

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers, not reduced to standard gravity, and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart IV. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border.

The general configuration of the isobars on Chart IV is closely in accord with normal September conditions. It is to be noticed, however, that the geographic position of the area of highest pressure, usually on the Piedmont Plateau, was this year quite a distance inland, viz, over the Ohio Valley and Lake Region.

It is generally conceived that the September high in the eastern part of the United States is an extension of the great ocean high that stretches westward from the Azores between the thirty-fifth and fortieth parallels. The increase in pressure from August to September in the present case would seem to be greater over land areas than over adjacent water surfaces. The greatest increase occurred in the Lake Region and Ohio Valley, although there was a marked increase in all sections save portions of Montana, South Dakota, and the middle Plateau. Pressure was high at Bermuda, although the comparative increase was much less than at stations in the Ohio Valley. The numerical values of Tables I and III should be consulted for further details.

AREAS OF HIGH AND LOW PRESSURE.

By Prof. H. A. HAZEN.

During September there were nine highs and eleven lows of sufficient definiteness to be charted (see Maps I and II at the end of this REVIEW). The accompanying table gives the principal facts as to place of origin and disappearance, duration, length, and velocity of each high and low. In making up the mean data, low No. XI was omitted for the reason that there was only the beginning of a storm, it having been kept back and finally dissipated by the high to the north.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.....	1, a. m.	50	86	6, a. m.	39	79	Miles. Days.	Miles.	Miles.	
II.....	6, a. m.	49	87	9, p. m.	33	79	1,410 5.0	282	11.8	
III.....	7, p. m.	36	125	12, p. m.	41	68	2,040 3.5	583	24.3	
IV.....	10, p. m.	46	128	17, p. m.	26	82	3,420 5.0	684	28.5	
V.....	13, a. m.	38	125	18, a. m.	33	100	4,320 7.0	617	25.7	
VI.....	18, a. m.	52	117	23, a. m.	44	59	2,820 5.0	564	23.5	
VII.....	21, a. m.	43	110	24, a. m.	30	92	3,300 5.0	672	28.0	
VIII.....	22, a. m.	47	121	24, a. m.	44	111	1,440 3.0	480	20.0	
IX.....	25, a. m.	51	109	30, p. m.	36	73	720 2.0	360	15.0	
Total.....							21,900	41.0	4,689	
Mean of 9 tracks.....							2,443		521	21.7
Mean of 41 days.....									536	22.3
Low areas.										
I.....	1, a. m.	52	117	4, a. m.	53	101	1,140 3.0	390	15.8	
II.....	4, p. m.	54	108	11, a. m.	48	53	3,900 6.5	600	25.0	
III.....	10, p. m.	24	83	14, a. m.	34	99	1,260 3.5	360	15.0	
IV.....	10, p. m.	51	117	14, a. m.	47	59	2,700 3.5	739	32.9	
V.....	12, a. m.	51	124	18, a. m.	49	53	3,600 6.0	600	25.0	
VI.....	16, p. m.	54	114	21, a. m.	48	64	3,480 4.5	773	32.2	
VII.....	18, p. m.	47	125	21, a. m.	50	89	1,740 2.5	696	29.0	
VIII.....	30, a. m.	23	85	25, a. m.	48	59	2,680 5.0	516	21.5	
IX.....	23, p. m.	55	111	27, a. m.	49	57	2,580 3.5	737	30.7	
X.....	26, a. m.	53	121	30, p. m.	52	70	3,060 4.5	690	28.3	
XI*.....	27, a. m.	25	86	30, p. m.	28	86	600 3.5	171	7.1	
Total.....							26,100	42.5	6,131	
Mean of 10 tracks.....							2,610		613	25.5
Mean of 42.5 days.....									614	25.6

* Not used in final summary.

HIGHS.

In the first half of the month the general tendency of highs was along the northern border of the country; during the latter half their tendency was more across the country. The velocity of apparent motion was very slow at the opening and closing of the month, but one and a half to twice as fast in the middle.

Four highs began on the Pacific Coast, two in Montana, two over Lake Superior, and one in Wyoming. Six disappeared on the Atlantic Coast, one in Wyoming, one in Texas, and one on the middle Gulf Coast.

LOWS.

