and the solar radiation as measured by actinometers. The building for the work in seismology will be entirely subterranean. The habitual purity of the sky, the entire absence of electric tramways, and of whatever may produce magnetic perturbations render this a favorable location. The observatory is in the neighborhood of the principal college of the Jesuits, namely, the college of higher studies, so that those who expect to be sent to the Observatory at Manila will receive preparatory education in observatory work. Fortunately, this observatory is also in the belt of totality for the eclipse of 1905, and it is hoped that everything will be in readiness for special work on that occasion.

In 1902 an important observatory for astronomy, geodynamics, and meteorology was established by the Society of Jesuits in Grenada, Spain, and its first annual volume of monthly bulletins for the year 1903 has been published. A still older seismologic station is a part of the marine observatory located at San Fernando, near Cadiz, Spain, and represents the high table-land of that region. At this station a Milne pendulum is established, whereas at the Ebro Observatory there is at present a microseismograph by Vicentini, and a horizontal pendulum by Grablovitz.

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In so far as observatories for seismology, earth currents, solar phenomena, magnetism, tides, or astronomy maintain also records and studies bearing upon meteorology, we must welcome their indefinite multiplication. As yet we have but a fragmentary knowledge of the earth's atmosphere, and although it seems like accumulating an unmanageable mass of details, yet eventually all will be coordinated properly. The present state of astronomy is the result of just such a similar accumulation of details; crude records that are two thousand years old have been combined with those that are two hundred years old, and even with the most accurate work of the present day, in order to perfect our knowledge of the movements of the heavenly bodies. Just so it will be in meteorology. The data as to storms, the pressures, temperatures, and winds that have been recorded during the past fifty years will be combined with the more complete data and weather maps of the whole world that will be available to our successors, in order that they may understand more perfectly than we the movements that appear to us so irregular and accidental.

## A NEW MOUNTAIN OBSERVATORY.

By the joint efforts of the Italian Alpenverien, the Duke of Abruzzi, the Minister of Agriculture for Italy, and Queen Margarhita, a geophysical observatory on the summit of Monta Rosa, at an altitude of 4560 meters (14,961 feet), has at last been erected. It is the highest in Europe except that of Vallot on Mont Blanc, and higher than the station on Pikes Peak formerly occupied by the Weather Bureau. The regular observational activity will begin in the summer of 1904. Young men expert in meteorological and physical laboratory work will be appointed as assistants. It will be occupied in the winter time as well as in the summer if the severity of the weather does not prevent. Both the observatory and the hut of refuge for mountaineers will be accessible, not only to Italian but to foreign students who wish to carry on geophysical investigations therein. In fact, it was used for that purpose last summer. The meteorological observations are expected to be of especial importance in connection with the simultaneous international balloon ascensions. Italy now possesses three mountain observatories, namely, Monta Rosa, 4560 meters; Ætna, 2942 meters; Cimone, 2162 meters.

## KITE ASCENSIONS AT KAZAN.

During the summer and autumn of 1893 a Richard meteorograph was sent up to considerable heights at the University of Kazan by Prof. V. A. Uljanin, professor of physics and director of the meteorological observatory. The Hargrave kites were used, with surfaces of about two to three meters square. The meteorograph was carried either between two small kites or by one large kite. The first four ascensions gave the following general average temperature gradient per 100 meters altitude:

1903, July 18, 1.23° C., up to 858 meters.
1903, September 1, 0.88° C., up to 635 meters.
1903, September 5, 1.08° C., up to 1270 meters.
1903, October 1, 0.85° C., up to 766 meters.

## POLARIZATION OF THE LIGHT OF THE SKY.

The observation of the polarization of sky light is a matter that has interested meteorologists ever since the early work by Arago, Babinet, and Brewster; it seemed to promise to give us some information with regard to the moisture, the dust, the mixture of warm and cold air, and even, according to the latest studies, the nature of the gases that are mechanically mixed together in the atmosphere. The latest contribution to this subject is published in the Meteorologische Zeitschrift for March, 1904, namely a series of observations on the polarization of sky light made by Dr. G. Sack in Lubeck. These are a continuation of the studies made by Dr. Busch in 1886–1889, which latter were stimulated by the optical effects produced by the volcanic eruption of Krakotoa in 1883. The work of Dr. Sack began as soon as he heard of the eruptions of Mount Pelée, Martinique, and Soufriere on St. Lucia, in the summer of 1902. He determined the neutral points of Babinet and Arago by means of a Savart polariscope. The observations extend from September, 1902, to the end of August, 1903, and the following general conclusions are announced by Dr. Sack:

1. The distances of Babinet's point from the sun and of Arago's from the antisun change in the same direction with the position of the sun at the time of its rising and setting.

2. The general law announced by Dr. Busch (Meteorologische Zeitschrift, December, 1886), can be expressed more generally as follows:

> The distance of the Babinet point from the sun increases until the sun is at a slight altitude above the horizon, when it has its maximum value, and decreases as the sun departs from this position; the distance of the Arago point from the antisolar point decreases until the sun attains a slight altitude below the horizon, when it has its minimum value, and increases as the sun departs from this position.

3. The effect of the eruption of the West Indian volcanoes is recognized by an astonishing increase in the distance of the Babinet point from the sun and a decrease of the distance of the Arago point from the antisun.

It will be remembered that in 1892 the Weather Bureau had an opportunity to employ one of our most distinguished American physicists, Prof. Carl Barus, now at Brown University, upon various problems in meteorology, especially the method and process of condensation of aqueous vapor in the atmosphere. A preliminary notice of his work was published in a report of the Chief of Bureau, 1891–2, pp. 526–8. His first results were published in the Weather Bureau Bulletin, No. 12, "Report on the Condensation of Atmospheric Moisture," by Carl Barus, Washington, 1895. The dates of the preface are May 1, 1893, and April, 1895, and the report presents the results of much work done after the position occupied by Dr. Barus had been abolished by Secretary Morton; he having been able to continue his work at his own expense, with some considerable assistance from Prof. Alexander Graham Bell. Bulletin No. 12, presenting the results obtained up to 1895, has been followed by a series of equally interesting and important papers published either in the London, Edinburgh, and Dublin Philosophical Magazine, or in the Contributions of the Smithsonian Institution. The latest results of this research, which is still being actively prosecuted, were communicated to the Ameri-