fresh west wind was blowing at this time, and clouds were drifting from west to east quite swiftly.

Further analysis of the forms of February 13 shows us that the crystals, while large and branching in outline, are not frail and ethereal like the branching forms common to mild temperatures. So broad are the secondary rays, it is obvious that a slight augmentation of growth would have filled in all the smaller interstices between the secondary and primary rays and greatly increased the dimensions of the solid nuclear portion. Further analysis reveals that the crystals have undergone a multitude of transformations, leaving the crystals full of interior details. This is a common characteristic of those produced during intense cold. By this we may conclude that during intense cold the outgrowths, while they may be many, are each of small extent.

Of the other numbers of the series, No. 2 is very rare and unusual, containing as it does eleven triangular divisions within its outlines. Apparently the lines of greatest growth were reversed during one stage of the growth of this strange form, thus differing widely from No. 3, whose outlines are somewhat similar. No. 6 possesses a very rare unique nuclear design which is very difficult to explain by any process of crystallization of which we know. No. 7 (a souvenir of the great blizzard of March 12, 1888) is very symmetrical, as also are Nos. 9 and 21, of February 15, 1901. No. 10 is, in all but the unimportant outermost points, a marvel of complexity and perfect symmetry. No. 20 is also a marvellously beautiful and symmetrical example of snow architecture. No. 22 is rare and unusual, a conundrum for the crystalographer.

Passing to the causes governing the formation of the nucleus, whether it be columnar or tabular, the electrified state of the atmosphere, whether negative or positive, and perhaps, also, as suggested by Prof. Cleveland Abbe, the presence in greater or less amounts of various gases and vapors in the atmosphere, may all be controlling factors.

The study of hoar frost crystals, which are also divisible like snow into two fundamental classes, columnar and tabular, may throw much light upon this obscure point. As already noted (see article on frost crystals in Popular Science, April, 1899), the two varieties of frost crystals do not usually coalesce in equal numbers; generally one or the other variety will greatly predominate and form the great mass of the crystals. Should it be found that one variety forms on nights when the air is negatively, and the others when it is positively, electrified, then we should be led to conclude that one is the negative and the other the positive form of crystal.

Although much has been already learned about these interesting phenomena, yet there still remains much more. Cooperation between many observers is essential to carry out this work successfully. Simultaneous observations of the forms and changes the crystals undergo from hour to hour during our great blizzards should be made by many skilled observers, stationed along a general line extending north and south. These observers must be familiar with the names and approximate heights of the various clouds. This study should include observations of the kind and approximate height and direction of drift of the various clouds, direction and force of the surface wind, temperature of the air, and amount of moisture at the earth's surface; also its electric condition, whether negative or positive, and the portion of the storm from which the crystals emanate.

It is also highly desirable that observations be made to ascertain why the perfect crystals are more common in the western portion of storms, and also why certain portions produce certain types.

Such a study, supplemented by investigations as to the causes of the formation of the two fundamental types of hoar frost crystals, would doubtless lead to the discovery of very many of the mysteries surrounding the origin and history of the wondrously beautiful forms of snow.

LIST OF MICROPHOTOGRAPHS ON PLATES I, II, AND III.

1. 1895, February 8. Wind northwest, temperature —4° F.
2. 1900, February 18. Wind west to northwest, temperature 11°.
3. 1899, February 13. Wind north, temperature 1°.
4. 1895, March 2. Wind northwest, temperature 16°. Cloud, cirro-stratus.
5. 1898, November 27. A great blizzard. Temperature 12°; size one-fifth of an inch.
6. 1900, December 5. Wind northwest to north. Temperature 22°. Cloud, stratus.
7. 1888, March 12. Great blizzard. Temperature 12°. Diameter one-quarter of an inch.
8. 1901, January 28. Wind changing from west to northwest. Temperature 11°.
9. 1901, February 15. Wind northwest. Temperature 14.
10. 1898, January 26. Wind changing west to northwest. Temperature 18°.
11. 1901, February 13.
12. 1901, February 13.
13. 1901, February 13.
14. 1901, February 13.
15. 1901, February 13. Temperature —2°. Diameter one-third of an inch.
16. 1901, February 13.
17. ——.
18. ——.
19. 1899, January 6. Wind south-southeast. Temperature 22°. Clouds, upper stratus.
20. 1886, February 26. Wind northwest. Temperature 8°.
21. 1901, February 15. Wind northwest. Temperature 13°.
22. 1900, December 27. Temperature 28°.
23. 1901, February 5. Temperature 18°.
24. ——. Wind west. Temperature 34°.
25. ——. Wind northwest. Temperature —11°. Thin, low clouds.
26. ——. Temperature 24°. Cirro-stratus clouds.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of Mr. Maxwell Hall, the following data are offered to the MONTHLY WEATHER REVIEW in advance of the publication of the regular monthly weather report for Jamaica:

Jamaica, W. I., climatological data, May, 1901.

