

observed in Formosa was that of Keelung 733.7 mm. (28.89 ins.), with hurricane winds from SW. The maximum velocity of the wind was of 48.3 m. p. s. (108 m.p.h.). The following report was received from the director of Taihoku Observatory:

The typhoon was destructive in north Formosa, causing great damage; persons killed, 18; missing, 14; and injured, 312; houses destroyed, 3,300; partially destroyed, 4,060; damaged, more than 6,000; two steamers and more than 50 junks wrecked.

From 6 a. m. of the 7th the typhoon moved west into China along the 25° latitude N.

Other depressions of less importance.—On the 10th a small cyclonic center was observed to the NE. of Formosa, between 124° and 125° longitude E., 25° and 26° latitude N. It moved NNE. across the Eastern Sea on the 11th and then ENE. across central Japan on the 12th.

Another depression was formed over the Eastern Sea on the 16th to 17th near 30° latitude N., between 126° and 127° longitude E. It moved E. by N. on the 18th and 19th to the south of Japan.

A depression traversed the southern part of Japan on the 16th, moving eastward. It is doubtful whether it really formed over the Eastern Sea ESE. of Shanghai on the 14th, or if it developed out of a low-pressure area shown in our weather maps between Hongkong and Shanghai before the 14th. In the latter case, it should be considered as a continental depression.

THE DESTRUCTIVE TYPHOON OF NORTHERN LUZON, OCTOBER 3, AND FIVE OTHER LESS IMPORTANT TYPHOONS OF THE FAR EAST IN OCTOBER, 1924

By Rev. JOSÉ CORONAS, S. J.

[Weather Bureau, Manila, P. I.]

Both the Pacific and the China Sea were very stormy during the first 8 or 10 days of October. There were three typhoons, which, if not altogether simultaneous during those days, were at least partly so. The most important, however, is that which struck northern Luzon during the night of October 2 to 3 and the morning of the 3d.

Typhoon of northern Luzon, October 3.—This typhoon was shown for the first time in our weather maps on the morning of October 1 about 400 miles to the east of central Luzon near 128° longitude E. and 15° latitude N. It seems to have moved at the beginning NW. by W. and WNW., but gradually inclined more and more to the west, thus threatening the northern part of Luzon. The center traversed Luzon through the central part of Cagayan Province, the northern part of Ilocos Sur, and the southern part of Ilocos Norte. Its actual direction while traversing Luzon was either due west or even perhaps W. by S. Great damage was done not only to the three mentioned Provinces, but also to the Mountain, La Isabela, La Union, and Abra Provinces. It is considered as one of the worst typhoons ever experienced in northern Luzon.

The lowest barometric minima so far reported to our office are: Aparri, 720.63 mm. (28.37 inch.) at 4:30 a. m.; Tuguegarao, 720.90 mm. (28.38 inch.) at 4:51 a. m.) on board S. S. *Macaria*, stranded at 17° 46' latitude N., 120° 24' longitude E., 724.0 mm. (28.50 inch.) at 10 a. m.; Laoag, 726.69 mm. (28.61 inch.) at 8 a. m.; Vigan, 726.16 mm. (28.59 inch.) at 9:30 a. m.

It has been reported that in Lallo, a town 10 miles south of Aparri, the barometer fell to 707.0 mm. (27.59 inch.). In the China Sea the typhoon continued moving almost due W. with a very little inclination to the north.

The positions of the center at 6 a. m. of the 2d to the 6th are as follows:

October 2, 6 a. m., 126° 45' longitude E., 16° 25' latitude N.
 October 3, 6 a. m., 121° 15' longitude E., 18° 00' latitude N.
 October 4, 6 a. m., 116° 10' longitude E., 17° 55' latitude N.
 October 5, 6 a. m., 111° 15' longitude E., 18° 20' latitude N.
 October 6, 6 a. m., 107° 20' longitude E., 18° 50' latitude N.

