the squall which is its occasional cause. But one must not conclude from this that the tornado may generate in any region of the "squall-zone." This error has arisen from the rare cases of several "squall-zones" following each other at short distances and separated by brief intervals of relative calm and inverse rotation of the wind. We have said that when the "squall-zone" has, for example, a north-south direction and the center of the depression is to the north of the observer, the wind to the right and left of the "squall-zone" is weak and southwesterly, while it is between west and northwest and violent within the "zone."

It would therefore be necessary for the central bureau to be informed whether the "squall-zone" passing over the western part of the United States, is simple or whether it is composed of several closely associated "squall-zones" [see Monthly Weather Review, v. 37, p. 239]; in the latter case, the cone for "*certain* squall with *possible* tornado" should not cease to announce the danger of a tornado until after the passage of the last of the parallel zones. When this has passed all danger of a tornado would be over until the arrival of a new "squall-zone."

This very simple method of prediction that we recommended 17 years ago—if not for tornadoes, which are very rare in our climates, at least for violent squalls - has not yet been adopted in France. It seems, however, as if it soon would be, in view of the present very marked movement in favor of agricultural forecasts. But we should be very happy if the application of the *law of squalls and tornadoes* were to be made in a country which tornadoes seem to have selected as the land of their predilection. The consequences of squalls and tornadoes can not be entirely averted, far from it, but if the people were warned of the danger, much damage could be prevented and, above all, by seeking places of safety many lives would be saved. There are, it appears, at present in America shelters erected against tornadoes; but they would be much more useful if people were informed of the *exact* hour and of the *very short* duration of the danger.

EVAPORATION FROM SNOW AND ERRORS OF RAIN GAGE WHEN USED TO CATCH SNOWFALL.

R. E. HORTON, M. Am. Soc. C. E.

[Dated Albany, N. Y., Jan. 28, 1914.]

The sketch (Fig. 1) shows the condition of the galvanized rain gage can at the end of the storm of December 26, 1913, at Albany, N. Y. Gage located at elevation about 220 above tide. At this point the entire storm fell as snow, the first portion being very damp. The first fall down town at about tide level occurred as rain. It was apparently this first snow which stuck to the outside of the gage, as shown in the sketch. This barrier on the edge of the can undoubtedly greatly increased the deflection of the later snow so that only 0.43 inch water equivalent entered the gage, although the total snowfall on the ground was 1.41 inches. There was not enough wind to cause any drifting of this snow for eight days, and there was practically no melting of the snow during this time, as the temperature was constantly very low. What melting occurred was apparently confined to about one-eighth to one-fourth inch at the surface, but was not sufficiently intense to form a solid crust. The cold weather changed the crystal form and the snow became very hard and resembled coarse granulated sugar after the first two or three days. The settlement of the snow mass is shown in the table and also the amount of loss by direct evaporation. In the first determination of the amount of snowfall samples were taken at several different locations in a yard about 35 by 100 feet. These were found to agree closely, although the depth of snow varied about 1 inch. Samples used to determine the evaporation were all taken within an area of 1 square yard. To get these samples the galvanized gage can was thrust down over the cylinder of snow, a thin-edged shovel was slipped under the edge of the can, and care was taken to get all of the snow from the ground surface.

