wind produced by the whirling. The dew-point of the air in which the thermometer is whirled is about as far below the temperature of the wet bulb as this is below the temperature of the dry bulb, if the latter has been similarly whirled and read rapidly. These two thermometers may be hung side by side on a short piece of string for convenience in whirling and are then called the sling psychrometer. On account of its convenience and portability, the sling psychrometer replaces the most delicate dew-point apparatus in all ordinary meteorological work. Mr. Kaufman submits the following problem:

Given the temperature of the air and of the dew-point with the height of the barometer, what does this mean in the light of our latest science? We have great trouble here in making good hay, so that this is a very practical matter.

We understand our correspondent's question to be a purely practical one. What bearing has the temperature, moisture, and pressure of the air upon practical farming operations, especially hay making? Can not some observer at a State agricultural college or experiment station answer this question?

THE WEATHER BUREAU AND THE UNIVERSITIES AND COLLEGES.

Again we have to chronicle the encouragement given by the colleges to the intellectual and educational side of the work of the Weather Bureau. Mr. D. J. Herndon, observer at Lexington, K. Y., informs the Chief of the Weather Bureau that the authorities of the Kentucky State College will furnish free office quarters and space for instrumental exposures. A well-lighted room has been placed at the disposal of the Weather Bureau. * * * The college authorities will have all necessary changes and improvements made at their own expense.

Similar arrangements are now in force at the following institutions:

Baltimore, Md.—Johns Hopkins University.
Columbia, Mo.—State University, Agricultural College.
Ithaca, N. Y.—Cornell University, engineering building.
Knoxville, Tenn.—University of Tennessee.
Lincoln, Nebr.—University of Nebraska.
New Brunswick, N. J.—State Experiment station.
Northfield, Vt.—Norwich University.

In all these cases the Weather Bureau offers a full equivalent by way of lectures and teaching, weekly crop reports, monthly meteorological returns and daily forecasts. The union of the two brings about an increased attention on the part of the students to the study of meteorology and climatology, and makes them by so much the more intelligent and better citizens. Similar intimate union between the State universities and the many scientific divisions and bureaus of the Federal Government can but lead to important advantages on both sides.

CHINOOK AT HAVRE, MONT.

Mr. C. W. Ling, observer at Havre, Mont., sends a tracing of the thermograph record for December 18–20, from which it appears that the temperature fell steadily from 45° F., on the afternoon of December 18 to about 18° F., at about 6 a. m. December 19 (seventy-fifth meridian time). After rising slowly for over half an hour, in accordance with the regular diurnal variation the temperature took a sudden jump a little before 8 a. m., and within ten minutes rose from 24° to 44°. After a half hour of this high temperature, there was an equally sudden fall to 30°, and after an hour of this temperature, a precipitous rise back to 44°, where it remained until late in the afternoon. Mr. Ling says that—

We have here two pronounced chinooks within four hours of time; the first chinook was evidently shut off for a few hours by a cold stream of air.

The Editor has often remarked upon the great variations of temperature that sometimes take place within a short period of time, during the prevalence of a chinook. It seems evident that the rapidly descending air, which is thereby warmed, is also mixed with masses of air near the ground that have not descended. Alternations of temperature of 3°, 5°, and 10°, within five minutes have been observed by himself, by Buchanan, and, doubtless others, but we know of no case where the alternation was so great as in the present instance.

NORTHERS IN THE CARIBBEAN SEA AND THE GULF OF MEXICO.

Although our West Indian service was immediately organized in view of the approaching hurricane season of 1898, yet the officials of the Weather Bureau were not unmindful of the fact that the northers in the winter season were of equal importance to the commercial shipping interests of that region. On many occasions, ever since the first predictions of November, 1871, the Editor has explained the movement of the so-called northers of Texas, and an interesting illustration of the progress of a norther over the Gulf of Mexico will be found in the MONTHLY WEATHER REVIEW for December, 1893, pages 363–364, and the accompanying Chart, No. I. Frequently the combination of a high area in the Mississippi and a low area on the Atlantic coast draws the cold air farther eastward so that it overflows a large part of Cuba. The northers of Havana have been especially studied by the officials of the Belen Observatory. We have not yet much data with regard to the progress of northers, southward over the Caribbean Sea, but the fact that severe northers occur at Colon shows that they must either proceed from high areas over the United States or else from low areas south of the Isthmus of Panama. It is to be hoped that our West Indian system will enable us to investigate this subject and predict the northers for the Isthmus of Panama as accurately as we can those for Vera Cruz, Tampico, and Havana.

