were too dry for germination of wheat in the drier parts of the eastern counties.—*G. N. Salisbury.*

West Virginia.—Fall plowing was rapidly pushed during the first week and seeding was mostly done. Wheat, rye, and oats germinated quickly under the warm sunshine, and were looking green and thrifty at the close of the month. Later sown grain did not germinate so well for lack of moisture. Corn hardened nicely and some was husked. Cabbages and turnips turned out better than expected. Pastures were short, but stock was in good condition; apples were mostly picked, but the yield was light and of inferior quality.—*E. C. Vose.*

Wisconsin.—The month was slightly warmer than usual and favorable for the completion of fall work. Corn was secured early in the month in the southeastern counties and along the lake shore, where there was little damage from the early September frosts. Winter wheat and rye attained a good stand and is generally reported in excellent condition. Fall pasturage was very good throughout the month.—*W. M. Wilson.*

Wyoming.—The month was pleasant throughout the State, and favorable to the stock. No extremely cold weather or heavy snowfall was reported from any section of the State. In a few sections water for stock became scarce, owing to the absence of rain or snow; owing to lack of snow some stock could not be moved to the winter ranges.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

CLOUDBURSTS.

By A. D. ELMER, Voluntary Observer, Northfield, Mass.

I have seen the tracks of several so-called cloudbursts in New England and have also seen some of the storms themselves at a distance. Observers who happen to be in close proximity can determine whether these storms differ from thunderstorms except as to direction and velocity of motion. The cyclonic thunderstorm passes over the observer slantingly. If it moves broadside it passes over the observer quickly, with a tornado of wind; this is rare. Conversely, if it moves lengthwise, then it may last at one point until the whole length of the disturbance has passed over; in this case the observer experiences a calm with heavy rain. When the thundercloud moves transversely to the line of action it moves rapidly and, therefore, its short rainfall covers a wide area. In proportion as it moves more obliquely it is less squally, the area of precipitation is narrower, and the total amount heavier. If it moves along on the line of its greatest axis, the path of precipitation must be very narrow and the total amount very heavy; the most excessive amounts, of course, make the line of heaviest condensation. Therefore, such a local storm is capable of depositing as much water along a narrow track as a storm moving sidewise would do over a much wider area. The prevailing tendency of storms is to move in a median direction; those moving lengthwise are as rare as those moving broadside on. The latter, as described by Hinrichs, in Iowa, have a local name (*derecho*). The fact that they move along their short axis accounts for their covering a wide area, and for their being observed by many. The local storm that moves lengthwise being both infrequent and felt over a narrow area, is, of course, very rarely recorded. Its amount of precipitation may be still further increased at any given point by another characteristic. As above stated, the side-moving squall has the greatest velocity, the oblique-moving thunderstorm has less, and the disturbance which moves lengthwise sometimes seems to drag along. Let us consider the effect of this slow progress on an Indian file of pouring rain clouds when lifted in its march over a hill or mountain range. I have seen two such; one was climbing over the Northfield Mountains rising about 1,400 feet from the Connecticut River Valley; the other was passing up over the Hoosac Mountains, in Adams County, and rising about 2,500 feet from the valley of the Hoosac River. In such cases we have a continuous rain for hours along one line and which may amount to ½ inch in five minutes, or 6 inches in one hour. If the storm line is 60 miles long and moves 20 miles per hour, 18 inches may fall in the three hours it occupies in marching over. Such being possible on the windward side of a mountain, at valley stations in New England thunderstorms, where the rate of fall occasionally equals 6 inches per hour, how long would it take a valley brook starting in the mountains to increase into a destructive body of water? It is probable that many of these storms are discontinuous, coming in series of showers. The one observed by me on the Northfield Mountains was at times so narrow that I could look under it and through the rain wall to distant Mount Toby; it lasted much of the afternoon and the brooks washed out every culvert on the railroad for several miles. The storm in Adams County and that of June, 1902, at Middlesex, Vt., and northeast of that place were more destructive. Davis's Report on the New England Thunderstorms, 1885, furnishes good illustrations of storms which move broadside on (see July 21) and of the ordinary but severe thunderstorms (see July 9). I have not mentioned the occasional advance of an isolated thundershower, which being practically a point, has no breadth; but hope I have made it clear that the long thunderstorm cloud, advancing along its long axis may be directly responsible for all so-called cloudbursts.

DOES THE LIGHTNING EVER STRIKE THE OCEAN.

By Prof. JOHN TROWBRIDGE.

Prof. John Trowbridge, Cambridge, Mass., calls attention to the fact that—

Low lying clouds heavily charged may possibly sometimes discharge electrically to the surface of a large body of water like the sea; but he believes that his experiments show that at the average altitude of thunder clouds the tendency is to discharge from one region of cloud to another in preference to discharging to the sea. The testimony of persons who claim to have seen lightning strike the sea is not very reliable, since most persons are ignorant of the phenomena of irradiation, they are confused by the blinding flash and mistake reflection in the water for the flash itself.

He adds:

By means of a battery of 20,000 small cells a voltage of about 6,000,000 is obtained, which is at least comparable to that of lightning. With this large battery, I was able to obtain an electric spark about 7 feet long and found that instead of striking the water a spark of 6 or 7 feet in length invariably jumped to some adjacent object in preference to striking the liquid surface. A spark of only a few inches in length, however, will strike the water, but such a spark is not comparable to lightning.

Beyond a million volts the initial resistance of atmospheric air to electrical discharges becomes less, and the discharges, therefore, are shunted through the air instead of upon the water, and strike some object adjacent to the water.

THE CLIMATE OF BAGUIO, PHILIPPINE ISLANDS.

By FRANK O. STETSON, United States Weather Bureau.

Rev. Jose Algué, the Director of the Philippine Weather Bureau, has published an interesting study of the weather at Baguio, the first of a series of reports "On the climatological conditions of certain regions of the archipelago which might be advantageously chosen as health resorts." Baguio, on the island of Luzon, about 140 miles north of Manila and some 18 miles from the western coast, occupies a plateau 4,777 feet above sea level. The observations, which are taken ten times daily, are given in extenso for pressure, humidity, cloudiness, precipitation, fog, and wind direction. The record covers only a period of twelve months, but this will perhaps suffice for a general idea of the climate of a locality within 17° of the equator. The claims of Baguio as a health resort rest chiefly, if not entirely, upon its temperature. This, as the latitude and elevation would indicate, is delightfully mild and equable. During the period under examination it varied from a minimum of 47° in February, the coldest month of the year, to a maximum of 84° in April, which is the hottest month. The extremes at Key West, Fla., during the same period were 89° and 51°.