METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR DECEMBER 1944

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AEROLOGICAL OBSERVATIONS

CURVE METHOD FOR OBTAINING MONTHLY MEANS OF RELATIVE HUMIDITY

THE resistance of the electric element used to measure relative humidity varies inversely with both temperature and relative humidity until, at low temperatures, the resistance becomes so high that it is virtually equivalent to on open circuit and so prevents recording of low humidities.

Thus, at upper and consequently colder levels, actual values are not available for low relative humidities. These measurable limits are indicated by a broken line on the graph accompanying this article; those values below the line not being measurable by the electric hygrometer. In order to prevent the monthly mean values from being biased upwards, due to absence of the low humidities, a system was devised and is now being used, for estimating the missing values and so obtaining monthly means which are approximately those which would result if all humidities were recorded.

A group of observations derived by means of the hair hygrometer was selected for use in preparation of this system. From these observations, humidity values which would not have been recorded if the electric hygrometer had been used (due to the limitations mentioned) were tabulated against their temperatures, which were divided into classes of 3 degrees. Means of over 2,500 of these values were used in preparation of the curve shown below. A copy of the tabulation used for the 500,000 to 550,000 series of radiosondes is also shown. The curve constructed from these data was similar to that in use for the 340,000 to 400,000 series of radiosondes and instructions accordingly provide for use of the same curve for both series of instruments. Data used were for various years and mainly for the months of January and July, using both day and night observations. Samples of data for other months were occasionally injected but showed no outstanding differences.

Whenever humidity values from the electric hygrometer are missing, due to these temperature-humidity limitations, values from the means curve are entered in their place on the monthly summary forms. For example, if the humidity value is lower than the measurable limit at a temperature of −20° a humidity value of 22 percent would be entered on Form 1109. Columns, representing standard levels must, however, have at least 16 recorded values, as distinuished from estimated values, in order to be summarized.

Since the humidity range of values below the measurable limits increases as the temperature decreases, the accuracy of the curve decreases accordingly. Therefore, only monthly mean humidity values having a corresponding monthly mean temperature of −20° or higher are published, in order to reduce the error.

Although curve values are not satisfactory for daily comparison, it is believed their use in preparation of monthly means will result in values within the 10 percent limit of tolerance required of the radiosondes, and in most cases measurements will be considerably closer.

TABULATION OF DELIMITED HUMIDITY VALUES

(For 500,000 to 550,000 series of radiosondes)

Relative Humidity

From—	To—	Bismarck		Charleston		Denver		El Paso		Fairbanks		Oakland		Portland		San Juan		Total		
		Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Number of observations	Sums	Means
°C.	°C.																			
10	12			1	12			1	13					3	18	1	9	6	52	8.7
7	9			3	38							7	78	9	104	3	26	22	246	11.2
4	6	1	12	4	56	1	17	1	17	1	15	8	99	13	155	9	130	38	501	13.2
1	3			6	83			2	28	1	11	7	84	16	182	18	242	50	630	12.6
0	−2	7	103	6	86	1	11	1	16	4	78	11	157	27	420	19	246	76	1,117	14.7
−3	−5	3	43	4	59	6	106	4	71	3	45	11	167	25	381	27	385	83	1,257	15.1
−6	−8	11	208	14	230	4	74	7	124	3	47	12	184	37	612	28	441	116	1,920	16.6
−9	−11	14	275	7	142	4	62	6	111	5	91	18	319	37	642	26	458	117	2,100	17.9
−12	−14	12	263	13	227	8	158	11	265	5	116	15	267	47	866	44	721	155	2,883	18.6
−15	−17	17	350	13	266	10	237	17	362	5	103	19	353	54	1,070	19	388	154	3,129	20.3
−18	−20	29	691	20	418	14	278	23	549	6	132	22	478	51	1,045	45	918	210	4,509	21.5
−21	−23	24	593	18	360	17	404	24	604	3	59	14	272	63	1,398	36	663	199	4,353	21.9
−24	−26	38	969	18	410	20	568	36	915	16	429	24	480	71	1,742	35	809	258	6,322	24.5
−27	−29	33	873	23	525	23	575	32	884	12	376	26	599	67	1,651	60	1,227	276	6,710	24.3
−30	−32	39	1,167	17	394	34	1,028	47	1,434	22	726	20	504	69	1,911	30	779	278	7,943	28.6
−33	−35	37	1,080	23	560	35	1,185	44	1,380	28	988	30	770	55	1,624	48	1,051	300	8,638	28.8
−36	−38	17	559	2	40	18	597	15	481	18	738	30	822	50	1,563	24	519	174	5,319	30.6
−39	−40	3	127			5	191	7	203	11	452	15	484	5	193	5	118	51	1,768	34.7

TABLE 1A.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during December 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Albany, N. Y. (86 m.)				Albuquerque, N. Mex. (1,620 m.)				Apalachicola, Fla. (5 m.)				Atlanta, Ga. (300 m.)				Big Spring, Tex. (774 m.)				Bismarck, N. Dak. (505 m.)				Boise, Idaho (868 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	31	1,008	−4.6	75	31	840	3.2	53	22	1,021	11.0	86	30	987	4.3	74	31	932	4.2	73	28	959	−8.5	83	29	924	−2.1	88
500	31	956	−5.4	72					22	963	11.6	71	30	963	5.6	68												
1,000	31	897	−7.1	71					22	907	9.5	64	30	906	4.9	69	31	906	6.1	63	28	900	−8.1	74	29	909	−1.8	85
1,500	21	841	−8.5	67					22	854	7.7	51	30	852	4.4	60	31	853	6.2	54	28	843	−8.4	58	29	854	−1.3	75
2,000	31	788	−9.6	65	31	862	2.8	50	22	803	6.2	44	30	801	3.1	59	31	802	4.9	49	28	790	−9.2	48	29	801	−2.3	64
2,500	31	739	−10.1	63	31	754	0.3	49	22	755	4.6		29	753	1.1	47	31	754	2.4	44	28	740	−10.9	46	29	753	−3.4	55
3,000	31	692	−11.3	59	31	707	−2.4	48	22	710	2.4		28	708	−1.0	40	31	709	−0.1	40	28	694	−13.0	45	29	706	−5.2	48
4,000	31	607	−15.8	56	31	623	−8.2	48	22	627	−2.6		28	624	−6.3	39	31	625	−5.7	31	28	607	−19.1	51	29	621	−10.5	
5,000	31	531	−21.5	62	31	547	−14.2	45	22	552	−8.5		28	548	−12.6		31	549	−12.1		28	530	−24.8	48	28	544	−17.3	
6,000	31	463	−27.7		29	479	−21.2		21	484	−14.2		27	480	−18.9		31	481	−19.0		27	462	−31.7		28	476	−24.2	
7,000	31	401	−34.8		29	417	−28.6		19	424	−20.5		26	418	−25.9		30	420	−26.5		26	400	−38.7		26	413	−32.3	
8,000	31	347	−41.4		29	361	−35.9		18	369	−28.0		25	363	−32.9		29	364	−33.6		26	344	−45.6		25	358	−39.7	
9,000	31	299	−49.5		29	312	−42.8		18	320	−35.0		25	314	−39.7		27	315	−40.6		25	295	−51.8		25	308	−47.3	
10,000	30	257	−53.7		29	269	−49.4		18	277	−42.2		21	271	−46.3		26	272	−47.7		21	253	−55.9		23	265	−54.4	
11,000	26	220	−57.3		26	230	−54.8		17	238	−49.5		18	234	−52.4		24	233	−54.4		17	217	−56.8		16	226	−60.2	
12,000	21	187	−57.5		24	197	−58.0		14	203	−56.7		18	200	−57.5		21	199	−59.4		10	185	−56.1		11	191	−64.3	
13,000	10	160	−55.0		17	168	−58.4		12	174	−61.1		11	170	−59.8		14	170	−61.9		7	159	−55.6		5	163	−62.1	
14,000	5	135	−55.3		14	143	−59.4		8	147	−61.6		7	145	−59.5		12	144	−61.7									
15,000									5	124	−64.6						9	123	−63.6									

Altitude (meters) m. s. l.	Brownsville, Tex. (6 m.)				Buffalo, N. Y. (221 m.)				Caribou, Maine (193 m.)				Charleston, S. C. (14 m.)				Denver, Colo. (1,616 m.)				Dodge City, Kans. (787 m.)				El Paso, Tex. (1,195 m.)			
Surface	31	1,021	14.3	82	31	991	−3.3	77	30	992	−10.2	91	26	1,020	4.0	80	31	839	−3.0	69	31	929	−1.7	82	30	885	6.9	50
500	31	963	14.7	71	31	957	−4.0	75	30	953	−9.9	86	26	961	6.2	58												
1,000	31	908	12.2	66	31	898	−6.6	75	30	894	−11.3	79	26	904	4.7	55					31	904	0.4	68				
1,500	31	855	9.8	63	31	842	−8.7	72	30	837	−11.9	72	26	851	4.1	45					31	850	−0.1	61	30	854	8.2	45
2,000	31	805	8.2	54	31	789	−10.1	71	30	784	−13.0	70	26	799	2.4	41	31	800	0.6	47	31	798	0.1	50	30	802	5.6	44
2,500	31	757	6.6	44	31	739	−10.9	60	30	734	−14.3	67	26	751	0.3		31	751	−1.3	44	31	750	−1.4	40	30	755	3.0	43
3,000	31	712	4.0	40	31	693	−12.0	54	30	687	−16.3	64	26	706	−1.6		31	705	−4.2	45	31	704	−4.1	39	30	709	0.1	39
4,000	31	629	−1.6	31	30	607	−16.0	59	30	600	−20.6	58	25	622	−6.8		31	620	−10.9	46	31	619	−10.0	38	30	625	−5.6	
5,000	31	554	−7.7		29	531	−21.6		29	524	−25.8		23	546	−13.0		31	544	−17.4	40	31	543	−16.6		30	550	−12.5	
6,000	31	487	−13.9		29	463	−28.0		29	456	−32.1		21	479	−18.9		31	476	−24.4	42	31	475	−23.8		30	481	−19.6	
7,000	31	426	−20.5		28	402	−35.1		28	395	−38.2		21	418	−25.6		30	413	−32.0		31	413	−31.0		30	420	−26.9	
8,000	31	371	−27.4		26	347	−41.6		28	341	−44.6		18	362	−33.1		24	359	−39.2		31	358	−38.5		30	364	−34.0	
9,000	31	322	−34.7		24	299	−47.7		27	294	−50.6		15	313	−40.4		21	309	−46.8		30	308	−45.9		30	315	−41.0	
10,000	31	279	−42.1		21	257	−53.0		25	252	−55.4		10	269	−46.3		17	266	−53.5		27	264	−52.4		30	271	−47.7	
11,000	28	240	−49.7		18	221	−56.5		16	217	−57.7		8	231	−51.2		10	228	−57.9		20	227	−57.2		29	233	−53.6	
12,000	28	206	−56.2		11	189	−57.6		13	185	−56.8						5	197	−63.5		14	193	−58.6		27	199	−58.8	
13,000	26	175	−60.9						8	159	−56.6										5	164	−57.3		16	169	−59.6	
14,000	21	149	−64.0																						9	144	−60.1	
15,000	13	126	−65.8																						6	122	−63.1	
16,000	5	107	−69.4																									

