5.50a.	95.3	14.2	13.9	53.6	1.6	1.4		
10	34.49	17.1	20.6	1.10p.	14.9	12m.n.	21.8	1.00p.	15	12m.n.	98.8	14.4	14.9	47	0	0		
11	33.56	16.1	17.4	3.20p.	14.5	6.00a.	18.2	1.20p.	14.8	6.00a.	99.2	13.5	14.4	34.1	0	0		
12	35.62	16.7	19.8	2.40p.	15.5	2.30a.	20.3	2.35p.	15.4	11.10p.	97.8	13.8	14.3	44.6	.4	.5		
13	36.76	18.1	25	Noon	15.2	3.00a.	24.8	10.50a.	14.2	4.00a.	88	13.6	13.4	57.4	2.4	1.5		
14	36.78	17.3	20.8	9.40a.	14.9	0.20a.	21.4	9.45a.	14.2	4.00a.	92.5	13.6	13.4	44.3	.9	.6		
15	36.98	18.6	24.5	1.00p.	15.2	6.00a.	25.1	11.15a.	14	4.00a.	90.7	14.5	13.5	62.3	1.6	1		
16	36.55	18.8	24.6	10.25a.	15.9	2.00a.	24.9	10.50a.	15.5	5.35a.	89.7	14.5	13.4	59.1	3	1.7		
17	36.27	18.4	23.6	2.10p.	15.2	6.00a.	24.9	11.55a.	14.5	3.45a.	83	12.8	13.9	58	3.6	2		
18	37.09	18.9	25.5	0.25p.	15.7	4.50a.	25.4	0.50p.	15.2	5.40a.	85.8	13.9	12.9	57.8	2.7	1.7		
19	37.28	18.7	24.8	10.40a.	15.9	2.30a.	25.5	Noon	14.9	5.45a.	86.8	13.8	13.7	57.7	2.7	1.7		
20	36.45	18.8	24.8	Noon	15.8	6.00a.	25.5	1.20p.	15	4.00a.	81	13	13.6	62.9	3.5	2.1		
21	36.81	17.3	22.6	11.00a.	15	12m.n.	25.5	11.50a.	14.7	12m.n.	88.5	12.8	13.9	56.2	3.3	1.7		
22	36.70	17.6	22.6	2.10p.	15.2	0.05a.	23	10.20a.	14.6	3.55a.	84.3	12.7	13.7	57	1.5	1		
23	35.92	18.1	22.9	2.10p.	15.3	4.00a.	22.4	1.00p.	14	5.30a.	89.7	13.8	13	58.2	1.4	.8		
24	35.54	17.6	22.5	9.25a.	15.5	1.40a.	22.7	9.45a.	15	6.00a.	95.5	14.3	13	61.3	.6	.5		
25	34.69	17.6	22.1	8.45a.	16	11.50p.	23.3	9.10a.	15.2	6.00a.	96.3	14.4	14.2	53.7	0	0		
26	34.86	17.6	21.1	11.15a.	16	0.05a.	22.6	11.35a.	14.7	5.25a.	92.3	13.9	13.7	55.9	.7	.5		
27	35.40	17.9	22.4	2.50p.	15.7	5.30a.	23.8	10.55a.	14.9	3.25a.	96.3	14.7	14.5	53	.2	0		
28	34.82	17.7	23.1	1.00p.	15.7	2.10a.	23	2.00p.	15.5	5.40a.	93.7	14.1	13.6	60	1.2	.5		
29	35.29	17.3	21.2	0.25p.	15.4	6.00a.	22.2	0.30p.	15.5	12m.n.	95.2	14	14.4	57.1	0	0		
30	36.02	17.3	22.4	11.15a.	15.6	4.50a.	22.9	11.10a.	15.3	5.30a.	95	13.9	14.4	59	.5	.3		
Mean	635.55	17.8	22.8		15.6		23.3		15.2		92	13.9	14.1	55.8	1.2	0.8		
Total															37.1	24.7		

Day.	Wind.					Clouds.				Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.
	Prevailing direction. <sup>d</sup>	Total move- ment.	Maxi- mum hour- ly veloc- ity.	Direction at the time of the maxi- mum velocity.	Amount (mean).	Form and direction.		Upper.	Lower.			
						0-10.	Amount.					
1	E	365.8	25.4	E	9.3	Ci.-S.	Cu.			h. m.	mm.	☉ a. p. ☽ ☼ ☽ p.
2	SE	423.8	30.9	SE	9.7	Ci.-S.	Cu.-N.	SE		4 05	26.7	☉ p.
3	SE quad.	341.2	20.9	E	10	A.-S.	Fr.-N.			4 20	2.8	☉ ☼ a. p. ☽ p.
4	SE quad.	248.6	22.2	W	10	A.-S.	Fr.-N.			2 55	9.7	☉ ☼ a. p. ☽ p.
5	W	238.5	22	W	9.9	A.-S.	N.			2 20	14	☉ ☼ a. p. ☽ p.
6	Variable	263.9	21.4	SW	9.7	Ci.-S., Ci.	N.			0 40	12	☉ ☼ a. p. ☽ p.
7	E	329.3	21.5	SW	9.9	Ci.	S.	ESE		3 35	39.1	☉ ☼ a. p. ☽ p.
8	E	267.4	19.5	E	9.9	A.-S.	Variable			2 40	42.2	☉ ☼ a. p. ☽ p.
9	W quad.	286.6	31.2	SW	9.9	Ci.-S.	Cu.-N., N.			2 55	7.9	☉ ☼ a. p. ☽ p.
10	W	474	41.3	SW	10	A.-S.	N.			4 05	4.1	☉ ☼ a. p. ☽ p.
11	SW	1,271.9	71.6	W	10	A.-Cu.	N.			0 40	137.4	☉ ☼ a. p. ☽ p.
12	SW	452.2	32.4	SW	10	A.-Cu.	N.			0 00	49.6	☉ ☼ a. p. ☽ p.
13	Variable	267.4	19.8	W	5.9	Ci.	EbyN	Cu.-N.	ENE	0 20	3.4	☉ ☼ a. p. ☽ p.
14	E quad.	188	14.3	NE	9.1	Ci.	NE	Cu.-N.		6 00	15.6	☉ ☼ a. p. ☽ p.
15	E	270.4	20.9	W	6	Ci.		Cu.-N.	E	1 05	3	☉ ☼ a. p. ☽ p.
16	E	341.4	19.9	E	5.9	Ci.	SEbyS	Cu.-N.		6 30	10.9	☉ ☼ a. p. ☽ p.
17	E	266.5	23	E	6.6	Ci.-S.	E	Cu.	N	4 50	3	☉ ☼ a. p. ☽ p.
18	E	279.4	23.9	E	9.1	Ci.-S.		S.-Cu.	NE	6 45	20.9	☉ ☼ a. p. ☽ p.
19	E	288.7	22.7	SW	5.4	Ci.		Cu.-N.	SE, E	4 05	3.3	☉ ☼ a. p. ☽ p.
20	E	348.6	25.7	E	6.9	Ci.-S.	WbyS	Cu.-N.	SW	5 55	3.3	☉ ☼ a. p. ☽ p.
21	E	308.2	19.9	E	7.1	Ci.		Cu.-N.	SE	6 35	3.3	☉ ☼ a. p. ☽ p.
22	Variable	265.9	20.3	SW	9.3	A.-Cu.	SE	Cu.-N.	SE	4 10	18.3	☉ ☼ a. p. ☽ p.
23	Variable	234.2	23	SW	6.1	Ci.		Cu.-N.	WSW	3 25	23.4	☉ ☼ a. p. ☽ p.
24	SW quad.	211.2	16.1	W	7.3	Ci.		Cu.-N.	ESE	5 30	9.4	☉ ☼ a. p. ☽ p.
25	E	234	16.9	W	7.1	Ci.		Cu.-N.	E	3 30	14.9	☉ ☼ a. p. ☽ p.
26	NE, E	226.2	18.8	S	7.3	Ci.		Cu.-N.	E	3 55	43.4	☉ ☼ a. p. ☽ p.
27	E, W	291.4	29.6	W	8.3	Ci.	NNE	Cu.-N.	ESE	3 15	16.6	☉ ☼ a. p. ☽ p.
28	W, SW	300.8	25.7	W	9.3	Ci.	WNW	Cu.	WSW	4 25	41.6	☉ ☼ a. p. ☽ p.
29	SW, W	402.4	30.6	SW	8.6	Ci.	NW	Cu.-N.	WSW	4 05	.8	☉ ☼ a. p. ☽ p.
30	W	320	33.5	SW	8.7	Ci.	NE	Cu.-N.	WSW	2 00	38.1	☉ ☼ a. p. ☽ p.
Mean		335.1	25.5		8.4					3 36		☉ ☼ a. p. ☽ p.
Total			10,052.9							107 45	625.5	☉ ☼ a. p. ☽ p.

\* 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.  
<sup>b</sup> The barometric readings of this station are not reduced to sea level.  
<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.  
<sup>d</sup> This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.

METEOROLOGICAL BULLETIN.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, SEPTEMBER, 1917.

Station.	Day of month.															
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
Jolo	11.9	4.3	7.6	1.3	0.3	mm.	21.6	mm.	mm.	mm.	mm.	24.2	mm.	6.1	4.1	2.3
Isabela, Basilan	6.1						6.4	14	17.6	24.2	27.4	3				
Zamboanga	3.8	4.9		5.4		3.8		2.3	3	2	24.1	0.3		.5	.3	8.9
Davao	27.9	1.3		13	3	9.9	47.3	7.1	14.9	8.4		6.6				
Cotabato	1.5	15		1.3		2.3			.5			2.8	10.4		.5	3
Cagayan, Misamis	.5	.5	8.9	11.4		3.8	19.8		3.6	19		44.4	3.3			
Butuan	1.5	.5	2.5	12.4		1	7.9	.3	22.6	1.3		14.2	4.6	.3	2	.6
Mambajao	6.4	1.3	1.3	16.2								2.3	3.8			
Dumaguete	3	9.2		29.1								7.1	8.1			24.1
Yap, W. Carolines	51.5	1.5			.8		20.3	9.4	15.3	8.6	9.1		1.3	15.5	.3	22.7
Tagbilaran	6.6	5.6		50.5			21.3	10.7				19.8	12.2		14.2	
Iwahig	9.1	1.8	5.9			.8		27.2	63.5	35.3		.8	3.3	1.8		.8
Surigao	3.3		2.3	16	3.5		6.6		13.8	3						
Maasin	7.6	11.2		40.6		25.4	12.2		14	50.8			19.3	11.2		
Cebu	3.8		.5	2.9	1.5	26.9	4.1	37.6	2	.8			16			
Iloilo	86.8	32.5	10.2	1		6.1		2.5	23.4	.8			8.4	.5	1.5	
San Jose Buenavista	23.7	31.5	14.7	2.5	6.9	4.8		10.7	20.8	41.4						1.8
Cuyo	22.6	16.3	3.6	5.6	4.8	49.3	4.8	3.8	33	31.7				4.6	2	28.7
Ormoc	6.3	5.1	.5	21.2	2.3		29.2	1.8	35.8	17.5			2.8	8.9		.5
Guiuan	.3	1	.5	1.5	.8	.3		3.3				28.2	9.9		.5	3
Tacloban	2		3.9	5	.8	27.4	7.6	.3		82.8	1.3	3.4	2.1	.8		
Capiz	1.3			1	1.8	1.5	3.3	1.3	.3	3.5	11.2		1.5	12.2	1.8	.5
Borongan			4.3	1.3		1.5	4.8		.8			2.5	4.1			
Catbalogan	2	3.6	49.8	23.2	14.5	14.8	5.1		10.7			14.8	1.5		4.6	8.1
Calbayog	11.9	.5	3.8	5.2		9.6	4.3		3	13.2	2.3	2.5	1.5		13	53.9
Masbate	21.6		1.8	18	4.1	.5		52.6	3.3	6.4	.3			3		
Romblon	12.2	.3		2	.3			.5	1.3	1.5					12.5	2
Batag			1.5	11.5				.8	3.3	6.4			8.4	1.3		21.3
Sorsogon	15.5	.3		8.9	1.3			11.9	17.3						5.3	5.3
Legaspi	42.7	8.4	3.1	23.9	62.3	14.5		1	44	26.7	1					9.1
Sumay, Guam	88.9	22.9	2.6		45.7		30.5	30.5	7.7	20.3	16.5	81.3	2.5			17.8
Calapan	8.6	1.8	9.7	.8		10.7					1		32.5	.8	27.9	58.1
Virac	8.4			8.4		2.8	.5	.5			.8		1.6		1.3	14
Naga	30.8	23.3		36.8	23.4	5.6		.5	53.8	7.1			30.5			
Batangas	36.1	.8	3	2	1.8	.5	1	27.9	7.4		1.8		3	6.1		3.3
Lucena	12.2			1.8					2.5				14			9.1
Atimonan	15.7	13.2	.5	8.2			1		6.6		7.1		4.5	14.7	.5	7.9
Ambulong, Tanauan	22.6	39.4	15	3.6	5.9				23.1	14.5	4		23.6	.8	5.8	2
Canlubang, Calamba	11.9	9.9	7.6	13.2	1.3	21.6		11.4	4.3	.8		1.5	34.3	17.3	.5	6.1
Paracale	24.1	3.3		37.3		17.3		21.1	2.1			6.5	7.4	7.1		43.5
Santa Cruz, Laguna	8.4	3.3	8.6	14	14.2	1.3	2.8		17	5.6	.5		2	4.4	.8	7.4
Manila	10.6	29.7		2.5	35.1				8.6		23.3		1	11.4		.3
Antipolo	19.3	8.4	1.8	31	48	1.3	4.3	1.8	8.4	2.5	15.3	.5	9.1	1.5	1.3	2.8
Iba		74	40.1	37.8	9.4	3.3	17.2	6.9	42.4	17.6	79	21.9	.3	11.2		
San Isidro		21.8	1.5	9.5	1	4.5	1.3	8.1	50.8	10.4	5.3	7.1		3.3	2.1	1
Tarlac		4.3	3.8	.3	50.8	.5	18.8	1.3	4.3	19.6	28.5	18.6		.8		19.6
Baler	3.8	15.7	1.6	8.4	21.6				.2	8.6	1			23.9		17.8
Dagupan			10.5	1.6		.8	1.3	24.6	10.4	44.4	32.4	7.9	15.5			
Bolinao	12.2	2.3	19.5			6.4	2.8	5.1	33	61.5	72.9	8.4	12.4			
Baguio	26.7	2.8	9.7	14	12	39.1	42.2	7.9	4.1	137.4	49.6	3.4	15.6	.3	10.9	
San Fernando, Union	8.9	4.1	.8	5.8	5.2	22.1	.8	27.2	38.6	140.5	128.5	2.1	1.3			
Echague		8.1	4.8	1.3	3.3				2.8	3.8			5.8	12.7		
Candon	1.5	11.7	7.1	3.8	2.5	13.5		1	34.8	114.3	149.1	12.8			7.9	
Vigan	10	13.9	2.2	1.1	.2	5.5		1.5	48.5	41.6	33.2	12.3	1.5	.3		
Tuguegarao		3.3	74.5				34.3			74.4	14.5	55.6		43.2		
Laoag		97.5	58.6	22.1	86.7	64.2		3.8	3.6	15.9	201.4	23.9	6.1	7.1		
Aparri			25.1				10.4	1.3	6.3	41.2	62	1.8		9.7		
Cape Bojeador		22.9		5.3		6.9			19.6	58.1	66.3	11.9	33.5			
Santo Domingo, Batanes	17.4	12.7	13.2	1.7	.3	6.8	.2			35.6	66					.8

\* No observation.

Daily rainfall at the stations of the Weather Bureau, September, 1917—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
Jolo	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Isabela, Basilan	0.5	2.8	0.3	17	17.3	21.1	3.6	9.9	4.8	0.3	13.8	0.8	0.5	12.9	37.3
Zamboanga	0.3	.8	20.6	1.8	8.9	1.3	8.1	0.3	4.8	59.4	18.3	5	5	12.9	191
Davao				3.8		8.9	1.3	6.4	18.3						87.6
Cotabato		10.1	1.5	13.5			1.3	6.4	18.3						176.8
Cagayan, Misamis	2.3	6.4	50.8	5.3	7.9			4.8	59.4	2.5		2.5		4.3	132.2
Butuan	29.8	3	25.4	13.7			16							5.1	198
Mambajao		5.1	38.4	33.8			6.1				26.4			4.4	187.7
Dumaguete	7.4	22.6	27.4	38.9	26.7		8.6				49.5				164.2
Yap, W. Carolines	8.9	19.6	40.6	15	1.3	36.3	47.5	6.9			48.8	24.9	7.1	32.5	220.5
Tagbilaran			16.8	1.5			1.5								160.7
Iwahig		1	4	13	26.4	1	11.3	17.1			27.5	12.2	12.5	17.7	288.6
Surigao		.8	3	4.6	7.5						2.5				64.2
Maasin		14.5		58.4				41.1							306.3
Cebu	36.6	1.3	9.2	62.7	45.2		2	2.3	45.3					1	301.7
Iloilo	3.8	4.6	17	10.7	48	1.5	3								262.3
San Jose Buenavista	6.1	14.8	6.4	12.2	4	2.5	14.2	3.6	3.3	3	6.9	61.5	5	2.3	302.4
Cuyo	3.5	2	6.6	6.4	11.9	4.3	5		1.3	16	19.8	42.6	2.3	2.8	330.8
Ormoc	5	1	3.3	1.3	9.1	24.1			6.3			36.8			191.5
Guiuan	13.5	.5	18.3	5.3	6.6	5		18	6.3	11.9	13.2	45.7	10.2		216.6
Tacloban			15.7	12.8				1.8							175
Capiz	9.6		49.5	4.8	27.2	14.5	2.3		1.8	1.3					220.8
Borongan		2	7.1	2.8	8.9			16.7			8.4	29	3	8	188
Catbalogan		2	18.3	10.5	5.6	3.8		19.6	14.3		48.2	23.4	8	18.5	281
Calbayog		1	5.4	2.8	3.8	6.1	3	1.3	2.5	10.2	48.2	1.3	8		281
Masbate	28.2	3.3	8	5	22.5	6.1	34	2	48.2	19.6	30.8				248.7
Romblon	10.7	24.1	67.4	19.9	34.5	3.8		1.5		3		13			213.3
Batag		3.3	55.6		1.5						1	6.6	3		224
Sorsogon	18.5	16.8	25.7	3	7.9	4.6			3	62	32.8			7.4	129.4
Legaspi	5	2.3	16.8	13.5	8	12.7	1.8		10.9	4.6	33.8	8.1		8.9	234.7
Sumay, Guam		22.9	20.3	27.9	16.6	76.2			35.6	58.4	30.5	3.8	15.2	10.2	351.4
Calapan	1.8	15.7	3.6	8.2	8.1	9.1			14.5	2.3		8	4.3		684.8
Virac	6		2.8	42.5	19.8			3	14.5	2.3					220.6
Naga	6.1	2.8	11.5		67	.5	2	51.3	1.5		11.4	15		21.6	204.8
Batangas	5.1	2	8.9	12.4	8.6	6.9	5.8		1.3	13	69.8	58.9	3.8	23.4	479.5
Lucena		6.4	2.3	3.3	9.7		8		5.5	2.8	8.6	5	1.3	.5	130.7
Atimonan	21	16.4	16.8	16.2	25.7	16.5		2.6	9.9		7.9	20.1	5.1	.5	138.8
Ambulong, Tanauan	1.3	1.3	6.9		5.7	21.1	1		1.5	8	4.1	2.3	8		200.6
Canlubang, Calamba	3.3	1	3	8	1.5	13.7	3.5		3.6	5.3	4.1	4.3		3.6	215
Paracale	36.3	73.1	11.6	13.2	9.7	22.4		12.5	18.3	13.7	1.3	5.6	11.7	15.2	232.5
Santa Cruz, Laguna	5.5	1.5	11.7	5.1	3.1	7.7	16.5		41.7	1.8	1.3	4.3		8.4	430.6
Manila	5.6	.4	8.6	24.8	.2	11.4	6		1.8		5.3	8.1	1.3	4.3	229
Antipolo	4.6	1.3	3.3	8		4.6			20.8	3.8	25.6	22.6	6.4	4.4	263.2
Iba			7.1	4.1		.5			22.9	13.2	14.3	4.1	21.8	6.4	259
San Isidro		2.6		7.3	4.3				1	6.1	8.6	14.7	36.1	38.8	499.7
Tarlac			3		3.6				14.8		2	3.5			165.2
Baler	1.2	15		1	30.8	1		6.1	31.7	2	2.3	41.4		8.6	270.9
Dagupan			.3			1.3	10.9	1.3	51.8	7.6	26.9			20.8	271.2
Bolinao						14.7	10.2	13.7	37.6	68.1	40.7	19.8	8.1	2	364.6
Baguio						3	12.7	29.7	41.1	17.3	8.9	3.3		9.1	358.9
San Fernando, Union		20.9	3.3		18.3	23.4	9.4	14.9	43.4	16.6	41.6	3.8	38.1	19.1	625.5
Echague	3	1.5			2	6.4		1	14.5	2.3	17	46	3.3	40.6	512.1
Candon			1.3	45.2		5.1	3.3		5.8	33.8	5.3	33.8	5	23.9	124.1
Vigan				15.5	.8	.7	.8	26.3	1.5	2.3	3.6		.3	62.8	469.3
Tuguegarao															299
Laoag			10.9	2.3	50.8	50.3		30.5	7.4	34.3		70.6	57.4	30.8	936.2
Aparri		.5	23.6		1.8			6.6	9.4	3.8	20.1	9.1	2.5	2	237.2
Cape Bojeador												10.7	3	75.9	314.1
Santo Domingo, Batanes	3.3			1.1		1	1.4	.1	14	1	.6	2.4	3	4.3	186.9

\* 27 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, SEPTEMBER, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.*		Davao.		Cotabato.		Cagayan, Misamis.		Dapitan.		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	28	19.5	31.6	21.6	27.3	21.4	31.5	22.4	28	21.7	30.5	22.4	30.9	21.7	31.6	22.7
2	29.9	22.47	32.6	22.1	29.5	23.3	26.5	21.7	29	21.7	30.2	22.5	30.9	22.8	28.5	22.3
3	30.8	20.7	32.3	21.7	29.9	23.1	31.7	21.6	30.5	22.7	35.7	22.5	32.1	22	33.2	22.7
4	28.9	21.5	33.1	22.4	29	23.6	30.7	22.9	30.5	23.6	28.9	21.7	29.8	23.3	27.1	23.4
5	31.3	21.2	34.1	23.1	29.5	23	28.2	21.3	31.4	22.4	32.4	21.4	33.9	21	32.9	22.3
6	31.4	21.4	32.1	22.4	29.3	24	32.1	22.5	31.4	23.6	33.1	22.8	32.5	22	35	23.1
7	28.8	21.17	32.6	22.6	28.2	24	30.9	22.8	30.3	22.5	33	22.8	31.6	22.2	34.3	22.3
8	29.5	21	31.6	23.1	28	23.3	28	21.4	30.9	22.4	29	21.4	31.9	21.7	28.1	21.7
9	30.7	21.37	31.1	22.4	28.8	22.4	31.3	22.4	30.9	21.9	31.3	21.5	32.9	22.3	34.8	22.7
10	29.9	20.1	31.7	22.6	28.7	23.1	31.7	21.5	31.8	23	30.5	21.9	31.2	21.9	33.1	22.4
11	30.2	20.1	31.6	22.1	30.8	22.5	31.6	21.6	32	23	30.9	21.7	32.6	21.7	33.3	22.2
12	29.4	20.1	33.6	21.1	29.6	22.8	32.5	21.6	31.1	22.7	31.5	22.6	33	22.1	34.8	23.4
13	30.7	22	34.1	22.1	32.3	23.5	31.6	22.2	33	22.5	30.8	21.6	38.4	22.6	33.4	22.7
14	32.4	23.3	34.1	21.6	30.2	24.5	33.1	21.7	33	22.2	31.1	21.5	33.8	22.3	33.6	22.5
15	30.4	21.1	30.6	22.3	29.9	22.8	29.6	21	32.9	23.1	30.8	21.4	33.9	22.1	33.2	21.5
16	30	21	34.3	22.1	29.8	22.5	32.4	20.2	32.5	22.2	31.6	22.2	34.9	21.8	33.2	21.9
17	30.1	20.9	32.6	23.1	29.3	23	31.6	21.5	30.8	22.3	31.6	21.8	33.8	22.5	36	22.7
18	29.6	20.5	30.1	21.6	29.5	23	27.5	21.3	28.6	23.6	30.7	22.5	31.8	22.1	34.4	22
19	29.1	20.7	30.3	22	29.5	23.5	31.6	21	31.2	22.5	30.9	21	34.4	22.2	32.3	22.7
20	28.9	20.9	32.6	22.6	28.5	22.5	31.2	21	32.5	22.7	30.8	22	31.1	22.6	33.1	23.2
21	29.7	20.4	34.4	21.6	28.9	24	32.2	21.7	31	22.6	31.2	22.1	31.7	22.3	33.1	22.9
22	30.1	20.7	31.6	22.1	29	23.3	32.8	21.4	31.5	22.8	31	22.5	31.8	23.2	33.1	21.7
23	29.4	19.9	34.1	22.1	29.3	23	32.6	22	33.7	23	31.4	22	32.6	23	34.8	22.8
24	29.8	21.3	33.3	22.6	28.6	23.2	33.1	21.6	31.2	22.9	31.2	22.9	31.8	22.6	33.1	22.4
25	30.3	20.4	32.1	22.5	28.6	23.8	33.5	22.8	31	23.4	31.6	22.6	32.2	22.7	34.2	23.1
26	30.2	20.3	33.8	22.1	29.5	23.8	32.6	21.4	30.6	22.7	31.8	21.4	32.7	21.5	34.6	22.9
27	30.4	21.3	32.6	21.6	29.8	23.6	32.7	22.5	31.6	23	32.2	22	33	22.4	35.3	22.7
28	31	21.5	33.1	22.6	29.4	24	32.7	22	32.3	23	32.1	22.1	33	22.1	33.6	22.1
29	29.9	21.2	33.6	22.1	31	22.3	33.2	21	31.9	22.5	31.1	21.5	32.8	22.5	31.8	22.3
30	29.3	20.5	31.3	22.3	29.8	23.2	33.7	21	32.9	23.1	32.4	22.6	33.9	22.7	33.9	23.2
Mean	30	20.9	32.6	22.2	29.4	23.2	31.5	21.7	31.4	22.7	31.4	22	32.5	22.3	33.1	22.6

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao. b		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	31.9	23.9	29	23.8	31	25	28.8	24.4	29.1	22.4	28.3	23.4	30.3	23.4	29.5	24.7
2	28	23.8	29.8	22.6	29.7	22.6	30.4	22.6	28.3	22	28.9	24.1	30	23.5	28.6	23.5
3	33.8	24.7	31.4	23.3	31.2	23.2	32.2	24	29.3	22.3	30.2	23.6	32	23.8	30	24.9
4	29.9	23.5	29.4	23.2	32.2	25.5	30.7	22.4	32.1	21.9	28.3	23	32	23.3	30	24
5	32.1	20.27	30.1	22.4	33.2	26.7	31.4	22.3	32.2	22.3	31.1	23.1	32.8	22.2	30.3	24.2
6	32	24	30.9	22.2	32.7	24.2	31.4	23.4	32.3	22.2	31	24	34	23.2	30.3	22.2
7	32	23.2	32	22.2	28	23.3	31.7	21.7	32.7	21.3	31	23.4	33.1	23	31.4	23.8
8	28.9	22	30.4	22.9	33.2	23.5	29.2	20.9	32.3	21.9	28.4	23.3	33	22.8	30	23.6
9	30.3	21.6	31.1	22.7	30.7	23.4	31.6	22.7	31.4	22.5	31.3	22.8	31.5	22.4	29.9	22.2
10	31.7	23.4	31.4	22.4	33.2	23.7	32.6	24.2	29.9	20.8	31	23	32	23.5	31	24.9
11	30.6	23	30.8	22.4	30.2	24.1	30.8	23.2	31.5	19.9	31.3	22.6	33.2	23	31.5	24.4
12	32.6	23.4	31.2	22.5	32.7	24	31.9	22.2	32.5	21	30.8	24	33	23.2	31.5	23.6
13	30.7	23.9	29.6	23.7	34.2	23.3	31.6	22.6	32.3	22.1	29.6	24	33.5	23.3	30.1	23.1
14	31.1	22.9	30.3	24	34.6	23.5	31.5	23.5	28.9	22.6	31.8	22.3	33.1	23.4	31.8	24.9
15	30.5	21.6	30.4	23.3	30.7	24.2	32.2	22.5	32.6	20.3	31.5	22.5	32.5	23.6	31.4	24.4
16	31.5	23.2	30.6	23.7	33.4	23.5	32	23.3	33.2	20.5	32	23.5	32.2	23.3	32	25.3
17	32.1	23.7	31.7	24.9	34.1	23.1	32.5	22.8	32.3	22.5	31	22.8	34	23.2	32.4	21.8
18	31.5	23.3	30.2	23.3	34.2	23.4	30.5	22.8	32.1	21.8	30.5	23.3	34	23.8	31.5	24.5
19	30.4	22.4	29.8	23.3	31.2	22.6	31.5	22.4	32.5	22.4	29.8	22.8	32.5	23	32.5	24.1
20	30.7	23.6	30	22.7	32.8	22.7	31.6	22.4	29.6	21.2	30.9	23.1	32.4	23.6	30.5	23
21	29.6	23.1	30.3	22.2	33.3	24.6	31.7	22.3	30.1	22.1	29.5	22.3	33	23.5	31	23.5
22	30.6	22.2	29.9	22.7	34.2	23.1	30.9	22.9	31.9	21.1	29.7	22.1	33.6	23	30.5	23.3
23	31.2	22.7	30.6	22.7	32.2	24.3	31.7	23	32.3	21.4	30.6	22.9	34.2	23.5	32.6	23.9
24	31.6	23.6	31.4	23.6	28.2	23.3	31.6	23.6	32.4	21.2	30.5	23.5	33.2	22.8	31	24
25	31.6	24	31.5	23.1	28.5	23.5	32.8	23.5	31.1	21.6	31.5	23.3	33.4	23.6	30.8	24
26	32.7	23.9	32.1	22.4	32.7	24	33.5	24.5	32.2	21.4	32.1	23.5	33	23	31.8	25.2
27	33.1	26.3	33.1	23.4	30.8	25.3	33.3	25.6	31.9	21.4	33	24.2	34.5	24	32	25.7
28	32.2	23.2	34.8	23.2	26.9	21.7	33	25.8	30.3	21.8	32	23.5	33	24.5	31.1	26.7
29	31	25	31	22.9	33.3	24	31.5	24.4	32.2	21.8	30.9	24.2	32.8	24.6	32	26.5
30	32.3	23.5	31.8	23.1	28.2	23.5	32.8	23.7	32.2	21.4	32.7	23.2	32.5	24	32.6	24.4
Mean	31.3	23.3	30.9	23	31.7	23.8	31.6	23.2	31.5	21.6	30.7	23.2	32.8	23.4	31.1	24.1

<sup>a</sup> The maximum and minimum temperatures from 5 to 8 are taken from a self-registering apparatus.  
<sup>b</sup> The maximum temperatures from 11 to 30 are taken from a self-registering apparatus.

Maximum and minimum temperatures at the stations of the Weather Bureau, September, 1917—Cont'd.

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	28.5	22.2	30.2	23.7	27.6	24.9	28.8	23.8	32.8	26.7	28.4	23.5	31.6	24.1	31	23.1
2	26.4	21.5	27.7	23	29.5	23.3	30.1	23.2	32	24.6	32	23.9	32.3	23.5	31.6	22.7
3	29.5	22	30.7	23	29.8	23.9	31.8	23.5	32	24.1	32.9	22.9	33	24.6	33.9	22.3
4	29	24	30.7	22.8	30.5	23.3	29.4	23.4	29	24.6	27.7	23.9	33.4	24	28.6	23.1
5	32	24.3	31.1	23.2	30.2	23.7	31.1	23.7	31.1	24.9	31.9	23.9	33.6	24.1	32.5	23.5
6	30.5	24	30.7	22.9	31	23.3	31.5	23	31.9	26.7	32.3	23.5	33.8	23	32.6	23.9
7	30	24.5	30.7	23	30.3	22.5	32.6	23.2	33.3	27.4	33.5	23.1	33.2	23.6	33.2	22.6
8	31	24.5	31.8	23.3	30.3	23.7	29	22.2	29.9	25.6	28	23.3	34.1	23.4	28.5	22.8
9	28.8	24.2	28.8	23.8	27.3	24.9	30.2	22.9	31.4	25.3	30	23.5	27.2	23.1	31.7	23
10	29	23.2	27.3	23.4	27.3	23.5	28.8	22.9	31.5	27.1	32.8	23.3	31.2	23.3	32.4	22.6
11	30	24.2	31.2	23.1	29.8	22.5	32.1	22.9	34	24.9	32.4	22.9	33	22.7	32.2	22.5
12	31.5	23.5	31.3	23	31.8	23.6	32.2	22.9	34.2	27.2	32.6	24.4	33.1	22.4	32.2	22.9
13	29	23.8	30.8	23.9	30.2	23.8	29.1	22.4	28.5	23	29	23.6	30.5	23	28.7	23.5
14	30.9	23.5	29.7	23	30.3	24.2	32.5	21.2	33.4	22.3	32.5	23.3	32.1	22.6	31	21.5
15	33	23.5	31.7	22.4	31.7	23.8	32.9	20.4	33.7	21.6	33.6	21.8	32.3	21.9	31.8	21
16	32.4	24.7	32.1	23.4	31.6	24.9	32.8	21.9	32.4	23.4	33	32.2	32.2	23.5	31.8	22.9
17	32.4	24.5	33.2	22.5	30.5	23.6	33.8	22.4	33.8	22.7	33.9	23.1	33.6	23.1	32.2	22.6
18	31	23.8	30.9	23	30.8	24.1	32.4	23.2	32.4	22.5	33.4	23.3	31.9	22.6	31.8	22.5
19	31.7	23.5	30.8	22.5	30.6	24.2	32	22.4	32.5	23.5	33.8	23.2	32.4	22.9	32	22.5
20	31	21.5	31.3	23	28.9	25.2	30.9	22.9	31.6	23.1	32.2	23.6	31.3	22.9	30.1	23.1
21	29.5	23	29.6	22.8	28.7	23.4	31.8	22.9	32.1	24.2	31.7	23.5	30.2	23.4	29.1	22.9
22	29.9	23	30.2	23.4	28.8	23.5	31.4	22.4	33.1	23.6	32.6	23.1	31.2	23.1	31.1	22.8
23	31.5	24.4	31.7	23.5	29.9	23.9	32.4	22.8	32.9	23.4	33.2	24	32.8	23.6	32	22.1
24	30.8	23.7	31.2	23.1	31.3	24.7	32.4	22.9	31.6	25	31.3	23.5	32.2	23.2	31.1	22
25	31	23.8	30.2	23.2	28.8	24.3	33.2	23.6	32.9	23.3	33.2	24.2	30.3	23.5	32	22.5
26	31.2	25	31.4	22.1	31.3	23.2	32.6	24.2	31.3	26.8	32.9	23.5	32.4	23.7	33.3	22.7
27	31.4	25.8	31.7	23.5	31.4	24.1	32.6	23.5	30.5	24.6	32.9	23.4	32.2	23.7	33.9	22.1
28	30.5	24.5	30.7	23.4	28.4	23.9	33	23.4	32.1	24.2	34.6	23.8	32.2	23.6	32.6	24.5
29	30.5	24.9	31.8	22	30.1	24.1	31.9	22.5	31	22.9	33	24.4	31.6	23.4	30.2	23.1
30	31.8	23.8	31.7	23.7	32	24.7	32.9	22.8	33.5	22.8?	34.2	24.1	32.5	22.9	32.6	23.2
Mean	30.5	23.8	30.8	23.1	30	23.9	31.6	22.8	32.1	24.4	32.2	23.5	32.1	23.3	31.6	22.8

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	29.9	23.2	27.9	23.4	30.2	25.5	30.3	23.4	28.6	23	32.2	23	29.1	23.6	28.4	23.4
2	30.6	23.5	30.1	25	30.8	25.4	32.4	23.2	32.3	22.8	31.7	23.4?	31.6	23.5	28.4	23.6
3	31.2	23.2	29.8	24.2	33	24.6	32.9	25	31.8	23	31.7	23	31.8	23.9	29	22.4
4	28.3	22.6	28.6	23.8	31.8	24.8	33	24	27.7	23.5	30.1	23.4	29.8	23.3	30	23.6
5	30.7	23.3	30.1	24.4	32	24.4	33.8	23.7	30.6	23.6	31.4	22.4	31.8	24	29.6	24.2
6	31.2	24.5	31.1	24.4	31	24.4	33.6	23.2	30.8	23.4	30.1	23	30.4	24.5	30.6	23.2
7	32.2	22.5	32.3	23.4	31.4	24.4	33.9	25.1	32.5	23.2	32.1	23.7	32.3	24.3	28	24
8	29.4	22.6	30	23.7	32.8	25	34.3	25.7	30.9	23.5	33.1	21.5	32.3	24.1	28	21.6
9	28.7	23.5	27.2	23.5	27	23.8	29	24.3	30.2	23.7	29	23.4	29.4	23.9	29.8	23.2
10	30.8	23	30.6	22.9	29.8	24.2	31.5	24	30.6	23	29	22	28.1	22.7	28.4	24.6
11	32.6	23	31.4	23.8	31.8	25.2	34	24.4	31.7	22.8	31.5	24	32.2	24	29.8	23.2
12	31.5	23	30.4	23.4	32.6	24.2	34	26	32.4	22.8	33.4	21	33.3	24.2	29.8	23.6
13	28	23.3	28.7	23	32	24.8	34.9	23.2	27.3	22.5	30.1	21	30.1	24.2	28.6	23
14	32.2	22.2	32.3	21.7	31	24	32.7	23.2	30.6	22.4	32.5	20	31.5	23	29.6	22.6
15	32	20.3	32.4	21.9	31.4	25	34.7	23	30.5	23	33.5	20	32.4	23.3	29.8	23.8
16	31.4	21.9	32	22.8	32.6	25.5	34.5	23.1	32.3	24	32.5	21	32	24.6	29.2	23.2
17	32.7	22.5	33.3	23.3	30.4	24.8	32.8	23.5	31.5	23.9	32.6	21.5	31.8	23.9	30.4	23.2
18	31.2	22.4	31.1	23.3	31.4	23.6	34	22.8	32	23.4	33.5	19.9	31.8	23.3	29.6	23.4
19	31.2	22.2	29.8	22.6	31.8	24.5	32	22.9	31.2	23.6	30	20.5	30.4	24.5	30	23.8
20	30.8	22.2	29.8	23.1	30.6	24.2	31.5	22.3	30.4	22.5	32	20	29.8	23	29.2	24
21	31.5	22.7	30.8	23	27.8	23.8	32.4	23.2	27.7	23.3	30.7	20	29.8	23.1	29.2	24
22	31	23.3	32.1	24	30.4	24	32.9	22.9	31.4	23	31	22	31.7	23.8	27.6	23.6
23	32	22.7	32.4	23.5	31.8	25	32.6	23.4	31.4	23.4	32	21.5	31.6	23.3	28.2	22.8
24	31.5	22.8	32.2	23.8	31.6	24.5	32.9	23.4	30.5?	23.2	31.5	21	30.1	23.7	28.2	22.2
25	31.5	22.5	32.1	23.3	32.6	24.8	32.7	23.4	30.8	23.3	31.3	22	32.2	23.3	31	22.4
26	31.6	23.6	32.1	23.7	32.6	24.5	33	23.3	31.4	23.7	32	22	30.3	23.2	30	23.4
27	30.6	23.8	30.3	24.1	30.8	25.8	34.3	24.8	31.7	23	30.4	23	31.4	24.4	30.6	23.4
28	32.3	23.5	29.8	26.1	31.6	26.2	32	23.9	31.8	23.9	30.4	22	30.4	24	30.2	22.4
29	30.1	23.2	30.7	25.3	30.4	24.2	32.6	23.5	31	23.9	30.2	22	29.6	24	30.2	23
30	31.9	23.5	31.9	24.4	32.8	25.2	34	24.6	31.9	23.4	31.9	22.1	32.4	24.1	29.4	23
Mean	31	22.9	30.8	23.6	31.3	24.7	33	23.7	30.8	23.3	31.4	21.7	31	23.8	29.4	23.3

Maximum and minimum temperatures at the stations of the Weather Bureau, September, 1917—Cont'd.

Day.	Calapan.		Virac.		Naga.		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	30.5	23	30.6	22.9	31	21.4	28.8	23.5	30.3	23	31.6	23.8	29.8	23.8	33	22.4
2	30.7	23.1	33.1	22.4	30.2	21.2	32.1	23.8	30.6	24.1	29.8	24.2	31.6	23.4	31.2	22.2
3	34	23	32.7	22.5	31.6	22.4	34.4	22.7	31.8	23.2	32.6	23.6	32	23.1	33	22.1
4	33	23.6	29.6	22.3	30.3	21.7	32	22.6	31.3	24.4	31.7	24.6	31.5	23.5	29.9	22.4
5	34.5	22.1	33	22.5	32	21.4	30.3	22	32.5	23.4	32.5	23.7	30.1	23.2	31.1	22.9
6	31.1	23	32.4	22.3	30.1	21.2	31.1	23.2	31.7	21.9	32.5	22.4	30.7	22.9	30.9	21.5
7	32.6	23	32	23	32	22.3	32.1	23.1	31.7	22.3	32.9	22.9	32.5	23.5	32.4	21.4
8		23.5	32.4	22.8	32.4	22.2	32.3	24	32	22.8	31.8	24	33	23.8	31.8	22.6
9			29.5	22.4	30.8	22.1	29	23.8	28	23	28.4	23.4	29.2	23.5	28.9	23
10			30	22.5	28	21.4	30	22.6	29	23	29.9	23.2	28.9	23.2	30	22.4
11			32.6	24	31.9	21	31.5	26.1	30.7	24.7	30.3	24.8	28.9	25	29.5	23.1
12	32.5		32.8	22.3	33.7	21.7	31.9	23	31.6	24.1	32.4	24.1	31.2	24	30.6	22.4
13	33	22.5	28.5	23	31.1	22.1	33.7	22.4	31.2	22	33.4	23.2	33.1	22.7	32	21.6
14	31.6	22.5	31.8	22	32.6	20.8	31.9	23.8	30.8	22.6	29.7	23.5	31.8	23.4	29.9	22.6
15	33.2	22.1	32.9	21.2	33.5	20.1	31.8	22.9	32.5	22.5	32.2	22.9	33.1	23.9	32.2	22.1
16	32.5	23	32	22	31.9	21	32	22.4	31.4	23.5	30.4	23.5	31.8	23.7	31.2	23.2
17	32.4	23.1	32.5	22.6	31.9	21.5	31.5	22.6	29.7	23.4	28.5	24	28.9	23.8	30.9	23.1
18	33	22.5	32.5	23	32.5	21.1	31.8	22.3	31.7	22.5	30.6	23.5	33	23	31.2	22.5
19	32.5	23.2	32.1	22	30.6	21.3	31.7	23.5	30.5	23.2	29.7	23.2	33	24	31	23.1
20	31.6	24	31.2	22.8	31.7	21.6	32.7	22.3	30	22.6	29.3	23.6	30.3	22.4	30.2	22.2
21	31.2	23	30.7	22.2	31	20.8	31.7	23.4	29	23.6	29.1	23.7	30.8	23.8	29.4	22.1
22	31.8	22.1	31.6	22.7	29.4	21.3	31.3	22.6	30.7	22.5	27.9	22.8	32.4	22.5	31	21.9
23	31.9	22.5	31.4	21.5	30.9	21.8	31.6	22.6	31.1	22.4	31.4	23	30.3	22.4	30.6	21.8
24	33	22.6	32.3	22	29.2	21.6	32.1	22.8	30.9	22.4	30.7	23.4	31	23.3	29.8	22.4
25	32.2	24	32.3	21.5	31.2	21.6	31.8	23.7	30.3	22.6	31.1	23.9	30	24	29.4	23
26	32.6	23.8	32.7	22	30.4	21.1	32.5	23.8	30.3	22.6	30.2	23.3	30.9	23.1	29.8	22.1
27	32.2	22.5	33	23	32.2	21.4	31.8	22.4	30.7	22.2	31.7	23.5	30	22.8	31.2	22
28	32.5	23.9	30	22.7	27.5	22.2	31.8	23.8	30.5	23.1	31.7	23.6	30.9	23.5	30.2	22.8
29	31.8	23	30.5	23.5	30.7	22	30.7	23.4	30.7	23.1	30.9	24.3	29.7	23.5	29.5	22.6
30	32.5	23.5	32.7	22.4	31.9	21.6	31.9	24.1	30.7	23.5	32.5	23.9	31.2	23.3	30.1	22.3
Mean	32.3	23	31.7	22.5	31.1	21.5	31.7	23.2	30.8	23	30.9	23.6	31.1	23.4	30.7	22.4

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	33.6	23.8	32	23.8	32.4	23.4	32.4	22.3	32.2	23.5	32.4	23.8	34.5	23.5	32.8	23
2	32	24.6	30.7	23.3	32.1	24	31	22.5	31.3	24.1	31	24	31.6	23.4	32.1	24
3	32.5	24.3	32.4	23.1	32.8	23.4	31.9	21.8	29.8	23	31.1	23.2	31.2	23.2	32.2	22.7
4	31.1	24.6	30	22.8	31.6	24.4	30.3	22	31.9	22.6	31.1	23.8	32	23.6	32.7	23.8
5	30.4	23.3	29.9	23.5	31.2	24.1	29.5	22.2	28.1	23.5	30.4	23.5	33.1	24	32.7	23.6
6	31.5	23.8	30.6	22.3	30.4	23.6	30.2	21.8	30.9	23.2	31.4	24	33.4	23.1	33.3	23
7	33.4	24	32	22.8	31.8	23.6	31.7	22.8	30	23.4	31.6	24	32.4	23.7	33.5	23
8	32.6	24.6	31.9	22.8	32.1	24.4	31.8	22.5	30.9	24	32.1	24.1	33	23.8	31.7	23.4
9	31	24.8	28.8	23.5	29.8	24.5	29.1	23	30.9	23.5	29	23	32	23.6	30.6	23.1
10	28.4	25	29.2	23	31.2	23.6	29.2	22.3	29.8	22.6	29.4	23.3	32	23.5	31.2	24
11	32.5	25	30.6	24.2	28.3	24.3	27.7	22.2	26.9	23.6	28.6	23.8	26.8	23.5	30.5	24.2
12	33.5	24.2	30.8	23.7	31.2	23.9	29.4	22.3	30.5	23.1	30.6	23.3	30.4	23.2	32.2	23
13	33	23.5	32.3	22.6	33.3	22.6	32.8	21.1	31.5	22.4	32.1	22.5	33.6	23.1	32.2	21.9
14	31.2	24	29.3	23.1	30.6	24.2	29.7	21.8	31.4	22.4	27.2	23.6	33.4	23.2	29.6	22.9
15	32.5	23.4	31.8	23	31.9	22.8	32.2	21.3	30.9	22.9	31.9	22.8	33.4	23.1	31.5	21.6
16	31.4	24	30.3	23.7	30.9	23.8	29.3	22	31.9	22.5	31.1	23	32.2	22.7	32.9	22.2
17	28.8	23.8	28.1	23.5	27.9	23.8	27.2	22	31.5	22.9	28.4	23.3	29.8	23.6	29.4	23.3
18	31.2	23.1	31.5	23.6	31.2	23.5	31.2	21.9	29.9	22	28.9	22.6	29.8	22.2	29.7	22.3
19	30.8	23.3	31.1	23.9	30.5	23.4	29.4	21.8	31.8	22.6	32.2	23.5	34.6	22.8	32.1	22.9
20	30.3	24.4	31.1	22.5	31.4	22.1	30.9	22	32.6	21.9	31.4	23.4	34.4	22.6	32.8	23.3
21	28.6	23.5	29.3	23.5	29.7	22.7	30.2	21.9	32.5	23.2	27.6	23	29.9	23.4	27.5	22.9
22	29.8	23.2	30.5	22.7	31.3	23.4	31.3	21.8	31.7	21.9	30.7	22.4	30.8	21.8	28.6	21.3
23	31	23	32	22.4	31.3	22.9	31.4	21.1	31.4	21.9	31.6	23.1	34.4	22.4	30.9	22.1
24	29	23.6	31.5	23.2	31.4	23.7	30.7	22.6	31.3	22	31.6	23.4	34.5	23.1	31.1	23.1
25	30.4	23.6	31.1	23.6	30.4	23.5	28.8	22.1	30.9	22.6	31	23.8	33.6	23.4	30.9	23.8
26	31	24	30.7	22.6	31	23	29.1	21.3	30.9	22.9	30.1	23.6	32.6	23	34.5	22.6
27	32	24.5	31.3	23.1	31	23.3	30.6	21.6	30.6	23.5	32.3	23.5	33.6	23.5	34	22.4
28	31.6	24.5	30.9	23.5	30.3	24	28.9	22.7	30.9	23.3	31.3	23.9	33	24.2	32.7	22.3
29	33.1	23.6	29.4	23	29.9	23.1	28.7	21.8	27.1	22.5	29.2	22.7	33.4	23.4	31.7	24
30	33.3	23.4	30.4	24.4	30.9	23.8	30.1	22.2	30.4	22.5	31.2	23	31.8	23.2	33.9	23.1
Mean	31.4	23.9	30.7	23.2	31	23.6	30.2	22	30.7	22.9	30.6	23.4	32.4	23.2	31.7	23

Maximum and minimum temperatures at the stations of the Weather Bureau, September, 1917—Cont'd.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.....	35	25	33	24.6	25.7	16.6	34.6	24.3	34.5	23	32.9	26.6
2.....	33.3	24.5	32.1	24.5	24.3	16.4	33.5	23.9	33.1	23	32.9	25.8
3.....	31.4	24.2	30.3	24.5	22.1	16.4	33.5	24.5	34.6	23	32	25.1
4.....	33.2	24.1	32.5	23.9	23.2	16.3	32.6	25	31	23	32	25.1
5.....	31	23.8	30.2	24.3	21.4	15.8	30.5	24	34.5	23.5	32.2	25.9
6.....	32.3	24.1	31.6	23.5	22.4	15	31.6	23.3	33.5	23.5	32.1	25.5
7.....	33.2	24	32	24	22.8	15.9	33.1	23.5	34	22.5	32.5	25
8.....	33.3	23	33	24.6	23.6	16.1	32.5	24.5	31	24.1	32.4	26
9.....	32.6	23.2	32.2	24.2	22.6	15.4	32.2	23.2	31.8	23.5	33	25.1
10.....	30	24.3	30.2	23	20.6	14.9	31.1	23.7	30.4	23.5	28.9	25.6
11.....	27.9	24	30.1	23.6	17.4	14.5	28.1	23	30.8	22.3	28.7	23.4
12.....	30.8	23.5	31.5	23.5	19.8	15.5	31.8	23.8	34.4	22.4	30	25.1
13.....	34.6	23.3	32.5	23.7	25	15.2	33.3	22.8	33.5	22.2	31.5	24
14.....	31.2	23.2	32.5	23.6	20.8	14.9	31.2	22.7	27	23.1	30.4	24.1
15.....	34.1	23.4	32.3	23.7	24.5	15.2	32.5	23.5	33.4	20.6	31.5	24.4
16.....	33.2	23.8	33	23.3	24.6	15.9	32.5	23.3	34.1	23.1	32.4	24
17.....	32.4	24.5	33.5	24.6	23.6	15.2	32.7	23.5	33.6	23.6	32.3	25
18.....	32.4	23.7	33.5	24	25.5	15.7	32.6	23.7	31.6	23.2	32.9	25.5
19.....	34.8	23.9	33.7	24	24.8	15.9	32.8	23	33.9	23.3	33	26
20.....	33.7	23.4	33.3	24.5	24.8	15.8	32.8	23.6	34	22.6	32.6	24.1
21.....	34.3	24.4	33.5	24.7	24.6	15	34	23	32	22.4	32.8	24.1
22.....	33.4	23.4	33.1	24	22.6	15.2	32.6	23.4	33	21.3	32.5	24.1
23.....	33.3	23.3	32.3	24.2	22.9	15.3	32	22.4	33.6	21.5	32.5	24
24.....	32.7	23.9	32.2	24	22.5	15.5	33.3	23.5	34	23.5	32	24.8
25.....	33.2	23.5	32.6	24.2	22.1	16	32	23.4	33.2	24.1	32.6	25
26.....	33.3	23.2	32.8	24	21.1	16	32.5	23	33.4	23.8	32.4	25
27.....	32.8	23.1	32.6	25	22.4	15.7	32.5	23.4	33.5	23.5	32.6	25.1
28.....	32.4	23.6	32.5	24.3	23.1	15.7	31.5	23.2	33.6	22.7	32.5	24.9
29.....	32.1	23.5	31.9	24.2	21.2	15.4	32.2	23.5	34.5	23.1	32.6	25.8
30.....	32.4	23.5	30.5	24	22.4	15.6	32.6	23.5	34	22.6	32.6	25
Mean.....	32.7	23.7	32.2	24.1	22.8	15.6	32.4	23.5	33	22.9	32	25

Day.	Vigan.		Tuguegarao.		Laoag.		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1.....	33.5	24.7	32.4	24	34.7	24	34.8	24.5	31.6	24.6	31.3	26
2.....	33.3	24.4	36	25.2	34.5	24	34.7	24.6	31.8	25	32.4	25
3.....	32	24	36.8	21.9	32.9	23.2	35.2	24	32	23.4	32.6	25.7
4.....	32.3	24.5	29.2	21.7	32.9	23	28.8	23.3	32.8	24	32	24.5
5.....	31.2	23.8	33.4	24.2	32.7	23.6	32.5	24.6	31.6	23.8	31.8	24.2
6.....	31.4	24	33.4	24	32.2	22.3	33.7	23.7	31.8	23.8	30.4	25.9
7.....	33	24	36.2	23	32.8	23.6	34.1	24.5	30.6	23.8	31.8	26.1
8.....	32.4	24.4	32	23.4	32.4	24.2	32.2	24	31.4	25	31.4	25
9.....	32.1	23.1	32.4	24.8	32.9	22.9	32.8	24	30.8	24	31.7	23.6
10.....	29.3	23.8	28.5	23.5	29.2	23.8	30.4	24	29.6	23.5	31.1	25
11.....	28.3	22.8	27.8	22.7	25.8	23	27.3	23.2	26.6	22.5	27.8	23.8
12.....	28.1	23.8	35.4	23.1	29.3	22.4	33.4	24.3	27.8	21.2	29.2	25
13.....	32.3	23.6	32.3	22.5	33	22.3	32.3	23	30.8	22.6	31	24.2
14.....	29.6	23	25.7	22.8	29.4	22.3	30	23	30.4	23	31.6	25.6
15.....	31.9	23.3	34	21.9	32.4	21.1	31.5	22.4	32	22.8	31.8	25.4
16.....	32	24	34.6	23.5	32.8	23.2	32.2	23.8	31.2	23.7	31.6	25.4
17.....	32.6	23.6	33	23.6	35.8	23	32.5	24.6	30.6	24.4	31.9	25.4
18.....	32.3	23.8	32.2	23.7	33.4	23.8	32.7	23.8	31.8	23.6	31.7	24.4
19.....	32.5	23.7	34.6	24.2	34.7	24	32.2	24.3	31	24	31.8	23.9
20.....	32.5	24	31.8	22.6	34.8	22.1	31.3	24	31.2	24.4	31.5	25.2
21.....	32.3	23.8	33.3	22.8	33.5	22.8	32.1	24.1	33.2	23.8	31.9	23.9
22.....	31.6	23.5	33.3	22.6	32.2	22.7	31.8	23.6	32.2	24.4	32	23
23.....	31.7	23	34.6	23.4	32.1	22.4	31.8	23.6	31.5	24.5	31.8	22.8
24.....	32.5	23.4	34.5	24.5	32.5	22.5	32	23.6	31.8	23.7	31.9	24.8
25.....	31.6	23.5	33.1	24	33.3	23	30	24.3	30.8	24.4	31.3	24.4
26.....	31.3	23.5	34.3	23.5	32.1	23.7	31.1	24	31.2	23.6	31.4	24.1
27.....	31.4	23.6	32.6	24.1	33.9	23.8	29.8	24.1	31.4	24.6	31.5	26.5
28.....	32.1	23.8	34	23.1	32.8	22.9	30.3	23	32.2	24.4	31.5	26
29.....	30.3	23.3	35.5	24.2	32.1	22.7	31.8	23.1	30	23.6	31.1	25.8
30.....	30.4	23.4	35.2	24	28.1	23	33	23	27.2	23	30	24
Mean.....	31.6	23.7	33.2	23.4	32.4	23	31.9	23.8	31	23.8	31.4	24.8



## SEISMOLOGICAL BULLETIN FOR SEPTEMBER, 1917.

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

### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

3, 10<sup>h</sup> 08<sup>m</sup> 30<sup>s\*</sup> [3, 18<sup>h</sup> 08<sup>m</sup> 30<sup>s</sup>]. **Vigan** (NW Luzon). Earthquake shock of intensity II-III; reported also as slightly felt in the Benguet Province. It originated within the Mountain Province.

