

NORTH PACIFIC OCEAN, NOVEMBER 1939

By WILLIS E. HURD

Atmospheric pressure.—There was a marked deepening of the Aleutian LOW since the preceding October, but its average location had changed very little and it was still central in the western Gulf of Alaska. The average at Kodiak was 994.0 millibars (29.35 inches) which was 7.0 millibars (0.21 inch) below the normal of the month. Subnormal pressures continued to the eastward and southward along the Alaskan coast.

In middle latitudes, from the west coast of the United States southwestward to Midway Island, pressure was generally high—from normal to above normal. To the westward of Midway, the belt of high pressure continued to the China coast.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, November 1939, at selected stations

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Millibars	Millibars	Millibars		Millibars	
Point Barrow.....	1,013.6	-2.0	1,033	11	999	24
Dutch Harbor.....	1,001.6	-0.4	1,018	26	979	7
St. Paul.....	1,004.8	+2.8	1,027	26	985	4
Kodiak.....	994.0	-7.0	1,009	7	983	9
Juneau.....	1,003.7	-4.1	1,020	6	986	11
Tatoosh Island.....	1,017.6	+2.7	1,029	27	1,003	13
San Francisco.....	1,019.0	0.0	1,025	30	1,011	25
Mazatlan.....	1,012.3	+0.1	1,015	7	1,010	12-13
Honolulu.....	1,016.3	-0.3	1,021	20	1,011	28
Midway Island.....	1,021.7	+3.1	1,026	9-10, 21	1,013	30
Guan.....	1,009.7	-1.5	1,012	15, 17	1,006	1, 20
Manila.....	1,010.0	-0.2	1,014	15, 26	1,005	7-9
Hong Kong.....	1,015.9	-1.4	1,024	29, 30	1,008	23
Naha.....	1,017.6	+2.4	1,025	29, 30	1,010	9
Titijima.....	1,016.2	+1.0	1,023	2, 27	1,000	19
Petropavlovsk.....	1,004.0	-1.1	1,028	20	978	26

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.

Extratropical cyclones and gales.—So far as reports indicate, November was stormier than October only in eastern waters of the North Pacific. Between about longitudes 130° and 155° W., no winds of force as high as 8 were reported in October but several of higher force than 8 occurred in November. The stormiest part of the ocean was that lying between about 150° W. and the 180th meridian. No gales of consequence, however, were reported from extratropical waters during the first few days of the month.

On November 6 a rather deep cyclone lay over the western Aleutians. At 4 p. m. the Japanese motorship *Koryu Maru*, near 50° N., 178° W., had a barometer of 983.6 millibars (29.05 inches), with a strong southwesterly wind. During most of the afternoon of the 7th, near 50° N., 172° W. the ship was in a westerly gale of force 11, decreasing to force 9 late at night, and continuing of about the same force until late in the afternoon of the 8th, at which time the ship had advanced to about 165° W. During the 7th and 8th rough weather covered a large extent of ocean south of the Aleutians. On the 9th the storm moved into the Gulf of Alaska (barometer at Kodiak, 983 millibars—29.03 inches) and along its eastern extremity at times during the 10th to 14th, fresh gales occurred in Washington and Oregon coastal regions.

The middle days of November were in general the stormiest of the month, with three cyclones in progress. Gale areas were of wide extent, particularly on the 15th and 16th, accompanied by low barometer readings in higher middle longitudes, which continued until the 18th.

The earliest of the three cyclones was centered near the Kuril Islands on the 13th, and a little to the eastward on the 15th, after which it disappeared from observation. On the 13th the Norwegian motorship *Nordbo* had a west gale of force 9, with moderately depressed barometer, near 41° N., 151° E. On the 15th two ships reported gales within the region 42° to 44° N., 160° to 163° E. The stronger, of force 10 from the south, was experienced by the motorship *Nordbo*.

The other two storms were first observed as of considerable energy in middle longitudes on the 15th, one over the central Aleutians, and the other to the southward on the middle steamer route. The paths of these disturbances converged as they went eastward, and apparently merged on the 17th about midway between the Hawaiian Islands and the Gulf of Alaska. During the 15th and 16th several ships encountered fresh to whole gales between 35° N. and the Aleutians, longitudes 160° and 175° W. Among them the Danish motorship *Laura Maersk*, near 41° N., 173° W., on the 16th, had a low barometer reading of 965.5 millibars (28.51 inches), with a west gale of force 9 changing to a gale of force 10 from the southwest.

