

Ocean gales and storms, October, 1929—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN													
Pres. Taft, Am. S. S.	Yokohama	Seattle	49 40 N.	170 00 W.	1	8 p., 1	1	29.09	W	W, 7	SW	WSW, 9	SW.-NW.
Arabia Maru, Jap. S. S.	Victoria	Yokohama	52 25 N.	162 00 W.	1	3 p., 1	2	28.68	SSE	WSW, 9	NW	W, 9	
Admiral Rogers, Am. S. S.	Seattle	Alaska	56 50 N.	134 37 W.	1	4 p., 3	5	29.16	SE	SE, 8	SE	SE, 8	
San Pedro Maru, Jap. S. S.	San Francisco	Osaka	33 33 N.	148 50 E.	5	Mdt., 5	6	29.87	S	SSW, 8	WSW	SSW, 9	S.-SW.-WSW.
Grays Harbor, Am. S. S.	Puget Sound	Orient	44 00 N.	154 48 E.	5	Noon, 6	7	29.50	E	SW, 2	NNW	SE, 10	SW.-NW.
Arabia Maru, Jap. S. S.	Victoria	Yokohama	48 30 N.	167 25 E.	7	2 p., 7	7	29.62	ESE	E, 9	NE	E, 9	
Arizona Maru, Jap. S. S.	Yokohama	Victoria	50 57 N.	169 45 W.	7	8 a., 8	9	29.07	SE	W, 8	N	SE, 9	3 pts.
Lockkatrine, Br. M. S.	London	San Diego	13 48 N.	95 16 W.	8	4 a., 8	8	29.74	NNW	N, 7	E	N, 8	NNW.-NE.
Admiral Rogers, Am. S. S.	Alaska	Seattle	50 54 N.	127 40 W.	8	Noon, 8	8	29.46	E	E, 8	E	E, 8	
Emp. of France, Br. S. S.	Yokohama	Vancouver	50 34 N.	164 12 W.	8	4 p., 8	8	28.66	W	NE, 4	NE	WSW, 9	WSW.-NE.
Pennsylvania, Am. S. S.	Hong Kong	San Francisco	48 15 N.	167 36 W.	8	Noon, 8	9	29.16	W	W, 8	WNW	W, 10	W.-WNW.
Golden Star, Am. S. S.	do	do	23 14 N.	128 46 E.	8	1 p., 10	11	28.92	NNE	N, 12	NNW	NW, 12	
Ayaha Maru, Jap. S. S.	Grays Harbor	Yokohama	51 40 N.	166 40 E.	9	2 p., 9	10	28.89	SSE	NW, 12	N	NW, 12	W.-NW.-N.
Oregon, Am. S. S.	Shanghai	San Francisco	33 30 N.	137 40 E.	9	Noon, 9	10	29.60	NE	NE, 7	NE	NE, 9	Steady.
Do	do	do	34 12 N.	140 37 E.	12	—, 12	14	29.60	NE	NE, 7	N	NE, 10	Steady.
Illinois, Am. S. S.	Hong Kong	do	46 16 N.	171 25 E.	11	Noon, 13	14	29.14	ESE	W, 8	NNW	ESE, 8	ESE.-W.
Steel Trader, Am. S. S.	Englewood, B. C.	Los Angeles	50 46 N.	128 32 W.	12	4 a., 12	13	29.75	SSE	SSE, 8	SSE	SSE, 8	Steady.
Choyo Maru, Jap. S. S.	Miike	Portland	49 10 N.	147 40 W.	16	8 a., 17	18	28.95	NE	NNE, 10	WNW	NNE, 10	NNE.-NNW.
Tokiwa Maru, Jap. S. S.	Vancouver	Yokohama	50 30 N.	176 32 W.	17	8 p., 18	20	28.59	NNE	WNW, 5	NW	—, 9	W.-WNW.-NW.
Chief Skidgate, Br. S. S.	Tacoma	do	49 04 N.	175 10 E.	18	Noon, 19	20	28.57	SW	W, 11	NW	W, 11	SW.-W.-WNW.
