Father Sarasola's successor as director of the Observatorio de Montserrat is MARIANO GUTIÉRREZ LANZA, S. J., heretofore sub-director at the Observatorio de Belén at Habana.

PEREZ ETKES, who recently went to Palestine, is now employed by the Palestine Government as civil engineer in the Jaffa district office. He has recently been appointed meteorological member of the Palestine Waters Commission, and is drawing up specifications for an extension of the meteorological net of the country.

MONTHLY WEATHER REVIEW, JULY, 1920.

(Issued October 4, 1920.)

Although synopses of the contributions are published in the BULLETIN, no attempt is made to cover all the contents which may be of interest to readers of the BULLETIN. This is because about half the fellows and members of the Society see the *Monthly Weather Review* regularly, and the others can find it at any regular Weather Bureau office, at public libraries, or at libraries of scientific institutions (including universities).

The 35 contributions, abstracts and notes which appear in the current issue of the *Review* are led by a group on the aurora, particularly that of March 22–25, 1920. The account of this great aurora is based to some extent on numerous descriptions of the display which were sent to the authors in response to a request published in the BULLETIN.

The aurora of March 22-25, 1920, and associated displays. C. F. Brooks and H. Lyman. Pp. 379–392, map.

[A disturbed area marked by a group of sunspots stretching more than a quarter of the way across the face of the sun, bombarded the earth with such an abundance of electrified atoms that it caused an intense magnetic storm and an extraordinarily active and brilliant aurora, lasting for 20 hours and followed by 3 days of lesser magnetic and auroral activity. The beginning of the aurora was observed at Tatoosh Island, Washington, and in Australia practically simultaneously; then it became visible at dusk successively around the world until the last of its brilliance was seen toward dawn in the northwestern United States.

The numerous reports show not only that the periods of greatest brilliance and maximum magnetic activity were simultaneous throughout the world, but also that the general aspect of the display as a whole was similar. The local differences depended largely on the positions of the observers relative to the great series of auroral curtains. Great activity, some brilliant colors, especially crimson, and great vibrations of the whole display were characterictic features.

Some 100 reports received from parts of eastern North America have made it possible to map the actual locations of the brilliant auroral curtains at particular times, and thus to picture what might be called the geography of the aurora.

Auroras and magnetic disturbances occurred in mid-February, mid-April and mid-May, during the preceding and following presentations of the same active region on the sun, as it rotated.

This aurora ranks among the greatest five world-wide displays of the past 5 (or, in fact, 11) years, embracing the recent unusual sunspot maximum. In many places this aurora was the most brilliant one seen in this century.—[AUTHOR'S SYNOPSIS.]

Note on the height and location of the auroral spots and belt of March 24, 1920. C. F. Brooks and C. L. Meisinger. Pp. 392.

[Calculations from non-instrumental observations made in the northeastern quarter of the United States show that this peculiar spot-light aurora was at a height of about 130 km. (81 miles). Two spots over eastern and western Pennsylvania seen early in the evening, grew into a belt stretching from a few

hundred miles out to sea, across northern Virginia to southwestern Ohio. Although the belt seemed to move slowly, it was traveling southward at about 60 miles an hour.]

The physics of the aurora. W. J. Humphreys. Pp. 392–393.
[Abstract of paper presented at April 22nd meeting. See May BULLETIN, p. 50.]

Here is a reprinted abstract about the spectrum of the aurora. Then there is a note about the aurora of March 4–5, 1920, in which Prof. A. S. Eve, of Montreal, suggests "an organization for recording, with accurate timing, auroras in both northern and southern hemispheres."

Auroras of 1919 in the United States. H. Lyman. Pp. 393–394.
[The 171 dates and the number of States in which the aurora was seen on each, are tabulated. The aurora was reported for 21 dates in March, 20 in May, 19 in August, 20 in September, and 21 in October. Displays were reported from 8 or more States on Feb, 27, May 2, Aug. 11, Sept. 19, Sept, 24, and Oct. 1. The longest continuous series of daily displays was from Sept. 15 to 27, inclusive. There were 7 series with auroras on six or more dates in succession.—*C. F. B.*]

This group of aurora papers has been reprinted and copies have been sent to all who contributed accounts. A surplus is held by the Weather Bureau, Washington, D. C., for others who may apply.

Synopses of other contributions and original notes will follow. Those starred have been reprinted.

***A simple equation of general application for the normal temperature in terms of the time of day and the day of the year.** F. L. West. Pp. 394–396.
[The following empirical equation

$$T = \frac{Ma}{2} + \mathrm{Va}\cos t + \frac{My}{2}\cos\theta$$

represents the normal temperature as a function of the time for the United States except for the arid west, where we must add the term $\left\{\frac{\mathrm{Vv}}{4}\cos t\cos\theta\right)$. The constants are the mean annual temperature, the range of the annual march, and the range of the daily march, and are obviously easily obtained from the Weather Bureau data for the place desired. The mean error for the arid west was 2.75° F. and it is less for the rest of the United States. The equation simply assumes that the annual and daily march of temperatures are simple cosine functions.—AUTHOR'S SYNOPSIS.]