On the 17th the principal gale region of the storm lay between 35° and 45° N., 150° and 160° W., and within this region that day the heaviest reported wind of the month occurred. The Japanese steamer *Syoyo Maru* had full storm to hurricane gales from about 10 a. m. to 6 p. m., with lowest barometer 971.2 millibars (29.68 inches) in 42°36' N., 155°00' W.

From the 19th to 22d scattered gales of force 9-10 were encountered along the northern and middle routes between 135° and 160° W. The lowest barometer reading of the month, 958.0 millibars (28.29 inches) was read on board the Japanese steamer *Taketoyo Maru* on the 22d, in 45°35' N., 145°30' W., accompanied by a northwest wind of force 7, but preceded by an east gale of force 10.

Thereafter the most important of the few scattered gales reported in west longitudes was from the west-southwest, force 10, experienced by the Dutch steamer *Bengkalis* near 37° N., 151° W., on the 30th. The ship's lowest barometer was 993 millibars (29.32 inches).

In east longitudes, during the last decade of November, local gales of force 8 were met on the 22d and 23d in about 30° N., 157° to 165° E. From the 25th to 27th heavy storm conditions affected northern Japanese waters, the Sea of Okhotsk, and the extreme western part of the Bering Sea. Gales of force 8 to 9 were reported by several stations along the coasts.

Tropical cyclones.—Elsewhere in this issue of the REVIEW is an account of several depressions and one typhoon that occurred in the Far East during the month. The account was prepared by the Reverend Bernard F. Doucette, S. J., of the Weather Bureau at Manila, P. I.

Tehuantepecers.—Pronounced Tehuantepecer weather was unusually frequent in the Gulf of Tehuantepec during November 1939. The month had 13 days with northerly winds of force 7 to 10, which much exceeds the record of previous November occurrences of the past 16 years. Gales of force 7 occurred on the 13th, 16th, and 29th; of force 8 on the 1st, 2d, 4th, 23d, 26th, and 28th; of force 9 on the 5th, 8th, and 14th; and of force 10 on the 24th. A special account of the Tehuantepecer of the 24th appears elsewhere in this issue of the REVIEW.

Fog.—There were only a few scattered occurrences of fog on all the ocean west of longitude 135° W. With approach to the California coast, fog became more frequent, and in coastal waters was reported by ships on 14 days. Ships

along the Washington and Oregon coasts reported it on 9 days.

TEHUANTEPECER OF NOVEMBER 24, 1939

By WILLIS E. HURD

During the afternoon of November 24, 1939, an anti-cyclone of considerable magnitude lay central over the southern part of the United States, with a southward extension over the Gulf of Mexico, a pressure condition especially favorable for the production of the overflow type of norther in the Gulf of Tehuantepec known as the "Tehuantepecer."

The American steamer *Columbian* was passing near the shore from east to west across the Gulf of Tehuantepec and caught the strong force of the blow. In a special report of the gale made for the Weather Bureau by the vessel's observer, Second Officer William E. Brown, several interesting meteorological points mentioned are worthy of presentation.

At local noon the ship was in latitude 15°50' N., longitude 93°45' W., with a wind from the northeast, force 2, barometer 29.90. The sea was smooth, with a moderate northwest swell. At 12:20 p. m., there was a slight shift of the wind to north, force 6, then a decline an hour and a half later to force 3 from the same direction. At 3:30 p. m., in 16°07' N., 94°32' W., the wind changed to northwest, increasing, and rising to force 10 at 4:15 p. m., later gradually hauling into north. At 10 p. m., in 15°44' N., 95°44' W., the wind was northeast, force 4, diminishing.

The following paragraphs are excerpts from Officer Brown's report:

The sky was nearly overcast at noon, with cirrus and alto-cumulus, which moved from the north slowly. As the vessel approached the head of the Gulf, the clouds disappeared directly overhead, leaving a clear sky in the wake of the wind, but with the same type of clouds perceptible on either side of the Gulf. At all times there were heavy cumulus clouds lying in the pass of the mountains from where the wind issued.

The first wind encountered shortly after noon apparently was a side blow, diverted in the mountains and passing to the east of the Chimalapa Region, while the full force of the norther was not encountered until farther west, when it descended from the westward of the Chimalapa Region.

