AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE, in charge]

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At those stations with a sufficient period of record for the determination of approximate normals, upper-air temperatures during February averaged below normal. (See table 1.) Exceptionally large departures occurred from the surface to 1,500 meters at Omaha. While the departures at Seattle were likewise exceptionally large, there were too few observations made during the month at that station to determine reliable means. Mean temperatures for the month were considerably lower over the north-central part of the country than over corresponding latitudes in the eastern and western sections.

Upper-air relative humidities averaged mostly above normal, as indicated in table 1.

The directions of the upper-air wind resultants contained greater northerly components than normal in the lower levels at a number of stations, especially in the north-central section. Elsewhere these directions were close to normal. Resultant velocities exceeded the normals at nearly all stations, with the departures increasing to moderately large values at the high levels.

TABLE 1.—*Mean free-air temperatures and relative humidities obtained by airplanes during February 1936*

TEMPERATURE (° C.)

Stations	Altitude (meters) m. s. l.																Number of observations
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	
Barksdale Field (Shreveport), La.[1] (52 m)	3.7		5.2		5.7		5.6		4.2		2.4		0.2		−5.8		−12.1		23
Billings, Mont.[2] (1088 m)	−18.2						−14.3		−13.2		−13.4		−15.2		−21.9		−28.9		27
Cheyenne, Wyo.[2] (1,873 m)	−9.9								−9.6		−9.2		−11.7		−18.4		−25.9		29
El Paso, Tex.[2] (1,194 m)	7.6						9.6		7.2		3.4		.6		−5.7		−12.3		29
Fargo, N. Dak.[2] (274 m)	−25.6		−22.8		−21.0		−19.2		−19.2		−19.8		−21.4		−26.7		−32.4		24
Kelly Field (San Antonio), Tex.[1] (206 m)	5.6		7.5		9.3		10.5		9.1		6.3		2.8		−3.8		−11.4		19
Lakehurst, N. J.[2] (39 m)	−5.1		−7.3		−7.7		−8.3		−9.6		−11.1		−13.2		−18.7		−25.4		21
Maxwell Field (Montgomery), Ala.[1] (52 m)	6.9		6.0		4.2		3.7		2.6		.5		−1.8		−7.0		−13.3		19
Mitchell Field (Hempstead, Long Island), N. Y.[1] (29 m)	−7.4		−7.8		−7.9		−8.3		−9.3		−10.9		−12.9		−17.1		−24.0		22
Murfreesboro, Tenn.[2] (174 m)	−.7		−.6		−1.0		−1.3		−2.4		−4.2		−6.2		−11.6		−18.3		27
Norfolk, Va.[3] (10 m)	1.6	−1.8	3.3	0	1.6	−0.4	−.2	−0.7	−2.1	−1.0	−4.1	−0.9	−6.3	−1.0	−10.6	−0.6	−16.8	−1.0	13
Oklahoma City, Okla.[2] (391 m)	−3.0		−1.7		−.9		2.1		1.5		−.3		−3.4		−9.6		−16.0		28
Omaha, Nebr.[2] (300 m)	−15.9	−9.2	−15.3	−9.5	−11.3	−7.7	−8.8	−6.0	−8.4	−4.8	−9.4	−3.8	−11.6	−3.5	−17.7	−3.7	−24.7	−4.2	27
Pearl Harbor, Territory of Hawaii[2] (6 m)	19.6	−2.0	19.0	−.5	15.4	−.3	12.4	−.7	10.6	−.6	9.5	−.1	6.2	−1.1	−.2	−1.7	−9.6	−5.1	29
Pensacola, Fla.[3] (0 m)	9.2	−.9	9.6	−.9	9.1	0	7.9	+.4	5.8	+.3	3.3	0	.9	−.1	−4.6	−.1	−11.6	−.4	26
San Diego, Calif.[3] (10 m)	10.6	−1.5	11.0	−.9	8.8	−1.4	6.5	−1.4	4.0	−1.5	1.8	−1.3	−.6	−1.1	−6.0	−.5	−12.1	0	28
Scott Field (Belleville), Ill.[1] (135 m)	−9.3		−8.0		−5.6		−4.0		−5.5		−7.8		−9.9		−15.9		−22.2		17
Seattle, Wash.[3] (10 m)	−.2	−6.5	−5.5	−10.1	−6.9	−8.8	−8.5	−7.7	−9.8	−6.4	−10.7	−4.8	−12.9	−4.2	−18.8	−5.1	−25.5	−6.1	5
Spokane, Wash.[3] (596 m)	−10.3				−9.4		−9.9		−10.7		−12.6		−15.0		−20.7		−26.6		28
Washington, D. C.[3] (13 m)	−5.6	−5.6	−4.1	−3.9	−5.2	−3.6	−6.1	−3.3	−6.7	−2.6	−8.0	−2.1	−9.8	−1.9	−14.3	−1.3	−19.4	−1.0	20
Wright Field (Dayton), Ohio[1] (244 m)	−8.0		−7.9		−7.5		−6.8		−7.9		−9.9		−12.1		−17.2		−23.2		23