Altitude (meters) m. s. l.	Ely, Nev. (1,908 m.)				Glasgow, Mont. (648 m.)				Grand Junction, Colo. (1,416 m.)				Great Falls, Mont. (1,128 m.)				Greensboro, N. C. (273 m.)				Hatteras, N. C. (3 m.)				Huntington, W. Va. (172 m.)			
Surface	31	812	−5.6	81	31	944	−7.4	80	31	863	0.2	57	31	889	−2.1	57	25	988	−0.5	74	31	1,021	6.8	81	30	1,001	−1.1	82
500																	25	960	0.4	63	31	961	6.9	65	30	960	−0.8	80
1,000					31	903	−5.2	72									25	903	−0.3	58	31	904	4.2	59	30	902	−2.8	77
1,500					31	847	−5.4	62	31	855	0.9	55	31	850	−0.6	51	25	848	−0.5	51	31	850	2.7	55	30	847	−3.3	70
2,000	31	803	−3.8	74	31	794	−7.0	62	31	803	0.4	50	31	797	−3.3	51	25	796	−1.7	49	31	799	1.1	42	30	795	−4.0	64
2,500	31	754	−1.7	53	31	745	−9.2	61	31	754	−2.1	52	31	748	−6.1	53	25	747	−3.7	48	31	751	−0.9	40	30	746	−4.9	45
3,000	31	708	−3.8	48	31	698	−11.6	58	31	708	−4.6	52	31	701	−8.7	54	25	702	−5.7		31	705	−3.4	41	28	699	−7.4	
4,000	31	623	−9.1	44	31	612	−17.0	50	31	623	−10.6	49	30	616	−13.3	45	25	617	−11.1		31	621	−8.2		28	614	−12.4	
5,000	31	547	−15.4	41	30	535	−23.1	47	31	546	−16.6		28	540	−19.9	46	24	540	−17.5		31	515	−14.1		28	538	−18.3	
6,000	30	478	−22.9		30	466	−29.6		30	477	−23.2		27	471	−27.1		24	472	−24.2		28	477	−20.3		28	470	−24.4	
7,000	30	417	−30.8		29	404	−36.7		29	415	−30.8		27	409	−34.7		24	411	−31.2		28	416	−26.6		28	409	−30.8	
8,000	30	361	−38.5		28	348	−43.9		26	360	−38.3		27	353	−42.6		24	356	−37.6		27	362	−33.1		26	354	−38.2	
9,000	26	311	−46.2		26	300	−50.8		25	310	−45.9		25	304	−49.8		23	307	−43.5		26	313	−40.3		25	305	−44.7	
10,000	25	267	−53.2		23	258	−56.1		20	267	−53.1		19	261	−55.1		21	264	−49.6		25	270	−47.2		24	262	−50.8	
11,000	21	228	−59.5		18	221	−59.8		15	229	−57.5		15	224	−58.4		20	226	−54.7		23	232	−53.2		21	225	−54.8	
12,000	6	194	−61.6		7	188	−55.8		11	195	−59.4		5	189	−58.7		14	193	−56.1		18	198	−57.9		16	191	−56.8	
13,000									9	166	−59.1						10	164	−54.7		14	169	−59.1		8	162	−52.6	
14,000																					6	143	−59.6		5	137	−51.1	

TABLE 1A.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during December 1944*—Continued

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m.s.l.	Int'l Falls, Minn. (343 m.)				Jackson, Miss. (97 m.)				Joliet, Ill. (178 m.)				Lake Charles, La. (5 m.)				Little Rock, Ark. (79 m.)				Louisville, Ky. (165 m.)				Mazatlan, Mexico (80 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	975	−10.9	85	25	1,010	5.0	77	30	999	−6.6	84	31	1,022	9.7	85	31	1,013	3.1	78	31	1,002	−1.2	76	29	1,006	21.1	80
500	29	955	−11.4	86	25	962	5.8	67	30	959	−6.4	81	31	963	10.4	73	31	962	2.6	72	31	960	−1.7	72	29	959	22.1	40
1,000	29	896	−11.8	84	25	905	4.6	62	30	900	−7.1	72	31	907	8.8	65	31	904	2.3	69	31	902	−2.7	63	29	905	19.8	32
1,500	29	839	−11.8	74	25	851	3.8	55	30	844	−6.9	59	31	851	7.1	52	31	850	3.0	54	31	848	−2.6	57	29	854	16.6	30
2,000	29	786	−12.3	62	25	800	2.5	49	30	791	−7.5	48	31	803	5.6	49	31	799	1.7	51	31	795	−3.4	47	29	804	13.1	31
2,500	29	736	−14.3	59	25	752	0.4	47	30	742	−8.9	47	31	756	3.7	42	31	750	−0.2	47	31	746	−4.8	45	29	758	9.8	33
3,000	29	688	−16.5	59	25	706	−1.6	----	30	695	−10.4	47	31	710	1.4	38	31	705	−2.5	43	31	700	−6.9	43	29	713	6.5	----
4,000	29	602	−21.5	57	23	622	−6.3	----	30	610	−15.2	53	31	627	−3.5	----	31	621	−8.0	47	31	615	−11.8	----	29	631	−0.1	----
5,000	28	525	−27.2	----	23	547	−12.2	----	29	534	−21.0	59	28	551	−9.8	----	31	545	−13.8	----	29	539	−18.0	----	29	556	−6.7	----
6,000	28	456	−33.8	----	22	480	−19.2	----	29	465	−27.6	----	27	483	−16.6	----	31	477	−20.4	----	26	471	−24.8	----	27	488	−13.1	----
7,000	28	394	−40.8	----	21	418	−26.4	----	29	404	−34.1	----	25	422	−23.2	----	30	416	−27.2	----	24	409	−31.8	----	27	427	−20.3	----
8,000	24	340	−47.2	----	21	363	−33.2	----	29	350	−41.4	----	25	367	−30.2	----	30	361	−34.4	----	24	354	−39.2	----	23	373	−28.1	----
9,000	22	292	−51.8	----	21	314	−40.1	----	28	301	−48.2	----	25	318	−37.3	----	29	312	−41.2	----	22	306	−45.1	----	23	323	−36.0	----
10,000	19	249	−55.4	----	21	271	−47.1	----	27	258	−53.5	----	24	275	−44.8	----	27	270	−47.9	----	20	263	−50.2	----	23	280	−43.6	----
11,000	14	213	−55.3	----	20	232	−53.6	----	16	221	−57.1	----	22	236	−51.6	----	26	231	−54.6	----	18	225	−54.3	----	20	241	−51.3	----
12,000	12	182	−54.5	----	17	199	−57.3	----	11	189	−57.2	----	17	202	−56.8	----	22	198	−59.8	----	17	192	−57.9	----	19	206	−58.3	----
13,000	9	156	−53.7	----	10	169	−58.4	----	5	161	−56.9	----	12	172	−59.3	----	20	169	−62.8	----	6	163	−58.2	----	9	176	−62.2	----
14,000	5	134	−53.7	----	8	145	−61.5	----	----	----	----	----	10	146	−61.6	----	12	143	−62.2	----	----	----	----	----	----	----	----	----
15,000	----	----	----	----	----	----	----	----	----	----	----	----	9	125	−63.3	----	6	123	−64.0	----	----	----	----	----	----	----	----	----
16,000	----	----	----	----	----	----	----	----	----	----	----	----	5	105	−63.9	----	----	----	----	----	----	----	----	----	----	----	----	----

