

cipitous valley, at an elevation of 2,000 feet above sea level, or at from 3,500 to 5,500 feet below the tops of the mountains. The valley and the lightning seem to have some connection. I asked about other mountains, e. g., whether the flash ever went from Ziaret to Chakchak (No. 5 to No. 1), and was told that it never went except as indicated on the map. Between any two mountains of those indicated it goes indifferently in either direction. Ziaret Mountain stands out prominently and is said to be visible from all the cities named on the map, viz, Harpoot, Malatia, Arghuni, Choonkoosh, Diarbekir, Severek, and Oorfa.

In several places the people said that this lightning was seen only when Turkey was at war. Later, at Kefferdis, near Mount Ziaret, we heard the origin of this tradition. Once at a time of a war scare lightning flashed from Mount Ziaret. The people in Malatia heard the sound of the thunder. No clouds were in sight and they did not think it could be thunder. So they said: "The Russians are coming; we hear their guns."

If you or your readers have heard of similar phenomena in any part of the world, may I ask for information in regard to the conditions and causes?

SUDDEN DISAPPEARANCE OF ICE ON THE LAKES.

By H. H. TEN BROECK, Braidentown, Fla.

On page 114 of the MONTHLY WEATHER REVIEW for March, 1900, is a note on the sudden disappearance of ice from lakes in the spring. While living in Wisconsin I noted this phenomenon, and was told the usual explanation, namely, that the ice got rotten and sank. Knowing this to be irrational, I examined the matter and at once found out the cause. After a period of thawing weather the upper surface of the ice becomes a mass of sharp points, still hard and clear, and 6 or 8 inches thick, and capable of bearing one's weight, apparently as strong as ever. But each of the sharp points is the end of a crystal of ice, extending through the mass. As the disintegration of the ice proceeds the crystals become more distinct in their formation until the whole mass gives way. The crystals separate from each other and float on their sides as a loose mass of small pieces which rapidly melt. In shallow water the process is quicker than in deep water, as I found out once in crossing a lake. Where I got on the ice the lake water was deep, the ice dark and solid, though the surface was covered with the sharp points. On reaching the other side, where the water was three or four feet deep, the ice was of a light green color, and when I stepped on it the ice broke up into separate crystals under me, or rather around me, and I at once went through. Within a few hours after the deep-water ice became disintegrated and soon melted. The mystery of the sudden disappearance of the ice is simply due to the sudden change of its particles, since the warmth breaks up the solid mass into separate small crystals. But none of these are rotten—they are clear and solid, and float on the surface of the water as long as a piece is left.

METEOROLOGICAL NOTES FROM PORTO RICO.

By R. M. GEDDINGS, Section Director, dated San Juan, Aug. 9, 1900.

It has been frequently noticed, at least in San Juan, that while thunderstorms are numerous, though not severe, they nearly all present the following peculiarity, viz: That rarely does the lightning precede the rain. Frequent heavy showers occur with no accompanying thunder, which is only heard after the rain has nearly ceased. The matter has been looked up, but no explanation which could fit the case was found

until the article in the April MONTHLY WEATHER REVIEW, entitled "The formation of large rain drops," was received. In this article appears the following paragraph:

There is some plausibility in the hypothesis that the critical electrical condition, which results in lightning, is directly due to the disruption of the condition of extreme supersaturation and the sudden formation of large drops of water.

May not this explain the phenomenon? I must confess that attention was not called to this before, because I was afraid that I might be asserting something which was already well known, but the paragraph referred to, showing the matter to be still under investigation, emboldens me to call attention to it. It had, up to this time, been thought to have something to do with the liberation of latent heat.