RECENT EARTHQUAKES.

Sunday, August 7, at Oakland, Cal., and on Sunday, August 28, and Wednesday, August 31, at San Leandro, Cal.; both of these shocks were quite slight.

A very circumstantial account of an earthquake on Saturday morning, September 17, at Morrills Corner (described on page 415 of the September REVIEW) and North Deering, both located near Portland, Me., has been followed up by correspondence which has convinced the Editor that the whole story is a so-called fake. We can understand that political, religious, or local jealousies may suggest the publication of fakes, hoaxes, fictions, or lies, but it passes our comprehension why a respectable journal should print such matter relative to any form of natural phenomena.

Friday, October 23, at Cleveland, Ohio, three successive shocks are reported by the newspapers to have been felt during the night. Prof. E. W. Morley, of Adelbert College, Cleveland, reports several disturbances shown by the seismograph during October, caused by blasting at a point about 800 feet southwest of the instrument. Only the most powerful blasts made any record. The most vigorous movement occurred on October 29, and was probably due to some seismic disturbance. Professor Morley further reports that the seis-

mograph was not disturbed during November and December.

Friday, November 25, at the following stations in Virginia: Bedford City, Bonair, Buckingham, Colmans Falls, Fredericksburg, Blacksburg, Burkes Garden, Grahams Forge, Lexington. On this date, November 25, shocks were also felt at the following places: Pulaski, Va., a slight shock, lasting half a minute, at 3:10 p. m.; Radford, Va., a distinct shock, lasting ten or twelve seconds, at 3:05; Wytheville, Va., alarming, twenty seconds duration, at 3:10; Roanoke, Va., plainly felt; Lynchburg, Va., duration fifteen or twenty seconds, at a few minutes past three; Danville, Va., duration five seconds, at 3:07; Norfolk, Va., two very slight shocks at a few minutes after three; Winston, N. C., distinct, at 3:10 p. m.; Franklinsville, N. C., very distinct, at 3:05 p. m.; Charlotte, N. C. distinct, at 3:10 p. m.; Oakvale, W. Va., very severe, lasting about twenty seconds, at 3:08 p. m.

Professor Marvin reports that the seismograph belonging to the Weather Bureau was moved from one room to an adjoining one during November, and was reinstalled apparently just at the right time to give a very satisfactory record of the earthquake of Friday, November 25. The instrument shows that the tremor reached Washington, D. C., at exactly 3 h., 10 m., 30 s., p. m., seventy-fifth meridian time. In addition to Professor Marvin's seismograph, the only other observation in Washington was made by Mrs. N. G. Sprague, No. 705 Mount Vernon Square, N. W., who reports, "A lounge rocked slightly at 3:10 p. m. for less than half a minute."

Mr. R. D. Buford, of the clerk's office, Bedford City, Va., reports through the Chief of the United States Geological Survey, an account of earth tremors on the farm of Mr. Henry Creasy, near Otter Hill, Bedford Co., which have continued almost constantly for more than a year. The tremors in the valley of New River were the subject of a special investigation by Mr. N. R. Campbell, of the Geological Survey, in 1897. His report will give all necessary information to those interested in the subject. These tremors apparently arise from the sliding of the stratified layers of rocks over each other; they are in a state of great strain, and are continually cracking and sliding; the individual motions are extremely small in the case of slight tremors, and only amount to a few feet in the case of the heaviest earthquake.

THE MOON AND THE WEATHER.

The Editor has been requested to remark upon some special ideas with regard to the relation of the moon to the weather.

