Examination of the Reseau Mondial charts suggests that there is also a northeast-southwest oscillation of the Icelandic minimum ranging from Spitsbergen or northern Russia to Newfoundland, which takes place much more slowly. Since the greatest droughts occur when this minimum is not to the west over Greenland but unusually far north toward Spitzbergen, this longer oscillation is discussed at some length. There is strong reason the authors assert for supposing that this northeast-southwest oscillation of the Icelandic minimum is connected with the ice conditions in the Arctic waters, for droughts of Type B in the British Isles are followed by years with much ice near Iceland.

The sequence of events leading up to a drought in the British Isles with low pressure in the neighborhood of Spitzbergen is about as follows: In the Arctic Ocean the temperature is abnormally high and the weather is stormy. Consequently, the polar ice is broken up and much floe and field ice drifts into the East Greenland current. Owing to the prevalence of strong westerly winds this ice is spread out to the eastward of its normal limits and some of it collects around the shores of Iceland. Between Spitzbergen and Iceland the average velocity of the ice is about 7 miles a day, so that it would take some 200 days, or nearly 7 months, on the journey, and the ice broken up in summer would appear off Iceland early in the following year. The Arctic ice generally passes Cape Farewell in January or February. It follows the southerly current up the west coast of Greenland nearly as far as Disko Island, 70° north. Here it is driven westward by the easterly winds of spring, after which it again drifts southward along the western side of Baffin Bay and Davis Strait into the Labrador Current, which carries it past Newfoundland into the Gulf Drift.

As the floating ice melts it must cause an appreciable cooling and this cooling is propagated to the northeastward with the velocity of the current and it finally reaches the Northeastern Atlantic. The deficit in temperature of the Gulf Drift is followed by a cold season in the Arctic Ocean with high pressure and an absence of storminess. Hence there is little loose ice to be swept into the East Greenland current and the whole sequence begins again, but with the values reversed.

The total length of this path of circulation is about 7,000 miles and the average velocity of the current is about 8 miles a day. This gives a period of 2.4 years for a change from warm to cold conditions in the Arctic, or 4.8 years for the complete cycle, which exactly coincide with the periodicity of ice conditions off Iceland as demonstrated by Meinardus.[3]

In regard to forecasting droughts the authors say:

> If pressure becomes persistently low over the Arctic regions, especially at Spitzbergen, the possibility of an approaching drought must be considered. If pressure is also low over the Tropics the chances are somewhat greater, especially if the position in the 11-year solar cycle is favorable and 4 years have elapsed since the last drought. If under these conditions pressure becomes high over the Urals or northern Russia, it appears highly probable that a drought will set in within the next few months. Unfortunately the last source of information is still closed to us.
>
> The conclusions reached in this paper require to be verified and extended by a similar study of exceptionally rainy periods.

DISCUSSION.

In the discussion that followed, Dr. G. C. Simpson made the interesting suggestion that an increase in the velocity of the whirl about the poles would result in a fall in pressure in the center and a rise on the margins. Thus, when the vortex in the atmosphere in the northern regions becomes intensified, the pressure in the polar regions is decreased while that in the surrounding belt is increased. This causes the Azores high pressure to move farther north and the movement of this high pressure alters the whole of the climatic conditions of England.

Doctor Simpson also remarked that the place to look for forecasts and the mechanism of the whole thing was in the upper atmosphere where the whirl is to be found. He also remarked that probably it would be found that the pressure changes are not localized in that part of the world in which the rainfall shows the greatest abnormalities.

[3] Ann. Hydrogr. Berlin, 34, 1906, pp. 148, 227, 278.

BRIEF DESCRIPTION OF A NEW DIAL FOR THE ANEROID.

By JOSÉ CARLOS MILLÁS, Director.

[Observatorio Nacional, Habana, Cuba, June 20, 1922.]

Facing always the difficulties of obtaining good observations from untrained observers, the idea of changing the usual dial of the aneroid barometer for a simpler one, such as could be read without trouble and without training, presented itself as a solution to the problem constantly encountered by the Observatorio Nacional of Cuba.

When a meteorological service has to depend on observations made by nontechnical observers, the greatest pains should be taken to insure accuracy with *the least possible* labor to the observer. Our experience of many years in receiving daily telegrams from such a class of observers compelled us to use the aneroid with the new dial.

The instrument for this purpose should be a good aneroid, with as large a dial as possible. All division lines are absent. Instead, a system of short words is inserted, say for every millimeter of pressure. In our instruments the circle described by the index hand is about 5 inches in diameter. The words were not well placed by the printer, as those dials were printed on bristol board; therefore, we had to determine the exact value of the space from word to word. (See fig. 1.)

These short words are so chosen that no confusion whatever is possible in the telegraphic transmission of the message. The observer sends the word nearest to the index or, if it falls between two words, both are sent at the same time as one word. In this manner, the instrument reads to half a millimeter (0.02 inch). Before reading, the observer should tap the instrument lightly. In our dials we place a sign that says: *Golpear el cristal antes de leer;* the observer on facing the instrument reads that the glass should be tapped lightly before reading, *a most necessary operation* with this class of instruments. This is the only weak point of the barometer, as the observer may forget to tap it lightly before reading. To avoid this, the instrument could be placed in a case with a small door, and a mechanism attached to it so that the instrument would be tapped mechanically by the opening of the door. Then the only thing the observer would have to do would be to read the word or words.

We take away the hand-moved index that usually accompanies this class of barometers; it is not needed and may introduce errors. The correction screw is covered so as to make the barometer foolproof.

The instruments are sent well packed to the observer *with a small spike and instructions for mounting it*, which in our case are the following:

INSTRUCTIONS FOR MOUNTING THE BAROMETER.

