

WEATHER OF NORTH AMERICA AND ADJACENT OCEANS.

NORTH ATLANTIC OCEAN.

By F. A. Young.

The average pressure for the month was not far from the normal at land stations in Newfoundland and on the Atlantic coast of Canada and the United States, as well as in the British Isles, West Indies, and stations in the Caribbean Sea; it was considerably higher than usual in the Azores and also in the Bermudas during the greater part of the month.

The number of days on which fog was observed was not far from the normal over practically the entire ocean, as it was reported on 11 days over the Grand Banks, 9 days off the coast of Canada and New England, and from 7 to 8 days over the eastern end of the steamer lanes.

The number of days with winds of gale force differed considerably over different sections of the ocean, when compared with the normal as shown on the pilot chart, and by far the greater number occurred during the last half of the month.

From the 1st to the 10th moderate weather was the rule over the entire ocean, with the exception of slight disturbances on the 3d and 4th and 7th and 8th over the northern steamer lanes.

From the 10th to the 14th gales prevailed between the 50th meridian and the American coast and from the 11th to the 15th there was an area of low pressure north of the 45th parallel between the 25th meridian and the European coast. Storm logs:

American S. S. Connes Peak:

Gale began on the 11th, wind N. by E. Lowest barometer 29.65 inches at 2 p. m. on the 9th, wind NW., 10, in latitude 39° 30' N., longitude 59° 35' W. End on the 11th, wind SW. Highest force of wind 10, NW.; shifts N.-NW.-W.-SW.

British S. S. Comanchee:

Gale began on the 13th, wind WNW. Lowest barometer 29.01 inches at 8 a. m. on the 13th, wind WNW., 6, in latitude 52° N., longitude 6° 55' W. End on the 14th, wind N. by W. Highest force of wind 9; steady from WNW.

According to press dispatches two vessels in the mouth of the Panuco River near Tampico, Mexico, foundered during a heavy wind on the 13th. This storm must have been very local in character, as the few reports from craft in that vicinity on the 13th indicated moderate weather.

A very brief report was received from the American S. S. *Kingsway*, stating that on the 13th in latitude 10° 15' N., longitude 50° W., there was a slight disturbance with heavy, confused sea; barometer 29.80 inches. This was the first vessel report relating to the tropical disturbance that followed a rather unusual track and finally broke up off the coast of Europe on the 28th, causing a great deal of damage in the West Indies and Bermudas.

A most comprehensive account of this storm, covering the period from the 14th to 17th, was received from Dr. Oliver T. Fassig, official in charge at San Juan, Porto Rico. This included reports from the Leeward Islands, made by Mr. A. E. Collens at Antigua and Mr. Geoffrey Downing at Barbuda. Doctor Fassig states:

A slight fall in the barometer accompanied by variable winds at Barbados, St. Lucia, and Dominica on September 13 and 14 gave the first intimations of abnormal conditions. About noon on the 14th an unofficial message from Martinique reported a heavy swell from the east and winds varying from N. and NE. to SW., with rumors of a storm approaching from the south.

Frequent barometric observations at Antigua show that the lowest reading was 29.45 inches at 2 a. m. on the

16th, while from 12:30 to 9 a. m. on that date the wind backed from NW. to SW.

Mr. Downing reports from Barbuda as follows:

Between 8 a. m. and 10 p. m. on the 15th the barometer fell from 30 inches to 29.80 inches, the wind rising but steady from NE. By 11 p. m. the barometer began to fall rapidly and the gale to attain hurricane violence. At 1:30 a. m. on the 16th the wind had backed to NW., and the barometer fallen to 28.58 inches, the force of the wind being terrific. At 1:45 a. m. the center of the hurricane reached us, as there was an immediate lull, then a dead calm which lasted until 2:45 a. m. when the wind sprang up from the SE. By 4 a. m. it was blowing as hard as ever, but the barometer was rising, and by 6 a. m. the wind had moderated. One inch of rain fell during the night.

The hurricane apparently caused more damage at Barbuda than at Antigua, and Mr. Downing states that at the former island:

The country looks as though it had been swept by fire, with the fences all down, numerous buildings and trees blown down, while a number of small craft in the lagoon were sunk or blown ashore, although fortunately no lives were lost.

