levels, 0.5° colder at 12,000 m., 3.5° colder at 13,000 m. and 8.3° colder at 14,000 m., while at Minneapolis, Sault Ste. Marie, and at St. Louis, temperatures were lower than in May at the higher two of these three levels. At four other stations in the eastern half of the United States and at the Atlantic station No. 1, the mean free-air temperature was colder than in May at the 14,000 m. level. The mean free-air temperatures at all stations in the United States were colder in June than in May at the next four higher 1,000 m. levels. At the two Alaska stations and at the Atlantic station No. 2 the temperatures were warmer than in May at these four levels.

At the 1,000 m. and the 2,000 m. levels mean free-air temperatures were higher in June of this year than in June 1939 over the western one-third of the United States and over the northern half of the Central States, and were lower over the eastern one-third of the country and over the southern half of the Central States. At the 3,000, 4,000 and 5,000 m. levels the mean free-air temperatures for June this year were also higher than last year over the western one-third of the United States and over the northern half of the Central States except at San Diego where the temperatures were lower at the upper two of these levels. Temperatures were lower over the eastern third of the country and over the southern half of the Central States except at Oklahoma City and El Paso where it was warmer than last year at the 5,000 m. level. At still higher levels no well defined change from the temperatures of last year was evident.

The altitude of the level of mean freezing temperature was higher over the plateau than over the Eastern States at corresponding latitudes. The altitude of this level of mean 0° C. temperature was about 3,100 m. at Sault Ste Marie, 4,000 m. at Joliet, 4,400 m. at Atlanta, 4,600 m. at Miami, 4,600 m. at Denver, 4,900 m. at Phoenix, 3,500 m. at Seattle, and 4,400 m., at Boise. The altitude of the average freezing level was higher in June than in May, being about 1,000 higher over that part of the country north of 45° N. Latitude and about 500 m. higher over the area south of 35° N.

The coldest recorded free-air temperature in June (not shown on table I) was −79.2° C. (−110.6° F.) which occurred near the 15,000 m. level over Miami. The absolute minimum temperatures were higher to the northward, the absolute minimum during the month for that part of the United States lying between 30° and 40° N. latitude being −77.4° C. (−107.3° F.) at Charleston near the 16,000 m. level while for the area north of 40° the corresponding minimum, −72.9° C. (−99.2° F.) occurred at Lakehurst, near the 15,000 m. level. In Alaska the absolute minimum for the month at Fairbanks was −60.4° C. (−83.9° F.) near the 11,000 m. level and at Juneau was −59.8° C. (−75.6° F.) near the 12,000 m. level.

Tropopause data for June showing the mean altitudes and temperatures of the tropopause at various stations is shown in table 4 and on chart XIII.

Table 3 shows the maximum free-air wind velocities and their directions for various sections of the United States during June, as determined by pilot-balloon observations. The extreme maximum for the month was 63 m. p. s. (141 m. p. h.) reported on June 15 from the W. over Sault Ste. Marie at a height of 10,650 meters (over 6½ miles) above sea level. This extreme free-air velocity was, however, 10 m. p. s. lower than the corresponding extreme for June in 1939.

MEAN ISENTROPIC CHART [1]

The dominant feature on the mean isentropic chart for June 1940 (θ=312° A.) was the large anticyclonic eddy which prevailed over the Gulf of Mexico and the Gulf States. Of less significance was the smaller anticyclonic system over the central part of the country.

A comparison with the precipitation chart reveals that the more westerly anticyclonic eddy did not produce extensive departures from normal; evidently the low relative humidities necessitated too much lifting for excess rain. Also, there is no apparent relation between the excess precipitation west of the lakes and the flow pattern in the 312° A. isentropic chart.

However, the moist tongue, which was present over the western Gulf States, did produce excess precipitation in some areas, while the occasional deficits along the Gulf coast were probably caused by invasions of the dry air.

CORRECTION IN PREVIOUSLY PUBLISHED DATA

Pressures shown in Table 1, May 1940, for Atlantic station No. 2 for the levels from 12,000 m. to 20,000 m., inclusive, were in error and should be corrected to read: 201 mb., 171 mb., 145 mb., 123 mb., 105 mb., 89 mb., 76 mb., 64 mb., and 55 mb., respectively, for these levels.

All temperatures shown in table 4 for the months of March, April and May 1940 should be negative instead of positive as printed.

[1] Prepared by the Research Division.

TABLE 1.—*Mean free-air barometric pressure (P.) in millibars, temperature (T.) in degrees Centigrade, and relative humidities (R. H.) in percent, obtained by airplanes and radiosondes during June 1940*