7, 22<sup>h</sup> 23<sup>m</sup> 23<sup>s\*</sup> [8, 6<sup>h</sup> 23<sup>m</sup> 23<sup>s</sup>]. **SE Luzon**. Earthquake of intensity VI-VII. The epicenter was in the vicinity of the old volcanic cone Isarog, through the N and NE slopes and plains, consisting of soft volcanic ejecta thrown by the volcano and carried down by water. The shocks had sufficient intensity to open some cracks in the ground and in some building. This earthquake was felt with decreasing intensity to distance of 200 kilometers from the epicenter. Of the numerous aftershocks which occurred in the epicentral region only the one at 21<sup>h</sup> 36<sup>m</sup> 22<sup>s\*</sup> [9, 5<sup>h</sup> 36<sup>m</sup> 22<sup>s</sup>] was noticed outside of it.

12, 23<sup>h</sup> 25<sup>m</sup> [13, 7<sup>h</sup> 25<sup>m</sup>]. **Ormoc** (W Leyte). Earthquake of intensity III. On the 14 at 12<sup>h</sup> 19<sup>m</sup> (insular time) a second shock occurred; both had a very near and shallow origin.

14, 5<sup>h</sup> 33<sup>m</sup> 35<sup>s\*</sup> [14, 13<sup>h</sup> 33<sup>m</sup> 35<sup>s</sup>]. **Naga** (SE Luzon). Oscillatory earthquake, direction NE-SW, intensity III, duration 4 seconds. It originated in the Isarog center.

17, 5<sup>h</sup> 48<sup>m</sup> 39<sup>s\*</sup> [17, 13<sup>h</sup> 48<sup>m</sup> 39<sup>s</sup>]. **N Luzon**. Earthquake of intensity IV in the Mountain Province and Ilocos. Its origin seems to have been in the western part of the former, in the Cordillera.

18, 9<sup>h</sup> 33<sup>m</sup> [18, 17<sup>h</sup> 33<sup>m</sup>]. **Ormoc** (W Leyte). Oscillatory earthquake, direction W-E, intensity III, duration 2 seconds.

18, 13<sup>h</sup> 41<sup>m</sup> 36<sup>s\*</sup> [18, 21<sup>h</sup> 41<sup>m</sup> 36<sup>s</sup>]. **Butuan** (N Mindanao). Earthquake shocks of intensity III-IV; their origin was under the Pacific, ESE of Butuan; they must have been felt throughout the eastern coast.

18, 20<sup>h</sup> 25<sup>m</sup> 42<sup>s\*</sup> [19, 4<sup>h</sup> 25<sup>m</sup> 42<sup>s</sup>]. **SE Luzon**. Earthquake felt in the provinces of Ambos Camarines and Albay, it apparently originated under the sea, near the northern coasts of the said provinces.

21, 11<sup>h</sup> 13<sup>m</sup> 58<sup>s\*</sup> [21, 19<sup>h</sup> 13<sup>m</sup> 58<sup>s</sup>]. **SE Luzon**. Earthquake felt in the western part of Ambos Camarines, with intensity III-IV, the origin was under the sea, N of San Miguel Bay.

22, 6<sup>h</sup> 51<sup>m</sup> 28<sup>s\*</sup> [22, 14<sup>h</sup> 51<sup>m</sup> 28<sup>s</sup>]. **Candon** (W Luzon). Oscillatory earthquake, direction SE-NW, intensity III, duration 3 seconds.

<sup>1</sup> 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<sup>h</sup>), insular time being added in brackets for the convenience of Philippine readers.

23, 15<sup>h</sup> 39<sup>m</sup> 17<sup>s</sup>\* [23, 23<sup>h</sup> 39<sup>m</sup> 17<sup>s</sup>]. **W Luzon.** Earthquake felt through the provinces of La Union and Benguet, with intensity III-IV and rather long duration. The origin lay in the China Sea, some distance from the Luzon coast. Surely the shock must have been perceptible in other western provinces but at such hour of the night it was not noticed.

30, 13<sup>h</sup> 57<sup>m</sup> [30, 21<sup>h</sup> 57<sup>m</sup>]. **NE Mindanao.** Earthquake of intensity II-III felt through the peninsula of Surigao and northern part of the Agusan Valley, it originated in the Butuan Bay. About an hour later the seismograph of this station recorded a second very light shock from the same center.

## RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0<sup>h</sup>. Instrument: Wiechert seismograph; 1,000 kilograms.  $A_N$ :  $T_0=5.9$ ,  $\epsilon=2.340$ ,  $r_{T_0^2}=0.024$ ;  
 $A_E$ :  $T_0=5.3$ ,  $\epsilon=1.783$ ,  $r_{T_0^2}=0.092$ . Alluvium. 2.40 meters above sea level].

No.	Date.	Character.	Phase.	Hour.			Amplitude.		Remarks.
							$A_N$ $\mu$	$A_E$ $\mu$	
274	2	Iv	eP F	<i>h.</i> 22	<i>m.</i> 30	<i>s.</i> 04			
275	3	Iv	eP F	10	08	30			Vigan (NW Luzon).
276	4	I	e L M <sub>E</sub> M <sub>N</sub> F	16	56				
					01	36			
					02	14	16		5
					03	40	15	6	
					17	16			
277	7	IIIv	eP L	22	23	23			SE Luzon. Maxima and end lost by the force of the shock.
					23	54			
278	8	Iv	eP F	2	05	42			
					09				
279	8	Iv	eP L M <sub>N</sub> F	19	36	46			
					37	10			
					37	16	2	47	
					40				
280	8	Iv	eP F	21	36	22			SE Luzon.
					40				
281	9	I	e L F	1	07				
					13	02			
					34				
282	12	Iv	eP L M <sub>E</sub> F	9	57	30			
					57	43			
					58	10	2		45
					10	00			
283	12	Iv	eP F	23	31	34			
					35				
284	13	Iv	eP F	4	25	28			
					29				
285	13	Iv	eP F	11	55	05			
					57				
286	14	Iv	eP F	5	33	35			Naga (SE Luzon).
					38				
287	14	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	15	33	03			
					33	18			
					33	22	5		192
					33	23	5	223	
					41				
288	17	IIv	eP L M <sub>N</sub> M <sub>E</sub> F	5	48	39			N Luzon.
					49	19			
					49	58	4	773	
					50	16	5		712
					6	10			
289	18	Iv	eP L F	13	41	36			Butuan (N Mindanao).
					44	52			
					14	04			

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A <sub>N</sub> μ	A <sub>E</sub> μ	
290	18	Iv	eP F	h. 20	m. 25	s. 42			SE Luzon.	
291	20	Ir	eP S L F	3	00	53				
					09	00				
					57					
292	20	Iv	eP F	14	57	15				
				15	00					
293	21	Ir	eP L F	10	43	48				
					48	22				
				11	04					
294	21	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	11	13	58			SE Luzon.	
					14	30				
					14	38	5	146		
					14	56	5	164		
					29					
295	21	Iv	eP L M <sub>N</sub> M <sub>E</sub> F	23	32	21				
					32	44				
					32	46	5	144		
					32	46	5	60		
					42					
296	22	Iv	eP F	6	51	28			Candon (W Luzon).	
					55					
297	23	IIv	eP L M <sub>E</sub> M <sub>N</sub> F	15	39	17			W Luzon.	
					39	50				
					39	54	4	397		
					40	04	4	553		
					55					
298	24	Iv	eP F	11	16	31				
					21					
299	24	Ir	eP S L M <sub>E1</sub> M <sub>N1</sub> M <sub>E2</sub> M <sub>N2</sub> F	20	15	14				
					19	07				
					21	02				
					21	08	6	47		
					21	13	6	80		
					22	14	7	62		
					22	17	6	108		
				21	09					
300	26	Iv	eP L M <sub>E</sub> F	9	41	26				
					42	03				
					42	10	4	73		
					52					

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

3, 10<sup>h</sup> 08<sup>m</sup> 30<sup>s\*</sup> [3, 18<sup>h</sup> 08<sup>m</sup> 30<sup>s</sup>]. Vigan (NW de Luzón). Temblor de tierra de intensidad II-III. Sentido también ligeramente en Baguio; el origen se hallaba dentro de la Provincia Montañosa.

7, 22<sup>h</sup> 23<sup>m</sup> 23<sup>s\*</sup> [8, 6<sup>h</sup> 23<sup>m</sup> 23<sup>s</sup>]. SE de Luzón. Temblor de tierra de intensidad VI-VII. El epicentro parece se hallaba en las cercanías del cono volcánico Isarog; en las poblaciones situadas al E y NE de dicho monte y en sus vertientes resultaron agrietados tanto algunos edificios como el suelo, formado por las tobas y arenas arrojadas antiguamente por el volcán y acarreadas luego por las aguas. Fué perceptible con decreciente intensidad hasta distancias de 200 kilómetros del epicentro. Después del terremoto principal se sintieron en el epicentro multitud de ligeras repeticiones, con una de mayor intensidad a 21<sup>h</sup> 36<sup>m</sup> 22<sup>s\*</sup> del 8 [9, 5<sup>h</sup> 36<sup>m</sup> 22<sup>s</sup>].

12, 23<sup>h</sup> 25<sup>m</sup> [13, 7<sup>h</sup> 25<sup>m</sup>]. Ormoc (W de Leyte). Temblor de tierra de intensidad III. El día siguiente a 12<sup>h</sup> 19<sup>m</sup> (hora insular) se sintió otro del mismo carácter e intensidad; ambos de origen muy cercano y superficial.

14, 5<sup>h</sup> 33<sup>m</sup> 35<sup>s\*</sup> [14, 13<sup>h</sup> 33<sup>m</sup> 35<sup>s</sup>]. Naga (SE de Luzón). Temblor oscilatorio, dirección NE-SW, intensidad III, duración 4 segundos. Originado en el centro del Isarog.

17, 5<sup>h</sup> 48<sup>m</sup> 39<sup>s\*</sup> [17, 13<sup>h</sup> 48<sup>m</sup> 39<sup>s</sup>]. N de Luzón. Temblor de tierra de intensidad IV, sentido en la Provincia Montañosa y en las de Ilocos. El epicentro se hallaba en la parte occidental de la Provincia Montañosa o de la Cordillera.

18, 9<sup>h</sup> 33<sup>m</sup> [18, 17<sup>h</sup> 33<sup>m</sup>]. Ormoc (W de Leyte). Temblor oscilatorio, dirección W-E, intensidad III, duración 2 segundos.

18, 13<sup>h</sup> 41<sup>m</sup> 36<sup>s\*</sup> [18, 21<sup>h</sup> 41<sup>m</sup> 36<sup>s</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad III-IV; su origen se hallaba en el Pacífico hacia el ESE de Butúan y seguramente se sintió en gran parte del E de Mindanao.

18, 20<sup>h</sup> 25<sup>m</sup> 42<sup>s\*</sup> [19, 4<sup>h</sup> 25<sup>m</sup> 42<sup>s</sup>]. SE de Luzón. Temblor de tierra de intensidad III-IV sentido en las Provincias de Ambos Camarines y Albay y originado en el Pacífico cerca de las costas septentrionales de dichas provincias.

21, 11<sup>h</sup> 13<sup>m</sup> 58<sup>s\*</sup> [21, 19<sup>h</sup> 13<sup>m</sup> 58<sup>s</sup>]. SE de Luzón. Temblor de tierra sentido en la parte occidental de Ambos Camarines con intensidad III-IV; su origen se hallaba en el mar al N de la bahía de San Miguel.

22, 6<sup>h</sup> 51<sup>m</sup> 28<sup>s\*</sup> [22, 14<sup>h</sup> 51<sup>m</sup> 28<sup>s</sup>]. Candón (W de Luzón). Temblor oscilatorio, dirección SE-NW, intensidad III, duración 3 segundos.

23, 15<sup>h</sup> 39<sup>m</sup> 17<sup>s\*</sup> [23, 23<sup>h</sup> 39<sup>m</sup> 17<sup>s</sup>]. W de Luzón. Temblor de tierra sentido en las Provincias de La Unión y Benguet con intensidad III-IV y duración larga. Su origen parece estaba en el Mar de China a bastante distancia de las costas de Luzón. Fué sin duda perceptible en otras provincias occidentales pero lo imtempetivo de la hora y su poca intensidad hizo que la gente no se diese cuenta de él.

30, 13<sup>h</sup> 57<sup>m</sup> [30, 21<sup>h</sup> 57<sup>m</sup>]. NE de Mindanao. Temblor de tierra de intensidad II-III sentido en toda la península de Surigao y en la parte N del valle del Agusan. El origen parece se hallaba en la bahía de Butúan. Cerca de una hora más tarde el sismógrafo de esta estación registró una repetición procedente del mismo origen.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

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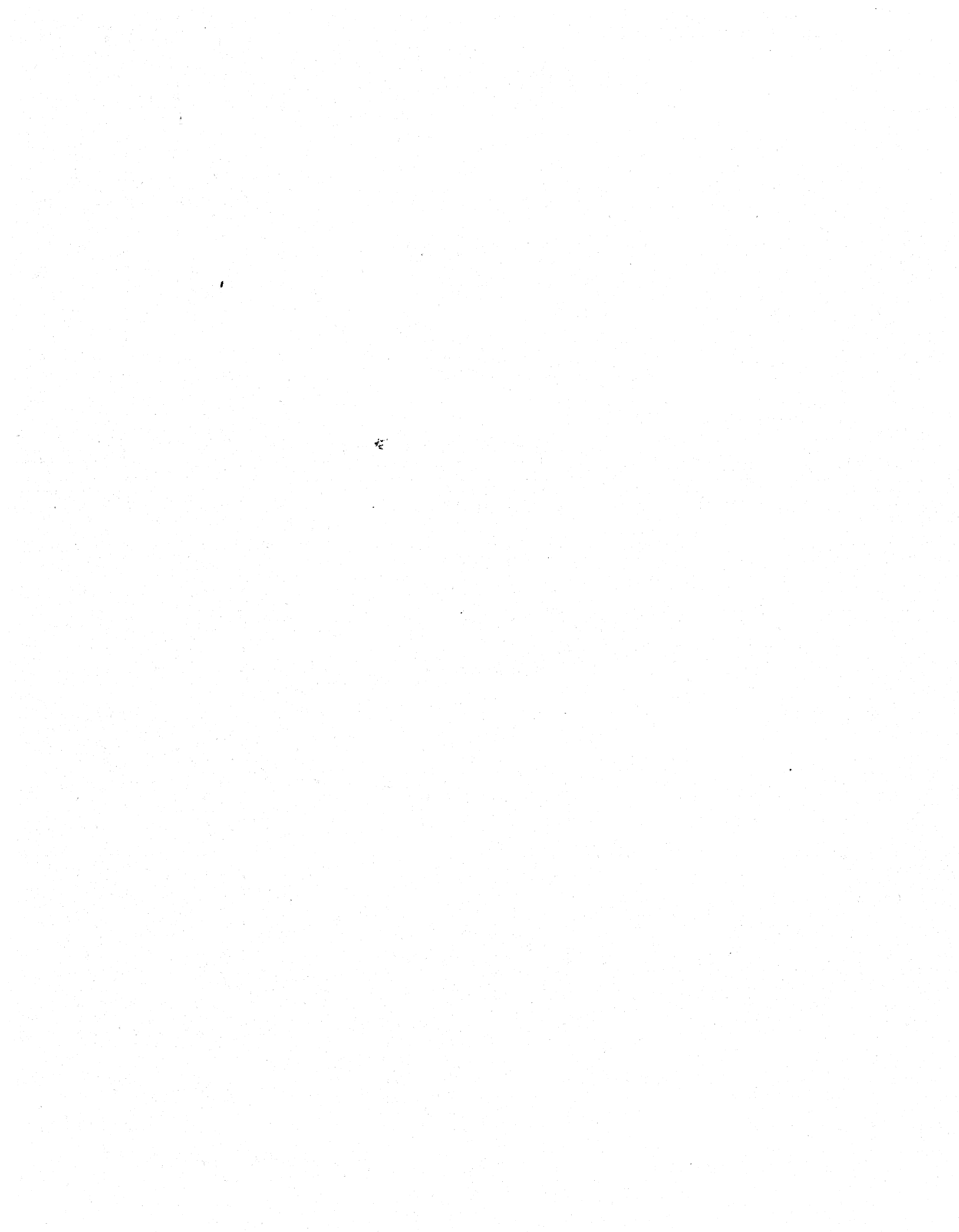
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PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

DIRECTOR OF THE WEATHER BUREAU

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1918



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**BULLETIN FOR OCTOBER, 1917.**





# METEOROLOGICAL BULLETIN FOR OCTÓBER, 1917.

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 below than of the preceding year and below the normal for October, especially in Luzon. The highest pressures were generally observed on the 13th, while the lowest took place on the 6th and 7th when a typhoon was passing to the east of Luzon.

The monthly mean temperature is very slightly above that of October, 1916, in Luzon, and very slightly below the same in the Visayas and Mindanao. The absolute monthly maximum and minimum temperatures at Manila were 33.2° C. on the 28th, and 21.9° C. on the 29th. The extreme temperatures for Baguio were 25.5° C., 14.3° C. on the top of Mirador, and 25.8° C., 13.7° C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR OCTOBER, 1917.

Station.	Pressure.					Temperature.						
	Mean.	Departure from Oct., 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Oct., 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga	758.08	+0.11	759.71	13	756.04	17	25.8	-0.2	30.5	14, 25	21.5	5
Tagbilaran	57.49	-.27	59.24	13	55.79	17	26.1	-.3	32.4	21	22	13
Surigao	57.56	-.29	59.47	13	55.21	6	26.4	-.2	32.2	27	22.1	31
Cebu	57.60	-.32	59.48	13	55.47	6	27.3	0	33	27	22.9	3
Hollo	57.47	-.31	59.56	13	54.94	6	26.5	-.3	32.5	20, 26	21.8	25
Ormoc	57.69	-.36	59.69	13	55.17	6	26	-.2	33.4	16	21.3	15
Tacloban	57.46	-.53	59.81	13	54.14	6	26.4	-.2	34	16, 26	22.1	15
Capiz	57.33	-.75	59.45	13	54.15	7	26.4	-.4	32.6	Various	22.6	11
Calbayog	57.54	-.63	59.86	13	53.80	6	26.1	+.2	33.1	21	22.1	23
Legaspi	57.34	-.76	59.56	13	52.14	6	26.6	-.3	31.8	3	22.4	23
Atimonan	57.55	-.65	59.66	13	52.18	7	26.4	-.4	31.8	28	22.5	14, 28
Ambulong, Tanauan	56.99	-.69	59.16	13	52.54	7	26.5	+.2	33.9	21	21.8	14
Paracale	57.51	-.90	59.72	13	51.67	7	26.4	-.2	32.2	1	22.7	15
Manila	57.49	-.84	59.55	13	52.34	7	26.1	+.2	33.2	28	21.9	29
San Isidro	57.63	-.96	59.62	13	52.49	7	26.5	+.6	32.5	31	22.3	29
Dagupan	56.83	-.84	58.97	13	51.52	7	27.3	+.2	35.4	30	22.2	5
Baguio <sup>a</sup>	635.71	-.62	637.37	29	631.47	7	18.2	+.1	25.5	30	14.3	18
Vigan	757.03	-.81	758.79	13	751.82	7	27.5	+.3	34	18	22.1	3, 9, 17
Tuguegarao	57.75	-1.24	59.67	30	52	7	26.3	+.4	34.8	28, 31	21.6	18, 31
Laoag <sup>b</sup>	57.60		58.83	13, 29			26.4				20.4	31
Aparri	57.98	-1.09	60.02	13	52.37	7	26.5	+.4	33.1	28	22.4	18

<sup>a</sup> The barometric readings of this station are not reduced to sea level.

<sup>b</sup> 27 days of observation.

Rainfall.—The total rainfall for this month is generally smaller than that of the preceding year and than the October's normal in the northern part of Luzon; but it is greater in the majority of the stations of the southern part of Luzon, the Visayas and Mindanao. The amount of rain collected this month in the gauges of the Central Observatory is 153 mm. above the normal and 117 mm. above the rainfall for October, 1916. The monthly rainfall for Baguio is only 6.4 mm. greater than that of the preceding year, but 215.9 mm. below the normal.

## RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF OCTOBER, 1917.

Station.						Station.										
	Total.	Departure from October, 1916.	Departure from normal.	Rainy days.	Departure from October, 1916.		Greatest rainfall in a single day.	Day.	Total.	Departure from October, 1916.	Departure from normal.	Rainy days.	Departure from October, 1916.	Greatest rainfall in a single day.	Day.	
	mm.	mm.	mm.		mm.		mm.	mm.	mm.		mm.	mm.	mm.		mm.	
Jolo	195.5	-152.2	-18.6	22	-4	45.4	22	Sumay, Guam	328.4	+34.9	-26.3	21	-5	133.3	17	
Isabela, Basilan	374.8	-43.7	+107.9	25	-1	77.5	22	Calapan	233.8	-22.1	-34.6	26	+1	56.6	20	
Zamboanga	236.5	+149.5	+121.4	21	+7	49.7	9	Virac	394.7	-299.8	+64.5	26	-2	84.9	5	
Davao	116.5	-220	-129.8	12	-4	24.6	22	Naga	344.9	+81.1	+88.7	23	0	106.5	5	
Cotabato	404.2		+148.5	24		37.8	5	Batangas	239.2	+83.6	+26.4	23	-1	35.1	13	
Cagayan, Misamis	169.2	+43.1		18	0	27.4	9	Lucena	231.5	-118.8		18	-8	58.2	31	
Butuan	194.7	+56.9	+32.6	25	+1	40.4	19	Atimonan	337.3	+19.3	-35.3	24	+5	58.6	5	
Mambajao	304.6			16		62.2	3	Ambulong, Tanauan	218.8	-17.8		20	-1	29.7	4	
Dumaguete	359.9	+19.6		27	+5	67.6	5	Canlubang, Calamba	206.2	-2.4		20	-6	48	5	
Yap, Western Carollines	209.7	-178.9		28	+1	48.5	13	Paracale	835.8	+156.9		25	-2	170.6	5	
Tagbilaran	215.7	+82.8	-51	15	+4	47.2	29	Santa Cruz, Laguna	283.6	-42		28	-1	39.4	5	
Iwahig	280.9	+63.8		19	-1	53.3	6	Manila	340.6	+117	+153	22	-3	44.4	7	
Surigao	147.4	-44.1	-81.2	25	+4	26.4	30	Antipolo	412.2	+210.5		25	+4	103.1	7	
Maasin	168.9	-57.8	-58.5	11	-3	78.7	4	Iba	227.2	+33.3	+56.1	20	-1	63.8	2	
Cebu	272.5	-63	+55.7	20	-2	45.5	3	San Isidro	170.1	-82.9	-8.6	21	-3	62	7	
Iloilo	356.5	+57.3	+97.7	19	+2	103.2	5	Baler	180	+57.6	+4.7	16	+2	40.1	21	
San Jose Buenavista	483	+199.1	+128.5	26	+8	90.9	5	Dagupan	335.2	-313.2	-30.5	22	-5	81.3	23	
Cuyo	420.6	-29.8	+157.2	25	+6	51.5	20	Bolinao	287.6	+64.2	+83.9	16	+2	51.3	4	
Ormoc	215.2	-117	-23.2	25	+8	38.3	28	Baguio	139.3	-143.3	-44.8	20	+9	35.6	3	
Guian	331.8	+9.5		25	+1	70.9	29	San Fernando, Union	211.9	+6.4	-215.9	22	+1	27.3	4	
Tacloban	232	+47.8	+22.8	25	0	54	31	Echague	199.5	-3.8	+33.6			52.1	14	
Capiz	489.4	+221.8	+41.1	27	-2	86.6	31	Candon	202.8	-119.6	-13.3	20	-4	44.1	6	
Borongan	306.9	-73.8	-16.9	25	-3	68.8	29	Vigan	141.8	-94	-55.2	13	+1	44.4	4	
Catbalogan	424.9	+277.3		23	+1	87.7	5	Tuguegarao	120.8	-16.3	-53.5	11	+1	55.5	14	
Calbayog	345.3	+7.5	+74.5	24	-1	74	5	Laog	129.3	-239.4	-38.9	12	-6	27.2	7	
Masbate	279.5	+122.3	+130	23	+2	79.2	5	Aparri	63.2	-254.1	-186.5	12	+3	14.2	23	
Romblon	324.4	-4.5	+13.4	28	0	41.2	19	Cape Bojeador	288.4	-269.2	-10.7	19	-6	46.3	20	
Batag	403	-123.8		20	-1	77.7	3	Santo Domingo, Bata-	137.3	-333.5		7	+1	37.6	26	
Sorsogon	424.8	-295.3		22	+1	82.3	5	nes	406.5	-286.1	+51.6	27	+1	77.5	22	
Legaspi	401.9	-51.3	+58.3	23	-2	80	5									

<sup>a</sup> 30 days of observation.<sup>b</sup> 27 days of observation.

## DEPRESSIONS AND TYPHOONS.

There was only one really well-developed typhoon in the Far East during this month. Its track will be published in the next Bulletin together with the tracks of the depressions and typhoons for November and December. A few other depressions were observed, but they were of little importance, and the data on hand are not enough to draw their tracks with sufficient accuracy. One of these depressions seemed to be near the Paracels on the 2d and 3d; another was shown by our weather maps to the E of southern Formosa on the 15th, recurving probably NNE on the 16th toward the Eastern Sea and the Korea Strait; a third one was noticed on the 17th and 18th to the E of the southern part of the Philippines; and the last one was moving ENE between the Ladrone and the Bonins on the 21st.

Typhoon of Japan, October 4 to 11, 1917.—This typhoon appeared on the 4th to the E of southern Luzon probably between 14° and 15° latitude N and in about 130° longitude E. It moved very slowly for three days, its track inclining gradually to NW and N on the 6th. On the 7th it moved N and NbyE between 124° and 125° longitude E, about 150 miles E of Luzon. For the next two days the typhoon kept a NNE direction until the 10th when it began to move ENE thus striking the southern part of Japan S of Nagasaki in the afternoon of the 10th, and passing near Tokio in the morning of the 11th.

The following warnings were sent by Manila Observatory on the 4th to 9th to the foreign Observatories in the Far East:

- October 4, 3 p. m.: Typhoon E of Luzon, more than 300 miles distant, direction unknown.
- October 5, 4 p. m.: Typhoon in about 125° longitude E and 15° latitude N, moving WNW.
- October 5, 9 p. m.: Typhoon E of Luzon, less than 300 miles distant, moving W or WNW.
- October 6, 4 p. m.: Typhoon in about 125° longitude E and 16° latitude N, moving WNW.
- October 7, 9.50 a. m.: Typhoon in about 124° longitude E and 16° latitude N, inclining northward.
- October 7, 10 p. m.: Typhoon in about 124° longitude E and 17° latitude N, recurving north-eastward.

- October 8, 10.15 a. m.: Typhoon E of Aparri, less than 300 miles distant, moving NNE.
- October 9, 2 p. m.: Typhoon E of Meiacosima moving NNE.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes es menor que la del año pasado y menor también que la normal de octubre, especialmente en Luzón. Las presiones más altas se observaron generalmente el día 13, al paso que las más bajas tuvieron lugar los días 6 y 7 cuando un tifón pasaba por el E de Luzón.

La temperatura media mensual es un poco mayor que la de octubre de 1916 en Luzon, y un poco menor que la misma en Visayas y Mindanao. Las temperaturas máxima y mínima absolutas del mes en Manila fueron 33.2° C. y 21.9° C. observadas respectivamente los días 28 y 29. Las temperaturas extremas de Baguio fueron 25.5° C., 14.3° C. en la cumbre del Mirador, y 25.8° C., 13.7° C. en el valle.

**Precipitación acuosa.**—La lluvia total de este mes es generalmente menor que la del año pasado y que la normal de octubre en la parte N de Luzón, pero es mayor en muchas de nuestras estaciones del S de Luzón, de Visayas y Mindanao. La cantidad de lluvia recogida este mes en los pluviómetros del Observatorio Central es 153 mm. mayor que la normal, y 117 mm. mayor que la lluvia de octubre de 1916. La lluvia total del mes en Baguio es sólo 6.4 mm. mayor que la del año pasado, pero 215.9 mm. menor que la normal.

## DEPRESIONES Y TIFONES.

Durante este mes sólo hubo un tifón realmente bien desarrollado en el Extremo Oriente. Su trayectoria se publicará en el próximo Boletín juntamente con las de las depresiones y tifones de noviembre y diciembre. Algunas otras depresiones se observaron este mes, pero fueron de poca importancia, y los datos que poseemos no son bastantes para trazar sus trayectorias con suficiente exactitud. Una de estas depresiones parecía estar cerca de Paracels los días 2 y 3; otra se echó de ver en nuestros mapas del tiempo al E del sur de Formosa el día 15, recurvando probablemente al NNE el 16 en dirección al Mar del Este y al Estrecho de Korea; la tercera se observó los días 17 y 18 al E de la parte meridional de Filipinas; y la última se movió al ENE entre las Islas Ladrones y Bonín el día 21.

El tifón de Japón, octubre 4 al 11, 1917.—Este tifón apareció en día 4 al E del sur de Luzón probablemente entre 14° y 15° latitud N y en los alrededores de 130° longitud E. Se movió muy lentamente durante tres días, inclinando gradualmente su trayectoria al NW y N el día 6. El 7 se movió al N y N-NE entre 124° y 125° longitud E, a unas 150 millas al E de Luzón. Durante los dos días siguientes el tifón conservó la dirección NNE hasta el día 10 en que comenzó a moverse al ENE, llegando así a azotar la parte meridional de Japón al S de Nagasaki la tarde del día 10 y pasando cerca de Tokio la madrugada del 11.

El Observatorio de Manila envió los siguientes avisos de tifón del 4 al 9 a los Observatorios extranjeros en el Extremo Oriente:

Octubre 4, 3 p. m.: Tifón E de Luzón, distancia mayor de 300 millas, dirección desconocida.

Octubre 5, 4 p. m.: Tifón en los alrededores de 125° longitud E y 15° latitud N, moviéndose al WNW.

Octubre 5, 9 p. m.: Tifón E de Luzón, distancia menor de 300 millas, moviéndose al W o WNW.

Octubre 6, 4 p. m.: Tifón en los alrededores de 125° longitud E y 16° latitud N, moviéndose al WNW.

Octubre 7, 9.50 a. m.: Tifón en los alrededores de 124° longitud E y 16° latitud N, inclinándose al norte.

Octubre 7, 10 p. m.: Tifón en los alrededores de 124° longitud E y 17° latitud N, recurvando al nordeste.

Octubre 8, 10.15 a. m.: Tifón E de Aparri, distancia menor de 300 millas, moviéndose al NNE.

Octubre 9, 2 p. m.: Tifón E de Meiacosima, moviéndose al NNE.

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.	Air temperature. <sup>b</sup>				Underground temperature.				Relative humidity (mean)	Vapor pressure (mean)	Radiation.		Evaporation. <sup>b</sup>					
	Pressure (mean).	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.	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.											
mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	mm.	mm.					
1	758.79	26	30.3	23.2	28.7	29.2	29.5	29.5	29.3	28.6	88	21.9	22	52.8	2.1	1.5		
2	58.34	26.2	31.7	23.2	28.7	29.6	29.5	29.5	29.4	28.5	88	22	22.1	53.1	2.1	1.6		
3	58.06	25.9	31.3	23.8	28.9	29.6	29.6	29.6	29.3	28.5	90.7	22.4	22.8	54.3	1.2	1.1		
4	57.31	25.9	31.3	23.3	28.9	29.8	29.6	29.6	29.4	28.5	88.9	21.9	21.7	53.7	1.9	1.5		
5	55.52	25.4	29.5	23.6	28.8	29.3	29.6	29.6	29.3	28.5	89.8	21.6	22.4	44.5	1.2	1.1		
6	53.08	26.1	31.1	23.7	28.5	29.5	29.5	29.7	29.3	28.4	91	22.8	22.7	47.9	1.4	.9		
7	52.34	27.4	31.7	24.3	28.9	29.5	29.4	29.6	29.5	28.6	89.3	24.2	23	56	2.7	1.9		
8	54.33	25.4	30	23.3	28.8	29	29.1	29.2	29.4	28.3	93.4	22.5	24.1	57	.3	.5		
9	57.12	24.7	27.6	23	28.2	28.3	29	28.9	29.4	28.4	93.4	21.5	22.3	38.5	.5	.6		
10	57.65	25.7	31.3	23.2	28.2	28.9	28.9	28.9	29.4	28.4	90.8	22.2	22.3	50.2	2	1.2		
11	58.42	26.5	30.6	23.5	28.4	29.1	28.8	29	29.3	28.5	89.4	22.9	22.5	46.9	1.6	1.3		
12	59.07	26.7	31.5	23.9	28.5	29.3	28.9	29.1	29.2	28.5	86.7	22.5	22.7	54.6	1.9	1.4		
13	59.55	25.6	32	22.6	28.6	29.5	29.2	29.2	29.3	28.6	88.8	21.6	21.2	54	1.7	1.3		
14	59.26	25.8	31.2	23	28.6	29.5	29.3	29.3	29.3	28.5	90.7	22.2	21.3	52.5	1.3	1		
15	58.60	26.3	32	23	28.5	29.3	29.2	29.4	29.3	28.5	87.8	22.2	21.8	55.6	2.2	1.5		
16	58.14	26.5	31.3	23.4	28.7	29.5	29.4	29.5	29.3	28.5	88.1	22.5	22.6	52.3	2.2	1.5		
17	57.05	25.9	31.6	22.8	28.7	29.6	29.4	29.5	29.3	28.4	86.1	21.2	20.8	54.6	1.4	1.4		
18	57.31	25.1	31.3	22.8	28.6	29.6	29.5	29.5	29.3	28.4	90.7	21.3	21.2	54.4	2	1.3		
19	57.48	25.6	30.3	22.6	28.5	29.3	29.3	29.4	29.2	28.5	88.6	21.5	20.8	50.9	1.8	1.3		
20	57.51	26.2	32.1	22.1	28.5	29.6	29.3	29.5	29.2	28.4	85.1	21.2	20.5	51.6	2.7	2		
21	27.69	26.4	32	23.1	28.9	29.7	29.5	29.6	29.3	28.4	86.8	22	21.2	54.5	2	1.7		
22	57.97	26.3	30.8	23.7	29.1	29.7	29.5	29.8	29.3	28.5	89.6	22.7	22.5	50.5	2.1	1.2		
23	58.22	25.8	29.8	24.3	29.1	29.3	29.6	29.5	29.2	28.3	92	22.6	23.2	50.7	.4	.7		
24	58.07	26.3	30.9	23.7	28.8	29.7	29.5	29.7	29.3	28.4	89.8	22.7	22.8	55.3	1.8	1.3		
25	57.66	27.2	32.7	23	28.7	29.9	29.5	29.6	29.2	28.2	81.8	21.5	21.3	54.8	3.7	2.7		
26	57.19	26.4	31.8	22.6	29.1	29.8	29.6	29.7	29.3	28.3	84.9	21.5	20.3	54.3	2.4	1.8		
27	56.85	26.3	31.8	22.6	28.8	29.8	29.6	29.6	29.2	28.3	85.7	21.7	20.4	57	2.2	1.6		
28	58.04	26.9	33.2	22.4	28.8	29.9	29.6	29.8	29.2	28.3	83	21.5	20.2	56	3.3	2.2		
29	59.11	26	32.8	21.9	29.1	30	29.7	29.9	29.3	28.2	87.1	21.5	19.6	58.2	2.3	1.7		
30	58.59	26.6	32.3	23.2	28.8	29.8	29.7	29.8	29.2	28.2	83.6	21.4	21.5	56	3.3	2.3		
31	57.89	26.8	32.8	22.8	28.8	29.9	29.6	29.8	29.2	28.3	79.9	20.6		57.7	3.5	2.7		
Mean Total	757.49	26.1	31.3	23.1	28.7	29.5	29.4	29.5	29.3	28.4	88	22	21.8	52.9	2	1.5		
Departure from normal	-1.13	-0.6	+0.2	0							+4.2	+0.4			61.2	45.8		

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.									
	Km.	Km.		0-10.			h. m.	mm.	mm.							
1	SW	204	23	SW	8.3	Ci.	N	Cu.	W	3 50	35.3	37.8	2 a. d 2 a. p.			
2	SW	129	14	E	7.2	Ci.-S.	NE	Cu.	E	5 45	3.5	3.8	d a. [ 2 a. p.			
3	SW	82	11	SW	8.6	A.-Cu.	ENE	Cu.-N.	NE	3 30	19.4	20.5	d 2 a. [ 2 a. p.			
4	W quad.	173	19.5	WSW	8.4	Ci.		Cu., cu.-N.	N-W	5 30	11.9	11.8	d 2 a. [ 2 a. p.			
5	NNW	148	12	NNW	9.7	A.-Cu.	NE	Cu.	NNW	0 00	16.9	17.7	[ 2 a. p.			
6	SW, S	150	16	SW	9.7	A.-Cu.	NE	Cu.-N.	N	0 45	40.4	44	d a. [ 2 a. p.			
7	SW, SSW	325.5	29	SW	9.1	Ci.-S.	ESE	Cu.	W	2 55	44.4	43.7	d 2 a. [ 2 a. p.			
8	S quad.	228.5	29	SSW	10			N. SW quad.		0 45	33.9	33.4	2 a. [ 2 a. p.			
9	E	70.5	7	ENE	9.8	Ci.-S.		N. E quad.		0 00	8.3	7.7	a. d a. p.			
10	SE	118.5	14	WbyN	9.7	Ci.-S.	SE	Cu.	NNW	1 50	1.9	1.5	d 2 p.			
11	E quad.	79	7.5	NW	9.8	Ci.-S.		Cu.	SE	0 00			a. p.			
12	NE	64	10	WNW	8.4	Ci.-S.		Cu.-N.	E	4 45	6	5.6	[ 2 a. p.			
13	ESE	138	14	ENE	6.9	Ci.	E	Cu.-N.	E	6 10	16.4	16.8	a. [ 2 a. p.			
14	E quad.	95	14	SW	8.2	Ci.-S.	SbyE	Cu.-N.	SE	1 30	32	31.5	a. [ 2 a. p.			
15	NE	111	12.5	WSW	8.3	Ci.-S.		cu., cu.-N.	ESE	5 30			[ 2 a. p.			
16	NNE	84	11	W	6.8	Ci.		Cu.	E	5 25			< p.			
17	NE quad.	109	10.5	NNE	8.3	A.-Cu.	EbyN	Cu.	ENE	5 05	1.5	1	d p.			
18	ESE	102.5	19	ESE	8.1	A.-Cu.	NE	Cu.	E	3 10	5.6	5.1	d a. [ 2 a. p.			
19	NE quad.	106.5	10.5	WSW	8.5	A.-Cu.	E	Cu.-N.	ENE, E	5 05	13.8	12.4	[ 2 a. p.			
20	NE quad.	86	12	WSW, NE	6.7	Ci.-cu.	SE, SSE	Cu.	E	9 50	8.4	8.6	[ 2 a. p.			
21	NE quad.	120	14	WNW	6.6	Ci., Ci.-S.	S	Cu., cu.-N.	E	7 20	1.5	1.5	[ 2 a. p.			
22	W quad.	97	10	W	8.6	Ci.-S.		Cu.-N.	E	2 15	5.1	4.8	a. [ 2 a. p.			
23	NNE	77.5	11.5	NbyW	9.2	A.-Cu.	ESE	Cu.-N.	E	1 20	11.1	10.4	a. [ 2 a. p.			
24	NE, ENE	95.5	12	wnw, wsw	7.4	Ci.	NE	Cu.-N.	ESE	6 05			a. [ 2 a. p.			
25	ESE, SE	169	14	ESE	5.5	Ci.		Cu.	E	9 25			< p.			
26	E quad.	122.5	13	WNW	6.1	Ci.	EbyS	Cu.	E	6 50			a. [ 2 a. p.			
27	SE	113.5	10	NE	7.5	A.-Cu.	SE	Cu.	ESE	5 30			a. [ 2 a. p.			
28	SE	121	10.5	SE	3.4	Ci.		Cu.	EbyS	9 10			a. [ 2 a. p.			
29	W quad.	132	15	WNW	5.2	Ci., A.-Cu.		Cu.	E	7 30	21.5	20.6	a. [ 2 a. p.			
30	E quad.	161	16.5	ESE	6.8	Ci.		Cu.	ENE	7 50			a. [ 2 a. p.			
31	NE	136.5	12	NE	5.2	Ci.		Cu.	ENE	7 55	1.8	1.6	d a. p.			
Mean Total		127.5	14.3		7.8					4 36						
Departure from normal		-1,483.8			+1.1					-23 56	+153					

\* All the mean values given in this table are deduced from hourly observations.  
 \* These values are taken from instruments mounted in the Observatory Park, 15 meters above ground.