The storm also did a great deal of damage at Anguilla, the highest force of wind and lowest barometer, 29.60 inches, occurring at about 11 a. m. on the 16th. Doctor Fassig states that at 8 p. m. on the 16th a bulletin was distributed giving the center of the storm apparently northeast of St. Thomas, and moving slowly north by west.

On the morning of the 17th the center was probably not far from latitude 21° N. longitude 66° W., although it was impossible to plot its position accurately on account of lack of observations.

The New York Maritime Register of October 4 has the following note:

French S. S. *Mont Rose* arrived at Fort de France, September 17, and reported encountering a cyclone 260 miles off Martinique. The vessel received slight damage. Cargo damaged.

The American S. S. *Paria* at the time of Greenwich mean noon observation on the 17th was in latitude 22° 23' N, longitude 67° 01' W, wind ESE., 4, barometer 29.84 inches. Shortly afterwards the gale overtook her, as shown by following storm log.

Gale began on the 17th, wind ESE. Lowest barometer 29.65 inches on the 17th (time not given), wind NE., in latitude 22° 11' N., longitude 67° 06' W. End on the 18th, wind SE. Highest force of wind 10; shifts NE. SW.

Charts VIII to XIII show the conditions from September 18 to 23, inclusive.

Continuing in its northwesterly course, the disturbance on the morning of the 18th was central near latitude 24° N, longitude 66° W, and on the 19th, near latitude 26° N, longitude 77° W. It then began to curve toward the east and on the 21st the center was a short distance east of Bermuda. Judging from the few reports received the disturbance seemed to be of moderate intensity from the 18th to the 20th.

By the 21st, however, it had increased tremendously in violence, and Bermuda was visited by the most severe hurricane experienced in years. At the time of the 8 a. m. observation the barometer read 28.72 inches. Wind N., force 8. The lowest barometer was 28.57 inches from 8:40 to 8:55 p. m., highest force of wind 12, WNW. to W.; shifts of wind near time of lowest barometer NE. to WNW.

An interesting account of this storm was received from Lieut. G. E. Harper, R. N., one of the officers of H. M. S. *Valerian*, the vessel being stationed in Bermuda at the time. As shown by this report and a number of

others, a great deal of damage was done on the island, and also to small craft anchored in the harbor. The disturbance continued on its northeasterly course with an increased rate of translation and on the 22d was central near latitude 39° N., longitude 52° W., and on the 23d near latitude 42° N., longitude 47° W. The U. S. battleship *Maryland*, en route from Brazil to New York, ran across the track of this storm at nearly right angles, not far from Bermuda, but missed the center, a wind of force 7, being the highest reported. Storm logs follow:

American S. S. Cody:

Gale began on the 23d, wind SSE. Lowest barometer 28.68 inches at 1 p. m. on the 23d, wind calm, in latitude $43^{\circ} 20'$ N., longitude $44^{\circ} 40'$ W. End on the 24th, wind N., highest force of wind 12; shifts 18 points.

British S. S. Paul Pair:

Gale began on the 21st, wind S. Lowest barometer 29.42 inches at 8 a. m. on the 23d, wind NE., 8, in latitude $42^{\circ} 48'$ N., longitude $48^{\circ} 15'$ W. End on the 24th, wind NNW. Highest force of wind 8, NE.; shifts SSE.-E.-NE.-N.-NNW.

From the 23d to the 24th the area of low pressure moved rapidly northeastward and on the latter date the center was near latitude 49° N., longitude 29° W. It appeared to be reinforced by some northern disturbance, assuming as it did some of the characteristics of an extra-tropical storm, and there was also a most marked increase in intensity. From the 24th to the 25th the rate of its northeasterly movement had decreased, as on the latter date the center was near latitude 52° N., longitude $17^{\circ} 30'$ W. During the next 24 hours it drifted about 3° toward the east, and then moved southward, as on the 27th it was central near the Scilly Islands, with a rising barometer and decreasing winds. From the 24th to the 26th as shown on Charts XIV to XVI, inclusive, the storm developed into one of the most violent encountered in years. Especially interesting was the newspaper account of the experience of the Cunard liner *Aquitania* which was evidently near the center on the 25th. Some idea of the force of the sea can be gathered by the fact that 10 ports on the "B" deck 50 feet above the water line were smashed in, and 40 feet of the teak-wood coping which inclosed the windows on the shelter deck, 60 feet above the water line, were swept away. Capt. Sir James Charles, R. N. R., stated he had never seen higher seas or known it to blow harder than it did from the night of the 24th until the following afternoon.