The sea increased with the wind, the waves reaching a height of about 10 feet. With the increase in the sea, the swell disappeared shortly after noon. The seas being very short, the vessel shipped no water.

From 5:30 p. m., in latitude 16°08' N., longitude 94°53' W., the air temperature dropped from 82° to 74°, and the sea temperature, from 84° to 68°, remaining so until 6:30 p. m., in 16°05' N., 95°02' W., when sea rose again to 82° and air began to rise.

The barometer was entirely normal during the period and showed only the usual 4 p. m. low.

In connection with the severe Tehuantepecer weather described in the foregoing, it may be added that, according to Weather Bureau records for the 15-year period 1924-1938, November (closely followed by January) is the month of most frequent norther gales (force 8 to 12) that occur in the Gulf of Tehuantepec during the season October to April. Practically one-fourth of the entire number reported by ships during the period have been experienced in November.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST, NOVEMBER 1939

By BERNARD F. DOUCETTE, S. J.

[Weather Bureau, Manila, P. I.]

Depression, November 4-9, 1939.—This disturbance first appeared about 300 miles east of northern Mindanao, from which location it moved rapidly in a west-north-

westerly direction toward Samar. A slight inclination to the west during the early morning hours of November 5 brought the center to a position about 30 miles south-southeast of Marinduque. Then, during the day, there was a change to the northwest for about 60 miles and finally, during the evening hours, a shift to the west-northwest as the center passed over Batangas Province. It entered the China Sea during the night of November 5-6. The four days, November 6 to 9, saw the depression incline to the north and northeast and finally disappear over the regions southwest of Formosa.

On November 5, when the depression center was about 50 or 60 miles southeast of Manila, and changing its course toward Batangas Province and the China Sea, a typhoon situation developed over central and southern Luzon. Late in the forenoon the low clouds began to move very fast from northwesterly and northerly directions; the wind became gusty up to 48 k. p. h. at the Observatory; and the sky had all the appearances indicating the existence of a typhoon close at hand. Yet the pressure at the Observatory was not low and did not give many indications that it would fall. In the writer's opinion, it was merely a minor surge of air from the north intensified by the circulation of the depression and the proximity of the mountains (Mount Banahao and Mount Maquiling). There was very little activity south and southwest of the depression center, a factor which made it doubtful whether or not a real typhoon was present. However, there were a few stations that reported minimum values rather low, which were caused by local effects due to the proximity of the mountains mentioned above, in the opinion of the writer. For example, Santa Cruz, Laguna Province, had a minimum pressure value of 747.70 mm. (996.8 mb.) at 4 p. m. Lucena, Tayabas Province, reported 748.7 mm. (998.2 mb.) at 2 p. m., November 5. Ambulong, Batangas Province, had a value of 749.87 mm. (999.7 mb.) at 4 p. m. of that day. Winds were from the northwest and north quadrants at Santa Cruz, but from the southwest and west-southwest at the other stations, force 5 to 8. Canlubang, Laguna Province, had westerly winds, force 5, but the pressure did not become lower than 750.77 mm. (1,000.9 mb.).

The only aspect of the upper winds to mention is the advance of a weak southwesterly current from Medan, Sumatra Island, to Zamboanga, P. I., from November 1 to 4. Then, when the depression center formed (November 4, morning map) and moved toward the archipelago, there was an extensive sector of air flowing from the southwest. The velocities, however, were weak, and no intensification resulted, except for the pressures and winds mentioned above. In the China Sea, the disturbance was of minor importance as far as available information shows.

Depression, November 6-13, 1939.—Forming about 500 miles east of Mindanao, a depression moved west-northwest, then north, inclining slightly to the north-northwest as it moved to higher latitudes. It recurved to the northeast November 10 when about 250 miles east of Isabela Province and gradually inclined to the east-northeast during the next 3 days. November 13, it passed about 200 miles south of the Bonins, apparently weakening, and the next day its center, only a low pressure area according to available data, was east of the 150th meridian.

Typhoon, November 18-26, 1939.—The morning and afternoon situation east of Mindanao, November 18, showed the presence of a depression which either formed rapidly over these regions or had developed near or over the Western Caroline Islands previously. It moved northwest about 250 miles and then inclined to the west-northwest or west-by-north, increasing all the time to