TABLE 5.—*Mean winds, Manila*, 1865–1898.

(As read off by the Editor from Fr. Algué's diagrams.)

Month.	Resultant direction.	Relative frequency.			
		Direction.	Nov.-May.	June-Oct.	Annual.
	°		*Per cent.*	*Per cent.*	*Per cent.*
January	n. 50 e.	n.	8	4	7
February	n. 80 e.	nne.	7	4	6
March	s. 80 e.	ne.	9	5	7
April	s. 45 e.	ene.	5	3	4
May	s. 20 e.	e.	11	5	8
June	south	ese.	9	4	6
July	s. 40 w.	se.	6	4	5
August	s. 45 w.	sse.	2	3	3
September	s. 45 w.	s.	2	6	3
October	s. 80 e.	ssw.	2	9	5
November	n. 30 e.	sw.	5	17	9
December	n. 20 e.	wsw.	7	9	7
		w.	6	6	5
Annual	s. 45 e.	wnw.	2	2	2
		nw.	2	3	2
		nnw.	3	2	2
		n.	8	4	7
Resultant			n. 70.5° e.	s. 32.7° w.	s. 85.7° e.

THE NEW PHILIPPINE WEATHER SERVICE.

As is well known, the Observatory at Manila has been maintained for many years by the Jesuit Fathers under the Spanish administration, and embraced the subjects of astronomy, seismology, and meteorology. About 1894, Father Joseph Algué was transferred from Havana to Manila, and within the next few years distinguished himself by his activity in the study of typhoons. He subsequently became the director of the observatory, and as such, in 1899, had occasion to visit Washington, D. C., on behalf of the first Philippine Commission (of which Professor Schurman was president) here he remained a year superintending the publication of his extensive report to the commission on the climatology and geography of the Philippine Archipelago. The original Spanish edition of this report is already published, and the English summary will appear in the second volume of the commission's report to Congress, dated January 31, 1900, and published as Senate Doc. No. 138, Fifty-sixth Congress, first session.

Early in 1900, in an interview with the Secretary of Agriculture, Father Algué proposed that the United States should organize a meteorological system for the Philippines, placing it in charge of the Chief of the Weather Bureau, who should make the Manila Observatory the headquarters of the Philippine service. On the other hand, Professor Moore urged that it would be best that the Philippine system should be independent of the United States Weather Bureau; that it should be supported by the funds of the Philippine government rather than those of the United States; that Father Algué himself should be the director, and that the United States Weather Bureau would cooperate and render all the assistance possible. Professor Moore's plan was agreed to by Secretary Wilson, and adopted by the Philippine Commission, Secretary Wilson stating, however, that as soon as enough of the islands of the Pacific are connected by cable, it will be advisable for the United States Government to organize an extensive storm-warning system with the Philippine service incorporated under Federal direction.

Father Algué, during the rest of his stay in the United States, consulted with the various officials of the Weather Bureau and studied its methods. Since returning to Manila he has organized the Philippine system on lines parallel to those that characterize the Weather Bureau. As far as practicable, the same apparatus and methods have been adopted and the following extract from his letter to Professor Moore, dated February 17, shows the rapid progress that is being made:

MY DEAR PROFESSOR:

Most of the instruments intended for the first class stations of the Philippine weather service are at hand, and a few will be made in our mechanic's shop. The United States Philippine Commission[1] has established civil government in some provinces, and there will be a chance to open a few stations on the islands before the coming of the full typhoon season in May. I expect that by that time there will be some twenty telegraphic stations scattered over the islands: everything is done in accordance with the plan approved by you about the end of March, 1900. If this be entirely executed, as you suggested, here will be one of the finest meteorological and seismical *reseau* (network of stations) in existence in any colony over the world.

The mail will bring you a new pamphlet recently published on a typhoon felt in Manila about the 8th of September, 1900 (the very day of the Galveston cyclone.) The pamphlet proved to be very welcome in Manila and in Asia. I confine myself to quoting to you only one instance, viz, the following letter which was received yesterday:

UNITED STATES NAVAL STATION,
CAVITE, PHILIPPINE ISLANDS,
February 15, 1901.

"*The Director Observatorio de Manila:*

DEAR SIR: I beg to thank you for a copy of your most interesting publication on the storm which prevailed in this vicinity on the 8th of September, last. While I was not in command of this station on that date, I was informed by my predecessor how extremely valuable the telegrams from the Manila Observatory were in guiding him in his disposition of the numerous yard launches and other craft.