The weather was fine until 8 p. m. on the 24th, when it began to blow hard from the southeast. By midnight it had veered to the southwest, reaching hurricane force. The *Aquitania* was now evidently near the center, as the barometer had dropped to 28.23 inches. The ship slowed down to 12 knots by the engines, and for 12 hours only made 5 knots in actual speed. There was little decrease in the force of the wind for 24 hours, and the rough sea continued until the 28th. A large number of other vessels were caught in this gale, and storm logs follow:

American S. S. Blair:

Gale began on the 24th, wind N. Lowest barometer 28.94 inches at 10 a. m. on the 24th, wind N., 11, in latitude $49^{\circ} 43'$ N., longitude $29^{\circ} 42'$ W. End on the 25th, wind NNW. Highest force of wind 12, N.; shifts SE.-N.

British S. S. Paludina:

Gale began on the 24th, wind SSE. Lowest barometer 28.60 inches at 9 p. m. on the 24th, in latitude 49° N., longitude 21° W. End on the 26th, wind NNW. Highest force of wind 12, WNW. to NNW.; shifts W-W by N.

American S. S. Anaconda:

Gale began on the 24th, wind SSE. Lowest barometer 28.11 inches at 3 p. m. on the 24th, wind ESE, 6, in latitude 50° N., longitude $23^{\circ} 45'$ W. End on the 25th, wind NNW. Highest force of wind 11; shifts ESE.-SE.-S.-SW.-W.

Apparently the storm center passed over us about 3 p. m. on the 24th, the time of our lowest barometer. At that time the wind dropped almost to calm, followed by a rising barometer and an abrupt change of wind to the west. The wind then rapidly increased from this direction, causing the crest of waves to fall back in great smotherers of foam.

British S. S. Lexington:

Gale began on the 24th, wind SW. Lowest barometer 27.87 inches at 5 a. m. on the 25th, wind SSE., 10, in latitude $51^{\circ} 10'$ N., longitude 19° W. End at noon on the 26th, wind NNW. Highest force of wind 11; shifts SSE.-NW. by W.

It is possible that the barometric reading of 27.87 inches may be somewhat too low, although the *Lexington* is equipped with a mercurial barometer that appears to be reliable, judging from the Greenwich mean noon observations.

From the 18th to the 22d there was a second tropical storm as shown on Charts VIII to XII, inclusive. This was central on the 18th near latitude 29° N., longitude 79° W., and moved slowly northeastward until the 22d, when the center was near latitude 35° N., longitude 70° W. It was only natural that this disturbance should be confused with the one just described, as on the 18th, 19th, and 20th the centers of the two areas of low pressure were not far apart. This disturbance, while of a tropical nature was not fully developed, and no unusually low barometric readings were reported. Storm logs and special report follow:

American S. S. B. Hunt:

Gale began on the 18th, wind NE. Lowest barometer 29.66 inches at 2 a. m. on the 21st, wind N, in latitude $34^{\circ} 23'$ N., longitude $75^{\circ} 54'$ W. End on the 22d, wind NE. Highest force of wind 10, N; shifts NE.-N. Heavy rain squalls at intervals.

British S. S. Rathlin Head:

Gale began on the 20th, wind NNE. Lowest barometer 29.60 inches on the 21st, wind NNE., 8, in latitude $34^{\circ} 07'$ N., longitude $75^{\circ} 35'$ W. End on the 21st, wind N. Highest force of wind 10, NNE.; shifts, veering and backing between N. and NE.

Cuban S. S. Paloma:

8 a. m. on the 19th, in latitude $32^{\circ} 04'$ N., longitude $76^{\circ} 40'$ W., barometer 30 inches, wind ENE., 8. High easterly sea.

