MISCELLANEOUS PHENOMENA.

Under the above title it has been the custom for a century past throughout the world to invite all meteorological observers to make a record of a large variety of phenomena that are somewhat beyond the range of technical meteorology. Among these, in the first class, comes the phenomena that are ordinarily considered to belong to climatology, such as the migrations and habits of birds, mammals, and fishes; the freezing of lakes and rivers and the soil; the times of leafing, flowering, and ripening of plants.

In addition to climatology, there were included phenomena that belong to terrestrial physics, and may have some possible relation to meteorology, such as the shooting stars or meteors, the aurora, the earthquake and the ocean waves, or so-called tidal waves and storm waves.

By a resolution of a recent international meteorological congress the whole subject of terrestrial magnetism has been committed to the meteorological services when not otherwise specially provided for.

As the weather and the climate are subjects that directly affect every branch of human industry, it naturally happens that the number of meteorological observers far excells the sum total of all who are specially engaged in observing earthquakes, magnetics, meteors or any other terrestrial phenomenon, and it does seem desirable that they should contribute, as far as possible, to our knowledge of all that is going on about us. Is it not the duty of every one to contribute his mite toward the observations and investigations that are gradually enlarging our knowledge of the earth as the home of man?

The habits of regularity and exactness and the love of nature that distinguish our voluntary observers render it certain that science must look to them for work in the abovementioned lines of miscellaneous observation. The earthquakes that occur throughout our country have awakened a desire to know more about their nature and origin. Those who cannot establish and maintain the Marvin seismograph, or some of the simpler forms, can at least take the greatest pains to keep a daily record of the errors of their watches or clocks on standard time, so that when an earthquake is observed they may be able to state the time correctly to within a few seconds, instead of making such a crude record as "about 10 or 15 minutes after 5 a. m." An exact record of the time of beginning and ending is of more use to the student of the subject than a general statement as to the direction or severity of the shock.

As self-registering meteorological and magnetic apparatus frequently show peculiar marks that are sometimes known to have been caused by slight earthquake disturbances, it is generally recognized as very desirable that a seismograph should be established in every magnetic and meteorological observatory where continuous registers are employed. In so far as this new piece of apparatus can be added to the others at our stations, we shall have the means of explaining anomalies on the automatic record sheets.

The editor desires to repeat a statement made by him on several occasions, namely, that the Weather Bureau seismograph is not only an efficient earthquake indicator, but an equally efficient burglar detector. A seismograph set up within or on a large safe, or within the vault of a safe deposit company would, by means of the proper telegraphic connections, give immediate notice of any serious disturbance by burglars. Those of our banks who maintain such instruments in working order and keep the record closely regulated to standard time, will contribute not only to their own security but to the collection of data important to the study of earthquakes.

This is a field in which the Weather Bureau and the banks can advantageously cooperate.

OBSERVATIONS AT HONOLULU.

Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, —0.06, is still to be applied.

The absolute humidity is expressed in grains of water, per cubic foot, and is the average of four observations daily.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

	Pressure at sea level.			Temperature.					Humidity.			Wind.		Cloudiness.	Rain measured at 6 a. m.
July, 1895.	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Maximum.	Minimum.	Relative. 9 a. m.	Relative. 9 p. m.	Absolute.	Direction.	Force.		
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%					*Ins.*
1..	30.18	30.10	30.14	74	78	75	80	72	85	70	6.9	ne.	4	6	0.21
2..	30.11	30.04	30.08	74	80	76	82	72	61	67	6.2	nne.	4	6-3	0.08
3..	30.08	30.04	30.10	74	82	75	83	71	68	74	6.7	ne.	4	4	0.11
4..	30.12	30.07	30.14	72	78	74	83	71	70	80	7.4	ne.	3	5	0.10
5..	30.13	30.07	30.13	70	82	75	83	70	70	74	7.2	ne.	2	3	0.15
6..	30.10	30.02	30.06	72	80	75	83	67	74	70	7.1	ne.	2	4	0.02
7..	30.07	30.00	30.04	77	83	75	84	71	67	74	7.0	ene.	3	0-6	0.00
8..	30.04	30.00	30.04	76	83	76	84	69	63	70	6.8	ene.	2	3	0.14
9..	30.03	29.99	30.08	76	82	76	83	70	60	70	6.8	e.	2	2	0.00
10..	30.08	30.04	30.09	76	83	77	84	71	58	67	6.8	ne.	2	1	0.00
11..	30.09	30.03	30.08	76	82	76	83	71	63	62	6.8	nne.	3	4	0.05
12..	30.06	30.01	30.05	75	82	75	83	72	63	66	6.6	e.	2	4-2	0.00
13..	30.04	29.99	30.03	76	83	76	84	71	60	70	6.7	ne.	3	2	0.00
14..	30.04	29.99	30.05	77	80	76	84	72	60	77	7.2	ne.	3	3-10	0.05
15..	30.03	30.00	30.06	76	81	77	84	73	72	72	7.1	ne.	4	4-9	0.03
16..	30.06	30.03	30.07	77	81	77	83	74	63	74	7.2	e.	3	5-8	0.02
17..	30.09	30.03	30.07	76	81	77	83	73	60	64	6.9	ne.	4	6	0.04
18..	30.07	30.00	30.04	77	81	76	84	75	56	67	6.7	ene.	2	3	0.00
19..	30.04	30.00	30.05	72	82	76	85	71	60	67	6.7	ne.	3	3	0.11
20..	30.04	29.99	30.04	76	85	78	86	74	60	71	7.0	ne.	2	3	0.04
21..	30.06	30.03	30.08	79	83	78	85	77	60	74	7.5	ne.	3	3	0.00
22..	30.13	30.04	30.11	78	81	77	83	76	61	65	6.7	ene.	4	5	0.00
23..	30.08	30.00	30.05	76	82	75	84	74	60	80	6.8	ne.	5	2	0.00
24..	30.05	30.00	30.04	75	82	77	84	74	66	70	7.1	nne.	5	2	0.05
25..	30.07	30.05	30.09	76	82	76	85	75	58	67	6.6	ene.	3	3-4	0.00
26..	30.09	30.02	30.07	74	83	76	85	72	64	70	6.8	ne.	3	2	0.00
27..	30.06	30.00	30.04	72	83	76	84	72	70	74	7.3	ne.	3	5	0.05
28..	30.07	30.03	30.09	75	84	78	86	72	70	70	7.4	ne.	3	3	0.13
29..	30.10	30.06	30.10	76	82	75	86	74	67	78	7.2	ne.	3	5	0.03
30..	30.09	29.99	30.05	73	84	77	85	71	74	74	7.5	ne.	3	2-5	0.07
31..	30.00	29.94	30.00	75	82	78	83	75	77	75	8.0	ne.	3	7-10	0.07
	30.07	30.02	30.07	75.1	81.8	76.7	83.8	72.3	64.3	70.7	7.0	.....	.....	.....	1.55