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 (mean). <sup>b</sup>	Mean.	Maximum.	Hour.	Minimum.	Hour.	Maximum.	Hour.	Minimum.	Hour.			Minimum on grass.	Maximum in sun.	Black bulb in vacuo. <sup>c</sup>	Free exposure (total).	Shelter (total)
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.		
1	636.45	17.3	23.6	10.55a.	15.2	3.20a.	23.2	11.15a.	15	5.40a.	96.2	14.1	14.3	59.1	0.9	0.4	
2	36.12	18	21.4	9.55a.	15.4	5.05a.	21.5	10.00a.	15.6	5.15a.	90.8	13.8	14.4	46.5	2	1.2	
3	36.20	17.7	22.8	10.10a.	15.1	6.00a.	23.8	10.25a.	14.4	4.00a.	90.7	13.7	13.6	55.7	1.8	.7	
4	35.48	17.3	23.3	11.40a.	15	9.40p.	22.9	10.00a.	15	4.20a.	93.8	13.8	13.2	61.6	1	.7	
5	34.01	17.8	22.9	0.35p.	15.3	0.25a.	23.5	Noon	15	0.25a.	93.8	14.2	14.3	59.2	1.8	.5	
6	32.10	18.2	24.3	0.50p.	15.3	5.15a.	23.6	0.55p.	15.8	6.40a.	91.7	14.3	14.3	58.3	1	.8	
7	31.47	18.6	22.2	11.30a.	16.2	5.15a.	23.2	0.15p.	14.9	5.20a.	92.5	14.8	14.4	55.5	1.8	.5	
8	32.90	19.5	24.3	10.35a.	16.5	3.15a.	25.6	11.35a.	16.3	3.20a.	91.2	15.3	14.4	59.5	1	.4	
9	34.85	17.8	22.6	0.10p.	15.3	11.05p.	23	0.05p.	15.3	11.25p.	94.7	14.4	15.2	61.9	1.5	.8	
10	35.42	17.6	20.7	10.40a.	15	5.35a.	22.4	1.20p.	14.5	5.40a.	89.5	13.4	13	44.2	1.2	.7	
11	36.51	18.5	23.1	2.20p.	16.4	6.10a.	23	2.20p.	16.6	4.00a.	89.3	14	14.1	46.7	2.6	1.2	
12	37.22	18.7	23.8	11.05a.	16.4	6.00a.	24.4	10.40a.	16.5	12 m. n.	85.8	13.7	15.5	63.1	1.5	.9	
13	37.35	18.6	23.3	1.50p.	15.7	6.35a.	25	Noon	15	6.05a.	88.3	13.9	14.3	57.2	1.1	.7	
14	37.02	17.4	23.7	10.20a.	15.4	8.30p.	22.8	10.05a.	15.8	4.50a.	95	14	14.3	64.3	1	.5	
15	36.49	18.2	23.5	10.25a.	15.6	7.40p.	24.2	1.25p.	15.3	4.15a.	86.8	13.5	15.1	61.6	2	1.1	
16	36.23	17.8	23.5	10.20a.	15.2	4.20a.	24.5	11.35a.	14.7	6.15a.	86.2	13	14.8	56.6	1.8	.8	
17	35.36	18.6	24.1	11.35a.	15.3	4.40a.	24.5	1.00p.	14.2	5.50a.	73.3	11.5	13.2	57.3	6	2.8	
18	35.47	18.3	24.5	11.20a.	14.3	5.40a.	25.7	0.25p.?	13.7	6.00a.	82.2	12.8	12.5	59.2	2.8	.9	
19	35.78	18	23.6	0.05p.	15.3	11.05p.	24.3	0.20p.	14.5	4.20a.	84	12.9	13.5	58	3.2	1.5	
20	35.75	18.1	22.6	10.00a.	15.5	4.45a.	24.5	10.05a.	15.4	6.00a.	85.5	13.2	13.9	58.7	1.1	1	
21	36.03	18.6	24.3	10.20a.	15.9	4.40a.	25.4	11.00a.	15.2	5.00a.	88.5	14.1	13.9	58	1.5	1	
22	36.13	18.3	23.6	0.50p.	16.1	1.30a.	24	10.30a.	15.3	5.35a.	88	13.8	13.9	57.5	1.1	.9	
23	36.43	17.8	23	1.05p.	16	2.30a.	23.2	0.25p.	15.7	4.10a.	92.7	14.1	14	56	.9	.7	
24	36.42	18.9	24.4	10.35a.	16.2	2.55a.	25.5	0.15p.	15.8	1.20a.	90	14.6	14.5	55.4	1.4	.9	
25	36.02	19	25	11.00a.	15.9	6.50a.	25.6	11.05a.	16	6.05a.	91.7	14.9	14.4	63.4	1.2	.7	
26	35.62	17.4	22.3	10.00a.	15.5	4.15a.	23.4	10.20a.	15.3	6.00a.	92.7	13.6	14.1	59.1	.7	.6	
27	35.12	18.1	24.3	11.35a.	15.4	3.10a.	23.8	0.05p.	14.1	5.00a.	88.2	13.5	13	60.3	1.7	1	
28	36.28	18.5	24.5	10.35a.	15.6	1.40a.	24.8	10.40a.	14.5	5.20a.	89.3	14	13.4	59	1.4	.9	
29	37.37	19	24.8	1.10p.	15.4	4.50a.	24.6	2.05p.	14.9	6.20a.	87.3	14.1	13.5	57.8	2.3	1.3	
30	36.96	19	25.5	Noon	15.5	3.35a.	25.5	1.20p.	14.7	5.00a.	78.2	12.8	13	56.5	5.1	2.6	
31	36.40	19.1	25.4	11.20a.	15.1	5.10a.	25.8	0.40p.	14	5.50a.	65.2	10.5	13.3	54.5	8.3	3.8	
Mean	635.71	18.2	23.6		15.6		24.1		15.1		88.2	13.7	14	57.5	1.9	1	
Total															59.7	32.5	

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. <sup>d</sup>	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 quad.	257.9	20.9	E	7.4	Ci. WNW	Cu.-N. E, SSE	3 25	2.8	☉ ≡ ☽ ☽ ☽ p.
2	E	267.4	24.6	E	9.4	A.-Cu. ENE	Cu.-N. SSE, E	0 00		☉ a. d. p.
3	E	270	15.6	SW	8	Ci.-S. NNW, ENE	Cu.-N. SW	0 00	22.8	☉ a. ☽ ≡ ☽ ☽ ☽ p.
4	NW quad.	317.6	27.1	N	7.7	Ci. S	Cu.-N. NE	5 25	27.3	d ☽ a. ☽ ☽ ☽ p.
5	SW, W	318.7	22.2	W	6.9	A.-Cu. ENE	Cu.-N. N, NNE	5 30	3.4	☉ a. p. ☽ ☽ p.
6	W	226.7	20.3	NE	8.7	Ci.-S. ESE	s.-cu. NE quad.	0 40	1.3	☉ a. p. ☽ ☽ ☽ p.
7	Variable	254.8	19.5	W	9	Ci.-S.	Cu.-N. NNE	2 50	3.4	d ☽ a. ☽ ☽ ☽ p.
8	W, N	261.8	21.9	N	8.7	Ci.-S. wsw, sw	S.-Cu. E	3 30	5.6	☉ a. ☽ a. p. d ☽ p.
9	W	314	23.6	SW	9.3	Ci. SE	Cu.-N. wquad.	5 10		☉ a. d ☽ p.
10	SW, W	187.9	15.6	SE	9.3	Ci.-S. SE by E	S.-Cu. WSW	1 05	10.5	☉ a. p. ☽ p.
11	E	424	36.2	E	9.4	Ci.-S. ENE	Cu.-N. SE	3 50		☉ a. p. ☽ ☽ d ☽ p.
12	E, W	428.2	35.1	E	7.6	Ci.-S. NNW	Cu.-N. SE	2 25	3.3	d ☽ a. ☽ ☽ p.
13	E, W	239.2	19.6	W	7	Ci.-S. Variable	Cu.-N. Variable	4 20	4.6	☉ ☽ ☽ p.
14	E quad.	286.7	24.1	W	8.6	Ci.-S.	Cu.-N. E quad.	2 35	20.3	d ☽ a. ☽ a. p. ☽ p.
15	E	355	23	SE	7.6	Ci. NE	Cu.-N. ESE	6 35	15.1	☉ ☽ ☽ p.
16	E quad.	274.9	19.1	E	8.1	Ci.-Cu. WNW	Cu.-N. ENE	3 55	12.2	☉ ☽ ☽ p.
17	E	383.7	24.4	E	4.3	Ci. NE	Cu. ESE, E	7 50		☽ p.
18	E	308.8	21.5	E	5.4	Ci. WNW	Cu.-N. ENE, E	5 55	.3	☽ p.
19	E quad.	197.1	14.7	E	6.3	A.-Cu. ENE	Cu. E	4 45		d ☽ ☽ p.
20	E quad.	250.8	18.5	E	7.7	Ci.-S. wsw, wsw	S.-Cu. NE	3 00	26.7	☉ a. ☽ a. p. ☽ p.
21	E	269.5	27.4	E	6.6	A.-Cu. WNW	Cu. ESE	5 35	5.1	☉ ☽ ☽ p.
22	E	255.4	17.4	SE	8	Ci.-S.	Cu. E	3 15	6.2	☉ a. p. ☽ ☽ p.
23	NE quad.	283.1	24.1	E	8	Ci.-S. SE by S	Cu.-N. E	2 40	17.5	☉ a. p. ☽ ☽ p.
24	E	271.7	23.5	E	7.3	Ci.-S. NNW	S.-Cu. E	4 15	12	d ☽ a. ☽ ☽ p.
25	NE quad.	249.1	17.1	SW, NE	5.6	Ci.	Cu.-N. NE	4 50	8.1	☉ a. p. ☽ ☽ p.
26	E quad.	270.8	17.9	SW	7.3	Ci. E by S	Cu.-N. SE	2 35	2.9	☉ d a. ☽ ☽ p.
27	E quad.	248.3	18.3	W	5.4	Ci.-S. NE by N	Cu. SE by E	5 20		☉ ☽ a. ☽ p.
28	E, SW	208.3	19.5?	SE	5.9	Ci.	Cu. SE	4 20	.5	☉ a. ☽ d p.
29	E quad.	287.3	17.9	W	5.3	Ci. ENE	Cu.-N. SE	6 40?		☉ a. ☽ d p.
30	E	361.2	23.6	E	2.9	Ci. WNW, WSW	Cu. E, SSE	9 00		☉ a. ☽ d p.
31	E	382.7	23.6	E	.7	Ci.	Cu. ESE	9 40		☉ a.
Mean		287.5	21.9		7.1			4 13		
Total		8,912.6						130 55	211.9	

\* 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.  
 e 4 hours missing.

DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, OCTOBER, 1917.

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.
Isabela, Basilan	19.8	1.5	0.5	38.9	15	10.4	42.4	36.1	5.8	4.6	2	8.9	1.3	19.3	1.3	
Zamboanga	3	.3		3.3	24.4	10.9	24.5	3.6	49.7	7.1	1.8	1.6	2.5	1.5	7.6	
Davao	22.1	23.4	6.4	15.5	37.8	26.7	5.8	10	6.1	30.7	3	2.5	1.3	2.5	7.6	
Cotabato	22.1	23.4	6.4	15.5	37.8	26.7	5.8	10	6.1	30.7	3	2.5	1.3	2.5	7.6	
Cagayan, Misamis	6.4	4.3	1.3	6.1	4	1.3	5.1	27.4	12.7	1.3	12.1	6.1	1.3	3.6	3	
Butuan	13.5	4.3	21.6	1.3	4.9	8.9	4.6	9.9	6.9	1.3	13.2	5.8	18.5	4.1	4.1	
Mambajao	58.4	19	62.2	23.9	21.1	3.8	8.9	4.6	9.9	6.9	1.3	13.2	5.8	18.5	4.1	
Dumaguete	25	2.5	1.5	1	6.1	39.7	4.6	9.9	6.9	1.3	13.2	5.8	18.5	4.1	4.1	
Yap, W. Carolines	15.2	3	4.1	.8	8	6.3	1.6	1.1	.5	26.4	19.3	48.5	3.3	3	6.1	
Tagbilaran	11.4	1.8			21	16.8	6.1	7.6				23.7				
Iwahig		37.8	7.5	11.2	50.6	53.3	18.8	19	21.6	12.5	.3	6.6				
Surigao	1.5	8.4	20.1	2.6	.6	7.7	3	2	1.5	1.3	1	3	3.8	6.6	3.3	
Maasin		6.1	8.4	78.7	7.4	10.2		5.1						11.2		
Cebu	4.5	12.5	45.5		22.8	29	5.9	8			13.7		4.1			
Iloilo	3.3	15.8		26.6	103.2	24.5	2.9	19.5	2.3	.5		8	16.8			
San Jose Buenavista	27.9	6.9	55.9	50.3	90.9	31.5	3.3	33.3	26.9	12.7		11.4	8.1	.3	1.3	
Cuyo	38.4	29.7	4.6	3.6	37.8	33	14.7	29.3	2.1	3.8		26.2	33.3	25	1.3	
Ormoc	5.2	6.1	12.8	37.1	9.9	3.3	1				1.3		1.3	1.3	.5	
Guiuan	20.8	1.5	4.1		29.5	1.1					13	11.2	15	.3	2.5	
Tacloban	10.9	10.5	.5	12.2	37.3	12	7.6	5	2.5	9.9	5.3	14.2	3.6		4.1	
Capiz		15		2.6	6.9	27.5	2.3	3.3	.5	3.3	9.9	8.6	18.1	.3	17.1	
Borongan	2			14	24.4	6.1	.3		9.7			9.6	9.9		17.5	
Catbalogan	3	6.4	30.5	57.7	87.7	34.6		3.3			19.6	12.7		2.8	19	
Catbayog	3	1.8	36.1	64.1	74	62.7	2.1	5.8	6.1		2.3	4.5		5.6	8	
Masbate	6.6	2.5	15.2	73.4	79.2	37.1	2.3	1.8	1.5	.5			15.8		15.2	
Romblon	15	5.6	.3	19.2	16	15.9	5.9	4.6	2.1	4.4		19.6	17.5	11.2	28.7	
Batag	19.6		77.7	7.9	5.1	18		2.8	1.3	7.9					16.5	
Sorsogon	32.5		4.6	8.1	82.3	66.3	10.7	3.6				8.2		6.6	5.3	
Legaspi				25.2	80	62.6	22.1	4.5	4	1.8	2	5.1		8.1	31.8	
Sumay, Guam	10.2	12.7	6.4	2.6	5.1	15.2			17.8	15.2	7.6	2.5	5.1	14	17.7	
Calapan		4.8		6.9	25.4	4.6	2.1	18.8	2.5	3.3		31.5	.3	5.1	3.9	
Virac	13.2	.5	2.6	69.8	84.9	64.3	1	1.5	5	4.9	.5	6.4		3.8	3	
Naga	10.7		25.4	23.4	106.5	64.5	1.3	8.4	3.8				20.6	1.9	6.1	
Batangas		3	25.9		19.8	21.3	1.5	18	9.6	1		1	35.1	13	43.7	
Lucena	4.8	4.1		26.7	21.4	9.4		24.1	3.6				11.4		43.7	
Atimonan	8.9	38.9		38.4	58.6	5		9.1	6.9	4.3	9.9	2.3	12.2	16.8	26.7	
Ambulong, Tanauan		4.6	8.7	29.7	18.3	29.2	4.8	15.2		5.1			18.3	14.3	4.6	
Canlubang, Calamba	6.1	19		11.7	48	20.6		9.6		10.7			8.6	8.9	1.5	
Faracale		1.3	21.3	110.2	170.6	94.8			40.6	4.5	1.8	5.3	2	138.9	5.1	
Santa Cruz, Laguna	3.6	9.9	2.5	9.2	39.4	35.1	.8	11.2	2	3.6		2.3	22.6	14	12.7	
Manila	35.3	3.5	19.4	11.9	16.9	40.4	44.4	33.9	8.3	1.9		6	16.4	32		
Antipolo	11	52.3	6.4	3.6	30.5	21.6	103.1	47.5	10.7	13.2			20.3	2.5	1.8	
Iba	1.8	63.8	12.7	51.8		.3	1	4.6	2.8			2.5	1	1.5	17.5	
San Isidro	8.2	.3	2	7.1	22.1	1.3	62	8.9	3.5	1.6	.8	7.4	5.3	13.7	4.1	
Tarlac	8.4		13	11.9	8		6.4	3	14.2			39.1	2.5	7.6	7.6	
Baler	69.3	.3		13.2	1.8	4.8	21.6	23.6	10.2		12.7	10.7	23.6	3.1	1.3	
Dagupan	3		21.3	51.3	10.4			39.9		.3		8.4	5.8	20	37.6	
Bolinao	6.6	3.6	35.6	24.1			1		9.6	.3	8.4	1	5.8	21.8	7.4	
Baguio	2.8		22.8	27.3	3.4	1.3	3.4	5.6		10.5		3.3	4.6	20.3	15.1	
San Fernando, Union	6		.5	30.8	29.5					.3	8.4	51.1	2.8	52.1	.5	
Echague	11.5	10.4	.5	8.1	38.1	44.1		2.3		6.4	.5		3.8	13.7	13.2	
Candon	3.8		16.5	44.4		2.6				1.3		10.2		21.3	1	
Vigan	2.4	.5	29.2	19.2	.5					5.2		.1		55.5	3.9	
Tuguegarao	24.7	2.8		9.9	9.1	4.8	27.2	9.4		5.3				7.1		
Laoag	7.3	.8					14.2	3		6.4	1					
Aparri	30	17.1		14.2	40.2	14.1	31.8	10	6.1	6.6	.5	19.6	2.6	9.2	1	
Cape Bojeador	4.3				33	23.6	10.7	3						25.1		
Santo Domingo, Batanes		2.5	14.5	3.1		4.1	34.5	2.6	2.5	34	45.9	6.6	4.8	6.8	7.2	

Daily rainfall at the stations of the Weather Bureau, October, 1917—Continued.

Station.	Day of month.														Total.	
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.		31.
Jolo	3		1.3	2	32	45.4	0.8	22.1	7.1	9.1	19.8		2.8		0.8	195.5
Isabela, Basilan			3.8	41.2	20.3	77.5	2.3	9.1	6.6	1.5	4.8	2.3	.5		.5	374.8
Zamboanga					1.1	44.7	44.7	3				2	8.4	.3	0.3	236.5
Davao		2.5	5.1	4.1		24.6	4.6		13.2		4.3					116.5
Cotabato	17.3			13.2	28.2	32	15.5		6.1	9.1	27.7	31.2	15.5	19.8		404.2
Cagayan, Misamis			1		15	25.9	18.8			6.4	9.1	.8	18.5		1	169.2
Butuan	3	9.9	40.4	8.9	18.8	13.2	10.4		3		3.6		2.3	3.3	11.7	194.7
Mambajao					8.1		7.9			27.9	19	9.9	3.8		11.7	304.6
Dumaguete	1.3	12.7	1	4.1	18.5	41	41.4	1.3	.5	3.8	5.7	12.4	6.9		16.5	359.9
Yap, W. Carolines	8.9	.3	10.2	5.8	4.3	1.3		1	3.3	4.3	2	21.4	.5	6.4		209.7
Tagbilaran	2.5	37.6			2	9.9		4.1				3.9	47.2	20.1		215.7
Iwahig				8.1	6.2	15		2.8	3			4.6		3.8		280.9
Surigao	10.6		1		6.4	12.7	1.8				.3		3.6	26.4	.9	147.4
Maasin					5.6								6.4	13	16.8	168.9
Cebu	10.6		13	2.5	23.9	18.3	14.2		1.3	3.6	6.9	11.7			27.7	272.5
Iloilo					11.5	4.9	14.2	92.4	1.3				2	4.1	9.9	356.5
San Jose Buenavista		6.9	.3	4.9	1.5	28.9	5.4	24.4	17.5	.8	3.5		15.5		12.7	483
Cuyo		8.9	21.8	51.5	7.6	8.9	1.3	18.3		3	11.7		5.4	.4	3	420.6
Ormoc	2.5	10.4		14	1.3	3.9	2.4		15	1	3.8	38.3	9.9		18.6	215.2
Guiuan	6.1	12.7	3.6	15.5	14	9.2	5.8	22.6	6.1	1.3	1.5	17	70.9	1.3	45.2	331.8
Tacloban	4.1	3.1			6.6	3.1	3.8		.8		2	1.3	14.5		7.6	232
Capiz		3.8	77.3	2.5	10.1	9.2	4.1	59.9	4.3	85.9	.8	9.9	14	5.6	86.6	489.4
Borongan	6.6	4.9	19	4.3	5.8	11.7	6.4	12.7	2.3	3.8		6.4	68.8	9.7	22.8	306.9
Catbalogan	1.5	1.3	1	13.5			24.4	1.3	11.4		18.8	15.2	2.3		50.5	424.9
Calbayog		3				2	.8	14	4.3		1.8	16.5	2.5	10.4	17	345.3
Masbate	1	3.6	1.8	3.8	6.4	1.5	.8					1.1	1.5	5.6		279.5
Romblon	3	3.9	41.2	11.7	39.6	.4	14.1	.8	3.3	8.1	.3	25.4	2	6.6		324.4
Batag	29.4	52.1	39.4			1.3	16.8	18.5	15.7			5.8	53.4	10.2	3.6	403
Sorsogon	14.3	15	4.6	6.1			6.4	6.1		4.6		52.3	12	30		424.8
Legaspi	12.2	8.9	9.9	4.6	2		13	1.5	2.3	3.6		33.2	19.3	44.2		401.9
Sumay, Guam	133.3	33	3.8	2.5		2.5		2.6				17.3	1.3			328.4
Calapan	2.3	1		56.6	7.6	2.8	1	15.5	8.9	1.8	.3		7.7	1.3	2.8	233.8
Virac	11.9	12.2	3.3		7.6	2.3	2	4.8	4.3			14.7	51	19		394.7
Naga		1	4.1	2.5		18.5	.3		3	2.3	23.9		3.3	12.2	.3	344.9
Batangas		7.2	11.7	15.7	.5	2	26.7		1.8		10.7		.3	2	3	239.2
Lucena	5.1	1.3			1.5	2.3					1.5		5.3	5.6	58.2	231.5
Atimonan	19	3.6	9.9		3.8	10.7	3.1		2		4.1		5.6		32.7	337.3
Ambulong, Tanauan	10.4	.5				2.5	20.1			1	2.8	21.6	5.1	2		218.8
Canlubang, Calamba	11.2	5.3			3.3	.8	8.1				28.7	.5	.3	1.5		206.2
Paracale	48.7	19.1	24	13.2	11.2	21.8		7.9	4.9			3.8	23.2	22.6	18.6	835.8
Santa Cruz, Laguna	24.2	3.4		5.8	10.5	6.1	8.6	.6	1	.1	5.1	.3	8.6	26.6	13.8	283.6
Manila	1.5	5.6	13.8	8.4	1.5	5.1	11.1					21.5			1.8	340.6
Antipolo	5.3	13.4	8.4	17	10.9	18	6.3	1.8	.8		.5		4.3			412.2
Iba	7.4		.3	7.6	7.6	5.8	9.1	23.4	5.6							227.2
San Isidro			.3		6.8	5.3	8.6							.3		170.1
Tarlac				2.3	40.1	4.6	16.5									180
Baler			1	2.8	1.3	5.1	81.3	.8		9.1				6.4		335.2
Dagupan		4.1			.3	.3	17.8	29.2	20.6							287.6
Bolinao					3	1	8	1	8.9	.3	.5	1.3				139.3
Baguio		.3		26.7	5.1	6.2	17.5	12	8.1	2.9	.5					211.9
San Fernando, Union	*	*	*	*			.3	.5	1.5	12.2	2.7			.3		199.5 <sup>a</sup>
Echague	4.3	13	18.3	11.9	.8	1.3	.3									202.8
Candon	1.3	1.3	1.8			5.1				3.8						141.8
Vigan						1.7										120.8
Tuguegarao	19.6		8.4													129.3
Laoag	.3						14.2	5.6	2	7.9		5				63.2
Aparri	14.7		21.1	46.3						2.5					.8	288.4
Cape Bojeador										37.6						137.3
Santo Domingo, Batanes	7	10.7	4.9	1	6.2	77.5	44.4	7.3	15.9			43.6	3.8	10.1	.8	406.5

\* No observation.

<sup>a</sup> 27 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, OCTOBER, 1917.

Day.	Jolo.		Isabela, Basilan.		Zamboanga.		Davao.		Cotabato.		Cagayan, Misamis.		Dapitan.		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	29.1	21.8	31.3	22.6	30.1	23.5	32.2	22.1	30.4	23.1	31.6	22	33.2	22.7	32.9	22.1
2	29.3	21.6	30.6	22.1	28.3	22.5	31.2	21.6	29.8	22.9	31.2	22.8	30.8	22	31.8	22.7
3	29.2	21.6	31.9	22.6	29.1	23.5	32.2	21.6	30	22.9	30.4	21.9	31.4	22.1	31	22.7
4	31.1		32.1	23.1	29.2	23.7	32.2	22.3	29.3	23.1	28.8	22	27.6	22.3	31.6	22.4
5	30.4	22.27	30.1	22.4	27.5	21.5	29.6	22.5	27.6	22.6	28	22.6	25.1	21.9	31.2	22.9
6	27.8		28.1	21.1	27.7	22.5	31.2	21.5	27.5	22	28.5	22.2	27.1	21.3	31.3	22.9
7	30.7	23.4	30.6	22.1	28	23	30.6	21.5	27.3	22.4	31.9	22.4	30.1	22.2	32.9	22.9
8	31.3	21.7	32.1	22.6	29.6	23	31.9	21.5	30.4	21.4	32.6	21.4	32.1	21.8	33.4	22.9
9	30.9	22.4	33.1	22.1	29.4	22.5	31.9	22	29.6	22.5	32.1	22.3	32.4	21.3	34.1	22.6
10	28.9	20.27	30.7	22.3	27.5	22.5	31.4	21.8	29.4	22.5	31.2	22.2	31.5	22	34.1	22.4
11	30	20.2	31.6	22.1	29.8	22.5	33.5	21.1	31.5	22.3	31.5	21.2	32.9	21.5	34.3	22.1
12	27.5	227	32.1	22	28	23.3	28.3	22.6	29.5	23	28.9	22.6	32	22.3	29.6	23.1
13	28.4	21.4	31.6	22.3	29.1	23.5	29.2	22	30.5	23	30.2	22.6	30.9	21.8	31.6	23.3
14	28.2	20.3	31.6	21.6	30.5	23	31.2	21.1	31.4	22.6	30.2	21.8	32.5	22.9	32.6	22.3
15	28.7	20.5	32.1	21.6	29	23	32.7	21.5	32.2	23.1	30.4	21.4	31.9	22.8	33.3	22.2
16	30.4	20.7	31.3	22.1	29.2	22.8	32.9	21.4	32.6	23	30.6	21.5	32.5	21.4	33.6	22.1
17	30.6	21.2	32.1	22.6	29.7	23.4	33.2	21.1	31.7	22.5	31	22.1	32.9	23.4	34.3	23
18	30.1	21.1	33.1	22.3	29	22.5	32.4	20.4	31.2	22	31	21.9	31.4	23.1	34.6	21.7
19	28.5	21.3	32.1	22.5	29.2	23	32.5	21.2	30.2	23.6	28.9	22.5	31.7	22.7	33.3	22.2
20	28.9	21.3	33.1	22.6	28.8	23.5	31.7	23.2	32	23.6	30.7	21.6	32	22	33.3	22.2
21	29.7	20.5	31.6	22.1	29	23.5	32.9	22	31	22.9	31.6	22.1	32.2	21.5	34.2	23.4
22	27.4	20.4	30.3	22.1	27.5	23.2	29	22	30.9	23	30.4	21.9	30.8	22	31.6	22.7
23	28.2	21	30.1	22.5	27.9	22.4	32	21.5	29	23.1	29.4	22	30.4	21.9	31.9	22.8
24	28.5	21	31.1	21.7	29	22	30.2	22.1	30.5	22.3	29.5	22.2	31.6	22	28.4	22.9
25	28.8	21.3	33.3	22.7	30.5	23	32.5	21.8	31	23.1	30.9	21.5	32.4	22.7	33.7	22.4
26	28.6	20.9	30.6	22.1	28.7	23.8	33.1	22	31.6	22.1	31	21.8	33.3	22.2	33.8	22.2
27	29		30.1	23.1	29	23.5	32.1	22.6	31.6	22.1	30.4	22.5	32.1	22.9	32.6	22.7
28	29.4	20.9	33.1	23.3	29	23.1	31.1	21.9	31.5	21.5	30.4	22	32.4	22.3	32.7	22.5
29	30.4	21.4	31.1	22.1	29.4	22.5	29.5	21	30.8	21.8	30.2	21.2	32.7	21.9	30.1	22.9
30	29.9	20.3	32.9	22.4	29.3	23	31.5	21.4	30.5	22.2	31	21.3	30.5	22.5	29.8	22
31	29.8	21.2	33.6	22.6	29.3	22.5	30.5	21.2	29.7	22.2	27.4	21.7	29.9	24.3	29.5	22
Mean	29.3	21.2	31.6	22.3	28.9	22.9	31.5	21.7	30.4	22.6	30.4	22	31.3	22.2	32.5	22.6

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao. a		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	31.5	23.5	31.6	23	31	23.2	31.6	23.4	31.6	20.7	31.1	23.3	32.2	23.8	31	24.3
2	30.2	23.2	30.6	23.2	30.6	23.3	31.1	23.6	30.6	22.5	30.5	22.7	31.6	23.5	30	23.5
3	31.4	23.3	30.3	23.4	32.7	24	30.7	22.5	30.6	22.2	28.8	23.4	32	23	30	22.9
4	29.5	23.1	30.4	23.4	32.7	23.2	31.9	23.6	32	21	29	23.8	32	23.2	31	25
5	29	23.4	26.4	23.4	33.1	23.9	29.6	23.5	29.2	23.2	29.4	24.9	30.2	23	29	24.4
6	28.3	23.3	26.4	22.7	31.2	23.5	26	22.6	28	22.9	27.7	23.4	30	24	27	23.5
7	29.7	23.9	28.3	22.5	31	23.1	27.6	23.2	27.1	22.9	29.8	24.5	29.6	24.5	27	23.5
8	31	22.6	30.6	23.8	32.7	24.1	31.2	23.5	29.4	23	30.8	23.3	31.5	25	29.5	24.8
9	32.5	23.4	31	23.5	33.8	23.6	31.5	24.2	27.6	22.7	31.7	23	32	25.2	30.5	24.5
10	32.5	25.1	29.8	23.1	33.4	24	31.4	24.6	31.2	22.6	31	22.9	32.8	25	29.4	24.7
11	31.2	22.5	30.6	22.7	31.2	23.2	31.9	23.7	30.2	21.7	31.1	23.2	33.5	23.5	31.7	23.8
12	29.5	23.4	31	23.7	33.7	23.5	31.6	23.8	31.6	22.6	29	23.7	33	22.5	30	23
13	30.7	23.4	29	23.9	33.7	24.4	31.4	22.8	30.3	22	29.9	23.2	32.5	23.8	29	24.6
14	30.2	22.9	29.6	23.7	33.6	22.3	30.5	23.4	31.5	22.5	30.5	23.4	33.5	23.5	31.7	24.9
15	30.6	22.9	30.6	23.2	31.7	24.4	31.7	22.3	32.1	21.9	31.5	23.5	34	23	31.5	24.8
16	30.8	24.7	29.9	23.3	33.7	21.5	32.2	22.4	32.2	21.5	31.4	23.8	34.4	22.8	31.5	25
17	30.6	25.9	30.9	24.3	30.7	23.7	31.9	22.6	32.3	21.6	29.9	23.5	32.8	22.8	31.6	24.5
18	30.6	24.1	30.8	24.3	32.6	25	32.1	22	32.3	21.9	29.9	23.7	33.2	23	31	24.8
19	31.3	23.7	29.9	23.5	33.7	24.4	32.2	23.5	30.9	21.9	30.6	23.5	34	23.1	31.7	24.8
20	31.7	23	29.8	23.7	30	24.4	32	23.8	32.3	21.8	31	23.3	33.8	23.6	30.7	24.6
21	31.1	23.7	30.9	23.2	32.7	23.5	32.4	23.6	30.8	21.7	30.8	23.8	32.2	23.5	32	24.3
22	29.6	22.7	29.7	23.4	33.8	24	30.7	23	26.9	22.3	28.3	23.4	32	23.2	31	24.2
23	30.6	23.2	29.3	22.9	33.7	24.5	31.3	23.4	29.6	21.4	30	23.7	33	23	30	23.8
24	30.1	23	29.8	22.1	34.6	24.6	30.8	23.4	31.8	21.9	28.3	23	34	23.5	31.7	24
25	30.6	22.9	29.8	23.9	33.2	24.4	31.9	22.6	31.6	21.3	30.7	22.8	33.2	23	32.4	24.7
26	32.1	23	30.4	23.9	33.7	23.2	31.6	23.4	31.8	21.2	31.2	23.3	33.5	23.8	31.6	24.7
27	31.6	22.1	30.4	23	34.3	24	31.8	23.4	32.8	21.8	32.2	23.3	33	23.4	33	23.9
28	30.5	23.1	30.6	22.3	33.7	24.6	32	23.2	32.1	21.5	31.4	23	32.8	23.6	31.5	24.9
29	30.5	22.9	30.8	23.3	34.2	23.2	31.7	22.8	32.2	21.9	29.5	23.3	32.5	23.3	31	24.5
30	29.2	23.6	29.9	23.7	32.5	23.9	31.2	22.5	30.1	22.2	30.2	23	33	23.5	30	25.1
31	26.1	23.6	28.6	24.7	33.2	24.1	26.8	22.4	31.8	22.5	25.8	22.1	29.6	22.8	29.4	23
Mean	30.5	23.4	29.9	23.4	32.9	23.9	31	23.2	30.8	22	30.1	23.4	32.5	23.5	30.6	24.3

a The maximum temperature was taken from a self-recording instrument.



Maximum and minimum temperatures at the stations of the Weather Bureau, October, 1917—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.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	32.4	23.5	31.8	23.6	28.2	24.6	31	23.2	33.6	24.3	33	23.1	31.3	22.8	31.9	21.8
2	28.8	23.7	31.2	23	29.2	23.1	31.2	23.1	32.5	23.8	32.7	23	31.3	23.6	31.3	22.4
3	31.2	23.6	30.7	23.1	30.1	23	29.1	22.6	31	23.7	30.8	23	30.7	23.5	31.8	21.9
4	30.7	24.1	30.3	22.9	30.5	25.9	27.5	23.6	30.3	24.7	30.2	23.9	29.6	23.6	31.1	22.8
5	27.7	23.3	27.7	22.9	28.2	-----	29.4	23.3	30.6	25.6	28.2	23	28.3	24.7	27.9	23.4
6	26	23.4	27.1	23.1	27.5	-----	27.9	25.2	30.4	23.8	27.4	23.4	26.2	23.2	27.5	23.2
7	29.4	24.2	28.7	24.5	27.2	-----	28.8	26	30.4	26.3	27.4	23.8	30.5	23.2	28.2	23.5
8	30.1	23.8	28.7	24.5	27.7	-----	31.2	26.8	31.4	26.9	31.9	24.1	30.6	23.5	32.9	22.4
9	30	25.2	30.4	23.5	27.9	-----	32	25.4	32.3	26.4	33.1	23.7	30	23.7	32.6	22.9
10	30.8	23.4	30	23.2	29.9	25.5	31.9	25.7	32.7	26.6	32.6	22.7	30.7	23.2	33.2	22.2
11	30.8	23.3	31.6	22.5	30.8	23	32.9	22.4	32.9	22.9	33.4	22.9	32.6	22.6	32.2	22.6
12	32	24.5	31.7	22.9	30.7	23.5	32.2	22.9	30.9	23.8	31	23.9	31.3	24.3	31.7	23.1
13	29.1	24	31.2	23.2	30	23.3	30.6	21.9	30.8	24.1	30.5	23.5	30.6	23.9	29.5	23
14	32.4	23.5	30.8	22.2	30.8	22.7	31.5	22.6	31.3	22.5	32.7	22.9	32.4	23.2	31.4	22.2
15	32	23.7	32.2	23.1	31.4	23.8	32.9	21.3	31.9	22.5	32.8	22.1	32.6	23.1	31.5	22.1
16	31.5	24.3	31.7	22.5	30	22.5	33.4	21.6	32.1	23.4	34	23.6	32.1	22.9	32.8	22.4
17	31.5	24	31.2	22.9	30.7	22.2	32.8	22.2	32.4	23.5	31.8	24.4	32.3	25	32	23.5
18	31.4	24.8	32.2	22.6	30.4	26.5	32.6	22.4	30.8	24.7	32.7	24.2	32.5	24.8	29.8	23.1
19	31	23.2	31.2	23	30.2	23.8	32.9	22.1	33.4	23.6	31	23.9	31.4	23.4	32.4	23.4
20	32.5	23.7	31.3	22.5	31	23.6	31.9	22.1	31.9	23.7	33.3	23.2	31.2	23.1	33	22.7
21	31.5	23.9	32.3	23.4	31	23.5	31.9	21.9	33.4	23.8	33.6	23.3	32	24.1	32.1	22.7
22	30	24.8	30.7	23.6	29.8	24	30.8	23.5	29.2	23.4	28.5	23.5	32.2	24	27.5	23.2
23	29.8	23.7	29.5	23	28.8	23.5	29.6	22.2	30.2	23.4	29.3	23.6	31.2	23.9	30.5	22.6
24	30.2	21.9	30.7	22.6	30.3	23.4	32.8	22.5	29.6	23.3	32.1	23	31.9	23.7	31.5	22.9
25	31.2	21.8	32.1	23.8	30.3	22.7	32.4	22.4	31.7	24	33.4	24	32.3	23.3	32.4	23.4
26	32.5	24.7	31.6	23.1	31	23.5	32.8	21.9	32.1	23.6	34	24	32.6	23.1	31.6	23.1
27	31.8	24.4	31.7	23.1	31.2	23.2	32.2	22	31.6	23.1	33.5	23.4	32.6	23.6	31.6	22.9
28	32	24.4	31.7	22.4	31.4	23.4	32.4	21.4	32.5	22.5	33.6	23.6	32.5	23.4	31.8	22.2
29	31	24.5	32.6	22.1	31.5	24.1	30.5	21.6	27.7	23.3	31	23.7	32	23.8	28.5	22.5
30	29.3	24.5	31.3	22.5	30.8	25.7	30.9	23	32.2	22.3	31.7	23.4	31.1	24.4	39.3	22.2
31	31	23.6	32.2	22.4	31.2	24.4	29.6	22.2	31.7	24	27	22.6	31.9	23.6	31	23.4
Mean	30.7	23.9	30.9	23	30	24	31.3	22.9	31.5	24	31.6	23.4	31.3	23.6	31	22.8

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.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
1	31	22	32.9	23.7	32.8	25	31.3	23.7	31.6	23.1	30.5	23	30.8	23.4	28.4	22.8
2	31.1	23.1	32	22.7	29.8	24.2	33.3	23.1	30.9	23	31.4	22.8	31.4	22.9	29.2	23
3	30.3	22	30.4	22.6	30.4	24	32.4	23	29.5	23.3	31.3	21.8	31.8	22.7	30.2	23.4
4	29	23.6	27.6	23.8	29.4	24	33.9	23.7	28	23	30.1	21.8	28.2	23.9	29.4	23.4
5	26	24.1	27.9	24.2	28.4	23.5	28.4	23	28.3	23.3	29	20.5	24.8	23.4	28.4	23
6	26.8	23.8	26.6	23.6	28.4	23.8	28.4	23.8	25.3	22.5	-----	-----	25.5	23.5	28.8	23
7	30	24.5	27.9	25.7	29.8	24.2	31.4	24.2	29	23.1	28.9	-----	28.5	24.4	29.8	23
8	30.2	25.2	29.4	25.1	30.6	24.2	30.3	23.9	29.8	23.8	30.9	24.2	29.8	24.4	31	25.6
9	31.5	23.7	30.4	24.8	30.8	24.6	28.9	23.8	28.9	23.4	30.5	24	28.8	24.3	29.6	25.2
10	31.8	24.2	31.6	24.1	30.6	24.4	32.5	22	32	23.2	30.8	23	28.8	23.9	28.4	23.4
11	31.5	23.5	30.6	23.1	31	23.8	33	22.7	30.4	23	32.5	22.4	31	23.4	29.4	22.8
12	31.8	23	30.4	23.4	31.4	25.6	31.4	24.1	30.6	23.5	32	23	30.1	25.1	30	25
13	29.5	22	30	22.4	30.6	24	30.7	22.9	29.8	23.4	32	22.1	30.9	23.4	30	24.8
14	30.9	22.2	31.9	22.9	32	25.6	31	22.3	30.8	23.9	32.6	22.5	31.1	24.3	28.6	24
15	32	21	29.8	22.4	32	24.2	33.4	22.5	30.9	23	32.5	23	31.1	24.5	29.6	25.4
16	32.2	21.6	32.1	22.5	31.6	25.5	33.4	24.2	-----	-----	31	23	31.2	23.8	29.8	25
17	30.5	22.4	31.6	23.5	30.6	23.8	33.4	23.4	28.1	23.8	29.8	23	28.6	23.1	29.2	23.6
18	32	21.9	32.8	23.4	31.4	25.5	33.7	24.2	30	23.4	28.5	22.2	29.2	24.7	28.2	22.6
19	31.5	22.2	31.9	23.4	30.8	24.2	32.4	24	30	22.6	30.5	22.7	30.3	23.9	30.2	24.4
20	30.3	22.2	31.3	23.3	31.4	24.2	31.5	23.7	30.7	23.6	31.4	22.5	30.9	24.5	30	24.6
21	31.7	22	33.1	23	31.4	25.5	34	23.2	30.3	23.9	32.8	23	30.7	23.5	29.2	23.4
22	30.5	23.1	31.3	23.6	31.4	25.4	33.5	23.4	30.8	23.7	32.8	23.2	30.4	24.2	29.2	24.4
23	29.5	22.2	30.1	22.8	30	24.8	31.9	23.5	26.9	23.4	29	22.3	29.2	22.4	30	24.4
24	31.2	21.7	32.1	22.7	30.8	25.4	32.8	23.3	30	23	32.3	22	30.9	23.7	30	26
25	30.4	22.7	31	23.1	32	25.5	33.6	23.2	30.6	23.2	31.2	22.4	30.5	24.4	30.4	23
26	31.5	22.3	32.9	23	32.4	25.2	33.4	23.3	30.2	23.2	32.1	23	31.4	23.9	30.4	23.8
27	31.8	22.6	30.8	23.3	32.6	25.6	32.4	24.1	30.4	23.5	32.4	23.2	31.2	25	30.4	22.8
28	31.6	21.3	32.6	22.1	31.6	25.8	33.5	23.3	30.9	23.8	32	22.2	31.5	23.7	30.2	25.5
29	30.7	22	30	22.8	31.6	25.5	34.7	23.2	29.3	23.4	30.7	21.6	31.4	24.4	29.6	25
30	30.3	22.5	30.5	23.4	30.4	25.2	30	23	28.8	22.8	28.9	21.4	27.9	23.2	28.7	24.5
31	29.9	21.5	30.9	22.9	30.4	25.4	33.6	24	30.5	23.5	30	23.4	30.1	23.9	29.6	23.4
Mean	30.6	22.6	30.8	23.3	30.9	24.8	32.2	23.4	29.8	23.3	31	22.6	29.9	23.9	29.5	24

Maximum and minimum temperatures at the stations of the Weather Bureau, October, 1917—Continued.

Day.	Calapan.		Virac.		Naga.		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	32.5	23.1	32.6	22	31.2	21.2	31	22.47	30.7	22.3	31.7	22.8	30.6	22.4	30.8	21.6
2	32.5	23.2	31.9	22.5	31.4	20.7	31.4	22.8	30.4	22.2	30.4	22.7	30.6	23.1	30.8	21.6
3	32.5	23.5	30.5	22	30	20.7	31.2	23	31.3	22.4	31.2	22.7	33	23	30.9	21.8
4	33.6	24.5	28.5	22.8	26.6	21.9	31.3	22.4	32	22.1	31.2	23.7	31.9	23.3	31.2	21.8
5	33.8	23.5	26	22	24.7	21.1	27.8	23.8	26.5	23.1	25.5	23.5	29.1	23.9	30.2	22.8
6	30	23.6	27.5	22.1	26.1	21.5	27.8	23.4	27.8	23	26.9	23.3	27	23.7	28.6	22.4
7	31.7	23	28.8	23	29.5	22.1	29.8	23.7	30.3	23.5	31.1	24.8	29.7	24	29.8	23.1
8	29.5	23.4	31	23.8	30.4	22.6	29.8	25	29.3	24.5	30.4	23.4	28.2	22.9	30	23.2
9	30.1	23.1	30.3	23.5	28.9	22.3	29.4	22.4	28	22	28.4	22.6	28.6	22.1	28	21.9
10	31.5	22.5	30	23	30.8	22.1	30.5	22.8	29.8	21.6	29.9	22.8	31.5	23	29	22.4
11	31.6	22.5	32.1	23.5	33	22.5	31.1	22.4	30.5	23.3	30.2	23.5	30.7	22.8	29.8	22.1
12	32.1	24	32.3	22.4	31	20.9	32.7	23.6	31.7	23.5	30.4	22.9	31.6	23.9	30.4	22.8
13	32.5	23.5	32	22.8	30.5	21.6	32.3	23.2	31	23	30.7	23	32.6	23.4	31	22.2
14	31.1	23	31.8	24	31.2	21	32.4	22.4	31	22.4	30.1	22.5	31.6	21.8	30	21.97
15	31.8	22.5	31.5	22.5	31.2	21.4	31.2	23.4	32	22.6	30.6	22.8	29.4	22.7	31	21.4
16	32.1	23.1	33.4	22.7	31.3	21.2	32.8	22.6	31	22.6	28.1	24	31.9	23.9	30.8	22.2
17	33.1	24.1	31.6	22.5	29.5	21.6	32.7	22.8	31.3	22.9	28.2	23.5	33	24.3	30.2	22.8
18	32.5	23.6	29.5	22	31.7	21.7	32.4	22.6	30.4	22.2	28.1	24.2	32.3	24.3	30.1	21.8
19	32.4	23.5	30.7	22.2	31.1	21.1	30.6	22	30.5	23	28.7	24.6	33	24.7	30.6	21.8
20	32.3	24	31.8	21.9	31.7	20.5	31.8	21.8	31.5	23	29.7	24	33.8	24.6	30.8	21.2
21	31.6	23	31.3	22.3	32.4	20.4	32.6	23.3	32.5	23	30.7	24.6	33.9	24.7	31.2	22.4
22	31.6	23.8	31.2	22.4	31.8	22.1	31.8	22.8	32	23.6	30.2	24	30.2	23.3	30.3	22.3
23	30.2	23.1	28.5	22.5	29.6	21	30.8	23.6	32.7	23.4	30.6	23.5	30.7	23	31	23
24	30.6	23.5	31.5	21.8	31	20.5	32.5	23.1	32.9	23.9	31.4	23.9	32	24.2	30.6	22.1
25	32	22.5	32.3	22	32.5	20.5	32.2	22.5	32.7	23.2	30.9	24.1	33.1	23.9	31	22.3
26	32	23	32	22.4	31.4	20.7	32.8	22.5	33	23.6	31.4	24.5	33.3	23.4	31.5	22.2
27	32	23.2	32.8	22.5	32.5	21.2	32.1	22.6	32	23.5	30.5	23.5	31.2	22.5	32.1	21.2
28	31.6	22.5	32.7	21.2	32	20.3	32.3	22.6	32.5	23	31.8	22.5	33.1	22.5	31	21.4
29	32	23.4	33.4	21.6	30.8	19.9	32.4	21.77	31.6	22.7	30.6	26	32.3	22.4	32	21.3
30	32.1	25.1	29	22.3	27.7	20.6	31.3	22.8	32.1	23.5	29.8	25.1	29.8	24.4	31	23
31	33.1	24	32.5	22	31.6	19.6	32.8	23	31.7	23.5	29.9	24	31.8	24.2	31.8	23.1
Mean	31.9	23.4	31	22.5	30.5	21.2	31.4	22.9	31.1	23	30	23.6	31.4	23.4	30.6	22.1

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	32.2	23.8	30.6	22.6	30.3	23.2	29.8	22	30.6	22.6	31.1	23.7	32.8	23.3	31.7	22.7
2	31.2	23.5	30.4	23.2	31.7	23.2	31.8	21.5	30.9	22.6	31.4	23	33.4	23.2	29.6	23.1
3	31.7	23.5	31.3	23.7	31.3	23.8	29.8	22.1	30.6	21.9	31.8	23.4	33	23.4	31.4	22.5
4	27.2	24.4	31.8	23.7	31.3	23.3	30.3	21.8	32.3	22.9	32.1	23.5	33.6	23.3	32.3	22.1
5	25.8	23.9	27.3	23.9	29.5	23.6	28	22.2	31.8	21.5	31.4	22.5	32.8	23	31.5	23
6	26	24	29.3	23.5	31.1	23.7	29.8	22.2	31.8	23	30.9	23.9	34.4	24	32.8	23.7
7	31	24.4	31.2	23.9	31.7	24.3	30.2	23	31.4	23.3	31	23	33.8	24.2	33.5	23.5
8	32	24.5	31	24.2	30	23.3	29.3	22.2	32	24.2	30.2	23.6	32	23	33	22.8
9	29	23.7	27.6	22.9	27.6	23	27.8	21.2	30.8	23.1	28.4	23	29	23.8	29.8	23.6
10	30.2	23.8	30	23.1	31.3	23.2	29.7	21.6	31	21.8	29.6	23.6	31.2	23	29.9	22.9
11	31	23.3	29.6	23.1	30.6	23.5	30.1	22	30	23.9	29.6	24	30.4	23.6	29.6	23.4
12	30.5	24.7	30.3	24.4	31.5	23.9	30.7	22.2	31.7	23.4	32.1	24.4	34.4	24	31.5	23.8
13	31.2	23.9	31.3	23	32	22.6	31.4	21.3	32	22	32.1	23.1	34.4	23.9	31.9	22.4
14	31	23.5	30.1	22.9	31.2	23	30.8	21.4	31.7	23.4	30	23.6	32.4	23.8	30	23.5
15	30.6	22.7	31.5	23.4	32	23	32.3	21.6	31.7	22.5	31.6	23	33.2	22.4	31.4	22.3
16	29.3	23.5	30.7	23.5	31.3	23.4	32.2	21.6	32.4	22.3	31.1	23	33.6	22.4	29.5	22.6
17	28.5	23	30	22.9	31.6	22.8	31.7	21	31.9	21.6	31.4	23.2	33.6	23.5	30.9	22.2
18	29	23.5	30.3	22.2	31.3	22.8	30.2	21.3	32.4	22.3	31.8	23	33.4	22.2	31.5	22.5
19	30.6	23.5	29.6	23	30.3	22.6	30.3	20.8	32.5	21.9	28.3	23.6	32.6	22.4	29	22.8
20	30.9	24	30.8	22.5	32.1	22.1	31.5	20.8	32.1	22.4	31.1	23	34.6	22.5	31.6	22.6
21	31.2	24.1	30	23.4	32	23.1	30.2	21	32.2	22.7	32.1	23.6	34.5	23.2	31	22.9
22	31.2	24.4	30.3	23.6	30.8	23.7	30.7	22	32.1	23.1	31.4	23.8	33.9	23.6	31	23.2
23	31	24.4	30.8	24	29.8	24.3	29.9	22.2	30.8	22.9	28.4	23.6	31.6	23.4	28.6	23.2
24	31.6	23.5	30.5	23.2	30.9	23.7	31.7	21.4	32	22	31.7	23.2	33.6	23.4	30	22.5
25	31	24.2	31.1	23.7	32.7	23	31.8	21.1	32.1	22.7	31.5	23.1	33.7	23.6	34.1	22.1
26	31.3	23.5	32.3	23.1	31.8	22.6	32.6	20.8	31.6	23.2	32	23	33.5	23	34.8	21.9
27	31.7	24.2	32.3	23.3	31.8	22.6	31	21.3	30.4	23.8	31	22.9	33.2	23.5	30.5	23
28	31.2	23.9	32.2	23.3	32.2	22.4	33	21.1	32.2	22.1	32.2	22.7	34.2	23.3	31.6	21.6
29	30.8	23.9	32.7	22.7	32.8	21.9	31.6	21.37	32.5	22.3	31.9	22.3	35.2	23	32	21.5
30	29.1	24.5	32.4	23.4	32.3	23.2	31.7	21.4	33	22.4	32	22.4	34.3	22.5	32.2	22.7
31	31	24.3	32.7	23.7	32.8	22.8	32.7	21.4	33.1	23.2	32.5	22.4	35.2	22.4	33.5	22.5
Mean	30.3	23.8	30.3	23.3	31.3	23.1	30.8	21.6	31.7	22.7	31.1	23.2	33.3	23.2	31.3	22.7

Maximum and minimum temperatures at the stations of the Weather Bureau, October, 1917—Continued.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echague.		Candon.	
	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	23.8	30.9	23.5	23.6	15.2	31.4	23.1	32.5	22.5	32	25.2
2	33.2	23.5	32.3	24	21.4	15.4	32	23.6	27	22.8	32	24.2
3	32.7	24	32.5	23.5	22.8	15.1	32	23	31.5	21.6	32.8	25
4	32.6	22.5	32.5	24	23.3	15	32.3	24.3	31.6	22.8	32.4	24.5
5	31.2	22.2	32.4	22.2	22.9	15.3	32	23	28	22.8	32.8	25
6	31.6	24.5	32	25.3	24.3	15.9	31.1	23.5	30.2	23.5	32.5	24.6
7	32.8	25	32.7	26	22.2	16.2	32.1	24.5	32	23	32.7	25
8	31.6	24.5	31.3	25.8	21.3	16.5	31.9	24.9	32	23	32.8	25
9	31.7	23.9	31.8	24.9	22.6	15.3	32.4	24	30	23.3	32.2	24
10	31.2	24	30.3	23.8	20.7	15	31.2	23.3	27	23.6	32	24.9
11	31.2	24.4	30.6	24.2	23.1	16.4	31.1	24.3	31	23.3	31.8	25
12	32.7	24.5	31.9	24.5	23.8	16.4	32.5	24.2	34	22.3	32.6	25.4
13	33.2	23.9	31.8	23.9	23.3	15.7	31	23.3	32.9	22.9	32.5	25
14	33.8	24	32	24.1	23.7	15.4	32.2	23.7	32	23.9	32.4	26
15	33.6	23.2	32.5	23.5	23.5	15.6	31.8	23.3	33.1	21.9	32	24
16	32	23.1	32.7	23.5	23.5	15.2	31.6?	23.3	32.1	22.3	31.9	24.8
17	31.5	23.3	32.9	23	24.1	15.3	-----	-----	30.1	22	32.3	23.5
18	32.1	23	32.6	23.5	24.5	14.3	-----	-----	31.6	21.8	32.5	23.5
19	33.8	23.4	33.5	23.9	23.6	15.3	-----	-----	28	22.8	32.7	24.2
20	33	23.9	33.2	24	22.6	15.5	-----	-----	31.5	23.1	32.5	24.5
21	33.5	23.8	33	24	24.3	15.9	33	23.6	32	22.8	32	24.6
22	34	24.4	33	24.4	23.6	16.1	33	24	33.5	22.8	32.6	26
23	33.6	23.3	32.9	24.5	23	16	32.6	23.5	33.6	24.1	32.5	24.2
24	34.5	23	33.9	24	24.4	16.2	32.5	23.1	34	23.2	32	24.9
25	34.4	24	33.7	24.9	25	15.9	33.6	23.5	34.2	22.3	33.5	24.9
26	33.8	23.9	32	24.5	22.3	15.5	33.2	23.3	33	22.8	33	25.2
27	34.2	24.2	31.9	24.1	24.3	15.4	32.7	22.4	33	22	32.4	23.2
28	34.5	24	33.4	24.5	24.5	15.6	32.9	23.6	34	22.6	33.2	24.8
29	34.5	23.8	33.9	23.8	24.8	15.4	32.5	23.7	33.5	21.2	33.3	25.1
30	35.4	23.9	34	23.5	25.5	15.5	32.1	22.6	32.4	22.2	33	25
31	34	23.4	33.7	23.6	25.4	15.1	32	23	33.1	22.2	33.7	24.6
Mean	33.1	23.8	32.5	24.1	23.6	15.6	32.2	23.5	31.8	22.7	32.5	24.7

Day.	Vigan.		Tuguegarao.		Laoag. <sup>a</sup>		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	29.2	23.3	29.8	24.2	32.1	22.9	30.5	24.3	29.4	22.8	29.4	23.5
2	29.6	23	31.7	23.4	33.1	23	31.4	23.5	30.4	22.8	31.1	23
3	31	22.1	32.7	23.3	33.1	23.5	31.1	23.8	30.2	23.6	30.3	23.6
4	32	24	31.8	23.1	-----	-----	31	23.6	30.2	23.2	31.5	23.6
5	32	23.5	29.6	23.3	-----	-----	30.7	23.3	29.4	24	30.6	24
6	32	23.9	30.2	23.7	-----	-----	29.7	23.4	28	23	30.6	25.3
7	31.4	24.6	29.7	23.7	-----	-----	29.2	24.8	27.8	23.4	29.1	24.5
8	30.4	24.2	29.3	23.5	30.1	22.6	30.1	24	27.5	23.5	28.1	23.9
9	30.9	22.1	31	22.7	32.1	21.5	30.6	22.8	29.4	23	30.5	25
10	30.1	23	28.4	24	31.8	22.1	28.6	23.8	28.6	23.4	29.5	24.6
11	30.3	24.3	31	24.1	29.6	24.1	29.5	23.6	28.6	23.8	27.7	23.2
12	31.3	24.6	32	23.4	34.7	23.9	31.8	23.4	31.2	24.2	31.4	25
13	31.6	24	32.4	22.5	34.1	22.6	30.4	23.5	29.2	24	29	24.2
14	30.6	24.2	30.8	23.5	31	22.7	29.7?	23.5	25.8	23.2	28.7	24.5
15	31.4	23.4	32.1	23	33.3	22.6	31.9	22.8	30	22.8	30.4	24
16	30.8	23	31.5	23.8	33.1	23	30.7	23.3	29.8	24.6	29.8	23.8
17	30.5	22.1	30.3	22.5	34.3	21.2	30.4	23.2	29.6	23.2	29.4	23.7
18	34	23.2	30.9	21.6	34.7	20.6	29.6	22.4	29.8	23.4	29	24.7
19	32.6	24	28.3	23.2	35.9	21.8	31	23.5	29.8	24	30.7	23.8
20	32.5	24.1	30.5	23	33.6	22	29	23.6	28.2	23.5	29.6	24.5
21	31.6	24.2	31.8	23.2	33.7	22.4	30	23.2	28.8	22.8	30.5	24.5
22	32.4	23.5	32.4	23.5	32.4	22.1	30.2	23.4	30.8	23.2	29.8	23.9
23	31.7	23	32.6	23.6	32.9	22.4	31.8	23.9	30.4	23.2	29.2	22.6
24	32.8	24	34.4	24	32.4	21.7	31.3	24.2	31.8	23.8	29.7	22.9
25	32.9	24	34.3	24.4	33.9	21.3	31.2	23.4	30.2	23.6	28.8	23.4
26	33.3	24	32.8	23.4	31.4	22.2	29	24.3	28.2	23.2	29	23.1
27	32.6	23.5	33.7	24	32.4	20.5	32.2	23.4	30.4	23.2	30.5	24
28	32.3	23.6	34.8	23.8	33.1	21	33.1	23.4	31.6	23.7	30.6	23.2
29	33.8	25	34.4	23.7	33.3	21.1	31.5	23.6	31.5	24	30.6	23.2
30	33.7	24.2	33.2	22.5	35.1	20.5	31.8	23.4	29.8	24	30.9	23.1
31	32.9	23.9	34.8	21.6	34.4	20.4	30.9	23.3	30.8	23.5	31.5	23.5
Mean	31.7	23.7	31.7	23.3	33	22.1	30.6	23.5	29.6	23.5	29.9	23.9

<sup>a</sup> The maximum temperatures of this station are not very reliable: they seem to be too high.



