

latitudes. Typhoons and strong monsoons were felt in the Far East. Locally intensified trades, rising in force to that of a fresh gale, were reported on the 9th to 11th east of the Hawaiian Islands, and on several days Tehuantepecers roughened the weather off the Mexican south coast. But stormiest of all the regions was that lying approximately between latitudes 35° and 53° N., and longitudes 165° W. and 160° E. This region was traversed by most of the principal cyclones of the month.

The earliest northern cyclone of November, coming out of Siberia on the 1st, passed eastward over the Aleutians and entered the American mainland on the 6th. It was attended by fresh to whole westerly gales over an extensive area, involving the main trans-Pacific steamship routes south of the Aleutians, with the highest wind, force 11, on the 2d.

During the 9th to 12th another Siberian cyclone, after crossing the lower Kurils, sped northeastward and entered the Aleutian area. Its effects were experienced by shipping most severely on the 12th, during which day gales of varying forces up to 11 were reported along the upper route between 160° and 175° E.

About the 22d or 23d a storm development, secondary to a disturbance then over the Aleutians, appeared to the northeastward of Midway Island. At first it had a northwesterly trend about the HIGH then overlying the eastern part of the ocean, but by the 24th it was moving nearly north toward the Bering Sea, which it entered on the 26th. During most of its course it was a deep and violent cyclone. The heavy gales associated with it began on the 23d, when the American steamship *Stuart Dollar* encountered a northwesterly hurricane in 38° 30' N., 178° 30' W., barometer down to 28.88 inches. On the 25th several vessels experienced wind forces of 11 to 12, among them the American steamship *Oregon*, which encountered a southeast hurricane, with barometer down to 28.44 inches, in 50° 25' N., 171° 30' W. The cyclone continued northward with diminishing energy and by the 28th lay over northern Alaska and the adjacent Arctic Ocean.

During the 29th, in about 42° N., 163° E., the American motor ship *Defiance* encountered a northwest gale of force 11 in connection with a moderately deep cyclone, the earlier and subsequent movements of which are as yet little known.

Other gales of forces 8 to 10, not associated with the cyclones already mentioned, occurred at various times over the northern Pacific. They were for the most part connected with the fluctuating activities of the semi-permanent Aleutian Low. On the American coast fresh gales occurred on a few days, due to the proximity of depressions over the western extremity of the continent. The most important of these winds are mentioned in the tabular report of gales and storms.

One further extratropical cyclone needs to be mentioned. It gathered on the 1st of the month near 32° N., 147° W., in the midst of the North Pacific anticyclone. It had a slow northeast progression, but by the 3d, then central near 37° N., 137° W., it had penetrated the high-pressure area and joined the lower extension of the Aleutian cyclone to the northward. Thereafter it quickly lost identity and force, and only a very shallow depression remained of it off the California coast on the 4th. The cyclone attained local violence on the 3d, as may be gathered by the report of the American steamer *Melville Dollar*, which experienced a northerly gale of force 11, barometer down to 29.41 inches, while crossing the Low near 39° N., 140° W.

*Typhoons.*—Three November typhoons appear to have formed in the Far East. The first formed about midway between Guam and the Philippines on the 3d or 4th. It crossed central Luzon on the 7th and went westward into the China Sea. We have no present information as to its intensity.

The second typhoon probably formed on the 6th or 7th in much the same locality as had its predecessor. It went northwestward over Luzon and seems to have entered the China coast not far from Hong Kong on the 11th. Reports from two vessels indicate considerable intensity both east and west of the Philippines. On the 9th the American steamer *Stuart Dollar* experienced an east gale of force 11, lowest barometer 29.68, in 15° N., 128° E., and on the 11th the British tanker *Tamaha* encountered this storm as a northeasterly gale of similar force, lowest barometer 29.52, some 130 miles east of Hong Kong.

