MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Anastasio Alfaro, Director of the National Observatory, San José, Costa Rica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian, which is exactly five hours behind Greenwich time, is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

SUGGESTIONS AS TO TEACHING THE SCIENCE OF THE WEATHER.

Outline of lecture by J. WARREN SMITH, at Teachers' Institutes in Ohio, August, 1906.

Practically all life and energy with which we are familiar comes from the sun. The sun undoubtedly controls all our weather conditions. There is no well established relation between the sun spots and the weather, notwithstanding recent newspaper writers to the contrary, but it is probable that there is a relation between the variations in the activity of the sun and the weather of our globe—not directly in well established lines, but indirectly thru a long chain of conditions that will produce different results in different places.

The moon causes a tide in large bodies of water, but its influence on our atmosphere produces a tide of only 0.004 inch on the mercurial barometric scale, and it has no recognizable influence upon the weather conditions.

The planets do not have the slightest influence on the weather, and people who pretend to predict the weather for weeks or months in advance by basing their calculations on the positions of the planets are deceiving themselves or are intentionally misleading the public.

The officials of the Weather Bureau believe that the time will come when we shall be able to predict the general character of the weather of a season, and possibly of a month, for several months in advance; but no reliable meteorologist believes for a moment that we shall be able to predict, several weeks or months in advance, the character of any day or the movement of any particular area of storm or fair weather across the country.

Very careful computations give the temperature of the surface of the sun at between 5000° and 10,000° F. This temperature denotes the energy of molecular motions that we call heat, and these motions, whether undulations or vibrations, move outward from the sun thru the ether of space with great rapidity and in every direction. The earth in its revolution about the sun intercepts less than one two-billionth of the energy of the solar radiation.

An iron ball attached to a chain so that it may be heated red hot and held up in the school room offers a most excellent example for illustrating and explaining solar radiation, as well as all the different radiation and absorption phenomena. A spectroscope or simple glass prism should be in constant use also. No scholar is too young to admire the rainbow and the other beautiful atmospheric colors, and to wonder how they are produced. Therefore no scholar is too young to have the colors of the spectrum shown him, and to have the principles of refraction, reflection, and diffraction illustrated and explained.

A scholar may not understand that the different wave lengths of solar energy make the colors of the spectrum possible, but it opens up wonderful fields of possible educational attainment to him when you explain that beyond the violet there are the unseen photographic or chemical rays, and beyond the red rays there are the unseen heat and electric waves. It may not mean much to some scholars to tell them that Schumann's shortest ultra-violet waves are something less than four millionths of an inch in length, or that Langley has measured the infra-red rays 529 millionths of an inch in length and Rubens and Nichols 944 millionths of an inch in length; but if you can get the scholar to inquire how these measurements are possible you have accomplished very much.

More recent investigations in connection with electric waves indicate that these may be several inches or several yards or even several hundreds of yards in length. They can be reflected, refracted, and polarized just as light waves; but altho these waves have many analogous properties, yet they have also fundamental differences.

Heat is transmitted by conduction, radiation, reflection, and convection. The principle of conduction is easily shown, as well as the difference between a good and a poor conductor. Radiation can quickly be explained by the example of the hot stove and the person of the scholar, or the red-hot ball and a thermometer. The fact that radiated heat does not necessarily heat the air thru which it is transmitted can be shown by holding one thermometer directly exposed to radiation from the hot ball and another thermometer behind a card even nearer the ball than the first thermometer. This experiment is desirable to enable the student to understand that the air is not warmed to any considerable extent by the direct heat of the sun.

Reflection of heat can be shown with the hot ball and a looking-glass; convection, by putting some sawdust into water and holding the dish over a burner, or by holding light tissue paper in the current of air rising from a hot stove.