1. Mark your height on the wall where the instrument is to be placed.
2. Nail the small spike 8 centimeters above the mark, so as to place the center of dial at the same height of your eyes.

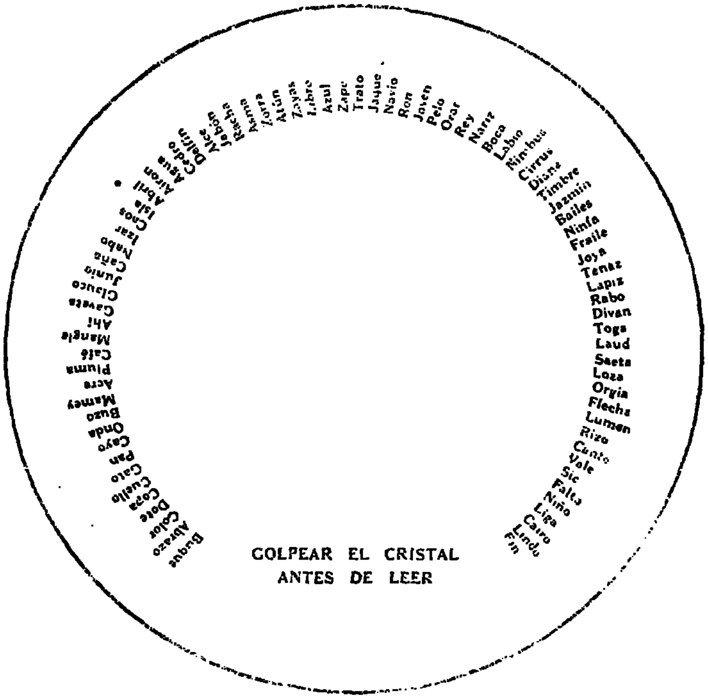

FIG. 1.—Dial for aneroid barometer used in the Cuban Meteorological Service.

Besides, in the letter to the future observer we recommend to him to place his head in such a position that he may see by reflection his eyes in the instrument, avoiding as far as possible parallactic errors.

The instruments are sent to any place without knowing the height above sea level. In fact, we do not care about this, as measures will be expressed finally to correspond to those of mercurial barometers, corrected for temperature, sea level, and normal gravity.

Of course, we have to depend on readings of mercurial barometers for the determination of the constant of each instrument. We proceed in the following manner:

Readings are taken at 7 a. m. and a value is assigned to the word sent each day from the isobar that crosses the place of the observer. In normal weather, 20 observations will suffice to eliminate all errors of drawing of isobars and give a very approximate value for a chosen word. For instance, suppose the observations sent are the following:

[Distance between words=1 mm.]

	Words received.	Value assigned.	Reduction to a chosen word on the basis of each value assigned.
June 1	toga	762.5	toga=762.5
June 2	togalaud	763.1	toga=762.6
June 3	laud	763.7	toga=762.7
June 4	toga	762.1	toga=762.1
June 5	divan	761.8	toga=762.8
June 6	divanrabo	761.1	toga=762.6
June 7	rabo	760.0	toga=762.0

The mean of 20 readings will give a fair value for the reading "toga" at this special place. Then all other values for the station are inserted and the instrument can then render service. Other determinations of the constant for the word chosen can be made from time to time.

We have found this to be the most economical and exact procedure of obtaining air pressure observations from nontechnical observers.

It might be mentioned that this device of introducing the code directly in the instrument could be utilized also in wind direction and velocity. We intend to do so in the future.

In developing this system the writer had the valuable assistance of Mr. Miguel Gutierrez Cenizos, observer of the Observatorio Nacional of Cuba.

THUNDERSTORMS OF JULY 13, 1922, IN THE DISTRICT OF COLUMBIA, MARYLAND, AND VIRGINIA.

By ALFRED J. HENRY, Meteorologist.

[Weather Bureau, Washington, D. C., August 15, 1922.]

The series of thunderstorms that occurred on July 13, 1922, as well as others which have been experienced during the present season, clearly lacked the usual evidence of a definite movement from one point of the compass to another that is a characteristic of thunderstorms in this vicinity. It has seemed rather that the storms have developed directly over the city and spread locally from that point as a center. The usual progression of thunderstorms in the vicinity of Washington is from the northwest to the southeast.

The object of this note is to ascertain whether the usual statistics on the occurrence of thunderstorms in the adjoining States of Maryland and Virginia would throw any light of a definitive character upon the progression of the thunderstorms of July 13, 1922.

Meteorological conditions.—At 8 a. m. of the date in question a trough of low pressure stretched from the mouth of the St. Lawrence southwestward to the Carolinas. This trough was flanked on either side by higher pressure, the level of the barometer at the center of the respective anticyclones being 30.30 inches. The winds were south to west in the trough and northerly on its western margin. The temperature at 8 a. m. at Washington, Baltimore, and in southeastern Pennsylvania was 80° or above and the humidity was relatively high, both conditions being favorable to the development of thunderstorms later in the day.

The beginning of the storm at Washington, D. C.—The first thunder was heard at 4 p. m. and rain began 5 minutes later. The local sky signs, however, indicated that preliminary thunderstorm activity had been in progress over the city for at least an hour. At 3:05 p. m. thunder was heard to the east of the station, but further development of this disturbance ceased. At 3:30 p. m. typical thunderstorm clouds appeared to the southwest and these thickened and apparently moved to the east; meanwhile the northwestern segment of the sky was devoid of thunderstorm clouds, although shortly before the storm broke a confused mass of clouds appeared in that part of the sky. At about 4 p. m. the electrical display, which had hitherto been confined to the south and east, appeared in the northwest and very quickly thereafter