8 p. m. on the 19th, in latitude $31^{\circ} 15'$ N., longitude $76^{\circ} 40'$ W., barometer 29.87 inches, wind SSE., 7. Squalls and lightning in NW.

At 10 p. m. furious squalls of wind and rain, vivid lightning all around, wind increasing to almost hurricane force from SE. Sea nearly flattened out.

Midnight on the 19th, barometer 29.82 inches, wind SE., 11 (high force).

1 a. m. on the 20th, barometer 29.72 inches (lowest reading), wind SE., 8.

2 a. m. on the 20th, in latitude 31° N., longitude $76^{\circ} 20'$ W., barometer 29.77 inches, wind SE., 7. Sky breaking up. Center of disturbance apparently passed to westward of ship, a long line of black clouds being seen to west, lying SW. and NE., with clear sky above and below (traveling northerly).

On the 18th there was a fairly well developed area of low pressure over the eastern section of the steamer lanes that on the 19th was central off the north coast of Scotland, as shown on Charts VIII and IX.

On the 27th and 28th westerly gales prevailed off the coast of Labrador, as shown by following storm log:

British S. S. Manchester Spinner:

Gale began on the 27th, wind WNW. Lowest barometer 29.46 inches at 3 a. m. on the 28th, wind WNW., 10, in latitude 53° N., longitude $54^{\circ} 19'$ W. End on the 29th, wind NW. by W. Highest force of wind 10, WNW., steady WNW.

From the 27th to 30th heavy weather was reported over to middle and eastern sections of the steamer lanes. Storm logs:

American S. S. *Ala*:

Gale began on the 27th, wind WSW. Lowest barometer 29.18 inches at 10:30 a. m. on the 28th, wind W, 10, in latitude 52° 39' N., longitude 35° 34' W. End on October 1, wind N. Highest force of wind 10, W. by S. to WNW. Shifts; WSW-WNW.

Danish S. S. *Oscar II*:

Gale began on the 29th, wind S. Lowest barometer 29.35 inches at 8 p. m. on the 29th, wind SSW, 7, in latitude 57° 58' N., longitude 14° 35' W. End on the 30th, wind SSW. Highest force of wind 9, steady SSW.

NORTH PACIFIC OCEAN.

By WILLIS E. HURD.

The early receipt of the very complete typhoon report for the REVIEW from Rev. José Coronas, S. J., of the Manila Observatory, renders it unnecessary to remark in detail in this résumé upon the weather in the Far East for September. Father Coronas notes the behavior of an August-September typhoon, and records the movements of four others whose histories are wholly contained within the latter month. The Weather Bureau has received reports from vessels slightly involved in all these storms. In the first, on September 11, the Japanese S. S. *Taiyo Maru*, Captain Nagana, Observer Kamada, Yokohama to Hongkong, encountered winds from the NW., force 8, in latitude 25° 49' N., longitude 121° 20' E., lowest corrected pressure, 29.27 inches. The observer notes:

At 4 a. m. wind N. by W., force 7, ugly, threatening weather; barometer showed 29.46, corrected. Then we avoided the typhoon, putting engine slow down, and taking ship's course on north.

This storm, which prevailed over the lower Loochoos on the 10th, is reported to have been one of the severest ever experienced there. On Miyako Island alone about 2,000 houses were destroyed.

The influence of the second typhoon, that of the 11th to 21st, was felt by the British S. S. *Talhybius* on the 19th and 20th, in latitudes 22° to 23° N., longitudes 115° to 117° E.; highest wind force ENE., 8, on the 20th.

The third typhoon, which formed on the 13th to 14th over the Marianas, is mentioned by Father Coronas as having been last seen on the 21st in about 35° N., 144° E., but reports which have since become available would indicate that it continued eastward and into still higher latitudes. The American S. S. *West Iran* had a gale, force 7, on the 22d, in 39° 10' N., 157° E., with shifts from S. to WNW., lowest pressure, 29.43. It seems unquestionable that this vessel was affected by that cyclone, and still further reports indicate as fully that the typhoon, now become an extratropical storm of much reduced intensity, moved still farther northward until on the 25th it was over the upper reaches of Bering Sea.