	Negril Point Lighthouse.	Morant Point Lighthouse.
Latitude (north)	18° 16′	17° 56′
Longitude (west)	78° 23′	76° 10′
Elevation (feet)	33	8
Mean barometer 7 a. m.	29.904	29.902
Mean barometer 3 p. m.	29.856	29.853
Mean temperature 7 a. m	80.3	80.6
Mean temperature 3 p. m	84.3	86.0
Mean of maxima	86.6	.....
Mean of minima	74.3	.....
Highest maximum	89.1	.....
Lowest minimum	71.3	.....
Mean dew-point 7 a. m	72.1	.....
Mean dew-point 3 p. m	75.0	.....
Mean relative humidity 7 a. m.	74.5	.....
Mean relative humidity 3 p. m.	72.0	.....
Total rainfall (inches)	1.71	3.49
Average wind direction 7 a. m	e.	e.
Average wind direction 3 p. m	.....	se.
Average hourly velocity 7 a. m	6.7	6
Average hourly velocity 3 p. m	13.5	9.2
Average cloudiness (tenths):		
7 a. m. Lower clouds	0.0	1.3
7 a. m. Middle clouds	2.4	2.1
7 a. m. Upper clouds	3.3	1.2
3 p. m. Lower clouds	0.3	1.7
3 p. m. Middle clouds	6.5	2.2
3 p. m. Upper clouds	1.1	1.3

NOTE.—The pressures are reduced to standard temperature and gravity, to the Kew standard, and to mean sea level. The thermometers are exposed in Stevenson screens.

Comparative table of rainfall for each geographical division.

Divisions.	Relative area.	Number of available averages.	Rainfall.	
			Average for May.	Current for May, 1901.
Northeastern division	25	18	12.58	5.46
Northern and sub-central division	22	50	7.57	5.00
Western-central division	26	36	14.02	10.06
Southern division	27	35	8.66	4.01
General means	.....	.....	10.71	6.13

Evidently the rainfall for May, like that for April, was seriously deficient.

In taking the average rainfall Mr. Hall uses only those stations for which he has several years of observation, so that the column of averages represents fairly well the normal rainfall for each division, while the column for the current month represents the average rainfall at those same stations. The relative areas of the division is very nearly the same and is given in the following table as expressed in percentages of the total area of Jamaica. The number of rainfall stations utilized in each area varies slightly from month to month, according as returns have come in promptly or not, but will not differ greatly from the numbers in the second column of the table.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