The monthly summary for July is: Mean temperature, 77.7°; the normal is 78.3; extreme temperatures, 85 and 69. Disturbance periods occurred on the 1st, 16th, 22d, and 31st. Humidity and temperature this month higher than for two years, and barometer down at last to normal. Very heavy rain on the Island of Hawaii on the 31st. Slight earthquake, Hawaii, 16th.

OBSERVATIONS IN ALASKA.

The accompanying tables, on pp. 281, 282, present in full the record of meteorological observations just received from V. C. Gambell, voluntary observer at St. Lawrence Island, Alaska; latitude 63° 34′ N., longitude 171° 45′ W.; height above sea, 30 feet. The thermometers were 6 feet above the ground; the rain gauge is stated to be 20 feet above ground, but this may be a slip for "above sea level." The instruments were furnished by the Weather Bureau, but the rain gauge was not received by Mr. Gambell until May, 1895. Apparently he read only the maximum and minimum thermometers during October, November, and December, 1894, but in January, 1895, he began to read the standard dry thermometer at 7 a. m., 2 p. m., and 9 p. m., local time, in addition to the maximum and minimum thermometer. The blanks in the columns of wind direction and force are published as recorded, but are presumed to be intended for calms and have been so treated by the observer in computing the average wind force. The expressions "snow" and "a little snow" in the original record appear to refer to amounts that were too small for measurement or that could not be measured on account of drifting; for convenience of printing they are replaced by a * and †, respectively. The depth of snow on the ground at the middle and end of the month gives a little better idea of the snowfall than do these individual statements. The observer has recorded the dates of solar and lunar halos without further

description; he has also recorded the dates on which auroras were observed, but it is not known whether they were always looked for and recorded. The aurora dates are as follows: October, none; November, none; December, 1894, 21; January, 1895, none; February, 1, 2, 15, 16, 27; March, 18; April, none; May, none. The original record of *minus* 11 as the minimum temperature on the 4th of April, 1895, has been changed to *plus* 11 by the Editor, as it seemed incredible that the abnormal diurnal range of 37° could have occurred on a cloudy night with a light breeze. The record ". . . . 3" for the wind at 9 p. m., December 26, 1894, has been changed to "e., 3."

METEOROLOGICAL TABLES.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

Table I gives, for about 130 Weather Bureau stations making two observations daily and for about 20 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation.

Table II gives, for about 2,400 stations occupied by voluntary observers, the extreme maximum and minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . . .).

Table III gives, for about 30 Canadian stations, the mean pressure; mean temperature, total precipitation, prevailing wind, and the respective departures from normal values. Reports from Newfoundland and Bermuda are included in this table for convenience of tabulation.

Table IV gives, for 82 stations, the mean hourly temperatures deduced from thermographs of the pattern described and figured in the Report of the Chief of the Weather Bureau, 1891–'92, p. 29.

Table V gives, for 67 stations, the mean hourly pressures as automatically registered by Richard barographs, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau, 1891–'92, pp. 26 and 30.

Table VI gives, for 136 stations, the arithmetical means of the hourly movements of the wind ending with the respective hours, as registered automatically by the Robinson anemometer, in conjunction with an electrical recording mechanism, described and illustrated in the Report of the Chief of the Weather Bureau, 1891–'92, p. 19.

Table VII gives the danger points, the highest, lowest, and mean stages of water in the rivers at cities and towns on the principal rivers; also the distance of the station from the river mouth along the river channel.

Table VIII gives the maximum, minimum, and mean readings of the wet-bulb thermometer for 135 stations, as determined by observations of the whirled psychrometer at 8 a. m. and 8 p. m., daily.

The difference between mean local time and seventy-fifth meridian time is also given in the table.

Table IX gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geographical division one may obtain the average resultant direction for that division.

Table X gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table XI gives, for 42 stations, the percentages of hourly sunshine as derived from the automatic records made by two essentially different types of instruments, designated, respectively, the thermometric recorder and the photographic recorder. The kind of instrument used at each station is indicated in the table by the letter T or P in the column following the name of the station.

Table XII gives the records of hourly precipitation as reported by stations equipped with automatic gauges, of which 37 are known as float gauges and 7 as weighing rain and snow gauges.

Table XIII gives the record of excessive precipitation at all stations from which reports are received.

Table XIV gives a record of the heaviest rainfalls for periods of five and ten minutes and one hour, as reported by regular stations of the Weather Bureau furnished with self-registering rain gauges.

Additional information concerning the tables will be found in the January, 1895, REVIEW.