

an elevation commanding a perfect horizon in the east, observing the stars with a telescope, and awaiting the rising of the new comet, Brooks. At 7:30 p. m. there was a light wind in this locality from the northwest, mere breathings. At about 9 p. m. there came a sudden gust of wind, lasting but the fractional part of a minute, and then, some minutes later succeeded by another gust of more force. After this they came more frequently, and soon developed into a cold, gusty, northeast wind, which lasted with variable force until 1 a. m., when I retired. At that hour the wind was strong but more to the north. Our horizon in the northeast quadrant is low. In the southeast, limited by mountain crests from four to seven miles distant, and ranging from one thousand to sixteen hundred feet high. Beyond this horizon are a succession of other mountains hidden from our view, with deep valleys between, including the valley of the Hudson River. The night was cloudless until the wind came.

Soon after this a few cloudlets of stratus formed near the north end of the mountains, say east-northeast, near the horizon, but disappeared before the appearance of the phenomenon I am about to mention.

At the moment of the rising of Fomalhaut above the mountains southeast, we noticed a gleam of lightning, of rather delicate type, just to the left of the star, and back of the mountains. The conditions were such that we could hardly believe that it was lightning, but it continued and increased, waxing and waning until we discontinued observations at 1 a. m. It seemed to me that it changed intensity with the wind. The lightning occurred at frequent intervals all along the horizon from the point of origin to near the east point, and was undoubtedly true lightning.

This is the first time I ever saw lightning in a cloudless sky, and it occurred to me that it might be of interest to the Weather Bureau to question their observers about it, as such phenomena are rare.

My first impression was that it was the reflection from a distant thunderstorm, as the lightning seemed always beyond the mountains and the place of origin below the crest line. On inquiry of some friends who were at Hempstead, L. I., that evening, they informed me that the night there was cloudless, and that at one time lightning occurred, as they then thought, but later concluded it was produced by a falling meteor of the August stream, many of which were visible that night there, as well as here. This information seems to exclude the thunderstorm theory. It seemed to me possible that the cold, gusty wind currents, falling at a steep gradient, as shown by the gusty type of the wind, might exchange electricities with the warmer surface air forced upward, and thus explain the phenomenon. The character of the topography would seem favorable, under such conditions, to the formation of convection currents with steep gradients.

With regard to the above, the Editor can only say that the daily weather map for 8 p. m., August 3, gives no indication of conditions favorable to lightning in the neighborhood of Newburg on the Hudson. In fact, the map shows that New England and eastern New York were in the midst of an area of high pressure and cloudless skies, and the cool, northerly winds had rapidly extended southward over this region. In general, as we have often had occasion to say, cloudless skies and dry air mean a general descending tendency in the atmosphere. The cold air that streamed down the Hudson River Valley was but one incident in the general character of the high area. Inasmuch as the sky was clear for 100 miles east of Newburg, we think there is no reason to assume a distant thunderstorm or even real lightning flashes between the earth and the sky, and we therefore incline to believe that Mr. Weed, like his correspondent at Hempstead, L. I., must have observed the flashes produced by distant meteors descending, perhaps nearly vertically, through the air toward the earth. Still, to a careful observer, the lightning flash and the meteor flash ordinarily present very different appearances, and we should be glad to receive some better explanation from those living east of the Hudson who may have seen the same phenomenon.

On Tuesday, August 7, about 5 p. m., according to a news despatch from Richmond, Va., lightning from an apparently clear sky, without warning, struck Mr. W. R. White and a colored farm hand near Coldharbor, Hanover County, while both were working in the open field.

The weather map gives no indication of any thunderstorm or rain in this neighborhood at that time; an area of high pressure prevailed, with very hot atmosphere near the ground. During the subsequent night it was cloudless throughout this

region; a cool northwesterly wind sprang up. The circumstances are parallel to those attending the small lightning flashes seen at Newburg, except that the latter occurred at night-time. In both cases a cool breeze succeeded to a hot day, whence we infer that a vertical circulation of air was in progress. Ordinarily we think of the lightning that attends a thunderstorm as being in some way the result of the formation of cloud and rain or hail, but the frequent reports of lightning from a perfectly clear sky seem to suggest that the ascent and descent of the currents of air is the important feature in both cases.

WEATHER BUREAU STATION ON TURKS ISLAND.