Stations and elevations in meters above sea level

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,620 m.)				Atlanta, Ga. (300 m.)				Billings, Mont. (1,089 m.)				Bismarck, N. Dak. (505 m.)				Boise, Idaho (864 m.)				Buffalo, N. Y. (220 m.)				Charleston, S. C. (14 m.)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
Surface	30	838	21.2	40	30	982	21.6	81	30	890	17.7	56	30	954	15.3	71	30	914	19.1	40	30	987	15.5	84	30	1,015	23.0	92
500					30	959	21.8	74													30	955	16.3	71	30	960	22.6	72
1,000					30	906	19.7	73					30	900	17.5	57	30	900	23.0	36	30	900	14.3	71	30	906	20.2	68
1,500					30	855	16.6	75	30	849	17.7	50	30	849	15.3	55	30	850	21.6	30	30	848	11.2	72	30	855	17.0	66
2,000	30	802	20.6	41	30	806	13.4	74	30	800	14.8	50	30	800	12.8	53	30	802	17.8	30	30	798	8.3	69	30	806	13.9	61
2,500	30	756	17.6	41	30	759	10.5	70	30	754	11.4	51	30	753	9.7	54	30	755	13.8	32	30	752	5.6	64	30	759	11.2	57
3,000	30	713	13.9	42	30	714	7.6	66	30	710	7.9	53	30	709	6.2	55	30	711	10.0	33	30	706	2.9	60	30	715	8.5	57
4,000	29	632	6.3	47	29	632	1.9	62	29	628	1.0	55	29	627	0.0	50	29	630	3.3	33	29	624	−2.0	54	30	633	3.0	55
5,000	29	559	−1.6	52	29	558	−3.4	60	29	554	−6.3	55	29	552	−6.1	45	29	556	−4.0	31	29	550	−7.7	49	30	559	−2.6	52
6,000	29	492	−8.8	54	29	491	−9.0	58	29	486	−13.5	54	29	486	−12.4	43	29	489	−11.0	33	29	483	−13.8	45	30	492	−8.3	46
7,000	29	432	−15.7	54	28	431	−15.7	54	29	426	−20.7	50	28	425	−19.6	40	28	429	−17.9	34	29	422	−20.6	41	30	432	−14.5	43
8,000	29	378	−23.3	52	27	377	−22.6	54	28	371	−28.3	48	28	371	−27.4	37	28	374	−25.7	34	28	368	−28.0	40	30	378	−21.4	41
9,000	29	328	−30.9	51	27	328	−30.0	52	28	322	−36.6	49	27	322	−35.5	36	27	325	−33.9	34	26	319	−35.6	39	30	329	−28.8	40
10,000	29	285	−39.1	50	27	284	−37.8	51	28	278	−44.7		24	278	−43.3		27	281	−41.8		26	276	−42.4		30	286	−36.6	44
11,000	29	246	−47.1		26	245	−45.7		28	239	−51.9		23	239	−50.7		26	242	−49.0		25	238	−48.0		30	246	−44.9	
12,000	28	211	−54.4		26	211	−53.1		28	204	−56.6		21	204	−56.3		26	208	−54.8		24	204	−53.2		29	212	−52.3	
13,000	28	180	−58.9		26	180	−59.3		26	174	−58.9		21	174	−58.4		26	178	−56.5		23	174	−57.6		29	181	−58.7	
14,000	28	154	−61.2		25	153	−64.0		25	149	−59.7		19	148	−57.8		25	151	−57.7		23	148	−60.0		29	154	−63.7	
15,000	28	131	−63.0		24	130	−67.2		23	126	−60.1		18	126	−57.5		25	129	−58.9		21	126	−60.2		29	131	−67.0	
16,000	28	111	−64.2		24	110	−69.1		20	108	−60.5		17	108	−58.3		25	110	−59.7		19	108	−60.1		27	111	−68.6	
17,000	27	94	−64.5		23	93	−69.3		16	92	−60.5		17	92	−58.0		23	94	−59.7		17	92	−60.4		26	94	−67.8	
18,000	26	80	−64.4		23	79	−67.8		15	78	−59.2		13	78	−57.0		18	80	−59.3		12	78	−59.5		26	79	−66.4	
19,000	21	68	−62.8		19	67	−64.8		13	66	−57.8		11	67	−56.2		11	68	−57.9		10	66	−57.8		18	67	−63.6	
20,000	11	57	−60.6		12	57	−61.8						6	56	−54.9						6	56	−56.9		16	57	−61.0	
21,000	5	49	−58.7																		6	48	−55.4		8	49	−59.6	
22,000																					5	41	−54.7		5	41	−58.5	

Stations and elevations in meters above sea level

Altitude (meters) m. s. l.	Denver, Colo. (1,616 m.)				El Paso, Tex. (1,193 m.)				Ely, Nev. (1,908 m.)				Fairbanks, Alaska (153 m.)				Joliet, Ill. (178 m.)				Juneau, Alaska (49 m.)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
Surface	29	839	17.3	51	30	880	23.8	40	30	810	14.8	32	30	991	17.6	54	29	992	17.0	83	30	1,010	12.0	77
500													30	952	15.3	52	29	956	19.5	68	30	957	9.3	77
1,000													30	897	11.6	54	29	901	17.0	70	30	901	5.8	79
1,500					30	850	23.5	40					30	844	7.4	60	29	850	13.6	73	30	847	2.2	83
2,000	28	802	18.2	45	30	802	20.6	40	30	801	17.9	29	30	794	3.5	66	29	800	10.4	77	29	796	−1.2	85
2,500	28	756	15.6	44	30	757	16.9	42	30	756	17.4	29	29	747	−0.1	71	29	754	8.0	73	29	747	−4.1	83
3,000	28	712	12.3	44	30	713	13.3	45	30	712	13.5	29	29	701	−3.9	75	29	709	5.3	66	28	701	−6.5	77
4,000	28	631	5.1	50	30	633	5.6	50	30	631	5.5	31	29	617	−10.4	71	28	627	0.1	52	28	616	−11.8	67
5,000	28	558	−2.2	48	30	559	−1.5	49	30	558	−2.7	33	29	541	−17.0	67	28	553	−5.7	48	27	540	−18.1	61
6,000	28	491	−9.6	50	29	492	−8.9	50	30	491	−10.2	34	29	472	−24.1	65	28	486	−11.7	45	27	472	−25.2	60
7,000	28	431	−16.7	49	29	432	−15.5	46	30	431	−17.6	35	29	411	−32.4	64	25	426	−18.8	43	27	410	−32.8	60
8,000	28	376	−24.0	47	29	378	−22.5	44	30	376	−25.5	33	29	356	−40.0		24	372	−26.2	42	25	355	−40.3	
9,000	27	327	−31.8	47	29	329	−30.1	42	30	326	−33.8	32	29	307	−47.6		23	323	−33.6	42	24	306	−47.3	
10,000	27	283	−39.5	45	28	285	−38.2		30	282	−41.8		28	263	−53.9		23	279	−41.3		23	262	−51.9	
11,000	27	244	−47.3		28	246	−46.6		30	243	−48.9		28	226	−55.2		22	241	−49.1		21	225	−50.4	
12,000	26	210	−53.9		28	212	−54.0		30	208	−54.8		28	193	−50.5		22	206	−55.8		19	193	−47.6	
13,000	26	179	−58.2		28	180	−59.4		29	178	−58.5		28	165	−47.7		22	176	−60.7		19	166	−46.6	
14,000	25	152	−60.6		28	154	−62.6		28	152	−60.3		26	142	−46.9		21	150	−63.3		18	142	−46.3	
15,000	21	130	−61.8		28	130	−64.9		27	129	−61.5		26	122	−46.6		20	127	−63.5		17	122	−46.5	
16,000	20	110	−62.7		28	111	−67.0		27	110	−62.6		26	105	−46.4		19	108	−63.2		14	105	−46.8	
17,000	20	93	−63.0		27	94	−67.8		27	94	−62.8		25	90	−46.2		16	91	−62.8		13	90	−46.8	
18,000	16	79	−61.4		20	79	−66.5		21	80	−61.5		23	78	−45.8		13	78	−61.7		12	78	−46.8	
19,000	8	67	−60.5		12	67	−64.5		15	68	−59.7		21	67	−45.4		11	66	−60.2		6	67	−46.8	
20,000	7	56	−59.1										12	57	−45.2		6	56	−58.4					
21,000													6	44	−44.9									

