MONTHLY WEATHER REVIEW

General Conditions

The two outstanding features of the month were the extraordinary hot spell that culminated on the 21st-22d in northeastern districts and the West Indian hurricane that passed inland over Florida and the East Gulf States on the closing days of the month.

High temperatures in northeastern districts were the result of what appears to have been a purely fortuitous succession of anticyclone and cyclone is anticyclone-cyclone-anticyclone, etc., etc. In this particular case the succession was different, viz, anticyclone-cyclone-anticyclone-anticyclone.

The wind-systems associated with these barometric formations as they move eastward along the border between Canada and the United States, as is well known, induce successively an indraft of warm air from the south in cyclones and cool air from the north in anticyclones; when, however, as in July 1926, a cyclonic wind system is immediately followed by a second cyclonic system there can be but one result, viz, an intensification of the temperature, and this is precisely what happened on the days in question.

The anticyclone which dissipated the heat wave arrived over the North Atlantic so timed as to prevent the West Indian hurricane from recurving to the north when the latter was off the east Florida coast and it was therefore forced to pass inland and soon to lose its tropical characteristics.

The usual details of the weather of the month follow and these are further illumined by the series of Charts Nos. I-VI.—A. J. H.

Cyclones and Anticyclones

By W. P. Day

The tracks of 15 low-pressure and 8 high-pressure areas were charted for the month of July. The feature of the month, however, was the West Indian hurricane of the 22d to 31st, which has been treated elsewhere in this Review. There were no other storms of more than slight intensity and the highs were generally inactive.

Free-Air Summary

By L. T. Samuels

The mean free-air temperatures for the month averaged close to their normal values, there being a rather marked tendency, however, for increasing positive departures to obtain at the upper levels at all aerological stations except Ellendale. The same was generally true for the vapor pressure, while the relative humidity departures were small and mostly of opposite sign to those for temperature. (Table 1.)

The most striking feature in Table 2 is the marked contrast between the resultant winds up to the 2,500 m. level at Ellendale and their normal directions for these levels. The unusually large number of days with deep easterly winds at this northern station made it impossible for the kites to attain their usual maximum altitudes.

It is of interest to note the prevalence of easterly winds reaching to the cirrus level and occasionally higher over the southeastern part of the country from the 18th to 22d, during which time exceedingly high surface temperatures occurred throughout the region. During this period the Bermuda high extended its influence over this area and pilot-balloon observations showed that the southerly winds in its rear sector did not veer with altitude and become westerly, but backed and shifted to easterly. One of the most interesting observations made during this period was the double theodolite observation on the 19th at Broken Arrow to a height of 14 km.; easterly winds of moderate velocity were found to prevail to this level.

What is believed to be a record altitude for a two-theodolite observation was made at Broken Arrow on the 3d. The balloon was followed with both theodolites for 122 minutes and a practically uniform rate of ascent (about 190 m. p. m.) continued during the first 100 minutes, at the end of which the height was 19 km. During the last 22 minutes, however, the rate of ascent decreased considerably (averaging only about 90 m. p. m.) and the greatest height reached was 21 km. Easterly winds of 12 m. p. s. prevailed at this altitude. The balloon was finally eclipsed by Ci. Cu. clouds. It was the very light winds, of course, which made it possible to follow the balloon for so long a time and to such a great height.

On the morning of the 29th Due West was situated in the northern sector of a tropical hurricane. Notwithstanding decidedly unfavorable conditions for a kite flight, owing to light rain, low clouds, and a rapid increase in wind velocity off the ground, a flight was started and 1,365 m. altitude above ground attained. The record revealed a deep cloud layer with its base only a few hundred meters above ground and extending higher than the maximum altitude reached by the kites. On the previous day (28th), i.e., before the tropical storm had reached Due West, the top of this cloud layer was found to be only 800 m. above ground. An examination of these records shows that while the free-air temperatures rose from the 28th to the 29th throughout an 800 m., air column, i.e., to the upper limit of the cloud layer on the 28th, above this level the temperatures were lower on the 29th than on the 28th. Of special interest is the fact that throughout this higher air column wherein condensation had occurred (as indicated by the increased thickness of the cloud layer by the 29th) an actual decrease in temperature from the previous day occurred despite the latent heat of condensation thus necessarily liberated. It is therefore rather strikingly shown that a pronounced lowering of the temperatures at elevations above 800 m. occurred with the arrival of the northern sector of this tropical disturbance. The observed temperatures on these days are shown in the following table:

<table>
<thead>
<tr>
<th>Altitude (m.)</th>
<th>Temperature (°C)</th>
<th>Altitude (m.)</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26h</td>
<td></td>
<td>26h</td>
</tr>
<tr>
<td>217 (surface)</td>
<td>22.3</td>
<td>1,000</td>
<td>17.5</td>
</tr>
<tr>
<td>250</td>
<td>20.5</td>
<td>1,250</td>
<td>19.8</td>
</tr>
<tr>
<td>300</td>
<td>21.0</td>
<td>1,500</td>
<td>16.7</td>
</tr>
<tr>
<td>350</td>
<td>20.6</td>
<td>2,000</td>
<td>13.9</td>
</tr>
</tbody>
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1 Extrapolated.