Through the kindness of the local authorities, the Weather Bureau has opened a station at Grand Turk, Turks Island, W. I. (latitude, 21° 20' N.; longitude, 71° 0' W.; height of barometer above sea level, 11.3 feet). The station is located at the cable hut and the observations are made by Mr. O. Crewe-Read, who is not only station agent for the Weather Bureau but also operator for the cable company. His weather report will now be published regularly in the Royal Standard newspaper at that place and replaces the weather report hitherto published as made up by the messenger at the public buildings. When so ordered from headquarters at Washington or Havana, Mr. Crewe-Read will post on the bulletin board at the post office, advisory messages relative to hurricanes in the vicinity, and if one is to approach too near the island he will order the hurricane warning displayed on the flagstaff of Messrs. Frith, Brothers, so that the public may have ample warning of the approach of a dangerous storm.

The arrangements above mentioned were made under the immediate supervision of Dr. H. A. Frankenfield, Forecast Official, who visited the island for this purpose in June.

WELLS AND STORMS.

A correspondent says:

Why is it that in dozens of our bored wells the water just before a storm becomes riley, or partly muddy? From twelve to twenty-four hours before a storm my well becomes muddy and stays so."

As we know nothing about the location of these wells or the character of the storms with which the phenomenon occurs, we can only suggest a possible explanation. Extensive storms occur in the midst of areas of low pressure. When the barometric pressure is diminishing the air imprisoned within the soil can more easily push its way outward. Wells are but holes that open the way into the lower strata, and give the air and water contained therein an easier mode of egress. Every area of low barometer that passes near the well facilitates the escape of gas, and even of water, so that the well should stand higher when low pressures prevail. The bubbling up of the air through the water would undoubtedly make it riley, and, especially so if there be a deposit of fine mud and decaying vegetable matter at the bottom of the well. The trouble can be partly remedied in "dug" wells by placing one or two broad flat stones in a slightly inclined position at the bottom of the well, so that rising bubbles and muddy water are turned off to one side. But for bored wells, whose sides are cased with iron piping, we know of no remedy. Natural springs often flow more freely when the air pressure diminishes.

THE FREQUENCY AND EXTENT OF DESTRUCTIVE HAIL.

A newspaper paragraph states that a destructive, and in fact terrific hailstorm, occurred on July 30-31, in the valley of the Verde River, Ariz., and, especially between Pima and

Prescott. It is not clear what particular point is meant by Pima; there are many stations of that name in Arizona, but none of them very near to Prescott; the Weather Bureau voluntary station "Pima" is about 200 miles to the south-east of Prescott. This hailstorm seems to have occurred within the area of low pressure at the head of the Gulf of California, and while an area of high pressure was moving southward over the Rocky Mountains.

In general, the areas covered by destructive hailstorms, when they occur in the United States, are but a few square miles. Now that the prevention of a hailstorm by the Stiger method of cannonading begins to be advocated, it becomes important for us to know the total area covered by such storms in each State annually, also the number of storms at any one place, and the average frequency of their occurrence per year or decade. We hope that our section directors will be able to give some attention to these statistics, so that we may have some basis upon which to figure out whether it would be economical to go to the expense of preventing hail, assuming that we had an infallible method. Of course, where land is worth less than \$5 per acre, and the annual crop from that land worth less than \$10 per acre, it would be foolish to spend \$100 per acre annually in protecting from hailstorms.

ATMOSPHERIC CONDITIONS FAVORABLE TO COTTON SPINNING.

Mr. Lee A. Denson, Observer, Weather Bureau, at Meridian, Miss., favorably indorses the following remarks of Mr. Louis Cohn of that place, extracted from a paper read by him on July 10 before the Young Men's Business League.

Among the advantages of the South for the manufacture of cotton are * * * (8) mildness of climate peculiarly adapted to the proper manipulation of the delicate fiber, and also a saving of large expense in heating the manufacturing establishments. * * * The natural advantages of Meridian for the manufacture of the cotton fiber result from its peculiar physical location. Being almost entirely surrounded by hills and thus within a large basin, the moisture in the atmosphere is retained to a remarkable degree. The average conditions of the atmosphere, as found in Meridian, are such as are much sought by all *intelligently-conducted cotton manufacturing plants*, and large sums are invested for securing such conditions artificially as are here furnished by nature. It is the atmospheric conditions found in the Lancashire and Manchester sections of England and at Fall River, Mass., that have made those districts so celebrated for the manufacture of southern goods, and investigation will disclose the fact that Meridian possesses this essential requisite to a greater degree than possibly any other locality in the South.