## SEISMOLOGICAL BULLETIN FOR OCTOBER, 1917.

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### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

1, 12<sup>h</sup> 14<sup>m</sup> 17<sup>s\*</sup> [1, 20<sup>h</sup> 14<sup>m</sup> 17<sup>s</sup>]. N Luzon. Earthquake of intensity IV felt through the northern portion of Luzon comprised by the provinces of Cagayan, Apayao, and Ilocos Norte. Its origin seems to have been under the sea between the Babuyan group and the coast.

2, 17<sup>h</sup> 16<sup>m\*</sup> [3, 1<sup>h</sup> 16<sup>m</sup>]. Butuan (N Mindanao). Earthquake of intensity III, originated in the Pacific Ocean. Lightly registered at Manila.

3, 20<sup>h</sup> 14<sup>m</sup> [4, 4<sup>h</sup> 14<sup>m</sup>]. Ormoc (W Leyte). Oscillatory earthquake, direction S-N, intensity V, duration 15 seconds. Of very local character, registered only at Butuan about 240 kilometers from Ormoc.

7, 15<sup>h</sup> 04<sup>m</sup> [7, 23<sup>h</sup> 04<sup>m</sup>]. Butuan (N Mindanao). Earthquake of intensity IV, duration about 10 seconds. The origin very likely lay within the Agusan Valley toward the S. A lighter repetition occurred at 21<sup>h</sup> 43<sup>m</sup> [8, 5<sup>h</sup> 43<sup>m</sup>].

8, 0<sup>h</sup> 15<sup>m</sup> [8, 8<sup>h</sup> 15<sup>m</sup>]. Cotabato (SW Mindanao). Oscillatory shocks of intensity II-III. Registered at Butuan 235 kilometers distant.

10, 4<sup>h</sup> 31<sup>m</sup> [10, 12<sup>h</sup> 31<sup>m</sup>]. Naga (SE Luzon). Earthquake of intensity III duration 5 seconds.

14, 11<sup>h</sup> 13<sup>m</sup> 28<sup>s\*</sup> [14, 19<sup>h</sup> 13<sup>m</sup> 28<sup>s</sup>]. N Luzon. Earthquake of intensity V felt through the same northern portion shaken on the 1st. Very probably the origin was also the same, near to the coast.

16, 14<sup>h</sup> 47<sup>m</sup> 02<sup>s\*</sup> [16, 22<sup>h</sup> 47<sup>m</sup> 02<sup>s</sup>]. Laoag (NW Luzon). Oscillatory earthquake, direction E-W, intensity III, duration 4 seconds.

17, 19<sup>h</sup> 18<sup>m</sup> 21<sup>s</sup> [18, 4<sup>h</sup> 57<sup>m</sup> 21<sup>s</sup>]. Guam (Mariana Islands). Earthquake shocks of intensity II-III.

18, 16<sup>h</sup> 18<sup>m</sup> 39<sup>s\*</sup> [19, 0<sup>h</sup> 18<sup>m</sup> 39<sup>s</sup>]. NE Mindanao. Extensive and long lasting earthquake of intensity V-VI. It was felt through the whole province of Surigao, the Agusan Valley and the eastern part of Misamis Province. The origin lay in the Pacific not far from the Surigao coasts. The seismograph of Butuan recorded two light aftershocks at 5<sup>h</sup> 14<sup>m</sup> and 5<sup>h</sup> 18<sup>m</sup> insular time, which were also noticed by some few persons.

20, 8<sup>h</sup> 02<sup>m</sup> [20, 16<sup>h</sup> 02<sup>m</sup>]. Naga (SE Luzon). Earthquake shock of intensity III.

25, 19<sup>h</sup> 48<sup>m</sup> 25<sup>s</sup> [26, 5<sup>h</sup> 27<sup>m</sup> 25<sup>s</sup>]. Guam (Mariana Islands). Oscillatory earthquake, direction S-N, intensity III-IV.

26, 6<sup>h</sup> 11<sup>m</sup> 07<sup>s\*</sup> [26, 14<sup>h</sup> 11<sup>m</sup> 07<sup>s</sup>]. Santa Cruz, Laguna (E Luzon). Oscillatory earthquake of intensity II-III.

26, 16<sup>h</sup> 22<sup>m</sup> 54<sup>s</sup> [27, 2<sup>h</sup> 01<sup>m</sup> 54<sup>s</sup>]. Guam (Mariana Islands). Earthquake shocks of intensity III.

<sup>1</sup> 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<sup>h</sup>), insular time being added in brackets for the convenience of Philippine readers.

RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0<sup>h</sup>. Instrument: Wiechert seismograph; 1,000 kilograms.  $A_N$ :  $T_0=5.9$ ,  $\epsilon=2.340$ ,  $\frac{r}{T_0^2}=0.024$ ;  
 $A_E$ :  $T_0=5.3$ ,  $\epsilon=1.783$ ,  $\frac{r}{T_0^2}=0.092$ . Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
301	1	Iv	eP	12 14 17				N Luzon.
			L	15 02				
			M <sub>E</sub>	15 20	3	51		
			M <sub>N</sub>	15 30	4	57		
F	26							
302	2	Iv	e	17 16				Butuan (N Mindanao).
F	35							
303	3	Ir	eP	7 20 15				39
			L	22 46				
			M <sub>E</sub>	23 02	7	75		
			M <sub>N</sub>	23 22	9			
F	42							
304	3	IIv	eP	23 38 44				SE Luzon.
			L	39 18				
			M <sub>E</sub>	39 26	5	295		
			M <sub>N</sub>	39 37	5	744		
F	0 11							
305	3	Iv	eP	23 53 47				SE Luzon.
F	56							
306	4	Iv	eP	15 38 14				SE Luzon.
			L	38 46				
			F	41				
307	4	Iv	eP	22 39 06				SE Luzon.
			L	39 41				
			F	44				
308	4	Iv	eP	23 08 05				SE Luzon.
			F	11				
309	5	Iv	eP	4 31 08				SE Luzon.
			F	34				
310	5	Iv	eP	11 08 00				SE Luzon.
			L	08 33				
			M <sub>E</sub>	08 41	5	89		
			M <sub>N</sub>	08 51	5	136		
F	19							
311	5	Iv	eP	11 49 54				SE Luzon.
			F	53				
312	5	IIv	eP	12 13 06				SE Luzon.
			L	13 37				
			M <sub>E</sub>	13 39	4	186		
			M <sub>N</sub>	13 54	4	401		
F	28							
313	5	Iv	eP	12 30 42				SE Luzon.
			F	33				
314	5	Iv	eP	15 16 44				SE Luzon.
			L	17 16				
			F	20				
315	5	Iv	eP	22 49 04				SE Luzon.
			F	52				
316	6	Iv	eP	1 07 04				SE Luzon.
			F	10				
317	6	Iv	eP	7 04 00				SE Luzon. End overtaken by following earthquake.
			L	04 34				
			M <sub>E</sub>	04 40	5	118		
			M <sub>N</sub>	04 52	6	174		
318	6	Iv	eP	7 07 06				SE Luzon.
			L	07 41				
			M <sub>N</sub>	07 48	6	84		
			F	12				
319	6	Iv	eP	9 28 38				SE Luzon.
			F	32				
320	6	Iv	eP	18 42 24				SE Luzon.
			F	45				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Period.	Amplitude.		Remarks.
								A <sub>N</sub> μ	A <sub>E</sub> μ	
321	6	Iv	eP F	h. m. s.					SE Luzon.	
				19 53 37						
				57						
322	11	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	22 43 47						
				43 55						
				44 03	3		237			
				44 05	3	267				
				49						
323	11	Iv	eP F	23 25 24						
				28						
324	14	Iv	eP L M <sub>N</sub> F	11 13 28					N Luzon.	
				14 11						
				14 27	3	30				
				21						
325	14	Iv	eP F	14 50 20						
				53						
326	15	Iv	eP F	4 56 06						
				59						
327	15	Iv	e F	16 05 19						
328	16	Iv	eP F	14 47 02					Lacag (NW Luzon).	
				50						
329	17	Iv	eP F	2 15 02						
				18						
330	17	IIv	eP L M <sub>E</sub> M <sub>N</sub> F	7 05 46						
				06 23						
				06 31	3		327			
				06 34	3	500				
				27						
331	17	I <sub>r</sub>	e F	14 37 23						
				59						
332	18	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	16 18 39					NE Mindanao.	
				20 18						
				22 00	11		10			
				22 06	10	16				
				33						
333	25	I	e F	14 35 24						
				15 08						
334	25	I	e F	19 55 14						
				20 20						
335	25	Iv	eP F	23 32 40						
				35						
336	25	Iv	eP F	23 44 35						
				47						
337	26	IIv	eP L	6 11 07					Santa Cruz, Laguna (E Luzon). Maxima and end in both components lost by the force of the shock.	
				11 24						
338	29	Iv	eP L S M <sub>N1</sub> M <sub>N2</sub> F	20 43 36						
				45 43						
				46 13						
				46 57	6	24				
				49 41	6	30				
				21 28						
339	30	Iv	eP L M <sub>E</sub> M <sub>N</sub> F	3 02 04						
				02 22						
				02 24	2		78			
				02 27	2	91				
				08						
340	30	Iv	eP F	22 39 00						
				41						
341	31	I	eP F	2 20 51						
				37						
342	31	I	eP F	15 13 28						
				26						
343	31	Iv	eP F	19 42 22						
				45						

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

1, 12<sup>h</sup> 14<sup>m</sup> 17<sup>s\*</sup> [1, 20<sup>h</sup> 14<sup>m</sup> 17<sup>s</sup>]. N de Luzón. Temblor de tierra de intensidad IV sentido en toda la parte más septentrional de Luzón comprendida por las Provincias de Cagayán, Apayao e Ilocos Norte. Su origen se hallaba al parecer debajo del mar entre el grupo de las Islas Babuyanes y la costa de Luzón.

2, 17<sup>h</sup> 16<sup>m\*</sup> [3, 1<sup>h</sup> 16<sup>m</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad II-III, originado en el Pacífico. Registrado débilmente en Manila.

3, 20<sup>h</sup> 14<sup>m</sup> [4, 4<sup>h</sup> 14<sup>m</sup>]. Ormoc (W de Leyte). Temblor oscilatorio, dirección S-N, intensidad V, duración 15 segundos. Registrado solamente en Butúan distante unos 240 kilómetros.

7, 15<sup>h</sup> 04<sup>m</sup> [7, 23<sup>h</sup> 04<sup>m</sup>]. Butúan (N de Mindanao). Temblor de tierra de intensidad IV, duración 10 segundos. Originado en el valle Agusano hacia el S. Repitió con menos intensidad a 21<sup>h</sup> 43<sup>m</sup> [8, 5<sup>h</sup> 43<sup>m</sup>].

8, 0<sup>h</sup> 15<sup>m</sup> [8, 8<sup>h</sup> 15<sup>m</sup>]. Cotabato (SW de Mindanao). Temblor oscilatorio de intensidad II-III. Registrado débilmente en Butúan, a una distancia de 235 kilómetros.

10, 4<sup>h</sup> 31<sup>m</sup> [10, 12<sup>h</sup> 31<sup>m</sup>]. Naga (SE de Luzón). Temblor de tierra de intensidad III, duración 5 segundos.

14, 11<sup>h</sup> 13<sup>m</sup> 28<sup>s\*</sup> [14, 19<sup>h</sup> 13<sup>m</sup> 28<sup>s</sup>]. N de Luzón. Temblor de tierra de intensidad V en la misma región septentrional de Luzón donde ocurrió el del día 1.º. El origen se hallaba también cerca de la costa N.

16, 14<sup>h</sup> 47<sup>m</sup> 02<sup>s\*</sup> [16, 22<sup>h</sup> 47<sup>m</sup> 02<sup>s</sup>]. Laoag (NW de Luzón). Temblor oscilatorio, dirección E-W, intensidad III, duración 4 segundos.

17, 19<sup>h</sup> 18<sup>m</sup> 21<sup>s</sup> [18, 4<sup>h</sup> 57<sup>m</sup> 21<sup>s</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad II-III.

18, 16<sup>h</sup> 18<sup>m</sup> 39<sup>s</sup> [19, 0<sup>h</sup> 18<sup>m</sup> 39<sup>s</sup>]. NE de Mindanao. Temblor de tierra de grande extensión y duración y de intensidad V-VI. Sintióse en toda la Provincia de Surigao, en el Valle del Agusan y parte oriental de Misamis, el origen se hallaba en el Pacífico no lejos de las costas de Surigao. El sismógrafo de Butúan registró dos repeticiones, notadas también por algunas personas a 5<sup>h</sup> 14<sup>m</sup> y 5<sup>h</sup> 18<sup>m</sup> tiempo insular.

20, 8<sup>h</sup> 02<sup>m</sup> [20, 16<sup>h</sup> 02<sup>m</sup>]. Naga (SE de Luzón). Temblor de tierra de intensidad III.

25, 19<sup>h</sup> 48<sup>m</sup> 25<sup>s</sup> [26, 5<sup>h</sup> 27<sup>m</sup> 25<sup>s</sup>]. Guam (Islas Marianas). Temblor oscilatorio, dirección S-N, intensidad III-IV.

26, 6<sup>h</sup> 11<sup>m</sup> 07<sup>s\*</sup> [26, 14<sup>h</sup> 11<sup>m</sup> 07<sup>s</sup>]. Santa Cruz, Laguna (E de Luzón). Temblor oscilatorio de intensidad II-III.

26, 16<sup>h</sup> 22<sup>m</sup> 54<sup>s</sup> [27, 2<sup>h</sup> 01<sup>m</sup> 54<sup>s</sup>]. Guam (Islas Marianas). Temblor de tierra de intensidad III.

## THE EARTHQUAKES OF AMBOS CAMARINES (SE LUZON), OCTOBER, 4-7, 1917.

The earthquakes of Ambos Camarines which during four days caused so much concern to the people of Naga and of the towns lying near to the Isarog Mountain, began at 5<sup>h</sup> 13<sup>m</sup> a. m. of the 4th (3rd, 21<sup>h</sup> 13<sup>m</sup> G. M. T.) with a very light shock; but up to 7<sup>h</sup> 39<sup>m</sup> ten of similar intensity were felt at intervals varying from 2 to 40 minutes. At that hour a strong earthquake of intensity VI occurred; it lasted over 7 seconds and caused some cracks in reënforced concrete and masonry walls and shook hard the wooden frames of the houses. After this earthquake, which must be considered as the strongest

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.



of the period, there were felt eight light shocks during the following four hours. Until the evening at 18<sup>h</sup> 29<sup>m</sup> no perceptible disturbance was noticed, but at this hour began a new series of fourteen shocks and rumblings; the last being felt at 2<sup>h</sup> 08<sup>m</sup> of the 5th. A new period of calm succeeded for about four hours. At 6<sup>h</sup> 29<sup>m</sup> a. m. the shocks became perceptible again, repeating themselves practically the whole day. In all thirty-one quakes were counted, most of them of intensity II-III; there were but seven which reached degree III-IV, and one at 20<sup>h</sup> 12<sup>m</sup> of intensity V-VI. Shortly before midnight at 23<sup>h</sup> 14<sup>m</sup> the trembling ceased, everything being apparently quiet during seven hours.

On the 6th the first shock and rumbling occurred at 6<sup>h</sup> 19<sup>m</sup> but up to 23<sup>h</sup> 26<sup>m</sup> only sixteen were felt at long intervals. All had but little intensity, excepting two which took place at 15<sup>h</sup> 02<sup>m</sup> and 15<sup>h</sup> 05<sup>m</sup>, respectively. The next day, 7th, and the following night to 4<sup>h</sup> 10<sup>m</sup> of the 8th only thirteen light shocks were felt with but one of intensity IV, at 3<sup>h</sup> 53<sup>m</sup> a. m. During the 8th the calm was disturbed by three light shocks, at 11<sup>h</sup> 15<sup>m</sup>, 16<sup>h</sup> 09<sup>m</sup> and 21<sup>h</sup> 25<sup>m</sup>, and on the 9th only a shock was felt at 18<sup>h</sup> 36<sup>m</sup>; thus coming suddenly to an end this remarkable seismic period.

The total number of shocks recorded in the preceding lines is ninety-five taken from the report sent by the observer at Naga, Mr. Eduardo Ontengco; some persons communicated to the press of Manila as many as a hundred and eleven, while one reporter numbered only ninety.

**Intensity of the shocks.**—Taking the effects on the buildings as an index of the intensity of the shocks it is safe to say that none did reach fully the VII degree Rossi-Forel. It has been said that they were felt more strongly at Naga, W of the Isarog, than in the towns placed to the N and NE and nearer to this mountain; but such assertion seems somewhat doubtful, when at the same time many landslides and cracks in that mountain have been reported. Some apparently greater severity at Naga can certainly be possible on account not of it having been nearer to the epicenter, but because this city lies on the most recent alluvium of the region; such condition necessarily making the earth vibrations larger than through more solid ground. The epicenter according to all the data at hand must be placed within or very near the boundaries of the Isarog volcanic mountain.

**Subterranean rumblings.**—Generally the rumbling foreran so closely all the perceptible shocks that the sound, both aerial and subterranean and very like the noise made by an approaching heavily loaded truck, was a sure warning of the instantly felt motion of the earth. The direction in which the sound propagated seemed to be NE-SW, and the vibrations of the earth had apparently the same direction. In the report of Mr. Ontengco is found the direction of 34 shocks; out of this number NE-SW is given 16 times; N-S, 9; SE-NW, 5; E-W, 3; NNW-SSE, 1; these figures give also a resultant very close to NE-SW.

**Extension and character of the shocks.**—The region mainly affected by the earthquakes comprised only the central part of the eastern portion of Ambos Camarines. Its extension in a Naga-Goa line, ENE-WSW, passing nearly through the Isarog, scarcely exceeded 60 kilometers, while its width in the NNW-SSE direction probably had even less. In the SE direction only one of the severest shocks was felt as far as Legaspi, less than 70 kilometers distant, while at Paracale, about 95 kilometers toward the opposite direction, two were noticed. But the best indication of the local character of the shocks and of the shallowness of their origin is the fact that only eighteen of the strongest were recorded by the seismographs at Manila, less than 300 kilometers distant.

Such character of the shocks and the nature of the epicentric area, and old volcanic mountain and its neighbourhood, induced to consider them as indications of a new volcanic strain or activity. Many insular eruptions have been preceded by seismic series of shocks: for instance, the recent eruption of Taal Volcano, 1911, by a similar but very

short one; while repeated quakes during about two months warned the bursting of the Camiguin Volcano in 1871. In the present case the rainy and cloudy weather prevented seeing the top of the volcano and made impossible a visit to thoroughly inspect its conditions and the nature of the landslides reported as seen from a distance near the top and on the slopes, so the question about the actual cause of the shocks must remain open to further investigation.

Certainly the absence of any reliable indications of eruption, as far as they can be observed and heard from distant places, and also the occurrence of like seismic periods in similarly unstable but nonvolcanic regions of the Philippine Islands, permit to attribute the present case to a geological but very local origin. As instances of periods of the same character let us mention only the long one of Nueva Vizcaya, 1881, and the shorter of Benguet in 1914.

**Geologic conditions of the epicenter.**—After reporting the shocks of Ambos Camarines and their character some brief indications must be added of the physiographic and geologic conditions of the meizoseismic area. As stated before, this comprises in its southern part the lowest plain or valley where lies the city of Naga. From this portion the ground rises slowly in a ENE direction to the slopes of Mount Isarog, the highest top of which reaches 1,979 meters above sea level. The E and W slopes of this isolated mountain extend gradually to the Lagonoy Bay, in the E, and San Miguel Bay, in the W, occupying practically the whole neck or isthmus which separates the mainland of Camarines from the Caramuan Peninsula. The northern slope of the Isarog stretches itself to the said peninsula, which stands higher than the plains of Camarines and has a rather ragged appearance in contrast with the central part of the province.

A geologic reconnoissance of southeastern Luzon made by Messrs. G. I. Adams and W. E. Pratt, geologists of the Bureau of Science, division of mines<sup>1</sup> shows that the described region consists in its lowest and level portion of recent alluvial deposits; mount Isarog and its wide slopes of andesites with basalts: and the Caramuan Peninsula of older materials as schists and schistose andesites, capped at places with tertiary sedimentaries and fringed with coralline limestone. The said geologists and others who visited this region are of the opinion that before the volcanic period, during which the cones of the Isarog, Iriga, Mayon, etc. were built, the greatest part of Camarines lay under water, while the peninsula of Caramuan was higher than at present and emerged as an island. Later the volcanic ejecta rose gradually from the lowland until it appeared above the sea. Since the volcanic action finished, the torrential waters have continued to spread the soft volcanic products and leveled the ground to its actual configuration.

Consequently all this part of Camarines including the area of Mount Isarog is filled up ground, resting on an older base. The calcareous formations and other tertiary sedimentaries of the southern coast and cordillera of Camarines which appear also in the Caramuan Peninsula very probably form this base immediately below the volcanic and alluvial sediments.

Such geologic conditions show that this region must be very unstable, a property or rather a defect inseparable from all recent sedimentaries resting on limestones and other tertiary sedimentaries. Experience proves that similar formations while yielding to many natural causes give also rise to settling movements. This one condition would suffice to explain the frequent earthquakes of varying intensity and the series of shocks originated occasionally in different portions of eastern Camarines without any recurrence to volcanism.

There exist moreover other causes of instability affecting this particular region; the building up of the Isarog and the peculiarities of the Caramuan Peninsula reveal the

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<sup>1</sup> The Philippine Journal of Science, Vol. VI, No. 6, Sec. A, 1911.

existence of faulting across the isthmus, which faulting was responsible for the rising of the peninsula and sinking of the adjoining main land. The above mentioned geologists found many unmistakable indications of a recent sinking of the peninsula due to the thrusts from the Pacific region. Who can assert that such thrusts and sinking are not going on at present, in connexion with the great Philippine trough, more than 9,500 meters deep, bordering the eastern coasts of Mindanao, Samar and SE Luzon? The northern part of this trough bends to the NW and ends a few kilometers north of said Caramuan Peninsula.

The question about the origin of such troughs is not yet settled but experience teaches that they mark the place of origin of tectonic movements which affect the neighbouring regions with frequent shocks of varying intensity. To support this assertion come the regions near the Tuscarora Deep, E of Japan, and the Tonga Deep, S of Apia. Within our Archipelago, the eastern coast of Mindanao and the Agusan Valley present a remarkable instance. Along this valley runs a seismotectonic line, very probably a fault nearly parallel to the Pacific trough, which has undoubtedly some analogy with the faulting between Lagonoy Gulf and the San Miguel Bay in Ambos Camarines. It is therefore but natural that such conditions give rise to frequent earth movements similar to those of the Agusan Valley, where a good Wiechert seismograph, set up two years since at Butuan, records as an average not less than ninety disturbances per month. Most of these disturbances originate in the Pacific trough and the rest in the local tectonic line, but probably under the influence of geologic movements in that trough, which seem to be echoed by rotations and strains in the faulted Agusan line.

From the foregoing explanation it is not reasonable at all to infer that in such instable region as Camarines catastrophic events and changes are impending in the near future: the actual movements may be considered as natural effects of the past geologic changes occurred in the formation of the Pacific trough and the faulting from which resulted probably the rising of the Caramuan portion and the issuing forth of the volcanoes, which last event in its turn restored the level of the region.

So far it has been intended to show that the last earthquakes of Camarines might really have nothing to do with the volcanism of the region. The shallow origin of the same can be readily explained by compressions and yieldings of the sedimentary base and also by natural settling of the volcanic porous sediments. The rumbling noises make not any difficulty as they are connected rather with superficial than with deep and tectonic dislocations. When the Isarog will be examined, possibly a more definite view will be acquired of the whole question.

LOS TEMBLORES DE TIERRA DE AMBOS CAMARINES (SE DE LUZÓN),  
OCTUBRE 4-7, 1917.

Los temblores de tierra de Ambos Camarines, que durante cuatro días tanta zozobra causaron a los habitantes de Naga y de los pueblos cercanos al monte Isarog, principiaron a las 5<sup>h</sup> 13<sup>m</sup> del día 4 (3, 21<sup>h</sup> 13<sup>m</sup> G. M. T.) con un choque de muy poca intensidad. A intervalos desiguales de 2 a 40 minutos se repitieron luego diez veces sin aumentar en fuerza hasta las 7<sup>h</sup> 39<sup>m</sup>. A esta hora sobrevino un temblor de intensidad VI, el cual duró más de 7 segundos y produjo grietas en las paredes de cemento armado y de mampostería y quebrantó algo el maderamen de algunas casas. Después de este temblor, que debe considerarse como el principal del período, se percibieron ocho temblorcitos durante las siguientes cuatro horas; siguiendo luego un largo período de calma. A 18<sup>h</sup> 29<sup>m</sup> principió otra serie de catorce choques que duró hasta las 2<sup>h</sup> 08<sup>m</sup> de la madrugada del día 5, sucediendo también un período de calma de poco más de cuatro horas. A 6<sup>h</sup> 29<sup>m</sup> del 5 sobrevino otra serie más larga que duró prácticamente todo este día, contándose hasta las 23<sup>h</sup> 14<sup>m</sup> de la noche treinta y un temblores, todos de intensidad II-III, excepto siete que llegaron a III-IV y uno ocurrido a 20<sup>h</sup> 12<sup>m</sup> que alcanzó a V-VI. Después de siete horas de calma comenzó a 6<sup>h</sup> 19<sup>m</sup> del 6 la cuarta serie, en la que con intervalos más largos que el día 5 se contaron sólo diez y seis temblores con haber durado también hasta 23<sup>h</sup> 26<sup>m</sup>. Únicamente dos ocurridos a 15<sup>h</sup> 02<sup>m</sup> y 15<sup>h</sup> 05<sup>m</sup> llegaron al grado de intensidad IV-V. Durante el 7 y la noche siguiente, entre 1<sup>h</sup> 38<sup>m</sup> del 7 y 4<sup>h</sup> 10<sup>m</sup> del 8, se contaron trece todos de intensidad II-III a excepción de uno del grado IV sentido a 3<sup>h</sup> 53<sup>m</sup>. Durante el resto de este día no ocurrieron más que tres temblores a 11<sup>h</sup> 15<sup>m</sup>, 16<sup>h</sup> 09<sup>m</sup> y 21<sup>h</sup> 25<sup>m</sup> de muy poca intensidad y el 9 una a 18<sup>h</sup> 36<sup>m</sup> terminando así poco menos que repentinamente este singular período sísmico.

El número total de temblores de esta relación es el enviado por el observador de Naga, D. Eduardo Ontengco y alcanza a noventa y cinco; otras personas, según se publicó en los periódicos de Manila contaron ciento once, sin faltar algún corresponsal que sólo los hace llegar a noventa.

**Intensidad.**—Juzgando por sus efectos ésta no llegó nunca al grado VII de la escala Rossi-Forel. Se ha dicho que era mayor en Naga, al W del Isarog, que en otros pueblos más cercanos del N y NE del mismo, mas esto resulta dudoso cuando se afirma al mismo tiempo que ocurrieron derrumbamientos en la citada montaña y se abrieron pequeñas grietas en sus vertientes. Posible es sin embargo que tuvieran aparentemente mayor intensidad en Naga, debido esto a que dicha ciudad está asentada sobre las aluviones más recientes de toda la región, siendo así responsables de esta mayor intensidad las condiciones locales, pero no el hecho de que el origen de los choques estuviese más cercano a ella y por consiguiente fuera de la región del antiguo volcán, donde lo colocan los datos disponibles.

**Ruidos subterráneos.**—Todos los temblores bien perceptibles iban precedidos de un ruido subterráneo semejante al producido por un *truck* muy cargado; de tal manera que inmediatamente después de percibirse el sonido y su vibración seguían los choques sísmicos ondulatorios. El avance del rumor y del movimiento del suelo parecía ser del NE-SW. La dirección de las ondulaciones anotada por el citado observador en 34 principales temblores fué 16 veces NE-SW; 9 N-S; 5 SE-NW; 3 E-W y 1 NNW-SSE; valores que dan una resultante muy próxima al NE-SW.

**Extensión y carácter de los temblores.**—El área era ciertamente muy reducida, pues comprendía tan sólo el centro de la parte oriental de Camarines en una extensión de poco más de 60 kilómetros en la dirección ENE-WSW, o sea en la dirección o línea Goa-Naga que pasa por el Isarog, y probablemente algo menos en dirección NNW-SSE. Solamente uno de los más fuertes choques se sintió en Legaspi, distante unos 70 kilómetros hacia el SE, y dos en Paracale que dista 95 kilómetros hacia el NW. La mejor prueba

de que el origen, ya fuese volcánico, ya geológico, era muy superficial es que los sismógrafos del Observatorio tan sólo registraron diez y ocho de los principales temblores de Camarines, con estar a menos de 300 kilómetros de distancia. Por consiguiente dichos terremotos eran de carácter muy local; así es que vistas las condiciones topográficas, una montaña volcánica y sus cercanías, se consideraron en un principio como indicios de nueva actividad; sobre todo teniendo en cuenta el recentísimo caso del volcán Taal en 1911 y el no tan reciente de Camiguin (Misamis) en 1871. La imposibilidad de visitar el volcán y hacerse cargo de los desprendimientos y grietas que se dicen haber ocurrido en él hacen sin embargo muy arriesgado por hoy el decidir esta cuestión.

Ciertamente el no haberse visto ni oído señales de erupción, en cuantos estas pueden apreciarse a respetable distancia, y el haber ocurrido casos semejantes en terrenos no volcánicos, de formaciones calcáreas antiguas y grandemente agrietados por remotas convulsiones, como por ejemplo, el de Benguet en 1914 y de Nueva Vizcaya en 1881, siempre dejarán lugar a atribuir estos temblores a un origen geológico muy local y superficial.

Condiciones geológicas del epicentro.—Después de dar cuenta de este período sísmico preciso es añadir breves palabras sobre las condiciones fisiográficas y geológicas de la región donde tuvo lugar. Como se dijo antes, su porción meridional comprende la parte de llano o valle de Ambos Camarines donde está situada su capital Naga. En dirección al ENE el terreno se eleva muy paulatinamente hasta formar las vertientes meridionales del monte Isarog, cuya cúspide más alta se eleva 1,979 metros sobre el nivel del mar. Las vertientes W y E de este monte se extienden mucho, ocupando en suave declive casi todo el espacio o istmo que separe la bahía de San Miguel al W, del seno de Lagonoy al E. Las del N terminan en la llamada península de Caramúan, de terreno algo más elevado y en general muy quebrado, formando contraste con el centro de la provincia.

El reconocimiento geológico de esta región, hecho por los geólogos G. I. Adams y W. E. Pratt de la Oficina de Ciencias,<sup>1</sup> demuestra que la parte más baja y central del valle de Camarines está formada por aluviones modernos; el monte Isarog y sus extensas vertientes son de formación basáltica y andesítica, mientras que la península de Caramúan presenta materiales más antiguos, terciarios y diferentes de los mencionados. Tanto los citados autores como otros geólogos que han visitado la región de que tratamos creen que antes de la acción volcánica de que resultaron los diferentes conos de Isarog, Iriga, Mayón, etc., todo el llano de Camarines estaba cubierto por el mar, surgiendo tan sólo la península de Caramúan. Los productos de repetidas erupciones levantaron el suelo, y después de terminada la actividad volcánica las aguas torrenciales se encargaron de continuar el acarreo de los productos eruptivos hasta formar el actual nivel de esta región sobre el mar.

Por consiguiente toda esta región, inclusa la parte ocupada por el Isarog, está constituída por terreno sobrepuesto a una base antigua, o sea por terreno de relleno en época relativamente reciente. Las formaciones calcáreas, coralinas, que aparecen en la cordillera de la costa S. de la provincia y las que forman muchos picos erizados de Caramúan dan motivo para sospechar que el relleno verificado por las erupciones descansa sobre calizas.

Estas condiciones geológicas demuestran por sí solas que deben hacer a esta región por demás inestable; siendo esto una propiedad o más bien un defecto anejo a todo terreno sedimentario moderno en cuya base existen calizas y en general sedimentos terciarios. Por muchas y variadas causas naturales estos elementos ceden y dan lugar a movimientos de asiento. Sola esta circunstancia bastaría para explicar los frecuentes terremotos de variable intensidad y las series de movimientos experimentados de tiempo en tiempo y localizados en diferentes porciones de la región central de Ambos Camarines,

<sup>1</sup> The Philippine Journal of Science, Vol. VI, No. 6, Sec. A, 1911.

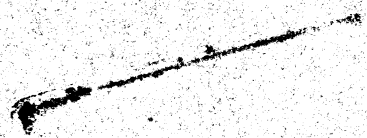
sin necesidad de acudir a conatos volcánicos. Pero en esta región existen además otras causas de inestabilidad; la misma formación del Isarog y la posición de la península de Caramúan revelan la existencia de una falla o rotura de la corteza terrestre a través del istmo, a la cual se debió la diferencia de nivel entre el Caramúan y el centro de Camarines, cuando sólo aquella península surgía del mar a manera de isla. Según numerosas indicaciones que pueden verse en el estudio citado, esta península era antiguamente mucho más elevada, y los movimientos más recientes en ella ocurridos parecen ser de descenso y debidos a empujes procedentes de la parte del Pacífico. ¿Quién puede asegurar que hayan cesado tales empujes y movimientos de descenso? El Grande Abismo submarino de más de 9,500 metros de profundidad que bordea las costas del E de Mindanao, Sámar y SE de Luzón, después de inclinarse hacia el NW termina a pocos kilómetros de distancia al N de dicha península.

Aunque no es muy conocido aún el origen de semejantes depresiones la observación enseña que se producen preferentemente en ellas movimientos tectónicos que afectan a las regiones vecinas, sujetándolas a frecuentes temblores de variable intensidad. Bastará citar las depresiones de Tuscarora al E de Japón, la de las Islas de Tonga al S de Apia. En nuestro Archipiélago tenemos las costas orientales de Mindanao y especialmente el valle del Agusan como ejemplo indiscutible. A lo largo de este valle corre una línea sismotectónica o de menor resistencia, probablemente una falla paralela a la depresión del Pacífico y análoga a la que sin duda existe en Ambos Camarines, entre la bahía de San Miguel y el seno de Lagonoy. En tales condiciones es muy natural que se produzcan en esta última región frecuentes movimientos sísmicos como sucede en la región agusana, donde un buen sismógrafo montado allí desde hace dos años registra por término medio noventa movimientos mensuales. La mayor parte de estos se origina en el abismo del Pacífico, y el resto en la línea tectónica local, donde a los movimientos geológicos lentos del abismo parecen corresponder roces que dan lugar a pequeños temblores locales.

No se crea sin embargo que de semejantes condiciones de inestabilidad haya de resultar un próximo cataclismo en la región de Camarines. Los movimientos actuales son más bien efectos del cataclismo que ocurrió cuando por formarse la depresión del Pacífico se produjo la rotura indicada, y la península de Caramúan quedó levantada mientras que la parte central se hundió bajo las aguas y surgió el Isarog y otros volcanes, los cuales se encargaron por otra parte de restablecer el nivel de la superficie.

De todo lo dicho se deduce, como insinuamos más arriba, que los últimos terremotos pueden no tener relación directa con el volcanismo y por ende con el Isarog. El carácter muy superficial de su causa puede explicarse por compresiones interiores de la base de calizas y también por el asiento y afirme de los terrenos volcánicos muy porosos; en cuanto a los ruidos, estos se suelen producir casi siempre en movimientos superficiales, más que en los tectónicos de muy profundo origen. Cuando se pueda visitar y examinar el volcán tal vez será posible establecer opinión más fundada sobre la materia.

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# WEATHER BUREAU

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BULLETIN FOR NOVEMBER, 1917

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

MANILA  
BUREAU OF PRINTING  
1918





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**BULLETIN FOR NOVEMBER, 1917.**



# METEOROLOGICAL BULLETIN FOR NOVEMBER, 1917.

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 higher than that of the preceding year, but lower than the normal for November. Thus that of Manila is 0.94 mm. above the monthly mean for November, 1916, while it is 0.69 mm. below the normal. The highest pressures were generally observed throughout the Archipelago on the 29th, and the lowest took place on the 19th in Luzon, and on the 14th in the Visayas and Mindanao.

The mean monthly temperature differs very little both from that of November, 1916, and from the normal of this month. The absolute maximum and minimum temperatures for Manila were 32.9° C. on the 10th, and 20.8° C. on the 13th. The extreme monthly temperatures for Baguio were: 25.5° C., 13.2° C. on the top of Mirador, and 26.5° C., 12.5° C. in the valley.

### PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR NOVEMBER, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from Mean, 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Mean, 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga	757.82	+ 0.58	759.75	29	756.30	15	25.9	- 0.2	32	30	22.2	30
Tagbilaran	57.49	+ .50	59.66	29	55.36	14	26	0	33.2	12	22.3	26
Surigao	57.71	+ .66	59.83	29	55.75	14	25.7	- .6	31.3	10	21.5	1
Cebu	57.82	+ .76	59.96	29	55.96	14	26.9	+ .1	31.8	10	22.5	24
Iloilo	57.61	+ .51	59.61	29	55.93	15	26.2	0	32.2	10	22.6	28
Ormoc	57.88	+ .76	59.89	29	55.86	14	25.7	- .2	33	21	20.6	10
Tacloban	57.88	+ .94	60.08	29	55.84	14	25.7	- .5	33.7	11	22.4	28
Capiz	57.81	+ .39	59.94	29	56.24	9	26.4	- .1	32.2	18	22.8	9, 11
Calbayog	58.05	+ .95	60.17	29	56.30	14	25.5	- .4	32.6	4, 21	21.8	10
Legaspi	58.27	+ 1.11	60.39	29	56.47	9	26.4	0	31.5	11	22.3	19
Atimonan	58.69	+ 1.12	60.37	29	57.51	19	26.2	- .2	31.1	10	22.1	8, 26
Ambulong, Tanauan	58.03	+ .88	59.92	29	56.76	10	26.1	- .3	32.8	10	22.4	27
Paracale	58.82	+ 1.10	60.65	29	57.55	9	26	- .2	31	1, 2, 10	22.8	29
Manila	58.65	+ .94	60.39	29	57.19	19	25.4	- .3	32.9	10	20.8	13
San Isidro	58.93	+ .99	60.57	29	57.29	19	25.3	- .7	32.9	2	21	9
Dagupan	58	+ .93	59.95	29	56.16	19	26.7	- .3	35.2	2	21.8	17
Baguio*	636.55	+ .86	638.01	29	634.99	19	17.9	+ .2	25.5	11	13.2	17
Vigan	758.27	+ .70	760.11	29	756.56	19	27.3	+ 1.1	35	7	20.8	14
Tuguegarao	60.27	+ 1.23	62.22	8	58.24	1	24.2	- .2	34.2	2, 4	20.4	14
Laoag	58.66	+ .46	60.37	29	57.36	19	25.5	+ .2	31.8	4	17	13, 17
Aparri	60.81	+ 1.41	62.72	21	58.38	1	24.7	- .1	31.8	4	21.3	13, 17

\* The barometric readings of this station are not reduced to sea level.

Rainfall.—With the exception of a great part of Mindanao and of a few other stations in the Visayas and Luzon, the total rainfall of this month in the Philippines is generally above that of the preceding year and also above the normal for November. Thus the Manila rainfall is 99 mm. greater than the normal, and 122.7 mm. greater than that of November, 1916.

RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF NOVEMBER, 1917.

Station.	Total.	Departure from Nov., 1916.	Departure from normal.	Rainy days.	Departure from Nov., 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from Nov., 1916.	Departure from normal.	Rainy days.	Departure from Nov., 1916.	Greatest rainfall in a single day.	Day.
	mm.	mm.	mm.		mm.	mm.			mm.	mm.	mm.		mm.	mm.	
Jolo	334.3	+ 99.8	+148	18	- 5	121.2	14	Calapan	747.4	+494.7	+408.8	27	+ 9	133.6	10
Isabela, Basilan	176.9	+ 32.3	+19.5	17	+ 5	68	14	Virac	553.9	+289.3	+164.4	26	+ 1	64	5
Zamboanga	159.1	+ 42	+ 57.5	17	+ 3	78.2	14	Naga	289.5	+ 15.2	+ 31.3	23	+ 2	79.3	12
Davao	94.7	- 80.8	- 64.2	11	+ 2	21.4	6	Batangas	120.6	+ 4.3	- 59.4	19	+ 5	26.1	25
Cotabato	131.3	- 81.1	- 81.1	12	- 8	48.5	3	Lucena	283.4	+151.5	- 14.3	19	0	45.7	22
Cagayan, Misamis	55.9	- 88.1	- 88.1	10	- 8	31	8	Atimonan	441.6	-159.4	- 14.3	26	+ 7	87.8	25
Butuan	176.1	- 93.8	- 77.9	22	- 1	31	30	Ambulong, Tanauan	173.2	+ 69.9	- 14.3	22	+10	26.7	16, 23
Mambajao	255.6	- 41.4	- 41.4	12	- 1	96.5	25	Canlubang, Calamba	215.1	+136.6	- 14.3	19	+ 1	50.8	25
Dumaguete	258.3	+ 100.8	- 16	+ 2	38.6	4	Paracale	1,095.6	+509.9	- 30	+ 2	167.9	16		
Yap, W. Carolines	297.6	- 41.4	- 41.4	30	+ 5	56.2	17	Santa Cruz, Laguna	384.3	+263.8	- 30	+ 4	42.9	19	
Tagbilaran	251.6	+ 164.5	+ 77.1	14	+ 2	60.7	14	Manila	229.2	-122.7	+ 99	18	+ 3	80.7	25
Iwahig	1,035.9	+ 960	- 25	+ 9	294.2	6	Antipolo	282.4	+154.5	- 24	+ 9	60.4	25		
Surigao	339.9	- 61	- 50.6	23	+ 4	47.2	22	Iba	54.6	-17.1	+ 6.1	16	+ 6	11.2	23, 24
Maasin	372.1	- 156.1	+ 64.1	10	- 3	137.7	15	San Isidro	188.8	+139.3	+ 94.9	16	+ 5	33.4	23
Cebu	200.1	- 51	+ 49.6	19	- 2	51.9	14	Tarlac	121.2	+ 87.6	+ 38.3	12	+ 6	26.7	24
Iloilo	188.8	+ 4.7	+ 16.7	18	0	40.9	16	Baler	764.1	+509	+396.6	17	+ 6	215.6	25
Cuyo	192.9	+ 26	+ 63	22	+ 6	49.5	9	Dagupan	27.1	+ 2.2	- 34.8	9	+ 4	7.1	10
Ormoc	147	- 53	- 62.7	23	+ 3	25.5	5	Bolinao	11.4	+ 8	- 34.7	3	- 1	5.6	20
Guiuan	664	+ 330.4	- 23	+ 4	103.7	21	Baguio	66.7	- 50.5	- 23.3	12	+ 1	20.4	12	
Tacloban	326.9	+ 40.1	+ 52.3	26	+ 1	59.7	5	San Fernando, Union	68	+ 1.9	+ 25.1	7	+ 3	37.3	29
Capiz	470.7	+ 161.1	+190	25	+ 1	78.7	16	Echague	446.2	+253.4	+203.6	25	+ 3	126.5	21
Borongan	731.3	+ 357.2	+233.5	25	+ 4	92.4	14	Candon	33.1	+ 12.3	- 12.4	6	+ 1	14	10
Catbalogan	300.6	+ 101.9	- 23	+ 4	49.2	5	Vigan	6.7	- 29.9	- 30.4	3	- 2	5.5	10	
Calbayog	221.2	+ 29.8	- 36.3	24	+ 5	33.2	5	Tuguegarao	386.5	+ 81.8	+106.9	17	+ 2	58.3	7
Masbate	201.2	+ 59.3	+ 16.6	21	+ 4	40.6	27	Laog	51.2	- 3.7	+ 11.3	7	- 5	23.6	27
Romblon	543.6	+ 421.9	+246.8	25	+ 1	95.3	21	Aparri	399.9	+ 8	+109.6	25	- 3	47.3	28
Batag	666	+ 292.5	- 24	+ 3	95.2	5	Cape Bojeador*	35.3	- 35.3	- 35.3	- 3	- 3	15	10	
Sorsogon	403	- 14.6	- 14.6	21	+ 8	50.8	3	Santo Domingo, Batanes	537.2	+136.6	+181.7	23	- 3	123	6
Legaspi	477.8	+ 209.3	+134.8	24	+ 3	71.1	3								
Sumay, Guam	128.3	- 341.5	-102.5	19	- 4	33.5	19								

\* 26 days of observation.

DEPRESSIONS AND TYPHOONS.

There was no well-developed typhoon during this month in the Far East. Only a few depressions were observed: Three in the Philippines, and two or three in the Pacific between Japan and the Ladrone Islands. In Plate V, however, we give the track on only one of the Pacific depressions which moved northeastward to the S and SE of the Bonins on the 15th and 16th.

The first Philippine depression appeared near Samar at 6 a. m. of the 9th, and crossed the northern part of the Visayas during that day, its center being situated at 6 a. m. of the 10th over the China Sea near the northern part of Palawan Island. The small disturbance traversed the China Sea moving westward during the next three days, and reached southern Indo-China on the 13th.

The second depression appeared also near Samar at 6 a. m. of the 14th; it seems to have moved south between Leyte and Cebu from 10 a. m. to 2 p. m. of that day; then it took a westerly direction between Negros and Mindanao and across the Sulu Sea; it recurved northeastward near the western coast of Palawan on the 17th; and finally it inclined northward on the 18th, and moved westward again on the 20th to 22d.

The third depression seems to have formed in the Sulu Sea on the 24th, and moved westward across the southern part of Palawan and the China Sea on the 25th to 27th. The three Philippine depressions were of little importance, the first one, however, being of a more definite character than the other two.



## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes en Filipinas es más alta que la de noviembre del año pasado, pero más baja que la normal de este mes. La de Manila es mayor que la media mensual de noviembre, 1916, en 0.94 mm., al paso que es menor que la normal en 0.69 mm. Las presiones más altas se observaron generalmente el día 29 en todo el Archipiélago, y las más bajas tuvieron lugar el día 19 en Luzón y el 14 en Visayas y Mindanao.

La temperatura media mensual difiere muy poco tanto de la de noviembre de 1916, como de la normal de este mes. Las temperaturas máxima y mínima absolutas de Manila fueron 32.9° C. y 20.8° C. registradas los días 10 y 13 respectivamente. Las temperaturas extremas del mes en Baguio fueron: 25.5° C., 13.2° C. en la cumbre del Mirador, y 26.5° C., 12.5° C. en el valle.

