NORTH PACIFIC OCEAN

By WILLIS E. HURD

The anticyclone of the eastern part of the ocean in middle latitudes continued well developed in August, as in July. Normally its greatest strength occurs in midsummer, and the same fact holds true this year so far as is indicated by observations up to the present time.

The Aleutian LOW exists on the average th s month as a shallow area of diminished pressure over the northern part of Bering Sea and the adjacent continental neighborhoods, but during August, 1928, it showed as a depression along the Alaskan Peninsula and adjoining southern and eastern waters, the center being near Kodiak. It developed considerable act vity on several days, causing fresh gales along its lower quadrants.

The following table gives barometric data for several island and coast stations in west longitudes:

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean, August, 1928*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Dutch Harbor [1]	29.84	−0.06	30.42	14th	29.14	28th.
St. Paul [1 2]	29.88	+0.12	30.44	14th	29.34	28th.
Kodiak [1 3]	29.77	−0.08	30.20	14th	29.08	5th.
Midway Island [1]	30.11	+0.02	30.18	5th [6]	30.04	9th.
Honolulu [4]	30.04	+0.03	30.13	3d	29.92	28th.
Juneau [4]	30.06	+0.04	30.42	23d	29.43	5th.
Tatoosh Island [4 5]	30.09	+0.04	30.23	22d	29.79	25th.
San Francisco [4 5]	30.00	+0.06	30.09	28th	29.81	25th.
San Diego [4 5]	29.92	+0.03	30.04	16th	29.79	20th.

[1] P. m. observations only.
[2] For 30 days.
[3] For 29 days.
[4] A. m. and p. m. observations.
[5] Corrected to 24-hour mean.
[6] Also on the 6th.

Following upon the very quiet month of July, in northern waters of the Pacific, August set in with considerable increase in storminess, fresh to strong gales being encountered at several times and places along the upper sailing routes.

Tropical disturbances were almost as numerous as extratropical, and much more violent. Reports on the July and August typhoons of the Far East, by the Rev. José Coronas, S. J., chief of the meteorological division of the Philippine Weather Bureau, are subjoined. In his July report, in which a tropical cyclone is stated as lost to observation south of Japan on August 1, it should be further remarked of this intense storm that, according to the Tokyo weather charts, it remained very nearly in its position of the 1st until the 5th, when it moved with greatly decreased energy into the Japan Sea. The British motor ship *Silveray* was heavily involved in the typhoon during the late hours of the 2d and through the 3d and 4th. At noon observation of the 3d, in 31° 15′ N., 137° 30′ E, and of the 4th, in 32° 28′ N., 139° 10′ E., wind forces of 11 from N. and ENE., respectively, were experienced, with hurricane velocities at other times, and accompanying low pressures.

Hurricane of August 6–11 off the Mexican coast.—A tropical cyclone of great fury raged over the entrance to the Gulf of California and up the lower west coast of the adjoining peninsula on the 9th and 10th, and with lesser violence in the coastal waters to the southward of Cape Corrientes on the 6th to 8th. High winds were reported at shore stations during the passage of the storm, and a strong southwesterly gale was blowing at La Paz as late as the morning observation of the 11th.

This cyclone may have originated as early as the 3d in latitude 8°–9° N., longitude 85°–87° W., where unsettled conditions, with strong shifting winds, were encountered by the American motorship *Unicoi*. However, the earliest report of gales comes from the southbound American steamer *Florence Luckenbach*, which ran into a strong wind at noon of the 6th. At 2 o'clock, in 15° 45′ N., 99° 05′ W., the wind had increased to a gale of force 8 from east-northeast, barometer depressed to 29.72 inches. On the following morning the British steamer *La Crescenta* encountered an east-southeast gale, force 8–9, in nearly the same position. On the 8th the gale-swept region extended, so far as observations show, from a little below Manzanillo to a little above Cape Corrientes. The storm had increased in energy, with whole southeasterly gales and lower pressures. Up to this time the cyclone had been running outside of the usual steamship routes, which closely hug the coast. Early on the 9th, however, as it began moving across the outer waters of the Gulf of California, vessels became involved in other quadrants of the storm and in or near its center. Late on the night of the 8th the American steamer *William A. McKenney*, southbound, ran into a strong easterly gale in 21° 28′ N., 108° 21′ W., according to press accounts. The wind rapidly increased in violence, and shortly after midnight was blowing an easterly hurricane, barometer down to 28.50 inches. About 1 a. m. the vessel was so battered by terrific seas that much damage was done to cargo and upper works, and 14 members of the deck crew of 20, in attempting repairs, were washed overboard and drowned. At 2 a. m. of the 9th the steamer passed through the center of the hurricane, and at 4 a. m. moderating weather allowed her to make a search for the missing members of her crew, then shortly to proceed on her voyage.

