

the lowest reported ship reading was 28.93 (uncorrected), made on the Japanese motorship *Hiye Maru*, January 1, in 47°30' N., 167°46' E.

On southern waters of the ocean, departures of pressure from the normal were small, but generally negative, Midway Island showing the greatest difference from normal, -0.08 inch.

A feature of unusual interest is the pronounced reversal from normal pressure conditions, as affecting a winter month, between Midway Island, in the usual January high pressure belt, and Dutch Harbor, in or near the position of the usually strongly entrenched Aleutian Low. The pressure at Dutch Harbor was 0.20 inch higher than that at Midway Island, which is extraordinarily anomalous for January.

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

Stations	Average pressure	Departure from normal	High-est	Date	Low-est	Date
	Inches	Inch	Inches		Inches	
Point Barrow.....	29.96	-0.12	30.86	31	29.06	1
Dutch Harbor.....	30.15	+ .57	30.84	29	29.50	1
St. Paul.....	30.02	+ .39	30.84	29	29.28	20
Kodiak.....	30.24	+ .65	30.70	29	29.68	2
Juneau.....	30.22	+ .34	30.83	4	29.57	24
Tatoosh Island.....	30.04	+ .06	30.54	6	29.44	13
San Francisco.....	30.08	- .03	30.40	2	29.71	5
Mazatlan.....	29.92	- .03	30.02	25	29.84	13, 21, 22
Honolulu.....	29.94	- .06	30.08	15	29.70	30
Midway Island.....	29.95	- .08	30.14	6	29.64	18
Guam.....	29.88	- .02	29.94	{ 26, 27, 29, 30 }	29.77	1, 9
Manila.....	29.87	- .02	29.94	25	29.74	2, 3
Hong Kong.....	30.05	- .06	30.28	11	29.84	31
Naha <sup>1</sup> .....						
Chichibima <sup>1</sup> .....						
Urakawa.....	29.99	+ .06	30.30	31	29.53	5

<sup>1</sup> Missing.

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.**—The eastern third of the ocean was practically free of cyclonic storms during January. Even as far north as Kodiak the lowest pressure, which occurred on the 2d, was 29.68, thus indicating weak cyclonic activity in northeastern waters. From 160° west longitude eastward to the American coast few ships encountered gales, and such as were met did not exceed eight in force. These were reported on 5 days: On the 6th, scattered over middle and higher latitudes; on the 9th near 42° N., 158½° W.; on the 20th, about 100 miles southwest of San Francisco; and on the 12th and 16th as intensified trades experienced by the steamer *Steel Voyager* along the twentieth parallel far to the eastward of the Hawaiian Islands.

From midocean westward cyclonic activity, while more vigorous than to the eastward, was less than is normal for January. On 4 days, however, gales of force 11, accompanied by only moderately low pressures, were experienced in scattered localities: On the 2d by the American steamer *Washington*, in 42½° N., 178° E.; on the 6th by the same steamer, in 42½° N., 168° W.; and on the 30th and 31st by the Japanese motorship *Hokuroku Maru* 2 and 3 days out from Yokohama on a voyage toward Los Angeles. This last-named ship, it may be added, encountered a force-10 gale on the 29th. The last 3 days of January, for the locality east of Honshu, provided the stormiest weather for any part of the ocean during the entire month. With the exception of the locally high winds of these dates, and an isolated gale of force 9 near 39° N., 175½° E., on the 29th, the latter half of the month was practically

galeless over all parts of the ocean. The period of most frequent and widespread, and for the greater part moderate, storminess was that of the 1st to 7th, mostly confined to the western half of the sailing routes.

No tropical depressions of consequence were reported.

**Fog.**—Scattered fog was observed on 10 days within the region 35° to 45° N., 180° to 140° W., and on only 1 day outside it.

#### TYPHOON AND DEPRESSIONS OVER THE FAR EAST, DECEMBER 1936

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One typhoon and two depressions were reported this month. Of these, the typhoon was by far the most important disturbance; the depressions were mild and apparently of little importance.

**Typhoon, November 28 to December 5.**—From November 28 to December 1 a low-pressure area over the western Caroline Islands developed into a depression which moved west-northwest and then west. On December 1 it was about 400 miles east of San Bernardino Strait and, as it moved in a westerly direction toward the Philippines, it intensified into a typhoon. Its movement was quite rapid, so much so that evening observations (Dec. 1) from stations around San Bernardino Strait indicated that the locality was in danger. On December 2, 6 a. m., the center was about 60 miles east by south of Virac, Cataduanes Island, and moving west. During the day it passed close to and north of Legaspi, Albay Province. It continued this westerly course to Bondoc Peninsula, where it began to incline west-northwest, thus threatening the city of Manila. It proceeded along this course into the China Sea; the late afternoon and night hours of December 2 were anxious ones in Manila. The center passed close to and south of Manila about 7 a. m., December 3, fortunately very much weaker. The next day (Dec. 4) found it in the China Sea, still moving west-northwest, very weak, and on December 5 no traces of the storm could be found.

The following barometric minima were reported along the course of the typhoon: Virac, Cataduanes Island, on December 2, 8:40 a. m., had 738.00 mm (29.055 inches), with east winds of force 10. Legaspi, Albay Province, recorded 738.45 mm (29.073 inches), with southwest winds of force 9 at 10:45 a. m. Naga, Camarines Sur, experienced a relative calm, 2 to 3:15 p. m. of the same day. Afterward south winds, force 10, blew over the city. The absolute minimum occurred at 2 p. m., a value of 729.81 mm (28.665 inches) with north-northeast winds, force 10, which ceased at that moment. Atimonan, Tayabas Province, was affected after the typhoon inclined to the west-northwest. At 11 p. m., December 2, a relative calm was experienced, which lasted until 1 a. m., December 3. There was no rain, it was reported; however, no stars were visible. Southeast winds, forces 2 and 3, were blowing during this period. The absolute minimum was recorded at 10:15 p. m., 45 minutes before the calm area reached the city. The value observed was 742.07 mm (29.240 inches) and the winds were northeast and force 7 at the time. At Manila, 5:55 a. m., the absolute minimum was recorded, namely, 748.30 mm (29.461 inches), while northwest winds, force 6, were blowing. Throughout the early morning hours northwesterly winds prevailed, forces 5 and 6; the maximum velocity observed was 38 m. p. h. (The above pressure values have been corrected for gravity.)