**Precipitación acuosa.**—A excepción de una buena parte de Mindanao y de alguna que otra estación de Visayas y Luzón, la lluvia total de este mes en Filipinas es en general mayor que la del año pasado y mayor también que la normal de noviembre. La de Manila se diferencia de la normal en +99.0 mm., y de la de noviembre, 1916, en +122.7 mm.

## DEPRESIONES Y TIFONES.

No hubo durante este mes tifón alguno bien desarrollado en todo el Extremo Oriente. Solamente se observaron algunas depresiones: tres en Filipinas, y dos o tres en el Pacífico entre Japón y las Islas Marianas. En la Lámina V, sin embargo, damos la trayectoria de una sola de las depresiones del Pacífico, la cual se movió hacia el NE al S y SE de Bonins el 15 y 16.

La primera depresión en Filipinas apareció cerca de Sámar a las 6 a. m. del día 9, y cruzó la parte N de las Visayas durante dicho día, hallándose su centro a las 6 a. m. del 10 en el Mar de China cerca de la parte N de la Isla de Palawan. La pequeña perturbación atmosférica atravesó el Mar de China en dirección al W durante los tres días siguientes y llegó a la parte S de Indochina el día 13.

La segunda depresión apareció también cerca de Sámar a las 6 a. m. del 14; parece haberse movido al S entre Leyte y Cebú desde 10 a. m. hasta 2 p. m. de dicho día; luego tomó una dirección W entre Negros y Mindanao y a través del Mar de Joló; recurvó hacia el NE cerca de la costa W de Palawan el 17, y se inclinó finalmente hacia el N el 18 y se movió de nuevo al W del 20 al 22.

La tercera depresión parece haberse formado en el Mar de Joló el día 24, y se movió hacia el W a través de la parte S de Palawan y del Mar de China del 25 al 27. Las tres depresiones de Filipinas fueron de poca importancia, siendo la primera, sin embargo, más desarrollada que las otras dos.

METEOROLOGICAL DATA FOR MANILA CENTRAL OBSERVATORY.\*

[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. <sup>b</sup>			Underground temperature.				Relative humidity (mean).	Vapor pressure (mean).	Radiation.			Evaporation. <sup>b</sup>		
		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.	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	757.56	25.9	31.8	22	28.8	29.5	29.7	29.7	29.3	28.3	35.9	21.2	20.2	56	1.9	1.6
2	757.81	25.5	31.3	21.8	28.5	29.3	29.6	29.6	29.3	28.2	37.5	21	20	48.5	1.9	1.4
3	58.24	25.5	32.7	22	28.5	29.4	29.5	29.6	29.2	28.2	37.2	20.9	20	55.4	2.2	1.6
4	59.24	25.2	29.1	22.8	28.4	28.8	29.3	29.3	29.3	28.3	30.5	21.5	21.1	42.5	1.1	1
5	59.38	26.1	31.8	22.7	28.2	28.2	29.2	29.2	29.2	28.3	35.5	21.2	21	57	2.7	2.1
6	59.62	24.3	26.6	22.6	28.4	28.5	29.1	29.2	29.2	28.2	34.7	21.4	20.8	33	0	.5
7	59.73	24.1	27.1	22.2	27.9	28.1	28.9	29.2	29.2	28.2	35.4	21.2	21.4	34	0	.4
8	59.79	24.3	28.7	22.3	27.5	27.9	28.8	28.7	29.2	28.2	32.3	20.8	21.6	43.4	.8	.8
9	57.60	25.2	28.6	22.3	27.5	27.9	28.6	28.6	29.2	28.2	37.1	20.6	20.7	43.7	1.7	1.3
10	57.41	26.8	32.9	23.2	27.5	28.9	28.5	28.6	29.1	28.2	33.6	21.5	22.7	56.7	3.3	2.1
11	58.01	26.2	31.9	22.7	28.3	29.2	28.8	28.8	29.1	28.3	38.3	22.2	21	55.2	2.3	1.6
12	59.13	25.9	30.5	22.3	28.3	29.1	28.8	29.1	29.1	28.2	30.8	20.8	22	45.2	2.7	2
13	59.76	25.7	31.3	20.8	27.9	29	28.8	28.8	29.1	28.1	30.8	19.5	19.4	48.1	3.5	2.5
14	58.46	25.6	31.9	21.2	27.8	29	28.8	28.8	28.7	28.1	33.1	20.1	19.4	52.8	3.7	2.7
15	57.70	26.2	32	22	28	29.2	28.8	28.8	28.8	28.2	32.8	20.7	21	43.9	3.2	2.2
16	57.60	26.3	30.7	23	28.3	29.1	28.8	28.8	28.8	28.2	32.8	19.7	21.7	54.5	3.4	2.7
17	57.95	25.3	29.7	23	28.2	28.8	28.8	28.8	28.8	28.2	32.7	19.6	22.2	48.1	2.6	2.1
18	57.51	25.3	30.4	22.5	27.8	28.8	28.8	28.8	28.8	28.1	37.8	20.9	20.9	51.1	1.6	1.5
19	57.19	25.6	30.1	22.5	28	28.8	28.8	28.8	28.7	28.1	39.9	21.8	21.3	51.7	1	1.1
20	58.46	24.6	27.8	23.5	28	28.5	28.8	28.8	28.7	28	33.7	21.5	22.5	43	.2	.3
21	59.57	25	29.8	22.4	27.5	28.3	28.5	28.7	28.6	28	36.8	20.8	21.4	41.9	1.9	1.3
22	59.80	24.4	28.3	20.9	27.4	27.8	28.5	28.6	28.6	28	30.5	20.5	19.9	48.9	1.1	1.1
23	58.91	24.5	27.8	22.2	27.4	27.8	28.2	28.3	28.6	28	33.5	21.4	20.8	45.8	.8	.5
24	57.92	25.8	31.5	22.5	27.2	28.3	28.3	28.3	28.8	28.2	35.8	20.9	22	53.2	1.3	1.4
25	58.37	23.7	25.7	22.7	27.2	27.1	28.2	28.2	28.5	27.9	36.9	21.1	22.5	35.6	0	.3
26	58.51	24.8	29.6	22.1	26.5	27.4	27.5	27.7	28.5	27.9	30.9	21.1	21	55	1.6	1.4
27	58.34	25.3	30.7	21.6	26.7	27.8	27.6	27.8	28.5	28	38.7	21.2	20	54.7	1.7	1.2
28	59.41	25.8	30.6	22.8	27.3	28.2	27.8	28.1	28.3	28	38.5	21.8	21.3	54.2	1.7	1.2
29	60.39	26.2	31.7	22.5	27.5	28.5	28	28.1	28.4	28.1	36.7	21.7	21	54	2.2	1.5
30	60.04	26	31.4	22.2	27.5	28.7	28.1	28.4	28.3	27.9	35.7	21.3	20.8	51.8	2.9	1.9
Mean Total	758.65	25.4	30.1	22.3	27.8	28.6	28.7	28.8	28.9	28.1	37.8	21	21	48.8	1.8	1.5
Departure from normal	-0.69	-0.5	-0.3	+0.1							+5.2	+0.7			55	43.8

Day.	Wind.				Clouds.				Rain, 24 hours 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.		Sunshine.	On the tower.	In the park.		
						Upper.	Lower.					
		Km.	Km.		0-10.			h. m.	mm.	mm.		
1	NE quad.	122.5	17	NW	7.7	Cl.-S., Cl.-Cu.	Cu.-N. ENE	4 30	4.1	4.6	☉☉☉ a. p. p.	
2	E quad.	100	8	SWbyS	8.5	Cl.-S. SE	Cu. E	1 45			☉☉☉ a. p. p.	
3	NNE	152	12	E	8.5	Cl.-S. ESE	Cu. E	2 35	4.6	4.5	☉☉☉ a. p. p.	
4	NNE	102	15	NNE	10	Cl.-S. SE	S.-Cu. E	0 20	2.8	3	☉☉☉ a. p. p.	
5	NE	149	17	E	9	Cl.-S. SE	Cu. E	5 15	.5	.8	☉☉☉ a. p. p.	
6	N quad.	52	7	NbyW	10	Cl.-S.	N. E	0 00	14.4	13.8	☉☉☉ a. p. p.	
7	NNE	53.5	6	SE	10	Cl.-S.	N. E	0 00	16.5	16	☉☉☉ a. p. p.	
8	N quad.	94	11	NNE	9.8	Cl.-S.	Cu.-N. E	0 35	3.7	3.6	☉☉☉ a. p. p.	
9	N quad.	148	14	NNE	9.8	A.-Cu.	Cu.-N. E	1 10	4.1	3.9	☉☉☉ a. p. p.	
10	NE quad.	153.5	12.5	WbyS	7	Cl.-S., A.-Cu. E	Cu. E	7 55			☉☉☉ a. p. p.	
11	WSW	109	13	W	6.3	Cl.	N	7 15	18	17.7	☉☉☉ a. p. p.	
12	N	108	13	NE	7.2	A.-Cu. NE	Cu. NE	2 55			☉☉☉ a. p. p.	
13	NNE, NE	142	16	NE	5.2	Cl. SEbyS	Cu. NE	8 20			☉☉☉ a. p. p.	
14	NE	163	14.5	NWbyN	8.8	Cl. SE	Cu. NE	5 30			☉☉☉ a. p. p.	
15	NE quad.	147	15.5	W	6.9	Cl.	Cu. NE	8 00			☉☉☉ a. p. p.	
16	N quad.	127.5	12	NNW	8.3	Cl.-S.	Cu. NE	4 00			☉☉☉ a. p. p.	
17	NNE, NE	190.5	22	NNE	9.5	A.-cu. ENE	S.-Cu. NE	0 45			☉☉☉ a. p. p.	
18	W	117	13	WNW	9.6	Cl.-S.	Cu. E	1 50	1.1	1.1	☉☉☉ a. p. p.	
19	SE	111	10	ESE	9	A.-cu., Cl.-S.	N. E, RNE	2 55	6	5.9	☉☉☉ a. p. p.	
20	NE quad.	65	7.5	N	9.8	Cl.-S. SE	N. ESE	0 00	20.9	19.7	☉☉☉ a. p. p.	
21	N quad.	123	18	NNE	8.4	A.-cu. ENE	Cu. E quad.	1 30			☉☉☉ a. p. p.	
22	NE quad.	76.5	7	S, NW	9.2	A.-Cu.	N. E	1 05	2.3	2.4	☉☉☉ a. p. p.	
23	N quad.	95.5	12	NW	9.7	A.-Cu.	N. ENE	0 35	18.6	17.8	☉☉☉ a. p. p.	
24	N, NE	172	12	NNE, NE	8.3	A.-Cu. SE	Cu. NE, E	4 25	27.1	27.9	☉☉☉ a. p. p.	
25	NNW	192	18	NNE	10	Cl.-S.	N. E	0 00	80.7	83	☉☉☉ a. p. p.	
26	N quad.	117	17	NW	9.4	A.-Cu. SSE	Cu. E	3 20			☉☉☉ a. p. p.	
27	SW quad.	86	10	NNW, NEbyE	6.8	A.-Cu. S	Cu. E	6 35	1	1.5	☉☉☉ a. p. p.	
28	ws, wnw	80	13	WNW	8.2	A.-Cu. SE	Cu. E	3 20			☉☉☉ a. p. p.	
29	W quad.	119	16	WSW	6.9	Cl. SE	Cu. E	7 25	2.8	3	☉☉☉ a. p. p.	
30	SE	130.5	10.5	SW	4	Cl.	Cu. ENE	8 40			☉☉☉ a. p. p.	
Mean Total		119.9	13		8.4			3 25				
Departure from normal		-1,358.4			+2			-59 04	+99			

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

METEOROLOGICAL DATA FOR MIRADOR OBSERVATORY, BAGUIO.<sup>a</sup>

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

Day.	Pres- sure <sup>b</sup> (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. <sup>c</sup>	Free ex- posure (total)	Shel- ter (total)		
		mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.			mm.	°C.	°C.	mm.	mm.
1	636.04	19.2	25.4	Noon	15.2	5.40a.	26.5	0.55p.	13.5	6.00a.	73.8	12.1	13.5	54.8	4.9	2.6		
2	36.22	19	25.4	Noon	15.4	5.25a.	26.3	0.40p.	13.4	5.55a.	79.7	12.9	11.2	55	4.6	2.4		
3	36.70	18.8	24.7	Noon	14	4.40a.	25.8	0.20p.	14.6	4.10a.	68.2	10.8	12.2	54.2	9.9	3.7		
4	37.07	18.3	22.4	10.25a.	15.4	5.00a.	23.8	11.40a.	14.1	6.00a.	66.2	10.4	13.3	51.3	6.9	2.9		
5	37.49	18.1	21.1	2.25p.	15.3	6.05a.	22.6	9.55a.	15.4	6.20a.	80.7	12.3	13.4	45.4	3.4	1.6		
6	37.48	17.8	21.5	2.05p.	15.2	6.25a.	22.9	1.15p.	15.5	7.05a.	73.3	11	13.3	53.6	8.7	3.6		
7	37.12	17.9	22.4	10.30a.	15.6	3.20a.	23.3	10.30a.	15.6	4.20a.	73.2	11.2	14.2	54.8	5.5	3.6		
8	37.54	18.5	23.6	1.20p.	15.9	2.50a.	25	Noon	16	1.00a.	72.2	11.3	14.4	56.7	7.5	3.9		
9	36.21	18.8	24.6	1.40p.	15.4	3.30a.	25.5	1.55p.	14.4	3.50a.	76.2	12.3	12.5	58	5	2.1		
10	36.02	18.4	24.3	11.50a.	16.4	6.00a.	25.6	0.20p.	16.4	12m.n.	89	14	13.6	58.1	1.8	1.3		
11	36.03	18.5	25.5	11.20a.	15.9	6.00a.	26	11.20a.	14.4	6.00a.	85	13.3	12.5	56.8	2.4	1.9		
12	36.92	17.6	24.3	10.50a.	14.5	12m.n.	24.8	10.40a.	14.5	5.55a.	86.5	12.9	13.7	58.5	1.7	1.4		
13	37.56	17.5	23.3	10.35a.	13.6	4.00a.	25	2.35p.	13.2	5.00a.	84.3	12.5	11.4	58.5	2.1	1.6		
14	36.52	18	23.4	11.50a.	13.9	5.15a.	24.8	2.00p.	12.5	4.35a.	82.3	12.4	11.4	54	2.3	1.3		
15	35.87	17	22	0.25p.	14.4	6.00a.	24	0.25p.	13.6	6.30a.	91.5	13.1	12.2	50.9	1.1	.8		
16	35.43	17.6	24.5	11.50a.	14.4	6.00a.	24.6	1.40p.	13.4	5.20a.	82	12.1	11.5	53.5	5.4	3		
17	35.70	16.9	24.7	11.50a.	13.2	3.25a.	25.1	0.50p.	13.3	3.55a.	88.3	12.6	11.9	56	3.1	1.9		
18	35.39	18.2	24.1	10.30a.	15	4.50a.	24.8	11.25a.	14.5	5.05a.	85	13.1	12	59.3	2.5	1.6		
19	34.99	18.1	24.8	0.25p.	15.4	4.05a.	25	0.20p.	15.1	6.15a.	82.7	12.7	12.7	55.1	4.1	2.3		
20	35.98	18.6	24.5	0.20p.	15.3	12m.n.	25.2	1.35p.	15.3	11.35p.	77.8	12.3	14.4	57.6	4.6	2.7		
21	37.08	17.8	25.1	10.40a.	14.9	1.20a.	25	10.30a.	14.6	1.05a.	78.8	11.8	14	57.3	3.1	2.2		
22	37.52	16.8	18.4	8.00a.	15.4	2.10a.	19.3	1.20p.	15.4	5.30a.	87.3	12.4	14.3	30.1	2.3	1.7		
23	36.78	18.1	21.5	1.10p.	15.7	12m.n.	22.8	2.50p.	15	0.55a.	80.8	12.4	13.5	42	2.6	2		
24	36.16	17.7	23	1.00p.	14.6	5.10a.	24.1	1.20p.	14.9	5.15a.	84	12.5	13.7	59.1	4.1	3.1		
25	35.99	16	16.6	0.20a.	15	6.30p.	17.5	0.20a.	15.4	6.10p.	91	12.3	13.8	22.4	1.9	1.8		
26	35.98	16.9	21.4	11.55a.	14.5	2.05a.	22.7	0.15p.	14.9	2.10a.	89.2	12.7	13.4	54.8	2.8	2		
27	36.04	18	22.3	10.50a.	15.1	4.00a.	24	11.20a.	14.7	5.25a.	88.3	13.5	13.2	51.2	2.3	1.4		
28	37.08	17.6	23	0.05p.	15.4	6.50a.	23	10.35a.	15.6	12m.n.	93	13.9	13.2	57.2	.9	.7		
29	38.01	17.3	22	2.35p.	15.3	5.20a.	22.3	1.15p.	14.4	5.20a.	92.5	13.6	23.3	53.7	.8	.7		
30	37.72	17.8	23.2	1.50p.	15.2	6.20a.	23.9	1.55p.	14.2	5.40a.	90	13.7	12.7	60.7	1	.6		
Mean	636.55	17.9	23.1		15		24		14.6		82.4	12.5	13	53	3.6	2.1		
Total																109.3	62.4	

Day.	Wind.				Clouds.				Sun- shine.	Rain, 24 hours begin- ning 6 a. m.	Miscellaneous.	
	Prevailing direction. <sup>d</sup>	Total move- ment.	Maxi- mum hour- ly velo- city.	Direction at the time of the maximum velocity.	Amount (mean).	Form and direction.		Upper.				Lower.
						0-10.						
1	SE, E	Km. 286	Km. 22.8	SE	1.6	Ci.	Cu.			h. m.	mm.	
2	E quad.	230.2	18.7	W, E	2.9	Ci.	Cu.-N.	SSE		7 15		≡ p.
3	E	508.9	41.6	E	.4	Ci.	Cu.-N.	ESE		6 55		≡ p.
4	E	668.8	38.9	E	7.1	Ci.-S.	Cu.-N.	ESE		9 25		≡ a. p.
5	E	495.5	31.7	E	7.7	Ci.-S.	Cu.-N.	E		3 05		≡ a. d° p.
6	E	635	38.3	E	7	Ci.	Cu.-N.	ENE	S	0 50		≡ a. d° p.
7	E	966	50.7	E	8	Ci.-S., Ci.	Cu.-N.	E		2 45	0.3	≡ a. p. p.
8	E	572.7	38.3	E	6.6	A.-Cu.	Cu.-N.	ESE		5 45		≡ a. d° p.
9	E quad.	319.6	30.8	E	6.4	A.-Cu.	Cu.-N.	EbyN, NNE		5 20		≡ a. d° p.
10	SE quad.	290.8	21.9	SW	8.4	A.-Cu.	Cu.-N.	E		5 20		≡ a. d° p.
11	E	269.1	22	E	4.9	Ci.	Cu.-N., Cu.			2 15	1.8	≡ a. p. p.
12	E	339	20.6	E	5.4	A.-Cu.	Cu.	ENE		5 10	20.4	≡ a. p. p.
13	E	318.7	21.9	E	5.7	Ci.	Cu.-N.	E		4 10	2.3	≡ a. p. p.
14	NE quad.	268.6	19	E	3.6	Ci.	Cu.-N.	NE		5 25		≡ a. p. p.
15	E, SW	222.6	19	E	5	Ci.-S.	Cu.-N.	ENE		7 10		≡ a. p. p.
16	E	415.5	29.5	E	1.4	Ci.	Cu.	E		4 05		≡ a. p. p.
17	E	373.2	27.7	E	5.3	Ci.-S.	Cu.	ESE		7 50		≡ a. p. p.
18	E	309.1	21.2	E	8	Ci.	Cu., Cu.-N.			3 35		≡ a. p. p.
19	E	378.1	27.1	E	6.4	A.-Cu.	S.-Cu.	ESE		3 50		≡ a. p. p.
20	E	373.1	23.6	SE	5.3	A.-Cu., SW, NNW	Cu.-N., ESE, ENE			3 50		≡ a. p. p.
21	E quad.	436.8	36.5	E	5.4	Ci.	Cu.	E		5 30	1.8	≡ a. p. p.
22	E	328.5	30.9	E	10		Cu.-N.	ENE		0 00	5.1	≡ a. p. p.
23	E	350.1	37	E	9	Ci.-S.	Cu.-N.	ENE		0 35	7.6	≡ a. p. p.
24	E	594.9	39.4	E	5.7	A.-Cu.	Cu.	NE, E		6 20	1.5	≡ a. p. p.
25	E	885.1	58.1	E	10		N.			0 00	10.6	≡ a. p. p.
26	E	849.5	55.5	E	7.9	Ci.-S.	Cu.-N.			2 30		≡ a. p. p.
27	E	285.2	22.7	E	5.1	Ci.	Cu.	E		4 05		≡ a. p. p.
28	E	242.5	19.1	E	8.4	Ci., A.-Cu.	Cu.-N.	ESE		2 20	3.1	≡ a. p. p.
29	E	216.5	19.3	E	9.1		Cu.-N.			1 50	5.6	≡ a. p. p.
30	W quad.	207.3	14.8	S	6.7	Ci.	Cu.-N.	NE		4 25	6.6	≡ a. p. p.
Mean		421.2	30		6.1					4 10		
Total		12,636.9								124 55	66.7	

<sup>a</sup> 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.  
<sup>b</sup> The barometric readings of this station are not reduced to sea level.  
<sup>c</sup> Maximum of hourly observations taken from 6 a. m. to 6 p. m.  
<sup>d</sup> This element is based on hourly observations taken from a quadruple register, which gives only eight possible directions of the wind.



METEOROLOGICAL BULLETIN.

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DAILY RAINFALL AT THE STATIONS OF THE WEATHER BUREAU, NOVEMBER, 1917.

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	15.2	7.4			10.7	37.1			10.9				44.7	121.2	45.4	0.8	
Isabela, Basilan	1.8	3.3	9.1	11.4	5.1	50.8	6.4			10.9			1	68	.5	.5	
Zamboanga	6.8		7.7	2	4.3	16.5	11			1.1			3.3	78.2	4.1	3.9	
Davao				1.5		8.9	21.4	2.5		18			14	8.9	3		
Cotabato	4.3	3	48.5	6.4	4.1		11.7					10.7		1.5			
Cagayan, Misamis	1.3			2.4			1.5					9.7		2	1.8	10.2	
Butuan	6.9	6.9	3.8	1.3	7.4	7.6	10	0.8		14.5		6.4	10.7	5.6		.3	
Mambajao	68.5		4.6	12.4	5.4								2.5	14	10.2	20.3	
Dumaguete	36.1	8.1	14.5	38.6	14.7				15.5	2.8				34	20.6	32	
Yap, Western Carolines	.3	7.4	5.8	3.3	3.6	.8	2.3	3.5	13.5	2.3	1.6	27.4	6.4	.6	16.8	.3	
Tagbilaran	49.5	11.5			2.3			14.2	31.7			11		60.7	16		
Iwahig	.5	10.1	204.3	58.6	38.4	294.2	46.5		8.1	34.5	7.8	3.1			26.4	61.8	
Surigao	5	17.2	11	14	30.1	33	4.3				3.6	17.5		32.1	27.9	9.2	
Maasin			8.4	48.3	23.9							27.9	15.7	137.7			
Cebu	5.3			3.3	4.3		1.8		3.6	1.5		14.5	15.2	51.9	3.8	20.3	
Iloilo					19	.5			23.7	8.6	.8	5	11.9	6.3		40.9	
San Jose Buenavista		.3		9.1	11.4	1.3	3.6		47.2		3.5	20.8	9.7	8.2		4.8	
Cuyo	.4	1		2.5	.8		5.8		49.5	1.2	4.6	21.1	.8	4.4		29.4	
Ormoc	3.9	18.3	10.9	1.3	25.5	.8	2.5	5.1	7.7	1.3	.5	5.9	2	20.1	2.5	.5	
Guiuan	15.8	44.7	16.5	18.2	83.3	18.6	12.7	3.3	18.8	5.4	10.2	.3	8.9	81.5	52.3	30.5	
Tacloban	9.1	33.6	6.6	19.6	59.7	1.8	5.8	2.8	40.1	1.3	.3	4.6	18.1	36.4	3.1	9.7	
Capiz		2.5	1.3	6.2	17	.6	4.1		63.1	30	58.5	10.1	29.5	5.6		78.7	
Borongan	30.3	43.5	51.8	21.1	63.3	38.4	38.9	4.5	29	4.6		3	27	92.4	31.7	29.5	
Cathalogan	4.8	20.1	5.1	4.1	49.2	13.8	3.6	2.3	10.4	1	18.3	9.9	16	35.8	1.8	1.8	
Calbayog		12.4	2.1	4.8	38.2	13.2	11.4	11.1	14.2	1.5	10.2	2.5	16.3	14.4	1	3	
Masbate	3.5	.3	3.3	1.3	13	1.8	13	2.3	18.8		31.5	11.2	1.8	23.1	.5	12.2	
Romblon	6.1	.1	27.7	16.5	31.8	27.2	44		3.9		.4	42.9	10.6	28.9	1.8	21.5	
Batag	8.6	16	40.6	17	95.2	5.6	13	42.1	25.4			8.1	14	54.9	34.8	42.9	
Sorsogon	28	15	50.8	4.6	41.1	17.8	19.1	8.6	7.7			44.4	28.4	30.5	3.8	49.3	
Legaspi	23.3	28.6	71.1	9.2	37	30.4	22.4	6	9.9	15.2		70.6	18.5	33.8	4.6	42.2	
Sumay, Guam		4.6	1.3	4.3	1.5	16.5		16.3	8.7	2.3	1.8	.5	14.3	.3	3.1	54.6	
Calapan	.6	1.3	22.8	41.1	94.8	3.6	3.8	3.8	18.5	133.6	24.4	9.4		.5	1	37.8	
Virac	5.6	7.3	15.5	19.8	64	26.2	31.5	2.8	15		3.6	34.3	4.6	30.5	11.9		
Naga	3	1	5.3	4.3	14	8.6	21.5	11.9	36.6	.3	3.6	79.3	23.4	19.1			
Batangas				3	3.3	1.3			2.5	6.6		10.4				7.6	
Lucena	4.3		2	.3	15.2		.3	40.6	17.5		43.5	2.6		2.5		29.5	
Atimonan	5.8				16.5	1.8	2.1	25.4	29.9		29.2	8.6	6.4	6.9	1.8	49.3	
Ambulong, Tanauan	1.3	4	3.5	1	2.3	.5	.5	9.9	1.8		4.1					26.7	
Canlubang, Calamba			12.7	1.5	7.4	10.7	9.4	5.9	2.8	3	19					17	
Paracale	21.4	6.4	41.7	11.8	58.4	36	106.1	44.2	23.7	4.1	8.1	13	15.1	21.3	7.4	167.9	
Santa Cruz, Laguna	1.3	36.6	32.8	18.5	13.5	27.7	34	20.8	4.6	1.8	2.5	.5				18.8	
Manila	4.1		4.6	2.8	.5	14.4	16.5	3.7	4.1		18						
Antipolo		.5	8.1	6.9	3.6	13.3	20.6	19.8	4.3	.5	25.4					2.5	
Iba			.5	1.3			1.6	2.3	.8	.5	5.2						
San Isidro			4.8	20.3	2.8	2.8	21.3	13.6	7.3	.8							
Tarlac			12.7	3				3.6	5.8	.5	23.1						
Baler			7.4	4.3	43.1	7.2	119.6	8.8	47.3	.5							
Dagupan										7.1							
Bolinao																	
Baguio							3				1.8	20.4	2.3				
San Fernando, Union																	
Echagüe				2.3	26.9	6.3	8.1	3.6	6.1	5.6	9.4	.8	7.9			1.6	
Candon										14							
Vigan										5.5							
Tuguegarao				9.1	23.9	14.9	58.3	50.5	37.1	2				4.1	10.1		
Laoag							.8			2.3							
Aparri					9.2	6.6	8.1	22.8	7.4	43.2	3.6	6.6	.5	.8	5.8	36.8	
Cape Bojeador						*	*	*	*	15							
Santo Domingo, Batanes			1.7	20.4	57.2	123	23.6	1.8	12.1	118.6	.9	.7		3.6	2.5		

\* No observation.

Daily rainfall at the stations of the Weather Bureau, November, 1917—Continued.

Station.	Day of month.														Total.
	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	
Jolo	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Isabela, Basilan	1.3			4.8	1.8	7.3	0.3	0.3	5.1	17.5			2.5		334.3
Zamboanga		4.6			.5	12	.3	1				1.8	.5		176.9
Davao				3.8				8.9	3.8						159.1
Cotabato					5.6	24.4			2				9.1		94.7
Cagayan, Misamis								4.6	17.8						131.3
Butuan			10.4		20.6	4.1	1.5		2.5			8.2	14.8	31	55.9
Mambajao			8.6			4.1		13.5	96.5						176.1
Dumaguete					7.8	4.9	1.5	3.8	22.4	1					255.6
Yap, Western Carolines	56.2	1.5	50.6	7.1	1.3	10.2	34.5	.3	13	5.6	0.8	.3	5.3	15	258.3
Tagbilaran					2	4.5	7.9	12.4	14.7						297.6
Iwahig	.8	2.1	.3	28.4	1	10.9	14.1	107.7	57.9	.3			17.3		1,035.9
Surigao	.8	2.3			27.7	47.2	19.5	10.3	3.1	6		2.3	1.5	14.3	339.9
Maasin					20.6	34.5		31.2		23.9					372.1
Cebu	7.6				11.4	1.3	1.3	27.9	10.9			2		12.2	200.1
Iloilo	10.9	11.4	17.1			.3		3.6	4.6		7.1				188.8
San Jose Buenavista	40.2	6.4	5.1	.3	*		*	*	*	.8	*	*	*	*	171.9 <sup>a</sup>
Cuyo	16.8	17.5	.8	5.3	3.5	14		6.1	2.6		2	2.8			192.9
Ormoc					18.8	3.9	3.8	3.3	1.8				1.8	4.8	147
Guiuan	1.3	2			103.7	20.6	19.8	58.9	5.6	6.6	5.1	1	13	5.4	664
Tacloban					14.2	24.1	9.4	12.6	4.3	.5	3.3	1.5	4.1	.3	326.9
Capiz	33.8	2.8	.5	16.3	6.1		1.1	43.4	3.1	.3	3	51.8		1.3	470.7
Borongan		3	.5		83.8	21.8	6.8	76.7	11.4	8.9			8.1	1.3	731.3
Catbalogan					35.8	11.5	4.1	15.7	5.8	14.7			15		300.6
Calbayog			3.6		15.7	7.3	9.4	9.2	6.4	2.1			7.4	3.8	221.2
Masbate	5.1					4.6	1.3	7.9	3.6		40.6				201.2
Romblon	89.9	21	1.3	8.6	95.3	1.3	4.3	10.7	20.1	26.9			.8		543.6
Batag	12.4		18		38.8	69.1	10.4	71.1	20.1	1.5			2.8		666
Sorsogon	13.2	5.1			6.4	9.7	6.3	7.1				6.1			403
Legaspi	.8				6.1	.8	21.8	19.1	2.6	.5		1.3		2	477.8
Sumay, Guam		1.5	33.5	.8	.5			15.2							128.3
Calapan	79.5	40.7	33.7	2		12.4	6	6.3	71.2	36.8	18.8	19.8	6.4		747.4
Virac	26.7	4.3	5.8	3.8	56.9	38.3	22.6	57.1	12	5.1	10.9				553.9
Naga	1		1		4.1	3.3	4.6	36.1	1.3	.3	5.9				289.5
Batangas	10.4	6.8	5.8	3	17.3	1	7.9	2.5	26.1		1.3	1.8			120.6
Lucena	13.2	5.1			14.2	21.6	13.8	5.1	45.7		6.4				283.4
Atimonan	28.2	43.4	18.8	.5	31.8	87.8	3.8	3.3	8.4	2.1	1.3	7.1	2.3	19.1	441.6
Ambulong, Tanauan	4.9	1	2	12.4		9.7	26.7	3	25.9	10.9	11.4		9.7		173.2
Canlubang, Calamba	1.8	3.3	7.3	15	2.8	3.3	22.4	19	50.8						215.1
Paracale	73.9	122.9	23.3	10.1	19.1	13.5	21.7	107.7	31.1	6.4	48	30	.5	.8	1,095.6
Santa Cruz, Laguna	12.7	11.2	42.9	15	18	6.4	31.3	28.5	20.8	.5					384.3
Manila		1.1	6	20.9		2.3	18.6	27.1	80.7		1		2.8		229.2
Antipolo	.5	1.3	7.7	23.6	.5	9.4	25.4	33	60.4	.8	1.8	5.1	7.4		282.4
Iba		.1		1.5			11.2	11.2	9.1	1	4.8	2	1.5		54.6
San Isidro			.6	1.6			33.4	23.8	31.8	12.7	9.9	3			188.8
Tarlac			.8				22.4	26.7	19	2.8	.8				121.2
Baler				14.5	5.8	55.6	62.2	215.6	40.4	62.7	58.9	10.2			764.1
Dagupan				1.8	1.3	4.1	1.8	5.6			1	1.6	2.8		27.1
Bolinao				5.6				3.3			2.5				11.4
Baguio					1.8	5.1	7.6	1.5	10.6			3.1	5.6	6.6	66.7
San Fernando, Union					3	1.3	7.6	7.8			10.2		37.3		68
Echague	.8	.8	1.5	9.4	126.5	41.7	35.9	55.7	42.7	1.8	30.5	1.5	17	1.8	446.2
Candon					7.4			2.5	1.3	3.6			4.3		33.1
Vigan								.1					1.1		6.7
Tuguegarao				5.6	1.8	53.4	4.8	25.1	29.7		19.3	36.8			386.5
Laoag								6.8	2.5	23.6	8.6	6.6			51.2
Aparri	4.9		9.6	7.4	5.4	21.3	2	19.8	15.2	23.4	46.5	47.3	30	15.7	399.9
Cape Bojeador										8.9	8.9	2.5			35.3 <sup>b</sup>
Santo Domingo, Batanes			2	12.5	4.5	4.6	5.9		1.8	3.9	14	64.8	18.4	32.7	537.2

\* No observation.

<sup>a</sup> 20 days of observation.

<sup>b</sup> 26 days of observation.

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, NOVEMBER, 1917.

Day.	Jolo. <sup>a</sup>		Isabela, Basilan.		Zamboanga.		Davao.		Cotabato.		Cagayan, Misamis.		Dapitan.		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	29.8	20.9	32.1	22.6	28.5	23	29.5	21.8	30.3	22.6	29	20.9	30.9	22.8	30.3	21
2	29.2	20.5	31.1	22.8	29	22.9	29.8	22.4	31.3	23.5	30.7	22.6	31.1	21.4	30.1	23
3	30.4	20.9	31.3	22.1	30.3	22.8	31.9	20.8	32.5	23	31.1	21.5	30.4	22.7	30.9	21.7
4	30.6	21.4	33.1	21.6	29.2	23.1	31.9	21.5	31	22.5	30.8	22.8	31.5	21.1	32.6	22.9
5	28.9	22.3	31.6	22.4	29.6	22.5	29.2	20.8	29.8	22.5	29	21.8	27.2	22.4	25.9	22.8
6	28.5	21.5	32.5	22.6	31.2	23.3	26.3	20.7	30.9	23.4	30.4	23.4	30.9	22.4	28.1	22.7
7	29.3	19.9	29.6	22.1	29.6	23.1	30.2	21	31.5	23.6	30.4	23.1	30.3	22.3	29	22.9
8	29.5	21.4	31.1	22.6	29.8	22.6	33.3	21.4	30.6	22.4	30.6	21.5	32.1	22.9	31	22
9	30.2	21.6	31.6	22.3	31.6	22.6	32.2	21.5	31.2	23.2	31.1	22	33.2	22.8	31.9	22.4
10	30.5	20.8	32.1	22.1	29.5	23	32.7	22.3	31.6	22.6	31.2	22	31.4	21.8	32.9	22.7
11	32	21.2	33.1	21.6	29	22.5	32.7	22	30.1	23.6	31.1	21.5	32.2	22	32.5	22.7
12	28.5	21.3	32.1	22.3	29.5	23	33.4	21.9	31.5	23.9	31.3	22.2	31.7	22.3	32.4	23
13	29.7	22.1	32.6	23.1	30.5	24	32.8	21.5	30.4	23.1	31.5	22.7	31.4	22.7	31.9	23.3
14	28.1	20.5	28.6	24.3	28.4	22.5	31.3	21.5	32.2	24.2	29	23	30.4	22.7	28.4	23.7
15	27.7	20.1	29.8	22.1	27.5	22.8	32.9	22.7	29.5	23.4	30	22.4	29.9	23.1	33.1	23.1
16	29.9	20.5		22.6	27.6	23.5	31.5	21.8	29.8	23	29.5	22.6	31.9	22	29.6	23.7
17	31.5	21.4	33.1	23.1	29.5	23.6	33.2	21.4	30.1	22.6	30.8	22.8	31.8	21.7	31.4	22.8
18	31.4	22	31.5	21.8	29.5	23.5	32.9	20.8	30.8	21.6	31.9	22.1	32.3	21.9	33.4	23.6
19	30.7	21.8	31.9	22.6	29	22.6	32.2	21.8	30.8	22.1	31.1	21.4	31.9	21.8	34.1	23.6
20	29.5	20.8	32.8	21.4	29.8	23.3	32.5	22.4	31.2	22	31.1	22.6	34.1	22.1	33.1	23.5
21	30.3	20.3	32.8	22.1	29.2	23.1	33.2	21.5	31.9	23	31.3	22.6	33.5	22.2	31.7	23.2
22	29.4	21.8	31.6	22.8	29.5	23.4	30.2	22.8	31.6	22.9	29.6	21.5	28.4	22	29.3	22.9
23	29.1	21.9	29.6	23.1	27.5	23.5	30.4	21.8	31	22.6	29.9	22.1	30.7	22	28.9	21.9
24	29.9	20.7	31.6	21.6	28.8	23.4	30.3	22	31.5	23	31.1	22.6	30.4	23.2	32.1	22.7
25	29.3	20.5	31.1	22.8	28.3	23.5	26.9	22	28.2	23.1	27.7	22.6	29.8	21.8	27.4	23.1
26	28.1	20.9	32.6	23.1	31.2	23.2	30.5	22.2	31.3	22.2	30	21.9	30.9	21.5	31.4	22.6
27	29.6	21.1	32.1	21.1	30.2	22.9	32.2	21.5	30.9	22.4	30.5	21.6	31.3	21.3	33.2	21.8
28	30	20.1	32.6	22.1	29.5	23.5	31.7	21.7	32.3	22.4	30	21.1	31.8	21.2	32.3	22.2
29	29.5	21.3	30.1	21.6	30	23.4	32.2	22.1	32	22.6	30.7	20.9			31.6	22.8
30	30.1	21.3	34.6 <sup>a</sup>	21.4	32	22.2	32.2	21.4	32.8	23	31.1	21.4			33.6	22.4
Mean	29.7	21.1	31.7	22.3	29.5	23.1	31.4	21.7	31	22.9	30.4	22.1	31.2	22.1	31.1	22.8

Day.	Mambajao.		Dumaguete.		Yap, Western Carolines.		Tagbilaran.		Iwahig.		Surigao. <sup>b</sup>		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	29.7	21.7	30.5	23	33.4	25.2	31.6	22.6	32.5	22.4	29.2	21.5	30	22.5	31.3	23.4
2	28.5	22.8	29.5	23.1	32.2	25.9	31.3	23.2	31.2	22.7	26.4	23.2	29	23	28.9	22.7
3	30.2	23.9	30.7	24.6	32.7	24	32.5	22.5	26.5	22.7	28.2	22.8	31	23.1	30	24.8
4	30.2	23.2	29.8	22.6	28.2	24	32	22.5	26.2	22.5	30.5	24	31	23.4	30.5	24.9
5	26.5	23.1	28	23.2	31.2	24.1	26.7	22.6	31.9	21.9	25.8	23.8	29	22.8	26.7	24.6
6	27.6	24.7	29.6	24.6	33.5	25	31.3	22.5	26.5	22.3	27.2	23.8	31.3	23.6	29.2	25.1
7	29.2	24.6	30.4	24.8	33.7	24.6	31.6	22.7	26.9	22.9	29.9	23.3	32	23	29.1	24.4
8	29.8	23.2	30.5	23.3	33.7	24.9	32.2	23.4	30.8	22.4	29	23.2	32.8	22.8	31	24.6
9	30.2	22.5	30.4	23.8	34.2	23.7	30.8	22.7	32	20.9	28.4	22.8	31	22.2	29.4	24.1
10	30.2	22.4	29.8	23.2	31.3	24	31.8	22.7	24.3	23.1	31.3	22.2	32.6	23	31.8	25.4
11	30.7	22.6	30.3	23.5	32.9	25	32.3	23.6	30.4	21.4	29.6	23.7	33	22.5	30.8	25
12	32.5	23.5	30.9	23.6	32.2	24.4	33.2	23.4	31.5	21.2	30.3	23.4	33.6	23.5	30.3	24
13	32.7	24.3	31.7	23.2	33.5	24.6	31.4	23	31.1	20.7	29.7	24.3	31.5	23	29.5	24.1
14	30.6	23.5	30.1	23.3	33.7	24.2	27.6	23.5	32.1	22.1	29.5	23.7	30	22.6	27	23.9
15	29.9	23.2	29.4	23.2	33.2	24.2	31.8	22.9	28.1	23.4	28.9	23.7	31.5	22.8	28.8	24
16	26.6	23.8	28.9	23.4	32.7	23.5	29.9	23.4	27.1	23.4	27	23.7	30.2	22.9	27.7	24.1
17	32.2	23.1	31.8	23.6	31.7	23.5	31.6	23.6	28.6	23.4	29.4	23.4	31.6	22.5	29	23.9
18	30.7	23.1	30.9	22.3	31.7	23.1	31.7	23.1	30.4	22.1	29.8	23	32.8	23.3	31.6	23.7
19	31.6	23.2	31.9	22.4	32.7	23	31.2	22.8	31.4	22.9	29.8	22.9	33	23.6	31	24.1
20	31.1	23.5	30.8	22.7	31.3	24	32.6	22.5	31.6	21.8	30.7	23.7	33.5	23.3	31.5	24
21	30.6	22.7	30.6	23.3	32.7	25.1	31.4	23.4	30.9	21.4	29.6	22.7	31	23.2	31.6	24.6
22	27.9	24.3	29.8	22.9	33.7	25	30.9	23.4	31.2	21.3	27.1	22.7	32.6	23	28.4	24
23	28.3	24.5	28.6	24.1	33.7	25.3	29.6	22.5	25.3	22.2	26.5	23.8	30.6	22.5	27.7	24.6
24	30	24.4	30.6	24.3	31.4	23.2	31.1	22.6	26.4	22.1	28.4	23.8	30	22.4	28.5	22.5
25	27	22.9	29.6	23.4	33.7	24.5	28.8	22.7	31.3	23.1	26.9	23	29	22.8	28.9	23
26	29.6	22.6	29.3	22.2	34.2	24	30.5	23.3	28.9	23	28.9	23	31.6	22	30.8	23.4
27	29.8	22.7	29.4	22.2	34	23.1	31.3	23.3	31.2	22	30.5	21.9	33	22.5	30.9	24.9
28	29.8	22.2	29.9	22.7	33	24.6	32.2	22.7	31.4	22.7	31.1	22.9	33.2	23.1	31	24.4
29	30.3	23.7	30	24.1	34.2	24.6	32	22.4	32.4	21.3	30.4	23.2	33.8	22.5	31	24.5
30	30.3	24.5	30.1	24.1	34.2	23	30.9	22.4	32.1	20.4	29.7	23.8	33.3	23	29.7	23.4
Mean	29.8	23.3	30.1	23.4	32.8	24.2	31.1	22.9	29.8	22.2	29	23.2	31.6	22.9	29.8	24.2

<sup>a</sup> The minimum temperatures of this station seem to be too low.

<sup>b</sup> The maximum temperatures from 1 to 10 are taken from a self-registering apparatus.

Maximum and minimum temperatures at the stations of the Weather Bureau, November, 1917—Cont'd.

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	30.6	23.3	32.2	21.9	30.4	25.2	29.5	21.8	31.4	22.7	28	22.6	31.1	23.2	29.9	22.2
2	30.2	23.8	33.2	22.9	30.6	26.7	26.5	22.9	29.4	23.4	26.4	22.8	31.9	25.3	29.5	22.4
3	30.4	23.8	33.6	21.9	30.8	24.6	30	22.9	28.3	23.7	27.9	23	32.1	24.6	28	22.4
4	31	22.8	32.8	23.2	31.5	25.7	32.5	23.7	31.2	24.5	32.1	23.4	30.7	24.3	30.1	23.2
5	27	23.7	28.4	23.1	30	23.6	26.5	23.9	27.9	23.6	26.1	23.1	28.6	24.2	28.7	23.4
6	28.7	24.5	31.8	23.1	30.9	25.4	28.4	23.2	27.2	22.8	26.7	22.7	29.2	24.4	26.3	22.9
7	30	24.7	31.9	23.9	31.5	25.1	29.2	23.6	30.6	24.7	26.7	23	30.6	23.9	27.8	23
8	31.7	24.3	31.2	23.2	30.8	24.3	30.9	22	31.2	24.7	30.2	23.4	31.7	24.1	31.4	22.5
9	30.2	24	31.8	21	30.2	25.9	26.6	21.8	30.1	24.7	26	23.4	28.9	22.8	30.4	23.3
10	32.2	23.6	30.8	23.4	29	23.1	31.4	20.6	32.5	23.8	31.4	23.5	32.1	23	30.6	22.7
11	31	23.6	31.3	22.5	31.3	23.2	32.6	21.2	31.8	22.9	33.7	23.1	31.2	22.8	31.6	22
12	31.7	23.4	31.3	22.5	30.4	24.4	31.8	22.1	31.8	23.1	32.1	23.6	31.1	23.5	33	22.3
13	30	24	30.2	23.7	30.1	23.9	31.2	22.9	32.4	22.8	30.5	23.6	30.8	24.1	29.7	22.2
14	29.7	24.2	30.7	24.4	30.3	24.1	26.2	23.8	28.7	24	26.1	23.9	28.4	24.8	28.1	23.4
15	29.8	24.1	31.7	23.6	29.2	22.2	31.2	23.6	30.5	23.9	28.9	23.5	31.5	25.2	30.9	22.9
16	27.2	23.6	29.2	23	27.8	19.97	29.4	23	26.8	23.7	25.6	23.4	28.1	22.9	25.9	22.3
17	29.6	23.7	28.5	23.5	28	24.1	30.8	22.8	28.8	23.6	29.5	22.9	29	22.9	28.2	22.3
18	30.8	24.3	30.7	23.6	29	24.3	32.1	22.2	33.1	21.7	32.1	23.4	32.2	23.4	30.8	21.7
19	30.2	23.2	30.1	23.1	29.8	24	31.7	21.6	31.5	22.8	32.6	23.5	31.1	23.5	30.8	22.2
20	30.3	23.1	31.4	22.9	30.3	24.6	32.6	21.9	32.8	23.1	32.4	22.9	31.9	23.2	31.3	22
21	31	23.8			30.7	23.3	33	22.2	32.3	23.7	33	23.9	31.3	23.7	31.6	23
22	28.6	23.7			30	25.3	28.1	23.5	29.2	22.9	28.2	23.2	31.5	24.1	30.6	22.4
23	29.7	24.3			30.4	22	27.5	23.2	27.4	23.7	26.9	23.1	30.1	24.5	28	22.5
24	29.7	24.2			30	25.5	29	23.2	30.4	24.6	27	23.4	30.8	23.3	28.3	22.5
25	28.3	23.2			28.8	23.9	28.6	22.8	28.8	23.1	27.3	23.4	28.9	23	27.1	23
26	30.2	23.5			31.2	24.3	31.3	22.4	29.8	23.2	31	23.6	30.7	23.4	29	21.9
27	31.4	23.3			30.4	23	31.1	22.2	32.3	22.7	30.4	23.4	30.6	23.7	30.2	22.3
28	31.7	22.6			31	23.7	32.4	21.9	31.9	23.4	32.3	22.4	31.9	23	30.9	22.2
29	30.9	23.7			30.3	23.6	32	21.2	31.4	22	31.2	23.3	31.2	23.2	31.6	22
30	30.7	23.9			30	25.3	29.2	22.1	30.6	22	33.5	23.5	31	24.9	30.7	23.3
Mean	30.2	23.7	31.1	23	30.2	24.1	30.1	22.5	30.4	23.4	29.4	23.3	30.7	23.8	29.7	22.5

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	28.1	21.3	29	22.9	30	24.4	32.9	23.9	29.8	23.4	29.7	22.9	30.3	24.1	29.9	25
2	29.5	22.5	29.8	23	30.6	25.6	32.9	24.3	29.4	24.4	31.5	23.5	29.8	24.5	29.9	24
3	29.2	22	30	22.7	30.6	24.2	32.8	24.7	29.4	23.1	31.5	24	29.2	24.5	29.8	23.6
4	31.1	23.7	32.6	24	30.6	24.6	32.3	23.2	29.3	24	30.7	22.5	29.6	24	29.1	24.5
5	26.2	22.5	25.7	23.3	27.4	23.4	29	24.2	27.5	23.5	30.2	23.2	27.8	24	29.6	25.5
6	26.1	23	26.5	22.9	28	24.6	32	24	26.5	22.5	28.7	22.4	26.3	23.9	29.5	25
7	26.5	23.5	26	23.4	29	24.4	30.5	24	27.6	23.6	28.5	23.2	27.2	24.2	29.8	23.2
8	30.5	22.1	31.8	22.7	30.8	24.2	32.9	23.4	30.4	24.2	30.4	23.5	29.9	24.3	28.1	24.9
9	26.7	22	26.4	22.8	29.4	24.2	30.9	25.1	28.9	22.6	27.9	24	27.4	25.3	28.9	24
10	30.3	21.5	30	21.8	30.4	24	31.9	23.8	30.4	22.5	30.9	22.5	30.3	24.3	29.4	25
11	30.7	20.9	30.8	22.4	30.8	24.2	32.4	24.2	30.9	22.5	32.2	23.5	31.5	23.6	29.8	25.2
12	31	21.4	30.2	22.7	30	24.5	32.8	24	30.2	23.3	31.5	21.7	30.4	22.7	30	25.5
13	28.7	22.3	30	23.1	29.6	24.6	30.1	22.9	29.9	24	30.8	22.9	29.8	24.6	30.2	25
14	26.6	23	25.8	23.9	27.6	24.8	34.4	23.8	29.5	23.4	28.2	23.4	29.3	23.3	28.8	25
15	29.7	23.2	30.9	23.4	29.6	24.6	31.5	24	27.4	23.5	29.6	21	29.8	23.4	28.9	26.1
16	26.5	22.5	29	23.5	29.6	24	32.9	24.6	27.6	23	29	22.5	30.1	24.1	29.4	23.3
17	29.5	21.5	30	22.6	29.4	24	30.3	22.9	29.8	22.5	30.3	21.9	28.4	23.2	28.5	25
18	31.5	21.7	31.8	22.5	31	23.8	29	22.9	30.2	21.9	31.7	21.5	30.5	23	29.7	24.7
19	31.8	22.5	30.9	23.6	30.2	23.6	33.5	22.8	29.8	22	31.8	21	30.4	22.3	29.2	24.4
20	31.5	22.7	32.4	23.4	31.8	24.5	33.5	22.3	31.3	23	31.7	21.1	30.8	23	28.9	23.8
21	31.2	22.7	32.6	23.8	31.4	24.2	32.6	23.1	30.8	24.7	31.3	22.5	31.4	23.3	29.2	24.9
22	28.5	22.5	26.1	22.8	30	24.6	33.5	22.6	26	23	28.7	22	28.9	23.3	29.5	24.6
23	28.1	21.9	29.6	23.3	29.6	24.6	31.5	24.6	28.8	22.9	29	23.4	29.4	23.8	29.4	25.3
24	28	21.5	27.1	22.2	30	24.4	32	24.1	28	23	30	23	29.5	23.9	30	25.3
25	26.6	23	26.6	23.3	27.4	24.5	28.5	23.7	25.8	23.3	30	22	26.9	24	31.6	24.6
26	29.7	22	29.2	22.7	31	24.2	30.5	22.1	27.4	23.2	30.5	22.5	29.8	23.1	29.4	24.7
27	30.6	22	30.6	23.1	30.6	24.4	31.9	22.4	28.5	23	30.6	21.6	29.3	23.2	29.2	24.4
28	31.4	21.6	31.3	22.3	30.6	23.8	31.8	23.8	30.6	23.4	32.4	21.5	30.4	23.3	27.2	22.8
29	30.1	21.5	30.7	22.4	31	25	33.6	23.9	30.6	24.1	32.2	22.5	30.6	24.3	29.7	24.6
30	30.3	22.2	30.6	22.6	30.6	25.4	33.4	23.7	29.6	23.9	29.2	22.6	30	23.5	28.9	23.1
Mean	29.2	22.2	29.5	23	30	24.4	31.9	23.6	29.1	23.2	30.4	22.5	29.5	23.7	29.4	24.6

Maximum and minimum temperatures at the stations of the Weather Bureau, November, 1917—Cont'd.