At near 6 a. m. of the 10th the American steamer *K. R. Kingsbury*, Capt. D. W. Thomsen, San Francisco toward Balboa, ran into the "eye" of the hurricane in 23° 10′ N., 111° 05′ W. The storm report made to the Weather Bureau by the observer, Mr. George Barkley, second officer, is of such interest that it may be quoted herewith in part:

> At 2:30 a. m. rain commenced to fall, at first in showers, and later steadily and heavily, so that the sea was obscured.
>
> The wind reached hurricane force at 5 a. m., with a high NE. sea and heavy rain. At 5:45 the wind abruptly dropped to a calm as the ship reached the center of the hurricane. The barometer had now reached its minimum height of 29.08. For a half hour the vessel steamed in a calm with a slight confused sea, and then at 6:15 the wind suddenly came again from the SW. with hurricane force. At once a high southwesterly sea appeared. The wind did not long continue at its maximum force in this semicircle, falling in strength to a strong gale at 7 a. m. The glass was now rising fast, but with a diminishing rate. Rain continued to fall in the "eye" and after the vessel entered the right semicircle.
>
> The vessel passed directly through the center of the depression with the hurricane traveling almost north in its track. From observations of the weather and estimates of the ship's speed a rough approximation of the extent of this disturbance can be made. If the hurricane is allowed a rate of progress of 10 miles an hour, the center or "eye" was 10 miles in diameter. On each side of this was a belt of hurricane force winds, 15 miles in width on the foreside and 10 miles in width behind. Winds of gale force and stronger were felt in a belt of 75 miles width on each side of the zone of hurricane winds. The diameter of the storm can be estimated as approximately 190 miles.
>
> At the time that the wind blew a hurricane atmospheric pressure had changed so rapidly that the ears of several observers were uncomfortable. At daylight in the morning a number of butterflies were found beaten to the deck, evidence that the strong winds had extended to the land.

During the afternoon of the 10th the center evidently passed to the northwestward of Cape San Lucas, and on

the 11th the storm apparently died out in the highlands of the southern half of Lower California.

At Honolulu light trades blew 99 per cent of the time, with prevailing direction from the east. The maximum velocity for the month was 22 miles from the northeast on the 23d.

Fog was about one-half as frequent along the western half of the northern sailing routes as in July, the percentage of occurrence falling to 20 to 30, or slightly more in some localities. Fog lessened in west longitudes, except along the American coast between latitudes 25° and 40° N., where it was reported on 7 to 10 days in most 5° squares. At St. Paul, in Bering Sea, there is record of fog forming on 13 days in August.

Waterspout.—The unusual occurrence for the region of a waterspout in 33° 55′ N., 143° 56′ W., is to be noted. It was observed by the American steamer *Manini* at 2 p. m. of the 19th and lasted for 15 minutes, traveling northeast for a distance of about 5 miles, during the prevalence of a southeast wind of force 4. Heavy sheets of rain fell in its immediate vicinity. At the end the spout sundered, the lower half falling to the sea, the upper rising to the cloud.

INDIAN OCEAN

By WILLIS E. HURD

Southwest monsoon.—Very strong monsoon currents were reported from a section of the southwestern part of the Arabian Sea on the 3d to 5th and 29th to 31st of August. On the earlier dates the British steamer *City of Chester*, in latitudes 9° to 13° N., longitudes 59° to 55° E., encountered daily fierce southwesterly squalls of forces 9 to 10. At the end of the month the American motor ship *William Penn*, in nearly the same position, reported high seas, with monsoon winds of forces 8 to 9.

Volcanic dust.—The British steamer *Emlynian*, H. E. Maber, captain and observer, sends the following report of volcanic dust observed in the South Indian Ocean:

> August 5, 4:30 a. m., 12 miles NNW. of Toro Besi Point, Flores, encountered thick haze which an hour later became so dense as to enable us to see no farther than bows of ship. The cause was volcanic dust and sulphurous smoke blown off the land. The wind shifted to east about 7 a. m. and the sky began to lighten, but although an hour after sunrise at this time it was still quite dark. The ship was now completely covered from masts to water line with a thick coat of white powder resembling fuller's earth and an inch or more deep. At 7:45 daylight appeared, with small rain and general clearing of atmosphere, and at 10 a. m. sun shining with clear horizon to N. and E., and greenish appearance of sea.