The third typhoon originated a little west of Guam on the 17th. After a westward movement for two or three days, it turned north, then went northeastward between the Ogasawara Islands and Japan, and disappeared at sea on the 24th near 40° N., 155° E. The American motorship *Defiance* experienced this cyclone as a gale of force 11 on the 23d, in 31° 26' N., 133° 00' E.

*Northers.*—Northers were reported in the Gulf of Tehuantepec from the 1st to the 8th, all of force 7, except on the 4th, when the gale rose to force 9, and on the 8th, when a force of 10 was encountered.

*Winds at Honolulu.*—The prevailing wind direction at Honolulu was from the east, with a maximum velocity of 24 miles from the east on the 8th.

*Fog.*—Only three or four days with fog were reported for all that part of the ocean west of 160° W. On the upper and middle routes between 130° and 160° W., scattered fog occurred on nine days, principally between the 19th and the 29th. There was much lessening of fog on the American coast as compared with October; but taking that part of the coast between Capes Mendocino and Conception as a whole, fog occurred on the first eight days of November and on the 20th. In the Gulf of Tehuantepec it was reported on the 16th and 21st near boundary lines of blue and green water.

#### TYPHOONS OF THE FAR EAST DURING SEPTEMBER AND OCTOBER, 1931

[Abstract of reports furnished by the Rev. MIGUEL SELGA, S. J., director, Weather Bureau, Manila, P. I.]

The manuscripts descriptive of the September and October typhoons in the Asiatic section of the North Pacific Ocean, kindly furnished by the Rev. Miguel Selga, S. J., director of the Philippine Weather Bureau, were received too late for inclusion in the September and October issues of the MONTHLY WEATHER REVIEW. Inasmuch as the regular North Pacific weather summaries have already given brief, though necessarily incomplete, mention of the several typhoons of those months, the restrictions of space in the current issue allow only of a brief résumé of the more important details that may be drawn from the articles in hand.

*Typhoons of September.*—Three typhoons of low latitudes were reported. The first, a very narrow but violent storm of September 1-4, appeared off the southeast China coast in the Taiwan Channel. The second, that of September 9-13, crossed the Eastern and Japan Seas, and disappeared north of Japan. It acquired greatest intensity and progressive velocity with passage of the Chosen (Korea) Strait. The third, that of September

18-28, was the the severest storm of the month in the lower latitudes of the Far East. It originated east of Samar, and on the 20th and 21st, moving almost due north, crossed Luzon, barely missing Manila. The lowest pressure obtained in the Philippines was 28.80 inches, at Daet, and the highest wind force, 12, from southwest, in Legaspi Bay. The storm was attended by heavy rains. A little south of 30° N. the typhoon track turned north-eastward, skirted the western coast line of Japan, and the center then moved rapidly on past Sakhalin Island.

(The report does not mention among the typhoons of the month the very severe cyclone which occurred south and east of Japan from the 8th to 11th.)

*Typhoons of October.*—Four severe typhoons occurred in October, 1931. The storm of October 5-14 originated south-southwest of Guam, moved northwest, recurved to the northeast, and after crossing central Japan, proceeded into the open sea. "Press dispatches from Tokyo reported torrential rains and terrific winds associated with loss in life in central and western Japan. The typhoon was considered one of the worst to hit Japan in years."

The China Sea typhoon of October 9-11, which was of known hurricane force on the 10th south of Hong Kong, passed almost due west into Indo-China.

The so-called *Taurus* typhoon of October 13-20 originated between Guam and Yap. "Yet," said Father Selga, "no accurate idea of the extent and severity of the typhoon could be formed until the steamer *Taurus*, anchored at port San Vicente, reported a barometric reading of 731 millimeters (28.78 inches) and WSW. winds of force 12 at noon on October 18." The lowest barometer experienced by the *Taurus*, 28.69 inches, occurred a half hour later. The typhoon was then passing western Luzon. It headed into the China Sea, where it disintegrated on the 20th. The accompanying rainfall over northern Luzon was very heavy on the 18th. The total fall in Aparri was nearly 10 inches and gave rise to the severest flood in that region since 1908.

