

OCEAN GALES AND STORMS, MARCH 1937—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began March	Time of lowest barometer March	Gale ended March	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—Continued													
Kentuckian, Am. S. S.	Portland, Oreg.	Balboa	34 30' N.	121 10' W.	15	2p, 15	15	29.79	SE	SE, 8	SE	SE, 8	SE-S.
Bengalen, Du. M. S.	Cebu	Portland, Oreg.	41 37' N.	141 00' W.	16	9p, 16	16	30.32	NW	NW, 8	NW	NW, 8	None.
Empress of Russia, Br. S. S.	Vancouver, B. C.	Yokohama	38 30' N.	145 09' E.	17	4p, 17	18	29.25	W	W, 9	NW	WNW, 12	W-WNW.
Pres. Jackson, Am. S. S.	Seattle	do	52 35' N.	153 05' W.	17	6a, 17	18	29.31	NW	SSW, 2	NNW	NW, 9	SSW-W.
Kwanto Maru, Jap. M. S.	Yokohama	Los Angeles	46 29' N.	176 37' W.	18	11p, 17	18	29.71	E	E, 8	S	E, 9	E-SSE.
Forbes Hauptman, Am. S. S.	Balboa	do	29 00' N.	115 51' W.	18	4p, 18	18	30.10	WNW	WNW, 7	NW	WNW, 8	None.
Diamond Head, Am. S. S.	Port Townsend	Port Allen	42 00' N.	137 18' W.	18	6p, 18	19	29.87	SW	W, 8	WNW	WNW, 9	None.
Nitro, U. S. N.	San Francisco	Manila	35 45' N.	129 06' W.	20	9p, 20	21	29.74	S	N, 8	NNW	N, 8	S-N.
Empress of Asia, Br. S. S.	Yokohama	Victoria, B. C.	49 21' N.	177 50' E.	21	4p, 22	22	29.28	E	E, 9	SE	E, 10	E-SE.
Kwanto Maru, Jap. M. S.	do	Los Angeles	41 02' N.	135 15' W.	22	Noon, 23	24	29.65	WNW	W, 8	N	W, 8	WNW-W.
Pres. McKinley, Am. S. S.	do	Victoria, B. C.	42 41' N.	155 35' E.	24	4a, 25	25	29.63	NNW	NW, 9	N	NW, 10	NW-N.
Gen. Pershing, Am. S. S.	Hong Kong	Kobe	25 30' N.	121 26' E.	25	2a, 25	25	30.12	NNE	NNE, 8	NNE	NNE, 8	SE-S.
Pres. McKinley, Am. S. S.	Yokohama	Victoria, B. C.	47 17' N.	174 49' E.	27	Noon, 27	27	29.10	SSE	SE, 8	SW	SE, 8	SE-SW.

* Position approximate.

NORTH PACIFIC OCEAN, MARCH 1937

By WILLIS E. HURD

Atmospheric pressure.—Owing to the considerable amount of cyclonic activity on the North Pacific Ocean during March 1937, average pressures for the most part were below the normal. As shown by table 1, pressures in the Pacific area were above normal only at Dutch Harbor, Kodiak, and Midway Island, and at those stations only by small amounts.

The Aleutian low, within the isobar of 29.80 inches, occupied on the average an enormous region extending east-west between the Gulf of Alaska and extreme northern Japan, and north-south over much of the Bering Sea, and the northern part of the ocean to the southward of the Aleutian Islands.

The North Pacific high overlay the central part of the ocean, with average pressure, 30.12 inches, at Midway Island.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, March 1937, at selected stations

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	30.23	+0.08	30.90	26	29.20	15
Dutch Harbor	29.79	+0.09	30.46	19	29.06	14
St. Paul	29.71	-0.02	30.54	19	28.68	14
Kodiak	29.71	+0.02	30.20	20	29.18	15
Juneau	29.83	-0.11	30.31	27	29.37	5
Tatoosh Island	29.93	-0.03	30.38	6	29.44	12
San Francisco	29.99	-0.07	30.28	2	29.41	12
Mazatlan	29.88	-0.04	29.96	3, 4, 5, 18	29.80	10, 15
Honolulu	29.99	-0.05	30.18	31	29.77	1
Midway Island	30.12	+0.05	30.28	13	29.74	24
Guam	29.84	-0.06	29.92	{13, 22, 23, 28}	29.56	24
Manila	29.84	-0.02	29.92	13, 22	29.74	22
Hong Kong	29.88	-0.10	30.04	25	29.69	10
Nemuro	29.81		30.15	1, 14, 23	28.74	4

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Cyclones and gales.—March 1937 was the stormiest month on the North Pacific since November 1936. This was not so much due to winds of extremely high force as to the persistency with which cyclones occupied certain parts of the ocean and to the general frequency of gales within the great disturbed regions.

