

makes stream-lines more from the isobar trends than from the locally varying surface wind directions. On lines of convergence, rainfall is necessarily to be expected because of the forced ascent of air.]

Relation of winds to temperature in central Ohio. H. H. Martin. (pp. 85-86, 2 figs.)

[AUTHOR'S SYNOPSIS AND CONCLUSION.—This paper presents by table and graph the existing relation between the direction of the wind and the existing or current temperature, as well as the subsequent 24-hour temperature change. The data are taken from the records of the Columbus (Ohio) office, 1909-1918, inclusive.]

Under ordinary conditions, at Columbus, Ohio, it seems safe to consider the north, northeast, east, and southeast winds as prognostics of warmer weather 24 hours later, except in summer, when the east wind has no prognostic value; and the northwest, west, southwest, and south winds as prognostics of cooler conditions 24 hours later, except in summer, when the northwest wind is usually followed by higher temperatures. However, excepting the case of the east wind in winter, the true prognostic values are low and do not justify much reliance. Their value would be appreciable only when used in conjunction with other indications.]

Altitude determinations based on barometric readings. H. G. Cornthwaite. (pp. 87-88, 2 figs.)

[Under favorable conditions very accurate (max. error $\pm 1\%$) altitude determinations can be made from simultaneous barometric readings, especially in the Tropics where air-pressure fluctuations are small. Up to elevations of 5,000 or 6,000 feet a mercurial barometer is preferable to an aneroid for this work if closely accurate results are desired.]

Comparison of snowboard and raingage-can measurements of snowfall. R. E. Horton. (pp. 88-89, fig.)

[Measurements of depth of snowfall on a white-cloth covered board kept flush with the surface of the snow are 16% greater than those obtained with the usual raingage with snow attachment.]

On the comparison of meteorological data with results of chance. L. Besson. (Translation.) (pp. 89-94.)

[In a set of N daily values of a meteorological element, *e. g.*, pressure, it is desirable to be able to tell whether the n minima and m maxima are the results of some physical cause which always tends to produce n minima in N days, or whether they are merely random occurrences. Besson derives formulae giving the number, sizes, and distribution of the minima in a series of N numbers resulting from pure chance selection.—*E. W. W.*]

Influence of the wind on the movements of insects. W. E. HURD. (pp. 94-98.)

[For most insects wind is a highly important factor in ordinary movements and in the dispersal of insects and their invasions of new territory.]

Limited editions of reprints are being made for the sleet papers, and for those by Messrs. Martin, Besson and Hurd. Applications for any should be made to "Chief, U. S. Weather Bureau, Washington, D. C."

NOTES AND QUERIES.

Vortex Motion in the Atmosphere.—To a recent inquiry, the Weather Bureau made the following reply:

Not much has been added recently to "the theory of vortex motion and its application to the analysis of local cyclones, anticyclones, thunderstorms, etc."

One of the fullest discussions we have of vortex motion is given in Lamb's "Hydrodynamics."

This discussion applies, roughly, or with proper limitations, to the tornado. It does not apply, however, to the cyclone, except, possibly, to the small tropical cyclone, and to it but very roughly, because the average cyclone is only slightly vortical. Still less does it apply to the anticyclone; and scarcely at all to the thunderstorm.

Some of the recent discussions of more or less local revolving storms are by:

Shaw, Sir Napier: *Geophys. Memoirs*, Gr. Brit. Met. Office, London, No. 12, 1918.

Shaw, Sir Napier: "Revolving Fluid in the Atmosphere," *Proc. Roy. Soc.*, A. 94, p. 34, 1917.

Shaw, Sir Napier: "Manual of Meteorology," Part IV.

Jeffreys, Harold: *Phil. Mag.*, V. 37, p. 1, 1919.—*W. J. Humphreys*.

Sleet Storm Brings Starling Invasion.—One of the interesting effects of the recent sleet storm, in Washington, D. C., was the arrival of thousands of starlings, which have, heretofore, been seen only in very small numbers in and about the city. The sleet storm, however, brought great numbers, which, according to the *Washington Star* of March 15, 1920, "had for (their) immediate objective the back yard garbage cans hitherto held in security by the starling's compatriot, the English, or house, sparrow."

The Cold Winter of 1919-1920 in the Eastern United States.—The National Weather and Crop Bulletin (Weather Bureau, Washington, D. C.) for April 20, 1920, contains an interesting chart of the departure of mean temperature from the normal, December 1, 1919 to February 29, 1920, in the United States. The temperatures were more than 6 degrees F. below normal in much of the Lake region, and more than 4 degrees below normal in most of the country east of the Mississippi and north of the Ohio rivers and 40th parallel of latitude. The Gulf States and the Great Plains were warmer than normal, but not much so. The departures in the West were generally plus in the Southwest half and minus in the northeast half. Another chart shows the lowest temperatures of the winter.—*C. F. B.*

Mr. Frederick H. Brandenburg, meteorologist, in charge of the Denver office, died in that city on April 17, 1920.

Mr. Brandenburg was born in Washington, D. C., on August 23, 1854, and enlisted in the Signal Corps on August 21, 1877. All of his 43 years of service was in Colorado, with the exception of 3 months' training at Fort Whipple, 1 year as assistant at Chicago, and 3½ years as clerk in Washington. He was transferred from Washington May 5, 1882, to charge of the station at Las Animas, Colo., where he served until June 1, 1888, thence to charge of Pueblo until June 7, 1894, when he was placed in charge of the Denver office. When the Denver forecast district, comprising the States of Colorado, Utah, New Mexico, and Arizona, was organized in 1901, he became the official forecaster for that district.

Mr. Brandenburg had been in poor health for several months, but he remained on duty until noon, January 5, 1920, when he was stricken with paralysis and taken to his home. He was unable to resume his work thereafter.—*Weather Bureau Topics and Personnel.*

WEATHER OBSERVER NEEDED ON ISTHMUS OF PANAMA.

Mr. A. L. Flint, Chief of Office, The Panama Canal, Washington, D. C., has communicated the following:

This office has received by cablegram an urgent requisition from the officials on the Isthmus of Panama for the appointment of an observer at an entrance salary of \$137.50 a month, with prospects for promotion to \$150.00 a month. The appointee will be furnished with free steamship transportation from New York or New Orleans to the Isthmus, wages beginning on date of sailing. A man is desired who has had at least one or two years' experience in weather bureau observation and form work, and the appointee is required to sail as early as possible. The appointee will be furnished with free bachelor quarters on the Isthmus, including light; also free medical and hospital attention, and meals can be secured at the Government restaurants for 40 cents each and upward. Annual leave