

British S. S. Bradford City:

Gale began on the 21st, wind NNW. Lowest barometer 28.07 inches on the 21st at 3 p. m., wind NNW., 11, in latitude 48° 52' N., longitude 86° 51' W. End on the 22d, wind NNW. Highest force of wind 12; shifts NNW.-NE.-N.-NW. This gale was of force 11 throughout with squalls of hurricane force. The Norwegian steamer *Mod* foundered on the 22d near latitude 46° 17' N., longitude 41° 10' W.

Danish S. S. Texas:

Gale began on the 21st, wind SSW. Lowest barometer 28.79 inches at 6 p. m. on the 22d, wind S., in latitude 58° N., longitude 20° 05' W. End on the 23d, wind SSW. Highest force of wind 12; shifts not given.

French S. S. La Lorraine:

Gale began on the 23d, wind WSW. Lowest barometer 29.71 inches on the 23d, wind W., 7, in latitude 42° 30' N., longitude 60° 17' W. End on the 24th wind NW. Highest force of wind 10; shifts W.-WNW.

Dutch S. S. Rotterdam:

Gale began on the 23d, wind WNW. Lowest barometer 28.96 inches at 4 p. m. on the 23d, wind NNW., 10, in latitude 45° 04' N., longitude 44° 57' W. End on the 27th, wind W. Highest force of wind 11; shifts WNW.-NW.

American S. S. Montana:

Gale began on the 23d. Lowest barometer 28.20 inches at 4 p. m. on the 24th, wind SW., 8, in latitude 48° 11' N., longitude 34° 58' W. End on the 26th, wind WSW. Highest force of wind 11, SW.; shifts not given.

British S. S. Lapland:

Gale began on the 24th, wind SE. Lowest barometer 28.26 inches at 1 a. m. on the 25th, wind W., 10, in latitude 48° 18' N., longitude 33° 35' W. End on the 25th, wind W. Highest force of wind 12; shifts SW.-W.-WNW.

American S. S. Cliffwood:

Gale began on the 24th, wind W. Lowest barometer 29.31 inches at 6 a. m. on the 24th, wind W., 10, in latitude 39° 25' N., longitude 30° 30' W. End on the 25th, wind WSW. Highest force of wind 12; shifts SW.-W.

On the 26th strong gales still prevailed over the middle sections of the ocean and northerly winds of gale force were also encountered off the coasts of Georgia and South Carolina. Storm logs:

American S. S. West Nilus:

25th moderate wind shifts from W. by N. to W. by S., force 3 to 7. Weather moderating, sea confused, rough and heavy. Westerly swell, barometer falling slowly from 29.19 to 28.79 inches. Greenwich mean moon position on the 26th, latitude 47° N., longitude 33° W.

American S. S. William G. Warden:

Gale began on the 26th, wind NE. Lowest barometer 29.52 inches on the 29th, wind NW., in latitude 30° 51' N., longitude 79° 20' W. End on the 30th, wind N. Highest force of wind 10, shifted three points.

By the 27th the disturbance that was near mid-ocean on the 26th, had moved eastward, the storm area having contracted somewhat, and westerly gales were encountered by vessels in the region between the 30th meridian and the European coast. Storm log:

American S. S. W. H. Tilford:

Gale began on the 26th, wind W. Lowest barometer 29.41 inches at 10.30 p. m. on the 26th, wind W., in latitude 44° 40' N., longitude 12° 31' W. End on the 29th, wind W. Highest force of wind 11, WSW.; shifts SW. W.

On the 28th there was a LOW central near latitude 47° N., longitude 40° W., with northerly gales in the westerly quadrants. Storm log:

British S. S. Winnebago:

Gale began on the 27th, wind NNW. Lowest barometer 28.84 inches at 4 p. m. on the 27th, wind WSW., 4, in latitude 48° 47' N., longitude 45° 47' W. End on the 29th NNW. Highest force of wind 9, NNW.; shifts S.-WSW.-NNW.

The depression off the American coast, near Hatteras, that was first reported on the 26th, seemed to take on a new lease of life, as on the 29th strong to moderate gales covered a limited area between the 30th and 40th parallels, west of the 68th meridian. This disturbance moved slowly eastward, increasing in extent and intensity, and by the 31st the storm area extended south to the 30th parallel and east to the 45th meridian. Storm logs:

Dutch S. S. Maashaven:

Gale began on the 28th, wind W. Lowest barometer 29.52 inches at 4 a. m. on the 29th, wind W., 9, in latitude 33° 23' N., longitude 70° 55' W. End on the 30th. Highest force of wind 10; shifts SW.-W.-NNW.

British S. S. Badagry:

Gale began on the 29th, wind ESE. Lowest barometer 29.10 inches at 8 p. m. on the 29th, wind E., 11, at latitude 39° 20' N., longitude 59° W. End on the 30th, wind N. Highest force of wind 12; shifts ESE.-N.