RELATIVE HUMIDITY (PERCENT)

Barksdale Field (Shreveport), La.	73		63		54		50		44		41		41		40		38		
Billings, Mont.	57						54		55		60		65		73		70		
Cheyenne, Wyo.	69								66		61		63		61		58		
El Paso, Tex.	43						41		42		44		40		33		30		
Fargo, N. Dak.	76		75		71		65		59		56		57		59		60		
Kelly Field (San Antonio), Tex.	76		71		67		52		43		42		42		37		40		
Lakehurst, N. J.	63		59		57		56		57		56		51		42		38		
Maxwell Field (Montgomery), Ala.	64		54		51		47		39		36		35		32		30		
Mitchel Field (Hempstead, Long Island), N. Y.	64		59		56		54		55		57		55		52		52		
Murfreesboro, Tenn.	79		75		71		64		61		59		55		56		56		
Norfolk, Va.	72	+1	61	−2	55	−3	52	−2	49	−1	46	−2	45	−1	46	+4	45	+6	
Oklahoma City, Okla.	67		64		53		46		44		45		47		48		44		
Omaha, Nebr.	63	−14	62	−11	57	−5	54	−2	53	+1	54	+2	55	+3	57	+7	55	+8	
Pearl Harbor, Territory of Hawaii.	85	+10	80	+5	83	+4	77	+5	64	+3	48	0	41	+3	31	+3	32	+2	
Pensacola, Fla.	83	+3	75	+5	67	+1	54	−5	46	−8	46	−5	48	0	35	−6	31	−7	
San Diego, Calif.	91	+15	79	+11	71	+11	60	+8	53	+7	45	+4	41	+4	37	+3	35	+3	
Scott Field (Belleville), Ill.	75		68		60		57		56		57		56		57		55		
Seattle, Wash.	64	−9	76	+7	77	+10	76	+10	75	+11	73	+13	70	+13	71	+14	74	+13	
Spokane, Wash.	78				77		73		70		68		66		62		57		
Washington, D. C.	73	+1	60	−4	62	+1	60	+2	56	+1	56	+2	53	+1	48	−1	50	+2	
Wright Field (Dayton), Ohio.	76		76		75		67		62		61		59		54		54		

Late report for November 1935

TEMPERATURE (°C.)

Pearl Harbor, Territory of Hawaii[3] (6 m)	21.6	−3.0	21.3	−0.3	17.6	−0.2	14.3	−0.7	11.8	−1.1	10.1	−0.9	7.8	−1.0	2.2	−0.9			30

TABLE 1.—*Mean free-air temperatures and relative humidities obtained by airplanes during February 1936*—Continued

RELATIVE HUMIDITY (PERCENT)

Stations	Altitude (meters) m. s. l.																Number of observations
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	
Pearl Harbor, Territory of Hawaii	84	+11	77	+2	81	+2	80	+5	73	+6	57	+2	47	+1	34	−1	-------	-------	------

Late report for January 1936

TEMPERATURE (°C.)

Pearl Harbor, Territory of Hawaii[2] (6 m)	20.7	−1.7	20.3	+0.5	16.6	+0.7	13.5	+0.3	11.7	+0.5	10.1	+0.7	7.2	+0.3	1.9	+0.2	-------	-------	31

RELATIVE HUMIDITY (PERCENT)

Pearl Harbor, Territory of Hawaii	85	+11	80	+5	84	+6	79	+8	62	+2	46	−2	41	+1	28	−1	-------	-------	------

[1] Army.
[2] Weather Bureau.
[3] Navy.

Observations taken about 4 a. m., 75th meridian time, except along the Pacific coast and Hawaii where they are taken at dawn.

NOTE.—The departures are based on "normals" covering the following total number of observations made during the same month in previous years, including the current month: Norfolk 120; Omaha 136; Pensacola 123; San Diego 151; Seattle 58; Washington 169; Pearl Harbor (November 1935) 114; Pearl Harbor (January 1936) 122; Pearl Harbor (February 1936) 122.

TABLE 2.—*Free-air resultant winds (meters per second) based on pilot-balloon observations made near 5 a. m. (E. S. T.) during February 1936*

[Wind from N=360°, E=90°, etc.]