Terrestrial Magnetism and Atmospheric Electricity. Baltimore. Vol. 6.
Exner, Franz. Summary of the results of Recent Investigations in Atmospheric Electricity. (Concluded.) P. 1.
Science. New York. N. S. Vol. 13.
—— Syntonic Wireless Telegraphy. P. 874.
American Journal of Science. New Haven. Vol. 11.
Langley, S. P. The New Spectrum. P. 403.
Annales de Géographie. Paris. 10me année.
Voeikov, A. De l'influence de l'homme sur la terre. (Second article.) P. 193.
Ciel et Terre. Bruxelles. 22me année.
Bieler, S. Influence du climat sur le développement des races bovines. Pp. 165–173.
Wolfer, A. Les centres principaux de l'activité solaire. P. 133.
L., v. D. À propos du tir contre la grêle. P. 140.
Scientific American. New York. Vol. 84.
—— Wireless Telegraphy for the Prevention of Shipping Disasters. P. 355.
—— A new Flying Machine. P. 357.
Scientific American Supplement. New York. Vol. 51.
Marconi, G. Syntonic Wireless Telegraphy. Pp. 21269 and 21291–21293.
Deutsche Mechaniker Zeitung. Berlin. 1901.
Wiebe, H. F. Bericht über die Thermometer und Barometer auf der Pariser Weltausstellung. P. 81.
Baumann, Th. Versuch, die Höhe der Atmosphäre auf geometrischem Wege zu finden. P. 96.
Zeitschrift für Instrumentenkunde. Berlin. Vol. 21.
Hecker, O. Untersuchung der Konstanz von Siedethermometern aus dem Glasse. Vol. 59. III. P. 133.
Nature. London. Vol. 64.
—— Climate and Time and Mars. Pp. 106–107.
Lockyer. Wm. J. S. A long Period Sunspot Variation. Pp. 196–197.
Shaw, W. N. Hailstorm Artillery. Pp. 159–161.
Philosophical Magazine. London. Vol. 1. *6th Series.*
Townsend, J. S. Conductivity produced in Hydrogen and Carbonic Acid Gas by the Motion of Negatively Charged Ions. Pp. 630–642.
Annuaire, Société Météorologique de France. Tours. 49me année.
Decheverens, M. Sur la cause des variations accidentelles de la température de l'air. Pp. 103–105.
Comptes Rendus. Paris. Tome 132.
Baume-Pluvinel, A. de la. Sur le spectre de la couronne solaire photographié à Elche (Espagne) pendant l'éclipse totale de Soleil du 28 mai 1900. Pp. 1259–1264.
Marey, —. Changements de direction et de vitesse d'un courant d'air qui rencontre des corps de formes diverses. Pp. 1291–1296.
Gonnessait, F. Six mois d'observations météorologiques à Quito. P. 1444.
Engineering News. New York. Vol. 45.
Brown, L. W. Protection of Cities in the Mississippi Valley against Encroachments of Rivers. Pp. 427–429.
La Nature. Paris. 29me année.
Jullien, O. Près du Mont-blanc; le climat de Bonneville et des environs. Pp. 26–27.
L'Aérophile. Paris. 9me Année.
Farman, M. 3,000 kilomètres en ballon. Pp. 109–119.
Himmel und Erde. Berlin. 13 *Jahrg.*
Boernstein, R. Das Wetterschiessen. Pp. 402–408.
Jachmann, —. Die Taifune in den ostasiatischen Gewässern. Pp. 419–424.
Popular Science Monthly. New York. Vol. 69.
Willis, Bailey. Climate and Carbonic Acid. Pp. 242–256.
Symons's Meteorological Magazine. London. Vol. 36.
—— International Investigation of the Sea and Air. Pp. 74–76.
—— Proposed Observations on Dew-Ponds. Pp. 76–77.
Mohn, H. The Norwegian Rainfall Service. Pp. 80–81.
Gaea. Leipzig. 37 *Jahrg.*
—— Die neueren Anschauungen über die Ursachen der Luftelektrizität. (Schluss). Pp. 406–410.
—— Uber Kugelblitze. Pp. 410–417.
—— Uber Polar-Forschungen. Pp. 417–420.
—— Die internationale Ballonfahrt am 19 April, 1901. Pp. 432–433.
Meteorologische Zeitschrift. Band 18. *Wien.*
Kremser, V. Neunte Allgemeine Versammlung der Deutschen Meteorologischen Gesellschaft zu Stuttgart am 1–3 April, 1901. Pp. 193–211.
Hann, J. Einige Ergebnisse der Temperaturbeobachtungen auf dem Strassburger Münsterthurm. Pp. 211–216.
Heintz, E. Ueber Niederschlagsschwankungen in den Fluss gebieten der Wolga, des Dnieper und des Don während der Periode 1861–1898. Pp. 216–223.
Maurer, J. Frank Very's Experimentaluntersuchung über die atmosphärische Strahlung. Pp. 223–230.
Prohaska, K. Rother Schnee, Schlammregen und Gewitter am 11 März 1901 in den österreichischen Alpenprovinzen. Pp. 231–234.
—— Staubfall in der Schweiz und Ober-Italien. P. 234.
Czermak, P. und Jesser. Staubfall in Tirol. P. 234.
—— Staubfall vom 6–7 März, 1893. P. 236.
—— Der letzte Blutregen. P. 236.
—— Der Blutregen in Sicilien. P. 237.
Hapke, L. Wüstenstaub in Bremen. P. 237.
—— Der Staubfall in Tunis. P. 238.
—— Berichtigung. P. 238.

NOTES BY THE EDITOR.

THE EFFECT OF THE MOON ON VEGETATION.

In a letter received some time since from the editor of the Rural New Yorker, Mr. H. W. Collingwood, he states that there has been quite a discussion lately as to whether there are any accurate experiments regarding the influence of the moon upon vegetation. He desires to know of any records of experiments on this point, and also any relative to the effect of the changes of the moon on the weather. "So many farmers insist that the moon changes their crops in one way