Stations and elevations in meters above sea level

Altitude (meters) m. s. l.	Lakehurst, N. J.[1] (39 m.)				Medford, Oreg. (401 m.)				Miami, Fla. (4 m.)				Minneapolis, Minn. (263 m.)				Nashville, Tenn. (180 m.)				Norfolk, Va.[1 2] (10 m.)				Oakland, Cal. (2 m.)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
Surface	30	1,009	15.5	88	30	968	19.7	50	30	1,017	24.5	90	29	981	18.3	74	30	994	21.2	81	29	1,016	21.9	79	29	1,013	14.7	82
500	30	956	16.9	61	30	957	20.2	48	30	961	23.1	83	29	954	18.8	66	30	958	21.6	71	29	960	21.4	61	29	956	15.5	74
1,000	30	902	15.0	58	30	902	18.5	46	30	908	20.7	74	29	900	16.6	62	30	905	19.2	68	28	906	19.0	59	29	901	20.7	43
1,500	30	850	12.3	58	30	851	15.5	48	30	856	18.0	67	29	849	13.4	64	30	854	16.1	69	28	854	15.4	62	29	851	19.5	36
2,000	30	800	9.5	55	30	802	13.2	47	30	807	15.3	63	29	800	10.8	62	30	805	13.4	69	27	805	11.6	63	29	802	16.8	32
2,500	30	753	6.8	52	30	755	11.6	41	30	761	12.7	59	29	752	8.2	57	30	758	10.6	68	27	758	8.4	61	29	756	13.8	28
3,000	30	708	4.5	49	30	711	9.0	40	30	717	10.0	57	29	708	5.4	52	30	714	8.1	65	27	714	5.2	60	29	712	10.6	25
4,000	29	625	−0.5	43	30	630	2.8	36	30	635	3.8	54	27	626	−0.1	49	30	632	2.7	59	26	631	−0.2	49	29	631	4.0	23
5,000	29	550	−6.1	42	29	556	−3.9	36	29	561	−1.8	52	26	552	−6.0	45	29	558	−3.0	53	22	556	−5.7	40	29	557	−2.9	23
6,000	29	484	−12.0	40	29	489	−10.4	37	29	494	−7.3	51	25	485	−12.4	43	29	491	−8.7	48					29	490	−9.5	20
7,000	29	424	−18.4	45	29	429	−17.8	36	27	434	−13.1	52	23	425	−19.3	41	29	431	−15.2	47					29	430	−16.9	19
8,000	29	370	−25.6	44	29	374	−25.9	35	26	380	−19.8	53	23	371	−27.0	38	29	376	−22.3	47					29	376	−24.8	19
9,000	29	323	−33.1	46	29	324	−34.1	35	25	331	−27.3	51	18	322	−34.7	37	29	328	−29.9	47					29	326	−32.9	19
10,000	28	278	−40.0	33	29	281	−42.2		25	287	−35.1	51	17	279	−42.2		29	284	−37.7	48					29	283	−40.6	
11,000	27	240	−47.0		28	242	−49.4		25	249	−42.9		16	240	−49.1		29	245	−45.4						27	244	−48.0	
12,000	26	206	−53.8		28	207	−55.3		25	214	−50.9		13	206	−54.9		29	211	−52.1						27	209	−54.6	
13,000	25	176	−59.0		27	177	−59.4		24	183	−58.4		12	176	−59.4		29	180	−57.7						27	178	−58.8	
14,000	24	150	−62.0		27	150	−60.3		24	156	−64.7		11	149	−60.4		29	154	−62.6						27	152	−60.8	
15,000	22	128	−60.4		25	128	−61.6		23	132	−69.6		11	127	−59.4		29	130	−64.6						26	129	−62.5	
16,000	19	109	−60.1		20	109	−62.1		23	111	−71.5		10	108	−59.1		29	111	−65.4						26	110	−63.5	
17,000	16	92	−59.1		20	92	−61.9		23	94	−71.6		9	92	−58.6		29	94	−65.6						26	93	−63.5	
18,000	13	78	−57.5		18	78	−60.9		23	79	−68.8		6	78	−58.0		28	79	−64.7						23	79	−62.5	
19,000	12	66	−55.5		13	66	−60.1		18	67	−65.9		5	66	−57.7		25	68	−63.0						18	67	−61.2	
20,000	6	56	−52.9		6	56	−58.1		9	57	−62.3						25	57	−60.3						11	57	−59.1	
21,000	5	48	−50.3														12	49	−57.8						6	48	−57.3	
22,000																	7	42	−55.6									

See footnotes at end of table.

TABLE 1.—*Mean free-air barometric pressure (P.) in millibars, temperature (T.) in degrees Centigrade, and relative humidities (R. H.) in percent, obtained by airplanes and radiosondes during June 1940*—Continued

Altitude (meters) m. s. l.	Oklahoma City, (391 m)				Omaha, Neb. (301 m)				Pearl Harbor, T. H.[1 2] (6 m)				Pensacola, Fla.[1] (24 m)				Phoenix, Ariz. (339 m)				Portland, Maine (19 m)				St. Louis, Mo. (171 m)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
Surface	30	968	20.9	78	30	978	21.0	69	30	1,015	23.1	83	30	1,014	24.9	82	30	968	29.4	26	30	1,010	12.8	86	30	994	21.8	74
500	30	956	21.6	71	30	956	21.1	64	30	960	21.5	78	30	960	22.4	73	30	951	32.0	24	30	954	14.5	76	30	957	22.3	66
1,000	30	903	20.5	65	30	902	19.1	60	30	906	18.1	80	30	906	19.4	68	30	899	30.4	22	30	900	12.6	74	30	903	19.5	67
1,500	30	852	18.0	64	40	851	16.4	61	30	854	15.2	81	30	855	16.3	66	30	850	27.0	22	30	848	10.3	73	30	852	16.2	72
2,000	30	803	15.3	61	30	802	14.0	61	30	805	13.2	70	30	806	13.6	61	30	803	23.1	24	30	798	7.7	73	30	803	13.4	72
2,500	30	757	12.4	61	30	756	11.3	59	30	759	12.8	45	30	759	10.9	54	30	757	18.9	26	30	751	5.4	69	30	757	11.1	64
3,000	30	713	9.4	58	30	712	8.5	55	30	715	11.9	28	30	715	8.2	52	30	714	15.1	28	30	706	3.0	65	30	712	8.4	60
4,000	30	631	3.1	58	30	630	2.3	52	30	634	7.2	19	30	633	2.5	44	30	634	7.4	31	30	624	−2.7	61	30	631	2.7	55
5,000	30	558	−3.4	57	30	556	−4.2	48					30	559	−3.1	42	30	560	−0.2	35	30	549	−8.2	57	30	557	−3.6	53
6,000	30	491	−9.5	51	29	489	−10.7	46					30	492	−8.6	42	30	494	−7.8	36	29	482	−14.5	50	30	490	−9.6	53
7,000	30	430	−16.2	47	28	429	−17.3	40					29	432	−15.1	40	30	434	−15.1	36	29	422	−21.2	47	30	430	−16.1	50
8,000	30	376	−23.2	46	28	375	−24.1	39					25	377	−22.2	39	30	379	−22.8	34	29	366	−28.5	44	30	376	−23.2	48
9,000	30	327	−31.0	45	27	326	−31.8	38					25	328	−29.4	42	29	330	−30.9	33	29	318	−35.9	43	30	327	−30.8	46
10,000	30	284	−38.9	44	26	283	−39.4	38					25	285	−36.9	41	29	286	−38.8	32	29	275	−42.5		29	283	−38.7	47
11,000	30	244	−46.6		25	244	−46.8						24	246	−44.5		28	247	−46.4		29	237	−48.5		28	244	−46.4	
12,000	30	210	−54.0		25	209	−53.5						16	212	−52.2		28	212	−52.9		29	203	−53.6		27	210	−53.2	
13,000	26	179	−59.7		25	179	−59.0						16	181	−59.3		27	181	−57.5		28	174	−57.4		27	179	−58.8	
14,000	26	152	−63.0		25	152	−61.6						15	154	−64.3		25	154	−60.7		28	148	−59.0		27	152	−61.5	
15,000	25	129	−64.2		24	130	−60.7						12	131	−67.1		23	131	−63.3		28	126	−59.1		26	129	−62.7	
16,000	22	110	−65.3		24	110	−60.9						9	111	−68.7		22	111	−65.6		27	108	−59.1		25	110	−63.2	
17,000	21	93	−65.8		22	94	−61.2						6	95	−69.2		19	94	−66.4		25	92	−58.8		25	94	−63.2	
18,000	16	78	−64.5		22	80	−60.5						6	80	−68.9		16	80	−66.4		20	78	−57.9		20	79	−62.3	
19,000	15	67	−62.1		20	68	−59.0						5	68	−66.6		13	68	−63.9		13	67	−56.6		19	67	−60.3	
20,000	5	56	−58.9		9	58	−57.0										7	57	−61.3		7	57	−54.5		16	57	−58.5	
21,000																									10	49	−56.4	