Altitude (meters) m.s.l.	Medford, Oreg. (409 m.)				Merida, Mexico (27 m.)				Miami, Fla. (4 m.)				Nashville, Tenn. (180 m.)				Oakland, Calif. (2 m.)				Ogden, Utah (1,355 m.)				Oklahoma City, Okla. (391 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	972	4.5	85	29	1,016	21.9	74	31	1,021	16.5	81	31	1,001	1.7	81	31	1,020	10.7	76	31	870	−2.1	82	31	975	2.2	77
500	29	962	5.1	82	29	962	19.7	70	31	964	16.2	75	31	962	0.9	77	31	960	10.9	61	----	----	----	----	31	962	2.7	74
1,000	29	905	6.1	67	28	908	16.1	75	31	909	12.8	75	31	904	0.0	69	31	905	9.1	57	----	----	----	----	31	905	2.7	63
1,500	29	852	4.6	60	28	856	12.9	77	31	856	10.1	70	31	850	0.1	59	31	851	6.6	53	31	854	−0.6	72	30	851	2.9	61
2,000	29	800	2.2	58	28	806	10.2	71	31	806	8.1	58	31	798	−0.9	59	31	801	3.8	51	31	803	−1.8	63	30	800	2.1	54
2,500	29	752	−0.4	56	28	759	9.2	47	31	758	7.9	33	31	749	−3.1	58	31	753	0.9	51	31	754	−3.8	62	30	752	0.4	47
3,000	29	706	−3.5	55	28	714	7.9	----	31	714	5.8	----	31	703	−5.1	53	31	707	−2.3	52	31	707	−6.0	53	30	706	−2.1	42
4,000	27	621	−10.1	54	24	632	3.3	----	31	631	0.6	----	28	618	−10.1	43	31	622	−8.5	43	31	622	−11.2	49	30	622	−7.9	44
5,000	27	545	−16.7	58	24	558	−2.7	----	31	556	−4.9	----	27	542	−16.5	48	31	547	−14.7	47	31	545	−17.1	43	30	546	−14.3	46
6,000	26	476	−23.5	53	21	491	−9.5	----	31	489	−11.4	----	25	474	−22.8	----	31	478	−21.5	47	31	476	−24.1	42	30	478	−21.1	----
7,000	24	414	−31.4	----	19	431	−16.0	----	31	428	−18.3	----	25	412	−29.9	----	31	417	−28.9	----	30	414	−31.3	----	29	416	−27.6	----
8,000	24	358	−38.7	----	17	376	−24.0	----	31	374	−25.4	----	23	357	−37.3	----	30	361	−36.5	----	30	359	−39.1	----	29	361	−35.6	----
9,000	21	309	−46.2	----	17	327	−31.9	----	28	324	−33.2	----	22	309	−43.5	----	30	312	−43.7	----	30	309	−46.8	----	27	312	−42.5	----
10,000	21	265	−53.6	----	17	284	−39.8	----	26	281	−40.8	----	21	266	−49.8	----	28	268	−50.6	----	30	266	−53.8	----	27	269	−49.5	----
11,000	17	226	−59.3	----	16	244	−48.1	----	25	242	−48.3	----	19	228	−55.4	----	25	230	−56.7	----	30	227	−59.8	----	24	231	−55.6	----
12,000	13	192	−61.5	----	15	209	−55.9	----	22	208	−55.2	----	11	195	−58.5	----	21	196	−60.3	----	30	193	−62.1	----	21	197	−60.7	----
13,000	8	162	−58.2	----	14	179	−61.6	----	16	177	−60.5	----	8	166	−61.4	----	18	166	−59.4	----	26	164	−61.6	----	18	167	−61.8	----
14,000	7	138	−57.4	----	7	151	−65.7	----	9	151	−64.3	----	----	----	----	----	14	142	−58.2	----	22	140	−60.1	----	6	142	−61.5	----
15,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	8	120	−57.8	----	14	118	−59.2	----	----	----	----	----
16,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	11	101	−59.5	----	----	----	----	----
17,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	86	−60.0	----	----	----	----	----

Altitude (meters) m.s.l.	Omaha, Nebr. (308 m.)				Phoenix, Ariz. (339 m.)				Pittsburgh, Pa. (382 m.)				Portland, Maine (20 m.)				Rapid City, S. Dak. (981 m.)				St. Louis, Mo. (171 m.)				St. Paul, Minn. (225 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	986	−3.7	79	31	979	9.5	63	31	974	−2.5	82	31	1,015	−5.2	78	31	906	−4.7	71	30	1,002	−2.2	75	31	993	−6.7	78
500	30	962	−4.4	77	31	960	13.8	45	31	960	−2.6	81	31	955	−4.5	68	----	----	----	----	30	962	−3.3	73	31	959	−8.3	79
1,000	30	902	−5.1	69	31	905	12.2	39	31	901	−4.4	80	31	896	−6.7	68	31	904	−4.3	69	30	903	−3.4	64	31	899	−9.4	76
1,500	30	847	−4.8	63	31	852	9.0	39	31	845	−6.0	70	31	840	−7.8	60	31	849	−2.4	55	30	848	−2.0	52	31	843	−9.6	70
2,000	30	794	−5.0	61	31	802	5.7	41	31	792	−6.6	61	31	788	−8.8	56	31	797	−4.9	56	30	796	−3.3	53	31	790	−9.6	57
2,500	30	745	−6.4	62	30	754	2.8	39	31	744	−7.5	56	31	738	−9.9	58	31	747	−7.0	53	30	747	−4.8	51	30	740	−11.1	52
3,000	30	699	−8.3	61	30	709	−0.4	36	31	697	−8.9	57	31	692	−11.5	60	31	700	−9.6	52	30	700	−7.1	47	30	693	−13.0	49
4,000	29	614	−13.1	56	30	625	−6.1	----	30	612	−13.7	55	31	607	−16.1	62	31	614	−14.5	45	30	616	−12.1	43	30	607	−17.8	52
5,000	28	538	−18.7	----	30	549	−13.2	----	30	536	−19.5	57	31	531	−21.7	60	31	538	−21.0	45	30	540	−18.0	48	30	530	−24.0	55
6,000	28	470	−25.0	----	30	481	−20.9	----	30	467	−25.7	----	30	463	−28.5	----	31	469	−27.8	----	30	471	−24.9	----	30	462	−30.5	----
7,000	28	408	−32.5	----	29	419	−28.3	----	29	406	−32.5	----	29	401	−34.9	----	31	407	−35.1	----	29	409	−32.4	----	29	400	−37.6	----
8,000	23	353	−40.1	----	29	363	−35.7	----	28	351	−39.0	----	29	347	−41.5	----	31	351	−42.2	----	29	354	−39.4	----	29	345	−44.3	----
9,000	20	304	−46.9	----	29	313	−42.8	----	27	303	−45.3	----	27	299	−47.3	----	30	303	−48.9	----	28	306	−46.1	----	28	296	−50.5	----
10,000	18	260	−52.5	----	27	270	−49.9	----	24	260	−50.2	----	24	257	−52.4	----	29	259	−54.7	----	21	262	−52.1	----	26	254	−55.1	----
11,000	17	223	−57.0	----	19	232	−55.6	----	21	224	−54.9	----	20	221	−55.7	----	25	222	−58.6	----	19	224	−56.8	----	20	218	−56.8	----
12,000	11	191	−58.5	----	12	198	−60.0	----	13	190	−58.2	----	15	188	−55.3	----	16	188	−57.6	----	15	191	−59.1	----	19	186	−56.7	----
13,000	----	----	----	----	----	----	----	----	9	161	−57.4	----	11	159	−52.3	----	7	160	−55.7	----	8	163	−58.8	----	14	159	−55.8	----
14,000	----	----	----	----	----	----	----	----	5	138	−58.6	----	5	136	−50.7	----	----	----	----	----	5	138	−58.8	----	6	136	−54.4	----

TABLE 1A.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during December 1944*—Continued

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitnde (meters) m.s.l.	San Antonio, Tex. (240 m.)				San Juan, P. R. (15 m.)				Santa Maria, Calif. (71 m.)				S. Ste. Marie, Mich. (221 m.)				Spokane, Wash. (598 m.)				Swan Island, West Indies (10 m.)				Tacubaya, Mexico (2,306 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	31	994	8.3	81	28	1,014	24.7	75	31	1,011	10.3	82	31	990	−7.3	89	30	953	−1.8	87	30	1,016	24.2	77	31	775	12.7	50
500	31	963	10.2	71	28	958	20.9	76	31	960	13.3	53	31	955	−7.9	90	----	----	----	----	30	960	20.7	79	----	----	----	----
1,000	31	907	9.1	73	28	904	17.2	78	31	905	11.1	44	31	896	−10.0	86	30	907	−3.0	86	30	906	17.5	77	----	----	----	----
1,500	31	854	7.8	68	28	854	13.8	78	31	852	8.0	42	31	839	−11.5	73	30	851	−3.7	77	30	855	14.4	75	----	----	----	----
2,000	31	804	6.0	56	28	804	11.5	63	31	801	4.9	46	31	786	−13.4	76	30	799	−3.9	65	30	806	12.1	71	----	----	----	----
2,500	31	756	4.1	50	28	757	10.5	----	31	754	2.1	47	31	736	−14.6	70	30	749	−5.1	55	30	759	10.3	56	31	757	12.1	47
3,000	31	710	1.6	45	28	713	8.7	----	30	708	−0.9	43	31	688	−16.4	63	30	703	−7.2	54	30	714	8.6	42	31	713	9.1	48
4,000	31	627	−3.5	----	27	631	3.8	----	29	624	−7.5	41	31	602	−21.2	64	29	618	−12.4	53	30	632	4.2	27	31	631	1.2	62
5,000	31	552	−9.7	----	24	557	−2.0	----	29	548	−13.9	44	31	525	−27.0	----	28	541	−18.9	----	30	559	−1.7	----	31	557	−4.7	42
6,000	31	484	−16.3	----	21	490	−8.7	----	29	479	−21.3	42	31	457	−33.0	----	27	473	−26.2	----	29	492	−7.7	----	31	489	−10.9	33
7,000	31	423	−23.0	----	19	430	−15.5	----	29	418	−28.9	----	31	395	−39.3	----	27	411	−33.2	----	29	432	−14.7	----	31	429	−17.2	----
8,000	31	368	−30.0	----	18	376	−21.5	----	26	362	−36.6	----	30	341	−45.3	----	27	355	−40.8	----	28	378	−22.0	----	30	374	−24.6	----
9,000	31	319	−37.1	----	18	327	−30.2	----	26	312	−44.3	----	27	294	−50.8	----	25	307	−47.6	----	26	329	−29.5	----	30	325	−32.6	----
10,000	31	276	−44.1	----	17	284	−37.5	----	24	268	−52.0	----	26	252	−54.8	----	24	263	−54.6	----	25	285	−37.4	----	30	282	−40.6	----
11,000	30	237	−51.4	----	17	244	−44.8	----	19	230	−57.0	----	21	216	−55.6	----	15	225	−58.8	----	25	246	−45.5	----	30	243	−48.8	----
12,000	27	203	−57.6	----	13	211	−51.0	----	10	195	−58.3	----	18	183	−54.9	----	6	194	−61.1	----	24	212	−52.7	----	25	208	−56.2	----
13,000	25	173	−61.8	----	11	180	−58.0	----	5	166	−56.9	----	8	156	−53.0	----	----	----	----	----	24	181	−58.8	----	14	177	−62.1	----
14,000	18	146	−62.8	----	10	153	−63.8	----	----	----	----	----	5	132	−52.6	----	----	----	----	----	15	154	−63.7	----	----	----	----	----
15,000	13	124	−64.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	10	131	−67.8	----	----	----	----	----
16,000	7	107	−65.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
17,000	6	90	−67.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
18,000	5	77	−67.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Altitude (meters) m. s. l.	Tampa, Fla. (3 m.)				Tatoosh Island, Wash. (31 m.)				Toledo, Ohio (191 m.)				Washington, D. C. (25 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	31	1,023	13.2	80	31	1,015	7.1	74	30	997	−5.2	83	31	1,018	1.3	66
500	31	964	13.1	68	31	959	7.1	61	30	959	−5.2	81	31	959	−0.5	66
1,000	31	909	10.7	63	31	902	4.9	60	30	900	−6.2	71	31	901	−1.7	68
1,500	31	856	8.5	54	31	849	2.7	60	30	844	−7.2	67	31	847	−3.0	65
2,000	31	805	7.1	42	31	797	0.3	56	30	791	−8.7	62	31	794	−3.5	58
2,500	31	757	5.6	----	31	749	−2.2	49	30	742	−9.5	56	31	746	−5.0	53
3,000	31	712	3.7	----	31	703	−4.8	42	30	695	−10.8	52	31	699	−7.2	51
4,000	31	629	−1.1	----	31	618	−11.1	44	30	610	−15.5	56	30	615	−12.1	48
5,000	31	554	−6.9	----	31	542	−17.5	44	30	534	−21.2	62	30	539	−18.4	54
6,000	31	486	−12.8	----	30	473	−24.5	----	30	466	−27.5	----	29	471	−25.1	----
7,000	30	426	−19.6	----	29	412	−32.1	----	30	404	−34.4	----	29	409	−32.1	----
8,000	28	372	−26.7	----	28	356	−39.9	----	30	349	−41.1	----	29	354	−38.7	----
9,000	28	323	−34.0	----	25	307	−47.3	----	28	300	−47.1	----	29	305	−44.9	----
10,000	26	279	−41.6	----	20	266	−53.7	----	24	258	−52.2	----	29	225	−50.8	----
11,000	24	241	−49.0	----	17	228	−60.5	----	21	222	−55.7	----	26	226	−55.3	----
12,000	23	206	−56.0	----	11	195	−63.1	----	19	190	−57.8	----	20	191	−56.3	----
13,000	20	176	−61.2	----	6	164	−62.4	----	11	162	−56.2	----	17	163	−56.9	----
14,000	10	150	−64.8	----	----	----	----	----	7	137	−56.4	----	10	139	−56.5	----
15,000	----	----	----	----	----	----	----	----	5	118	−56.9	----	7	119	−56.9	----

