Mr. H. W. Richardson, Local Forecaster, Duluth, Minn., on December 7 delivered a lecture of about an hour's duration, on the Weather Bureau and its work, to twenty students of the class in physiography of the Superior State Normal School.

Mr. John R. Weeks, Observer, Macon, Ga., delivered two lectures before the students of the science department and members of the faculty of Wesleyan Female College. These lectures were given on November 29 and December 7 and were illustrated with the stereopticon, about one-hundred and seventy-five views and charts being shown. The topics treated were as follows:

FIRST LECTURE.

A brief history history of the science and its progress.
The U. S. Weather Bureau and its work.
A description of the instruments used.
The earth and the sun—the sun the source of all weather.
The atmosphere and its general circulation.
How cyclones and anticyclones are formed.
Their structure and general characteristics.
Some typical cyclones and anticyclones charted and miscellaneous views showing frosts, snow, floods, progress of cold waves, blizzards, etc., caused by them.
Weather forecasting, how its done, its limitations, and its practical application.
To-day's weather (charted) and today's forecast.

SECOND LECTURE.

Hurricanes, a special type of cyclone.
Local storms and their connection with cyclones and anticyclones.
Tornadoes.
Thunderstorms.
The simple physical laws governing the general condition of the atmosphere.
Rain, its formation, distribution, and effect on life.
Temperature, its distribution and effect on life.
Sunshine, its distribution and effect on life.
Climate, a summary of its controls and divisions.

Mr. R. M. Hardinge, Local Forcaster, Syracuse, N. Y., on December 3 lectured at the Weather Bureau office to the physical geography class of the Fayetteville High School on the instruments and forecast work of the Bureau.

Mr. Alfred F. Sims, Local Forecaster, Albany, N. Y., lectured on December 9, at the Weather Bureau office, to a class from the Rensselaer High School.

Mr. S. S. Bassler, Local Forecaster, Cincinnati, Ohio, on December 30 lectured before the Farmers' Institute at Collinsville on "Weather and Weather Forecasting."

KITE WORK BY THE BLUE HILL OBSERVATORY AND THE UNITED STATES WEATHER BUREAU.

In the following communication Mr. A. Lawrence Rotch, Director of the Blue Hill Observatory, calls attention to an apparent inaccuracy in the October REVIEW:

To the EDITOR OF THE MONTHLY WEATHER REVIEW.

The article by S. Tetsu Tamura in the October REVIEW contains a misstatement on page 464, namely: "While the Weather Bureau was conducting this work kiteflying was begun at the Blue Hill Observatory under the direction of Mr. A. L. Rotch." It was said previously: "In 1895 the United States Weather Bureau decided to equip with kites a number of stations." The fact is, however, that in 1894 kites were flown at Blue Hill to obtain meteorological records, and these records, with a description of the apparatus, were published in the Annals of the Harvard College Observatory, Volume XLII, Part I.

A. LAWRENCE ROTCH,
Director.

BLUE HILL METEOROLOGICAL OBSERVATORY,
Hyde Park, Mass., January 12, 1905.

If the expression "this work" in the sentence quoted refers to the use of self-recording instruments, then it is, as Mr. Rotch has pointed out, a mistake. The use of kites by the Blue Hill Observatory to obtain continuous meteorological records antedates their use for that purpose by the United States Weather Bureau. Professor Marvin, in the MONTHLY WEATHER REVIEW for April, 1896, page 114, has referred to the fact that kites were used at Blue Hill in 1894 to secure observations of atmospheric conditions at as high elevations as possible.

In connection with the more important events in the kite work of these two institutions, the following dates are worthy of record. So far as they relate to the Weather Bureau, they are taken for the most part from the notes of Prof. C. F. Marvin, to whom, more than to anyone else, belongs the credit for the form of kite and the instruments, accessories, and methods finally adopted. Work by the Blue Hill Observatory[1] is distinguished by printing the dates in italics.