Mayebashi Maru, Jap. S. S.	Otaru	San Francisco	46 15 N.	169 40 E.	18	4 a., 19	21	29.53	SSE	WNW, 7	N	NW, 9	12 pts.
Havre Maru, Jap. S. S.	do	do	49 00 N.	152 00 W.	18	1 p., 20	22	28.71	S	S, 6	SSW	SE, 10	Steady.
Columbia Maru, Jap. M. S.	Kobe	Portland	49 30 N.	154 30 W.	19	1 a., 20	21	28.67	S	ESE, 6	S	S, 9	SE.-S.
Maunalei, Am. S. S.	Manila	Honolulu	12 15 N.	127 00 E.	20	8 p., 21	22	29.37	WNW	W, 9	S	W, 9	WNW.-W.-SW.
Pres. Wilson, Am. S. S.	Balboa	San Pedro	14 00 N.	95 10 W.	21	2 a., 22	22	29.77	NNW	N, 8	NE	N, 8	NNW.-N.-NE.
Hakushika Maru, Jap. S. S.	Miike	Victoria	42 35 N.	155 05 E.	21	2 p., 22	23	29.03	SW	W, 11	NNW	W, 11	WSW.-NNW.
Admiral Evans, Am. S. S.	Seattle	Kodiak	57 55 N.	152 32 W.	23	Noon, 24	24	28.67	SE	NE, 8	SW	NE, 8	NE.-SW.
Emp. of Russia, Br. S. S.	Yokohama	Victoria	50 45 N.	151 04 W.	23	6 p., 23	24	28.46	ESE	SE, 5	SW	SW, 9	S.-SSE.-S.
Shikisan Maru, Jap. S. S.	do	San Francisco	45 28 N.	147 00 W.	23	2 p., 23	24	28.29	S	SSW, 9	W	S, 10	S.-SW.-W.
Pres. Jackson, Am. S. S.	Honolulu	Yokohama	35 00 N.	140 25 E.	25	Mdt., 26	27	29.00	E	S, 9	SW	S, 9	Steady.
Iowa, Am. S. S.	Japan	San Francisco	45 22 N.	169 05 E.	25	6 a., 27	28	29.86	NW	NW, 9	NW	NW, 9	Steady.
Java, Nor. M. S.	San Pedro	Yokohama	36 07 N.	141 54 E.	25	5 a., 27	27	29.40	SSW	SSW, 12	NNE	SSW, 12	Steady.
Golden Star, Am. S. S.	Hong Kong	San Francisco	42 07 N.	160 29 W.	26	5 p., 26	27	28.66	NE	Calm	SSW	WNW, 11	ESE.-W.-WNW.
Oregon, Am. S. S.	Shanghai	do	46 30 N.	152 41 W.	26	7 p., 26	28	29.43	SE	SSE, 10	S	SSE, 10	Steady.
William Penn, Am. M. S.	Hong Kong	Kobe	26 00 N.	122 20 E.	26	—, 27	28	30.14	NE	NE, 8	NE	NE, 8	Steady.
Satanta, Br. S. S.	Hankow	San Pedro	37 12 N.	150 54 E.	26	2 p., 27	28	29.48	S	S, 9	N	S, 9	S.-WNW.
Tamaha, Br. S. S.	Nagasaki	do	38 00 N.	174 27 W.	27	6 p., 28	29	29.10	SE	SW, 8	NW	SSW, 10	SSE.-SW.
San Pedro Maru, Jap. S. S.	Moji	San Francisco	35 35 N.	177 10 W.	28	4 p., 28	29	29.41	S	WSW, 8	NW	SW, 9	WSW.-W.-NW.
Hakushika Maru, Jap. S. S.	Miike	Victoria	49 58 N.	161 08 W.	29	4 a., 30	Nov. 1	28.49	NNE	W, 5	SW	SW, 11	SE.-SW.
SOUTH PACIFIC OCEAN													
James McGee, Am. S. S.	Buenos Aires	Talara	51 25 S.	76 41 W.	11	11 p., 11	12	28.98	NNW	NNW, 8	WSW	NW, 10	