NOTE.—All observations taken near 11 p. m., E. S. T. except at Mazatlan and Merida where they are taken near 9 p. m.

"Number of observations" refers to pressure only, as temperature and humidity data are sometimes missing for some observations at certain levels. Relative humidity data are not used in daily observations when the temperature is below −20.0° C.

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

All relative humidity observations are obtained by means of the electric hygrometer and have been adjusted to compensate for the values occurring below the operating range of the humidity element. See article entitled "Curve Method for Obtaining Monthly Means of Relative Humidity" in this issue.

TABLE 1B.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during the year 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Albany, N. Y. (86 m.)				Albuquerque, N. Mex. (1,620 m.)				Apalachicola, Fla. (5 m.)				Atlanta, Ga. (300 m.)				Big Spring, Tex. (774 m.)				Bismarck, N. Dak. (505 m.)				Boise, Idaho (868 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	363	1,006	6.9	78	352	837	13.5	43	356	1,018	19.5	84	357	984	15.3	74	363	927	17.2	55	360	955	5.1	76	355	916	11.3	58
500	363	957	6.9	69					356	961	18.7	68	357	961	15.8	66												
1,000	363	900	4.7	69					356	907	16.1	62	357	906	13.0	65	363	903	17.5	50	360	906	5.4	67	355	902	11.6	51
1,500	363	847	2.5	67					356	855	13.6	56	357	854	11.2	61	363	851	15.0	47	360	846	3.7	64	355	850	9.2	47
2,000	363	795	0.4	65	352	800	12.0	40	356	805	10.5	50	357	804	9.0	57	363	802	12.2	45	360	795	1.5	60	355	799	5.8	48
2,500	362	747	−1.7	61	352	753	8.8	42	356	758	8.8	47	354	756	6.5	53	363	755	9.2	42	360	747	−1.0	56	355	751	2.4	51
3,000	362	701	−3.4	56	352	709	5.1	44	356	713	6.2	43	351	711	3.8	50	363	711	5.8	41	360	701	−3.7	54	355	706	−0.9	52
4,000	359	617	−8.9	47	352	626	−2.4	51	354	631	0.8	39	339	628	−1.7	45	362	628	−0.8	38	355	617	−9.6	51	354	622	−7.6	55
5,000	357	542	−14.6	43	351	551	−9.6	53	352	556	−5.0		335	553	−7.5		358	554	−7.4	38	347	542	−15.6	47	346	546	−14.3	54
6,000	355	474	−21.1		341	483	−16.6	43	349	489	−11.3		327	486	−13.7		356	486	−13.9		341	474	−22.3	47	342	478	−21.1	48
7,000	350	413	−28.0		339	423	−23.2		346	429	−18.0		316	425	−20.6		354	425	−21.0		329	413	−29.4		335	417	−28.3	
8,000	349	359	−35.0		321	367	−30.6		344	374	−25.2		299	371	−27.7		352	370	−28.3		310	358	−36.7		323	362	−35.5	
9,000	344	310	−41.9		299	318	−37.7		342	325	−32.5		282	322	−35.1		346	321	−35.6		279	309	−43.7		300	312	−42.7	
10,000	337	267	−47.8		270	275	−44.4		338	282	−40.1		255	279	−42.2		334	278	−43.0		238	267	−49.4		275	269	−49.0	
11,000	315	229	−52.1		242	237	−50.4		315	243	−47.5		230	240	−49.2		299	239	−50.1						233	231	−53.4	
12,000	273	196	−54.9						262	208	−54.0		195	206	−55.0		259	205	−55.6						200	198	−55.3	
13,000	213	168	−56.2						196	178	−59.5		148	176	−59.0										148	169	−55.6	
14,000	163	144	−57.5																									

Altitude (meters) m. s. l.	Brownsville, Tex. (6 m.)				Buffalo, N. Y. (221 m.)				Caribou, Maine[1] (193 m.)				Charleston, S. C. (14 m.)				Denver, Colo. (1,616 m.)				Dodge City, Kans. (787 m.)				El Paso, Tex. (1,195 m.)			
Surface	365	1,014	21.6	85	356	991	7.7	78	324	992	2.9	81	350	1,017	15.8	88	362	837	8.7	56	360	925	10.9	75	359	881	17.4	41
500	365	958	19.7	78	356	958	7.5	70	324	955	3.3	73	350	960	16.5	72												
1,000	365	904	17.6	64	356	901	5.2	68	324	898	1.3	71	350	906	14.2	67					360	902	12.2	63				
1,500	365	853	15.6	54	356	847	2.7	67	324	843	−0.7	68	350	853	11.8	62					360	849	10.7	55	359	851	17.4	37
2,000	365	804	13.6	45	356	796	0.5	64	324	792	−2.6	65	350	803	9.4	58	362	799	9.6	45	360	799	8.7	50	359	802	14.0	37
2,500	365	757	11.1	40	356	748	−1.8	59	324	743	−4.8	60	350	756	7.0	55	362	752	6.4	45	359	752	5.9	47	359	755	10.4	40
3,000	365	713	8.4	37	356	702	−4.0	55	324	697	−7.0	56	350	711	4.6	52	362	707	2.8	48	359	707	2.8	45	359	711	6.7	42
4,000	362	631	2.1	35	350	618	−9.2	50	324	613	−12.1	48	339	629	−6.9	48	361	624	−4.6	54	358	624	−3.9	43	359	628	0.4	46
5,000	361	557	−4.3	34	348	542	−14.9	44	322	537	−17.9	44	324	554	−6.8	49	361	550	−11.9	57	357	549	−10.7	36	359	554	−7.4	46
6,000	358	490	−10.9	32	346	474	−21.3	41	322	469	−24.4		318	487	−13.1	46	360	481	−19.0	53	356	481	−17.4	33	358	486	−14.0	41
7,000	354	429	−17.5		343	413	−28.2		315	408	−31.1		308	426	−19.7		355	420	−26.3		354	420	−24.4		357	426	−20.9	
8,000	350	375	−24.7		329	359	−34.9		305	353	−37.9		290	372	−26.8		335	364	−33.6		350	366	−31.7		355	371	−28.0	
9,000	347	325	−32.1		310	310	−41.4		294	305	−44.1		272	323	−34.1		309	315	−40.9		334	317	−39.0		347	321	−35.4	
10,000	341	282	−39.6		284	268	−46.9		282	263	−48.9		247	280	−41.2		266	272	−47.2		313	273	−46.1		322	278	−42.6	
11,000	329	243	−47.1		264	230	−51.3		248	225	−51.9		201	241	−48.1		219	231	−51.7		295	235	−52.0		275	240	−49.4	
12,000	294	209	−53.9		228	197	−54.3		211	193	−53.2						170	200	−55.0		264	201	−55.5		239	206	−54.5	
13,000	243	179	−59.3																		227	171	−57.6					

