systems involved in the registration. It is quite improbable, for example, that the pressure of 90 pounds per square foot reported to have been indicated by the Osler's pressure gage at Bidston, Liverpool, March 9, 1871, was an accurate record of the force of the wind at that time and place.

Even at the present time there is a great deal of uncertainty not only as to the velocity of the wind in those cases where our instruments indicate velocities of from 50 to 100 miles per hour, but also as to the relations between velocity and pressure under these extreme conditions. This is owing to the difficulty and expense surrounding reliable experimental investigations of this problem, and also to the considerable discordance that exists between the results of the investigations that have been attempted.

The question was quite extensively studied in England by the Wind Force Committee of the Royal Meteorological Society, and numerous papers on the subject will be found in the "Quarterly Journal of the Royal Meteorological Society," since about 1888. Notes of exceptionally high wind pressures, as deduced from the results of the investigations referred to, will also be found in the recent numbers of "Symons's Meteorological Magazine."

In regard to the highest wind velocity records in the United States, it may be stated that records by the Weather Bureau type of Robinson anemometer used on Mount Washington, N. H., have frequently shown velocities ranging from 100 to 120 miles per hour. There is one doubtful record of a velocity of 186 miles per hour, but we have authentic records of 150 miles per hour. We have also a perfect record from our station at Point Reyes Light, Cal., of a long sustained velocity exceeding 90 miles per hour, with an extreme velocity of 120 miles per hour.[1] It must be confessed that we are unable to accurately interpret the indications of our anemometers at these very high velocities.

The size and inertia of the Robinson anemometer affect its records, and that too differently in gusts and in steady winds. The Weather Bureau pattern has been tested up to 60 miles per hour only, and the resulting table for converting recorded into true velocities is as follows:

| Indicated velocity. | Correct velocity. |
|---|---|
| 5 | 5.1 |
| 10 | 9.6 |
| 20 | 17.8 |
| 30 | 25.7 |
| 40 | 33.3 |
| 50 | 40.8 |
| 60 | 48.0 |
| 70 | 55.2 |
| 80 | 62.2 |
| 90 | 69.2 |

All velocities above the 60-mile limit must remain hypothetical until the apparatus has been properly standardized.

## THE PHILIPPINE WEATHER BUREAU.

The Annual Report of the Director of the Philippine Weather Bureau for the year ending August 1, 1902, is addressed to the Hon. Dean C. Worcester, Secretary of the Interior, P. I., and was printed as Appendix P, pp. 663–677, of the Report of the Philippine Commission to the President of the United States. Although printed at Washington in 1902, this report reached the U. S. Weather Bureau, via Manila, only in July, 1903.

The publications of the Philippine Weather Bureau, so far as we have received them, may be classified as—

(*a*) The Annual Report of the Director to the Philippine Commission. Published in octavo as an official document of the United States Senate, at Washington, and also to be had as a separate from the Annual Report of the Bureau of Insular Affairs, under the Secretary of War.

(*b*) A series of bulletins of information printed in Manila by the Bureau of Public Printing, on behalf of the Manila Central Observatory. This series is a continuation of an earlier series, alternately 8vo and 4to, dealing with seismology and the seismic service of the archipelago. The first five are in Spanish; the sixth is by the Assistant Director of the Philippine Weather Bureau, M. Saderra Masó, S. J., entitled: Report on the Seismic and Volcanic Centers of the Philippine Archipelago. Manila, 1902. The preface is dated September, 1901. This pamphlet of 26 pages, with several maps, gives an admirable summary of our knowledge of Philippine vulcanology. On page 20 is given a table showing the monthly frequency of earthquakes during eighteen years. Nine hundred and sixty-two shocks are recorded, being an average of fifty-three earthquake days for last year, or 4.5 per month. An earthquake day is the date of the main shock, and does not include the subsequent shocks. The maximum frequency occurred in 1881 and again in 1897 and the minimum in 1886. The annual variation is such that we apparently have a minimum in March, a maximum in February, and a principal maximum in September; but these annual and monthly maxima are not sufficiently well marked to justify the conclusion that they represent normal periodicities. They will probably be changed by increasing the number of observers and the number of years of record, and, especially, by the substitution of seismographs for personal observations. In this same series of bulletins of information we must include the publications bearing on terrestrial magnetism, which began with the magnetic observations at Paragua, Jolo, and Mindanao in the year 1888: this subject includes five pamphlets, the last one being, The Magnetic Dip and Declination in the Philippine Islands. In this series, also, we include the publications bearing on meteorology proper. These begin with the pamphlet by Father Faura, On the Cyclones of October 20 and November 5, 1882, and include twenty-five pamphlets, of which the latest is by Father Algué, Observations of Soil Temperatures at Manila, 1896–1902. One of the most elaborate papers in this series is the Climatologia de Filipinas, which is a large collection of data and maps, 265 pages and 64 plates, printed at Washington in 1900.

(*c*) The third class of publications includes the regular monthly and annual volumes of data published in quarto. This series begins with the monthly bulletin in Spanish from 1865 to 1901, which contains the tables of meteorological, magnetic, and seismic observations; since 1901 agricultural data have been added. The monthly bulletin has gone through several slight changes as to its name and contents, but is sufficiently described by its title. The annual volumes begin with the Report of the Director of the Philippine Weather Bureau for 1901–2. This includes: Part 1. The Climate of Baguio (Beguet). Manila, 1902. Part 2. Report of the Director of the Philippine Weather Bureau, 1902. Meteorological Service of the Philippine Islands. Manila, 1903. Part 3. Hourly Observations of Atmospheric Phenomena at the Manila Central Observatory, 1902. Manila, 1903.

It is probable that these three parts, although they receive independent paginations, are intended to form one volume and there is nothing to indicate but that a fourth part will be necessary in order to complete the volume for the official year 1901–2. This first volume, therefore, as far as received, consists of 74 pages devoted to the climate of Baguio; 68 pages devoted to the history of the meteorological service of the Philippine Islands from its establishment in 1865, under the Spanish Government, to its organization in May, 1901, under the Government of the United States, concluding with the legislation of 1902; and 147 pages devoted to the complete record of hourly observations taken during the year 1902 at the Central Observatory of Manila.

Such a complete publication as this of records for Manila and

[1] See Monthly Weather Review, February, 1903, pp. 64–68.