551.506 (265, 2)
NORTH PACIFIC OCEAN

By WILLIS E. HURD

Pronounced winter conditions of atmospheric pressure prevailed over the Aleutian Islands and the Gulf of Alaska in October. At St. Paul, in the Bering Sea, pressure had risen slightly since September. At Dutch Harbor there had been a slight fall, from an average of 29.51 to 29.44 inches, but at Kodiak the fall from September to October had amounted to 0.59 inch, or a drop from 29.85 to 29.26 inches, the maximum daily reading for the latter month being 29.90. At Juneau the downward change was 0.37 inch, or from 30.12 to 29.75. The Aleutian cyclone, strongly developed, was thus central over the northwestern waters of the Gulf of Alaska, in its fluctuations being much more frequently situated east than west of the Alaska Peninsula.

The California-Pacific anticyclone in the early days of the month overspread much of middle and higher latitudes. During the second and third weeks it was subject to strong cyclonic displacements from the northward, but the final week showed some recovery. On the average it extended from the Washington, Oregon, and upper California coasts southwestward to middle latitudes, below the fortieth parallel, and thence westward in a compara-

tively narrow and irregular region to approximately the one hundred and sixtieth meridian of east longitude. As a whole it was apparently less well developed than in any previous month of the year.

Barometric data for several island and coast stations in west longitudes, including Point Barrow on the Arctic Ocean, are given in the following table:

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean and adjacent waters, October, 1929

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
Point Barrow 1 2	Inches 29.65	Inch	Inches 30.12	28th	Inches 29.14	16th.
Dutch Harbor 1 3	29.44	-0.25	30.14	7th	28.82	19th.
St. Paul 1 3	29.60	-0.06	30.24	7th	29.18	1st.
Kodiak 1	29.26	-0.33	29.90	27th	28.36	10th.
Midway Island 1	30.07	+0.02	30.22	31st	29.86	22d.
Honolulu 4	29.99	-0.01	30.07	7th	29.83	20th.
Juneau 4	29.75	-0.12	30.36	6th	29.19	15th.
Fatsoosh Island 4 5	30.07	+0.04	30.38	31st	29.64	16th.
San Francisco 4 6	29.99	-0.01	30.14	11th	29.84	28th.
San Diego 4 5	29.92	-0.01	30.02	31st	29.66	28th.

1 P. m. observations only.
2 For 24 days.
3 For 30 days.
4 A. m. and p. m. observations.
5 Corrected to 24-hour mean.

With the great activity of the Aleutian cyclone and the increasing number of lows entering the upper Pacific from Asia, trans-Pacific steamships experienced rougher weather generally than during any month since February or March. On the northern routes, between longitudes 155° W. and 160° E., gales were reported on 15 to 30 per cent of the days. Many of these were of force 10, and full storm winds were reported on the 19th near 49° N., 175° E.; on the 22d, near 43° N., 155° E.; on the 26th, near 42° N., 160° W.; and on the 31st, near 51° N., 156° W. In addition, hurricane velocities occurred on the 9th near 51° N., 167° E. Along the American coast gales were reported off California on the 28th; off Vancouver Island on the 8th and 12th; and in Alaskan waters on the 4th, 9th, 23d, and 31st. One of the most interesting storm developments of the month was that which appeared as a slight depression near Midway Island on the 25th. It apparently joined with another depression from the northwest on the 26th and rapidly deepened into an intense storm, at which time it was experienced by the American steamship *Golden Star*, Capt. O. Lee, Hong Kong to San Francisco. The observer, Mr. P. A. Caldwell, reported that "at 4 p. m. wind hauled to ENE., force 8, barometer 28.70, wind gradually decreasing. Between 5 and 6 p. m. wind was calm. Lowest barometer reading at this time was 28.66; then at about 6 p. m. wind hauled to NNW., 6-8. Engines put on half speed account of heavy seas. At 8 p. m. wind increased to force 11." This is one of the few instances we have of seamen reporting a calm in the center of an extratropical cyclone.

Of the typhoons mentioned by the Rev. José Coronas in the subjoined article, reports from our marine observers show that several vessels were more or less heavily involved in two or more of these tropical storms. The following may be mentioned because of the higher winds encountered:

The American steamship *Golden Star*, Hong Kong to San Francisco, ran into northeasterly gales of force 8 on the 8th near 23° N., 124° E. On the 9th the wind hauled into north and increased to force 9. On the 10th, near 23° N., 129° E., immediately to the westward of the typhoon center, the vessel experienced hurricane velocities from the northwest, lowest pressure 28.92. These continued from 4 a. m. until noon, after which there was a slow moderation.