Altitude (meters) m. s. l.	Ely, Nev. (1,908 m.)				Glasgow, Mont. (648 m.)				Great Falls, Mont. (1,128 m.)				Greensboro, N. C. (273 m.)				Hatteras, N. C. (3 m.)				Huntington, W. Va. (172 m.)				Int'l Falls, Minn. (343 m.)			
Surface	360	808	6.3	55	365	939	6.7	67	364	885	8.1	54	346	986	12.1	79	353	1,018	15.9	84	359	998	10.7	82	361	974	3.7	77
500													346	960	13.2	67	353	960	14.7	69	359	959	12.1	68	361	956	4.2	71
1,000					366	900	7.1	60					346	905	11.0	63	353	905	12.1	63	359	904	9.6	65	361	899	2.0	70
1,500					366	847	4.9	57	364	847	7.5	48	346	852	8.4	62	353	853	9.7	58	369	851	6.9	64	361	845	0.3	68
2,000	360	800	7.4	53	366	796	2.1	59	364	797	4.2	51	346	801	6.0	60	353	802	7.3	51	359	800	4.4	62	361	793	−1.6	63
2,500	360	752	6.1	49	366	748	−0.9	60	364	749	0.8	55	345	754	3.7	53	353	755	5.0	47	357	752	2.2	56	361	745	−3.8	57
3,000	360	707	2.7	48	366	702	−3.9	59	364	703	−2.6	58	345	709	1.2	47	353	710	2.6	44	353	707	−0.3	51	361	699	−6.2	55
4,000	360	624	−4.4	47	366	618	−9.9	56	361	619	−9.0	58	339	625	−4.3	42	347	626	−2.9	40	349	623	−5.6	44	359	614	−11.5	50
5,000	360	549	−11.6	46	362	542	−16.1	50	356	543	−15.6	53	336	550	−10.1		339	551	−8.7		344	548	−11.4	40	356	538	−17.5	45
6,000	350	481	−18.7	46	359	474	−22.8	56	352	475	−22.6	50	326	482	−16.4		330	484	−14.9		339	480	−17.7	41	352	470	−24.2	
7,000	342	420	−26.1	43	355	412	−30.0		347	414	−29.9		335	422	−23.3		326	424	−21.5		335	419	−24.4		344	409	−31.1	
8,000	330	365	−33.6		353	357	−37.5		338	359	−37.3		329	367	−30.3		309	369	−28.5		329	365	−31.3		321	355	−38.0	
9,000	312	315	−40.8		348	308	−44.7		322	310	−44.6		321	318	−37.5		301	320	−36.0		324	316	−38.2		289	306	−44.3	
10,000	297	272	−47.6		337	265	−50.7		302	266	−50.7		312	275	−44.8		291	277	−43.4		320	273	−45.0		261	263	−49.7	
11,000	271	234	−53.1		307	228	−54.7		252	229	−54.4		297	236	−51.4		270	235	−50.5		299	235	−51.1		244	226	−52.7	
12,000	232	200	−56.4		248	195	−55.1		199	195	−55.1		268	202	−56.6		228	204	−56.4		264	201	−55.3		195	194	−54.0	
13,000	192	171	−58.2		179	167	−54.5						240	172	−59.7						221	171	−57.6					
14,000	146	146	−59.5										177	148	−62.5													
15,000	89	124	−62.4										111	126	−64.3													

Altitude (meters) m. s. l.	Joliet, Ill. (178 m.)				Lake Charles, La. (5 m.)				Little Rock, Ark. (79 m.)				Louisville, Ky. (166 m.)				Mazatlan, Mexico[2] (80 m.)				Medford, Oreg. (409 m.)				Miami, Fla. (4 m.)			
Surface	360	996	8.3	82	366	1,017	18.8	85	364	1,008	15.9	75	365	998	12.6	73	295	1,004	23.4	80	363	968	13.8	60	366	1,018	22.1	84
500	360	958	9.4	71	366	960	18.2	71	364	959	15.9	63	365	959	12.9	64	295	957	22.4	58	363	958	13.8	59	366	961	20.5	81
1,000	360	902	7.1	68	366	905	15.8	65	364	904	13.4	63	365	904	10.2	63	295	904	21.0	49	363	903	11.6	56	366	907	17.4	78
1,500	359	848	5.1	64	366	854	13.5	57	364	852	11.1	59	365	851	7.7	62	295	853	18.3	48	363	850	8.4	58	365	856	14.7	73
2,000	359	797	3.0	57	366	804	11.3	51	364	802	8.8	54	365	800	5.5	56	295	804	15.5	45	363	800	5.0	60	365	806	12.4	64
2,500	359	750	0.7	52	365	757	8.8	46	364	755	6.4	50	365	753	3.1	51	295	758	12.7	44	363	752	2.0	60	364	759	10.3	55
3,000	359	704	−1.6	48	364	713	6.3	41	363	710	3.7	46	365	708	0.6	46	295	714	9.7		362	706	−0.8	57	364	715	7.9	52
4,000	357	620	−7.1	44	364	630	0.6	37	358	627	−2.2	41	360	624	−4.9	39	280	632	3.1		357	623	−6.6	51	360	633	2.6	46
5,000	351	545	−13.1	45	360	556	−5.6	34	354	552	−8.3	39	358	549	−10.7	33	265	558	−3.3		351	547	−12.9	49	356	558	−3.1	44
6,000	348	477	−19.4	43	358	488	−12.0	35	352	485	−14.7		354	481	−17.1		254	491	−9.9		349	479	−19.5	46	354	491	−9.2	
7,000	345	416	−26.3		353	428	−18.9		350	424	−21.6		343	421	−23.8		248	431	−16.7		339	418	−26.7	43	352	431	−16.0	
8,000	335	362	−33.4		352	373	−26.0		348	369	−28.7		335	366	−31.0		232	376	−23.5		329	363	−34.2		349	377	−23.0	
9,000	324	313	−40.3		349	324	−33.3		340	320	−36.0		310	317	−37.8		226	327	−31.2		321	314	−41.4		345	328	−30.4	
10,000	304	271	−46.6		343	280	−40.7		316	277	−43.1		267	275	−44.1		215	284	−38.8		301	270	−48.1		332	284	−37.9	
11,000	272	233	−51.8		324	242	−47.9		275	239	−49.6						175	245	−46.1		279	232	−53.4		323	245	−45.5	
12,000	239	200	−54.7		304	207	−54.3										144	211	−53.2		243	198	−56.4		300	211	−52.8	
13,000	192	171	−56.5		262	177	−58.9														207	169	−56.9		264	180	−58.7	
14,000					217	151	−62.8														149	145	−56.9		206	153	−63.7	
15,000																									116	131	−67.3	

See footnotes at end of table.

TABLE 1B.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during the year 1944*—Continued

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m.s.l.	Nashville, Tenn. (180 m.)				Oakland, Calif. (2 m.)				Ogden, Utah (1,355 m.)				Oklahoma City, Okla. (391 m.)				Omaha, Nebr. (308 m.)				Phoenix, Ariz. (339 m.)				Pittsburgh, Pa. (382 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	363	997	14.8	71	366	1,016	13.5	75	366	864	9.0	60	357	970	14.8	73	358	981	10.6	76	366	973	20.2	46	364	971	10.1	73
500	363	960	14.4	63	366	957	13.0	62					357	957	15.5	66	358	958	10.3	71	366	954	22.8	32	364	957	10.2	70
1,000	363	905	11.7	62	366	902	12.6	48					357	903	13.9	59	357	902	8.4	67	366	901	19.9	30	364	903	8.2	67
1,500	363	852	9.4	59	366	850	10.3	42	366	849	10.1	51	355	851	12.0	55	357	849	6.6	63	366	850	16.0	33	364	850	5.6	65
2,000	363	802	7.2	54	366	800	7.5	38	366	799	7.6	46	354	801	8.9	50	357	798	4.8	58	366	801	12.1	37	364	799	3.1	63
2,500	363	754	4.7	52	366	752	4.7	34	366	752	4.0	49	353	754	7.2	44	356	751	2.5	53	365	751	8.2	39	362	750	0.7	59
3,000	363	709	2.1	47	366	707	1.9	34	366	707	0.6	51	352	709	4.3	41	354	705	−0.1	50	365	709	4.7	39	362	705	−1.2	52
4,000	352	626	−3.4	42	366	624	−4.3	33	366	623	−6.4	52	345	627	−2.2	38	352	622	−6.1	48	365	627	−2.0	38	358	621	−6.6	47
5,000	346	551	−9.3	42	363	549	−10.8		365	547	−13.3	50	339	552	−8.6	35	347	547	−12.4	42	364	552	−8.6	39	356	546	−12.3	43
6,000	334	483	−15.5		361	481	−17.7		365	479	−20.4	52	337	484	−15.2		346	479	−19.1	40	363	484	−15.5	37	354	478	−18.6	40
7,000	331	423	−22.4		360	420	−25.0		364	418	−27.6		333	424	−22.2		344	418	−26.2		362	423	−22.6		349	417	−25.4	
8,000	322	368	−29.5		358	365	−32.5		362	362	−35.2		321	369	−29.4		334	363	−33.3		359	368	−30.0		344	363	−32.3	
9,000	314	319	−36.7		355	316	−39.7		358	313	−42.6		314	320	−36.5		324	314	−40.3		356	319	−37.4		337	314	−39.1	
10,000	281	276	−43.8		347	273	−46.6		354	270	−49.1		305	276	−43.7		302	271	−46.5		352	276	−44.4		311	271	−45.7	
11,000	246	238	−50.5		322	234	−52.4		351	231	−53.7		286	238	−50.5		271	233	−51.2		336	237	−50.6		275	234	−51.4	
12,000					286	201	−56.0		337	198	−56.0		259	204	−55.6		241	200	−54.6		312	203	−55.0					
13,000					254	171	−57.9		311	169	−57.0										280	174	−57.6					
14,000					220	146	−59.1		276	144	−58.1										244	149	−60.7					
15,000					168	125	−55.8		186	123	−59.3										185	127	−63.1					
16,000									114	105	−60.5																	