Altitude (meters) m. s. l.	San Antonio, Tex. (174 m.)				San Diego, Calif.[1] (19 m.)				S. S. Marie, Mich. (221 m.)				Seattle, Wash.[1] (27 m.)				Spokane, Wash. (598 m.)				Washington, D. C.[1] (7 m.)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
Surface	30	993	23.4	80	29	1,010	16.8	84	30	984	10.8	87	25	1,015	15.3	68	29	944	18.6	46	30	1,014	19.7	81
500	30	957	22.5	77	29	954	13.9	81	30	952	12.4	78	25	960	14.3	53					30	957	19.1	64
1,000	30	903	20.8	73	29	900	18.9	46	30	897	12.1	71	24	905	12.7	49	29	901	19.5	40	30	903	17.0	62
1,500	30	853	18.4	69	29	849	19.9	25	20	845	9.6	70	24	852	9.7	53	29	850	16.2	38	30	851	14.3	63
2,000	30	804	15.8	67	29	801	18.3	25	30	795	6.7	71	24	802	6.7	55	29	801	12.2	40	30	802	11.3	64
2,500	30	758	13.1	65	29	755	16.0	25	30	748	3.7	70	24	754	4.3	49	29	754	8.3	43	30	755	8.6	61
3,000	30	714	10.6	60	28	712	12.7	26	30	703	1.0	67	34	709	2.5	40	29	709	4.6	44	30	711	5.9	62
4,000	30	632	4.6	57	27	631	5.2	24	30	620	−4.6	65	24	626	−2.4	40	29	627	−1.4	43	30	628	0.6	56
5,000	29	559	−1.7	56	26	558	−2.2	21	30	546	−10.5	57	24	551	−8.2	43	28	552	−7.7	41	30	554	−4.7	54
6,000	29	492	−8.0	54	25	491	−9.5	27	30	478	−16.9	54	24	483	−15.0	52	28	485	−14.3	42	29	487	−10.5	54
7,000	29	432	−14.6	51	23	431	−17.4	35	30	418	−23.7	51	24	423	−21.9	59	28	424	−21.3	43	29	427	−16.6	54
8,000	28	378	−21.9	47	22	376	−25.4		30	364	−30.6	48	23	368	−29.2	66	28	369	−29.0	44	19	373	−23.6	55
9,000	28	329	−29.3	46	22	327	−33.1		30	315	−37.7	46	20	320	−36.5	61	28	320	−36.9	44	19	324	−31.0	50
10,000	26	286	−36.9	46	22	283	−40.9		30	272	−44.1		18	276	−43.8		28	277	−44.8		18	281	−36.6	48
11,000	26	246	−44.7		21	244	−47.9		28	234	−49.7		14	238	−50.5		27	238	−51.9		16	243	−42.4	
12,000	26	212	−51.8		21	209	−54.3		28	201	−54.6		11	204	−55.1		26	204	−56.1		12	208	−49.0	
13,000	24	181	−57.5		19	179	−59.4		27	171	−57.3		9	175	−57.0		25	174	−56.6		9	178	−53.9	
14,000	23	154	−61.9		17	152	−62.9		26	146	−57.3		9	149	−59.0		23	148	−56.4		7	152	−57.6	
15,000	23	131	−64.5		16	129	−65.0		23	125	−57.4		6	128	−60.4		23	127	−57.1		6	129	−59.6	
16,000	23	112	−66.4		15	110	−66.6		19	107	−57.5		6	109	−61.5		22	108	−57.5					
17,000	22	94	−67.1		14	94	−67.0		15	91	−57.3		5	93	−61.4		18	92	−57.2					
18,000	21	80	−66.1		13	80	−65.9		13	78	−56.4						17	78	−56.5					
19,000	17	68	−63.9		12	68	−64.3		5	66	−55.1						12	67	−55.1					
20,000	13	58	−61.2		7	57	−62.4																	
21,000	6	49	−58.3																					

Altitude (meters) m.s.l.	Atlantic station No. 1[3] (5 m.)				Atlantic station No. 2[4] (5 m.)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
Surface	30	1,016	21.0	83	30	1,019	18.0	85
500	30	959	17.4	83	30	962	14.9	84
1,000	30	904	14.9	78	30	906	12.6	78
1,500	30	852	12.8	72	30	854	11.0	70
2,000	30	803	10.5	69	30	804	9.1	62
2,500	30	756	8.3	64	30	756	6.9	58
3,000	30	711	5.9	59	29	712	4.4	53
4,000	30	629	0.8	55	29	629	−1.1	49
5,000	30	555	−4.8	49	29	554	−6.8	46
6,000	30	488	−10.5	46	29	486	−13.1	44
7,000	29	428	−16.9	46	29	426	−19.9	42
8,000	28	374	−24.1	46	29	371	−27.6	41

Altitude (meters) m.s.l.	Atlantic station No 1[3] (5 m.)				Atlantic station No. 2[4] (5 m.)			
	Number of obs.	P.	T.	R. H.	Number of obs.	P.	T.	R. H.
9,000	28	325	−31.4	46	28	322	−35.0	42
10,000	28	282	−39.4	44	27	279	−42.7	
11,000	28	243	−46.6		27	240	−50.1	
12,000	26	208	−53.3		27	205	−55.9	
13,000	26	178	−59.1		26	175	−59.5	
14,000	26	152	−62.2		25	149	−59.9	
15,000	23	129	−62.0		23	127	−59.1	
16,000	20	110	−61.4		22	108	−58.8	
17,000	20	93	−61.2		22	92	−58.2	
18,000	18	79	−60.4		20	78	−57.3	
19,000	16	67	−58.9		15	67	−56.1	
20,000					6	56	−55.0	

NOTE.—All observations taken at 1 a. m., seventy-fifth meridian time, except those at Washington, D. C., Lakehurst, N. J., Norfolk, Va., and Pensacola, Fla., where they are taken before 5 a. m., seventy-fifth meridian time. At Pearl Harbor, T. H., observations are taken after sunrise.