Day.	Calapan.		Virac.		Naga.		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	25	32	23	32.6	21	32.4	22.4	30.9	23	29.4	25.1	30.7	24.8	32	23
2	32.5	24.9	31.5	23.2	31.5	20.4	32.3	22.2	30	23.5	29.6	24.5	31	24.7	31	22.4
3	33	24.5	30.5	23.3	30.9	20.4	32.3	22.7	31.2	23.8	29.4	26.3	31.2	24.4	31	22.2
4	30	23.2	29.7	23.8	29.7	21.8	30.8	22.7	30.9	24.4	29.2	25.9	29.6	24.4	29.8	22.3
5	32.5	23.1	29	22.6	30	20.3	31.8	22.6	30.5	24	29.7	24.2	30.8	24	30	22.2
6	30	23.8	27.6	21.7	25.6	20.9	28.3	22.5	27.9	22.6	27.1	24.9	27.2	24.2	30	22.4
7	31.5	24	28.9	21.5	25.9	21.5	28.6	23.6	27	24.2	26.8	24.9	26	24.7	28	22.5
8	32	24.1	31.4	22.5	30.4	20.7	33.1	23.4	32.3	23.6	28.8	22.1	30.6	24.2	28.8	22.4
9	32.2	24.5	29	22.8	27	22.1	30.1	23.2	23.5	22.5	27.3	23.4	29.2	23.9	29	22.2
10	28	23.5	31.8	22.3	31.3	20.1	32	22.5	32.3	23.7	31.1	23.6	32.3	24.4	30	22.2
11	31.5	23.5	31.5	21.5	31	20.4	32.4	22.3	30.5	23.4	29.2	24.8	32.2	24.2	30.4	22.8
12	28.7	23	32.7	21.7	29.9	22.2	30.2	22.3	23	22.9	27.2	24.7	30.3	24	29.5	22.7
13	32	24	30.7	22.2	28.6	21.4	29.6	20.6	29.2	23	27.8	24	31.2	24	30.2	23
14	31.8	22	30.6	22.8	28.3	22.1	31.4	20.4	29.8	23.3	27.7	24.5	31.6	24.2	30.6	22.6
15	31.5	23.5	30.1	22.4	28.8	21.4	30.2	22.9	30.3	23.2	28	24.5	31.9	23.7	30.8	22.3
16	32	25.2	32.3	22.9	30.8	22	31.7	21.7	28.9	24	27	23.5	30.7	23.6	30	23.1
17	30	22.5	29.7	22.3	28.3	21.4	28.4	22.8	27	22.6	26	23.5	28.2	23.4	29.9	22.3
18	27.5	22.5	30.8	21.6	32.1	21.6	27.1	22.9	26.8	22.8	26.3	23.3	28.4	23.6	29	22.4
19	28.2	22.9	31	21	32.1	20.1	28.5	22.6	30.3	22.6	29.3	23.5	28.3	24	28	22.3
20	30	23.5	31.3	21.7	31.9	22.2	29.8	22.8	30.7	22.6	28.8	24	29.3	22.8	28.9	22.4
21	31.2	23	31.5	21.5	30.8	20.6	31.4	21.9	29.5	22.5	27.7	23.3	30.3	23.6	29	22.6
22	31	23.6	28.5	21.7	26.7	20.6	28.8	22.2	28.5	22.7	27.3	23.7	27.3	23.7	27.9	21.6
23	31.2	23.2	30.8	21	30.9	20.6	28.8	22.2	29.4	23.6	28.3	24.5	26.5	23.8	27.8	21.3
24	30.5	24.2	31	21.2	30.5	21.4	30.7	21.9	29.5	23.3	27.8	24.4	29.7	23.9	29	22.2
25	27.5	22.7	27	22.7	26.6	21.7	26.9	23.4	29	23.4	26.8	23.8	27	23	27	22.5
26	30.6	22.5	30	21.1	30.3	20.9	31	22.5	30.5	22.6	29.1	22.1	30.2	22.5	29	22.2
27	30.4	23	29.4	21.5	30	21.1	31.5	21.8	31.8	22.6	29.1	24	31	22.4	29.9	21.6
28	31.6	22.5	31.6	21.8	31.2	20.7	31.1	23.2	31.7	22.6	28.3	23.4	31.9	22.9	29.6	22.2
29	30.5	22.8	31.8	21	32	20.1	32.2	22.6	31.7	22.1	29.4	23.3	31.3	22.8	30.4	21.6
30	31.4	22.9	31.1	20.8	31.9	19.3	30.9	21.5	30.1	23.6	28.6	24.1	32.1	22.7	30.6	21.6
Mean	30.8	23.5	30.5	22	29.9	21	30.6	22.4	29.8	23.2	28.3	24.1	30	23.8	29.6	22.4

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	23.9	30.2	23.7	31.8	22	32.7	21.1	32.8	22.1	31.8	21.8	35	22.5	31.7	22.4
2	31	24.5	29.2	23.5	31.3	21.8	31.4	20.5	33.1	21	32.9	21.9	35.2	22.4	33.6	22.6
3	28	24.5	29.1	23.7	32.7	22	30.7	21.1	33.2	21.4	31.9	22.1	34.4	22	35	23.5
4	29	24.6	28.1	23.4	29.1	22.8	29.1	21.6	27	23.2	24.6	23.1	24.4	23	28	22.8
5	30.3	23.5	30.1	23.4	31.8	22.7	30.6	21.5	33	24.1	29.5	22.5	31.4	23	29.1	24
6	27.6	23.6	27.1	23.1	26.6	22.6	26.7	21.2	28	23.7	26.9	22.3	33	22.3	27.9	22.6
7	27.3	23.1	25.4	23.3	27.1	22.8	26.1	21.6	30.6	24.5	25.9	22.4	32.6	22.4	27.9	22.5
8	28.5	23.5	29.7	23.4	28.7	22.2	28	20.8	33	23	27.4	21.9	31	21.8	29	22
9	29.6	24.5	28.6	23.4	28.6	22.3	28.2	20.7	32.5	21.5	29.4	21	33.2	21	27.9	21.9
10	31	23.9	31.1	24.3	32.9	23.2	31.8	21.9	32.6	23.6	30	23	33	23.4	31.8	22
11	30.4	23.6	30.4	23.5	31.9	22.7	33	20.9	32.2	21.2	31.6	22	34.2	22.4	32.4	22.3
12	27.5	24.6	28.2	23.8	30.5	22.3	29.8	22	31.8	23	31.7	22.4	34	21.5	32.3	22.8
13	27.9	24.6	29.6	24.3	31.3	20.8	31.8	19.5	31.5	22.6	31.4	21.9	34.2	20.5	33.5	20.6
14	28.4	24.3	29.5	24.3	31.9	21.2	32.2	20.3	31.4	20.5	31.5	21.1	34	20.2	34	21.4
15	29.1	24.5	30.6	23.4	32.7	22	31.6	21	31.5	20.7	31.1	21.4	33.6	20.5	32	20.8
16	28.1	24	28.9	24.8	30.7	23	30.3	21.2	31.2	21	30.6	21.7	33.2	20.5	30.5	20.7
17	25.9	23.4	26.9	23.4	29.7	23	28	21.7	32.8	21.5	28.9	21.4	33	21.2	29.3	21.3
18	29	23.8	28.2	23.3	30.4	22.5	29.8	21.6	31.2	23	30.4	22.6	33	21.4	29.5	21.3
19	28.9	23.8	28.4	23.6	30.1	22.5	30	21.1	30.6	23.2	30.6	22.7	32.7	20.8	31.2	23.7
20	29.5	23.3	27.7	23.2	27.8	23.5	26.5	21	31.7	23.6	28.4	22.6	33.3	22.5	32	22
21	30.6	23.5	28.4	23.7	29.8	22.4	29.6	21.8	31.5	21.7	30.6	22.4	34.3	22	27.5	22.8
22	28.4	24.4	27.4	23	28.3	20.9	29.6	20.3	30.9	21.4	29.4	21.4	29.6	21.8	28.8	21.7
23	30.2	23.9	26.4	24.1	27.8	22.2	27.7	22	31.3	22	28	22.4	31.9	21.7	28.5	22.4
24	29.5	23.9	28.6	23	31.5	22.5	31	21.1	32.7	22.3	31.4	22	33.3	21.8	30.4	22.2
25	26	23.7	28.3	23.6	25.7	22.7	26.2	21.9	26.5	22.6	24.4	22	31.2	22.5	27.7	21.4
26	29.1	23.2	29.6	23.2	29.6	22.1	30.7	20.8	31.9	22.5	26.6	21.7	29.3	20.8	25.5	21.7
27	29.6	23.2	30.1	22.2	30.7	21.6	30.2	21	32.5	21	29.5	21.4	31.4	20.8	29.9	22
28	30.4	23	30.8	22.7	30.6	22.8	29.2	21.2	31.3	22.3	29.9	23	32.4	22.8	29	22.6
29	30.5	22.8	31.3	22.8	31.7	22.5	31.1	21.3	31	22.4	30	22.5	32	22.5	28.3	22
30	29.8	23.4	30.4	22.4	31.4	22.2	30.9	21.5	31.1	21.2	30.6	21.5	33.5	21.7	30.9	20.9
Mean	29.1	23.8	28.9	23.4	30.1	22.3	29.8	21.2	31.4	22.3	29.6	22.1	32.6	21.8	30.2	22.1

Maximum and minimum temperatures at the stations of the Weather Bureau, November, 1917—Cont'd.

Day.	Dagupan.		Bolinao.		Baguio.		San Fernando, Union.		Echagüe.		Candon.	
	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	33.5	23.1	33.2	23	25.4	15.2	33	22.6	33.5	21	33	24
2	35.2	22.9	34.4	23.9	25.4	15.4	33.8	22	33.1	20.8	32.6	24
3	33	23.4	33.5	22.4	24.7	14	32	21.7	33	22.2	33	23.8
4	29	24	32	22.5	22.4	15.4	32	21.7	34	21	31.7	22.5
5	31.6	23.5	32	23.7	21.1	15.3	31	23	28	22.8	32.8	24.4
6	33.1	22.9	33.5	22.8	21.5	15.2	32.4	23.5	30.5	22.4	33.4	24.7
7	33	23.1	31.5	23.4	22.4	15.6	32.1	23	27	22.1	31.8	23.5
8	33	23.5	33.5	24.2	23.6	15.9	33	23.7	25	22.3	33.4	25.5
9	32.8	22.1	33.6	23	24.6	15.4	32.5	23.9	27	21.3	33.2	23
10	33.8	24.3	32.6	24.9	24.3	16.4	32.7	24.1	30.9	22.8	31.7	25.5
11	32.7	23	33	23.5	25.5	15.9	32.1	22.3	26.2	22.2	32.5	23.1
12	32.8	23.7	32.4	24.3	24.3	14.5	31.3	23.3	27	21	33	23
13	31.9	22.4	32.5	21.8	23.3	13.6	31.5	21.3	28.5	20.3	33	22.5
14	32.5	22.5	32.6	22.4	23.4	13.9	31.5	20.7	30	21.1	32.4	22.2
15	30.2	23.2	30.4	26.4	22	14.4	31.1	21.8	29.4	21.8	32.5	22.9
16	33	23.3	33.1	22.6	24.5	14.4	32	21.7	28	21.1	33	22.5
17	33.5	21.8	33	22.4	24.7	13.2	31.7	21.5	27.9	20.5	33	22
18	33.8	23.2	33.1	23.8	24.1	15	32	23.6	28.4	21.6	32.4	22.5
19	33	23.7	31	24	24.8	15.4	31.3	23	27.1	21.6	32.2	23.7
20	32.5	23.5	32.1	22.5	24.5	15.3	32	23.3	25.7	21.4	33.4	23.6
21	31.9	22.6	32	22.3	25.1	14.9	31	22.5	22.3	20.5	33.4	24
22	28	22.8	30.5	24	18.4	15.4	28.4	23.1	23.9	21.1	31.5	25
23	30	22.2	32	22.7	21.5	15.7	31.6	23	26	21	31	24
24	31.8	22.9	32.5	24	23	14.6	31.4	23.6	27.1	22.1	33.4	25
25	25.2	22.7	26	23.7	16.6	15	26	23.5	22.5	20.9	29	24.1
26	31.5	22.5	30	22.8	21.4	14.5	29.5	22.5	25	20.4	29.5	23.2
27	31.9	22	32.6	22.7	22.3	15.1	31.5	23	29.5	20.5	32.2	24
28	31.5	23.4	31.7	24	23	15.4	30.7	23.5	27.6	22	31.5	24.7
29	31.5	23.2	31.4	24	22	15.3	31.5	23.5	29.5	22.5	28.9	24.8
30	32.7	22.5	32.9	23.5	23.2	15.2	31.6	22.7	29.5	21.8	31	23.5
Mean	32	23	32.2	23.4	23.1	15	31.5	22.8	28.1	21.5	32.2	23.7

Day.	Vigan.		Tuguegarao.		Laoag. <sup>a</sup>		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	33.1	23.6	34	20.8	33.8	19.7	31.6	22.5	31.6	23.4	30.9	24.8
2	33.9	24.1	34.2	21.5	33.1	20.6	31.5	23	31.8	24.6	30.7	25.4
3	33.6	23.4	33.6	22.8	36	20.3	31.5	23.7	30.4	23.6	30.9	24.9
4	34.1	23.6	34.2	22	35.5	19.2	31.8	23.3	29.8	24	31.4	25.1
5	32.5	25	28	23	33.2	21.7	29.3	23.7	-----	24.8	26.8	23.2
6	34.5	24	32	22.2	34.8	21.5	31	23	-----	-----	25.1	22
7	35	24	25	22	34.2	22.1	29	23.4	-----	-----	25.6	22.5
8	34.1	25.6	23.5	22	30.6	22.7	25.4	21.8	-----	-----	28.9	22.6
9	34.8	25.6	28.7	21.8	35.1	21	29.1	22.6	-----	-----	28.9	24.6
10	33.7	23.2	29	23.3	33.9	22.2	28.3	23.7	27.4	23.8	25.4	22.2
11	30.1	22.6	26.8	21.6	29.9	21.2	24.5	22.5	24.2	21	23.6	19.5
12	30.5	22	28	21	31.8	20	26	21.7	25.4	20	25.2	19.9
13	31.1	23	28.2	20.6	33.2	17	28.2	21.3	26.8	21	26.2	21.5
14	32.1	20.8	29.4	20.4	33.7	18.2	28.3	23.5	27.2	20.2	26.4	22
15	29.7	21.9	28.5	22.2	30.9	19.4	28.1	23.2	27.4	22.6	26.5	23.4
16	31.1	22.1	26.4	21.3	30.9	18.7	25	23	24.4	22	24.6	21.5
17	32.4	21.8	28	21	34.7	17	27.5	21.3	27.2	21.2	26.2	21.8
18	32.5	22.6	29.5	21.8	34.6	20.1	28.4	21.8	27.2	21.8	26.4	22
19	30.3	22.3	27.7	22.3	30.9	20.5	28.6	24	26.6	22.2	26	22.9
20	29.2	23	26	21.2	29.6	22.9	25	22	23.4	20.8	23.1	20.6
21	34.5	22.2	24.3	21	33.2	22.9	24.6	21.6	24.6	19.8	23.6	18.6
22	33.2	23.3	25.2	21.1	36.5	20.9	27.5	21.8	26.5	21.4	24.5	21
23	32.3	23.8	25.7	21.3	35.6	20.1	28	22	27.5	22.4	26.6	21.9
24	34.1	24.2	24.7	22.5	34.6	22	25.9	22.6	27	23.2	27.4	22.5
25	30.1	24.5	24.9	21.2	32.4	19.2	26.4	22.7	26.6	23	27.5	22.5
26	30.6	23	25.8	21.7	33.1	22	24.8	22	27.4	22.4	24.8	23
27	30.5	23.9	29	22.8	30.9	22.8	24.7	22.3	24	21.2	24	21.8
28	29.2	22.6	24.5	22.5	28.2	21.9	24.3	22.6	23.6	21.2	23.6	20.9
29	31	23.2	26.4	22.6	27.2	23	23.8	22.3	24	21.6	24.4	21.6
30	31.5	22.3	27.2	21.8	32.3	21	25.6	22.3	26	21.4	22.9	20.2
Mean	32.2	23.2	27.9	21.8	32.8	20.7	27.5	22.6	26.7	22.1	26.3	22.2

<sup>a</sup> The maximum temperatures of this station are not very reliable: they seem to be too high.

## SEISMOLOGICAL BULLETIN FOR NOVEMBER, 1917.

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### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

3, 3<sup>h</sup> 26<sup>m</sup> 16<sup>s\*</sup> [3, 11<sup>h</sup> 26<sup>m</sup> 16<sup>s</sup>]. Naga (SE Luzón). Oscillatory earthquake, direction NNE-SSW, intensity V, duration 15 seconds. It originated outside of Camarines Province, toward the N under the sea, and was also felt in Catanduanes Island. At 10<sup>h</sup> 40<sup>m</sup> [18<sup>h</sup> 40<sup>m</sup>] a light aftershock occurred.

3, 13<sup>h</sup> 21<sup>m</sup> [3, 21<sup>h</sup> 21<sup>m</sup>]. Surigao (NE Mindanao). Earthquake of intensity III. It was lightly recorded at Butuan as originated W of Surigao. On the 4th at 4<sup>h</sup> 40<sup>m</sup> [12<sup>h</sup> 40<sup>m</sup>] a second shock of the same character was felt in the last town.

4, 11<sup>h</sup> 47<sup>m</sup> [4, 19<sup>h</sup> 47<sup>m</sup>]. Candon (W Luzon). Oscillatory earthquake of intensity III.

5, 11<sup>h</sup> 16<sup>m</sup> 12<sup>s\*</sup> [5, 19<sup>h</sup> 16<sup>m</sup> 12<sup>s</sup>]. Manila (W Luzon). Earthquake shock of intensity II-III, the origin was toward the W, at a distance of about 200 kilometers, in the China Sea.

7, 14<sup>h</sup> 09<sup>m</sup> [7, 22<sup>h</sup> 09<sup>m</sup>]. Basco (Batan Island). Earthquake of intensity III.

7, 20<sup>h</sup> 53<sup>m</sup> 00<sup>s\*</sup> [8, 4<sup>h</sup> 53<sup>m</sup> 00<sup>s</sup>]. N Luzon. Earthquake of intensity IV, felt through the northern provinces of Cagayan, Kalinga and Ilocos Norte. The origin was further north in the Babuyan group.

7, 22<sup>h</sup> 10<sup>m</sup> [8, 6<sup>h</sup> 10<sup>m</sup>]. Basco (Batan Island). Subsultory shocks of intensity III. A repetition occurred at 19<sup>h</sup> 16<sup>m</sup> (Insular mean time).

8, 8<sup>h</sup> 10<sup>m</sup> 00<sup>s\*</sup> [8, 16<sup>h</sup> 10<sup>m</sup> 00<sup>s</sup>]. Legaspi (SE Luzon). Oscillatory earthquake, direction N-S, intensity III, duration 3 seconds.

10, 0<sup>h</sup> 02<sup>m</sup> 55<sup>s\*</sup> [10, 8<sup>h</sup> 02<sup>m</sup> 55<sup>s</sup>]. Baguio (W Luzon). Earthquake shock of intensity II-III, originated toward the E, in Nueva Vizcaya.

12, 6<sup>h</sup> 12<sup>m</sup> [12, 14<sup>h</sup> 12<sup>m</sup>]. Guiuan (SE Samar). Oscillatory earthquake, direction SE-NW, intensity III, duration 5 seconds. Recorded by the seismograph at Butuan.

13, 6<sup>h</sup> 41<sup>m</sup> [13, 14<sup>h</sup> 41<sup>m</sup>]. Baguio (W Luzon). Earthquake shock of intensity II-III.

13, 20<sup>h</sup> 01<sup>m</sup> 30<sup>s\*</sup> [14, 4<sup>h</sup> 01<sup>m</sup> 30<sup>s</sup>]. Butuan (N Mindanao). Oscillatory earthquake of intensity II-III. At 15<sup>h</sup> 18<sup>m</sup> 49<sup>s\*</sup> [14, 23<sup>h</sup> 18<sup>m</sup> 49<sup>s</sup>] a second quake of the same character was felt. Both had the origin E of Mindanao in the Pacific. During this day 14th, the seismograph at Butuan recorded seven instrumental shocks, all, excepting one, from the same origin.

16, 22<sup>h</sup> 19<sup>m</sup> 32<sup>s\*</sup> [17, 6<sup>h</sup> 19<sup>m</sup> 32<sup>s</sup>]. Eastern Mindanao. Earthquake of intensity V-VI, long duration and ample but very slow undulations. The epicenter seems to have been in the southern portion of the Agusan Valley, from which region observations have not been received. It was felt through the districts of Agusan, Davao, Cotabato, Bukidnon, and the eastern part of Misamis. Attention is called by the observer of Butuan about

<sup>1</sup> 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<sup>h</sup>), insular time being added in brackets for the convenience of Philippine readers.

the slowness of the oscillations, which made the objects to move but without jerks; the persons experienced a marked feeling of sea sickness. The direction of the movements as observed in the movable objects and in some water tanks was S-N: it was preceded by a low noise advancing from the south. The water of an artesian well ceased to flow during the strongest movements, afterwards flowing under greater pressure but at impulses or gushes as if momentarily confined. During the 24 hours of the 17th the seismograph of this station recorded twenty-nine instrumental shocks, three before the earthquake and the rest after it. Recorded at Zikawei Observatory.

17, 12<sup>h</sup> 49<sup>m</sup> 24<sup>s</sup>\* [17, 20<sup>h</sup> 49<sup>m</sup> 24<sup>s</sup>\*]. Panay and Cuyo Islands. Earthquake of intensity IV. The origin of this shock was in the northern part of the Sulu Sea, and may be considered as a foreshock of the extensive earthquake of the 18th, although this second one originated further to the south.

17, 19<sup>h</sup> 52<sup>m</sup> [18, 3<sup>h</sup> 52<sup>m</sup>]. Naga (SE Luzon). Oscillatory earthquake of intensity II-III.

18, 2<sup>h</sup> 59<sup>m</sup> 27<sup>s</sup>\* [18, 10<sup>h</sup> 59<sup>m</sup> 27<sup>s</sup>\*]. Sulu Sea. Extensive earthquake originated between the meridians 121° and 122° E and the parallels 8° and 9° N. It shook with intensity VI-VII the peninsula of Zamboanga, western end of Mindanao, causing small cracks in the building of that town. The shocks were fairly perceptible to distances of more than 400 kilometers from the epicenter, that is, in the whole island of Mindanao, Basilan, the Sulu Archipelago, Palawan and Cuyo and in the western and central Visayas, Panay, Negros, Cebu and Bohol. This macroseism was recorded throughout the world, but fortunately did not have in the epicenter so much intensity nor caused sea waves as the one originated near to the same place in 1897.

18, 23<sup>h</sup> 18<sup>m</sup> [19, 7<sup>h</sup> 18<sup>m</sup>]. Naga (SE Luzon). Oscillatory earthquake of intensity III, preceded by subterranean rumbling.

20, 3<sup>h</sup> 56<sup>m</sup> 14<sup>s</sup>\* [20, 11<sup>h</sup> 56<sup>m</sup> 14<sup>s</sup>\*]. Zamboanga (W Mindanao). Oscillatory shock of intensity III. Apparently it had the same origin with the great earthquake occurred on the 18th.

24, 11<sup>h</sup> 13<sup>m</sup> 45<sup>s</sup> [24, 20<sup>h</sup> 52<sup>m</sup> 45<sup>s</sup>\*]. Guam (Mariana Islands). Earthquake shocks of intensity VI. It originated W of Guam near the meridian 143° E. The movements at Guam were large but slow, so they did not cause any damage in spite of their long duration. As a true macroseism it was recorded around the world.

24, 19<sup>h</sup> 34<sup>m</sup> 16<sup>s</sup>\* [25, 3<sup>h</sup> 34<sup>m</sup> 16<sup>s</sup>\*]. Tacloban (NE Leyte). Earthquake of intensity II-III, recorded at Manila and Butuan as originated in the Philippine Deep of the Pacific.

28, 14<sup>h</sup> 35<sup>m</sup> [28, 22<sup>h</sup> 35<sup>m</sup>]. Butuan (N Mindanao). Oscillatory earthquake direction NNE-SSW, intensity III, duration 6 seconds.

This month has been one of extraordinary seismic activity in the southern part of the Archipelago, as it is shown by the many reported shocks felt within and near the Mindanao Island, and by the fact that the Wiechert seismograph at Butuan recorded 154 disturbances; the days with seven or more were the 14th, 17th, 18th, 19th and 25th.



RECORDS OF THE MICROSEISMOGRAPH.

[Time: Greenwich mean. Midnight=0h. Instrument: Wiechert seismograph; 1,000 kilograms.  $A_N$ :  $T_0=5.9$ ,  $\epsilon=2.340$ ,  $\frac{F}{T_0^2}=0.024$ ;  
 $A_E$ :  $T_0=5.3$ ,  $\epsilon=1.783$ ,  $\frac{F}{T_0^2}=0.092$ . Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
344	1	Iv	eP	h. m. s.	3	64		
			L	20 19 51				
			M <sub>E</sub>	20 20 13				
			F	20 20 14				
345	2	I	eP	18 57 52				
			L	19 01 22				
			M <sub>E</sub>	19 01 22				
			F	19 17				
346	3	Iv	eP	3 26 16	4	151	63	Naga (SE Luzon).
			L	3 26 49				
			M <sub>E</sub>	3 27 00				
			M <sub>N</sub>	3 27 07				
347	4	IIv	eP	11 49 04	3	192		
			L	11 49 39				
			M <sub>N</sub>	11 49 44				
			M <sub>E</sub>	11 49 50				
348	4	Ir	eP	12 09 20	11	94	34	
			S	12 15 16				
			L	12 22 36				
			M <sub>N1</sub>	12 23 04				
349	4	Iv	M <sub>E1</sub>	12 23 57	10	74	32	
			M <sub>N2</sub>	12 29 30				
			M <sub>E2</sub>	12 34 26				
			F	12 13 36				
350	5	Id	eP	14 31 18	2	117	237	Manila (W Luzon).
			F	14 34				
			L	11 16 12				
			M <sub>N</sub>	11 16 24				
351	7	Iv	M <sub>E</sub>	11 16 25	2	45	29	N Luzon.
			M <sub>N</sub>	11 16 25				
			F	11 16 25				
			eP	11 20				
352	8	Iv	eP	20 53 00	4	45	29	N Luzon.
			L	20 53 53				
			M <sub>E</sub>	20 54 12				
			M <sub>N</sub>	20 54 24				
353	8	Iv	F	21 00	4	45	29	Legaspi (SE Luzon).
			eP	8 10 00				
			F	8 14				
			Iv	10 17 24				
354	8	Iv	eP	10 20	4	38		
			L	13 43 16				
			M <sub>N</sub>	13 43 42				
			F	13 43 54				
355	9	Iv	F	13 47	4	38		
			eP	7 28 44				
			F	7 32				
			Iv	13 26 32				
356	9	Iv	eP	13 29	4	38		
			F	13 29				
			Iv	21 35 06				
			F	21 37				
357	9	Iv	eP	21 37	4	38		
			F	21 37				
			Iv	0 02 55				
			F	0 03 19				
358	10	Iv	M <sub>E</sub>	0 03 31	2	26		Baguio (W Luzon).
			M <sub>N</sub>	0 03 31				
			F	0 08				
			eP	7 22 36				
359	10	I	F	7 36				
			eP	19 51 46				
			F	19 55				
			Iv	8 01 39				
360	10	Iv	eP	8 05				
			F	8 05				
			Iv	20 01 30				
			F	20 04 14				
361	11	Iv	eP	20 04 18	8	59		Butuan (N Mindanao).
			F	20 04 18				
			M <sub>N</sub>	20 04 18				
			F	20 26				

Records of the microseismograph—Continued.

No.	Date.	Character.	Phase.	Hour.			Amplitude.		Remarks.
							A <sub>N</sub> μ	A <sub>E</sub> μ	
363	14	Ir	eP	h.	m.	s.			
			L	5	10	29			
			M <sub>N</sub>		16	19			
			F		16	44	17	8	
364	14	Ir	eP	15	18	49			Butuan (N Mindanao).
			L		22	48			
			M <sub>N</sub>		23	08	16	9	
			F		33				
365	15	Ir	eP	5	15	48			
			L		19	36			
			M <sub>N</sub>		20	49	9	14	
			F		31				
366	16	Ir	eP	3	31	12			
			iS		41	06			
			eL		56	00			
			M <sub>E1</sub>		56	29	18	13	
			M <sub>N1</sub>		57	11	23	15	
			M <sub>N2</sub>		59	28	19	24	
			M <sub>E2</sub>	4	00	07	17	15	
			F	6	24				
367	16	IIv	eP	22	19	32			Eastern Mindanao.
			iS		21	37			
			iL		22	14			
			M <sub>E1</sub>		22	18	6	283	
			M <sub>N1</sub>		22	41	6	500	
			M <sub>N2</sub>		23	42	6	848	
			M <sub>E2</sub>		23	57	6	391	
			F	23	40				
368	17	Iv	eP	12	49	24			Panay and Cuyo Islands.
			F	13	01				
369	18	IIIv	eP	2	59	27			Sulu Sea. Maxima and end in both components lost by the force of the shock.
iL	3	00	24						
370	18	Iv	eP	9	29	50			
			L		30	35			
			M <sub>E</sub>		30	40	4	37	
			F		36				
371	20	Iv	eP	3	56	14			Zamboanga (W Mindanao).
			L		57	41			
			M <sub>E</sub>		58	16	3	26	
			F	4	10				
372	20	Iv	eP	15	38	38			
			F	16	00				
373	22	Iv	eP	12	46	11			
F		48							
374	23	Ir	eP	5	52	29			
			L		55	22			
			F	6	09				
375	24	IIr	eP	11	15	56			
			S		19	32			
			L		21	06			
			M <sub>N</sub>		21	22	8	73	
			M <sub>E</sub>		22	07	6	73	
			F	12	35				
376	24	Ir	eP	19	34	16			Tacloban (NE Leyte).
			S		35	38			
			F	20	22				
377	24	Iv	eP	23	45	47			
			F		49				
378	27	Ir	e	5	10	09			
			S		15	08			
			L		16	35	13	7	
			M <sub>E</sub>		38				
379	27	Iv	eP	22	52	38			
			F		55				
380	30	Iv	eP	14	36	52			
			F		39				
381	30	I	e	17	12	10			
			F		51				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

3, 3<sup>h</sup> 26<sup>m</sup> 16<sup>s\*</sup> [3, 11<sup>h</sup> 26<sup>m</sup> 16<sup>s</sup>]. **Naga** (SE de Luzón). Temblor oscilatorio, dirección NNE-SSW, intensidad V, duración 15 segundos. El origen de este temblor se hallaba fuera de la Provincia de Ambos Camarines en el mar hacia el N. Sintióse también en la Isla de Catanduanes. A 10<sup>h</sup> 40<sup>m</sup> [18<sup>h</sup> 40<sup>m</sup>] percibióse en Naga una ligerísima repetición de intensidad II-III.

3, 13<sup>h</sup> 21<sup>m</sup> [3, 21<sup>h</sup> 21<sup>m</sup>]. **Surigao** (NE de Mindanao). Temblor de tierra de intensidad III. Registróse débilmente en Butúan; su origen parece se hallaba al W de Surigao. El día siguiente 4 a 4<sup>h</sup> 40<sup>m</sup> [12<sup>h</sup> 40<sup>m</sup>] se sintió en Surigao otro choque del mismo carácter.

4, 11<sup>h</sup> 47<sup>m</sup> [4, 19<sup>h</sup> 47<sup>m</sup>]. **Candón** (W de Luzón). Temblor oscilatorio de intensidad III.

5, 11<sup>h</sup> 16<sup>m</sup> 12<sup>s\*</sup> [5, 19<sup>h</sup> 16<sup>m</sup> 12<sup>s</sup>]. **Manila** (W de Luzón). Temblor de tierra de intensidad II-III. El origen se hallaba hacia el W a unos 100 kilómetros de distancia en el Mar de la China.

7, 14<sup>h</sup> 09<sup>m</sup> [7, 22<sup>h</sup> 09<sup>m</sup>]. **Basco** (Islas Batanes). Temblor de tierra de intensidad III.

7, 20<sup>h</sup> 53<sup>m</sup> 00<sup>s\*</sup> [8, 4<sup>h</sup> 53<sup>m</sup> 00<sup>s</sup>]. **N de Luzón**. Temblor de tierra de intensidad IV, sentido en toda la parte más septentrional de la isla, comprendida por las Provincias de Cagayán, Kalinga e Ilocos Norte; el origen se hallaba al N hacia las Babuyan.

7, 22<sup>h</sup> 10<sup>m</sup> [8, 6<sup>h</sup> 10<sup>m</sup>]. **Basco** (Islas Batanes). Temblor de tierra susultorio, intensidad III. Repitió a 19<sup>h</sup> 16<sup>m</sup> (tiempo medio insular) con el mismo carácter e intensidad.

8, 8<sup>h</sup> 10<sup>m</sup> 00<sup>s\*</sup> [8, 16<sup>h</sup> 10<sup>m</sup> 00<sup>s</sup>]. **Legaspi** (SE de Luzón). Temblor oscilatorio, dirección N-S, intensidad III, duración 3 segundos.

10, 0<sup>h</sup> 02<sup>m</sup> 55<sup>s\*</sup> [10, 8<sup>h</sup> 02<sup>m</sup> 55<sup>s</sup>]. **Baguio** (W de Luzón). Temblor de tierra de intensidad II-III. El epicentro se hallaba hacia el E, en Nueva Vizcaya.

12, 6<sup>h</sup> 12<sup>m</sup> [12, 14<sup>h</sup> 12<sup>m</sup>]. **Guiuan** (SE de Sámar). Temblor oscilatorio, dirección SE-NW, intensidad III, duración 5 segundos. Registrado por el sismógrafo de Butúan.

13, 6<sup>h</sup> 41<sup>m</sup> [13, 14<sup>h</sup> 41<sup>m</sup>]. **Baguio** (W de Luzón). Temblor de tierra de intensidad II-III.

13, 20<sup>h</sup> 01<sup>m</sup> 30<sup>s\*</sup> [14, 4<sup>h</sup> 01<sup>m</sup> 30<sup>s</sup>]. **Bútuan** (N de Mindanao). Temblor de tierra oscilatorio, intensidad II-III. A 15<sup>h</sup> 18<sup>m</sup> 49<sup>s\*</sup> [14, 23<sup>h</sup> 18<sup>m</sup> 49<sup>s</sup>] se sintió otro del mismo carácter. El origen de ambos se hallaba hacia el E de Mindanao en el Mar Pacífico. Durante este día 14 el sismógrafo de Butúan registró otros siete sismos imperceptibles, todos del mismo origen, excepto uno.

16, 22<sup>h</sup> 19<sup>m</sup> 32<sup>s\*</sup> [17, 6<sup>h</sup> 19<sup>m</sup> 32<sup>s</sup>]. **E de Mindanao**. Temblor oscilatorio de intensidad V-VI, de larga duración y de oscilaciones lentas. El origen parece que se hallaba en la parte S del Valle del Agusan, de donde no poseemos datos. Sintióse en todos los distritos de Agusan, Bukidnon, Dávao, Cotabato y en parte de Misamis. El observador de Butúan llama la atención acerca de la lentitud de los vaivenes, los cuales hacían mover los objetos pero sin causar sobresalto aunque sí perceptible mareo. La dirección del movimiento de los objetos y del agua observada en tanques era de S-N: precedió un ténue ruido procedente de la misma dirección. Los caños de un pozo artesiano cesaron de manar en lo más fuerte del movimiento, pero luego salió el agua con mayor presión y a golpes como detenida momentáneamente. El sismógrafo de esta estación registró durante las 24 horas del 17 veintinueve sismos, de los cuales veintiseis ocurrieron después del temblor descrito.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.

17, 12<sup>h</sup> 49<sup>m</sup> 24<sup>s\*</sup> [17, 20<sup>h</sup> 49<sup>m</sup> 24<sup>s</sup>]. **Islas de Panay y Cuyo.** Temblor de tierra de intensidad IV. Su origen se hallaba en la parte N del Mar de Joló y puede considerarse como un choque preliminar del gran terremoto del 18, aunque este último se originó mucho más al S.

17, 19<sup>h</sup> 52<sup>m</sup> [18, 3<sup>h</sup> 52<sup>m</sup>]. **Naga (SE de Luzón).** Temblor oscilatorio de intensidad II-III.

18, 2<sup>h</sup> 59<sup>m</sup> 27<sup>s\*</sup> [18, 10<sup>h</sup> 59<sup>m</sup> 27<sup>s</sup>]. **Mar de Joló.** Terremoto de grande extensión originado en el Mar de Joló. Tuvo su epicentro entre los meridianos 121° y 122° E y los paralelos 8° y 9° N, sacudió con intensidad VI-VII la tierra más occidental de la Isla de Mindanao, la península de Zamboanga, produciendo algunas pequeñas grietas en los edificios de esta población. Las ondas sísmicas fueron bien perceptibles a distancias de más de 400 kilómetros del epicentro, es decir; en toda la Isla de Mindanao, Basilan, Archipiélago de Joló, Palawan y Cuyo y en las Visayas occidentales y centrales: Panay, Negros, Cebú y Bohol. Fué un verdadero macrosismo registrado por todos los observatorios del mundo, aunque por fortuna, no desarrolló la misma intensidad, ni produjo las olas que el de 1897 y otros originados en la misma línea sismotectónica.

18, 23<sup>h</sup> 18<sup>m</sup> [19, 7<sup>h</sup> 18<sup>m</sup>]. **Naga (SE de Luzón).** Temblor oscilatorio, intensidad III, precedido de ruido subterráneo.

20, 3<sup>h</sup> 56<sup>m</sup> 14<sup>s\*</sup> [20, 11<sup>h</sup> 56<sup>m</sup> 14<sup>s</sup>]. **Zamboanga (W de Mindanao).** Temblor oscilatorio, intensidad III. Al parecer tuvo el mismo origen que el del día 18.

24, 11<sup>h</sup> 13<sup>m</sup> 45<sup>s</sup> [24, 20<sup>h</sup> 52<sup>m</sup> 45<sup>s</sup>]. **Guam (Islas Marianas).** Temblor de intensidad VI. Originóse al W de Guam y a bastante distancia hacia el meridiano 143° E; produjo en Guam ondulaciones grandes pero lentas, debiéndose a esto el que no causasen desperfectos a pesar de su larga duración. Fué macrosismo registrado en toda la tierra.

24, 19<sup>h</sup> 34<sup>m</sup> 16<sup>s\*</sup> [25, 3<sup>h</sup> 34<sup>m</sup> 16<sup>s</sup>]. **Tacloban (NE de Leyte).** Temblor de tierra de intensidad II-III; registrado también en Butúan como de origen algo lejano, en el Abismo Filipino.

28, 14<sup>h</sup> 35<sup>m</sup> [28, 22<sup>h</sup> 35<sup>m</sup>]. **Butúan (N de Mindanao).** Temblor oscilatorio, dirección NNE-SSW, intensidad III, duración 6 segundos.

Este mes ha sido de excepcional actividad sísmica en la parte meridional del Archipiélago; el sismógrafo Wiechert de Butúan registró 154 sismos; los días más perturbados fueron el 14, 17, 18, 19 y 25.

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS

# WEATHER BUREAU

MANILA CENTRAL OBSERVATORY

APR 20 1918  
BULLETIN FOR DECEMBER, 1917

PREPARED UNDER THE DIRECTION OF

REV. JOSÉ ALGUÉ, S. J.

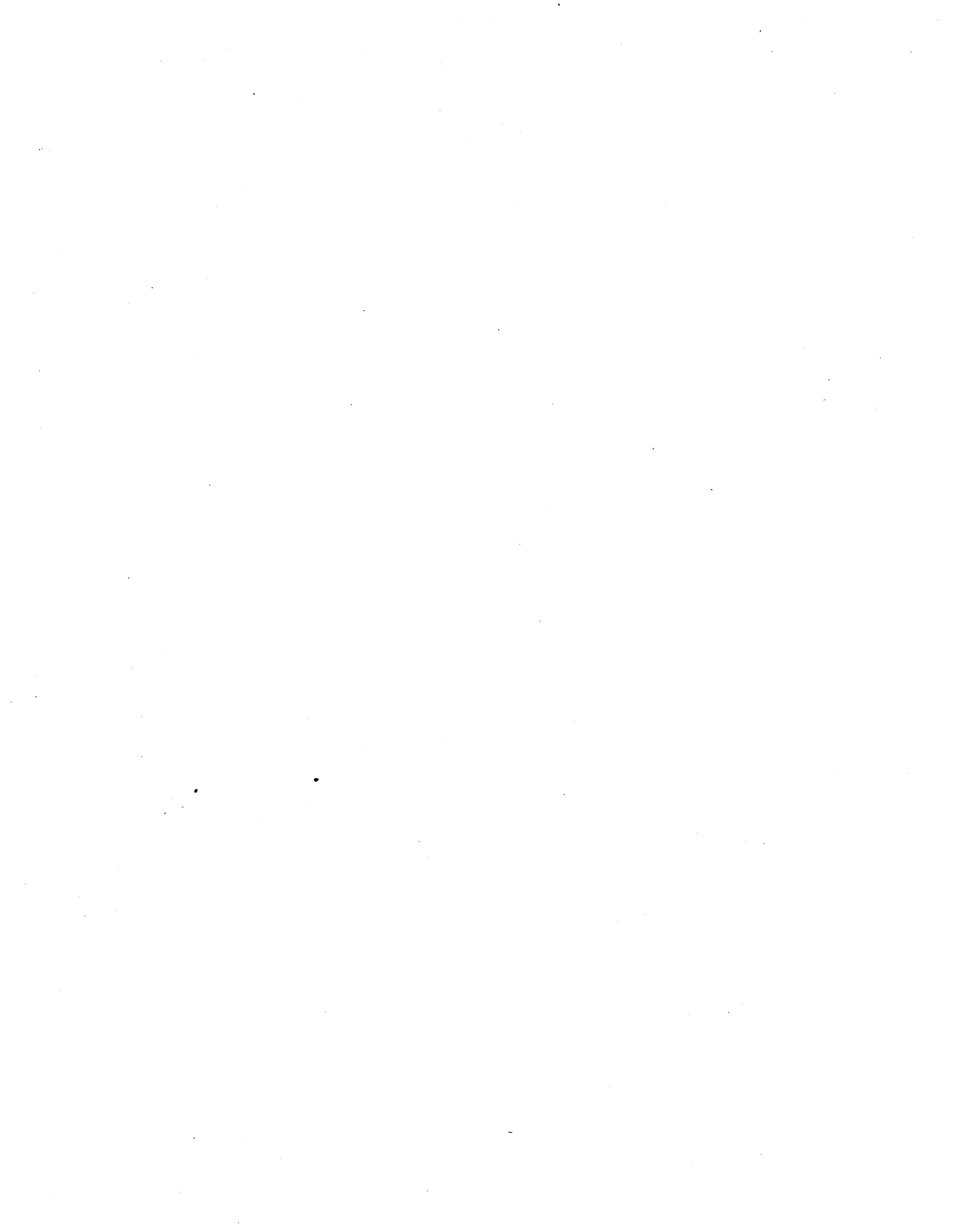
DIRECTOR OF THE WEATHER BUREAU

MANILA  
BUREAU OF PRINTING  
1918



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**BULLETIN FOR DECEMBER, 1917.**





# METEOROLOGICAL BULLETIN FOR DECEMBER, 1917.

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

## GENERAL WEATHER NOTES.

Pressures and temperature.—The mean atmospheric pressure for this month in the Philippines is higher than that of the preceding year, but lower than the December's normal. Thus that of Manila differs from the normal by  $-1.68$  mm., and from the monthly mean of December, 1916, by  $+0.83$  mm. With a few exceptions the highest pressures were observed on the 4th, and the lowest on the 8th.

The mean monthly temperature is almost identical with that of the preceding year in Mindanao and the Visayas, while it is slightly lower in Luzon. The absolute maximum and minimum temperatures of the month for Manila were  $32.1^{\circ}$  C. on the 3d, and  $19.0^{\circ}$  C. on the 31st. The extreme temperatures for Baguio were  $24.5^{\circ}$  C.,  $10.4^{\circ}$  C. on the top of Mirador, and  $24.5^{\circ}$  C.,  $10.5^{\circ}$  C. in the valley.

PRESSURE AND TEMPERATURE AT THE FIRST AND SECOND CLASS STATIONS FOR DECEMBER, 1917.

Station.	Pressure.						Temperature.					
	Mean.	Departure from Dec., 1916.	Highest mean.	Day.	Lowest mean.	Day.	Mean.	Departure from Dec., 1916.	Highest.	Day.	Lowest.	Day.
	mm.	mm.	mm.		mm.		°C.	°C.	°C.		°C.	
Zamboanga	757.38	+1.33	759.58	1	755.41	7	25.8	0	32.7	15	21.1	12
Tagbilaran	57.22	+ .76	59.16	2	55	7, 8	25.5	-.1	32.3	21	20.9	4
Surigao	57.33	+ .85	59.35	3	55.01	8	25.8	+ .3	32	9	22	10
Cebu	57.43	+ .92	59.40	4	55.17	7	27	+ .4	32	14	22.7	24
Hiloilo	57.38	+ .98	59.20	2	55.37	7	26.2	0	31.4	13	22.3	8
Tarlac	57.55	+ .87	59.46	3	55.26	8	25.6	-.1	33	20	19.4	14
Tacloban	57.54	+ .81	59.64	4	55.32	8	26.2	+ .7	33.2	14	22.1	13
Capiz	57.63	+ .48	59.63	4	55.33	8	26.4	-.1	32	5	22	6
Calbayog	57.78	+ .80	59.82	4	55.55	8	25.4	0	32.8	18	20.6	1
Legaspi	58.12	+ .85	60.26	4	55.91	8	25.8	-.5	31.2	4	20.9	2
Atimonan	58.68	+ .95	60.75	4	56.75	8	25.4	-.7	29.9	2	21.1	31
Ambulong, Tanauan	58.01	+ .95	60.21	4	56.12	8	25.4	-.6	32.7	2	21.2	31
Paracale	58.75	+ .78	60.85	4	56.76	8	25.2	-.8	30.8	2	21.7	3, 31
Manila	58.62	+ .83	60.99	4	56.75	8	24.8	-.1	32.1	3	19	31
San Isidro	58.89	+ .82	61.02	4	57.26	8	24.9	-.5	32.1	10	17.4	31
Dagupan	58.07	+ .89	60.17	4	56.64	8	26	-.4	34.3	12	20.3	27
Baguio <sup>a</sup>	636.19	+ .53	638.21	4	634.55	8	16.9	-.6	24.5	12, 18	10.4	28
Vigan	758.44	+ .92	760.16	4	756.79	11	25.6	-.7	32.8	4	19.6	8, 27
Tuguegarao	60.49	+ .98	62.88	31	58.35	11	22.7	-1.2	30.8	14	17.1	31
Laoag	58.83	+1	60.36	4	56.78	11	(b) 24.8	-.8			(b) 17	31
Aparri	61.15	+1.31	63.42	4	58.77	11	22.4	-1.3	29.8	14	17	30

<sup>a</sup> The barometric readings of this station are not reduced to sea level.

<sup>b</sup> 28 days of observation.

Rainfall.—The total rainfall for this month is generally below the normal and also below the total for December, 1916, in the Visayas and Mindanao, while in Luzon the number of stations giving a total amount of rainfall greater than the normal and than that of the preceding year is almost equal to the number of those giving a smaller amount. The quantity of water collected during this month in the gauges of the Central Observatory was 75.7 mm., which is 0.3 mm. below that of December, 1916, and 13 mm. above the normal.

