

toward a period of diminished heat, but rather an irregularity in the distribution of warm and cold years that suggests at once the absence of any system of compensation or any gradual progression from one extreme to the other. Studies of annual means, when broadened to include those from a number of stations scattered over the globe are not devoid of interest, though perhaps they have not as yet yielded results of immediate practical importance.

For the States bordering the Gulf and South Atlantic coasts continuous instrumental records of the temperature previous to 1870 are lacking, although a number of broken series are available. The degree of cold experienced before that date is naturally a matter of considerable uncertainty, and while we may form a general idea of the relative severity of the winters, we are prevented from making as full an examination of the matter as its importance demands.

Taking Florida as a concrete illustration, we find that at least four very disastrous freezes have occurred within the one hundred years ending with 1898. We are inclined to the opinion that the first one, viz, that of 1835, was the most severe. The State then escaped further visitation for a period of fifty-one years, or to January, 1886. The next period of immunity was comparatively brief, viz, seven years, or to December, 1894. Within two months of the last-named date, a second disastrous freeze occurred and there have been a number of dangerously low temperatures since.

The impression that the climate is changing is partly due to the fact that in recent times an account of every severe frost and freeze that occurs in the South is sent broadcast to all parts of the country, whereas, during earlier times no record was preserved except of the very severe freezes. This very lack of information respecting the earlier minor freezes prevents us in a measure from asserting in a more positive manner a rule of climate that appears to be common to all parts of the United States, viz, that periods of great refrigeration generally extend over several years. In support of this assertion, as affecting Florida, reference is made to the fact that the great freeze of 1835 was preceded by two severe winters, 1830-31 and 1831-32, and was immediately followed by a winter of more than average severity, 1836. The freeze of 1886 was preceded by a cold spell in January, 1884 (minimum at Jacksonville 21°), and the temperature fell to 22° at Jacksonville in January of 1887. The two freezes of the winter of 1894-95 were preceded by a cold wave in 1893, in which temperature fell to 24° at Jacksonville. All of this would seem to indicate, as above stated, that cold years are likely to be followed by years of similar character separated by one or more warm years, the complete cycle of events extending over from four to seven years; but we should not forget that this conclusion is not based on sufficient data to establish it firmly.

OBSERVATIONS AT RIVAS, NICARAGUA.

The records contributed for many years by Dr. Earl Flint, at Rivas, Nicaragua, include barometric readings. His present station is at 11° 26' N., 85° 47' W. The observations at 7:17 a. m., local time are simultaneous with Greenwich 1 p. m. The altitude of his barometer is 36 meters above sea level, but until the barometer has been compared with a standard it seems hardly necessary to publish the daily readings. The wind force is recorded on the Beaufort scale, 0-12. When cloudiness is less than $\frac{1}{10}$, the letter "F," or "Few," is recorded.

This station is situated on the western shore of Lake Nicaragua, not far from the eastern end of the western division of the Nicaragua Canal. The volcano Ometepe, on an island in Lake Nicaragua, is about 10 miles northeast of the station. Mr. Flint's records occasionally mention the presence of clouds in the early morning on the summit of this mountain.

Observations at Rivas, Nicaragua, November, 1898.

OBSERVATIONS AT 7:17 A. M. LOCAL (8 A. M. EASTERN STANDARD) TIME.