None of the means included in this table are based on less than 15 surface or 5 standard level observations.

Number of observations refers to pressure only as temperature and humidity data are missing for some observations at certain levels; also, the humidity data are not used in daily observations when the temperature is below −40.0° C.

[1] U. S. Navy.
[2] Airplane observations.
[3] In or near the 5 square: Lat. 35° 00′ N. to 40° 00′ N. Long. 55° 00′ W. to 60° 00′ W.
[4] In or near the 5 square: Lat. 40° 00′ N to 45° 00′ N. Long. 40° 00′ W. to 45° 00′ W.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during June 1940. Directions given in degrees from North (N=360°, E=90°, S=180°, W=270°)—Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (537 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (870 m.)			Brownsville, Tex. (17 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (18 m.)			Chicago, Ill. (192 m.)			Cincinnati, Ohio (157 m.)			Denver, Colo. (1,627 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	146	3.2	30	220	1.3	30	230	2.3	30	41	1.3	30	322	1.4	30	228	4.3	29	121	6.0	28	255	5.4	27	224	1.5	30	191	3.1	29	260	2.2	30	235	2.4	30	97	1.8
500	---	---	---	---	---	---	30	227	2.3	---	---	---	---	---	---	---	---	---	29	126	7.4	28	256	7.8	26	233	5.0	30	201	4.8	29	241	3.2	30	246	4.3	---	---	---
1,000	30	139	3.7	---	---	---	30	242	3.2	---	---	---	30	315	2.4	30	315	4.8	27	137	5.4	26	261	8.8	26	254	6.5	29	217	4.5	29	253	6.2	30	255	6.2	---	---	---
1,500	30	146	3.0	---	---	---	29	253	3.1	30	205	0.1	30	308	2.6	30	324	4.4	24	144	3.4	24	266	8.8	24	261	7.0	24	241	4.4	25	261	6.9	30	260	7.2	---	---	---
2,000	27	163	3.0	30	186	1.5	25	257	3.7	30	307	1.1	27	295	3.7	30	317	3.3	12	128	1.9	20	268	9.0	22	276	8.2	22	262	5.1	23	274	7.3	26	269	7.3	30	71	1.6
2,500	25	257	1.4	30	220	0.5	25	261	4.4	27	267	3.4	25	295	6.5	30	287	3.3	12	198	0.7	18	272	9.3	17	296	8.8	21	259	5.4	20	279	9.1	20	282	8.2	30	57	1.7
3,000	24	268	2.7	30	289	1.1	25	262	6.1	27	267	6.8	21	294	10.0	29	254	5.1	---	---	---	17	271	10.4	11	295	10.0	18	256	6.0	18	290	8.8	19	289	10.1	30	25	1.0
4,000	21	289	2.7	29	306	2.1	23	262	6.9	24	269	11.6	17	292	14.4	27	262	6.5	---	---	---	13	290	14.3	---	---	---	15	252	3.0	15	291	11.4	15	285	9.8	29	303	4.3
5,000	20	278	2.7	26	332	3.9	20	265	8.7	19	278	13.8	14	291	18.2	19	269	9.3	---	---	---	10	283	18.1	---	---	---	---	---	---	14	300	14.8	11	283	10.7	26	294	6.7
6,000	20	275	3.0	23	318	5.0	20	276	8.9	17	284	16.3	12	288	19.5	17	273	10.1	---	---	---	---	---	---	---	---	---	---	---	---	11	292	19.3	10	287	10.9	23	309	6.2
8,000	17	242	5.5	21	300	7.4	12	263	6.7	15	278	19.3	---	---	---	11	270	13.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18	295	7.7
10,000	14	234	7.5	16	304	8.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14	325	9.3
12,000	12	254	9.4	14	278	10.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13	291	10.2
14,000	11	254	10.5	11	281	10.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11	290	13.4