Two Japan typhoons, September 28 to October 9.—On September 28 a depression was formed in the neighborhood of the Loochoos, although it developed into a real typhoon while approaching Japan on the 29th. After moving NE. on the 28th, the typhoon traversed part of Japan and the eastern part of the Japan Sea on the 29th and 30th, moving first NNE., or N. by E., and then NE. At 6 a. m. of October 1 the center was shown by our weather maps not far from the northernmost coast of Japan.

The other Japan typhoon had its origin in the Western Carolines on September 29. The center was situated at 6 a. m. of that day south of Guam and east of Yap near 145° longitude E. and 9° latitude N. It moved north-westward on September 29 and 30 and October 1; then WNW. on October 2 and 3; and it recurved to N. and NNE. on October 4, when near 130° longitude E. and 19° latitude N. On October 6 it inclined back to WNW. toward the northern part of the Loochoos, but then at about noon of the 7th it recurved again to NE., the center being situated near Kagoshima in the early morning of the 8th. From noon of the 8th it seems to have moved eastward and it was probably only a depression of little importance; but we do not have as yet sufficient observations to verify this.

A Balintang Channel typhoon, October 7 to 11.—This typhoon, like the first one, was apparently formed over the Pacific about 300 or 350 miles to the east of central Luzon. Its center was shown by our weather maps at 6 a. m. of the 7th near 127° longitude E. and 15° latitude N. It moved NW. by W., traversing the Balintang Channel on the morning of the 9th and reaching the China coast between Swatow and Hongkong in the afternoon of the 10th. It was apparently only an ordinary typhoon and not a destructive one, like the first Philippine typhoon of this month.

A Pacific typhoon between Yap and Guam, October 6 to 9.—Although the track of this typhoon is not so certain, as it is based only on the observations made in Guam and Yap, yet it would seem that it formed on October 6 near 142° longitude E. and 9° latitude N. It moved NNW. on the 6th and N. on the 7th and finally it recurved to ENE. on the 8th between 138° and 139° longitude E., 12° and 13° latitude N.

A depression over the Visayas, October 19.—Signs of a depression or typhoon over the Pacific east of the Visayas appeared in the afternoon of the 18th, although the 6 a. m. weather map of October 19 showed clearly that there was only a shallow depression of little importance crossing the southern part of the Visayas in a westerly direction. In the China Sea it moved to WNW., at the same time developing into a real typhoon, which reached the Indochina coast in the early morning of the 23d near 109° longitude E., 14° latitude N.

CYCLONIC DISTURBANCES IN SOUTHERN OCEANS

By ALBERT J. McCURDY, Jr.

South Atlantic Ocean.—Weather reports thus far received from vessels that traversed the shipping routes of the South Atlantic Ocean in October, 1924, indicate only one disturbance of any consequence.

From the 9th to 12th the American S. S. *Swiftwind*, Capt. A. W. Barlow, Texas City to Buenos Aires, experienced southwesterly gales accompanied by heavy head seas off the coast of Uruguay. Mr. A. C. Allen, second officer, states that the lowest barometer, 29.86 inches, was recorded at 8 p. m. on the 9th in 28° 32' S., 47° W. The wind at the time of the lowest pressure was SW., force 5. By the 12th the gale had increased to force 10 from the southwest but lasted only until noon.

This same gale was experienced by the American S. S. *Tuscaloosa City*, Capt. R. C. Forbes, New York to Montevideo. Mr. T. W. Marvin, second officer, reports that the lowest barometer noted was 29.85 inches, occurring at 2 a. m. on the 10th in 28° 14' S., 46° 27' W. The

wind at this time was SW., force 8, later increasing to force 11. With the *Tuscaloosa City* this gale lasted until 2 p. m. of the 12th.

