## MACKEREL SKY AS A PROGNOSTIC OF PRECIPITATION.

By H. H. MARTIN, Observer.

[Weather Bureau, Columbus, Ohio, May 15, 1919.]

While compiling other data for investigation I have taken note of the occasional record of "mackerel sky" at the Columbus, Ohio, station. Of the 17 records made, it has been found that 10 were followed by precipitation within 12 hours, 15 within 24 hours, and 17 (all) within 48 hours. As will be agreed, the occurrence of "mackerel sky" is evidently of great prognostic value. However, the records of this formation are sparse and the value 13 does not, in my opinion, represent anything like the total number of times this cloud has been observed in the past 10 years.

I believe that this cloud formation is of sufficient importance to justify more complete records, and that it should be recorded, together with the time, direction from which moving, and where densest, whenever observed. "Mackerel sky" is usually of such short duration that an observer must be on the alert to note every occurrence. I believe that if such records were made, however, the results would be of greater value than any other cloud record in the forecast of precipitation.

## ON THE USE OF CIRRUS IN THE FORECASTING OF WEATHER.

By G. REBOUL and L. DUNOYER.

[Abstracted from *Comptes Rendus*, Mar. 22, 1920, pp. 744-747.]

It is a well-known fact that the distribution of cloudiness in advance of a low pressure area can be used for local forecasting. This paper presents the deductions from observations made at Malzéville, France, regarding the use of cirrus for this purpose. The rules deduced and the factors of certainty are presented here:

1. *The appearance of cirrus in a certain direction indicates the existence of a depression in that vicinity.* Certainty: In summer, 0.92; in winter, 0.94; when cirri are from west, 0.96; from the east, 0.81.

2. *The direction of movement of cirrus indicates the direction in which the depression is to be found.* Certainty: In summer, 0.84; in winter, 0.81; when cirri are from west, 0.91; from the east, 0.57.

3. *The direction of movement of cirrus indicates the direction of motion of the center of the depression.* Certainty: In summer, 0.67; in winter, 0.60; when cirri are from west, 0.76; from the east, 0.43.

4. *Cirri of high speed foretell a rapid motion of the center.* Certainty: January to October, 1916, 0.72; July, 1918, to July, 1919, 0.68.

5. *Abundant cirrus indicates, on occasions when the depression is in the vicinity of the place of observation, where it is intense.* Certainty. 0.77.

The warning is made that too much confidence should not be placed in cirrus as precepts for forecasting, and that these rules are applicable only to LOWS in the north or east of France and in cases where the coefficient of certainty is very large.—*C. L. M.*

NOTE.—These conditions, of course, are those with which the French have to contend, but some of the above rules would not be applicable in America. The reason is that barometric depressions in America travel much more rapidly than those of Europe, and it is therefore possible that the direction of motion of cirri indicate the radial motion from the center of the storm; on the other hand, in America, the center of the cyclone moves forward much more rapidly, so that the direction of motion of cirri represent the direction of motion of the storm, but not the location of the center, as is implied in (2) above.—*C. F. B.*

## THE SNOWFALL IN THE WESTERN STATES, WINTER OF 1919-20.

[Abstracted from Section Directors' Reports by A. J. Henry.]

In general the winter of 1919-20 was one of greatly reduced snowfall as compared with the normal. The distribution was abnormal in that rather heavy snow fell in the early part of the season, the greater portion of which disappeared before January 1, 1920. The fall of both January and February was much below normal and the outlook at the end of February was distinctly disappointing. The snowfall of March was fairly heavy in practically all of the Western States, but coming so late in the season it will not make up the deficiency of the midwinter months.

The most-favored districts appear to be southwestern Colorado and portions of Wyoming. Meteorologist A. H. Thiessen, in charge Climatological Service of Colorado, concludes that the flow of the Grand and Gunnison Rivers will be more than normal and that that of the Yampa, White, and San Juan Rivers will be considerably above the normal, thus giving an increased flow in the Colorado which he estimates at 30 per cent.

Snowfall in the Columbia watershed was deficient, particularly in the Coast States. Meteorologist E. L. Wells, of Portland, Oreg., concludes that with moderate, seasonable temperatures during May the run-off from the Snake River will be nearly normal and comparatively early and that nearly the usual volume of flow will come out of the Columbia.

## THE DROUGHT IN CALIFORNIA.

By ANDREW H. PALMER, Meteorologist.

[Weather Bureau Office, San Francisco, Calif., April, 1920.]

In California the year is divided into well-defined wet and dry seasons. Nearly all of the precipitation occurs during the winter half-year. The character of the rainy season, therefore, determines the prosperity of agriculture, which is largely dependent upon artificial irrigation. Hydroelectricity is largely used for pumping the irrigation water.

Because of abnormally deficient precipitation during the rainy season 1919-20, the central and northern portions of California face a serious problem during the summer of 1920. As the three preceding rainy seasons have also brought deficient precipitation, and the season just ended the least in many years, the natural reservoirs are largely depleted. An inevitable shortage of water will occur during 1920 in central and northern California. Generous rains in March assured the maturing of winter growing grains and grasses, and revived fruit trees. But summer growing crops, particularly rice, and general field crops, as well as deciduous fruit, will require much more water than now appears to be available in the partially filled reservoirs. Mr. H. D. Butler, State power Administrator, estimates that the deficient rainfall of the past season will cause a loss of $22,000,000 in the Sacramento Valley alone during the summer of 1920.