Date.	Temperature.		Wind.		Upper clouds.			Lower clouds.			Daily rainfall.
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.	
1.....	72	68	nw.	0	cs.-ck.	10	se.	.....	.....	.....	0.00
2.....	71	68	nw.	0	ck.	6	ne.	.....	.....	.....	0.00
3.....	72	69	nw.	0	cs.	10	se.	.....	.....	.....	0.00
4.....	74	71	se.	0	.....	.....	.....	k.	10	se.	0.06
5.....	77	73	se.	1	.....	.....	.....	ks.	Few	se.	0.00
6.....	78	74	ne.	1	cs.	1	ne.	.....	.....	.....	0.00
7.....	76	73	ne.	1	cs.	3	se.	.....	.....	.....	0.10
8.....	77	73	ne.	1	.....	.....	.....	k.	Few	ne.	2.76
9.....	77	74	ne.	1	.....	.....	.....	k.	10	ne.	0.04
10.....	77	73	ne.	2	cs.	5	se.	k.	5	ne.	0.04
11.....	77	74	ne.	1	c.	2	sw.	k.	2	ne.	1.23
12.....	77	75	ne.	0	cs.	8	e.	k.	8	ne.	1.77
13.....	75	74	ne.	2	.....	.....	.....	ks.	10	ne.	0.69
14.....	76	73	ne.	1	c.	5	se.	k.	5	ne.	0.00
15.....	76	74	ne.	2	.....	.....	.....	ks.	10	ne.	0.37
16.....	76.5	71	ne.	1	ck.	2	ene.	.....	.....	.....	0.33
17.....	76	73	ne.	3	.....	.....	.....	ks.	9	ne.	0.00
18.....	76	73	ne.	0	cs.	1	ne.	.....	.....	.....	0.00
19.....	76	73	ne.	2	cs.	3	ne.	.....	.....	.....	0.13
20.....	76	70	ne.	2	.....	.....	.....	ks.	10	ne.	0.00
21.....	76	73	ne.	2	.....	.....	.....	k.	Few	ne.	0.00
22.....	76	73	ne.	2	.....	.....	.....	k.	2	ne.	0.00
23.....	76	71	ne.	1	.....	.....	.....	k.	7	ne.	0.00
24.....	76	73	ne.	1	.....	.....	.....	k.	Few	ne.	0.00
25.....	76	72	ne.	2	c.	Few	se.	ks.	Few	ne.	0.00
26.....	76.5	73	ne.	1	.....	.....	.....	k.	Few	ne.	0.00
27.....	78	74	ne.	2	.....	.....	.....	ks.	10	ne.	0.86
28.....	77	73	ne.	1	.....	.....	.....	ks.	10	ne.	0.31
29.....	77	73	ne.	2	cs.	Few	ne.	k.	Few	ne.	0.00
30.....	76	71	ne.	3	cs.	Few	ne.	ks.	Few	ne.	0.00
Sums.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.19
Means.....	75.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Rainfall nearly twice the normal for November.

OBSERVATIONS AT 8:43 P. M. SEVENTY-FIFTH (8 P. M. LOCAL) TIME.

Date.	Temperature.		Wind.		Upper clouds.			Lower clouds.			
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.	
											°
1.....	75	72	w.	0.5	cs.-ck.	10	{nw. se.}	.....	.....	.....	.....
2.....	76	73	nw.	0	cs.	10	{nw. se.}	.....	.....	.....	.....
3.....	77	73	nw.	0	{cs. ck.}	10	{sw. ne.}	.....	.....	.....	.....
4.....	80	76	se.	1	c. ck.	6	se.	.....	.....	.....	.....
5.....	79	75	se.	0	ck.	10	se.	ks.	10	.....	.....
6.....	80	76	se.	2	cs.	10	se.	.....	.....	.....	.....
7.....	78	77	se.	0	.....	.....	.....	k.	10	.....	.....
8.....	78	75	se.	1	.....	.....	.....	k.	10	.....	.....
9.....	78	75	e.	0	.....	.....	.....	k.	10	se.	.....
10.....	77	74	se.	0	.....	.....	.....	k.	10	se.	.....
11.....	77	74	se.	0	.....	.....	.....	k.	10	se.	.....
12.....	77	76	ne.	1	.....	.....	.....	n.	10	ne.	.....
13.....	77	76	ne.	1	.....	.....	.....	n.	10	.....	.....
14.....	78	74	ne.	1	.....	0	.....	.....	0	.....	.....
15.....	78	74	ne.	2	.....	.....	.....	ks.	10	ne.	.....
16.....	77	73	ne.	2	.....	.....	.....	ks.	5	ne.	.....
17.....	77	74	ne.	0	.....	.....	.....	ks.	10	ne.	.....
18.....	78	74	ne.	0	.....	.....	.....	ks.	10	ne.	.....
19.....	77	72	e.	1	ck.	8	e. ne.	.....	.....	.....	.....
20.....	77	73	ne.	2	c.	Few	ne.	.....	.....	.....	.....
21.....	79	73	e.	1	cs.	Few	e.	.....	.....	.....	.....
22.....	78.5	75	e.	0	.....	0	.....	.....	0	.....	.....
23.....	80	74	e.	0	.....	0	.....	.....	0	.....	.....
24.....	78	73	ne.	1	.....	.....	.....	k.	6	ne.	.....
25.....	79	75	ne.	1	.....	.....	.....	k.	9	ne.	.....
26.....	79.5	75	e.	1	.....	.....	.....	k.	10	se.	.....
27.....	77	74	se.	1	.....	.....	.....	k.	10	.....	.....
28.....	76	73	e.	0	c.	7	e. ene.	.....	.....	.....	.....
29.....	78	74	ne.	2	cs.	8	.....	.....	.....	.....	.....
30.....	78	72	ne.	2	.....	.....	.....	ks.	9	ne.	.....
Means.....	78.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Mariano Bárcena, Director, and Señor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the monthly summaries