For the first time this season the conditions have been favorable for West India storms. The first of these, No. III, began to the north of Cuba on the 10th, p. m., though there had been a slight disturbance forming for several days previously. The storm traveled very slowly (15 miles per hour) a little to the north of west and finally disappeared in Texas morning of 14th. The lowest pressure noted was 29.58 off Galveston, p. m. of 12th. The heaviest rain in twenty-four hours was 1.12 inch at Mobile, p. m. of 12th, showing a rather remarkable deficiency, and possibly one reason for the rapid dissipation of the storm on reaching the land. The highest wind of the storm was at Port Eads, 72 miles per hour, northeast, a. m. of 12th, and the next highest was 42 miles at New Orleans, a. m. and p. m. of 12th. Another Gulf storm, No. VIII, began with a disturbance in the southeast Gulf before the 20th. Its motion was rather slow (21.5 miles) to a point a little east of north, reaching the Gulf of St. Lawrence, a. m. of 25th. The lowest pressure noted was 29.62 off Savannah, a. m. of 22d. Phenomenal rains attended this storm on the west Florida Coast and off the south Atlantic Coast, except in south Florida. Tampa reported 6.56 inches in twenty-four hours, a. m. of 21st; Jacksonville, 5.40 inches, p. m. of 21st; Savannah, 2.78 inches, a. m. of 22d, and Charleston, 1.48 inch, same date. Jupiter (170 miles from Tampa) had only 0.01 of an inch of rain, and the same amount fell at Key West. The highest wind was 50 miles per hour at Charleston, a. m. of 22d. In both of these storms all shipping and Gulf and south Atlantic ports received ample warning of high winds.

The third Gulf storm was first noted as a slight disturbance off west Cuba, a. m. of the 25th, the pressure at Habana having fallen off 0.10 in twenty-four hours. This disturbed condition practically continued in the east and southeast Gulf throughout the storm. Light rains were experienced. The highest wind, 48 miles northeast, was noted at Port Eads, a. m. of the 30th.

Aside from these Gulf storms, all the lows of the month had a trajectory north of this country. They all began to the north of Montana and Washington. No. I disappeared in Manitoba, No. VII to the north of Lake Superior, and all the rest over or very near Newfoundland.

The most remarkable characteristic of these lows has been their lack of rainfall. Leaving out of the count the coast stations, only ten have reported a fall of over 1 inch in twenty-four hours during the whole month. As low No. II was hovering over North Dakota the highest temperature ever experienced in September at Bismarck was noted, 102°, p. m. of the 7th. This low was followed in the same track by No. IV, and the two caused phenomenal heat in the middle and northern States about the Mississippi and Ohio valleys. On the 9th the highest temperatures ever noted in first ten days of September were reported from Alpena and Marquette.

Another marked peculiarity of these highs and lows was the lack of high winds. Many times during the month very steep barometric gradients between highs and lows occurred, but almost invariably without any high winds. Aside from

the coast stations, during the Gulf storms, the reports have shown quiet airs in general. The motion of cirrus has been remarkably uniform from west to east, except on the coasts. This has been due to the moderate character of the lows or to their lack of intensity, their influence rarely extending as high as cirrus.

LOCAL STORMS.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

There were very few severe local storms during the month. Two West India hurricanes crossed the Gulf and South Atlantic coasts, causing dangerous winds and destructive tides at a few points. The most serious disasters occurred on the Texas Coast about 7:30 p. m. of the 13th. Thirteen lives were lost and property to the value of \$150,000 was destroyed, the destruction being due to the combined forces of high winds and tides.

One low area storm moved from the upper Missouri Valley on the 14th to the Atlantic Coast, reaching the latter on the 17th. This disturbance was accompanied by severe thunder storms throughout the Missouri Valley, the Lake Region, and the Ohio Valley.

A West India hurricane passed northeastward across the Peninsula of Florida on the 20th, thence along the Atlantic Coast, finally disappearing south of New England on the 24th. The winds were not unusually dangerous, although considerable damage was done to exposed property on the beach. Reports from vessels that encountered the storm indicate that its center was several hundred miles east of the coast line.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The temperature was below normal on the Pacific Coast and in Florida, and there were also slight deficiencies in New Jersey, New York, and generally throughout New England. Elsewhere the month was unusually warm, especially so in the States of Iowa, Illinois, Missouri, Kansas, Nebraska, North Dakota, South Dakota, and Minnesota. In this large region the DAILY excesses of temperature exceeded 5° on the average of the month. Maximum temperatures, ranging from 90° to 100°, prevailed almost continuously from the 1st to the 16th. Prostrations, and in a few cases deaths, due to the extreme heat occurred in Chicago on the 9th, 10th, 11th, 13th, 14th, and 15th. The unusual heat was coupled with clear skies, southwesterly winds, and a low degree of humidity, conditions which are not especially hurtful to the human organism, however injurious they may be to vegetable life. Cool nights in many localities greatly lessened the discomfort of the heat. Serious bodily discomfort is rarely experienced except when the minimum temperature, or the temperature of nighttime, does not fall below 75°. It will be noticed that in the majority of cases in the table following that the temperature of nighttime fell to or below 75°; also, that the temperature of evaporation and the relative humidity were low, except in a few cases. No prostrations by heat were reported from the harvest fields or in the smaller towns and cities.