Altitude (meters) m.s.l.	Portland, Maine (20 m.)				Rapid City, S. Dak. (981 m.)				St. Louis, Mo. (171 m.)				St. Paul, Minn. (225 m.)				San Antonio, Tex. (240 m.)				San Juan, P. R. (15 m.)				Santa Maria, Calif. (71 m.)			
Surface	362	1,014	5.5	83	363	903	6.5	70	365	997	12.6	71	365	989	8.0	75	363	988	19.1	74	350	1,014	25.1	82	363	1,008	12.3	83
500	362	956	6.4	72					365	959	12.1	63	365	956	7.2	70	363	958	19.0	69	350	959	21.5	82	363	958	13.1	68
1,000	362	899	4.3	69	363	901	6.8	69	365	903	9.7	61	365	900	4.8	70	363	904	16.5	69	350	906	18.1	79	363	902	13.6	46
1,500	362	845	2.2	67	363	848	6.9	56	365	850	7.8	58	365	846	3.0	66	363	853	14.1	65	350	855	15.2	74	363	850	11.4	40
2,000	362	794	0.0	64	363	797	4.3	55	365	800	5.6	53	365	795	1.2	60	363	803	12.0	53	350	805	12.9	62	363	800	8.6	37
2,500	362	746	−2.1	63	363	750	1.5	54	365	752	3.4	48	363	747	−1.0	54	363	757	9.6	44	350	758	10.8	50	363	753	5.9	33
3,000	362	700	−4.3	60	363	704	−1.4	53	365	707	0.8	45	363	702	−3.4	50	363	712	7.0	37	350	714	8.5	41	362	708	3.0	30
4,000	356	616	−9.4	56	363	620	−7.6	51	361	623	−5.0	43	357	617	−9.0	46	361	630	1.0	33	343	632	3.3		359	625	−2.8	
5,000	351	541	−15.1	53	361	545	−14.3	50	359	548	−10.9	42	356	542	−15.1	44	358	556	−5.4		333	558	−2.5		356	550	−9.2	
6,000	342	473	−21.5	50	359	477	−21.2	44	352	481	−17.3	38	353	474	−21.6	42	353	488	−11.7		325	491	−8.6		355	483	−16.2	
7,000	334	412	−28.3	48	357	415	−28.5		347	420	−24.4	40	349	413	−28.7		353	428	−18.6		317	431	−15.3		354	422	−23.7	
8,000	312	358	−35.2		348	360	−35.7		340	365	−31.5		339	358	−35.9		350	373	−25.8		309	377	−22.2		345	367	−31.1	
9,000	292	309	−41.8		329	311	−42.8		324	316	−38.6		309	310	−42.6		342	324	−33.1		301	328	−29.6		338	318	−38.6	
10,000	266	266	−47.5		305	268	−49.2		280	274	−45.3		288	267	−48.1		337	281	−40.4		293	285	−37.1		326	274	−45.7	
11,000	231	229	−51.7		258	230	−53.8		237	237	−50.6						316	242	−47.8		279	246	−44.7		307	236	−51.9	
12,000	200	197	−54.1		190	198	−55.9										272	208	−53.7		245	211	−52.0		274	202	−56.4	
13,000					142	169	−56.4														195	181	−59.3		238	172	−58.4	
14,000																									202	148	−60.5	
15,000																									156	126	−62.7	

Altitude (meters) m.s.l.	Sault Ste. Marie, Mich. (221 m.)				Spokane, Wash. (598 m.)				Swan Island, West Indies (10 m.)				Tacubaya, Mexico (2,306 m.)				Tampa, Fla. (3 m.)				Tatoosh Island, Wash. (31 m.)				Toledo, Ohio (191 m.)			
Surface	358	990	4.0	84	365	945	10.3	63	341	1,013	25.7	81	364	774	15.7	58	344	1,018	20.8	82	364	1,013	9.6	85	358	995	8.3	80
500	358	957	4.4	80					341	958	22.2	82					344	961	19.2	71	364	957	8.7	74	358	958	8.8	70
1,000	358	899	2.7	74	365	901	9.4	56	341	905	19.0	77					344	907	16.6	67	364	901	6.7	68	358	902	6.4	68
1,500	358	845	0.8	71	365	848	6.2	56	341	854	16.2	69					344	856	13.9	62	364	848	4.4	63	358	849	4.2	65
2,000	358	794	−1.4	69	365	797	3.3	58	341	804	13.8	56					342	806	11.6	51	364	797	1.7	59	358	797	2.0	62
2,500	358	745	−3.4	66	365	749	−0.4	54	341	758	11.8	45	364	756	14.6	56	342	759	9.4	41	364	749	0.8	54	358	749	−0.2	56
3,000	358	699	−5.7	63	365	704	−3.6	60	339	714	9.7	36	364	713	11.2	59	339	714	6.9	36	363	703	−3.5	50	358	704	−2.5	50
4,000	354	615	−10.9	58	363	619	−9.6	55	333	632	4.4		364	632	3.5	70	337	632	1.4	32	358	619	−9.4	48	356	620	−7.9	44
5,000	345	539	−16.7	55	362	543	−15.8	44	327	559	−1.5		361	558	−3.0	66	333	557	−4.5		354	543	−15.7	46	354	544	−13.8	43
6,000	339	472	−23.1	50	358	475	−22.4	39	312	492	−7.2		358	491	−8.9	52	330	490	−10.7		345	475	−22.4	40	352	476	−20.2	41
7,000	332	411	−29.9	48	355	414	−29.7		309	432	−13.7		353	431	−15.2	49	327	430	−17.5		340	413	−29.6		350	415	−27.1	
8,000	317	356	−36.6		338	359	−36.9		299	378	−20.6		345	377	−22.1	47	316	375	−24.5		336	358	−36.9		347	361	−34.1	
9,000	292	308	−43.0		316	310	−44.0		291	329	−27.8		340	328	−29.6		313	326	−31.8		324	309	−43.8		331	312	−40.7	
10,000	263	265	−48.8		294	267	−50.3		283	286	−35.5		337	285	−37.4		306	282	−39.6		301	267	−50.1		296	269	−46.5	
11,000	223	229	−51.9		245	228	−54.2		275	247	−43.5		324	245	−45.4		291	243	−47.1		276	229	−54.6		268	231	−51.2	
12,000	181	195	−53.0		205	196	−55.1		263	213	−51.5		266	211	−53.1		258	209	−53.8		237	195	−56.5		236	198	−54.4	
13,000									241	182	−59.0		182	180	−60.6		203	179	−59.9		194	167	−55.3		187	169	−56.3	
14,000									172	155	−65.2										137	143	−54.6					

Altitude (meters) m. s. l.	Washington, D. C. (25 m.) Number of observations	Pressure	Temperature	Relative humidity
Surface	365	1,015	12.7	71
500	365	959	11.4	64
1,000	365	904	9.0	64
1,500	365	851	6.6	64
2,000	365	800	4.2	61
2,500	365	752	1.8	56
3,000	365	706	−0.5	50
4,000	360	623	−5.8	44
5,000	358	548	−11.7	42

Altitude (meters) m. s. l.	Washington, D. C. (25 m.) Number of observations	Pressure	Temperature	Relative humidity
6,000	355	480	−18.1	
7,000	354	419	−24.7	
8,000	354	364	−31.7	
9,000	349	315	−38.7	
10,000	338	272	−45.5	
11,000	311	231	−51.5	
12,000	280	200	−55.7	
13,000	235	171	−58.2	
14,000	154	146	−60.3	

[1] Data for 11 months; April missing.
[2] Data for 11 months; October missing.

NOTE.—All data are based on observations for 12 months, except as otherwise indicated.

At some stations, higher levels were not available during 1 or 2 months. These data are not published for any level where observations were missing for more than 1 month in the same season, or more than 2 months during the year.