May 6, 1885. A paper kite about four feet long, covered with cloth and tin foil, was used by Professor McAdie, at Cambridge, for observations of atmospheric electricity. On May 7 a height of 500 feet was attained.[2]

June 17, 1885. Similar kites were used by Professor McAdie for the same purpose at Blue Hill Observatory.[3] These experiments were repeated in June and July, 1891.[4]

August 9, 1892. Professor McAdie used a kite at Blue Hill to determine the value of the potential at points comparatively free from ground and local influences. Mr. Rotch not only placed the observatory at the disposal of the experimenter, but generously defrayed all incidental expenses.[5]

1893. Professor Harrington read a paper before the International Meteorological Congress at Chicago, Ill., on the use of kites in meteorological investigations.

1894. In the summer of this year experiments in kite flying were made by Professor McAdie and Mr. Potter. A large number of kites, mostly of the Malay type, were flown successfully at Mr. Potter's country residence.

In July and August, 1894, Mr. William A. Eddy, who had been very successful in reaching great altitudes with kites designed by himself, spent two weeks at the observatory for the purpose of elevating instruments with his kites.

August 3, 1894. An ordinary Richard thermograph was altered for use in the experiments, the heavy parts being replaced by wood and aluminum.

August 4, 1894. This instrument was raised to a height of 1430 feet.

January 18, 1895. The first Richard thermograph was purchased and records of temperature were obtained during the summer of this year.

August 18, 1895. The first Hargrave kite constructed at the observatory was flown.

August 19, 1895. The first barothermograph was elevated with kites.

September, 1895. A kite of the Hargrave cellular type, made by Mr. Potter, was successfully flown by him. Up to this time kites of the Eddy or Malay type had been used almost exclusively. The evident superiority of the Hargrave type in power and stability of flight led Mr. Potter shortly thereafter to devise the modified form of the cellular kite known as the Potter diamond kite, which can hardly be surpassed in lightness and simplicity of construction.

September 21, 1895. An improved Hargrave kite was used for raising the barothermograph.

October 14, 1895. Professor Hazen and Mr. Potter were officially assigned to the work of devising and perfecting an

[1] Annals of the Astronomical Observatory of Harvard College, vol. 42, part 1, pp. 42 and 67. Monthly Weather Review, September, 1896, vol. 24, p. 323.

[2] Proceedings of the American Academy of Arts and Sciences, N. S. vol. 12, 1884–85, p. 448.

[3] Proceedings of the American Academy of Arts and Sciences, N. S. vol. 13, 1885–86, p. 129.

[4] Annals of the Astronomical Observatory of Harvard College, vol. 40, part 1, p. 53.

[5] Annals of the Astronomical Observatory of Harvard College, vol 40, part 2, p. 122.

appliance for procuring upper air readings, as Professor McAdie had been placed on duty in San Francisco.

November 16, 1895. The first thermoanemograph was put into use.

November 18, 1895. Professor Marvin was officially directed to construct appliances for carrying meteorological instruments into the upper air, and to give attention to the construction of the necessary instruments. The first step taken by Professor Marvin was to abandon the use of twine for kite lines.

December 7, 1895. The diamond kite was publicly flown by Mr. Potter at the Weather Bureau.

December 20, 1895. Phosphor bronze was used for the kite line and a wooden reel was employed.

January 7, 1896. In order to scientifically compare the flying qualities of different kinds of kites, methods were devised for regularly observing the angle of flight and angle of incidence to the wind, the latter being obtained by means of a scale of division in bold lines stencilled on the cloth of the kite, and viewed from the reel by aid of a small telescope with graduated vertical circle.

January 10, 1896. The properties of the catenary as applied to the science of kiteflying were fully developed and tables of results computed.

January 24, 1896. The advantage of using a small motor attached to the line below the kite was considered and discussed.

January 27, 1896. Music wire was substituted for cord, and was used exclusively for the kite line thereafter. During this month waterproof kites were employed in rain or snowstorms.

February 4, 1896. Steel music wire was substituted for the bronze wire and subsequently used exclusively for the kite line.

February 13, 1896. Apparatus was devised and installed for testing the strength of wire, string, splices, etc. An improved style of splice was developed and tools devised for making such splices expeditiously.

March 5, 1896. Early in the tests of kites the marked inefficiency due to the fluttering of the cloth and looseness at the edges was noticed. On the above date a kite with the frame construction located entirely at the edges of the cell was completed and tested with very satisfactory results. This improved feature was ultimately used exclusively, and was generally adopted elsewhere in all high grade kites.