Altitude (meters) m. s. l.	El Paso, Tex. (1,196 m.)			Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (766 m.)			Jacksonville, Fla. (14 m.)			Las Vegas, Nev. (570 m.)			Little Rock, Ark. (79 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (10 m.)			Minneapolis, Minn. (261 m.)			Mobile, Ala. (10 m.)			Nashville, Tenn. (194 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	216	1.1	30	199	1.2	29	318	1.9	30	236	2.1	28	315	1.2	27	130	2.2	30	159	2.3	30	173	1.3	30	295	2.0	29	107	3.7	29	265	2.1	30	175	3.3	29	247	1.9
500	---	---	---	---	---	---	---	---	---	30	240	3.6	---	---	---	27	160	3.6	---	---	---	30	179	2.2	30	304	2.4	28	121	5.2	29	282	3.1	30	191	4.2	29	236	3.2
1,000	---	---	---	---	---	---	---	---	---	30	241	5.2	28	298	1.1	25	192	2.6	30	176	2.8	29	184	2.4	30	316	2.7	25	131	4.3	28	280	4.0	26	213	3.7	29	240	3.9
1,500	30	207	1.2	---	---	---	29	317	2.1	30	253	5.7	28	261	2.5	22	227	3.0	30	190	3.8	27	195	3.1	30	308	1.5	25	130	3.2	27	276	5.9	26	222	3.1	28	234	4.6
2,000	30	236	0.8	30	209	1.5	29	311	3.1	29	265	6.3	28	258	4.7	22	244	3.7	30	200	3.7	27	204	3.0	30	260	1.1	25	128	2.9	23	290	8.2	24	227	2.5	28	248	5.1
2,500	30	280	0.8	30	234	1.8	29	292	2.9	25	278	7.8	26	252	5.6	22	249	4.0	30	218	4.1	24	211	3.4	30	220	1.5	24	126	3.0	20	295	9.3	20	226	3.6	24	256	4.8
3,000	29	324	0.9	30	221	2.4	29	274	2.5	25	284	9.3	24	262	8.0	22	250	4.1	30	238	3.6	18	233	3.6	30	246	2.0	24	152	2.9	15	304	11.8	20	225	4.0	19	265	5.7
4,000	27	284	1.9	29	231	4.3	28	285	2.2	21	288	11.4	21	272	12.1	20	245	3.4	30	234	5.0	14	273	4.5	28	273	4.4	23	175	3.1	12	302	12.0	16	215	5.0	15	267	5.8
5,000	20	284	1.9	28	246	5.4	25	290	4.4	18	289	12.9	13	278	14.5	17	232	3.8	30	239	4.1	10	305	5.6	28	272	5.7	19	204	3.4	---	---	---	11	235	3.6	11	289	7.6
6,000	12	263	2.1	25	251	6.0	22	279	4.7	15	286	16.1	---	---	---	15	278	4.4	28	241	3.2	---	---	---	26	262	7.9	18	213	2.2	---	---	---	---	---	---	---	---	---
8,000	---	---	---	15	309	4.9	---	---	---	---	---	---	---	---	---	13	271	7.1	28	270	4.7	---	---	---	20	264	10.3	15	341	1.0	---	---	---	---	---	---	---	---	---
10,000	---	---	---	14	285	4.6	---	---	---	---	---	---	---	---	---	13	259	9.5	27	289	5.1	---	---	---	19	271	12.7	---	---	---	---	---	---	---	---	---	---	---	---
12,000	---	---	---	12	323	3.6	---	---	---	---	---	---	---	---	---	11	297	10.5	26	269	7.6	---	---	---	17	266	14.6	---	---	---	---	---	---	---	---	---	---	---	---
14,000	---	---	---	11	314	2.8	---	---	---	---	---	---	---	---	---	---	---	---	23	264	7.0	---	---	---	15	261	17.0	---	---	---	---	---	---	---	---	---	---	---	---
16,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17	247	5.2	---	---	---	14	263	11.9	---	---	---	---	---	---	---	---	---	---	---	---
18,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	101	1.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	New York, N. Y. (15 m.)			Oakland, Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (344 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			San Antonio, Tex. (183 m.)			San Diego, Calif. (15 m.)			Sault St. Marie, Mich. (230 m.)			Seattle, Wash. (14 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (10 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	28	228	4.3	30	285	4.9	30	154	3.6	30	200	0.2	30	257	2.3	30	18	2.3	30	244	2.0	30	140	1.9	28	268	4.0	30	287	2.3	30	315	2.7	28	234	3.7	30	249	2.6
500	28	258	5.3	30	284	3.4	30	156	4.5	30	169	0.1	30	258	2.9	---	---	---	30	231	4.0	30	142	3.1	28	288	2.5	30	290	3.0	30	345	2.1	---	---	---	30	241	4.5
1,000	28	268	8.6	30	247	1.6	30	155	3.7	29	225	1.2	30	263	3.1	30	17	2.3	30	229	4.9	30	157	3.1	22	274	0.9	30	268	3.8	27	319	1.4	28	242	4.1	28	250	5.7
1,500	28	279	9.6	29	243	1.7	30	187	3.2	26	234	2.8	30	259	3.4	30	346	2.1	30	250	5.5	29	159	3.0	22	251	2.0	28	276	6.7	25	272	1.2	28	243	4.5	26	271	7.2
2,000	22	287	10.8	29	224	1.5	29	203	2.5	26	252	4.7	30	247	3.1	29	327	1.3	27	257	6.0	26	174	2.1	20	234	2.1	25	277	8.5	24	244	2.6	28	246	4.2	26	283	8.9
2,500	19	289	10.0	29	223	1.3	29	200	1.9	26	276	5.9	30	248	2.9	27	284	3.4	24	264	6.5	24	207	2.4	19	212	3.0	22	288	10.3	24	244	3.7	25	250	5.2	24	284	9.8
3,000	16	289	10.4	29	233	1.0	24	223	2.0	24	294	6.4	30	252	2.0	27	279	8.5	23	272	7.0	23	242	3.0	18	200	4.9	21	288	10.4	23	247	5.8	24	254	7.0	24	285	10.9
4,000	---	---	---	28	258	1.8	20	283	1.8	20	302	9.7	30	299	1.4	22	288	10.0	18	288	7.1	22	255	3.3	16	202	4.9	18	299	13.4	22	253	9.6	22	260	11.0	21	285	12.5
5,000	---	---	---	26	251	1.2	16	323	4.0	18	300	12.0	27	332	1.6	19	292	13.2	18	300	7.1	18	248	2.6	15	204	4.0	17	297	15.3	19	255	13.2	17	267	14.0	15	279	11.5
6,000	---	---	---	26	242	2.3	13	307	5.7	17	306	13.0	24	307	2.5	17	288	14.4	15	288	8.5	16	248	3.9	13	252	1.5	15	298	19.9	14	256	16.4	16	266	17.1	14	275	14.6
8,000	---	---	---	19	251	2.8	---	---	---	12	302	9.4	20	296	2.3	13	287	19.2	---	---	---	11	272	4.0	---	---	---	11	300	24.4	---	---	---	11	262	21.4	---	---	---
10,000	---	---	---	17	236	3.6	---	---	---	---	---	---	18	291	3.8	10	295	17.2	---	---	---	10	252	6.2	---	---	---	11	302	30.5	---	---	---	---	---	---	---	---	---
12,000	---	---	---	16	252	3.0	---	---	---	---	---	---	16	293	6.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,000	---	---	---	12	304	4.1	---	---	---	---	---	---	13	281	9.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3.—*Maximum free-air wind velocities (m. p. s.,) for different sections of the United States based on pilot-balloon observations during June, 1940*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Max. Vel.	Direction	Altitude (m) m. s. l.	Date	Station	Max. Vel.	Direction	Altitude (m) m. s. l.	Date	Station	Max. Vel.	Direction	Altitude (m) m. s. l.	Date	Station
Northeast [1]	34.3	WSW	1,780	28	Toledo, Ohio	42.4	WNW	4,490	20	Columbus, Ohio	39.0	NW	7,010	20	Columbus, Ohio.
East-Central [2]	46.0	WSW	1,510	28	Louisville, Ky	36.5	WNW	3,660	20	Cincinnati, Ohio	53.0	SW	13,500	2	Greensboro, N. C.
Southeast [3]	29.0	WSW	730	25	Tampa, Fla	36.0	WNW	4,480	29	Spartanburg, S. C	41.0	SW	11,020	1	Jacksonville, Fla.
North-Central [4]	40.3	SW	1,520	14	Duluth, Minn	41.4	WNW	4,678	19	Madison, Wis	63.0	W	10,650	15	S. Ste. Marie, Mich.
Central [5]	32.3	WSW	1,110	30	Omaha, Nebr	42.0	W	3,160	30	Moline, Ill	58.0	NW	8,110	20	Chicago, Ill.
South-Central [6]	29.7	SW	618	27	Oklahoma City, Okla	28.5	N	2,630	12	Amarillo, Tex	44.8	WNW	6,410	2	Amarillo, Tex.
Northwest [7]	31.8	NW	750	19	Ellensburg, Wash.	51.4	SW	4,760	12	Ellensburg, Wash.	54.0	W	9,133	26	Tatoosh Island, Wash.
West-Central [8]	34.7	WSW	2,420	8	Casper, Wyo	34.2	SSW	3,800	1	Ely, Nev	45.6	SSE	6,840	18	Oakland, Calif.
Southwest [9]	21.6	ESE	2,242	24	Albuquerque, N. Mex.	34.5	SSE	5,000	18	Fresno, Calif	41.3	NW	5,940	4	Fresno, Calif.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except extreme west Texas), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