Mr. Denson, in commenting on this paper, says:

With Mr. Cohn, I, also, am firmly convinced that the general atmospheric conditions of Meridian are considerably influenced by the topographical surroundings. * * * I believe that the conditions are sufficiently well marked to warrant an investigation. It is a well-known fact that the temperature at Meridian with a northerly wind, is lower than at neighboring stations in the same latitude; this fact is also shown by the effect on fruit, as peaches are often killed here when trees beyond the hills on the south bear abundantly.

We understand that a relative humidity of 70 per cent, a temperature above 50° F., and freedom from atmospheric electricity, are the favorable conditions for cotton spinning, and that these are frequently secured by artificial means in those cotton factories that are not favorably located as to average climate.

It is not clear to us that the desired moderate temperatures and rather high relative humidity are secured by the establishment of a factory or a manufacturing town in a large basin surrounded by hills. There is no apparent reason why the moisture of the atmosphere should be especially retained by this arrangement; it is easily carried away by the wind. Such basins are usually hot and dry in the middle of the day, but cool and damp in the night-time and early morning.

If the temperature at Meridian is really cooler with a northerly wind than at neighboring stations, we should be rather inclined to attribute this local coolness, as well as the accompanying humidity, to topographic conditions. We hope that Mr. Denson will furnish us with fuller data as to the relative humidity and temperature during the 10, 12, or 14 hours of factory work.

AURORA IN FLORIDA.

On page 582 of the Annual Summary for 1899, Mr. H. H. Ten Broeck gives some account of an unusual aurora observed by him at Braidentown, Fla. In a recent letter he says:

I was formerly an observer for the Smithsonian Institution. In regard to the aurora of November 18, 1899, I would add that the next day I saw a press dispatch from Birmingham, Ala., reporting an extraordinary appearance observed at that place. The intelligent observer said that the bands of light were about 2 feet wide. The light was observed there over two hours before it was seen by me. This appears to show that the aurora is sometimes local and that its center is moving over the land. I have seen it stated repeatedly that the center of the aurora is over the earth's magnetic pole, but in this present case evidently it could not have been so.

The numerous notes on auroras in the MONTHLY WEATHER REVIEW for 1895-96 have already shown that it frequently happens that auroras appear almost simultaneously in very restricted localities, although these may be widely separated from each other. The atmospheric conditions favorable to aurora formation almost always move slowly southward over the United States from New York and New England to Virginia at rates that correspond fairly well with the motion over Alabama and Florida on November 18, 1899.

PROGRESS IN WIRELESS TELEGRAPHY.

The following extracts from an article signed G. E. W. published in the *Electrical World and Engineer*, New York, August 18, page 252, seem to have been written by one in authority and desirous of saying the very best that can be said for the Marconi system of wireless telegraphy, especially as developed and modified by the engineers of the British army. The Weather Bureau will undoubtedly adopt some style of wireless telegraphy for communication with ships at sea as soon as apparatus has been devised that is reasonably economical and reliable, but we are not yet sure that Marconi's is the best. The following are the extracts referred to:

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Signor Marconi did not go to South Africa personally, but several of his assistants went there with several outfits of wireless telegraphy, and they operated in conjunction with the fleet patrolling the coast. They confined their attention exclusively to sending messages between the several warships and between the fleet and the shore. At Delagoa Bay the British admiral sent messages a distance of 80 miles to the fleet off shore. The British battleship *Hannibal* also sent and received messages to and from the battleship *Jupiter*, when under way, over a distance of 32 miles. One message was sent 100 miles, the greatest distance successfully covered.

While there were none of his assistants with the land forces in South Africa, his system of telegraphy was used by Lord Roberts, and a modification of it by General Baden-Powell. * * * Upon assuming command in South Africa, he (Lord Roberts) summoned a body of wireless telegraphers and kept them in his camp all through the struggle. These experts kept him in touch with the various units of his enormous army, and some of the messages were sent overland a distance of 60 miles. There are ten sets of instruments in Lord Roberts's army, and these have been developed successfully. All scientific questions and experiments made by a rapidly-moving army are of necessity scantily reported by a commander in the field, and the accounts of the tests with the wireless telegraphy are still quite vague. Considerable interest will be shown in the official reports of the operators when the war has terminated, and no one will hail the accounts of the experiments with more concern than the inventor.

One important improvement in the system in war times was made through the cooperation of the hero of Mafeking. The difficulty of sending messages any great distance in a mountainous country like