

China Sea the morning of the 16th, close to and west of the coast of Luzon. It was a very small center, within 70 miles of the coast, as the observations taken on board the *S. S. Anking* show. This ship, en route to Manila, followed the one hundred and nineteenth meridian very closely and yet passed west of the typhoon on the afternoon of the 17th. The next day, the typhoon was over the western part of the Balintang Channel, where it changed its course to the northeast, filling up over the Nansei (Loochoos) Islands, November 19.

At Legaspi, the minimum reading of the barometer was 723.45 millimeters (28.482 inches); at Naga, 728.87 millimeters (28.695 inches). The rains which this typhoon brought caused many deaths in and around the town of Mauban, Tayabas Province. Seventeen hours of rain over the sources of the Mauban River caused a sudden and destructive flood, which took a toll of 52 lives. The province of Tayabas suffered heavily and, on November 24, the Governor released the report that 106 lives were lost because of this typhoon.

Typhoon, November 24 to December 3.—This typhoon first appeared on the weather map of November 24, 2 p. m., located about 500 miles southeast of Guam. It moved west-northwest and then was almost stationary, November 25 and 26, over the regions about 300 miles south-southwest of Guam. Taking a more westerly course, it approached the island of Yap November 27, passing that island on a west by south course early in the forenoon of the same day. Moving very fast on a west by north course, it approached the Visayan Islands, being located on November 28 near latitude 10° N., longitude 131° E. November 29, at 6 a. m., it was close to and south of Tacloban, Leyte Province, now changing to a west-northwest course. Crossing the Visayan Islands, it moved southwest of Masbate, north of Capiz, close to and south of Odiongon. The next morning, (Nov. 30) it was over northern Mindoro. It continued its west-northwest course into the China Sea for 2 days. On December 2, it changed its course more to the west and filled up over the Paracel Islands the next day.

This storm was the cause of much destruction to crops and light-material houses; little loss of life was reported, except the case of the sinking of the *M. S. Pulupandan* which was lost off Pandan, Antique Province, about 6:30 p. m. November 29. Of the crew of 28, 7 were saved, according to the newspapers of December 5.

Of the stations reporting, Guiuan, Samar Province, reported the lowest barometric minimum, 724.80 millimeters (28.535 inches). Tacloban, Leyte Province reported 727.24 millimeters (28.631 inches).

TYPHOONS AND DEPRESSIONS IN THE FAR EAST, DECEMBER 1934

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Four typhoons and 1 depression, 2 of which were exceptional because of their courses, occurred during the month. We shall consider these in chronological order.

Typhoon, November 30 to December 6.—The approximate positions of this typhoon, day by day, were:

November 30, 6 a. m., latitude 8° N., longitude 142°30' E.
December 1, 6 a. m., latitude 8°30' N., longitude 135° E.
December 2, 6 a. m., latitude 12° N., longitude 128°30' E.
December 3, 6 a. m., latitude 15°30' N., longitude 124°30' E.
December 4, 6 a. m., latitude 21°30' N., longitude 129° E.
December 5, 6 a. m., latitude 26°30' N., longitude 137° E.
December 6, 6 a. m., latitude 30° N., longitude 141° E.

This typhoon was severe. As it passed Yap, about 60 miles to the south, a barometric minimum of 742.3 milli-

meters (29.22 inches), was recorded, together with winds of force 9 from the east. On December 3, about 200 miles east of Luzon, it caused destructive rains in the Cagayan River Valley (northern Luzon). Also, on December 4 and 5, the northerly winds on the western side of the typhoon reinforced the circulation around the high-pressure area over China to such an extent that strong northeast monsoon winds extended as far as Singapore. The path of this typhoon was unusual for the time of year. The usual course of typhoons during the late months of the year is across the archipelago, so that one which recurves to the northeast is considered exceptional. It was very fortunate for the Philippines that this typhoon recurved and did not pass over any part of the Islands.

Typhoon, December 3 to 7.—This typhoon formed in the China Sea and moved eastward, decreasing in intensity as it crossed the archipelago. The daily positions are given below:

December 3, 6 a. m., latitude 10° N., longitude 116°30' E.
December 4, 6 a. m., latitude 11° N., longitude 119° E.
December 5, 6 a. m., latitude 11° N., longitude 122° E.
December 6, 6 a. m., latitude 11° N., longitude 129° E.
December 7, 6 a. m., latitude 12° N., longitude 134° E.

Regarding the formation of this typhoon, there are two possibilities. The typhoon of November 24 to December 3 (briefly described in the typhoons of November 1934) was in the China Sea close to the same region where the present typhoon appeared. There were at the time northeast monsoon winds of considerable intensity over the China Sea, so the typhoon could not move very far on a westerly course; there is no definite evidence that it filled up, and so it is possible that it moved southward and appeared in the China Sea west of Palawan Island, centered in the position given above. On the other hand, from observations at Puerto Princesa, Palawan Island, and also observations taken on board the *S. S. Fathomer*, then in port at an island at the southern portion of the Palawan group, it seems to have been a new typhoon. It was considered merely a low-pressure area until the *S. S. Habibi* sent observations which definitely proved that it was a typhoon. Its eastward course was not rapid, and, fortunately it decreased in intensity as it moved. It caused great destruction in the town of Bacuit, Palawan Province. Its path across the Visayan Islands was along a well-defined front, between the northeast monsoon and the southwest monsoon, as it is called. The surface and cloud observations from the stations in the Philippines together with pilot balloon reports received by radio from Singapore and Alor Star gave clear evidence of the existence of this front. The typhoon moved with the warmer current of air.

A few words concerning the general situation during these days might be of interest. From November 20 on, the high pressure over China became stronger, then weaker, then stronger. Then the typhoon of November 24 to December 3 formed and moved across the archipelago. Following it was the very severe typhoon described above, which, however, recurved. When it reached the ocean area east of northern Luzon and Formosa, it caused the northeast monsoon to intensify. In the China Sea, this prevented the typhoon which had just crossed the Visayan Islands (Nov. 29 and 30) from moving in a westerly direction. It moved more slowly and seemed to be filling up. Then, a typhoon appeared west of northern Palawan (Dec. 3, lat. 10°, long. 116°30') and began to move in an easterly direction. In advance of it was the well-defined front, and its course was practically that of the boundary between the two wind systems. When this typhoon moved into the Pacific Ocean,