TABLE 4.—*Mean altitudes and temperatures of significant points identifiable as tropopauses during June 1940, classified according to the potential temperatures (10° intervals between 290° and 409° A.) with which they are identified (based on radiosonde observations)*

Potential temperatures, °A.	Albuquerque, N. Mex.			Atlanta, Ga.			Billings, Mont.			Bismarck, N. Dak.			Boise, Idaho			Buffalo, N. Y.			Charleston, S. C.		
	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.
290-299																					
300-309																					
310-319													1	7.4	−34.0	6	8.6	−44.8			
320-329				3	8.5	−33.0	13	10.4	−52.5	6	9.6	−44.2	12	8.7	−41.5	8	9.5	−47.8	1	9.8	−47.0
330-339	12	11.7	−56.3	15	10.9	−49.3	20	11.6	−56.3	23	11.2	−53.1	20	10.8	−50.0	15	10.6	−48.6	12	11.1	−49.8
340-349	25	12.3	−56.2	18	12.5	−57.7	14	12.5	−59.9	18	12.4	−59.6	22	12.4	−55.4	20	12.4	−58.4	19	12.5	−57.2
350-359	9	13.3	−59.7	12	14.0	−65.9	6	13.5	−63.3	4	13.2	−57.2	6	13.0	−57.5	12	13.7	−64.4	18	13.7	−63.6
360-369	5	14.2	−63.4	10	14.7	−68.1	3	14.1	−63.0	4	13.9	−62.2	4	14.2	−61.5	2	13.7	−59.0	10	15.0	−70.1
370-379	6	15.1	−65.7	7	16.0	−72.4	3	14.6	−62.0	1	14.6	−60.0	3	14.6	−60.7	4	14.2	−59.2	6	15.3	−68.0
380-389	7	16.5	−66.4	1	17.3	−76.0	1	15.6	−67.0	3	14.9	−60.7	5	15.1	−61.4	3	14.7	−59.0	6	15.8	−65.7
390-399	3	16.2	−67.0	3	16.5	−68.3	2	16.0	−65.0	4	15.7	−60.5	5	15.9	−63.6	4	15.2	−57.8	2	16.0	−65.5
400-409	5	17.0	−68.2	4	16.7	−67.5	4	16.7	−65.5	5	16.0	−59.6	2	16.5	−61.0	3	15.9	−61.0	2	17.8	−71.5
Weighted means		13.6	−60.2		13.4	−60.4		12.5	−58.5		12.5	−56.2		12.1	−53.4		12.2	−55.4		13.6	−61.2
Mean potential temperature °A. (weighted)	357.7			355.0			346.5			350.5			347.7			348.0			356.6		
Number of days with observations	28			24			27			21			25			25			29		

Potential temperatures, °A.	Denver, Colo.			El Paso, Tex.			Ely, Nev.			Fairbanks, Alaska			Joliet, Ill.			Juneau, Alaska			Lakehurst, N. J.		
	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.
290-299																1	5.7	−33.0			
300-309										2	8.6	−55.0				6	7.3	−40.7			
310-319							1	9.0	−39.0	23	9.1	−49.8				20	9.0	−49.6	1	8.4	−44.0
320-329	3	10.2	−50.0				10	10.1	−48.0	28	10.3	−55.4				22	10.2	−53.7	6	9.2	−41.0
330-339	21	10.9	−49.3	11	12.0	−57.7	28	10.9	−49.4	6	11.3	−57.8	11	10.7	−49.3	1	11.9	−60.0	7	10.7	−48.9
340-349	28	12.1	−53.6	18	12.0	−53.5	22	12.2	−55.8				20	12.6	−59.4	1	10.6	−48.0	15	12.4	−58.3
350-359	15	13.2	−59.5	13	13.4	−61.3	9	13.2	−57.9	1	11.2	−48.0	7	13.8	−64.3				7	13.8	−65.1
360-369	8	14.0	−61.9	7	14.6	−66.1	6	14.0	−62.2				6	12.0	−54.5				3	14.4	−66.3
370-379	6	14.8	−61.8	10	15.4	−67.4	6	14.8	−63.2	1	12.6	−47.0	2	15.1	−64.5				1	15.0	−64.0
380-389	3	15.8	−66.0	6	16.1	−69.5	5	15.7	−64.4				2	15.4	−64.5	1	13.8	−50.0			
390-399	4	16.2	−64.2	5	16.6	−69.6	6	16.1	−64.7				4	15.8	−62.0						
400-409	4	16.7	−64.5	8	16.9	−67.6	3	16.7	−65.3	2	14.5	−47.5	3	16.3	−62.3				2	16.2	−61.0
Weighted means		12.8	−56.1		14.0	−62.0		12.5	−55.3		10.1	−53.0		12.9	−58.2		9.4	−50.2		12.2	−55.9
Mean potential temperature °A. (weighted)	352.6			362.8			350.5			324.7			348.5			319.7			346.2		
Number days with observations	27			28			29			28			21			22			24		

TABLE 4.—*Mean altitudes and temperatures of significant points identifiable as tropopauses during June 1940, classified according to the potential temperatures (10° intervals between 290° and 409° A.) with which they are identified (based on radiosonde observations)*—Continued