There is another thing to which I should like to call attention, but this is referred to in Davis' meteorology (page 193), and that is the lowering of the relative humidity in the eye of a cyclone. While no center has passed directly over this station during the past year, it was noticed during the last hurricane season that this happened about twenty-four to forty-eight hours in advance of the storms which passed near this island. Attempts have been made to prove this by tabulation, but the results have not been altogether satisfactory, for sometimes it occurred but slightly and sometimes not at all, but it is thought that a series of observations taken at close intervals would prove the fact. The hurricane of San Ciriaco occurred here last year on August 8. At 8 p. m. of the 6th the relative humidity was 73°, and at 8 a. m. of the 7th it was 68°, the preceding morning showing 74°. On the 30th of August a hurricane passed to the south of the island, the record being as follows:

Date.	Relative humidity.	
	a. m.	p. m.
Aug 1899.	%	%
27.....	73	80
28.....	72	75
29.....	75	86
30.....	77	87
31.....	71	98

Very little can be learned from this record, the drop being very slight.

On September 8 and 9 a hurricane passed to the northeast of the island, the record being as follows:

Date.	Relative humidity.	
	a. m.	p. m.
Sept 1899.	%	%
6.....	83	78
7.....	83	76
8.....	82	77
9.....	85	80
10.....	73	78

This again proves very little. The opportunity for investigation has been very slight, as only one hurricane passed very near the station during the past year, but, as before stated, I believe the fall in relative humidity to be a very valuable sign of the approach of a hurricane.

FORECASTING FOR THE FARMER.

By C. D. REED, Observer, Weather Bureau, dated August 24, 1900.

Recent instructions from the Chief of the Weather Bureau place the character of forecasts more nearly in the hands of the local forecaster. Such features may be included as, in the judgment of the forecast official, will be of the greatest local value. The forecast becomes desirable in proportion as it covers all local conditions in its territory.

With the increased facilities for distribution which rural free delivery of mails is bringing about, a new field of usefulness is being opened to the forecaster. In order to cover this field, he will have to acquire information hitherto unnecessary concerning the different branches of agricultural industry.

Among the items that would be of great value to farmers would be a knowledge, twenty-four to thirty-six hours in advance, of the moisture conditions of the atmosphere irrespective of precipitation; that is to say, the relative humidity. Such a knowledge might in many instances be of more service than a knowledge of the possibility of rain. The moist condition could be predicted with certainty over large areas, while rainfall might be restricted to small and widely scattered localities. This kind of forecasting would of course be most useful in sections where agriculture is most practised, such as the Mississippi, Ohio, and lower Missouri valleys, and where road improvement will advance so as to make rural free delivery possible, without which this class of forecasting would be practically useless. Of course many problems present themselves in distribution of forecasts by this method.

Agricultural instruction is spreading throughout the region referred to by means of the agricultural press and the Government experiment stations. Many thousands of farmers are already well informed concerning the various relations of soil, air, sunshine, and rainfall to agricultural operations. Many a farmer knows that it is not the best time to cut hay when there is a south or southeast wind, even when the sky is clear and there is little prospect of rain; for by practical observation he has learned that the drying process will often be so slow that the rainy conditions may overtake him before the hay will be fit to put in stack or barn, and that having been even wilted the hay is much more susceptible to injury from rain. He has learned, too, from the school of experience that he can cut hay just before a hard rain of considerable duration; provided that the rain is followed by a considerable period of dry northwest wind and clear sky, and that he has the improved implements necessary to handle hay in that condition. Many a time the only thing that he lacks, to enable him to make use of a threatening day, is to know the probable drying conditions for thirty-six hours following. If this were known he could often go out between showers on a cloudy and showery day, when the hay would not wilt much, and do cutting that would otherwise consume valuable time. Then, again, if the farmer could have some assurance of continuous drying conditions for a considerable time, he would venture upon wholesale methods in haying. Much that has been said about haying will apply with equal force to the grain and corn fodder harvest.