A gentleman at Huntington, Ind., states, as a general observation, that—

> The position of the moon at new moon forecasts the temperature for the following lunar month. Thus, on June 18, 1898, the new moon occurred 25° farther north than on July 18, and much farther than on August 17. Has this northing any special relation to the weather?

The Editor must answer, "No." Every careful study of suspected relations between the moon and the weather has shown that there are none. The same lunar phenomenon that is said to produce cold or rain in one part of the world is said to produce just the opposite somewhere else. The moon is too cold to radiate much heat, so that all phenomena that involve heat must depend upon the sun. True, the moon has an attractive power and can cause tides in the ocean as important as those caused by the sun, but that has little to do with our atmosphere. The atmospheric tides have not yet been shown to be important.

UNEQUAL DISTRIBUTION OF SNOW.

Having noticed the marked discrepancy between the depth of snow at Plattsburg, N. Y., and adjacent stations, further information was solicited from section director, Mr. R. G. Allen, who states that—

> There has been no snow this season (up to December 19) at Plattsburg or along the Champlain Valley, except flurries, while west of Lake Champlain, say 15 miles, snow is from 12 to 20 inches in depth.

RECENT METEORS.

November.—The occurrence of the November shower of meteors seems to have tempted active newspaper correspondents to add their own unnecessary exaggerations to the great stories reported by the ship captains. Thus, Captain Gartel, of the bark *Quevilly*, which arrived at Philadelphia November 25, and sailed away a few days later, stated that on November 15 a huge meteor flashed out of the heavens and fell with a tremendous splash directly in the path of the vessel. The numerous other details published in the Philadelphia papers are generally considered to be the invention of the newspaper reporter. We should probably discredit the whole story had we not a similar report from Capt. H. C. McCallum, master of the barge *Masaba*, of the Minnesota Steamship Company. Over his own signature he writes from Two Harbors, Minn., to the Weather Bureau, as follows:

> I, with my second mate, wheelsman, and lookout, saw a meteor fall from the heavens Monday, about 11 o'clock p. m., November 14.
>
> We were about 20 miles east of Standard Rock, steering west, and this meteor was due west, or dead ahead when it fell. It was blowing a gale from the west-southwest at the time. It gave me quite a start and also a scare at the time; never saw anything like it before, and for my part never want to see one again. It was about the size of an oil barrel and lit up the heavens, it being white with colors on the edges.
>
> Captain Morgan of the *Marina* saw it; he was abreast of Copper Harbor, Mich., and it fell in the direction of Houghton, Mich., at about 11 o'clock, so it must have fallen somewhere in that vicinity, as we were 50 or 60 miles due east of Houghton and on a line with the fall of the meteor.

As there is nothing at all impossible in the fall of a meteor into the ocean or the Great Lakes, we may probably give credence to the two reports above quoted.

A report from Perry, Okla., to the effect that several meteors fell near that place about 11 o'clock p. m., November 13, proves to be entirely false. It is denounced with indignation by Oklahoma papers, and is reported to be untrue by our own section director. As the report was widely copied the Editor is obliged to warn students of meteorites against accepting it.

December 2.—On the morning of December 2, after daylight, a meteor one-fourth as large as the full moon, with a long scintillating train, the head being as bright as an arc light, was seen by many persons at Cumberland, Md. Mr. Howard Shriver states that it moved in a northerly direction and disappeared beyond the right-hand peak of the Narrows.

An equally remarkable meteor seems to have been seen elsewhere. A report comes from Randall, Kans. (39° 45′ N., 98° 2′ W.), to the effect that a huge meteorite fell on the evening of December 2, but further inquiry has failed to confirm this story.

The exact height and path of a bright meteor like this can only be determined when various observers note the apparent angular azimuth and altitude of at least two points in the path as seen by each. The two best points to observe are the end or disappearance of the meteor and the position when nearest the observer's zenith.

OPTICAL PHENOMENA.

Mr. Howard Shriver, of Cumberland, Md., describes a beautiful optical effect. He states that when the twigs of a tree are fine and close, the light from an electric arc lamp shining