South Pacific Ocean.—Of the cyclonic disturbances occurring in the South Pacific Ocean during October, only one of any significance has been reported. This was a depression off the east coast of New Zealand. The British S. S. *Mahana*, Capt. W. Kershaw, Balboa to Auckland, came within its influence on the 11th, experiencing a west-northwesterly gale accompanied by very heavy seas. Messrs. F. Smith, second officer, and F. Gilroy, fourth officer, report that the lowest pressure was 29.48 inches (uncorrected), occurring at 4 p. m. on the 11th in 34° 47' S., 168° 42' W. The wind at this time was WNW., force 8, but later shifted to WSW., and increased to force 9 on the 12th. To quote:

After blowing force 5 from 2 p. m. on the 12th to 2 p. m. on the 13th the wind increased to gale force, maintaining a steady WNW. direction with barometer only fluctuating very slightly.

At 10 p. m. the wind fell off a little and by 6 a. m. on the following morning was blowing W., force 5, barometer still steady.

551.506 (73) DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

By ALFRED J. HENRY

The outstanding feature of the month was the drought that prevailed east of the 100th meridian and to the south of the parallel of about 37° north latitude. In all of this region precipitation was greatly deficient, save only in the Florida Peninsula, where the tropical cyclone of the 17th–21st was the occasion of heavy rainfall. The rainfall, however, did not extend beyond the limits of the State. Associated with the drought, but whether in the relation of cause and effect is not known, was the tendency for anticyclones to persist over Atlantic Coast States, presumably as a result of the frequent renewal of their supply of polar air from higher latitudes. In that position these anticyclones seemed to form an obstacle to the normal eastward movement of cyclonic systems that approached from the west. The text and charts which follow present the usual details.

CYCLONES AND ANTICYCLONES

By W. P. DAY

The persistence of high-pressure areas over the eastern portion of the country was the outstanding feature of the month. Low-pressure areas formed frequently over the Rocky Mountain and Plateau regions, but made very little headway eastward, and in most cases were forced northward and the southern ends of their troughs were closed by high pressure. The failure of these troughs to traverse the country, closely connected with the prevalence of high pressure to the east, are interesting facts in connection with the drought which prevailed over the Middle and North Atlantic States.

The hurricane which developed during the 13th–18th over the northwestern Caribbean Sea passed over the extreme western end of Cuba on the 19th. It caused some of the lowest barometer readings ever recorded in these regions. A land station, Los Arroyos, reported 27.52 inches and two vessels reported under 28 inches.

FREE-AIR SUMMARY

By V. E. JAKL

The outstanding feature of the month was the frequency with which winds having a decided easterly

component occurred at various levels throughout the region covered by aerological stations. This marked easterly tendency of the upper winds was apparently associated with the prevalence of stagnant or slowly moving high-pressure areas, which, instead of the usual succession of high and low pressure areas, largely influenced this portion of the country. The unusual condition of general easterly winds prevailing for a period of days over a considerable portion of the country was observed twice during the month. From the 10th to 12th and from the 20th to 25th, particularly during the latter period, easterly winds to high altitudes were observed with great regularity at nearly all aerological stations. In addition, easterly winds were observed quite frequently on scattered dates and over scattered areas. In the resultants for the month, however, the easterly component is apparent only in the South. Elsewhere east of the Rocky Mountains the resultant winds—especially in the lower 3,000 meters—show a circulation completing the anticyclonic circuit; i. e., southerly over the Mississippi Valley, westerly over the Lake region, and northerly over the Atlantic States. This distribution of resultant winds naturally resulted from the average high pressure for the month over the eastern half of the country.

The effect of the resultant winds on the mean upper-air temperatures is apparent from the figures in Table 1. Broken Arrow, Drexel, and Ellendale, which had winds decidedly more southerly than normal at all altitudes, showed temperatures well above the normal throughout the vertical column. At Royal Center, with normal winds from a general westerly direction, the temperature was also above normal at all levels, due to drainage from the abnormally warm region to the west. At Groesbeck, the most southerly kite station, where the winds were of normal direction and strength from about south, the temperature was very close to normal, while at Due West, another southern station, where winds had a decided northerly component, the temperature was perceptibly below normal for all altitudes observed.

Records of humidity showed no important features, except at Broken Arrow, Drexel, and Ellendale, where with temperature above normal the relative humidity was the same as normal. Consequently, the vapor pressure at these stations was decidedly above normal. Notwithstanding this higher average vapor content of