TABLE 2A.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during December 1944. 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. (538 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. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (17 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,196 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	25	9	0.7	31	321	0.3	26	279	2.7	30	241	3.8	31	287	3.4	25	102	0.3	28	131	2.0	25	250	4.2	29	233	1.4	29	279	1.7	25	285	1.6	31	40	1.6	30	301	0.8
500	---	---	---	---	---	---	26	279	2.8	---	---	---	---	---	---	---	---	---	28	152	2.4	25	253	5.6	29	231	4.5	29	273	3.6	25	259	2.7	---	---	---	---	---	---
1,000	25	269	2.6	---	---	---	26	271	4.6	---	---	---	31	298	7.6	25	115	0.9	26	185	2.3	22	272	7.6	28	257	5.7	28	271	5.7	22	259	4.8	---	---	---	---	---	---
1,500	20	284	6.3	---	---	---	24	269	5.9	30	279	7.8	28	302	8.9	25	148	2.4	20	284	2.4	15	270	9.2	22	270	7.4	27	277	8.1	17	267	7.8	---	---	---	30	300	0.6
2,000	20	289	7.2	31	255	1.4	22	278	7.7	30	296	9.5	23	298	10.8	22	205	2.7	19	284	3.7	13	269	10.6	19	282	8.9	23	281	9.4	15	268	9.9	31	352	2.3	29	260	1.8
2,500	20	294	7.8	31	263	3.5	19	281	8.8	29	297	10.4	24	299	11.9	19	255	4.3	15	282	5.0	12	274	11.0	15	284	11.5	19	285	11.4	12	2 8	10.5	30	328	4.4	29	263	3.8
3,000	19	303	8.9	28	282	6.1	19	278	11.1	29	303	12.0	21	300	13.1	19	266	4.8	13	286	7.0	10	274	12.9	13	289	14.3	17	276	12.7	10	293	13.4	29	313	5.8	27	276	3.5
4,000	18	299	12.9	27	291	9.8	17	286	14.8	25	305	12.6	18	299	15.6	15	267	6.5	11	290	9.2	---	---	---	10	283	17.8	15	277	16.7	---	---	---	27	304	9.6	22	293	7.3
5,000	15	297	13.2	26	292	12.8	15	285	18.1	21	314	14.0	16	294	17.4	13	285	7.4	11	275	14.1	---	---	---	---	---	---	12	292	18.8	---	---	---	25	300	12.3	13	313	0.8
6,000	12	287	14.1	25	286	15.0	12	273	21.7	19	323	14.5	13	286	19.1	10	299	7.5	11	274	17.5	---	---	---	---	---	---	10	288	23.6	---	---	---	21	282	13.2	---	---	---
8,000	---	---	---	23	287	17.9	---	---	---	12	331	13.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14	277	17.9	---	---	---
10,000	---	---	---	15	277	25.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (573 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (15 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 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	31	354	0.6	31	315	1.1	24	284	1.9	30	262	3.3	29	330	1.2	26	267	2.7	31	29	0.7	22	313	0.4	25	313	0.7	31	75	1.8	27	294	0.8	24	253	1.7	2[illegible]	315	3.9
500	---	---	---	---	---	---	24	278	3.2	---	---	---	29	285	1.9	26	272	4.3	---	---	---	22	321	1.2	25	340	0.6	31	58	2.9	27	238	1.8	24	236	3.0	2[illegible]	286	4.4
1,000	---	---	---	---	---	---	24	270	5.7	30	265	6.0	27	270	2.5	21	285	5.8	31	35	1.6	18	238	4.0	24	144	3.5	31	58	2.3	24	268	2.7	17	226	3.8	25	296	6.5
1,500	---	---	---	31	323	1.4	24	285	8.2	29	288	8.7	26	284	4.7	19	286	7.2	31	25	2.0	18	265	6.7	22	159	5.2	31	36	1.3	22	279	4.9	15	249	5.7	21	302	8.3
2,000	31	346	0.6	31	334	0.7	24	289	9.4	29	302	8.9	24	291	6.4	15	285	10.4	31	6	1.4	17	275	8.8	21	195	4.3	27	306	0.6	21	291	6.7	15	275	8.9	10	313	9.3
2,500	31	297	1.0	30	278	1.3	20	291	12.1	27	306	11.0	21	288	9.1	13	280	12.6	31	308	1.5	16	279	10.5	19	197	4.9	23	233	2.2	17	280	7.8	15	277	11.1	---	---	---
3,000	29	325	2.0	30	273	3.2	19	281	14.1	21	300	13.4	21	282	10.8	12	283	15.5	30	311	2.6	16	282	10.7	17	193	4.9	23	244	3.7	14	266	7.6	14	280	11.9	---	---	---
4,000	26	311	3.2	25	293	6.9	18	282	15.5	13	308	13.8	17	277	11.9	---	---	---	28	310	4.7	13	294	15.1	14	186	6.3	18	251	8.0	---	---	---	12	287	16.8	---	---	---
5,000	22	312	5.0	19	304	8.3	15	285	18.5	12	313	15.5	16	273	16.2	---	---	---	28	301	5.8	13	298	18.9	13	192	5.5	13	246	10.4	---	---	---	12	288	17.9	---	---	---
6,000	22	310	5.8	16	323	10.1	14	274	19.7	---	---	---	13	267	18.6	---	---	---	28	298	8.8	12	293	20.7	10	189	4.0	11	245	11.4	---	---	---	10	291	17.6	---	---	---
8,000	22	304	8.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	26	290	13.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,000	19	306	11.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	19	290	17.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,000	17	289	15.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11	278	23.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,000	12	297	16.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (116 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 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	29	188	1.0	22	324	3.4	26	331	2.7	31	84	0.7	29	337	4.9	28	296	1.6	25	301	3.4	25	314	1.6	31	284	2.6	23	313	2.4	29	52	0.6	27	159	0.7	27	306	2.9
500	29	88	1.8	22	320	3.3	26	323	2.6	31	78	0.7	---	---	---	28	288	3.0	25	303	4.8	25	314	2.0	31	313	1.4	23	289	3.2	29	144	2.7	---	---	---	27	282	4.6
1,000	26	133	1.8	22	324	4.4	23	306	5.0	31	87	1.4	29	335	5.2	22	283	5.0	24	287	6.2	24	289	2.6	29	96	1.3	15	300	4.6	25	171	3.2	27	180	2.3	26	286	7.1
1,500	24	169	2.6	22	318	6.7	22	306	8.2	31	98	1.3	29	323	9.5	20	285	6.4	21	300	8.9	22	295	4.5	29	97	1.5	---	---	---	24	193	3.0	23	212	3.7	24	291	10.5
2,000	22	173	3.2	19	317	10.4	19	306	10.5	30	100	0.4	27	316	10.5	17	282	9.2	18	297	10.8	21	300	6.0	28	71	0.1	---	---	---	22	215	3.1	16	241	3.9	20	294	11.4
2,500	20	168	2.2	19	318	10.3	17	302	12.4	30	301	0.5	25	312	11.6	17	286	10.4	16	295	11.6	15	299	6.9	27	324	0.8	---	---	---	19	252	3.2	13	264	6.0	18	292	13.6
3,000	20	186	2.2	19	309	11.8	17	301	14.6	28	301	2.0	23	312	12.7	15	281	12.5	14	296	12.6	15	295	8.3	25	285	2.1	---	---	---	16	252	3.2	11	296	4.1	18	287	14.0
4,000	19	180	2.4	18	298	13.8	13	307	18.3	26	294	6.0	22	304	14.3	11	285	14.2	10	296	14.7	15	285	10.7	23	273	4.2	---	---	---	13	267	2.7	10	312	7.4	16	285	16.8
5,000	18	216	4.1	17	300	14.5	10	306	20.5	24	301	7.1	21	298	17.2	---	---	---	---	---	---	13	284	13.6	23	274	5.0	---	---	---	12	288	3.7	---	---	---	15	287	17.7
6,000	16	246	5.2	13	292	17.1	---	---	---	24	291	10.1	15	297	15.8	---	---	---	---	---	---	12	283	15.9	21	264	8.2	---	---	---	12	277	1.9	---	---	---	11	290	17.4
8,000	14	261	6.3	---	---	---	---	---	---	19	282	15.0	---	---	---	---	---	---	---	---	---	---	---	---	18	264	10.0	---	---	---	12	304	4.3	---	---	---	---	---	---
10,000	11	243	6.8	---	---	---	---	---	---	12	280	21.0	---	---	---	---	---	---	---	---	---	---	---	---	14	265	15.9	---	---	---	---	---	---	---	---	---	---	---	---
12,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	268	23.9	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 2B.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during the year 1944. 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. (538 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. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (100 m.)			Charleston, S. C. (17 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,198 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	349	174	2.5	363	230	1.8	334	276	1.1	354	276	1.4	351	272	0.7	356	317	2.6	354	121	4.3	337	256	2.6	346	248	1.2	345	217	0.6	355	261	1.3	360	49	1.2	364	238	2.1
500							334	278	1.6										354	132	4.9	337	255	3.9	346	233	3.0	345	218	1.7	355	252	2.5						
1,000	348	188	3.6				328	273	2.1				348	292	2.0	356	316	2.3	307	142	3.7	295	256	5.4	327	256	4.8	321	257	2.8	329	251	3.4						
1,500	333	204	3.9				316	277	2.9	354	274	2.9	323	287	3.0	355	295	1.5	272	153	2.3	251	262	5.9	297	272	6.3	305	278	4.0	297	257	4.9				364	234	2.3
2,000	319	221	4.4	363	230	2.6	295	284	4.4	344	284	3.9	292	285	4.3	344	267	1.9	240	179	1.3	215	269	7.0	254	281	7.8	281	287	5.6	257	268	6.0	360	45	1.1	361	244	3.0
2,500	300	235	4.8	362	242	3.2	270	288	5.7	335	282	4.8	268	289	5.9	316	268	2.8	224	203	1.5				208	286	9.2	253	290	7.1	214	276	6.7	347	328	0.4	352	242	3.7
3,000	283	247	5.9	354	253	4.3	241	287	7.0	312	282	6.3	237	290	7.7	310	251	3.5	204	237	1.9				149	289	9.5	238	287	7.7	187	283	7.2	333	278	1.9	345	249	4.6
4,000	258	262	7.7	309	263	6.7	202	289	9.2	268	281	8.3	207	288	9.6	266	267	4.6	179	247	3.1							192	286	9.2				303	278	5.6	306	254	7.3
5,000	232	266	8.8	260	268	9.0	144	286	11.6	226	278	9.5	162	290	11.1	229	267	6.4	152	262	4.4							143	290	10.2				238	272	10.8	194	252	7.1
6,000	184	268	9.4	218	264	10.0				176	279	10.0	140	292	12.7	198	267	7.5																157	266	15.0			
8,000																																							

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.			Las Vegas, Nev. (573 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (416 m.)			Miami, Fla. (15 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 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	360	217	1.5	359	290	1.4	322	249	1.3	349	269	1.7	357	8[illegible]	1.6	349	23[illegible]	1.7	36[illegible]	16[illegible]	0.8	33[illegible]	16	0.8	349	310	1.3	360	119	2.1	329	209	0.8	349	254	1.2	337	274	1.6
500							322	249	2.0				35	14[illegible]	0.5	349	250	2.4				33[illegible]	19[illegible]	1.2	34	311	1.5	365	103	3.1	329	209	1.5	349	244	2.0	337	270	3.3
1,000							317	258	2.9	349	259	2.8	33[illegible]	23[illegible]	1.4	305	242	3.4	36[illegible]	170	1.4	32[illegible]	22[illegible]	2.0	347	286	0.6	355	102	2.0	286	254	1.4	32[illegible]	24[illegible]	2.8	310	274	5.1
1,500				359	291	1.7	315	272	4.3	342	268	4.2	318	266	3.1	272	256	4.8	364	199	1.7	31[illegible]	252	3.3	338	231	1.4	343	82	0.6	261	292	2.4	308	260	3.8	293	290	6.8
2,000	360	219	1.7	359	276	1.9	293	281	6.0	322	272	5.2	29[illegible]	276	4.4	220	26[illegible]	6.3	359	216	2.1	286	266	4.7	327	231	2.0	312	319	0.6	239	298	3.4	281	272	5.1	242	294	7.8
2,500	360	229	2.1	356	249	2.4	262	285	7.8	300	278	6.1	275	281	5.4	187	275	7.4	352	230	2.8	267	273	6.0	302	237	2.1	290	277	1.2	190	294	4.1	257	277	6.5	197	296	8.3
3,000	349	235	2.4	342	249	3.7	236	286	9.5	264	278	7.1	258	281	6.1	153	282	8.3	336	230	3.8	255	277	6.6	272	260	1.9	269	290	2.1	147	295	4.1	235	281	7.7			
4,000	293	252	3.5	271	257	5.2	187	281	12.5	181	274	6.9	226	277	7.5				321	257	4.8	206	282	8.7	230	280	3.2	240	262	3.4				203	284	10.0			
5,000	248	257	5.4	187	263	5.6							200	278	9.2				300	262	6.3	163	289	9.0	184	277	4.3	215	262	4.5				161	287	13.1			
6,000	213	261	6.6										175	276	10.4				287	251	8.5				162	284	5.1	194	265	5.7									
8,000																			238	272	10.6																		