While drying weather is not hoped for during harvest time, the reverse is true at any subsequent time when it becomes necessary to move fodder or hay from place to place. On a dry day the leaves, which are the most nutritious and palatable part of the plant, are badly shattered and lost. Clover hay will sometimes lose so much in this way as to become nearly worthless as a fodder for sheep and of much decreased value for other animals. It is even better to shred or chop the hay or fodder on a damp day, and then overcome the heating tendency which it develops when stored in large bulk by alternating layers of straw with the cut fodder to absorb the moisture, rather than to run the risk of loss on a dry day. This principle will not hold good in baling hay or shredded fodder, for in this case heating and mildewing will frequently result if the work is done on a damp day.

As all of these operations require planning and arranging by the farmer for several days ahead, it is very evident that a foreknowledge of the moisture conditions of the air would be very helpful. Most any experienced farmer, by reason of

his years of observation, can predict the more prominent features of the weather with fair certainty. He knows, for example, that in his locality a steady southeast wind is damp and that a steady northwest wind is dry, but he can not always tell thirty-six hours in advance from which direction the wind will blow; neither does he know of the drying power nor the duration of an area of high barometer, with its calms and variable winds. It is within the power of the forecaster to transmit this information.

The general forecasts as now issued frequently contain information of the wind direction, and should do so always; but since this does not carry with it the whole story of moisture conditions, and since there are many people directly concerned who do not fully understand the moist and dry attributes of wind from different directions, much amplification would result from the addition of such terms as "more moisture," "less moisture," "moisture stationary," or something similar.

Only a few instances of the usefulness of this kind of forecasting have been cited, but they show that there is a demand for such work. Doubtless tobacco curers, raisin growers, many manufacturers and others would be benefited.

THUNDERSTORMS NEAR WASHINGTON.¹

By MESSRS. H. W. and H. S. CRAGIN.

Mr. H. W. Cragin writes as follows:

"August 6.—The season has been very dry. From my observation I do not think the showers passing over the Blue Ridge go far to the east or northeast. Sometimes I see showers far to the north or northwest, which seem to reach the ridge. We can not see the east or northeast unless we go to the top of Stony Man Mountain, about 500 feet above our camp and about a mile northeast of it. This peak is supposed to be 90 miles in an air line from the Washington Monument, which it is said has been seen when the air is very clear by the aid of a powerful glass. To the west our view is unobstructed as far as the eye can reach. Most of the showers observed form west of the Massanutton Range, which separates Page Valley on the east from the Shenan-

¹In the MONTHLY WEATHER REVIEW for 1898, pages Nos. 256, 317, 360, and 465, the Editor has considered the difficulty of making predictions of the arrival of local storms at the City of Washington, even a few hours in advance, owing to the want of a sufficiently close network of telegraph and telephone stations. The most obvious remedy for this defect is the establishment of stations on elevated points, such that each observer may command a satisfactory view of the occurrence of storms within a radius of 20 miles. Although a few such stations would seem to command the situation satisfactorily, yet, they would be expensive because the whole time of the observer would, necessarily, have to be devoted to the careful observation of all visible thunderclouds. On the other hand, by utilizing the operators at telegraph and telephone stations we should ask for only a minute of time in order that each may send to the Central Office word that the first thunder is heard, or the first rain has fallen. The study of local storms in the United States always impresses one with a realization of the sparsity of inhabitants in this country as compared with Europe. We can rarely find an observer for every 50 square miles in the regions where they are most wanted.

Under these conditions an especial interest must attach to such detailed reports of thunderstorms and weather as we have received from Mr. H. W. Cragin and his son, Mr. H. S. Cragin, residents of Washington, D. C., who send us a very full report from their summer residence near Skyland, Page County, Va. The camp occupied by them is about ninety miles in a straight line from the Washington Monument, which it is said, has been seen by some from that place. The camp is about 500 feet below and a mile southwest of the top of Stony Man Mountain, the altitude of whose summit is 4,032 feet, according to the United States Geological Survey. It is 12 miles east of New Market Gap in the Massanutton Range, which is often referred to as "The gap." The details of the observations made at this place during July and August will have special interest in connection with the great area of high pressure and long-continued drought, with cloudless skies, that has prevailed throughout the Middle and South Atlantic States.—Ed.