TYPHOONS IN THE FAR EAST IN JULY AND AUGUST, 1928

By REV. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

July, 1928.—The first typhoon which has visited the Philippines during this year was probably formed on July 7 about 200 miles to the WSW. of Guam. Yet the first part of its track is rather indefinite until 2 p. m. of the 10th, when its center was clearly shown by our weather map to the east of southern Luzon in about 130° longitude E. and 14° latitude N. From that time the typhoon moved to WNW. and NW. by W. until it reached northern Luzon shortly after midnight of the 11th. The center of the storm passed across the Provinces of Cagayan and Ilocos with a due W. direction. The barometric minimum recorded in our stations was that of Tuguegarao 737.25 mm. at 4:30 a. m. of the 12th.

Once in the China Sea the typhoon moved to NNW. for several hours, and then to WNW. and W. from 2 p. m. of the 13th until it reached the northernmost part of Indo-China in the early morning of the 16th.

The center passed very close to the south of Pratas at about 2. a. m. of July 14, with a barometric minimum of 738.9 mm. and hurricane winds from the easterly quadrants.

The approximate positions of the center at 6 a. m. and 2 p. m. of July 11 to 14 were as follows:

July 11, 6 a. m., 126° 25′ longitude E., 15° 05′ latitude N.
July 11, 2 p. m., 125° 00′ longitude E., 16° 00′ latitude N.
July 12, 6 a. m., 121° 10′ longitude E., 17° 55′ latitude N.
July 12, 2 p. m., 120° 15′ longitude E., 17° 55′ latitude N.
July 13, 6 a. m., 119° 00′ longitude E., 19° 00′ latitude N.
July 13, 2 p. m., 118° 10′ longitude E., 19° 50′ latitude N.
July 14, 6 a. m., 115° 20′ longitude E., 20° 50′ latitude N.
July 14, 2 p. m., 113° 45′ longitude E., 21° 05′ latitude N.

The second typhoon of this month appeared as developing on the 18th in the China Sea, about 100 miles to the west of central Luzon near 118° longitude E. and 15° latitude N. It moved WNW. for a short time, and then due W. until it reached Indo-China in the early morning of the 21st. The center was over the Paracels at 6 a. m. of the 20th.

The third typhoon followed a very abnormal track. It was formed about 300 miles to the north of Yap on the 20th to 22d near 138° longitude E. and 14° latitude N. It moved NE. on the 23d, ENE. in the morning of the 24th, and E. in the afternoon of the same day and during the 25th. On the 26th it recurved to the N. and WNW. in the neighborhood of 147° longitude E., between 17° and 18° latitude N. The WNW. direction was kept until the morning of the 28th, when the typhoon recurved again to the NE. near 135° longitude E. and 22° latitude N. From 12 noon of the 29th until the 31st the direction of the track was almost due N.

The steamer *President Harrison* was near the coast of southeastern Japan when this typhoon was just between the Bonins and Japan. She reported a barometric minimum of 732.3 mm. at 12 midnight of July 31, and a whole gale from the east quadrants on the 31st, and from the north quadrants on August 1.

On August 1 the typhoon seems to have moved eastward, but we have no means to follow its track after that day.

The approximate positions of the typhoon at 6 a. m. of July 24 to 31 were as follows:

July 24, 6 a. m., 140° 50′ longitude E., 16° 15′ latitude N.
July 25, 6 a. m., 144° 45′ longitude E., 17° 10′ latitude N.
July 26, 6 a. m., 145° 45′ longitude E., 17° 20′ latitude N.
July 27, 6 a, m., 143° 20′ longitude E., 19° 15′ latitude N.
July 28, 6 a. m., 134° 45′ longitude E., 22° 00′ latitude N.
July 29, 6 a. m., 138° 50′ longitude E., 26° 25′ latitude N.
July 30, 6 a. m., 140° 00′ longitude E., 29° 45′ latitude N.
July 31, 6 a. m., 140° 00′ longitude E., 31° 45′ latitude N.

The fourth typhoon was of a short duration. It was formed on the 22d near 144° longitude E. and 20° or 21° latitude N. and moved northwestward to the south and southwest of the Bonins, filling up in the afternoon of the 24th near 137° longitude E. and 27° or 28° latitude N.

August, 1928.—The first typhoon of August appeared on our weather maps of the 8th far to the southwest of the Bonins near 135° longitude E. and 22° latitude N. It moved ENE., passing to the south of the Bonins in the afternoon of the 9th. From the 10th to the 13th the typhoon moved to the N. about 500 miles to the east of the Bonins and of central Japan. The steamer *Empress of Russia* was well under the influence of this typhoon on August 12 in about 145° longitude E. and