With renewed expressions of my regard for the Observatorio de Manila, believe me,

Yours, very respectfully,
F. HANFORD, *Commander, U. S. N.*,
Commandant, United States Naval Station, Cavite, P. I."

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. H. B. Boyer, Local Forecast Official at Savannah, Ga., states that he has met with some success in stimulating public interest in Weather Bureau work. On several occasions Prof. Otis Ashmore delivered lectures on meteorology to the teachers of the public schools; Prof. T. S. Lucas, of the High School, has been giving some instruction as to the lessons taught by the weather map; Prof. D. C. Suggs, of the Georgia State Industrial College (colored), has also requested maps as an aid to his classes in the study of physical geography. Applications for maps have been received from the Southern Normal Institute, Douglas, Ga., and the teacher of a school in Whitley, Ga. A cordial invitation was extended by Mr. Boyer to the public school teachers, which resulted in high school and grammar school classes visiting the office, where the instruments were shown and explained.

Mr. Alfred F. Sims, Local Forecast Official, Albany, N. Y., lectured on Monday, March 18, at the Albany High School, on the "Musings of a meteorologist." On March 26 he lectured on the growth of the globe and its atmosphere, under the title, "Glimpses into nature's laboratory."

Mr. Charles Stewart, Observer Weather Bureau, Spokane, Wash., lectured, January 29, to the students of the Blair Business College; February 13 at St. Stephen's School, and March 20 at Gonzaga College.

Mr. S. M. Blandford, Section Director at Boise, Idaho, lectured to the instructors and students at St. Margaret's Academy, Boise, Idaho, on the 16th of March, on barometric pressure, precipitation, temperature, clouds, and wind movement in cyclonic and anticyclonic areas.

DUST STORMS AND RED RAIN.

In previous numbers of the MONTHLY WEATHER REVIEW we have described several dust storms; a general article on that subject, by Prof. J. A. Udden, was published in the Popular Science Monthly for September, 1896. In this article

[1] That of which Judge Taft is president.

Professor Udden estimates the load of sand and dust that may be carried by the atmosphere under different conditions as to wind and soil. His estimates vary from 0.0009 grams per cubic foot, or 160 tons per cubic mile, as appropriate to a thick haze up to 0.77 grams per cubic foot, or 126,000 tons per cubic mile in the case of the highest estimate based on the quantity of sand found in dwellings. He finds the quantity of work done by the atmosphere in transporting soil to be about $\frac{1}{880}$ of the work done by the Mississippi River and its tributaries over the area of its watershed.

Recently the newspapers and scientific periodicals have contained accounts of a remarkable storm with falls of red rain or snow and red dust throughout southern Europe.

The International Decade Report for the first ten days of March says:

On March 10 and accompanying a depression traveling from Algeria to Pomerania, there occurred a sirocco with red dust in the morning in Sicily, in the afternoon in southern Italy; on March 11 there fell red and yellow dust generally with snow northward in Brandenburg and Pomerania, with east wind by midday, and over the lower Elbe and Weser with north wind by the evening of the 11th.

Prof. A. W. Rücker, of England, who had been staying some time at Taormina in Sicily, communicates the following interesting report. (See Nature, March 28, 1901, page 514.)

On March 12 the sirocco was blowing and the hills were wrapped in mist, but the fog assumed a yellow hue, and the sun, which at times could be seen through it, was a bright blue; this was caused and accompanied by a copious fall of red dust. Some which I shook off my hat was quite dry, and on looking at it through a low power lens all the granules seemed to be spherical, except a very few grains which looked like quartz. Of course, the question was raised whether Etna was ejecting something which corresponded to the Krakotoa dust, but this was negatived by the fact that the Italian papers state that the dust fell also at Naples and Palermo in such quantities that the streets looked red and the people were frightened. I scraped some off a marble table which I send you.

Under the microscope this dust is seen to be mainly composed of inorganic particles, chips of quartz in small quantities being mingled with minute plates of various micaceous and other minerals. There is also a fair admixture of frustules of fresh water diatomaceæ, entire and in fragments. The number and variety of these diatomaceæ does not appear to be so striking as in some of the celebrated cases described by Ehrenberg, the organisms from which were figured by him in his Passant Staub und Blut Regen, 1847. There are, however, a very considerable number of species represented in these recent falls.

On March 20 Professor Rücker says:

At 7:30 this morning the sky was copper colored, and it was evident that another fall of dust was taking place. The sirocco had been blowing for two days and it was raining slightly. The sky ceased to be copper colored about 8 or 8:15 a. m.