American S. S. Cliffwood:

Gale began on the 30th, wind SW. Lowest barometer 29.48 inches at 2 p. m. on the 31st, wind SW., 12, in latitude 31° 32' N., longitude 52° W. End on the 31st, wind NW. Highest force of wind 12, SW.; shifts SW.-W.

American S. S. Independence Hall:

Gale began on the 30th, wind N. Lowest barometer 29.20 inches at noon on the 30th, wind NW., 4, in latitude 35° 48' N., longitude 56° 39' W. End on the 31st. Highest force of wind 10, N.; steady NW.

Swedish S. S. Carlsholm:

Gale began on 30th, wind NNE. Lowest barometer 28.82 inches at 4 p. m. on the 31st, wind N., 12, in latitude 45° 22' N., longitude 50° 09' W. End February 1, wind NNW. Highest force of wind 12, N.; steady NW.

NORTH PACIFIC OCEAN.

By F. G. TINGLEY.

Judging from the reports that have been received from vessels the weather of the month over the North Pacific Ocean did not vary greatly from the average weather of January, differing in this respect from that of the North Atlantic Ocean, which was distinctly stormy. Most of the gales reported occurred west of the 155th meridian, W. longitude—85 per cent of those reported prior to the 26th. During the 26th-28th vessels between the Hawaiian Islands and the American coast experienced unusual northeast gales, due to the building up of a strong anti-cyclone to the northward.

Two vessels report having experienced winds of hurricane force. These were the American S. S. *West Jena*, Capt. J. A. Jacobson, Observer W. L. Doucett, Manila (Jan. 10), for San Pedro, and the British S. S. *Empress of Asia*, Capt. L. D. Douglas, R. N. R., Yokohama (Jan. 14), for Vancouver. The storm logs of these vessels are as follows:

West Jena.—Gale began on January 18 (eastern time) with wind at ENE. On the 19th the wind hauled slowly to S. and W., the barometer falling steadily. Lowest barometer, 29.41 inches, occurred at 6 a. m. on the 20th when in 35° 10' N., 149° 50' E., wind at that time SW. to W. Gale ended on 21st. Highest force, 12, W.

Empress of Asia.—Gale began early on 18th (eastern time) with wind at WNW. Lowest barometer, 29.11 inches, occurred at 4 a. m. same day in 46° 48' N., 169° 14' E., wind at the time being WNW., 7. Gale ended at 8 p. m. 18th. Highest force, 12, S. Wind backed from WNW. to S.

The American S. S. *Maui*, Capt. Peter Johnson, Honolulu (Jan. 26) for San Francisco, had very heavy weather for four of the five and one-half days of her voyage. For

the greater part of the time the decks were awash. Other vessels in the same area had a similar experience.

The month opened with the North Pacific anticyclone fairly well developed and occupying about its usual position. It remained nearly stationary until the 8th when there were indications of a movement eastward toward the continent. During this time a series of depressions from the western part of the ocean moved eastward across the Aleutian Islands and the Gulf of Alaska. During the passage of the disturbance of the 5th at Dutch Harbor the barometer at that place fell to 28.40 inches.

On the morning of the 10th the center of the anticyclone lay along the American coast, the central isobar being 30.50. Pressure was falling to the westward with the advance of a depression from the region of the Aleutians. By the 12th low pressure prevailed generally between the Hawaiian Islands and the mainland, being part of a system that extended thence westward to mid-ocean.

This distribution continued until the 16th when pressure rose over the region to the eastward of the Hawaiian Islands and a fresh anticyclone was formed. This was immediately reinforced from the northward by an area of high pressure that had appeared over Alaska on the 13th. The area broke up, however, on the 19th the northern portion moving southeastward over the western United States while the southern portion remained over the ocean. During the several succeeding days the latter was reinforced from the westward and attained to very large proportions. On the 25th-27th it covered the entire ocean east of the 170th meridian, W., and north of the 20th parallel. On the 25th and 26th the American S. S. *Manukai*, about midway between Puget Sound and Honolulu, recorded a barometer of 30.68 inches. A vigorous depression formed to the westward of this anticyclone on the 28th and moved northward to Bering Sea. On the morning of the 31st the barometer at Dutch Harbor was 28.58 inches.

Pressure was almost continuously below normal at Dutch Harbor, the average for the month being some 29.48 inches, about 0.23 below normal. The lowest pressure reported, 28.40 occurred on the 5th, the highest, 30.28, on the 25th. At Honolulu pressure was somewhat above normal on the 4th-9th and 20th-27th and below on other days. The average for the month was practically normal, being approximately 30.01 inches. The highest reading, 30.12, occurred on the 21st-22d and the lowest, 29.82, on the 31st. At Midway Island pressure was mostly above normal, the average being 30.03 inches, or about +0.03. The only negative departure of consequence, amounting for the period to -0.19, occurred on the 11th-15th. The highest was 30.20 inches on the 21st-22d.