## RAINFALL AT VARIOUS STATIONS OF THE WEATHER BUREAU DURING THE MONTH OF DECEMBER, 1917.

Station.	Total.	Departure from December, 1916.		Departure from normal.	Rainy days.	Departure from December, 1916.	Greatest rainfall in a single day.	Day.	Station.	Total.	Departure from December, 1916.		Departure from normal.	Rainy days.	Departure from December, 1916.	Greatest rainfall in a single day.	Day.
		mm.	mm.								mm.	mm.					
Jolo	233.6	-63.5	+66.4	22	-3	27.2	11	Calapan	205.9	-98.2	-3	24	-3	30.7	27		
Isabela, Basilan	152.2	-159	5	17	-3	32.3	29	Virac	429.1	-52.6	-13	26	-2	70.6	29		
Zamboanga	219.4	-60.2	+100.9	17	-1	63.5	23	Naga	185	-24.6	-103	18	-3	46.5	7		
Davao	82.2	-101	-114.7	12	-1	16.8	8	Batangas	135.3	+70.1	+19.7	8	-5	68.6	9		
Cotabato	104.3		-21	16		17.8	17	Lucena	309.2	+11.3		19	-4	74.4	19		
Cagayan, Misamis	90.9	+19.2		16	+6	19	2	Atimonan	481.6	+59	+84.6	26	+3	88.6	6		
Butuan	220.1	-75.7	-72.6	25	-1	50.3	9	Ambulong, Tanauan	46.9	-20.6		9	-2	17.1	19		
Mambajao	235.2			16		61.2	6	Canlubang, Calamba	118.4	-7.6		12	-4	36.3	19		
Dumaguete	210	-127.5		18	-1	43.4	10	Paracale	749.6	-46.1		29	+1	97.9	8		
Yap, Western Carolines	238.4	+76.3		22	-2	49	23	Santa Cruz, Laguna	180.2	+9.9		18	-5	42.7	19		
Tagbilaran	219.5		+61.3	14		50.6	3	Manila	75.7	-3	+13	16	+3	21	19		
Iwahig	360.2	-448.9		20	-1	104.4	30	Anipolo	215.8	+128.2		22	+8	43.1	17		
Surigao	330.7	-286.5	-190.4	25	-4	48.4	6	Iba	64	+36	+32.9	12	+4	25.9	17		
Maasin	167.4	-228.2	-133.8	10	-6	59.7	4	San Isidro	40.9	+4.3	-6.9	11	-1	15.3	20		
Cebu	103	-33.5	-42.7	17	-2	21.6	27	Tarlac	35.9	+25.6	-4	9	+4	8.4	2		
Iloilo	72.7	-14.1	-40.9	13	-1	25.9	26	Baler	462.9	+32.8	+92.9	16	-9	166.4	20		
Cuyo	138.2	+76.8	+80.4	10	+2	33.8	25	Dagupan	85.1	+54.6	+65.3	7	+3	66.3	6		
Ormoc	110.2	-281.4	-84.3	22	-3	28.4	28	Bolinao	1	-7.1	-11.4	1	-6	1	29		
Guiuan	423.7	-92.8		27	-2	143	27	Baguio	146.3	+121.7	+88.6	14	+6	52.6	11		
Tacloban	216.3	-302.8	-140.9	22	-7	64	28	San Fernando, Union	17.3	+5.9	+8.3	5	+3	5.6	9		
Capiz	550.9	+385.1	+296.1	22	-2	276.4	26	Echague	262.6	+34.8	+94.5	25	-3	30	10		
Borongan	820.6	+267.9	+196.7	25	-5	221.2	26	Candon	4.6	-5.3	-6.6	1	-4	4.6	11		
Catbalogan	199.1	-214.2		23	-3	36.4	28	Vigan	0	-7.3	-7.1	0	-3	0	0		
Calbayog	232.7	+4.8	-40.8	26	+1	35.8	17	Tuguegarao	166.2	-169.7	+8.9	11	-9	70.9	9		
Masbate	207.7	-5.5	+3.1	17	-5	42.4	31	Laosg	.8	-49.1	-24.1	1	-6	.8	7		
Romblon	230.5	-59.2	+4.5	21	-9	62.7	8	Aparri	273.8	-206.1	+13.1	27	-1	37.6	23		
Batag	633.1	+303.8		18	-7	112.3	29	Cape Bojeador	22.4	-66.7		3	-9	9.4	23		
Sorsogon	842.8	-696.2		25	-2	115.9	28	Santo Domingo, Bata-									
Legaspi	548.5	+73.6	+62	24	-3	108.4	26	nes	536.3	-202.8	+144.8	30	0	155.1	23		
Sumay, Guam	120.7	+64.7	-30	19	+9	27.9	27										

## DEPRESSIONS AND TYPHOONS.

Only a low-pressure area of very little importance was observed in the Philippines during the month; it crossed Mindanao in a westerly direction on the 8th, and passed near the southern part of Palawan Island on the 9th. Another low-pressure area formed east of southern Formosa on the 1st and moved ENE on the 2d and 3d. On the 29th a depression seems to have formed over the Pacific between the Bonins and the northern Loochoos; it moved northeastward on the 30th and 31st to the southeast and east of Japan.

## NOTAS GENERALES DEL TIEMPO.

**Presión y temperatura.**—La presión atmosférica media de este mes en Filipinas es mayor que la del año pasado, pero menor que la normal de diciembre. Así la de Manila difiere de la normal en  $-1.68$  mm., y de la media mensual de diciembre de 1916, en  $+0.83$  mm. Con pocas excepciones las presiones más altas se observaron el día 4, y las más bajas el 8.

La temperatura media mensual es casi idéntica a la del año pasado en Mindanao y Visayas, al paso que es algo menor en Luzón. Las temperaturas máxima y mínima absolutas del mes en Manila fueron  $32.1^{\circ}$  C. y  $19.0^{\circ}$  C. observadas los días 3 y 31, respectivamente. Las temperaturas extremas de Baguio fueron  $24.5^{\circ}$  C.,  $10.4^{\circ}$  C. en la cumbre del Mirador, y  $24.5^{\circ}$  C.,  $10.5^{\circ}$  C. en el valle.

**Precipitación acuosa.**—La lluvia total de este mes es generalmente menor que la normal y menor también que la de diciembre de 1916 en Visayas y Mindanao, mientras que en Luzón el número de estaciones que dan una cantidad total de lluvia mayor que la normal y que la del año pasado es casi igual al número de las que la dan menor. La cantidad de agua recogida durante este mes en los pluviómetros del Observatorio Central ha sido  $75.7$  mm., que es  $0.3$  mm. menor que la de diciembre de 1916, y  $13$  mm. mayor que la normal.

## DEPRESIONES Y TIFONES.

Una sola área de baja presión de muy poca importancia se observó en Filipinas durante este mes: cruzó Mindanao en dirección al W el día 8, y pasó cerca de la parte meridional de la Isla de Palawan el 9. Otra área de baja presión se formó al E del sur de Formosa el día 1 y se movió al ENE el 2 y el 3. El día 29 parecía haberse formado una depresión en el Pacífico entre las Islas Bonín y la parte norte de Loochoos: se movió al NE el 30 y 31 por el SE y E de Japón.

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.	Air temperature. <sup>b</sup>				Underground temperature.				Relative humidity (mean)	Vapor pressure (mean)	Radiation.			Evaporation. <sup>b</sup>		
	Pressure (mean).	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.	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	759.56	26	31	22.5	27.6	28.7	28.3	28.4	28.3	27.9	85.1	21.1	21.1	50.2	2.7	1.9
2	59.59	26.3	31.4	23.2	28.1	29	28.5	28.7	28.4	28.1	85.1	21.5	21.3	53.3	2.8	2
3	60.09	26	32.1	22.5	28.2	29.2	28.6	28.8	28.3	27.9	84.1	20.8	20.8	56	2.6	2
4	60.99	24.6	27.3	22.5	27.9	28.5	28.7	28.8	28.3	28	88.9	20.3	20.7	43.2	1.3	1.1
5	60.15	25.6	31.5	22.4	27.7	28.5	28.6	28.6	28.4	28	81.5	19.6	20.5	53.2	3.3	2.9
6	58.48	25.8	31	22.1	27.5	28.5	28.4	28.7	28.3	27.9	83.1	20.2	20.5	51.2	3.1	2.6
7	57.27	25.2	30.5	22	27.6	28.3	28.5	28.5	28.3	27.9	82.7	19.5	21.3	56.3	3	2.3
8	56.75	24.7	29.3	21.9	27.5	27.9	28.4	28.4	28.3	27.9	81.6	18.6	19.7	46.5	2.4	1.9
9	57.87	23.1	24.6	21.9	27.2	27.1	28.2	28.2	28.4	27.9	95.1	20	20.8	34	0	.4
10	57.68	25.2	30.9	21.7	26.7	27.7	27.8	28	28.3	27.9	88.6	21	20	53	2	1.5
11	57.31	25	30.9	21.7	27	28.1	27.8	28	28.3	27.9	88.6	20.7	20	54.9	2	1.5
12	57.90	24.9	30	21.2	27.3	28	27.9	28.1	28.3	27.9	89.1	20.8	19.6	47	2.2	1.4
13	58.55	25.2	31.3	21.1	27.1	27.9	27.9	28.1	28.3	27.9	86.2	20.2	19.2	54	3	1.7
14	58.74	25.4	31	21.4	27.2	28.1	27.9	28.1	28.3	27.9	87.4	20.9	19.3	51.7	2.3	1.8
15	58.78	25.2	30.7	21.5	27.3	28.1	27.9	28.1	28.3	27.9	88.4	21	19.8	47.2	1.7	1.3
16	58.16	24.7	28.3	22.6	27.5	27.7	28	28.1	28.3	27.9	89.8	20.7	21.5	43.4	1	.9
17	58.30	25.2	31.3	21.7	27.1	27.8	27.9	28.2	28.3	27.9	88	20.8	20.3	47.8	2	1.6
18	59.03	25.7	30.8	22.4	27.3	28.1	27.9	28.1	28.3	27.9	83.7	20.3	21	51	2.6	2.1
19	59.74	24.1	27.6	22.4	27.2	27.7	27.6	28.1	28.2	27.8	92.9	20.7	21.6	42.3	.4	.6
20	59.03	24.7	29.7	22.5	26.8	27.5	27.8	28	28.2	27.9	88.6	20.3	21.5	54.8	1.4	1
21	58.61	25.3	30.8	21.5	26.8	28.1	27.8	28	28.3	27.9	85.8	20.5	20	54.8	2.4	1.5
22	58.71	25.1	31	21.3	27	28.2	27.8	28	28.3	27.9	88	20.7	18.8	54.5	2.1	1.4
23	58.62	24.9	29.5	21.5	27.1	27.8	28	27.9	28.3	27.8	89.1	20.7	20	53.2	2.9	1.6
24	58.13	24.8	29.1	21.7	26.9	27.8	27.8	28	28.1	27.7	87.4	20.1	20.2	47.2	2	1.6
25	57.31	25	29.2	22.5	27.3	27.6	28	28	28.3	27.8	78.3	18.3	20.2	42	3.8	3
26	57.51	24	27.2	21.9	26.7	27.2	27.8	27.8	28.2	27.8	82.5	18.2	20	37.5	1.9	1.5
27	58.08	24.3	28.6	21	26.5	27.3	27.7	27.8	28.1	27.7	76	17.1	18.6	42.7	3.4	2.8
28	58.58	23.5	27.2	20.6	26.2	26.8	27.5	27.5	28.1	27.7	75.8	16.2	17.9	41.2	2.7	1.9
29	58.82	23.8	28.4	20.1	26.1	27.1	27.3	27.3	28	27.7	77.5	16.9	18	46.6	2.8	2
30	58.96	23.5	29.6	20	26	27	27.3	27.5	28.1	27.7	78.1	16.6	17.8	47.7	3.1	2.7
31	59.91	23	28.2	19	25.7	26.5	27.1	27.2	28	27.7	78.4	16.2	16.5	46	2.7	2.1
Mean Total	758.62	24.8	29.7	21.7	27.1	27.9	28	28.1	28.3	27.9	85	19.7	20	48.5	2.3	1.8
Departure from normal	-1.68	-0.3	-0.2	+0.4							+3.6	+0.5			71.6	54.6

Day.	Wind.				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.	Amount (mean).	Form and direction.		Upper.		Lower.	On the tower.		In the park.	
						0-10.								
1	W quad.	130	14	W	4.2	Ci.-Cu.	S	Cu.		7	35		∠° p.	
2	W	110.5	13.5	W	4.9	Ci.		Cu. SEbyS, E		8	00		∠° p.	
3	E quad.	130	16	ESE	4.3	Ci.		Cu. E		7	35	0.5	0.4	d° p.
4	NE quad.	134.5	10.5	NE	9.2	A.-Cu.	E	N, s.-Cu. ENE		0	30	.3	.3	d a. p. ∠ p.
5	NNE	183.5	16	NNE	5.2	Ci.-Cu.	SE	Cu. E		6	40			∠ d° p.
6	NE	219.5	21.5	NNE	6.5	A.-Cu.	E	s.-cu., cu. ENR		5	40	1.5	1.5	∠ d° p.
7	N quad.	186.5	17	N	8.2	Ci.		Cu. NE		3	40	.3		d a.
8	N	215	16	NNE	9.3	A.-Cu. EbyN		S.-Cu., Cu. E		0	05	6.6	6.6	∠ a. ∠° p.
9	NNW	80	12	NNW	10	Ci.-S.		N. E		0	00	14.9	14.4	∠ a. d p.
10	WSW	101.5	12	WSW	5.5	Ci.-S.	S	Cu. NE, ESE		7	10	4.8	5.1	∠ p. p.
11	W quad.	99.5	11	W	6.8	A.-Cu. ESE		Cu.-N, E, ESE		4	50	.9	1	∠ a. ∠ d° p.
12	W quad.	91.5	13	WNW	7	Ci.		cu.-N, EbyS, E		5	55			∠ a. ∠ d° p.
13	W	129.5	15	W	4.2	A.-Cu. ESE		Cu.-N, EbyN		8	05			∠ a. ∠ d° p.
14	N quad.	119.5	13.5	SW	7	A.-Cu. ENE		Cu. ENE		5	35			∠ a. ∠ d° p.
15	E quad.	101.5	10	WSW	6.9	A.-Cu.		Cu. E		5	10	4.6	3.8	∠ a. ∠ d° p.
16	NE quad.	81	7	WNW	9.8	Ci.-S.		Cu.-N, ENE		0	00	.1	.2	d° p.
17	N	126	15	N	8.8	A.-Cu. E		Cu., cu.-N. ENR		2	05	3.6	3.3	∠ a. ∠ d° p.
18	NE	138	11.5	SW	6.9	A.-Cu. E, ESE		Cu. ENE, E		5	55	4.1	4.3	∠ a. ∠ d° p.
19	NE	92	11	NNE, NE	9.9	A.-Cu.		N. E, NE		0	05	21	21.9	∠ a. p.
20	N quad.	124.5	12	NEbyE	9.4	A.-Cu.		Cu. E		2	20	1.4	1.1	∠ a. p.
21	N quad.	101.5	14	NNW	6.7	A.-Cu. E, NE		Cu. E, ESE		6	55			∠ a. ∠ d° p.
22	NE	113	13.5	NE	6.7	A.-Cu. E		Cu. ENE		5	25	1.8	2.3	∠ a. ∠ d° p.
23	NE	47	10	SW	7.9	Ci.	W	Cu. ENE		3	25	9.3	9.7	∠ a. p. d° p.
24	NNE	59	6.5	SW	7.7	A.-Cu. E		Cu. NE		1	35			d a.
25	N, NNE	193	20	N	8.6	A.-Cu. E		Cu. E		1	00			
26	N quad.	101.5	14	NNW	9.9	A.-Cu. SE		S.-Cu. ENE		0	00			d° a. p.
27	N quad.	125.5	10	NE	9.2	A.-Cu. NE		Cu. NE		0	20			
28	N	151	12	NNW	9.7	A.-Cu. SSW		s.-cu. E, ENE		0	45			
29	N	140	11	NbyW	8.8	A.-Cu. ENE		Cu. E		2	30			
30	N quad.	137	12	NNE	7.6	Ci.		Cu. ENE		4	05			
31	N, NNW	144	13	WSW	9.3	A.-Cu. SW		Cu. ENE		0	50			
Mean Total		126	13		7.6					3	40			
Departure from normal		-976.9			+1.4					-41	14	+13		

\* All the mean values given in this table are deduced from hourly observations.  
<sup>b</sup> These values are taken from instruments mounted in the Observatory Park, 15 meters above ground.

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 <sup>b</sup> (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. <sup>c</sup>	Free exposure (total).	Shelter (total).	
	mm.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	Per ct.	mm.	°C.	°C.	mm.	mm.	
1.	637.24	17.6	23.3	1.20p.	14.9	6.20a.	24	1.45p.	14.1	5.55a.	89.7	13.4	12.3	56.7	1.5	0.9	
2.	37.34	17.9	23	0.05p.	15.5	6.30a.	23.4	10.00a.	14.3	6.15a.	90	13.7	12.4	60.4	1.2	.8	
3.	37.68	17	22.4	9.30a.	14.4	6.00a.	23.5	10.50a.	13.6	5.50a.	91	13.1	12.6	54.7	1	.8	
4.	38.21	17.5	24.3	11.40a.	13.9	5.00a.	24.5	0.30p.	12.5	5.25a.	84.5	12.5	10.6	55.4	2.8	1.9	
5.	37.64	17	22.2	0.30p.	14.4	4.25a.	22.7	9.35a.	13.4	3.15a.	91.5	13.2	11.4	54	.8	.6	
6.	36.49	17.3	21.9	Noon	14.2	3.25a.	23.9	11.50a.	13	5.55a.	93	13.7	10.8	57	.9	.7	
7.	35.10	16.6	22.3	11.20a.	13.9	12 m. n.	22.9	0.40p.	13.4	12 m. n.	91.7	12.8	13.4	53	.9	.7	
8.	34.55	16.6	22.8	10.40a.	12.4	6.00a.	22.9	11.15a.	11.7	6.15a.	80	11	11.1	54	5	2.6	
9.	35.42	17.1	23.1	10.05a.	14.6	6.00a.	23	9.40a.	13.7	6.05a.	87.2	12.5	12	50.3	1.2	1.1	
10.	35.60	18	24.3	0.05p.	15.1	4.20a.	23	0.25p.	14.5	5.00a.	84.2	12.9	12	54	3.4	1.9	
11.	35.23	17.6	23.5	9.55a.	15.3	9.30p.	23.4	10.10a.	14.2	12 m. n.	85.7	12.8	13.6	51.7	1.6	1.1	
12.	35.86	17.7	24.5	0.40p.	15.3	0.05a.	24.2	0.55p.	14	0.50a.	87.5	13.2	13.3	57.3	2.2	1.5	
13.	36.40	17.6	23.5	10.20a.	14.9	4.35a.	24.1	10.35a.	13.8	6.05a.	90.5	13.4	13.6	53	1.1	.8	
14.	36.72	18	23.3	1.35p.	15.3	3.50a.	24.1	2.00p.	14.5	3.30a.	90.2	13.7	13.6	58.3	1.1	.9	
15.	36.57	17.2	22.9	9.40a.	14.9	4.00a.	23.7	10.10a.	13.9	4.15a.	90.8	13.3	13.5	52.2	1.6	.9	
16.	35.88	17	22.4	10.40a.	14.5	0.55a.	23.9	0.20p.	13.6	6.00a.	88.3	12.8	12.7	53.8	1.4	1	
17.	36.24	17.2	22.5	0.30p.	14.4	3.35a.	24.1	0.35p.	12.9	3.50a.	90	13.2	12.8	57.4	1.8	1	
18.	36.82	17.8	24.5	0.20p.	14.3	4.25a.	24.4	1.00p.	14.1	5.05a.	84.5	12.8	12.7	54	3.7	2	
19.	37.18	17.6	23.8	11.30a.	13.8	4.00a.	24.5	0.35p.	13.4	3.10a.	78.5	11.6	12.7	54.4	4.4	3.3	
20.	36.50	17	21.7	11.15a.	14.7	7.05a.	22.1	11.35a.	15	1.40a.	84.2	12.1	12.7	53.5	3.5	1.9	
21.	36.48	18.2	23.5	Noon	14.1	5.00a.	24.5	11.05a.	13.7	6.30a.	79.3	12.2	13	53.9	3.1	1.8	
22.	36.64	16.8	21.3	0.55p.	14.4	4.30a.	23.2	11.50a.	14.4	3.50a.	92.8	13.2	12.8	45.6	1.2	.6	
23.	36.33	17.4	21.8	9.50a.	14.4	6.25a.	23.5	10.10a.	14	6.00a.	92.7	13.8	13.7	52.8	.7	.5	
24.	35.87	17	23.3	0.40p.	14.2	12 m. n.	23	1.30p.	14	11.40p.	91.5	13.2	13.7	53	2	1.5	
25.	35.03	16.6	22.5	11.05a.	13.3	11.00p.	23.5	0.05p.	13	10.00p.	85.7	12	12.6	52.1	3.5	1.6	
26.	34.90	16.3	22.4	10.40a.	12	12 m. n.	22.9	2.00p.	12	6.10a.	79.2	10.8	11.3	53	2.9	1.7	
27.	35.07	15	21.9	2.05p.	10.7	12 m. n.	21.9	2.00p.	10.7	12 m. n.	76.3	9.4	10.5	52.8	4.7	2.9	
28.	35.31	13.9	20.4	0.35p.	10.4	0.45a.	20	0.55p.	10.5	0.45a.	81.5	9.7	9.4	47.1	3.4	1.9	
29.	35.69	14.8	20.4	10.40a.	12.8	0.05a.	20.8	11.00a.	12.6	6.00a.	83.3	10.5	11.6	53.9	1.6	1.2	
30.	35.74	14.6	22	10.00a.	10.7	12 m. n.	21.9	10.10a.	10.9	12 m. n.	86.8	10.8	11.2	53.3	2.9	1.6	
31.	36.23	14.5	21.4	1.10p.	10.6	0.25a.	21.5	0.35p.	10.9	0.05a.	77	9.4	10	54	4.5	2.8	
Mean	636.19	16.9	22.7		13.8		23.2		13.2		86.4	12.3	12.2	53.8	2.3	1.4	
Total															70.6	44.4	

Day.	Wind.				Amount (mean).	Clouds.		Sunshine.	Rain, 24 hours beginning 6 a. m.	Miscellaneous.
	Prevailing direction. <sup>d</sup>	Total movement.	Maximum hourly velocity.	Direction at the time of the maximum velocity.		Upper.	Lower.			
		Km.	Km.		0-10.			h. m.	mm.	
1.	W, SW	215.6	20.3	W	4.3	Ci.	Cu. ENE	6 10	4.8	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
2.	E	222.1	19.6	W	5	Ci.	Cu. ESE	5 00	6.9	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
3.	E	297.7	27.7	E	5.4	Ci.	Cu. SE	4 40	10.4	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
4.	E	228.3	17.4	E	3.6	Ci.	Cu. N	5 55		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
5.	E quad.	249.4	19.9	SE	5.3	A.-Cu.	ESE	2 50	7.1	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
6.	W quad.	154.8	14.8	SW	4.3	Ci.	Cu. SE	5 15	.8	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
7.	Variable	260.6	23	SE	7.4	Ci.-S.	SSE	3 05	.3	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
8.	E	432.7	28.5	E	2.6	Ci.	Cu.-N.	7 00		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
9.	E, SE	281.3	22.8	SE	5.9	Ci.	Cu. E	2 40	5.8	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
10.	E	276.8	23	E	6.3	A.-Cu.	SSW	4 20		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
11.	E	286.2	19.5	E	6.3	Ci.	SSW	3 35	52.6	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
12.	E	271.2	22	E	4.4	Ci.	SW	5 30	2.5	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
13.	E	308.2	24.6	E	5.3	Ci.	Cu. EbyS	4 15	.5	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
14.	W, N	260.9	18	W	7	Ci.	Cu.-N.	4 55	10.7	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
15.	E	258.5	20.6	E	4.1	Ci.	Cu. EbyS	2 45		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
16.	E	286.8	18.3	E	4.6	Ci.	Cu.-N.	3 30	28.4	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
17.	E quad.	248.8	16.7	NW	5.1	Ci.	Cu.-N.NW,WNW	6 15		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
18.	E	300.7	22.2	E	2.7	Ci.	Cu. ENE	5 00		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
19.	E	363.6	20.7	E	1.7	Ci.	Cu. E	5 45		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
20.	E, SE	549.4	48	E	8.7	A.-Cu.	Cu.-N.	1 15		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
21.	E quad.	289.7	26	E	4.4	Ci.	SSW	5 20		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
22.	NE quad.	224.6	20.6	E	8.3	A.-Cu.	ESE	0 25	4.3	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
23.	Variable	257.7	18.5	E	5.9	Ci.	Cu. ENE	3 20	11.2	☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
24.	E	305.4	23.6	E	9	Ci.-S.	Cu.-N.	3 00		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
25.	E	309.3	19.9	E	4.7	Ci.	WSW	3 45		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
26.	E	392.1	23.6	E	3.7	Ci.	Cu.-N. NE, E	5 20		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
27.	E	471.8	28.4	E	.9	Ci.	Cu. ESE	6 55		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
28.	E	378.6	28.7	E	9.4	A.-Cu.	Cu.-N. SW, E	1 25		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
29.	E	311.4	23.3	E	9.3	A.-cu. wsw, ssw	Cu.-N.	1 30		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
30.	E	414.9	30.8	E	5.3	Ci.	Cu. SE	3 00		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
31.	E	454.6	28	E	9.1	A.-Cu.	ENE	2 55		☉ ☽ ☿ ♀ ♁ ♂ ♃ ♄ ♅ ♆ ♇ ♈ ♉ ♊ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓
Mean								4 05		
Total		9,563.7			5.5			126 35	146.3	

\* 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, DECEMBER, 1917.

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	17.5	0.5		18.3	1.8	20	1.5	20.6								
Isabela, Basilan	4.1					2.8		5	1.3	25.1	9.7	1.8	6.1	19.6	10.5	
Zamboanga	2					3.6	7.9	1	1.3	1	42.6					
Davao	2.5	9.4	3.6			15		16.8		4.1		1.5				
Cotabato	5.3	12.2	1.5	1.8	7.1	12.2	6.9			2.8	15					5.1
Cagayan, Misamis		19	1.3			8.4		2.3	17.5		9.7	3.6				
Butuan	2.8	6.4	4.6	16.3	2.1	9.4	9.9	.8	50.3	4.8	13.7	14.5			.3	
Mambajao	4.6	1.5		13	15.7	61.2	2.5		11.9	6.6	4.1		1.3			16
Dumaguete	5.8	1.8		11.9	13	4.1	9.5	5.3	9.1	43.4	29.4	4.6				
Yap, W. Carolines	1.5	35	16.2	11.2	9.4	19.8	2	41.2	1.5		.3	4.6		3.3	.5	5
Tagbilaran	7.4	10.8	50.5	5.6				15.5	4.8		50.3					
Iwahig	.8	.8	2.5	1.1				32	36.4		4.4	6.1	.3	3.1	.3	
Surigao		14.2	4.9	13.6	4.8	48.4	8.8		10.6	16.5	38.8			1.3	2.6	10.9
Maasin		7.1		59.7			4.8				7.1					
Cebu		1		1.3		5.6	3.8	2.5	1.5	9.7					.8	
Iloilo				1.5	1.8		5.1	3.6			2.1					
Cuyo							1.3	5.6		13.2		2.8				
Ormoc	3.8	1.3	.3	8.3		.5	1.8	6.4		5	20.9	.3			2.8	6.6
Guiuan	6.6	1.1	2.5	13.2	10.7	8.4	43.9	13.5	10.9	18.3	35.8			1.8	1.8	.8
Tacloban		4.3		15.3	12.8	3.6	4.1	11.2		1	3.4		.3			6.4
Capiz			10.9		1.8	14.6	6.4	73.1	24.1	3	.5	1.1				3.6
Borongan	2.5	3.8	3.8	18.6	7.9	35	23.4	40.2		21.6	11				8.1	2.8
Catbalogan	.5	13.4	5.1	5.8	7.9	3.6	5.3	11.2			12.2				10.9	11.1
Calbayog	.8	20	3		1.3	2.8	1.3	2.3		16	12.9	.8				20.1
Masbate					6.9		8	36.3	8.4			1				.5
Romblon		2	7.4		6.4	6.9	42.6	62.7	1.4	28.7	6.9	1.3	.3			
Batag		20.3				13.5	21.3	23.1			10.1					9.1
Sorsogon			5.1	2.3	12.7	13.9	18.8	50.8		2	8.7	3.3				28
Legaspi		.5	.3	2.5	13	3.4	3.8	67.8		.5	7.1		9.7		2.8	6.8
Sumay, Guam	9.1		1.3		8.9	4.1	9.2	1.8	1	.8						2.5
Calapan		.3	2.8			10.2	1	12.9	30.2	5	29.5	5.1	5.3	1	3.6	6.4
Virac			7.6	6.1	5.3	1.5	29.2	57.4	2.8	17	14.2	1.3			7.9	21.8
Naga			3				46.5	22.4			11	16.8	3	.3		6.6
Batangas						7.4		6.9		68.6						13.5
Lucena	3.8		8.4	8.1	23.9	36.8	2.8	48.8							25.4	6.1
Atimonan		7.1	11.7	.8	9.2	88.6	16.5	43.1	15.7	15.6	15	2.1		7.6	8.4	1.3
Ambulong, Tanauan				2.6		5.3		7.7	2.6				1.5			1.5
Canlubang, Calamba			6.4	11.4	2.8	3		25.4	3.5							4.8
Paracale			11.5	13.5	5.1	82.5	32.8	97.9	18.5	5.3	3.3	5.3	4.3	1.3	90	34.3
Santa Cruz, Laguna			3.6	3.1	1.3	5.1		29	15.8		.3			4.9	17.2	30
Manila			.5	.3		1.5	.3	6.6	14.9	4.8	.9				4.6	.1
Antipolo		5.1	1	4.3		2	4.5	13.7	16.7	6.1	5.1	10.4	28	22.1	8.6	2.8
Iba		5.6	13.7	9.7		1					.5				.3	
San Isidro		2.1		1.3					.3							.3
Tarlac		8.4		5.1	.8	3.3					5.8					
Baler		21.1		15.3	.5	3.6		1.5	5.8		37.6	1.3	48.3	23.6	7.1	6.6
Dagupan			2			66.3						5.1			3.8	
Bolinao																
Baguio	4.8	6.9	10.4		7.1	.8	.3		5.8		52.6	2.5	.5	10.7		28.4
San Fernando, Union									5.6		2.8					
Echague	.8	25.4	.8	24.9	2.3	18.1	3.5	1.8	18.8	30	6.9			1.3	14.8	.8
Candon											4.6					
Vigan																
Tuguegarao		3.8	1.5	9.4	8.9	4.1			70.9		10.7					
Laoag							.8									
Aparri	11.3	1.8	6.6	19.1	3.3	14.5	8.4	7.4	4.3	2.1	3.5				5.1	1
Cape Bojeador						8.4			4.6							
Santo Domingo, Batanes	11.6	11.7	57.3	11	4.3	3.8	2.6	3.6	44.4	9.3	1.8	2	.2	61.6	15.5	25.4

Daily rainfall at the stations of the Weather Bureau, December, 1917—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	16.8	0.8		24.1	1.8		6.9		1	2.3		3	16.3		15.2	233.6	
Isabela, Basilan	5.6	1.5	5.3				8.9		19.3	19.5	0.8	12.5	32.8	1	1.5	152.2	
Zamboanga	9.9	.3	.3				63.5	4.6	13.5	16	11	25.2	15.7			219.4	
Davao					2.5	2.3	7.4	15.8					1.3			82.2	
Cotabato	17.8		1.8	1							2.1	6.9	5.8			104.3	
Cagayan, Misamis							2.6	.8	4.1	1.5	1.5	3.6	3.6	3.8	7.6	90.9	
Butuan	9.7		17.3		4.8	5.1	20	5.1	5.4	1	14	.8		.5	.5	220.1	
Mambajao		6.6			19		12.5	16.5	42.2							235.2	
Dumaguete			1.5			6.6	.8	21.3		3.3	31.7		6.9			210	
Yap, W. Carolines	.3		1.5	2	1.3	5.8	49	11.9							19.6	238.4	
Tagbilaran		5.6	16.8			2.9	6.4	24.2				15.1	3.6			219.5	
Iwahig							.3	1	2.4	22.9		3.8	81.8	33.5	104.4	360.2	
Surigao	20.8	1.5	9.1	11	32.3	39.4	23.1	6.4	3.3			4.3	3.1		.5	330.7	
Maasin						6.4	17.5					6.1	11.2		33.5	167.4	
Cebu		6.9	12.2				16.8	1.8	10.9	.8	21.6			1.8	4	103	
Iloilo			4.6				.8	7.4		25.9	4.6	12.3		6	2.4	72.7	
Cuyo									33.8	21.8	10.7		.8	21.8	26.4	138.2	
Ormoc		.5				6.4	3	3.1	1.3	.5	10.9	23.4		.8	1.8	110.2	
Guiuan	.5	.5			2	14.5	34.5	2	9.7	143	26.9	8.9		5	9.4	423.7	
Tacloban	1.1	.3	4.6	12		8.2	5.1	4.2		2.7	7.8	64		42.6	1.3	216.3	
Capiz	.5	1	22.6	.3				5.9	81.3	276.4	13.5	4.6	.3	5.6	2.5	550.9	
Borongan		2.5	18.3	5.3	1.3	4.3	53.4	22.9		22.1	221.2	171.2	106.5	5.5	7.4	820.6	
Catbalogan	1	1.3	12.5	.5		2.5	.8	20.3	15	9.1	10.7	36.4		2		199.1	
Calbayog	35.8	1	11.5	2	1.3	1	6.9	11.9	12.7	17.3	1.3	13.7	.8	9.4	24.8	232.7	
Masbate		1.8	2.8				6.6	9.9	20.6	18.3	2.6	34.3	.8	13.7	42.4	207.7	
Romblon		3.3	16.3	3.8			3.3	16.5	4	4.6	3.6	7.2		1.3		230.5	
Batag	10.2	12.2	9.1	9.4			16	10.2	61.3	29.5	65	112.3		99.1	101.4	633.1	
Sorsogon	12.4	6.3	35.8	20.1	5.3	1.3	7.9	13.2	62	107.7	107.9	115.9	93.7	42.6	65.1	842.8	
Legaspi			58.6	8.6			9.1	2.1	6.9	100.4	106.4	29.6	34.8	62	4.9	6.9	548.5
Sumay, Guam	4.1	2.1			4.1	1.3	2.6		1.3		27.9	9.4	14		15.2	120.7	
Calapan	.3	.3	1		13.5				4.5	1.1	30.7	25.1	2.3	4.6	9.2	205.9	
Virac	2		6.1	14.2	1.3	3.8			28.5	56.4	40.4	6.6	6.9	70.6	14.3	4.8	429.1
Naga	.6	8.7	12		.3			8.7	37.1	5.5	.6			.8	3.8	185	
Batangas	3.8	16	17.8						1.3							135.3	
Lucena	5.1	21.1	74.4				2.3	16.5	12.5	7.1	2.8	1			2.3	309.2	
Atimonan	43.1	72.1	50.8				7.8	8.4	14.5	3.3	5.6	3.3	12.7	6.4	10.9	481.6	
Ambulong, Tanauan		8.1	17.1						5							46.9	
Canlubang, Calamba	11.9	9.1	36.3	2.5						1.3						118.4	
Paracale	19.1	70.1	79.2	1.8	2.8	8.1	.8	16.8	32	16.8	20.3	22.4	17.8	16.4	19.6	749.6	
Santa Cruz, Laguna	1.3	16.5	42.7	4.6			2		2	.5		3				180.2	
Manila	3.6	4.1	21	1.4		1.8	9.3									75.7	
Antipolo	8.9	3.6	43.1	1.5	1.8	21.6	1	.8								215.8	
Iba	25.9			.5		.8		5.3								64	
San Isidro	3.6	5.8	7.4	15.3		5										40.9	
Tarlac	6.1			.8	1.8		3.8									35.9	
Baler			55.6	166.4	63	5.6										462.9	
Dagupan	2.5						1.8		3.6							85.1	
Bolinao																1	
Baguio						4.3	11.2						1			146.3	
San Fernando, Union				4.8		3.6	5									17.3	
Echague	19.6	16.3	5.6	22.8	24.4	7.1	12.2	1.5		.3			2	.6		262.6	
Candon																4.6	
Vigan																0	
Tuguegarao				2.3	38.8	14.5					1.3					166.2	
Laoag																.8	
Aparri	11.6	8.3	17.3	1.3		1.5	37.6	20.9	9.5	12.3	11.5	13.9	24.8	12.6	2.3	273.8	
Cape Bojeador							9.4									22.4	
Santo Domingo, Batanes	22.5	5.3	2.5	1	9.1	24.1	155.1	5.9	5.6	12.9	3.3	1.3	15.6	6		536.3	

MAXIMUM AND MINIMUM TEMPERATURES AT THE STATIONS OF THE WEATHER BUREAU, DECEMBER, 1917.

Day.	Jolo. <sup>a</sup>		Isabela, Basilan.		Zamboanga.		Davao.		Cotabato.		Cagayan, Misamis.		Dapitan.		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	29.8	20.2	31.6	21.6	29.8	23	32.1	21.4	31.2	23	30.7	21.2			32.6	21.9
2	30.1	21.2	32.1	22.1	30	22.5	29.7	21	31	22.6	30.7	21			30.2	22
3	28.1	20.6	33.6	22.1	30.2	23.2	31	20.3	31.1	21.4	30.2	20.6			29.9	22.3
4	29	20.3	33.7	22	31	23.2	31	20.6	31.5	21.4	30.3				32.1	21
5	29.9	20.5	33.1	22.3	29.9	22.8	31.2	20	31.2	21.7	29.8	20.9			33.4	21.7
6	29.2	21.8	34.1	22.2	31.5	22.5	30	20.2	30	21.5	28.8	20.8			26.7	21.1
7	29	20.9	33.6	21.7	31.6	21.5	31.5	20.8	30.9	21.5	30.4	21.2			28.3	22.3
8	28.9	21.7	33.3	22.1	31	22.3	30.7	22.3	31	22.5	29.2	22			27.9	21.9
9	30.9	20.6	33.1	22.3	31.2	23.2	31.6	20.8	31.2	22.6	30.8	22.8	31.8	22	33.1	22.7
10	31.8	20.9	33.5	21.6	31.4	23	33	21.8	32.1	22.5	30.1	23.1	31.9	22.9	31.1	22
11	30.3	21.3	31.6	22.1	29.6	21.9	29.2	21.9	30.2	22.5	29.7	21.8	29.7	21.7	30	22.7
12	28.4	21.1	31.3	20.8	28.8	21.1	31.7	21.4	30.9	21.7	29.6	21.5	31.6	21.8	33	21.5
13	29.4	20.1	31.1	21.3	29.9	22.5	31.5	21.6	32.1	23	30.6	21	31.4	22.7	33	21.9
14	29.3	20	32.1	21.6	29.5	22.2	31.7	21.4	31.4	22.5	30.4	20.8	30.5	22.8	33.3	21.9
15	28.8	21.5	33.1	23.1	32.7	23.2	31.7	21	29.9	21.5	30.5	20	29.6	22.8	33.4	21.2
16	29.2	21	34.3	20.8	32.2	22.5	30.5	20.7	31.5	22	30.4	21	31.6	22.9	32.5	22.7
17	29.4	20.6	32.3	22.1	28.5	22.5	28.7	20.9	30	22.4	30.2	21.5	29.9	21.1	33.1	22.8
18	28.4	21.2	32.6	23.1	32	22.8	27.3	21	29	22.2	29.9	22.1	30.8	22	31	22.3
19	29.2	20.7	30.6	22.6	31.6	23.2	30.4	20.5	31.1	22.9	31.5	20.5	31.1	24	32.7	22.3
20	28.8	20.1	33.6	22.1	30.8	22.8	27.8	21	30.5	22.6	30.2	21.8	30.7	24	32.4	22
21	28.9	19.7	33.9	22.1	31.6	23.2	31.5	20.4	32	22.5	31.8	20.2	30.9	22.3	30.3	22.2
22	29.3	20.1	33.1	22.6	32	22.1	30.4	21.2	32	22.3	31.3	21.6	30.9	25.1	31	21.9
23	27.9	22.4	33.1	22.6	31.4	22	26.9	21.7	29.2	23	27.1	22.7	29.1	24.9	27	22.7
24	28.1	21.9	31.3	23	28.7	22.4	24.5	21.3	26.5	23.1	28.8	22.2	25.4	22.5	29.4	22.2
25	29.3	21.2	29.7	22.1	28.8	22.5	29.6	21.2	30	22.5	30.2	21.4	29.5	22	31.5	22.2
26	29	22.1	29.1	22.1	27	22.8	30.3	21.3	29.9	21.6	30.6	21.6	30.1	21.2	31.1	22.2
27	29.9	21.5	31.6	22.6	27.9	23	30.7	21.6	29	22.4	30.6	21.6	29.7	22.1	32.4	22.6
28	29.3	21.8	32.1	21.6	30	23	32	22.5	29.9	21.9	30.5	21.2	30.4	22.4	32.1	23.3
29	26.7	21.8	29.1	22.6	28.5	23.2	31.2	21.6	30	22.2	30.6	21.2	30.4	22	32.1	23
30	30.1	21.3	31.5	21.6	29	23	31.2	21	31.4	22.2	31.5	21.2	31.4	21.3	33.6	22.9
31	28.9	21.9	31.6	21.8	29.9	22.9	31.9	22	30.7	23	30.5	21.9	29.7	22.2	32.4	22.4
Mean	29.2	21	32.3	22.1	30.3	22.6	30.4	21.2	30.6	22.3	30.2	21.4	30.4	22.6	31.4	22.2

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	29.6	23.1	30	24.3	33.4	25	31.4	22.5	31.6	21.1	30.4	23.6	33.5	22.8	31	24.6
2	30.1	22.9	30	23	32.7	23.5	30.4	22.8	31.5	20.9	29.9	22.8	32.6	22.5	31.5	23.7
3	29.7	23.3	30.2	24	32.8	23	32	22.6	31.8	21.4	30.9	22.8	33	23	30.5	23.7
4	30.3	24.6	30.2	25	32.7	23.6	31.4	20.9	30.1	21.5	29.9	23.5	32.2	22	31.4	24.9
5	28.3	24.1	30.1	24.3	32.2	24.5	32.1	22	31.7	20.9	28.5	22.3	33	22.8	30.1	24.4
6	28.5	23.2	31.1	23.4	31	23	31.8	22.6	32.6	20.7	28.9	23.6	32	23	30.6	23.8
7	29	22.7	30.3	23.1	33.7	24.3	30.9	22.6	32.1	20.5	28.4	23.4	30	22.6	29.5	23.7
8	29	23	29.1	22.8	33.8	24.1	29.9	22.6	27.1	21.6	28.9	23.3	33	22.5	29	24.3
9	31	22.7	31.1	23.7	31.8	23.2	31.2	22.5	30.4	21.5	32	23.3	33.1	23.4	31.4	24.8
10	29.5	22.3	30.1	23.7	34	25	31.4	23.4	29.6	21.7	31.1	22	33.4	22.2	31	24.6
11	29.7	23.5	27.6	21.9	33	24.1	28.2	21.5	30.8	22.6	29.8	23.3	33.5	22.8	30	23.6
12	29.5	22.7	29.8	21.8	33.9	24.1	30.5	21.5	31.1	22.4	30.5	22.7	34	23	30	23.9
13	29.7	24.7	30.5	24.8	33.2	24.5	31.3	21.4	27.7	21.4	31.4	23.8	34.4	22.5	30.8	24.5
14	29.7	25	30.3	24	33.6	23.5	31.4	21.7	31.8	21	31.8	23.1	33.8	22.8	32	23.8
15	29.8	25.9	30.3	23.6	33.2	23.5	31.5	21.6	32.9	19.7	30.4	23.4	33.5	22.5	31	23.6
16	29.3	24.4	30.3	24.1	34.7	24.5	31.7	23	31.1	20.4	31.3	23.2	33	23	31.3	24.5
17	30.3	23.6	30.3	23.6	33.1	23.4	31.9	22.3	32.4	20.1	31.6	23.4	33.4	22.8	30.8	23.7
18	29.1	24.3	29.9	23.7	33.7	25	31.5	21.6	31.6	20.9	30.6	22.8	33	22.6	31.4	23.8
19	30.2	24.9	30	24.6	34.2	24.6	31.7	21.5	31.7	21.5	29.2	23.5	32.6	23	30	24.2
20	30.2	23	29.9	24.9	33.6	24.3	31.5	21.7	31.2	22.3	30.8	23.4	33.8	22.5	30	23.9
21	30.3	24.2	29.6	26.8	32.2	24	32.3	21.5	31.6	21.7	29.9	23.1	33.5	23.6	29.5	24.5
22	29.6	23.2	30	23.1	33.7	25.5	31.7	21.6	31.3	21.2	28.6	23	33	23.3	30.5	24.5
23	26.3	24	29.6	24.1	31.4	24.1	27.4	22.5	32.3	20.6	25.9	23	32	22.8	29	24
24	27.7	23.1	29.8	23.2	27.4	22.5	30.2	22.1	30.2	19.9	27.4	23	31	22.5	28	22.7
25	29.2	23.5	29.3	23.4	31.7	23.2	30.5	22.1	26.6	21.7	28.8	23.2	30.6	22	30.5	23.8
26	30.1	23.1	28.9	23.2	33	24.1	30.3	22.5	30.2	20.6	30.3	22.6	30.8	22.8	30	23.5
27	29.1	23.2	28	23.2	32.7	23.5	29.1	22.5	25.8	21.7	29.1	22.4	30.5	23.2	28.5	23.5
28	28.7	24	29.4	23.8	32.7	23.2	30.4	22.6	26.1	22	29	23.8	31	23	31	23.9
29	29.2	23	29.2	23.2	33.2	23.3	30.4	22.4	25.9	21.9	28.6	23.2	31.5	23.5	29.9	24
30	30.2	23	29.8	22.9	34.2	23.9	30.5	22.6	25.1	22.1	30.2	23.2	31.1	23	31.5	24
31	30.5	23.2	29.4	22.8	34.2	23.8	28.5	23.4	27.8	21.9	30.3	23.4	30	23.2	27.5	23.8
Mean	29.5	23.6	29.8	23.7	32.9	23.9	30.8	22.2	30.1	21.3	29.8	23.1	32.4	22.8	30.3	24

<sup>a</sup> The minimum temperatures of this station seem to be too low.



Maximum and minimum temperatures at the stations of the Weather Bureau, December, 1917—Continued.

Day.	Iloilo.		Cuyo.		Ormoc.		Guiuan.		Tacloban.		Capiz.		Borongan.		Catbalogan.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
1	30.6	23.5	31	24.8	32.1	20.9	31.2	23	33.1	22.8	31.5	23.5	31.2	21.2	30.7	19.7
2	30.5	22.6	29.9	23.3	32.2	21.3	31.7	23.1	32.2	23.3	31.2	22.5	31	22.4	30.2	21.1
3	30.6	23.1	29.8	26.9	32	21.3	33.1	23.4	32.5	23.6	31.7	24.2	30.6	22.7	30.3	21.8
4	30.6	24.2	30.3	26.1	32.6	21.8	32.5	25	32.7	22.6	31.3	24	31.2	23.9	31.4	20.4
5	30.5	24	29.9	26.4	31.8	22.8	31.3	23.8	31.9	23.4	32	24.8	30.1	23.4	31.5	21.2
6	30.9	24.1	29.8	25.2	30.9	22.2	31.1	25.1	31	23.6	31.3	22	30.4	23.1	31	21
7	30.5	23	29		31	22.7	30.3	24.7	30.8	24.1	30.6	23.1	28.3	23.1	28.1	21.6
8	29.1	22.3	29.2		30.5	23.6	29.7	25.2	28	23.9	26.3	24.4	28.2	23.5	27.5	22.2
9	30.6	23.2	30.3	22.9	32.4	22.2	32.8	23.4	31.5	23.5	30.9	23.6	31.4	22.2	31.5	22.3
10	31	23.3	32.2	23.4	32.2	22.3	32.7	23.1	32.2	22.5	31.3	22.9	31	22.4	31	21.8
11	31	23.3	31.3	24.1	30.2	22.4	31.8	23.2	30.4	23.4	30.2	23.5	30.2	22.3	29.5	21.6
12	30.2	23.6	29.2	23	32.3	21.8	32.5	22.7	31.9	23	30.9	23.4	30.6	22.5	30.2	21.7
13	31.4	23.9	30.4	25.1	32.1	20.8	33	22.3	33	22.1	31.4	24.6	31.1	21.8	31	20.8
14	31.3	23.1	30.3	25.2	32.8	19.4	31.5	22.1	33.2	22.9	31.7	23.8	31	21.4	31	20.4
15	30.9	23.3	29.7	26.3	32.3	20.7	31.5	23.1	32.1	23.1	31.3	24.8	31.1	21.5	30.8	20.7
16	30.8	23.2	29.5	25.8	32.2	21.7	32	25	30.9	23	31.3	24.3	30.9	23	29.8	20.8
17	31.1	23.2	29.4	25.6	31.8	19.9	33	22.3	32.2	22.8	31.2	24.8	31.1	21.7	29.6	20.4
18	30.9	23.3	29.7	26.2	32	21.3	31.9	23.3	33	23.3	31.6	24.9	31.2	21.8	30.8	20.8
19	30.6	23.6	29.9	24.4	32.1	22.1	31.9	25.4	32.1	23.8	30.3	24.6	30.7	23.3	31.7	21.2
20	30.6	23.7	30.3	24.9	33	21.6	32.3	25.7	33	23.5	31	23.2	30.6	23.2	30.8	22
21	31.3	23.8	30.4	23.8	31.9	20.8	31.5	23.3	32.6	23	31.5	23.6	31.2	22.6	31.6	20.8
22	30.9	23.6	29.9	25.4	32	21.2	32.2	25.1	30.4	23.5	31.4	24.1	30.9	22.7	31.8	20.6
23	31	24.2	29.7		29.2	21.7	29.1	23.8	29.3	23.1	31.3	24.6	30.7	22.9	32	21
24	29.8	22.7	29.4		26.9	23.2	26.9	23.5	26	23.4	27.8	23.8	27.2	22	26.3	22
25	30.3	23.4	29.5	25.1	31.4	22.1	30.4	23.1	31.9	23	31	24.1	30.9	22.4	30	21.7
26	30.5	23.3	27	19	30.4	22.6	30.6	23.2	32	23.4	25.8	23.5	30	22.6	30	21.8
27	27.6	23.5	26.6	21.1	31.3	22.7	29.5	24	28.9	23	25.9	23.7	27.7	22.7	28.1	22
28	26	23.4	28	24.4	30.2	23.6	29.6	22.7	27.8	22.5	25.2	23.7	27	22.6	29.2	23
29	28.7	23.2	27.6	24.8	30	22.8	30	23.1	28.7	23	27.3	23.7	28.6	22	27.8	22.2
30	29.6	23.2	27.3	25.1	31.4	22	32	24.2	32	23.4	29.1	24.1	29.9	21.7	30.5	21.6
31	26.6	23.1	27.5	23.6	29.8	22.6	29.2	24.3	27	23	25.6	23.7	27.2	22.5	26.3	22.3
Mean	30.2	23.4	29.5	24.5	31.4	21.9	31.3	23.7	31.1	23.2	30	23.9	30.1	22.5	30.1	21.4

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	31.7	20.6	30.8	23.4	33.4	22.8	30.3	22.3	32	20.5	30.8	21	28.3	24.3	31.5	21.4
2	32.5	22	29.8	23.8	33	21.3	30.8	25	32.2	20.7	30.6	20.9	28.7	23.2	32	21.8
3	30.4	22.7	31.2	23.8	32.4	23	29.3	23	32.1	21	30.2	22.8	28.6	23.9	31.1	21.6
4	32	21.8	31.4	25.2	32.9	24.1	29.6	23.4	32	22	31.2	25.3	28.6	23.8	31	24
5	31	22.2		24.6	33	24	29.8	23.5	30	22.9	30.8	24.8	28.8	25.5	31.6	24
6	32.2	22.2	31.4	25.2	33.1	24.3	30.2	24.1	29.9	22.5	30.3	24.9	28.4	24.9	31	24.5
7	29.6	23.1	31	25.2	30.3	23.7	27	23.2	29.9	23	29.3	22.9	28.6	24.5	31.1	23.5
8	28.5	23.4	28.2	24.6	29.6	22.2	25.4	23.9	28.9	22	26.1	22.9	29.5	23.6	30	24
9	31.2	23	30	24.6	31.8	23.6	29.8	23.6	30.5	22.1	30.1	24.3	29	25.5	29.2	23.5
10	31.1	22.8	30.6	24.2	31.7	23.2	29.8	24	31.5	22	30.4	22.5	29.6	25.5	30.1	22.8
11	29.2	22.6	31	24.5	31.5	23.3	29.8	23.8	31.5	23.5	29.8	23.4	28.8	24.4	30.2	24
12	30.9	22.6	30.4	24.6	32	23.2	30	23	30.1	21.5	28.8	23	28.4	24.3	31	22.5
13	32	22	31	25.2	32.8	23.6	29.8	24	30.8	23	29.9	22.8	28.4	23.6	31.1	24.4
14	32.1	22	30.6	24.2	32	23.2	30.6	23	31.6	20.8	30.8	21.3	28.5	24.1	31.2	23
15	32.6	21.8	30	24	32.4	23	30.4	22.6	31.8	20.4	31.1	22.2	29.4	23.4	32	22.1
16	32.1	21.9	30.4	24.6	31.9	23.3	30	24.1	30.5	20.7	29.5	23	29	23.4	29.5	23.5
17	29.9	21.4	30.4	24.5	32.9	24.3	30.8	23.4	30.6	20	30.3	23.5	27.5	24.2	31	23.5
18	32.8	21.8	31	24.6	31.9	23.1	30.2	23	30.4	22	30.9	22.2	27.8	23.8	31.5	23.5
19	32.1	22.8	29.4	24.6	31.5	24.6	28.8	23.6	30.7	23	27.8	24.1	28.9	23.9	32	24.1
20	31.4	22	31.4	24.6	31.6	24	29.8	23.7	31	22.5	30.7	24.3	28.9	24.6	31.5	24
21	32.2	21.6	30.6	24.8	32.5	24.7	29.6	23.8	30.4	20.7	30.8	22.7	29	22.3	30.6	24.5
22	31.1	21.9	30.8	24.4	32.5	22.4	30.4	23	30.5	22	30.7	21.5	28.9	23.9	31	22.9
23	32.4	22.2	31	24.4	32.5	23.3	29.6	23.5	30.5	21	29.8	24.3	27.8	24.7	31	22.5
24	28.2	22.6	30	23.8	33.5	22.2	27.6	23	30	21.1	29.4	22.6	28.6	22.2	32	23
25	30.4	22.3	30	24	31.4	23.4	29.8	23.2	28	20	30	23.1	28.6	23.3	31.5	24.5
26	30.6	22.6	28	24.4	29.4	23.4	27.2	23	28	20	24.8	23.3	28.4	25	29.5	23.4
27	29.8	22.6	26.6	23.5	29.3	23.2	26.8	22.2	26.9	19.1	24.8	23.1	29.4	22.8	30.6	22.6
28	27.4	23.3	26.8	22.8	26.5	22.9	25.8	22	25	18.9	23.9	22.5	27.8	22.2	26.7	21.5
29	30.2	22.7	28.8	23.2	29.6	23	25.5	21.4	25.4	17.1	25.2	22.8	27.4	22.2	28.5	21
30	31.4	22.3	28.4	24.4	32	23.3	26	22.5	27.4	19	25.5	22.9	28.9	21.6	30.6	21.5
31	25.9	22.4	25.6	23	27.9	22.4	27.2	22.6	25.4	20	24	22.7	29.4	22.8	27.5	21.5
Mean	30.8	22.3	30	24.3	31.6	23.3	29	23.2	29.9	21.1	29	23	28.6	23.8	30.6	23.1

Maximum and minimum temperatures at the stations of the Weather Bureau, December, 1917—Continued.