Potential temperatures, °A.	Medford, Oreg.			Miami, Fla.			Nashville, Tenn.			Oakland, Calif.			Oklahoma City, Okla.			Omaha, Nebr.			Phoenix, Ariz.		
	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s. l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s. l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature ° C.
290–299																					
300–309																					
310–319	1	9.5	−46.0																		
320–329	9	9.9	−48.9				2	9.8	−44.5	6	9.8	−45.2	6	10.3	−51.2	3	9.2	−40.0	2	10.2	−48.0
330–339	23	11.1	−52.8	2	10.4	−44.5	13	10.8	−48.8	24	10.9	−49.4	6	10.8	−47.8	12	10.4	−43.5	15	10.7	−46.8
340–349	24	12.2	−56.4	16	12.7	−59.4	12	12.8	−60.4	18	12.2	−56.2	25	12.6	−58.8	22	12.4	−57.6	25	12.0	−52.6
350–359	11	12.9	−57.5	19	14.2	−67.1	17	13.6	−62.1	13	13.3	−61.0	10	13.6	−63.3	14	13.7	−64.2	14	13.4	−60.1
360–369	6	14.1	−60.3	12	15.1	−70.5	4	14.6	−66.8	7	13.8	−61.1	4	14.9	−68.2	4	13.8	−59.0	3	14.3	−62.7
370–379	4	14.9	−63.0	3	15.3	−67.3	8	17.2	−67.8	7	14.8	−65.4	3	15.5	−70.3	1	14.2	−60.0	7	15.2	−66.1
380–389	6	15.4	−63.2	5	16.5	−72.6	3	15.5	−66.0	8	15.5	−65.2	2	16.0	−69.5	4	15.1	−61.0	6	15.9	−68.2
390–399	1	16.6	−69.0	5	17.0	−73.0	4	15.7	−62.2	5	16.3	−65.8	3	16.4	−68.3	2	16.0	−62.0	4	16.3	−65.2
400–409	5	16.7	−65.0	2	17.3	−72.0	2	16.9	−68.0	5	16.6	−65.0	1	17.3	−69.0	3	15.0	−64.7	8	17.2	−69.5
Weighted means		12.5	−56.4		14.4	−66.2		13.6	−59.9		12.9	−57.2		13.0	−59.9		12.7	−56.4		13.3	−57.5
Mean potential temperature ° A. (weighted)	349.5			361.0			356.4			354.7			350.4			352.5			358.0		
Number days with observations	28			24			29			28			26			25			27		

Potential temperatures, ° A.	Portland, Maine			St. Louis, Mo.			San Antonio, Tex.			San Diego, Calif.			Sault Ste. Marie, Mich.			Spokane, Wash.			Atlantic Station			Atlantic Station		
	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	No. 1[1] Mean altitude (km.) m.s.l.	Mean temperature ° C.	Number of cases	No. 2[2] Mean altitude (km.) m.s.l.	Mean temperature ° C.
290–299													1	6.7	−41.0									
300–309	2	7.0	−35.5																					
310–319	8	7.9	−38.2										5	8.1	−42.2	1	8.4	−40.0				1	7.6	−33.0
320–329	9	9.4	−44.4	4	9.4	−45.0	1	12.6	−69.0	2	9.8	−44.0	6	9.6	−46.2	14	9.8	−48.5	2	9.6	−42.5	7	9.4	−41.7
330–339	20	10.9	−50.6	11	11.2	−50.9	9	11.2	−51.7	10	10.9	−49.5	18	11.0	−53.5	21	11.2	−54.1	15	10.5	−45.9	24	11.2	−52.9
340–349	22	12.5	−59.3	20	12.3	−56.0	25	12.0	−53.2	7	12.5	−58.6	16	12.5	−60.9	12	12.0	−56.2	21	12.7	−57.5	16	12.4	−58.9
350–359	10	13.2	−61.2	15	13.5	−62.6	16	13.2	−57.9	6	13.3	−60.8	6	13.0	−60.5	7	13.0	−57.7	17	13.6	−62.7	10	13.1	−60.5
360–369	5	13.3	−56.6	8	14.4	−64.6	13	14.6	−65.8	3	14.1	−61.7	1	13.6	−59.0	2	13.8	−58.5	5	14.3	−64.4	6	14.0	−61.0
370–379	4	14.7	−63.2	2	15.0	−64.0	6	15.2	−65.7	2	14.8	−64.5	2	14.0	−60.0	2	14.8	−64.0	1	15.1	−66.0	2	15.1	−66.5
380–389	6	14.3	−54.7	8	15.8	−65.1	4	16.0	−67.8	4	15.7	−67.0	4	14.0	−54.0	4	14.4	−55.2	4	15.2	−61.5	1	14.7	−58.0
390–399	3	15.2	−57.7	1	15.7	−63.0	5	16.3	−67.2	3	16.6	−69.7	3	15.1	−59.0	3	15.3	−60.0	1	16.4	−66.0	1	16.0	−62.0
400–409	2	15.8	−59.5	6	16.5	−63.0	4	16.9	−66.2	1	17.2	−69.0	1	15.9	−61.0	4	16.0	−59.5	1	16.2	−62.0	2	16.4	−61.5
Weighted means		11.8	−53.4		13.3	−58.7		13.5	−59.2		13.1	−58.4		11.8	−55.0		12.0	−54.5		12.7	−56.9		12.1	−55.4
Mean potential temperature ° A. (weighted)	346.2			356.7			358.3			354.9			344.1			348.1			350.2			345.4		
Number days with observations	29			27			25			17			26			26			25			27		

[1] In or near the 5 square: Lat. 35°00′ N. to 40°00′ N. Long. 55°00′ to 60°00′ W.
[2] In or near the 5 square: Lat. 40°00′ N. to 45°00′ N. Long. 40°00′ W. to 45°00′ W.

WEATHER ON THE NORTH ATLANTIC OCEAN

By H. C. HUNTER

Atmospheric pressure.—The pressure averaged somewhat above normal over the southeastern portion but near normal over the southwestern. A considerable deficiency appears near the coasts of New England and Nova Scotia, where the last week of the month was marked by quite low pressure for the season.

The extremes of pressure in available vessel reports were 1034.9 and 992.6 millibars (30.56 and 29.31 inches). The high mark was noted near 45° N., 45° W., during the afternoon of the 21st, on the American steamship *Gateway City*. In the very same part of the ocean (44° N., 43° W.) the low reading was made very clearly on the 6th, by the American liner *President Roosevelt*. Table 1 shows that a lower pressure was noted on the 14th at Belle Isle, Newfoundland.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, June 1940*

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Millibars	*Millibars*	*Millibars*		*Millibars*	
Lisbon	1,017.6	+0.7	1,025	26	1,009	23
Horta	1,025.0	+1.0	1,032	12, 17	1,015	6, 27
Belle Isle, Newfoundland [1]	1,010.6	−0.6	1,023	8, 10, 22	982	14
Halifax, Nova Scotia	1,012.1	−2.8	1,026	10	1,001	29
Nantucket	1,012.9	−2.3	1,027	17	998	26
Hatteras	1,015.6	−0.7	1,024	22	1,002	25
Turks Island	1,016.8	−0.1	1,020	13	1,012	20
Key West	1,015.9	+0.3	1,021	27	1,013	25
New Orleans	1,015.2	0.0	1,021	30	1,010	16

[1] For 23 days.

NOTE.—All data based on available observations, departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.