The typhoon of October 20-27 was first indicated as a depression south of Guam. Going northwestward, the storm gathered energy and by the 24th, when about midway between the Philippine and Bonin Islands, it began to recurve into the northeast, attaining hurricane strength for an approximate distance of 100 miles outward from the center. Here it was encountered by the M. S. *Irisbank*, which experienced winds of force 8 to 12 for 44 hours. Near the Bonins (Ogasawara) on the 26th the S. S. *Yoro Maru* was reported in distress and later to have gone ashore on one of the small islands. The *Silverhazel* proceeded to her assistance, but in 29° 25' N., 143° 20' E., was forced to heave to in a northwest hurricane (force 12) and in consequence had to abandon her quest. The typhoon was lost to observation on the 27th far to the eastward of Japan.—*W. E. H.*

BUCKET OBSERVATIONS OF SEA-SURFACE TEMPERATURES

By GILES SLOCUM

STRAITS OF FLORIDA AND CARIBBEAN SEA

Table 1 shows the average temperatures for the Caribbean Sea and the Straits of Florida for November of each year from 1919 to 1930, inclusive, and Table 2 summarizes

the temperature for November, 1930, in the same areas. The chart shows the number of observations taken in November, 1930, within each 1-degree square and mean temperature data for subdivisions of the area considered.

The surface water of the Caribbean Sea is warmer than the yearly mean throughout November, but autumn conditions are well established by the beginning of the month, and the temperature drop is pronounced thereafter until the end of the year and beyond. Of an annual range in temperature of approximately four and a half degrees, nearly a third of the drop from the peak in September to the minimum in March occurs in November and another third in December.

This temperature drop in the Caribbean is slightly greater in December than in November, but in the Straits the most rapid drop during the year is in November.

November, 1930, was the ninth consecutive month having above-average temperature in the Caribbean Sea, being warmer than the 11-year mean except during the first quarter when the temperature was seasonable. The fall in temperature, as the month progressed, was slower than is usual at this season, and at variance with the relatively rapid normal fall in mean temperature described above.

The Straits of Florida were unseasonably cool during the first half of the month and slightly warmer than the 11-year mean during the second half, the month as a whole being cooler than the average.

TABLE 1.—Mean sea-surface temperatures in the Caribbean Sea and the Straits of Florida for November, 1919-1930

Year	Caribbean Sea		Straits of Florida	
	Number of observations	Mean (° F.)	Number of observations	Mean (° F.)
1919 <sup>1</sup> .....	97	81.2	18	79.3
1920.....	146	81.5	47	78.2
1921.....	233	80.8	74	79.1
1922.....	205	81.8	78	79.6
1923.....	289	81.3	95	77.0
1924.....	259	81.7	91	77.2
1925.....	340	81.8	95	80.2
1926.....	259	82.3	127	78.5
1927.....	510	82.4	147	79.2
1928.....	539	81.6	140	79.3
1929.....	565	81.4	191	79.2
1930.....	550	82.0	129	78.2
Mean (1920-1930).....		81.7		78.7

<sup>1</sup> Not used in computations because of insufficient data available.

TABLE 2.—Mean sea-surface temperatures (°F.), and number of observations, November, 1930

Quarter	Period	Caribbean Sea				Straits of Florida			
		Number of observations	Mean	Departure from 11-year mean (1920-1930)	Change from preceding month	Number of observations	Mean	Departure from 11-year mean (1920-1930)	Change from preceding month
I.....	Nov. 1-7.....	136	82.1			34	77.8		
II.....	Nov. 8-15.....	135	82.1			40	78.4		
III.....	Nov. 16-22.....	132	81.9			23	78.6		
IV.....	Nov. 23-30.....	147	81.8			32	77.8		
	Month.....	550	82.0	+0.3	-0.9	129	78.2	-0.5	-3.0