Day.	Virac.		Naga.		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.	31.8	19	31.7	18.5	31.1	20.7	30.8	21.1	29.2	22.6	32.2	21.8	31	21.2	30.6	22.3
2.	32	19.3	31	18.5	31.3	21.4	31.5	22.1	29.9	22.9	32.7	22.7	31.1	21.3	30.8	22
3.	29.3	21.4	31.4	19.9	32.3	22.3	31	23	29.2	24.2	31.2	22.5	30.2	21.7	30	21.7
4.	31.1	22	32	20.4	31.6	22.5	29.7	23.3	28.4	24.7	28.4	24	27	21.8	29.7	24.2
5.	31.8	22.2	31.3	18.5	31.6	21.4	29.9	22.9	28.9	23.8	30.3	23.5	29.8	21.4	30.6	24
6.	31.1	22	29.9	21.4	30.1	22.2	29	22.7	27	22.1	29.6	23.5	28	22	29.7	22.6
7.	29.8	21.8	28.8	21	29.4	21.9	27.6	21.5	26.4	21.9	29.4	23	28.7	21.8	27.5	22.6
8.	29.8	21.6	25.1	21.7	27.8	21.8	26.7	22.6	25.9	23.2	28.3	23	28.9	21.2	26.3	23.5
9.	29.5	21.5	31	20.7	28.4	22.6	31.1	22.2	28.8	23.7	27.2	22.7	30	21.4	27.6	23
10.	31.4	22	30.1	20.8	30.6	21.5	30.2	22	28	23.6	30.7	21.4	29.8	21	29.8	22.5
11.	30.5	21.7	30.3	20.8	31.8	20.9	30.6	23.6	28.2	23.9	30.7	22.8	29.9	22.2	29.5	23.2
12.	30.5	21.3	29.6	20.7	31.3	21.3	30.6	22.6	28.1	23.9	31.3	22.4	30.1	22.1	29.2	22.5
13.	31.7	21	29.7	19.2	31.5	21.4	31.5	22.6	29.8	24.9	32.1	23.3	30.2	22.2	30.4	23.8
14.	31.5	20.2	31.3	19.2	32	21.8	32	21.6	28.3	24.6	31.8	21.9	30.1	21.1	29.8	23
15.	31	20.3	29.1	20.5	30.8	21.5	30.7	21.6	27.4	23.9	30.7	23	30.2	21.3	26.3	23.4
16.	30.5	21	29.7	21	29.8	22	27.7	21.8	27.1	23	28.8	23.4	29	21.2	26.2	22.8
17.	31.4	21.7	31	20	30.5	21.6	29.8	23	29.1	23.8	31.2	23.3	30	22.1	29.4	23.5
18.	31.6	21	29.6	20.4	31.5	21.4	29.2	22.6	27.7	23	30.6	21.8	29.8	22.2	27.5	23
19.	30.6	20.8	29.3	19.4	28.7	22	26.6	22	26	23	25.5	23.2	26.4	22.2	28.1	23.3
20.	32.4	23	31	21	30.7	22.3	29.4	22.2	27.6	23.4	28.6	22.9	27.8	22.2	27.8	23.1
21.	31	21.4	30.9	20	31.8	21.4	30.6	22.7	28.4	23.8	31	23.6	29.6	22.1	29.6	22.5
22.	31.9	20.2	30.9	17.8	30.7	21.2	30.2	22.1	27.8	24	30.7	22.9	29.7	21.3	29.5	23.8
23.	31.3	21	31.2	19.5	31.5	21	30.6	23	29.5	24.2	30	22.5	28.9	21.4	29.8	23.8
24.	29.5	21.2	29.9	18.8	31	20.7	29.2	22.9	27.5	23.7	30	22.9	29.6	21.3	28.8	23.5
25.	28.5	21	28.3	20.9	29.2	21.8	27	22.5	26.8	23.8	28.7	23.6	29.3	22.1	26.6	23
26.	26.3	21.5	24.2	21	26	21.9	25	22	25.7	22.4	25.7	22.3	27	21.3	26	23.6
27.	26	21.8	25	20.3	27.4	21.5	25.7	22.3	25.6	22	26.1	22.1	26.9	21.4	25.5	22.2
28.	25.5	21	25.1	20	25.8	20.6	26.4	21	25.4	21.3	26.1	21.4	27	21.1	24.6	22
29.	26.6	20.8	26.5	20.1	28.4	18.9	26.1	21.3	26.1	21.7	28.4	21.4	28	21	25.9	22
30.	26.5	21.1	25.9	20.8	29.1	18.9	25.4	21.7	25	21.8	28.1	21.6	28.2	21	25	22.3
31.	25.5	20.8	25.1	19.9	26.6	19.7	25.6	20.5	24.5	21.1	26.8	21.2	28.3	21.1	24.4	21.7
Mean	29.9	21.2	29.2	20.1	30	21.4	29.8	22.2	27.5	23.2	29.4	22.6	29	21.6	28.1	22.9

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.	31	22.4	31	22.5	31.4	20.5	31.1	21.4	31.1	22.1	33.6	21.5	30.9	22.2	32.2	22.4
2.	32.2	23.1	31.4	23.2	31.3	22	30.9	20.8	31.4	22.6	33.5	21.9	31.4	21.9	31.5	22.8
3.	30.6	22.6	32.1	22.5	31.7	21	31.3	20.9	31.1	21.6	33.2	22.5	30.6	21.9	31.6	22.6
4.	26.3	23.3	27.3	22.5	26.6	21	31.3	20.1	30.6	21.4	33	21	29.5	21.2	31.4	21.3
5.	29.5	21.9	31.5	22.4	31.1	20.4	31.7	20.3	30	21.2	32.2	20.3	30.4	21.2	31	21.5
6.	29.1	22.8	31	22.1	29.4	20.5	31.6	21.2	31.2	21.5	33.6	21.2	31.5	21.5	31	21.9
7.	28.6	22.3	30.5	22	28.8	20.8	28.5	22.4	29.4	22.1	29.9	20.4	30.4	21.7	29.1	24.2
8.	26.8	22.8	29.3	21.9	30.3	20	29.6	19.1	29.5	20	30.5	19.9	30.5	20.2	30	21.2
9.	25.9	22.7	24.6	21.9	24.2	21	29.6	20.5	26.8	22.3	29	20.4	29.5	21.5	30.5	21.5
10.	29.8	21.5	30.9	21.7	30.3	20.2	30.4	21	32.1	21.4	34	21.4	30.3	20.5	32	22.4
11.	29.3	23.7	30.9	21.7	30.2	20.6	30.9	20.9	30.9	21.5	33.6	21.4	31.8	21.8	32.5	22.6
12.	29.8	22.7	30	21.2	30.3	20	31.8	21.7	31.1	21.7	33.9	21.5	28.9	22.6	34.3	22.6
13.	30.9	21.3	31.3	21.1	29.8	20.1	31.4	21.1	31	21	33.8	20.5	30.4	22.4	32.5	22
14.	30.1	21.6	31	21.4	30.3	20.4	31.3	20.9	31.9	21	34.2	20.6	32.4	22.4	31.5	22.9
15.	28.6	22	30.7	21.5	30.2	20.3	30.8	21	31.4	21.5	33.5	21.8	33.5	21.7	33.6	22.4
16.	26.6	22.7	28.3	22.6	25.8	21.5	30.3	21.2	29	21.1	32.4	21	29.4	22.5	32.5	21.9
17.	29.2	22.5	31.3	21.7	29.4	20.6	31.4	20.9	30.7	21.9	33.8	21.4	30	22.7	31	22
18.	28.9	22.5	30.8	22.4	31.2	20.8	30.9	20.9	30.9	21.5	32.9	21	32	21.4	31.5	22
19.	25.5	23	27.6	22.4	25.8	21	31.3	21	30.6	21	33.5	20.5	31.8	24.4	31.1	22.1
20.	27.9	22.9	29.7	22.5	29.5	21.2	28.4	22.4	26.5	21.5	30.4	20.4?	25.6	21.2	30.5	22.5
21.	29.7	22.9	30.8	21.5	30.7	20.3	30.2	20.5	28.6	21.7	32.2	21.8	27.7	21.6	31.7	22
22.	29.3	21.9	31	21.3	29.3	20.1	31.4	21.5	30.4	22.1	34	22.3	32.3	22.2	32.5	22.5
23.	28.3	21.8	29.5	21.5	29.2	20.3	31	21.5	29.9	21.4	32.8	21.2	29.9	22	32	22.3
24.	28.9	22	29.1	21.7	28.7	20.3	30.1	22.2	30.5	21.7	32.8	21.8	29.2	22.2	30.5	23.4
25.	27.7	23.5	29.2	22.5	30.2	20.9	30.7	20.7	30.1	21.9	33.2	20.4	28.9	22.8	31.9	21.5
26.	25.8	22.5	27.2	21.9	25.7	20.5	30.1	22.1	28.2	19.6	30.8	21	27.9	20.9	31.3	21.7
27.	25.8	22.7	28.6	21	27.5	20	30	21	29	20.3	31.5	21.6	27.6	21.1	30.9	20.3
28.	25.1	20.9	27.2	20.6	27.7	18.5	29.8	21.7	28.1	18.8	30.6	20.7	26.9	19.6	30	20.5
29.	26.6	21.4	28.4	20.1	28.8	18.5	30.5	21.2	27.9	20.4	30	21.5	26.5	19.5	29.5	20.9
30.	25.9	21.7	29.6	20	28.8	18.6	29.9	20.4	28.4	19.7	30.6	19.8	27.5	19.5	29.2	20.8
31.	25.8	21.3	28.2	19	27.2	17.8	29.9	21.7	28.1	17.4	30.7	21.2	26.5	18.8	31	20.5
Mean	28.2	22.4	29.7	21.7	29.1	20.3	30.6	21.1	29.9	21.1	32.4	21.1	29.7	21.5	31.3	22

Maximum and minimum temperatures at the stations of the Weather Bureau, December, 1917—Continued.

Day.	Bolinao.		Baguio.		San Fernando, Union.		Echagüe.		Candon.		Vigan.	
	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.
1	32.6	23.6	23.3	14.9	30.9	22.6	31	21.8	32.4	23.2	31	22.5
2	32	24	23	15.5	31.6	22	29.5	21.5	32.1	23.1	31	21.5
3	32.2	25.6	22.4	14.4	31.5	22.3	29	21.9	32.3	23.4	30.8	22
4	32.1	22.6	24.3	13.9	31.2	22	25.6	21.3	32.5	23	32.8	22
5	32	20.7	22.2	14.4	31.9	23	26.6	20.5	33	23.4	30.9	22.2
6	32	23.5	21.9	14.2	31.7	22.4	29	21.4	33	23.1	30.1	21.5
7	28	24.9	22.3	13.9	28.7	23.4	25	19.6	30	22.9	26.3	20.2
8	30.9	24.2	22.8	12.4	30.3	21.2	25.9	19.4	31.4	21.2	28.2	19.6
9	31.5	21.7	23.1	14.6	29.9	20.3	22.6	19.3	31.7	21.5	29.6	20.9
10	31	24.6	24.3	15.1	30	21	22.7	21	31	22.1	29.7	21.2
11	33.1	22.6	23.5	15.3	30.8	22.1	26	21.1	32	23.5	31.1	22
12	33	23	24.5	15.3	30.6	21.6	30	22	32.2	22.9	31.8	23
13	33.5	22.5	23.5	14.9	31.4	22	30.5	21.8	32.5	23	31.5	22.3
14	32.3	25.9	23.3	15.3	31	22.7	31.5	21.3	32.5	23	31	22.6
15	32	26	22.9	14.9	32	22	27.7	22	32.6	23	30.1	21.9
16	32.5	23	22.4	14.5	31.5	22	27.2	20.8	32	22.5	31.2	21.3
17	32	21.6	22.5	14.4	31.4	22.1	27.7	21.8	32.4	22.9	30.5	22.4
18	32.2	22.6	24.5	14.3	32.1	22.3	28	21.8	33.6	23	30.2	20.9
19	31.9	22	23.8	13.8	31.1	21.5	25.4	20.8	34.4	22.6	29.7	21.9
20	31.8	21.5	21.7	14.7	30.6	21.7	23.7	20.2	31.5	23	32.7	22.6
21	32.2	22.6	23.5	14.1	30	21	25.5	20.7	31.5	23.5	30.4	22.9
22	32.9	22.6	21.3	14.4	31.1	22.4	28.4	21.8	32.5	23	30.8	23
23	32.3	22	21.8	14.4	31	21.8	28.5	21.8	32.5	22.8	31.2	22.3
24	30.4	25.5	23.3	14.2	31.5	22.7	25.6	20.2	32	23.5	29.1	21.5
25	31.9	21.9	22.5	13.3	31.1	21.5	26.4	19.5	31.7	23.5	31.1	21.4
26	31.7	19.6	22.4	12	30	21.5	26.5	19	31.8	21.9	29.8	20.4
27	31.5	20	21.9	10.7	29	21	24.6	18.5	31.4	21.5	29.7	19.6
28	30.7	19.1	20.4	10.4	28.7	20	23	16.8	30.5	19	29	20.6
29	28.8	20.1	20	12.3	29	20.3	22.6	17.9	30.5	22	27	21.1
30	29.7	23.1	22	10.7	29.8	20.5	22.1	17	31	20.9	29.5	20.2
31	31.2	20.6	21.4	10.6	30.3	21.8	23	16.5	31	21.5	29.9	21.6
Mean	31.7	22.7	22.7	13.8	30.7	21.8	26.5	20.4	32	22.6	30.2	21.6

Day.	Tuguegarao.		Laoag. <sup>a</sup>		Aparri.		Cape Bojeador.		Santo Domingo, Batanes.	
	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.
1	29.1	22.4	33.7	20.8	24.2	22	26.5	21.4	22.3	19.2
2	29.6	21.6	34	19.9	26.1	21.3	26.5	20.8	27.5	20.8
3	27.9	22	31.5	20.5	27.3	22.2	26.8	21.8	25.2	20.1
4	26.7	21.6	34.2	19.2	26.5	21.8	25.6	21.4	22.6	19.1
5	26.5	20.8	32.7	19.2	24.3	21.3	24.4	21.4	23	19.9
6	26.2	21.8	31.8	20.5	24.5	21.8	24.6	21	25.6	20.8
7	25.3	20.2	28	20.1	23.8	20.1	23	19.8	22.4	19.3
8	25.3	20.2	32	19.6	22.7	20.5	23.6	19.2	21.2	19
9	24	19.9	31.9	17.3	23.3	20	24.4	19.4	21.4	18.6
10	25.2	20.4	32.5	21.4	24.5	22.2	24.2	20.2	22.4	19
11	24.2	21.7	34.8	19.9	27	21.8	26.6	20.6	26	20.4
12	27.8	21.7	34.4	21.6	27.8	21.9	29	21.4	26.6	22.4
13	30.3	21.5	33.4	20.6	28.6	22.2	30.6	22.2	28.4	22.8
14	30.8	21.4	33.2	21.4	29.3	20.9	29.4	23.8	27.7	23.4
15	27	21.8	31.9	21	25.4	22.2	24	21.8	22.6	19.3
16	27.2	21.6	-----	19	27.7	21.5	26.2	20.6	22.1	19
17	30.6	21.9	-----	-----	27.9	21.8	26.6	22.2	22.8	19.9
18	28.4	21.6	31.6	-----	26.4	22.3	25.2	20.8	23	20.5
19	26.2	21.1	31.6	19.8	23.7	21	23.2	20.4	23.7	19.4
20	26	21	33.3	18.2	24	20.7	24.8	20	22.9	18.6
21	29.3	21.5	34	21.8	26.6	21.8	28.8	21	23.6	20.1
22	27.4	22.4	33.2	22.1	27.1	22.2	29.8	22.4	25.6	21
23	27.5	22.1	31.4	20.4	25.2	21.6	24.2	21.8	21.6	19.4
24	23.9	20.6	30.7	21.9	22.8	20.2	22.6	19.4	21.4	17.9
25	24.5	19.8	32.2	20.3	21.6	19.3	22.8	18.6	20.9	17.8
26	26	19.4	30.7	18	21.5	19.3	23	18.6	19.5	17.2
27	23.4	17.7	29.4	19	20.2	17.5	21.2	17.2	20	16.1
28	21.2	17.2	29.2	17.4	20.2	17.2	22.2	17	19.5	15.1
29	23	18.3	27	19.9	21.2	18.2	21.6	17.6	21.9	16.6
30	21.3	17.5	28.2	19.2	19.6	17	21.2	17.2	18	14.8
31	22.2	17.1	31.2	17	21.4	17.2	22.2	17.2	19.8	15
Mean	26.3	20.6	31.9	19.9	24.6	20.7	25	20.3	22.9	19.1

<sup>a</sup> The maximum temperatures of this station are not reliable: they seem to be too high.



## SEISMOLOGICAL BULLETIN FOR DECEMBER, 1917.

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### EARTHQUAKES FELT IN THE PHILIPPINES.<sup>1</sup>

1, 18<sup>h</sup> 22<sup>m</sup> 32<sup>s</sup> \* [2, 2<sup>h</sup> 22<sup>m</sup> 32<sup>s</sup>]. S Luzon. Extensive earthquake through the southern part of Luzon and adjacent islands of Mindoro and Calamianes. The epicenter was in the China Sea, W of the Mindoro Strait. It reached intensity V at Calapan (Mindoro), about 100 kilometers distant from the origin but the nearest from which any reports are obtainable. The shaken area had an extension of 500 kilometers in the N-S direction and less than half this quantity E-W. It was registered at Butuan.

3, 7<sup>h</sup> 07<sup>m</sup> [3, 15<sup>h</sup> 07<sup>m</sup>]. Legaspi (SE Luzon). Oscillatory earthquake, direction NE-SW, intensity III, duration 5 seconds.

3, 8<sup>h</sup> 37<sup>m</sup> [3, 16<sup>h</sup> 37<sup>m</sup>]. Butuan (N Mindanao). Earthquake shock of intensity II-III.

3, 14<sup>h</sup> 31<sup>m</sup> 41<sup>s</sup> \* [3, 22<sup>h</sup> 31<sup>m</sup> 41<sup>s</sup>]. Ambos Camarines (SE Luzon). Earthquake of intensity III-IV felt in the western and central part of Camarines. Its epicenter lay N of San Miguel Bay. At Naga it was preceded by a low rumbling. Recorded at Butuan.

9, 5<sup>h</sup> 34<sup>m</sup> 25<sup>s</sup> \* [9, 13<sup>h</sup> 34<sup>m</sup> 25<sup>s</sup>]. S Luzon. Earthquake shocks of intensity III-IV, originated in the same place of the one occurred on the 2d, but felt only at Manila and in the provinces of Cavite, Batangas and Mindoro. Recorded also at Butuan.

9, 8<sup>h</sup> 24<sup>m</sup> [9, 16<sup>h</sup> 24<sup>m</sup>]. Naga (SE Luzon). Oscillatory earthquake, direction NE-SW, intensity III, duration 4 seconds.

12, 20<sup>h</sup> 08<sup>m</sup> [13, 4<sup>h</sup> 08<sup>m</sup>]. Naga (SE Luzon). Earthquake shock of intensity II-III.

15, 21<sup>h</sup> 30<sup>m</sup> [16, 5<sup>h</sup> 30<sup>m</sup>]. Legaspi (SE Luzon). Oscillatory earthquake, direction NE-SW, intensity III, duration 3 seconds.

20, 8<sup>h</sup> 51<sup>m</sup> 00<sup>s</sup> \* [20, 16<sup>h</sup> 51<sup>m</sup> 00<sup>s</sup>]. Naga (SE Luzon). Earthquake shock of intensity III. This shock and those felt on the 24th at 1<sup>h</sup> 25<sup>m</sup> and 2<sup>h</sup> 14<sup>m</sup> (insular mean time) and on the 26th at 10<sup>h</sup> 58<sup>m</sup> seem to have originated in the region of the Isarog Mountain.

23, 18<sup>h</sup> 30<sup>m</sup> [24, 4<sup>h</sup> 00<sup>m</sup>]. Guam (Mariana Islands). Earthquake shock of intensity III.

26, 6<sup>h</sup> 55<sup>m</sup> [26, 14<sup>h</sup> 55<sup>m</sup>]. Zamboanga (W Mindanao). Oscillatory earthquake, direction N-S, intensity III, duration 6 seconds.

27, 13<sup>h</sup> 45<sup>m</sup> [27, 23<sup>h</sup> 15<sup>m</sup>]. Guam (Mariana Islands). Earthquake shock of intensity III.

31, 8<sup>h</sup> 27<sup>m</sup> [31, 16<sup>h</sup> 27<sup>m</sup>]. Butuan (N Mindanao). Oscillatory earthquake, direction N-S, intensity III-IV, duration 8 seconds. Recorded by a seismograph at Mambajao, Camiguin Island, 140 kilometers WNW of Butuan.

<sup>1</sup>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<sup>h</sup>), 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.  $A_N$ :  $T_0=5.9$ ,  $\epsilon=2.340$ ,  $\frac{r}{T_0^2}=0.024$ ;  
 $A_E$ :  $T_0=5.3$ ,  $\epsilon=1.783$ ,  $\frac{r}{T_0^2}=0.092$ . Alluvium. 2.40 meters above sea level.]

No.	Date.	Character.	Phase.	Hour.	Period.	Amplitude.		Remarks.
						$A_N$ $\mu$	$A_E$ $\mu$	
382	1	IIIa	eP L	h. m. s. .18 22 32 22 44				S Luzon. Maxima and end in both components lost by the force of the shock.
383	2	I <sub>r</sub>	eP L F	4 41 50 44 40 5 01				
384	3	I <sub>v</sub>	eP L F	14 31 41 32 10 37				Ambos Camarines (SE Luzon).
385	5	I <sub>v</sub>	eP L M <sub>N</sub> F	22 13 00 13 21 13 23 18	3	62		
386	6	I <sub>v</sub>	eP F	19 15 37 19				
387	7	I <sub>v</sub>	eP F	13 32 27 35				
388	7	I <sub>v</sub>	eP F	17 00 42 03				
389	8	I <sub>v</sub>	eP F	9 29 35 32				
390	8	I <sub>v</sub>	eP F	22 47 22 50				
391	9	IIIa	eP L	5 34 25 34 38				S Luzon. Maxima and end in both components lost by the force of the shock.
392	9	I <sub>v</sub>	eP L M <sub>N</sub> F	21 26 24 26 42 26 46 30	3	198		
393	10	I <sub>r</sub>	eP S L F	14 41 00 45 26 15 18				
394	11	I <sub>v</sub>	eP F	3 45 54 48				
395	14	I <sub>v</sub>	eP F	2 26 48 29				
396	14	I <sub>r</sub>	e F	8 10 32 56				
397	20	I <sub>v</sub>	eP F	8 51 00 54				Naga (SE Luzon).
398	21	I <sub>r</sub>	eP S L M <sub>E</sub> M <sub>N</sub> F	18 06 28 15 56 31 24 32 06 32 44 19 17	20 22	6 7		As of Nov. 20, 1917-18 changed to BSI
399	23	I <sub>v</sub>	eP F	6 25 36 28				
400	25	I <sub>v</sub>	eP F	15 48 09 50				
401	26	I <sub>v</sub>	eP F	8 34 24 37				
402	27	I <sub>v</sub>	eP F	22 43 08 45				
403	27	I <sub>v</sub>	eP F	23 03 24 05				
404	28	I	e F	21 35 53				
405	29	I <sub>u</sub>	e S? L? F	23 09 27 22 58 1 03				Guatemala? L and maxima lost by the changing of paper.
406	30	I <sub>v</sub>	eP F	2 19 00 22				

TEMBLORES DE TIERRA SENTIDOS EN FILIPINAS.<sup>1</sup>

1, 18<sup>h</sup> 22<sup>m</sup> 32<sup>s</sup> \* [2, 2<sup>h</sup> 22<sup>m</sup> 32<sup>s</sup>]. **S. de Luzón.** Extenso temblor de tierra sentido en toda la parte meridional de Luzón y en las islas adyacentes de Mindoro y Calamianes. El epicentro se hallaba en el Mar de China al W del estrecho que separa Luzón de Mindoro; tuvo intensidad V en Calapán (Mindoro), estación la más próxima al epicentro, pero distante aún unos 100 kilómetros. El área afectada se extendía cerca de 500 kilómetros en la dirección N-S y menos de la mitad de E-W. Registrado también por el sismógrafo de Butúan.

3, 7<sup>h</sup> 07<sup>m</sup> [3, 15<sup>h</sup> 07<sup>m</sup>]. **Legaspi (SE de Luzon).** Temblor oscilatorio, dirección NE-SW, intensidad III, duración 5 segundos.

3, 8<sup>h</sup> 37<sup>m</sup> [3, 16<sup>h</sup> 37<sup>m</sup>]. **Butúan (N de Mindanao).** Temblor de intensidad II-III.

3, 14<sup>h</sup> 31<sup>m</sup> 41<sup>s</sup> \* [3, 22<sup>h</sup> 31<sup>m</sup> 41<sup>s</sup>]. **Ambos Camarines (SE de Luzón).** Temblor de tierra de intensidad III-IV sentido en la parte W y central de Ambos Camarines. Su epicentro se hallaba al N de la Bahía de San Miguel. En Naga fué precedido de ruido subterráneo. Registrólo el sismógrafo de Butúan.

9, 5<sup>h</sup> 34<sup>m</sup> 25<sup>s</sup> \* [9, 13<sup>h</sup> 34<sup>m</sup> 25<sup>s</sup>]. **S de Luzon.** Temblor de tierra de intensidad III-IV originado en el mismo paraje que el del día 2 al W del estrecho de Mindoro, pero sentido solamente en Manila y en las Provincias de Cavite, Batangas y Mindoro. Fué registrado también en Butúan.

9, 8<sup>h</sup> 24<sup>m</sup> [9, 16<sup>h</sup> 24<sup>m</sup>]. **Naga (SE de Luzon).** Temblor oscilatorio, dirección N-S, intensidad III, duración 4 segundos.

12, 20<sup>h</sup> 08<sup>m</sup> [13, 4<sup>h</sup> 08]. **Naga (SE de Luzón).** Temblor de tierra de intensidad II-III.

15, 21<sup>h</sup> 30<sup>m</sup> [16, 5<sup>h</sup> 30<sup>m</sup>]. **Legaspi (SE de Luzón).** Temblor oscilatorio, dirección NE-SW, intensidad III, duración 3 segundos.

20, 8<sup>h</sup> 51<sup>m</sup> 00<sup>s</sup> \* [20, 16<sup>h</sup> 51<sup>m</sup> 00<sup>s</sup>]. **Naga (SE de Luzón).** Temblor de tierra de intensidad III. Este temblorcito y los tres siguientes de menos intensidad, ocurridos el 24 a 1<sup>h</sup> 25<sup>m</sup> y 2<sup>h</sup> 14<sup>m</sup> (tiempo medio insular) y el 26 a 10<sup>h</sup> 58<sup>m</sup>, tuvieron probablemente su origen en la región del Isarog.

23, 18<sup>h</sup> 30<sup>m</sup> [24, 4<sup>h</sup> 00<sup>m</sup>]. **Guam (Islas Marianas).** Temblor de tierra de intensidad III-IV.

36, 6<sup>h</sup> 55<sup>m</sup> [26, 14<sup>h</sup> 55<sup>m</sup>]. **Zamboanga (W de Mindanao).** Temblor oscilatorio, dirección N-S, intensidad III, duración 6 segundos.

27, 13<sup>h</sup> 45<sup>m</sup> [27, 23<sup>h</sup> 15<sup>m</sup>]. **Guam (Islas Marianas).** Temblor de tierra de intensidad III.

31, 8<sup>h</sup> 27<sup>m</sup> [31, 16<sup>h</sup> 27<sup>m</sup>]. **Butúan (N de Mindanao).** Temblor oscilatorio, dirección N-S, intensidad II<sup>+</sup> [duración] segundos. Registrado por el sismógrafo de Mambajao, estación situada en la isla de Camiguín a unos 140 kilómetros al WNW de Butúan.

<sup>1</sup> 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<sup>h</sup>). Para conveniencia de los lectores de Filipinas se añade también el tiempo insular.





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**APPENDIX TO THE MONTHLY  
BULLETINS FOR 1917.**

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**ANNUAL SUMMARY OF METEOROLOGICAL DATA FOR MANILA  
DEDUCED FROM TWENTY-FOUR DAILY OBSERVATIONS  
DURING THE YEAR 1917.**

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.
January	760.92	-0.22	24.7	-0.2	29.9	-0.2	21.2	+0.8	32.3	1	19.4	31
February	60.48	-0.75	25	-0.3	30.8	0	20.8	+0.5	33.3	27	18	24
March	59.52	-0.99	26	-0.6	32	-0.5	21.4	+0.1	33.8	8	19.6	15
April	57.93	-1.45	27.9	-0.2	33.8	-0.1	23.2	+0.4	35.4	23	21.3	7, 22
May	58.34	-0.01	27.9	-0.5	33.9	+0.3	23.6	-0.3	36	15	20.7	19
June	57.97	+0.05	27.8	-0.1	33.5	+0.1	23.6	-0.3	35.8	14	22.6	23
July	56.80	-0.43	26.1	-0.9	30.6	-0.4	23.2	-0.5	32.7	14	22.3	14, 25
August	57.29	-0.04	26.9	-0.1	31.9	+0.1	23.6	-0.1	33.7	22	22.4	30
September	57.55	+0.12	26.5	-0.3	31	+0.3	23.6	0	33.3	13	22.1	20
October	57.49	-0.13	26.1	-0.6	31.3	+0.2	23.1	0	33.2	28	21.9	29
November	58.65	-0.69	25.4	-0.5	30.1	-0.3	22.3	+0.1	32.9	10	20.8	13
December	58.62	-1.68	24.8	-0.3	29.7	-0.2	21.7	+0.4	32.1	3	19	31
Annual	758.46	-0.60	26.3	-0.4	31.5	+0.1	22.6	+0.1	36.0	V, 15	18.0	II, 24

Month.	Wind.				Relative humidity.		Vapor pressure.		Cloudiness.		
	Prevailing direction.	Velocity.			Direction at the time of the maximum velocity.	Mean.	Departure from normal.	Mean.	Departure from normal.	Mean.	Departure from normal.
Total.		Departure from normal.	Hourly maximum.								
January	NE quadrant.	Km. 4,628	-663.1	27	NNE	P. ct. 80.7	+2.5	mm. 18.4	+0.3	0-10. 7.3	0-10. +1.9
February	E quadrant.	5,010	-373.7	29	SE	75.7	+1.7	17.6	+1	6.1	+1.2
March	E quadrant.	5,858	-986.5	25	E by N	75.4	+3.8	18.6	+0.4	6.0	+1.5
April	E quadrant.	5,610	-1,298.8	23	ESE	75.4	+5.5	20.8	+1.3	5.2	+1.1
May	W quadrant.	5,654	-1,296.1	29	WSW	78.1	+2	21.5	-0.1	6.7	+0.9
June	SW, SE	5,145	-1,575	26.5	SW	79.8	-1	21.7	-0.6	7.0	0
July	SW	8,025	-155.6	41	WSW	87.6	+2.7	21.9	-0.5	9.0	+1.2
August	W quadrant.	6,538	-2,976.4	35.5	SW by W	85.5	+0.5	22.3	-0.1	7.5	-0.4
September	SW	5,545	-2,300.7	38	SW	86.8	+1	22.1	-0.3	7.8	+0.8
October	E quadrant.	3,953.5	-1,483.8	29	SW	88	+4.2	22.1	+0.4	8.6	+1.1
November	NE quadrant.	3,598	-1,358.4	22	NNE	87.8	+5.2	21	+0.7	8.4	+2
December	N quadrant.	3,906.5	-976.9	21.5	NNE	85	+3.6	19.7	+0.5	7.6	+1.4
Annual		63,471.0	-15,445.0	41		82.2	+2.6	20.6	+0.2	7.3	+1.1

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.		
January	mm. 92.5	mm. 71.1	h. 128	m. 10	mm. 18.0	-8.9	9.7	3	10	+5		
February	119.9	90	167	45	7	-3.5	6.1	18	4	+1		
March	138.3	105.6	182	45	54	13	47.6	+29	24	+6		
April	149.6	106.8	259	45	2	0.4	58.1	+23.5	8	+4		
May	136.7	99.4	220	15	9	4.4	53.9	-51.4	25	+3		
June	119	90.7	186	40	+14	16	270.7	+36.4	26	-1		
July	58.6	51.6	96	47	56	606	+206.7	107.6	11	+8		
August	78	61.1	163	35	+21	57	359.4	-1.7	4	+2		
September	65.8	49.4	98	45	-35	22	263.2	-107.2	5	+2		
October	61.2	45.8	142	30	-23	56	340.6	+153	7	+5		
November	55	43.8	102	30	-59	0.4	229.2	+99	25	+6		
December	71.6	54.6	113	45	-41	14	75.7	+13	19	+7		
Annual	1,146.2	869.9	1,861	40	-325	10	2,329.4	+387.9	107.6	VII, 11	191	+48

# CATALOGUE OF PHILIPPINE EARTHQUAKES, 1917.<sup>a</sup>

Date.	Time of occurrence (Greenwich mean time).	Place.	Probable origin or epicenter.		Approximate extension of the shaken area.		Intensity (Rossi-Forel).	Remarks.
			$\phi$	$\lambda$	Longer axis.	Shorter axis.		
	<i>h. m.</i>		$^{\circ}$	$^{\circ}$	<i>Km.</i>	<i>Km.</i>		
Jan.	4 9 04	Borongan (E Samar)					III	Registered at Manila.
	10 13 21	Western Mindanao and Visayan Islands	10.0 N	121.0 E	400	250	V III-IV	Do.
	12 12 13	Catanduanes Island					III	
	18 16 13	Guam (Mariana Islands)					III	
	25 3 26	Panay Island					III	
	31 4 03	Southern Mindanao	5.6 N	124.8 E	1,000	1,000?	VIII-IX	Registered throughout the world.
Feb.	2 17 07	Butuan (N Mindanao)					II-III	
	4 10 30	E Mindanao	7.5 N	125.9 E	350	300	V II	Registered in the Far East.
	10 12 25	Butuan (N Mindanao)					II-III	
	15 19 07	Baguio (W Luzon)					II-III	Do.
	17 22 49	Batanes Islands	20.3 N	122.0 E	500	?	VII-VIII	Registered all over the world.
	18 1 25	E Visayas	10.3 N	126.5 E	1,000	?	VIII	Registered at Manila.
	22 16 59	SE Luzon			230	200	IV	
	24 9 31	N Luzon	18.8 N	121.0 E	200	80	III-IV	
	25 5 22	SE Luzon; Samar and Leyte	14.0 N	126.0 E	420	?	IV-V	Registered in the Far East. Repeated at 5 <sup>h</sup> 47 <sup>m</sup> , intensity IV-V, and at 10 <sup>h</sup> 08 <sup>m</sup> intensity IV.
	25 10 35	N Luzon	18.3 N	121.0 E	200	100	III-IV	
	28 2 48	Butuan (N Mindanao)					III	
Mar.	2 2 40	SE Luzon	13.5 N	125.0 E	250	?	V	Registered at Manila.
	2 21 58	Davao (SE Mindanao)					III-IV	
	3 5 46	Guam (Mariana Islands)					H-III	Do.
	5 4 46	Basco (Batanes Islands)					III	
	7 16 11	Butuan (N Mindanao)					III	
	9 23 03	Basco (Batanes Islands)	20.3 N	122.0 E			IV	Registered in the Far East.
	11 7 48	Guam (Mariana Islands)					IV	
	17 23 25	E Visayas	13.0 N	126.0 E	400	400	V-VI	Registered at Manila.
	19 17 39	Butuan (N Mindanao)					II-III	Do.
	20 15 02	NE Mindanao	9.5 N	126.5 E			V	Repeated at 18 <sup>h</sup> 44 <sup>m</sup> , with intensity IV. Registered at Manila.
	22 2 56	Butuan (N Mindanao)					III	
	23 4 50	Butuan (N Mindanao)					II-III	
	27 9 07	Samar and Leyte Islands	11.1 N	125.2 E			III	
Apr.	9 11 12	NW Luzon	18.2 N	120.7 E	80	80	V-VI	Repeated at 11 <sup>h</sup> 22 <sup>m</sup> and 15 <sup>h</sup> 52 <sup>m</sup> .
	10 2 07	Basco (Batanes Islands)					III	
	10 13 35	W Visayas	10.6 N	122.5 E	300	150	IV	Repeated at 16 <sup>h</sup> 44 <sup>m</sup> . Registered at Manila. Two light after-shocks at 19 <sup>h</sup> 20 <sup>m</sup> and 20 <sup>h</sup> 10 <sup>m</sup> . Registered at Manila.
	11 22 02	N Luzon	18.7 N	121.8 E	200	80	V	
	14 5 22	Butuan (N Mindanao)					II-III	
	21 14 43	Cuyo Islands					III-IV	
	22 3 05	Ormoc (W Leyte)					III	Do.
	23 20 34	E Luzon	15.8 N	122.0 E	240	?	V	
	24 1 42	Butuan (N Mindanao)					II-III	Origin in the Pacific. Registered at Manila.
	24 17 57	Guam (Mariana Islands)					II-III	Repeated at 18 <sup>h</sup> 02 <sup>m</sup> .
	27 9 10	Echague (E Luzon)					II-III	
	27 20 39	Guam (Mariana Islands)					III-IV	
May	4 0 14	N Luzon	18.2 N	120.7 E	250	140	IV	Registered at Manila.
	5 12 20	Laog (NW Luzon)	21.0 N	120.0 E			III	Registered in the Far East.
	6 22 57	Guam (Mariana Islands)					III-IV	Do.
	7 17 59	NW Luzon	16.8 N	120.2 E	200	60	III-IV	Registered at Manila.
	9 15 58	Guam (Mariana Islands)					V-VI	Registered throughout the world.
	13 6 20	Butuan (N Mindanao)					III	
	24 21 28	Butuan (N Mindanao)					III-IV	
	26 21 17	Samar Island					III	Registered at Manila.
	27 20 05	Laog (NW Luzon)					III-IV	Do.
	28 12 02	SE Luzon	13.3 N	122.9 E	400	220	IV-V	Registered in the Far East.
	28 20 31	La Union (W Luzon)					II-III	
June	4 4 03	Samar Island					II-III	Registered at Butuan.
	5 20 59	Samar, Masbate and Panay Islands			300	?	III	Registered at Manila. Origin near Masbate Island.
	6 9 32	Butuan (N Mindanao)					II-III	Registered at Manila. Origin in the Philippine Deep.
	9 6 33	N Luzon	18.2 N	121.1 E	300	200	IV-V	Registered at Manila.
	10 20 05	Calbayog (NW Samar)					II-III	Do.
	13 15 33	Baguio (W Luzon)					II-III	Do.
	14 21 04	N Luzon	18.2 N	121.1 E	300	150	III-IV	Registered in the Far East and America.
	18 16 32	Guam (Mariana Islands)	14.0 N	144.0 E			IV-V	
	20 17 18	Butuan (N Mindanao)					III	
	20 21 27	Cape Bojeador (NW Luzon)					II-III	
	27 5 37	SE Luzon, Samar and Leyte Islands			430	?	III	Origin in the Pacific. Registered at Manila.

<sup>a</sup> See explanation in Monthly Bulletin of the Weather Bureau for December, 1910, p. 445.

## Catalogue of Philippine earthquakes, 1917—Continued.

Date.	Time of occurrence (Greenwich mean time).	Place.	Probable origin or epicenter.		Approximate extension of the shaken area.		Intensity (Rossi-Forel).	Remarks.
			$\phi$	$\lambda$	Longer axis.	Shorter axis.		
July 4	0 41	Aparri (NE Luzon)	24.0 N?	129.0 E?	Km.	Km.	II-III	Registered throughout the world.
11	17 35	Iloilo (E Panay)					III	
16	5 12	SE Luzon	14.5 N	124.0 E	200	?	IV-V	Registered at Manila.
19	16 59	Butuan (N Mindanao)					III	
22	14 36	Guam (Mariana Islands)					IV-V	Origin S of Guam. Registered in the Far East.
29	21 58	Butuan (N Mindanao)					II-III	Origin off the eastern coast of Mindanao. Registered throughout the world.
30	1 45	Guam (Mariana Islands)					III-IV	
Aug. 1	6 00	Calbayog (NW Samar)					II-III	
3	18 36	Butuan (N Mindanao)					III	Origin in the Pacific. Registered at Manila.
3	22 57	Cape Bojeador (NW Luzon)					III	
7	10 29	NE Mindanao	9.2 N	125.4 E			III-IV	
9	11 56	SE Luzon and N Samar	13.5 N	125.5 E	270	?	V	Registered at Manila.
10	2 24	Butuan (N Mindanao)					III-IV	
13	16 54	Butuan (N Mindanao)					II-III	
14	23 08	NE Luzon	18.8 N	122.5 E			III-IV	Registered in the Far East.
25	1 39	Tacloban (NE Leyte)					II-III	Registered at Butuan.
27	1 51	Camiguin Island (Mindanao)					II-III	Do.
30	4 12	Butuan (N Mindanao)					II-III	Origin off the eastern coast of Mindanao. Registered in the Far East and America.
30	4 28	Ambulong (S Luzon)					II-III	
Sept. 3	10 08	Vigan (NW Luzon)					II-III	Registered at Manila.
7	22 23	SE Luzon	13.7 N	123.3 E	60	60	VI-VII	Do.
12	23 25	Ormoc (W Leyte)					III	
14	5 34	Naga (SE Luzon)					III	Do.
17	5 49	N Luzon	17.7 N	121.0 E			IV	Registered in the Far East.
18	9 33	Ormoc (W Leyte)					III	
18	13 42	Butuan (N Mindanao)					III-IV	Origin near the eastern coast of Mindanao. Registered at Manila.
18	20 26	SE Luzon	14.2 N	123.8 E			III-IV	Registered at Manila.
21	11 14	SE Luzon					III-IV	
22	6 51	Candon (W Luzon)					III	
23	15 39	W Luzon					III-IV	Origin off the W coast. Registered at Manila.
30	13 57	NE Mindanao	9.2 N	125.4 E			II-III	
Oct. 1	12 14	N Luzon	18.8 N	121.0 E	200	100	IV	Registered at Manila.
2	17 16	Butuan (N Mindanao)					II-III	Registered at Manila. Origin in the Pacific.
3	20 14	Ormoc (W Leyte)	10.7 N	124.5 E	120	120	V	Registered at Butuan.
3	26 39	Camarines (SE Luzon)	13.7 N	123.3 E	250	250	VI	Registered at Manila. 10 foreshocks and 45 aftershocks during the 4th and the forenoon of the 5th.
5	12 13	Camarines (SE Luzon)	13.7 N	123.3 E	250	250	V-VI	Registered at Manila. 17 aftershocks during the afternoon and the following night.
6	7 04	Camarines (SE Luzon)	13.7 N	123.3 E	250	250	IV-V	Registered at Manila. 22 aftershocks until the end of this seismic period on the 9th.
7	15 04	Butuan (N Mindanao)					IV	Aftershock at 21 <sup>h</sup> 43 <sup>m</sup> .
8	0 15	Cotabato (SW Mindanao)					II-III	Registered at Butuan.
10	4 31	Naga (SE Luzon)					III	
14	11 13	N Luzon	18.8 N	121.0 E	200	100	V	Registered at Manila.
16	14 47	Laoag (NW Luzon)					III	Do.
17	19 18	Guam (Mariana Islands)					II-III	
18	16 19	NE Mindanao	9.7 N	126.7 E	350	200	VI-VII	Registered at Manila. 2 instrumental aftershocks were recorded at Butuan at 21 <sup>h</sup> 14 <sup>m</sup> and 21 <sup>h</sup> 18 <sup>m</sup> .
20	8 02	Naga (SE Luzon)					III	
25	19 48	Guam (Mariana Islands)					III-IV	
26	6 11	Santa Cruz, Laguna (E Luzon)					II-III	Registered at Manila.
26	16 23	Guam (Mariana Islands)					III	
Nov. 3	3 26	Naga (SE Luzon)	14.4 N	123.5 E			V	Registered at Manila. Aftershock at 10 <sup>h</sup> 40 <sup>m</sup> .
3	13 21	Surigao (NE Mindanao)					III	Repeated at 4 <sup>h</sup> 40 <sup>m</sup> on the 4th.
4	11 47	Candon (W Luzon)					III	
5	11 16	Manila (W Luzon)					II-III	
7	14 09	Basco (Batanes Islands)					III	
7	20 53	N Luzon	18.8 N	121.0 E	200	100	IV	Registered at Manila.
7	22 10	Basco (Batanes Islands)					III	Repeated at 11 <sup>h</sup> 16 <sup>m</sup> on the 8th.
8	8 10	Legaspi (SE Luzon)					III	
10	0 03	Baguio (W Luzon)					II-III	
12	6 12	Guiuan (SE Samar)					III	
13	6 41	Baguio (W Luzon)					II-III	Registered at Butuan.

## Catalogue of Philippine earthquakes, 1917—Continued.

Date.	Time of occurrence (Greenwich mean time).	Place.	Probable origin or epicenter.		Approximate extension of the shaken area.		Intensity (Rossi-Forel).	Remarks.
			$\phi$	$\lambda$	Longer axis.	Shorter axis.		
Nov. 13	<i>h. m.</i> 20 01	Butuan (N Mindanao) -----	o	o	<i>Km.</i>	<i>Km.</i>	II-III	Repeated the following day at 15 <sup>h</sup> 19 <sup>m</sup> ; 7 instrumental aftershocks were recorded at Butuan. Origin off the E coast of Mindanao. Registered in the Far East. Registered in the Far East: 29 instrumental aftershocks recorded at Butuan. Registered at Manila.
16	22 20	E Mindanao -----	7.7 N	125.9 E	450	200	V-VI	
17	12 49	Panay and Cuyo Islands -----	9.5 N	121.4 E	-----	-----	IV	
17	19 52	Naga (SE Luzon) -----	-----	-----	-----	-----	II-III	
18	2 59	Sulu Sea -----	8.5 N	121.5 E	700	700	VII	
18	23 18	Naga (SE Luzon) -----	-----	-----	-----	-----	III	
20	3 56	Zamboanga (W Mindanao) -----	8.5 N	121.5 E	-----	-----	III	
24	11 14	Guam (Mariana Islands) -----	13.4 N	142.0 E	-----	-----	VI	
24	19 34	Tacloban (NE Leyte) -----	-----	-----	-----	-----	II-III	
28	14 35	Butuan (N Mindanao) -----	-----	-----	-----	-----	III	
Dec. 1	18 23	S Luzon -----	13.5 N	120.0 E	400	300	V	Registered at Manila and Butuan.
3	7 07	Legaspi (SE Luzon) -----	-----	-----	-----	-----	III	
3	8 37	Butuan (N Mindanao) -----	-----	-----	-----	-----	II-III	
3	14 32	Camarines (SE Luzon) -----	14.5 N	123.4 E	200	200	III-IV	
9	5 34	S Luzon -----	13.5 N	120.0 E	300	250	IV	
9	8 24	Naga (SE Luzon) -----	-----	-----	-----	-----	III	
12	20 08	Naga (SE Luzon) -----	-----	-----	-----	-----	II-III	
15	21 30	Legaspi (SE Luzon) -----	-----	-----	-----	-----	III	
20	8 51	Naga (SE Luzon) -----	13.7 N	123.3 E	-----	-----	III	
23	18 30	Guam (Mariana Islands) -----	-----	-----	-----	-----	III	
26	6 55	Zamboanga (W Mindanao) -----	-----	-----	-----	-----	III	
27	13 45	Guam (Mariana Islands) -----	-----	-----	-----	-----	III	
31	8 27	Butuan (N Mindanao) -----	-----	-----	-----	-----	III-IV	

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