The principal regions of cyclonic activity were two—one comprising the northwestern part of the ocean from middle longitudes to Japan; the other, the eastern part of the ocean, between about 30° and 50° latitude.

The gales in the northwestern area were due to eastward-traveling cyclones from Siberia and middle Japanese waters and to a fluctuating oceanic cyclone over and to the northward of the upper western steamship routes. Here the most violent gales of the month, according to ships' reports now at hand, occurred on the 11th and 17th: On the 11th, of force 11, as encountered by the Japanese motorship *Nagara Maru*, near 44½° N., 169° E., barometer 28.74, and, also, of force 11, as encountered by the British steamship *Empress of Russia*, barometer 29.15, near 51° N., 177° W. On the 17th the *Empress of Russia* reported the most severe wind of the month, when involved in a west-northwest hurricane, barometer 29.25, in 38°30' N., 145°09' E.

On March 1 strong to whole southerly gales occurred south of the western Aleutians. On the 2d of the month a low developed over the southern waters of the Yellow Sea. It moved northeastward across Japan and by the 5th, when central near the Kuril Islands, was of great depth. On that date it caused fresh to strong gales over most east-Japanese waters. On the succeeding 3 days the cyclone moved slowly toward and into the Bering Sea, where it remained from the 7th until about the 20th, causing strong to storm gales (force 9-11) from the 9th to the 13th along the northern routes between midocean and longitude 160° E., and more scattered storminess on succeeding dates. During the movement of this cyclone over southern Kamchatka waters on the 6th, a press report of that date from Petropavlovsk stated that a destructive hurricane was occurring along the coast of the peninsula.

On March 15 a Siberian Low entered the Japan Sea and moved eastward across Japan. On the 17th, centered east of Hokushu, it was causing gales which continued into the 18th east of Japan. It was this storm which on the 17th caused the hurricane velocity earlier mentioned as experienced by the S. S. *Empress of Russia*. The disturbance deepened as it moved northeastward toward the western Aleutians, and on the 22d the American steamship *President Jackson* was near the center at about 50° N., 166° E., and reported the lowest barometer reading of the month,

28.35 inches, accompanied by an east gale of force 8. The British steamship *Empress of Asia*, to the eastward of the *President Jackson's* position on that date, encountered a gale of force 10. Thereafter the storm moved into the Bering Sea. Press reports indicate that the American steamship *Volunteer*, when about 1,000 miles out from Kobe late in the month, was disabled by heavy weather while bound for Japan, but that she succeeded in making port under her own power on April 4.

Stormy weather began early in the month over central latitudes of the eastern part of the ocean. On the 1st and 2d an extensive depression lay between the Hawaiian Islands and the Gulf of Alaska, and as a result ships experienced moderate to strong local gales over a considerable stretch of water to the north, northeast, and east of Honolulu. The disturbance advanced northward on the 3d, but thereafter made little progress until the 16th when it went inland over southern California. Throughout its path, rough weather with local moderate to strong gales was of practically daily occurrence within the region bounded approximately by latitudes 30° and 50°, and longitude 155° W. and the American coast. The strongest gale reported during the period was of force 10, on the 11th, within the square 35°-40° N., 140°-145° W.

A minor disturbance lay off the coast of British Columbia, Washington, and Oregon from the 18th to the 24th, and caused fresh to strong gales within its area on at least 3 of the 7 days of its existence at sea.

In other parts of the ocean, specific mention may be made of fresh to whole gales which occurred east of Midway Island on the 1st; of a fresh gale reported off Lower California on the 18th; and of a strong monsoon current of fresh gale force in the north entrance of Taiwan Channel on the 25th.

Tehuantepecers.—In the Gulf of Tehuantepec northerly gales were reported as follows: Of force 7 on the 13th, of force 8 on the 2d and 9th, and of force 9 on the 1st.

Fog.—There were 12 days reported by ships as having fog off the California coast, and 3 days off Lower California. Fog was encountered on the 1st to 4th a day or two outbound from San Francisco, and on the 23d to 30th in localities between 40°-50° N., 135°-175° W.