The Japanese steamship *Ishin Maru*, Capt. G. Yoshihira, second officer and observer, Mr. N. Obori, Miike to Astoria, in a special report to the Hydrographic Office, is shown to have encountered hurricane winds generally from midnight of the 25th until noon of the 26th, her noon position being in 32° 23' N., 134° 29' E., lowest pressure 29.10 inches, from 10 to 11 a. m., between which hours she was becalmed in the "eye" for 30 minutes. She entered the storm area on the 25th, with gales ranging in force from 8 to 11, and left it on the evening of the 26th.

The Norwegian motor ship *Java*, San Pedro to Yokohama, furnished a special report, with drawings, of her experience in the Japanese typhoon of the 26th-27th. On the 26th she ran into whole gales from south-southwest in about 36° N., 142° E. At 2 a. m. of the 27th the hurricane was at its height, barometer down to 29.40. The wind continued at force 12 until 10 a. m., after which it began to moderate. The observer calculated the radius of the typhoon to be 200 miles and the speed between 15 and 20 nautical miles an hour.

On account of the increasing number of continental anticyclones advancing upon the China coast, the northeast monsoon was strong on several days, particularly in

the Taiwan Channel and northward therefrom. It was at times accentuated by the northerly winds of the tropical storms passing by to the eastward.

No cyclones appear to have formed in Mexican waters, but on several days, including the 4th, 8th, 12th, 22d, and 24th, moderate to fresh northers were encountered by vessels in and south of the Gulf of Tehuantepec.

The prevailing wind at Honolulu was from the east, and the next most frequent was from the northeast. The maximum velocity was at the rate of 22 miles an hour from the east on the 5th.

Although fog is comparatively infrequent on the open North Pacific during October, it formed on fewer days than usual this month, and was absent, according to available reports, except on the 7th and 9th, to the westward of longitude 150° W. Between that meridian and longitude 130° W. it was observed on a few days toward the end of the month, but along the coast of the United States from 20 to 30 per cent of the days had fog off Washington and Oregon and nearly 50 per cent had fog within 200 miles or less of San Francisco. Below Point Conception the percentage decreased rapidly to Point Eugenia, Lower California, where fog ceased. On the 13th the Canadian liner *Empress of Canada* grounded in Homer Bay, Straits of Juan de Fuca, during a dense fog, and was not floated until the 15th. Her passengers meanwhile were transferred safely to another steamship, the *Otter*, and landed at Victoria.

TYPHOONS AND DEPRESSIONS—FIVE DEPRESSIONS OR TYPHOONS OVER THE FAR EAST IN OCTOBER, 1929

By Rev. José Coronas, S. J.

[Weather Bureau, Manila, P. I.]

There were three very well developed and severe typhoons and two others of less importance over the Far East during the last month of October. None of them, however, touched the Philippines, but four remained in the Pacific and one entered Indo-China.

The first of the Pacific typhoons appeared on our weather map at 6 a. m. of the 4th near 145° longitude E. and 10° latitude N. It moved northwest on the 4th, and at 6 a. m. of the 5th it began to move W. or W. by N., threatening the Philippines; but in the afternoon of the 7th and during the 8th it turned to the NW. and N. On the 11th it recurved to ENE. near the northern Loochoos, and then it filled up soon on the 12th to the south of Japan.

The approximate position of the center at 6 a. m. of the period October 4 to 12 was as follows:

October 4, 6 a. m., 144° 45' longitude E., 9° 45' latitude N.
 October 5, 6 a. m., 141° 20' longitude E., 12° 50' latitude N.
 October 6, 6 a. m., 138° 50' longitude E., 13° 10' latitude N.
 October 7, 6 a. m., 134° 35' longitude E., 13° 35' latitude N.
 October 8, 6 a. m., 131° 10' longitude E., 15° 10' latitude N.
 October 9, 6 a. m., 130° longitude E., 18° latitude N.
 October 10, 6 a. m., 129° 25' longitude E., 24° 10' latitude N.
 October 11, 6 a. m., 130° longitude E., 27° latitude N.
 October 12, 6 a. m., 137° 10' longitude E., 29° 30' latitude N.

The second Pacific typhoon was rather small and apparently of no great intensity. It formed probably on the 13th far to the east of San Bernardino Strait near 132° longitude E., 12° latitude N. It moved NW. on the 13th and 14th and N. by W. on the 15th and 16th, filling up probably in the evening or night of the 16th to the east of southern Formosa.

The other two Pacific typhoons existed simultaneously for about four days, after which one of the two dis-