PACIFIC TYPHOON BETWEEN GUAM AND YAP DECEMBER 3 TO 9, 1921.

By José CORONAS, S. J., Chief Meteorological Division.

(Weather Bureau, Manila, P. I., Dec. 20, 1921.)

Our observations of Guam gave the first signs of this typhoon on December 3 when it was probably formed not far from 145° E. and 10° N. On the 4th telegraphic reports received from Guam and Yap showed the center about halfway between the two stations moving apparently to WNW. or NW. by W. On the 5th and 6th the typhoon was practically to the west of Guam and north of Yap with a tendency to incline northward. Finally it recurved northeastward on the 7th and 8th,

the center passing between the Ladrone and Bonin Islands during the night of the 8th-9th.

The winds in Guam veered from NE. to SE., S. and SW., while in Yap they backed first from NW. to W. and SW., and then they veered to WSW., and possibly to W., although the observations received so far are not complete.

The American steamer *Granite State* was well under the influence of this typhoon on December 6 to 8, on her way from Honolulu to Manila. The steamer was on these days between 145° and 135° E., 16° and 18° N.; the barometric minimum 746.75 mm. (29.40 inches) was observed between 2 and 3 a. m. of December 8, and a gale reported from SE., S. and SW. on the 7th and 8th.

Meteorological observations for Dec. 2 to 8, 1921.

Date and hour.	Guam.				Yap.			
	Pres- sure. ¹	Wind.		Wea- ther.	Pres- sure. ¹	Wind.		Wea- ther.
		Direc- tion.	Force 0-12.			Direc- tion.	Force 0-12.	
Dec. 2:								
6 a. m.	mm. 758.8	ne.	1	c.				
2 p. m.	57.3	ne.	2	o.				
Dec. 3:								
6 a. m.	57.0	ne.	4	r.				
2 p. m.	54.3	ene.	5	o. q.				
Dec. 4:								
6 a. m.	55.1	ese.	4	o. q.	765.2	nw.	3	o.
2 p. m.	54.7	ese.	4	p.				
Dec. 5:								
6 a. m.	56.8	s.	1	p.	55.0	ws.	3	c.
2 p. m.	55.2	se.	4	o. q.	55.4	w.	3	c.
Dec. 6:								
6 a. m.	56.0	sse.	3	r.	53.3	ws.	5	c.
2 p. m.	55.4	sse.	3	p.	53.9	ws.	5	o.
Dec. 7:								
6 a. m.	56.2	sse.	3	p.	54.7	sw.	3	b.
2 p. m.	55.5	se.	3	p.	54.4	ws.	3	b.
Dec. 8:								
6 a. m.	56.6	s.	2	p.	56.1	sw.	2	c.
2 p. m.	56.2	ssw.	4	c.	55.7	ws.	3	c.

¹ Gravity correction not applied.

ADDITIONAL NOTE ON THE WEST INDIAN HURRICANE OF SEPTEMBER 5-17, 1921.

The Weather Bureau recently received from the master of the Danish S. S. *Florida* a report of the weather experienced by that vessel on September 5-7, 1921, during a voyage from Philadelphia to Rio de Janeiro, which showed that the hurricane which passed over the Windward Islands on the night of September 8 was in existence as early as the 5th. The following extract has been taken from the report.

Position at noon of September 5, 13° 15' N., 47° 36' W., barometer 30.37, wind SE., 2; sea SE., 2; 4 p. m., barometer 30.29, wind ENE., 2, sea ENE., 2; 8 p. m., barometer 30.28, wind ENE., 3, sea ENE., 3. At sunset the sky was very red and over the northeast horizon all was dark. The clouds observed comprised A. St., Fr. Nb., and Cu. Nb.; at this time the weather started to get squally.

At midnight of the 5th-6th the barometer was 30.29, wind NE., 4, sea NE., 4. At 4 a. m., barometer 30.17, wind ENE., 6, sea ENE., 6. At this time the same clouds were observed as at sunset on the preceding day but it was darkest over the northern horizon; 8 a. m., barometer 30.14, wind ENE., 6, sea ENE., 6. Noon, barometer 30.11, wind ENE., 8, sea ENE., 6. Position, 10° 10' N., 45° 48' W.

At 1 p. m. (6th) the wind suddenly turned to S., force 9; 4 p. m., barometer 30.11, wind S., 9, sea SE., 7, clouds, A. St. and Fr. Nb.; 8 p. m., barometer 30.23, wind SSW., 8, sea S., 7. Midnight, barometer 30.27, wind S., 6, sea S., 6, clouds Cu. Nb.; 4 a. m. (7th), barometer 30.23, wind S., 4, sea S., 4.

Had the *Florida* been equipped with wireless apparatus and able to send out reports of the hurricane the information would have been of great value, especially to the people of the Windward Islands, who had but very short notice of its approach.—F. G. T.

¹ The barometer evidently reads too high but no correction is available.