***Hailstorms in Nebraska.** H. G. Carter. Pp. 397–398, 5 photographs (showing size of hail, rabbits killed by hail, and houses badly damaged by hail.)
[From a study of all available hailstorm records from one hundred and fifty coöperative Weather Bureau stations and the regular Weather Bureau stations in Nebraska it was found that the average number of hailstorms during the season April to September, inclusive, was 3.2. Hailstorms are most frequent in May and least frequent in September. The greatest number of hailstorms occur about a month later than the time of greatest rate of temperature increase in spring.

The greatest number of thunderstorms is in June and the fewest in April. Although hail does not occur without a thunderstorm, but 7.2 per cent. of all thunderstorms is accompanied by hail. The percentage is largest in April and least in August.

Reports of hailstorms as large as hens' eggs, or even larger, are frequent, and although storms of such intensity are local, they cause considerable damage.—AUTHOR'S SYNOPSIS.]

***Large hailstones of Kansas City, Mo., May 14, 1896.** P. Connor. Pp. 398–399. Photo.
["The official in charge (of the local Weather Bureau station) measured be-

tween 15 and 20 of the largest hailstones and found them to range from 8 to $9\frac{1}{2}$ inches in circumference. They were unusually well-formed and very solid. Quite a number were almost spherical; the majority were egg-shaped with one side rather flat. Very few had irregular surfaces or protuberances. The larger ones, when cut, showed 7 and 8 concentric layers outside the core (one of 11 layers was reported). They were frozen hard, and a number of the heavier stones sank their depth in lawns and vacant ground. . . The damage by hail was very great. . . ."]

Funnel cloud over Lake Michigan, June 29, 1920. A. H. Ward. P. 399, fig.
[Sketch of what was evidently an incipient waterspout.]

A smoke arch marking an increase in wind. A. H. Ward. P. 399, fig.
[4 sketches of changing form of a smoke line over Lake Michigan.]

Some flying experiences in "bumpy" weather in Texas. D. P. Carlberk. Pp. 399–400.
[Describes usual feel and sound of bumps; mentions one that turned his airplane completely around, and discusses "bumpiness" on mornings after southerly wind has blown all night.]
Reprinted notes on aerial conditions in Africa follow this.

Exposed steel temperatures in the tropics. H. G. Cornthwaite. Pp. 403–404, fig.
["Blocks of steel of similar size and shape painted black, white, red and green were exposed side by side. . . . A maximum 'spread' of 20 degrees F. between the black and white steel temperatures was observed on one occasion. The red steel temperatures are only slightly higher than the white, indicating that red [in ordinary red paint] is not the warm color that it is popularly believed to be. On the other hand, green seems to absorb nearly as much as black." The diagram shows that the white steel temperatures were about 25 degrees F. above the air temperature in the shade: air temperature about 88° F., white steel, 112°; red, 115°; green, 124°, and black, 129°, from about noon to 2.30 P.M.]

Diurnal pressure change in Gulf of Fonseca. E. S. Jackson. P. 404.
[In an 8-day period the average drop in the barometer between noon and 1 P.M. was 0.05 inch.]

The climate of Japan and Formosa. Ellen Mary Sanders. Pp. 404–408, 17 figs.
[A comprehensive general discussion of the subject, well illustrated with maps and diagrams.]

Historical note on charts of the distribution of temperature, pressure, and winds over the surface of the earth. E. W. Woolard. Pp. 408–411, 2 maps.
[Facsimilies of the (von Humboldt's) first isothermal map of the world, and of (Halley's) the first wind chart of the oceans.]

This is followed by notes on Gorczynski's new isothermal and isobaric charts of Poland, Europe and the Globe, and on the new Dutch oceanographic and meteorological maps of the Atlantic.

Retirement of Mr. Henry E. Williams. A. J. Henry. P. 413.
[A brief sketch of Mr. Williams' career, 44 years of which were spent in the U. S. Weather Service. Most of this time he was associated with the administrative side of the forecast work, and was Chief of the Forecast Division at the time of his retirement, in August, 1920.]

Dr. Jesse C. Green, 1817-1920. G. S. Bliss. P. 413.
["Dr. Green began keeping weather records at West Chester in January, 1855, and continued without interruption until the time of the accident that caused his death.]

There are three abstracts of interest to agricultural meteorologists: Effect of the relative length of day and night and other factors of the environment on growth and reproduction in plants; temperature in relation to quality of sweet corn, and climate and weather and plant diseases.