Some accidents due to fog were reported by the press. On the 2d the seiner *Advance* was grounded in dense fog near San Francisco; and on the early afternoon of the 6th the steamship *President Coolidge* collided with the tanker *Frank H. Buck* nearly underneath the Golden Gate Bridge. The tanker was sunk and the liner was injured, but put back for repairs after taking on the crew of 40 from the other craft. In a collision between the trawler *Normandie* and the steamship *Alama* 12 miles off Eureka, Calif., on the night of the 10th, the trawler was sunk, but her crew was rescued. This accident was apparently due to fog, which was reported by other ships as occurring off and to the southward of Eureka on that date.

CLIMATOLOGICAL TABLES

CONDENSED CLIMATOLOGICAL SUMMARY

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

TABLE 1.—Condensed climatological summary of temperature and precipitation by sections, March 1937

[For description of tables and charts, see REVIEW, January, p. 35]

Section	Temperature								Precipitation					
	Section average	Departure from the normal	Monthly extremes						Section average	Departure from the normal	Greatest monthly		Least monthly	
			Station	Highest	Date	Station	Lowest	Date			Station	Amount	Station	Amount
Alabama.....	53.5	-2.3	Evergreen.....	85	22	Valley Head.....	20	3	4.53	-1.22	Sylacauga.....	8.57	Fort Payne.....	1.36
Arizona.....	50.7	-2.6	2 stations.....	92	10	Fort Valley.....	3	1 26	1.73	+ .77	Reno Ranger Station.....	4.81	Fairbank.....	.06
Arkansas.....	48.7	-3.8	Magnolia.....	84	19	Gilbert.....	14	1	3.04	-1.66	El Dorado.....	5.79	Mountain Home.....	.73
California.....	50.0	-1.4	El Centro.....	93	19	2 stations.....	-3	25	5.52	+1.93	Kennett.....	16.96	Independence.....	.04
Colorado.....	33.9	- .6	Las Animas.....	77	17	Hermit (near).....	-17	1	1.43	+ .13	Pagosa Springs (near).....	13.86	Savage Ranch.....	.16
Florida.....	62.6	-2.6	Clermont.....	92	25	Cottage Hill.....	25	2	4.32	+1.16	West Palm Beach.....	11.72	Key West.....	1.18
Georgia.....	53.8	-2.4	Millen.....	84	13	Blairsville.....	16	2	3.69	-1.16	Moultrie.....	7.00	Athens no. 2.....	2.00
Idaho.....	35.5	- .3	Lapwai.....	74	12	Deadwood.....	-15	18	1.35	- .42	Deception Creek.....	3.49	Blackfoot.....	.14
Illinois.....	37.9	-2.2	Carbondale.....	75	6	4 stations.....	9	19	1.20	-1.82	Mascoutah.....	3.04	Sycamore.....	.32
Indiana.....	37.0	-3.6	2 stations.....	78	16	2 stations.....	2	11	1.45	-2.25	Whitestown.....	3.05	Evansville.....	.55
Iowa.....	32.9	-1.5	Sac City.....	76	6	Cresco.....	-2	9	1.63	- .09	Pringhar.....	2.85	Cresco.....	.36
Kansas.....	40.0	-3.3	Wellington.....	77	7	Healy.....	0	15	1.65	+ .23	Iola no. 1.....	4.35	Stockton.....	.33
Kentucky.....	42.2	-4.0	Quicksand.....	77	20	Cumberland.....	6	1	1.43	-3.24	Jenkins.....	2.51	Carrollton.....	.45
Louisiana.....	55.8	-4.7	Belle Chasse.....	86	18	2 stations.....	23	1	5.03	+ .30	Reserve.....	9.58	Woodworth.....	2.97
Maryland-Delaware.....	39.4	-2.8	La Plata, Md.....	74	25	Sines, Md.....	1	1	2.02	-1.55	Princess Anne, Md.....	3.79	Chewsville, Md.....	1.05
Michigan.....	26.7	-3.1	2 stations.....	59	6	Dukes.....	-22	11	.66	-1.50	St. Joseph.....	1.94	St. Ignace.....	.04
Minnesota.....	23.1	-3.4	Pipestone.....	67	6	Meadowlands.....	-29	10	.83	- .34	Marshall.....	2.75	Detroit Lakes.....	T
Mississippi.....	52.8	-4.0	Hattiesburg.....	85	20	Kosciusko.....	20	1	4.26	-1.47	Pearlington.....	8.75	University.....	1.06
Missouri.....	40.4	-3.4	Mexico.....	77	7	Cystal City.....	6	16	1.66	-1.57	Harrisonville.....	3.92	Palmyra.....	.54
Montana.....	30.4	- .3	2 stations.....	71	15	Summit.....	-23	27	.78	- .17	Hebgen Dam.....	3.56	Westby.....	T

1 Other dates also.