Altitude (m) m. s. l.	Albuquerque, N. Mex. (1,554 m)		Atlanta, Ga. (309 m)		Billings, Mont. (1,088 m)		Boston, Mass. (15 m)		Cheyenne, Wyo. (1,873 m)		Chicago, Ill. (192 m)		Cincinnati, Ohio (153 m)		Detroit, Mich. (204 m)		Fargo, N. Dak. (274 m)		Houston, Tex. (21 m)		Key West, Fla. (11 m)		Medford, Oreg. (410 m)		Murfreesboro, Tenn. (180 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°		°	
Surface	257	2.3	342	1.5	283	1.0	290	2.6	245	4.4	288	2.0	305	1.2	262	1.6	314	1.8	29	2.1	116	1.3	277	0.3	246	0.7
500	-----	-----	342	1.7	-----	-----	305	10.6	-----	-----	273	3.4	242	3.2	270	2.2	319	4.5	87	2.2	153	4.4	205	.5	210	3.4
1,000	-----	-----	305	1.8	-----	-----	313	12.3	-----	-----	271	8.1	257	9.3	265	6.8	303	6.8	226	2.7	170	4.7	210	2.4	248	7.0
1,500	-----	-----	272	7.4	238	5.1	296	13.4	-----	-----	292	9.6	262	11.8	268	8.4	299	8.5	264	5.7	199	4.8	221	4.0	289	7.8
2,000	286	5.1	274	11.4	269	7.9	293	14.2	249	7.0	288	11.8	280	12.3	272	10.6	292	10.6	276	7.2	235	4.8	241	6.2	280	12.3
2,500	291	8.0	280	13.0	283	9.8	288	12.5	266	14.4	291	14.4	-----	-----	281	11.7	292	13.5	277	8.3	264	6.1	249	6.4	279	15.2
3,000	290	11.5	284	13.8	279	14.1	286	13.3	275	17.0	280	11.4	-----	-----	-----	-----	297	12.5	285	12.9	275	10.0	278	6.9	-----	-----
4,000	282	15.9	-----	-----	280	16.6	-----	-----	279	15.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	287	9.1	-----	-----
5,000	275	16.7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Altitude (m) m. s. l.	Newark, N. J. (14 m)		Oakland, Calif. (8 m)		Oklahoma City, Okla. (402 m)		Omaha, Nebr. (306 m)		Pearl Harbor, Territory of Hawaii[1] (68 m)		Pensacola, Fla.[1] (24 m)		St. Louis, Mo. (170 m)		Salt Lake City, Utah (1,294 m)		San Diego, Calif. (15 m)		Sault Ste. Marie, Mich. (198 m)		Seattle, Wash. (14 m)		Spokane, Wash. (603 m)		Washington, D. C. (10 m)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
	°		°		°		°		°		°		°		°		°		°		°		°		°	
Surface	299	2.9	186	2.5	138	0.6	337	2.1	350	0.9	39	3.3	276	0.7	174	3.9	30	0.5	257	1.3	125	0.6	194	1.0	331	1.4
500	311	6.7	222	3.4	168	4.0	338	3.0	232	1.6	102	2.9	251	3.8	-----	-----	280	1.3	279	5.2	225	1.2	-----	-----	301	5.1
1,000	299	10.2	248	3.9	243	6.9	314	6.6	236	2.8	219	1.3	263	9.1	-----	-----	301	1.9	288	6.5	265	2.0	204	2.0	290	8.0
1,500	293	11.6	257	4.1	260	7.8	287	8.9	249	3.2	255	3.6	283	12.5	182	6.4	306	4.7	281	7.9	263	3.3	235	3.0	288	11.3
2,000	285	11.6	268	4.8	265	9.9	283	10.8	276	3.9	276	6.0	282	11.7	222	5.4	299	6.3	283	10.5	286	4.6	259	5.2	279	11.9
2,500	285	12.0	304	4.2	276	9.9	284	12.4	262	2.9	284	8.1	287	12.4	259	6.9	293	8.1	284	11.4	310	7.2	279	7.8	270	14.8
3,000	-----	-----	306	7.2	284	10.7	285	14.8	297	3.7	274	8.2	286	16.7	269	9.9	294	9.9	-----	-----	318	11.3	286	10.0	-----	-----
4,000	-----	-----	-----	-----	278	15.1	-----	-----	-----	-----	-----	-----	-----	-----	289	11.3	301	9.0	-----	-----	-----	-----	295	12.2	-----	-----
5,000	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	299	7.4	-----	-----	-----	-----	-----	-----	-----	-----

[1] Navy stations.