

7 on the 15th and 25th; of force 8 on the 10th; and of force 9 on the 11th and 16th.

*Fog.*—Only 1 day with fog was reported over the ocean west of 145° W. Thence eastward to the one hundred and thirtieth meridian, north of the thirty-fifth parallel, it occurred on 1 to 3 days. Fog was observed on 4 days between the mouth of the Columbia River and Puget Sound; on about 16 days off the California coast; and on 4 days off the coast of Lower California.

#### TYPHOONS IN THE FAR EAST DURING NOVEMBER 1933

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Before describing the typhoons which traversed the Philippines during November, an additional remark must be made about the last typhoon for October.

(4) *October 26.*—After passing through the islands near the tenth degree of latitude, the typhoon crossed the China Sea in a northwest direction, and on November 1 struck Quinhon in Indo-China with great violence, causing at least 100 deaths in that locality. It is very instructive to note the rapid growth of this typhoon just in crossing the China Sea, a stretch of not more than 600 miles. Nowhere in the Philippines was a barometric pressure recorded less than 745 mm, and the wind forces were comparatively mild, yet Quinhon recorded a well-authenticated minimum of 708 mm with very destructive winds; in fact the storm had developed into the worst Indo-China experienced for at least 11 years.

(1) *November 1.*—To avoid confusion, this typhoon is designated as that of November 1, although really discovered on October 30, southeast of Yap, on the tropical front. It traveled with irregular speed in a northwest direction, until it reached the China Sea; then it recurved and dissipated near Hainan upon meeting the barrier of the Asiatic high pressure area. Like the previous typhoon it moved very quickly during the night when just east of the islands, after remaining almost stationary during the day. Thus it barely gave us time

to give proper warning to the more easterly cities affected. It was very fortunate that it had not yet developed fully, for it passed within 20 to 30 miles of 4 important places, Surigao, Cebu, Iloilo, and Culion (famous leper colony). Probably 10 lives were lost all told, and the property damage was comparatively slight. A study may be made later as to the possibility of fronts close to the center of the typhoon, but success will be hampered by the interference with free wind circulation by the topography. Before breaking up, the typhoon must have increased in violence while near Hainan, since Fort Bayard (on south China Coast, north of Hainan), though fully 100 miles away from the center, reported the uprooting of trees.

(2) *November 18.*—This depression, for it was only such and not truly a typhoon, arose near Palau, and after slowly moving north-northwest until latitude 12°, turned westward in passing through the islands, and then dissipated in the China Sea. It was apparently little more than a wave on the tropical front, one of the last feeble attempts of the southwest monsoon as the latter was being pushed back toward the Equator. The air streams could be quite satisfactorily traced in the islands during the passage. No strong winds were experienced.

(3) *November 20.*—Starting below Yap this storm traveled along the tropical front in a northwest direction until it passed through the islands. It then turned westward and dissipated in the middle of the China Sea. This storm well illustrates the danger of coming to conclusions too quickly. During its passage through the islands, not one of our stations reported a barometer less than 752 mm, and winds were weak. There were no indications of a typhoon center, only those of a depression. However, the following day, Baler (some 80 miles north-east of Manila, on east coast) which had not sent observations for a few days due to radio trouble, reported that it had had a minimum of 745 mm, maximum wind force 8! There really had been a true typhoon, but with a very small center. The coastal range of mountains had been sufficient to break this up, for no other station of ours reported similar conditions to Baler.