On the 14th an area of cloud and rain formed in Kansas and Nebraska and passed eastward, reaching the Atlantic Coast on the 17th, bringing relief from the unseasonable temperatures that had prevailed since the first of the month. The temperature rose after the passage of the storm, and the month closed with temperatures generally above the normal.

The mean temperatures and the departures from the normal, as determined from records of the maximum and minimum thermometers, are given in Table I for the regular stations of the Weather Bureau, which also gives the height of the

thermometers above the ground at each station. The mean temperature is given for each station in Table II, for voluntary observers.

Climatic statistics during the continuance of the hot weather.

CHICAGO, ILL.

September, 1897.	Max. temp.	Min. temp.	Wet thermometer.		Relative humidity.		Daily wind movement.
			8 a. m.	8 p. m.	8 a. m.	8 p. m.	
1	71	65	60	67	60	66	344
2	69	64	63	65	68	65	307
3	71	66	63	66	78	61	401
4	76	62	58	68	65	75	405
5	85	64	59	67	66	40	393
6	85	71	61	68	52	66	344
7	84	69	60	66	52	53	361
8	92	74	62	70	45	41	389
9	94	73	63	66	48	32	363
10	94	70	63	68	52	54	361
11	73	67	68	68	90	93	390
12	86	70	69	72	82	77	223
13	82	72	63	70	54	86	308
14	91	72	71	70	66	44	258
15	91	74	67	77	64	64	491
16	81	64	70	62	63	66	361
Mean	83	68	64	68	66	65	361

BISMARCK, N. DAK.

1	74	54	58	66	87	65	294
2	96	62	64	69	89	33	306
3	100	75	64	65	50	24	422
4	84	61	58	60	74	20	210
5	87	54	48	62	43	30	260
6	90	60	57	68	79	43	312
7	102	58	57	64	86	18	154
8	100	62	60	65	42	52	363
9	67	49	46	53	79	42	373
10	63	48	45	54	79	55	198
11	86	56	54	67	80	49	231
12	78	55	57	58	87	41	141
13	83	56	50	70	65	67	255
14	84	61	62	57	78	32	276
15	63	42	43	43	86	90	241
16	58	32	31	46	85	58	167
Mean	82	55	53	60	74	45	251

OMAHA, NEBR.

1	99	74	67	72	70	36	216
2	97	73	68	70	78	30	178
3	94	71	66	69	73	28	272
4	96	70	64	69	61	24	268
5	98	78	68	70	50	88	240
6	93	71	64	67	66	28	227
7	92	69	64	70	70	40	248
8	90	72	66	69	69	39	277
9	92	72	68	70	73	44	195
10	84	61	58	72	79	78	108
11	86	67	67	74	92	63	125
12	93	73	69	72	84	49	122
13	93	73	65	69	67	28	143
14	86	72	67	70	70	54	232
15	86	68	68	74	95	72	109
16	76	50	49	50	76	44	338
Mean	91	69	65	69	73	46	205

ST. LOUIS, MO.

1	96	75	70	73	78	42	161
2	94	75	68	74	65	46	106
3	93	72	68	73	75	54	194
4	91	67	63	67	70	36	160
5	93	70	64	67	70	34	158
6	98	68	67	68	82	35	136
7	95	71	62	72	48	41	151
8	95	74	69	68	67	32	156
9	96	74	66	68	60	33	164
10	96	75	66	70	62	36	154
11	95	77	69	73	65	54	140
12	98	74	68	67	64	27	86
13	95	74	66	73	57	49	146
14	96	73	69	72	74	44	180
15	98	75	70	73	74	42	206
16	91	69	71	70	63	34	289
Mean	95	73	67	70	66	43	164

The monthly mean temperatures published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary