

OCEAN GALES AND STORMS, OCTOBER 1933—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	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—Contd.													
Stanley Dollar, Am.S.S.	Sjain	Portland, Ore.	41 46 N	169 35 E	Oct. 21	Noon, 21	29.62	NW	NW, 6	NNW	NW, 9	None.	
San Pedro Maru, Jap. M.S.	Yokohama	San Francisco	45 14 N	147 37 W	Oct. 19	Mdt, 22	28.96	E	S, 5	WSW	E, 9	S.	
Olympia Maru, Jap. M.S.	Dairen	Los Angeles	41 54 N	146 20 E	Oct. 20	6a, 22	29.25	E	W, 6	NNW	NW, 9	E-S-W.	
Pres. Jackson, Am.S.S.	Yokohama	Victoria	36 33 N	143 23 E	Oct. 22	8a, 22	29.60	NW	NW, 8	NW	NW, 8		
Ryoyo Maru, Jap. M.S.	do	Los Angeles	42 10 N	158 15 E	Oct. 20	3a, 23	29.29	ENE	WNW, 7	N	NNW, 10	W-WNW-NW.	
Pres. Grant, Am.S.S.	Victoria	Yokohama	45 30 N	162 30 E	Oct. 22	4a, 23	28.98	ESE	ENE, 8	NNW	NE, 10	ENE-NE.	
Stanley Dollar, Am.S.S.	Sjain	Portland, Ore.	45 40 N	178 10 W	Oct. 23	5a, 23	29.00	SE	ESE, 9	NNE	SE, 11	SE-E.	
Everett, Am.S.S.	Dairen	Seattle	48 30 N	150 30 W	Oct. 22	3p, 23	28.83	E	NNE, 9	NNE	E, 11	NNE-N.	
Empress of Russia, Br. S.S.	Vancouver	Yokohama	51 46 N	143 26 W	Oct. 23	5p, 23	28.93	E	NE, 9	NNE	ENE, 9	ENE-NE.	
General Pershing, Am. S.S.	Yokohama	San Francisco	40 25 N	177 28 W	do	11p, 23	29.17	S	WSW, 3	S	S, 9	WSW-W.	
Olympia Maru, Jap. M.S.	Dairen	Los Angeles	41 58 N	160 57 E	Oct. 24	Mdt, 24	29.48	S	W, 6	S	S, 8	S-SW-W.	
Pres. Jackson, Am.S.S.	Yokohama	Victoria	45 30 N	165 45 E	do	6a, 25	29.29	SSE	SE, 7	S	S, 9	S-SE.	
Pres. Grant, Am.S.S.	Victoria	Yokohama	40 12 N	148 15 E	Oct. 25	7a, 25	29.55	WNW	WNW, 8	WNW	WNW, 8		
Stanley Dollar, Am.S.S.	Sjain	Portland, Ore.	47 48 N	163 18 W	Oct. 26	1p, 26	29.33	WSW	SW, 7	W	WSW, 8	SW-WSW.	
Hakonesan Maru, Jap. M.S.	Yokohama	Los Angeles	37 05 N	144 34 E	Oct. 30	4p, 30	29.84	NNE	NE, 7	NNW	NE, 8	NNE-NE.	

¹ Position approximate.
² Barometer uncorrected.

NORTH PACIFIC OCEAN, OCTOBER 1933

By WILLIS E. HURD

Atmospheric pressure.—The pressure situation over the North Pacific Ocean during October 1933 was in the main close to normal but showed a few marked departures. Over the central Aleutian Islands and in the southern part of Bering Sea the averages for the month were about a tenth of an inch above the normal. In the southwestern ocean, while the Japanese island groups south of Japan proper had pressures 0.05 to 0.06 above the normal, the average at Manila was 0.09 inch below.

The Aleutian cyclone was well established in October, central over the Alaska Peninsula and neighboring islands. The Pacific anticyclone covered a great belt of ocean extending from the upper United States coast westward to beyond Midway Island. It was much intruded upon by frequent cyclonic disturbances in northern and central waters, particularly from the 1st to the 7th and the 18th to 31st.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, October 1933, at selected stations

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	29.93	0.00	30.84	20	29.46	27
Dutch Harbor	29.70	+ .05	30.38	17	29.00	26
St. Paul	29.73	+ .10	30.28	17, 18	28.98	26
Kodlak	29.71	+ .12	30.42	19	28.88	11
Juneau	29.89	+ .02	30.67	21	29.08	28
Tatoosh Island	30.02	+ .01	30.41	16	29.24	28
San Francisco	29.98	-.03	30.19	16	29.58	30
Mazatlan	29.86	+ .02	29.94	11, 12	29.76	4, 5
Honolulu	30.02	+ .02	30.14	26	29.87	17
Midway Island	30.03	.00	30.18	27	29.78	21, 23
Guam	29.87	+ .03	29.98	22, 23	29.74	10, 14
Manila	29.78	-.09	29.92	27	29.68	15
Naha	29.96	+ .06	30.18	27	29.56	18
Chichishima	29.96	+ .05	30.20	27	29.70	20
Nemuro	29.93	-----	30.40	12	29.30	16

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.—Progressive and fluctuating cyclones of considerable depth and severity caused much rough weather along the northern steamship routes, and gales were reported on 2 to 4 or more days of the

month in each 5° square north of the fortieth parallel and west of 140° west longitude. The preponderating number of gale reports indicated that wind forces of 9 to 10 usually occurred during at least one or more hours of the storm experiences of the reporting ship, and were noted on at least a third of the days in the month.

The principal stormy periods in extratropical waters were the 3d to 5th and the 22d to 24th. The main storm region of the earlier period lay between 35° and 45° N., 150° and 170° E. The highest wind velocity noted was force 11. This was reported by the Japanese motor ship *San Luis Maru* on the 4th, near 41° N., 167° E., and by the Japanese motor ship *San Diego Maru* on the 5th, near 43° N., 161° E. The *San Diego Maru* reported the lowest pressure reading of the month, 28.55 inches, at midnight of the 4th-5th. Scattered gales were experienced on the same dates of the period, as noted in the table of gales.

During the second major storm period (22d-24th) whole gales (force 10) to storm winds (force 11) occurred at various points north of the 40th parallel, between approximately 160° E. and 150° W. In the western part of the area, they resulted from the typhoon, later described, which was then centered east or southeast of the Kuril Islands. In mid-Pacific, a southeast gale of force 11, with pressure noted as low as 29 inches on the 22d, was due to a cyclone then centered near 46° N., 178° W. This storm, which covered a wide area, spread eastward during the three succeeding days, and caused gales of force 10-11, with pressures below 29 inches, on the 23d and 24th. On these 2 days the greatest storm intensity occurred, roughly, between 40° and 50° N., 150° and 170° W. On the 25th the severity had subsided.

Typhoon.—Reports thus far received show that one typhoon, and that of hurricane severity, traversed the waters of the Far East in October 1933. It was first discovered as a depression north of Yap about the 11th. Its movement appears to have been somewhat uncertain until the 15th, on which date a clear northwestward advance was indicated. The British motor ship *Silverbelle*, Manila toward San Pedro, encountered northerly gales in front of the typhoon late on the 16th, near 21° N., 125° E., and on the 17th met with the full hurricane force of the approaching storm, lowest pressure 29.31 inches. On the 18th, east of Taiwan, the typhoon recurved northward across the Eastern Sea, passing west of the Nansei

Islands. During the 19th and 20th it crossed the two southernmost islands of Japan proper. Late on the 20th it crossed northern Honshu and emerged into the Pacific. Its later course was followed until the 23d, when it lay southeast of the Kuril Islands.

According to press reports, 1,000 fishing boats and 2,000 Japanese fishermen were missing after the devastation of Shikoku Island by the typhoon on the 20th. The Japanese steamer *Yashima Maru* foundered off Suma at this time with 54 out of 107 persons on board reported lost. At sea on the 22d and 23d, gales of force 9 and 10 were reported as accompanying the storm between the Japanese coast and about 165° E.

A depression that appeared east of the Philippines on October 31 caused the loss of a few lives and some damage to property over the Visayas on November 1 or 2.

Fog.—Frequent fog mantled the coastal waters of the United States. From Eureka to San Pedro about 50 percent of the October days had fog. Between Eureka and Vancouver Island and along the west coast of Lower California, it occurred on 30 to 35 percent of the days. For some distance outside this fog belt there were greatly lessened occurrences seaward, and over the great body of the northern routes it occurred on not to exceed 1 or 2 days in the several 5° squares.

TYPHOONS IN THE FAR EAST DURING OCTOBER 1933

By Rev. C. E. DEPPERMAN, S.J.

[Weather Bureau, Manila, P.I., November 1933]

(1) *October 11.*—Although suspected on October 10, this typhoon was not certain until the next day. It was rather low in latitude, on the tropical front between Yap and Palau. Traveling northwest for 2 days until within about 200 miles of mid-Philippines, it then turned north until the 17th. From the 12th on, the tropical front could be distinctly traced on our maps as it progressed northward, but since the southwest monsoon was not strong within the islands, we conclude that it had already been forced out of the center of the typhoon, i.e., the typhoon had occluded very early. This conjecture is strengthened by the fact that the northeast monsoon apparently reached the Philippines at the time; hence it is probable that the typhoon was now mainly fed by temperature differences between the northeast monsoon and the trade wind. Why did the typhoon take the path it did? Without upper-air data this is difficult to decide, but it was noticed that pressure was decreasing all the time to the northeast and over the Bonins, with rather strong northeast winds right above the Philippines. It is probable that the upper winds recurved in the direction the typhoon took. On the 17th the typhoon suddenly turned to the northwest till it reached the lower Nansei group, and then finally definitely recurved in a northeast direction along the polar front until around north Japan, whence it turned eastward. Even though the typhoon occluded early, there seems apparently to have remained, until the storm was well within Japan, a well-marked front between the northeast monsoon and the trade all the way from the typhoon to near the Philippines, where there seems to have been an interesting junction of the southwest monsoon, the northeast monsoon, and the trade. Since the typhoon kept

a course over water until near Japan, where its intensity had already abated, comparatively little damage was reported, except that in Japan an excursion steamer foundered right in sight of port, with the loss of some 40 lives.

(2) *October 14.*—This was a very small typhoon, but with some interesting and instructive features. As the typhoon of October 11, above mentioned, progressed, the tropical front became more in evidence, from the southernmost tip of Indo-China over to mid-Philippines and on to the typhoon. Above this front there were strong northeasterly winds, continuing down the coastline of Indo-China until they reached the end of the coastal range. At this point they met the southwest monsoon. The situation seems ideal for causing vortices. At any rate, near this part of the China Sea a small typhoon did form, and apparently proceeded in the rather unusual direction, southwest, until it reached this southern tip of the coastal range. It then dissipated over land in the interior.

(3) *October 23.*—Due to lack of sufficient data, the explanation of the origin of this typhoon is only tentative, but it appears quite plausible. As the typhoon of October 11 moved finally northeast, the front between the northerly winds and the trade progressed slowly but steadily eastward until the typhoon had reached northern Japan. Then the trade started to surge back rapidly. In this way, a secondary probably started at the junction of trade, northeast, and southwest monsoons. This secondary remained as a swift depression until just after it coursed through northern Philippines. Here its further progress was apparently blocked by the southern part of the Asiatic high-pressure area. The quick transition from a speed of about 35 miles per hour to almost nothing was remarkable. Remaining almost stationary for a day, the depression intensified into a true typhoon, and then proceeded comparatively slowly toward Indo-China. Before the depression passed through our islands, the tropical front was in evidence, but no squalls were present to indicate anything alarming.

(4) *October 26.*—This typhoon appears to have been brooding to the southwest of Yap as early as the 25th, at the meeting place of trade and southwest monsoon, but it did not start to move decidedly until the 27th. On the afternoon and evening of the 28th it remained almost stationary, but then started swiftly at the rate of over 30 miles an hour in a west-northwest direction toward the southern Philippines, giving us barely enough time for proper typhoon warnings for the people. Through the islands it still moved quite rapidly, about 20 miles an hour, and then leisurely crossed the China Sea and entered Indo-China. Fortunately the typhoon was only of moderate intensity (these usually move faster than the more intense typhoons), and directly struck land in the Philippines only in a few places. As it was, however, 15 or more lives were lost and quite some property damaged. How about the fronts as the typhoon passed through the islands? This question cannot be answered until all our barograph records have been received from the stations near the typhoon. However, it is quite probable that Father Gherzi and others are correct in stating that close to the center of a typhoon, i.e., in the region of very strong winds in the typhoon proper, no fronts can exist.