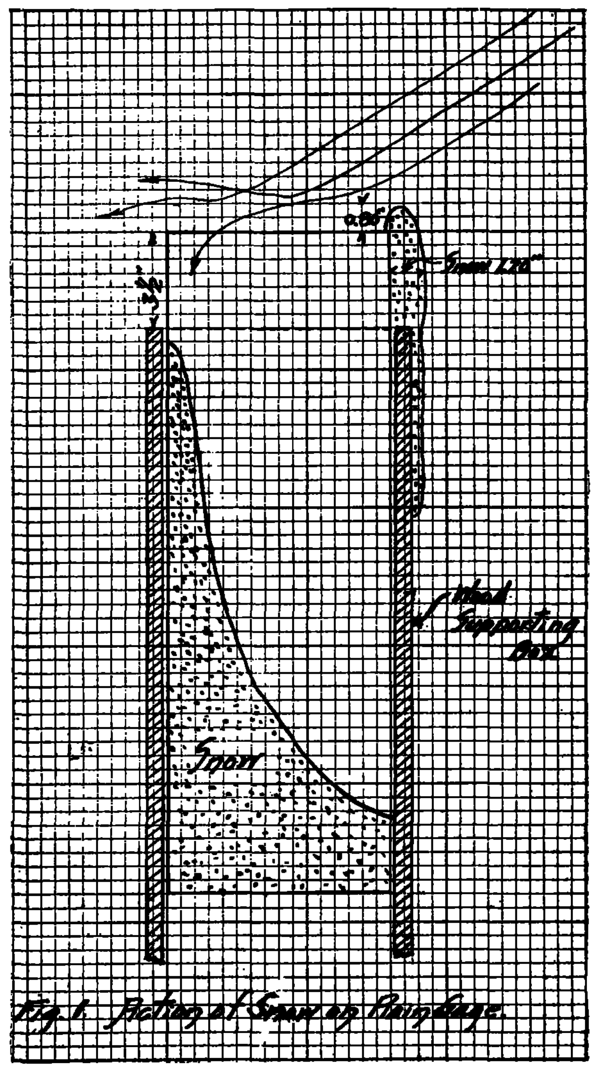

FIG. 1.—Action of snow on rain gage.

Depth, water equivalent, and evaporation loss from snow, Albany, N. Y., Dec. 26, 1913, to Jan. 4, 1914.[1]

Date.	Number of tests.	Depth on ground.	Water equivalent.		Total loss.	Loss per day.	Maximum temperature.[2]	Mean wind movement.[2]
			Inches.	Ratio.				
		Inches.			*Inches.*	*Inches.*	° *F.*	*Mis./hr.*
Dec. 26, 1913	4	11.25	1.41	0.125	0	0	22	14.6
Dec. 27, 1913		10.00					19	9.3
Dec. 28, 1913		9.50					18	3.0
Dec. 29, 1913		9.00					23	3.0
Dec. 30, 1913		8.00					37	6.8
Dec. 31, 1913		7.50					32	6.3
Jan. 1, 1914	2	7.00	1.22	0.174	} 0.18	0.028 {	19	7.5
Jan. 2, 1914	2	7.12	1.24	0.174			21	3.8
Jan. 3, 1914		6.50					36	6.2
Jan. 4, 1914	4	6.00	1.16	0.193	0.25	0.028	39	12.6

[1] Tests made about 4 p. m. each day.
[2] At United States Weather Bureau. Data contributed by George T. Todd, Local Forecaestr.

This was not difficult, as the ground was dry when the snowfall began, and there was no crust or ice layer at the bottom of the layer of snow.

The measurements of evaporation indicate an average monthly evaporation of about 1 inch per month for fairly cold weather without heavy winds, with air usually clear.

DAILY SYNOPTIC CHARTS OF THE NORTHERN HEMISPHERE AND ABSOLUTE UNITS.

[From Nature, London, Feb. 26, 1914, v. 92, pp. 715-716.]

On January 1 of this year, as already mentioned in the "Notes" of the issue of Nature for February 5, the Weather Bureau of the United States commenced the issue of a daily weather map of the Northern Hemisphere, compiled from observations received daily at Washington by telegraph.

In addition to the regular reports from the United States and Canada, represented in the well-known daily weather map of the bureau, reports are obtained from upward of 40 stations, which are sufficiently distributed in latitude and longitude to form the basis of a chart of isobars and isotherms for the Northern Hemisphere. The information is given on the back of the daily bulletin, and the Weather Bureau is to be congratulated upon being the first to publish a map showing the distribution of pressure and temperature over a hemisphere *on the day of issue.*

It rests with the bureau or with some still more enterprising institute, if there be one, to add the available observations from the Southern Hemisphere and realize what everyone who thinks about the subject knows to be the most sure basis for the study of the daily weather, viz, a daily map of the main features of the distribution of pressure and temperature over the globe.