March 21, 1896. Recognizing that the greater part of the pulling power exerted by the wind upon a kite is concentrated in the front cell, a Hargrave kite with three planes in both front and rear cells was made and tested. Subsequently the third plane was omitted from the rear cell, and at this point of the work a great variety of structures were made and tested for the purpose of determining how much the surface and extent of the rear cell might be diminished. It was recognized that the prime function of this part of the kite was that of controlling and maintaining the equilibrium. Structural and constructural considerations, however, led to the adoption of the simple Hargrave kite, with three horizontal planes in the forward cell and two in the rear.

April 4, 1896. A Richard meteorograph of aluminum, recording pressure, temperature, and humidity, was used.

April 13, 1896. A height of one kilometer above the hill was attained for the first time.

July 20, 1896. A height of 1.8 kilometers, or over one mile, was reached.

July 23, 1896. A tail composed of hollow cones was attached to one of the kites at the suggestion of Mr. Douglas Archibald.

August 1, 1896. The height of 2000 meters was reached.

October 8, 1896. The height of 2665 meters, probably the greatest to which a kite had attained up to that date, was reached.

February, 1897. To facilitate the use of a greater length of line under continued strain, a new windless with a strain pulley controlled by a steam engine was constructed. During this year important modifications of the meteorograph were made and new forms of kites tested.

February 3, 1897. Safety line devised and used in ascensions.

April 21, 1897. Ascensions at Washington with thermograph on kite were continued more or less regularly on every favorable day from this date until June.

June 11, 1897. Design completed of the hand and power kite reels afterward employed by the Weather Bureau.

August 7, 1897. Drawings and specifications of the improved kite meterograph of the Marvin design were sent to contractors.

September 20, 1897. The construction of a collapsible, three plane kite of the standard type for station use was begun, to serve as a model for the use of contractors in manufacturing kites for station supplies.

October 15, 1897. The meteorograph was raised to a height of 3379 meters above the hill or 3599 meters above the valley.

March 3, 1898. The automatic power kite reel for use at the Washington station and also the hand reels for the equipment of outlaying stations had been completed. Each one of these was separately filled with wire and calibrated, in order to give the length unwound during ascensions. All other details of the equipment for stations were also completed about this time, and shortly thereafter the instruction of observers employed to fly kites at stations began.

April, 1898. Systematic ascensions were begun at seventeen kite stations, established in different parts of the country.

1899. The Weather Bureau issued Bulletin F, by Prof. H. C. Frankenfield, containing a report of the kite observations of 1898.

August, 1901. Mr. Rotch was the first to use a steamer to raise a kite on a calm day.—*F. O. S.*

STORM ON THE PACIFIC COAST, DECEMBER 27-31, 1904.

A steep barometric gradient on the northern Pacific coast during the last days of the month was accompanied by notably high winds and heavy precipitation at several points. On the 28th an area of low pressure was central at North Head, Wash., with a reduced reading of 29.7 inches, with a high area to the southeast. The low developed rapidly in intensity during the next twenty-four hours, and the reduced pressure on the morning of the 29th ranged from 29.0 inches at Tatoosh Island to 30.0 inches at San Francisco and in the neighborhood of Boise, Idaho, a gradient of one inch in about 530 miles. The pressure then rose slowly as the low moved eastward. The influence of topography on wind velocity is well shown by the records from the various stations. The time given is 75th meridian.

At San Francisco the maximum wind velocity was 38 miles from the south on the 30th, and moderate rains fell on the 29th, 30th, and 31st. At Southeast Farallon, a small island 30 miles due west of San Francisco, occasional light rains fell on the 27th, 28th, and 29th, with heavier precipitation beginning at 9:15 p. m. on this date. On the 27th the observer notes that the sea was unusually smooth all day, without surf. High wind began on the 28th, reaching a velocity of 49 miles from the south on the following day. Conditions on the 30th and 31st are described in the following extracts from the daily journal of the Assistant Observer in Charge, Mr. E. C. Hobbs:

December 30.—Cloudy; falling barometer until 3:15 p. m., followed by sudden and rapid rise. Wind veered from south to northwest and velocity dropped from 48 to 15 miles in fifteen minutes. Rain ended at 10 p. m.; amount, 1.35 inches.

Gale raged furiously up to 3:15 p. m.; maximum velocity of 58 miles from the south occurred at 8:45 a. m. Communication with Professor