Under these circumstances he measured the dust that accumulated on various flat surfaces during the hour. The measurements gave the following results:

(a) 0.0010 grams per square inch; (b) 0.0017 grams per square inch. The average of these 0.00135, or about five and one-half tons per square mile gives a fair idea of the density of the dust in the region of Taormina.

In the Meteorologische Zeitschrift for March, 1901, pages 137–139, is a preliminary report on the dust storms of March 10, 11, from which we take the following items: The chart shows that a depression passed from the Algerian coast across Sardinia, Corsica, and northern Italy in a northeastern direction, and on the morning of the 12th was over west Prussia. Attending this distribution of pressure strong sirocco and high temperatures prevailed on the morning of the 11th throughout the Adriatic Sea, and the phenomena of 1879, February 24–25, described by Hann in his Meteorological Atlas were now again repeated. On that occasion as well as on the 15th of October, 1885, when a storm center moved over the same path, dust fell over Italy and the southern Alps and red-colored snow was observed near Vienna.

The dust was examined by Professor Perhanz both microscopically and chemically, and was found to be perfectly similar to the sands of the Desert of Sahara, as described by many authors. In Palermo the sky was covered with dark, red clouds after 8 a. m. of the 10th. The whole city appeared bathed in red; at noon time the drops of heavy rain looked like blood. At Naples, about 5:45 p. m. of the 10th, the sky became bright yellow and afterwards fiery red. The clothing of those in the street was entirely covered with dust. It was difficult to keep the eyelids open. Nothing like it had been seen in Naples since the eruption of Vesuvius in 1872. The phenomenon lasted about three hours.

On March 11 similar dust rains, or blood rains, prevailed over northern Germany. More complete reports are promised by Hann and Hellmann. One can easily see that we have here to do with a severe storm in the Sahara region, and by the attending winds the finer dust was raised and transported northward. Professor Salcher states that the dust is sirocco sand. Although the microscopic study of the dust in Germany has, so far as noted, revealed only mineral dusts, yet the Editor can not doubt that eventually diatom dust will also be found, similar to that which occurs when the harmattan carries the dust of the Sahara toward the west and southwest over the Atlantic Ocean. These diatoms are characteristic of the fresh-water marshes and ponds off the Sahara Desert.

This is the first time that Sahara dust has been known to be carried to England. The black rains of April, 1887, in Ireland, were undoubtedly due to the soot dust of soft-coal fires.

In January or February, 1890, the steamship *Queensmore*, arriving at Baltimore from England, reported red rain and red dust off the coast of Newfoundland. It would be very remarkable if this was Sahara dust.

THE PERMANENCE OF CLIMATE.

We quote the following excellent paragraph from a lecture recently delivered by Mr. A. F. Sims, Local Forecast Official, at Albany, N. Y., entitled "Some musings of a meteorologist."

Climate is a product of certain elements and properties of the atmosphere and physical features of the earth's surface. As these elements and conditions are substantially permanent, we have ample assurance of the stability of climate. The sun's energy is a physical constant producing in earth and air the results termed heat, light, and electricity, and causing the varied phenomena of evaporation and precipitation, wind movements, storms, etc. Nature gives us a warranty that the climate of a section will be practically unchanged so long as the continents and seas abide in their present forms and bounds and the mountains remain in place. All climatic records attest this fact of permanence. The student of climatology may find in the constituents of the soil ample proofs as to the weather conditions existing many thousands of years prior to the historic age, in like manner as the skilled geologist reads in the rocks the graphic story of nature's processes in world building, in the more distant epochs of the past. One of the obvious facts as to the climate of this section is the wide range of extremes and the marked variableness of the seasons as compared with the normal. This does not contravene the theory of the permanence of climate, but it simply implies that one of the permanent features of daily and seasonable weather is this tendency toward variations. Every season illustrates the fact that the law of variety holds sway in relation to the weather, as in all of nature's operations. One season is notable as a record breaker, in respect to sustained high temperatures, for many days during the summer; and the next season breaks the record for continued low temperature in the winter. So with substantial unity and stability, we note perpetual variety and changefulness in respect to the weather; irregularity is the thing to be expected. If a year should be strictly normal from first to last it would take rank as a phenomenal exception among all the years of record. Thus we reach the apparently paradoxical conclusion that in weather, the exceptional condition is the rule, and some measure of departure from the normal is the normal state of things.

THE MOON AND THE WEATHER.

The relations between the moon and various meteorological phenomena have been studied for a century past with great diligence, but hitherto nothing has been discovered to con-