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (396 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego,[1] Calif. (13 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (13 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 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	35[illegible]	26[illegible]	3.5	33	18[illegible]	2.9	34	22[illegible]	0.7	36	24	0.7	33	354	1.4	34[illegible]	244	1.4	348	246	1.3	345	134	2.0				324	279	1.8	343	258	1.4	357	222	1.3	329	275	1.2
500	35[illegible]	28[illegible]	2.3	33	18[illegible]	3.1	34	21[illegible]	1.3	36	24	1.1				34[illegible]	246	2.4	348	249	1.5	344	139	2.4				324	276	2.3	342	203	1.7				328	268	2.3
1,000	32[illegible]	29[illegible]	1.5	33	19[illegible]	3.6	32[illegible]	22[illegible]	2.6	36	22[illegible]	1.3	33[illegible]	348	1.6	32[illegible]	246	3.4	299	250	3.0	322	169	2.6				279	273	4.2	303	201	2.9	357	216	2.0	314	276	4.0
1,500	31[illegible]	304	1.9	31[illegible]	221	4.3	29[illegible]	247	3.9	36[illegible]	20[illegible]	1.7	33[illegible]	324	2.5	30[illegible]	261	4.6	274	267	4.5	275	171	2.4				232	276	5.3	271	210	3.3	337	224	3.1	310	283	5.5
2,000	29[illegible]	314	1.9	28[illegible]	243	5.6	24[illegible]	26[illegible]	5.9	35[illegible]	20[illegible]	2.3	32[illegible]	297	4.0	27[illegible]	269	6.4	238	274	6.2	276	208	2.3							230	217	3.1	299	236	3.6	261	288	7.1
2,500	27[illegible]	321	2.4	27[illegible]	255	6.3	21[illegible]	276	7.5	35[illegible]	21[illegible]	2.8	30[illegible]	289	5.7	25[illegible]	275	8.2	180	281	7.7	244	238	3.1							206	232	3.2	269	243	4.0	239	290	8.9
3,000	27[illegible]	322	2.7	265	263	7.3				34[illegible]	234	3.2	27[illegible]	288	7.7	227	277	9.3	158	292	9.0	216	256	4.3							173	241	3.5	236	251	3.9	224	287	10.1
4,000	261	315	3.9	230	270	9.3				331	249	5.2	256	287	9.4	177	284	10.9				103	265	5.8										189	261	5.3	183	288	11.8
5,000	243	306	5.2	207	278	11.3				295	256	6.3	204	286	11.2							150	270	8.6															
6,000	220	301	6.5	162	276	13.2				275	261	8.4	177	285	11.8																								
8,000										201	259	10.4																											

[1] Insufficient data.

NOTE.—All data are based on observations during 12 months except at Caribou, where data were not available for April. At some stations data were missing during 1 or 2 months at higher levels. Data not published for any level where observations are missing for more than 1 month in the same season or more than 2 months during the year.

TABLE 3A.—*Maximum free air wind velocities (m. p. s.), for different sections of the United States based on pilot balloon observations during December 1944*

Section	Surface to 2,500 meters (m. s. l.)					Above 2,500 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	47.5	NW.	1,557	28	Portland, Maine	68.0	WNW.	4,220	28	Albany, N. Y	80.0	WNW.	6,120	28	Albany, N. Y.
East-Central [2]	38.8	SW.	619	18	Hatteras, N. C	48.8	W.	3,192	20	Huntington, W. Va	64.8	NW.	6,865	19	Knoxville, Tenn.
Southeast [3]	39.0	NW.	2,500	19	Charleston, S. C	44.0	NW.	2,627	19	Charleston, S. C	60.2	WSW.	11,607	15	Miami, Fla.
North-Central [4]	48.5	NNW.	2,152	18	Rapid City, S. Dak	49.2	WSW.	4,892	25	Milwaukee, Wis	53.6	WSW.	5,162	25	Milwaukee, Wis.
Central [5]	50.2	NNE.	1,790	13	Dodge City, Kans	41.2	WNW.	4,548	15	Springfield, Mo	48.4	WSW.	6,753	30	Goodland, Kans.
South-Central [6]	35.0	NW.	2,080	11	Lake Charles, La	49.0	NW.	4,763	12	Little Rock, Ark	67.4	WSW.	7,799	10	Waco, Tex.
Northwest [7]	30.2	WNW.	1,820	19	Glasgow, Mont	42.0	SSW.	3,262	27	Eugene, Oreg	67.6	NW.	7,755	4	Glasgow, Mont.
West-Central [8]	30.0	WNW.	2,291	31	Cheyenne, Wyo	44.0	NW.	5,000	31	Ely, Nev	53.2	WNW.	16,185	13	Ely, Nev.
Southwest [9]	47.0	NE.	2,500	4	Mt. Laguna, Calif	40.8	NNW.	4,778	10	El Paso, Tex	84.0	WSW.	10,635	29	Albuquerque, N. Mex

[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 El Paso), 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 3B.—*Maximum free air wind velocities (m. p. s.) for different sections of the United States based on pilot-balloon observations during the year 1944*

Section	Surface to 2,500 meters (m. s. l.)					Above 2,500 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	50.8	NW.	2,265	Jan. 30	New York, N. Y.	68.0	WNW.	4,220	Dec. 28	Albany, N. Y.	90.0	NW.	10,903	Apr. 23	Ca ibou, Maine.
East-Central [2]	48.0	E.	1,164	Oct. 18	Hatteras, N. C.	67.0	WSW.	5,000	Jan. 20	Huntington, W. Va.	86.4	WNW.	15,879	Oct. 30	Huntington, W. Va.
Southeast [3]	39.0	NW.	2,500	Dec. 19	Charleston, S. C.	54.4	WSW.	5,000	Mar. 7	Atlanta, Ga.	80.0	WSW.	14,287	Jan. 22	Miami, Fla.
North-Central [4]	48.5	NNW.	2,152	Dec. 18	Rapid City, S. Dak.	57.6	W.	4,995	Jan. 10	St. Paul, Minn.	85.5	NNW.	7.875	Jan. 22	St. Paul Minn.,
Central [5]	51.3	W.	1,168	Feb. 5	Joliet, Ill.	54.2	NW.	4,856	Nov. 23	St. Louis, Mo.	68.0	W.	6,603	Feb. 20	Goodland, Kans.
South-Central [6]	42.4	W.	2,020	Apr. 10	Del Rio, Tex.	49.0	NW.	4,763	Dec. 12	Little Rock, Ark.	85.5	WSW.	11,781	Feb. 2	Big Spring, Tex.
Northwest [7]	43.5	SW.	2,442	May 15	Burns, Oreg.	61.2	W.	4.221	Mar. 23	Ellensburg, Wash.	81.0	N.	6,711	Mar. 13	Medford, Oreg.
West-Central [8]	54.6	S.	2,214	Apr. 8	Grand Junction, Colo.	66.0	NW.	4,784	Feb. 14	Sacramento, Calif.	69.8	E.	12,951	Oct. 23	Ely, Nev.
Southwest [9]	47.0	NE.	2,500	Dec. 4	Mt. Laguna, Calif.	64.3	W.	4,498	Feb. 9	El Paso, Tex.	84.0	WSW.	10,635	Dec. 29	Albuquerque, N. Mex.

[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 El Paso), 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.

RIVER STAGES AND FLOODS

By C. R. JORDAN

PRECIPITATION during December was above normal in most sections from the central Great Plains southward to the Gulf, much of the Ohio Valley, and New York and Pennsylvania. Rainfall was notably scanty in the Southeast, Central-Northern States, and the western Great Basin.

Floods, extraordinarily high for December, occurred in Kansas as a result of heavy rains in combination with frozen ground and high base flow. Moderately severe floods also occurred in West Virginia as a result of rainfall and melting of snow on December 25 and 26.

Atlantic slope drainage.—Rainfall that averaged about 2 inches fell over eastern North Carolina during the last 4 days of November that produced light overflow of the Neuse, Tar, and Roanoke Rivers during the early part of December. Crests were only a little above flood stage and no damage of consequence occurred.

MISSISSIPPI SYSTEM

Missouri Basin.—Heavy to excessive rains fell over the lower portion of the Grand River basin in the 3-day period December 3–5, 1944. Storm totals exceeded 3.50 inches at reporting stations. Sharp rises resulted; the stage at Chillicothe, Mo., rising from 6.30 feet on December 4 to 27.3 feet on the morning of the 6th. Damage resulting from this overflow was not great.

Unusually severe overflow occurred along the Marais des Cygnes (Osage) River from December 5 to 12, which was the first December overflow of record along that stream. It was due to torrential rains at and above Ottawa, especially in Osage County. The following report of the overflow was received from the Official in Charge, Weather Bureau Office, Topeka, Kans.

The crest at Quenemo was 36.35 on the 5th, 6.35 feet above bankful, and exceeded only by three previous overflows of record—those of November 1928, with a crest of 38.38; June 1935, with a crest of 36.6; and April 1944, with a crest of 38.1 feet.

At Ottawa this was the fifth greatest overflow of record, with a crest of 33.9 feet, 9.9 feet above bankful, on the 6th. Overflows that exceeded this at this point were those of May 1904, with a crest of 34.3 feet; July 1909, with a crest of 35.9 feet; November 1928, with a crest of 37.6 feet; and April 1944, with a crest of 36.5 feet.

At Osawatomie the crest was 38.8 feet, 10.8 feet above bankful, on the 7th. As this flood crest moved toward the Missouri line, it tended to flatten very materially, with the result that at Trading Post it was 27.14 feet, which was 3.7 feet lower than the crest of April 25, 1944, at that point and 7.3 feet lower than the great crest of November 18, 1928.

The greatest damage occurred at Ottawa, where the rise of the river was very rapid and there were several narrow escapes from drowning. It was estimated that in Ottawa the loss amounted to $100,000, which was about one-half as great as the loss during the great overflow of April preceding. Approximately 50 families were flooded out of their homes and there was great damage in the business section located near the river, due to flooded basements and also water over the first floor. The passenger and telegraph offices of the Sante Fe Railway were flooded and were abandoned for a few days. Train service over the north-and-south line of the Santa Fe passing through Ottawa and also over the Missouri Pacific was interruped for a day or two.

Persons forced to leave their homes in the flooded district were, in many cases, sheltered in churches and other buildings.

No other cities along the river are subject to overflow, but there was much damage to the corn crop that had been left in the fields. It was estimated that fully two-thirds of this crop had not been removed from the fields and it was an unusually good crop. Loss to this crop was near 50 percent of the loss during