The Dutch S. S. *van Overstraten*, Hongkong to Amoy, fell under the influence of the fourth typhoon, that of the 25th to 29th. The storm moved to the eastward and northward of the vessel's positions on the 28th and 29th. The steamship therefore remained in the left-hand semicircle and experienced little beyond northeasterly to northwesterly gales and rough seas up to the time the storm entered the China coast near 26° N.

Tropical storms were not confined to the Far East during September, however, for two violent cyclones were reported from the hurricane region off the west coast

of Mexico. The first was observed on September 1 by the American S. S. *West Catanace*, Capt. A. W. M. Knip, Balboa to San Pedro. Strong easterly and southeasterly gales to hurricane winds were encountered by this vessel from 4 a. m. until noon, between 17° 06' N., 102° 50' W., and 17° 16' N., 103° 04' W. Said Captain Knip:

Tried at 4 a. m. to bring wind on 4 points starboard bow, but ship refused to haul up in wind, and decided to keep running. In fact, thought to have success, as barometer started to rise between 4 and 5 a. m. After 5 barometer steady, sea increasing. After 6 barometer dropped, and before 6 a. m. a heavy sea struck starboard side, doing some damage. Tried again to bring ship up in wind, but in vain. At 7 a. m. barometer had dropped again. Took opportunity from lull in wind to bring ship up in the sea, but could not bring her further than NE 6 N. Decided to keep that course. Barometer dropping fast between 7 and 8. Ship laying fine and shipping very little water. Sea heavy, but not dangerous. After 8 a. m. barometer rising fast, wind hauling and sometimes moderating. Between 8 and 9 clearing in SW. Between 8 and 10 weather moderating and wind hauling after heavy rain squalls, and sky clearing at times, but about 11 a. m. wind increasing to 12 accompanied by terrific rains. After 11:30 weather moderating fast.

NOTE.—At 7:30 a. m. antennæ parted and could not be repaired on account of the storm. Repaired the same during the afternoon and at 6 p. m. sent out advisory to all ships in vicinity, asking also for their weather report, but didn't get any reply, although wireless operator heard advisory repeated by several steamers.

This storm was apparently moving in a course parallel with the coast. It is unfortunate that no other information concerning it is at hand.

On September 9-10 the American S. S. *Bessemer City*, Capt. John Murphy; observer, Second Officer David Polowe, Honolulu to New York, passed through the "eye" of a cyclone in 16° 12' N., 113° 44' W. The vessel experienced gale winds, beginning from NNE., 7, from 4 a. m. of the 9th until noon of the 10th, and hurricane winds from 11 a. m. to 11 p. m. of the 9th, except from about 3:30 p. m. to nearly 5 p. m., during which time calms to light airs accompanied the passage through the storm center. The "eye" was estimated to be from 15 to 18 miles in diameter. This size, coupled with the fact that the *Bessemer City* and the disturbance were moving in opposite directions and the vessel so long involved, suggests a hurricane of extraordinary dimensions, larger probably than any other of this locality of which there is trustworthy information.¹

Of the subsequent movement of the storm, no further data are available. Mr. Polowe suggests that:

The place of disappearance of the confused seas gives us our probable true point of origin of the cyclone (and) makes the parabolic nature of the track at once apparent. This point lies in latitude 16° N. and longitude 113° W. Since the eastern limit of the trade winds is soon reached, the disturbance probably recurved at 20° N., then traveled N. or NNE. and most likely was dissipated against the rocky and mountainous coasts of Lower California.

The pressure alignments over the eastern part of the ocean for September, 1922, showed a persistent low-pressure area over the Gulf of California or adjacent territory, with the North Pacific high-pressure area occupying the major portion of the central region from the 180th meridian to the California coast. This anti-cyclone was broken only from the 20th to the 26th, when it was pushed westward and southward and cut into two centers by a powerful disturbance central over the Gulf of Alaska.

The Aleutian Low lay to the southward of Alaska from the 1st to the 3d of the month. It disappeared on the 4th, and on the 5th low pressure covered the islands

¹ Numerous instances like those here mentioned are at hand of extremely valuable though incomplete data concerning the cyclones of west Mexican waters. The Weather Bureau is especially desirous of obtaining all available information about these storms so that their histories may be established, if possible, and is taking opportunity at this time to call the attention of seamen to its needs.