Practically no lines are drawn on these maps for latitudes lower than 25°, and it is interesting to speculate as to what sort of characteristics a synoptic chart of the equatorial regions would show if it could be drawn. North of 25° the rotation of the earth makes it possible for pressure differences represented by "parallel isobars" to be sufficiently permanent to be charted, while ordinary centrifugal action makes "circular" isobars also equally possible. Hence on a chart for temperate and polar regions, isobars may take any shape between the small circle of a cyclonic depression and the great circle of "straight" isobars; but in the equatorial region there is no place for "parallel isobars," as they are understood farther north, because the influence of the rotation of the earth is too feeble; the winds required to balance isobars such as those to which we are accustomed would be prodigious. Consequently a pressure distribution sufficiently permanent to be mapped could only be made up of "circular" isobars, and therefore a chart of isobars for part of the equatorial region ought to be a collection of small circles with whatever may be necessary to represent the diurnal variation. It would be interesting to have this conclusion verified, and the transition between the region of circular isobars and the region of straight isobars carefully explored.

Variations of pressure, small in magnitude, but associated with weather changes, are shown as irregularities in the course of the well-known diurnal variation on barograms for equatorial regions and the translation of a collection of barograms into synoptic charts is an attractive problem. It would presumably tell us what the meteorological conditions would be if the earth were fixed and the sun went round it in 24 hours, as the ancients used to suppose.

One of the striking features of the maps now issued by the Weather Bureau is that for the first time in the history of official meteorological institutions C. G. S. units of pressure and the absolute scale of temperature are used for a daily issue of charts. The isobars are figured for every 5 millibars and the isotherms for every 10° or 5° on the centigrade scale measured from 273° below the freezing point of water.

This is indeed a remarkable step toward the unification of the methods of expressing pressure over the globe, and it has been immediately followed by the Meteorological Office in the corresponding charts which are published in the weekly weather report. The Office figures the centibars while the Bureau figures the millibars, but that is only a matter of decimal point.

Millibars are in future to be used, though not exclusively, for the international publication of the results of the investigation of the upper air, so that while it now seems likely that before many years are passed we may see a daily synchronous chart for the globe and really begin to study weather as it ought to be studied, we may at the same time expect to take leave of the inch and the millimeter as measures of pressure. They certainly have had a very long innings on a side to which they did not properly belong, and it will be interesting to see how the more scientific measure of pressure in in pressure units will adapt itself to practical requirements. The Meteorological Office is to make use of C. G. S. units of pressure for the Daily Weather Report on May 1 of the current year, and the preparations for that event have already placed some well-known facts in a curious light. The task which during the last 60 years we have been setting to British instrument makers is as follows: "Construct a barometer which will give a true pressure reading when the whole instrument is in latitude 45°, the mercury at 273° A., and its brass case at 290° A." Continental makers have had a problem that sounds simpler, viz, to construct a barometer which will give a true pressure reading when the instrument and its case are in latitude 45° at 273° A. The figures show that if instrument makers were to make a barometer which was correct at the equator at the freezing point of water, it would be correct in latitude 45° at the ordinary air temperature of 289° A. (61° F.) and at the poles at 305° A (89.6° F.). So for each latitude there would be a temperature within the common range for which the readings were true pressures. At other temperatures of course a correction would be required.—W. N. S[HAW].

THE JAPAN CURRENT AND THE CLIMATE OF CALIFORNIA.

The Editor receives so many inquiries in regard to the Japan Current and the Gulf Stream that the readers of the REVIEW will doubtless be interested in the following extracts from a well-considered article by William G. Reed, Ph. D., of the University of California, published in the Sierra Educational News, November, 1913, and the Journal of Geography, March, 1914:

The supposed relation between the climate of California and the Japan Current appears in the newspapers from time to time. In some way, not clearly stated, this current is held to have a profound effect upon the climate of the State. The Japan Current is an ocean stream of considerable interest and importance, but it is not a great factor in the climatic conditions of California. * * *

The Japan Current is, properly, that part of the drift which is warmer than the surrounding ocean; it is a warm current. As such it has its