

## NORTH PACIFIC OCEAN

By WILLIS E. HURD

Pressures were below the normal over the northern part of the ocean, with the Aleutian cyclone strongly developed, and central with an average of 29.30 inches over the western part of the Gulf of Alaska and the eastern Aleutians. Early in November this cyclone was of extraordinary depth, barometer readings even as far to the southeast as 43° N., 140° W., being as low as 28.20 inches on the 1st and 2d, and pressure at Dutch Harbor dropping to 27.92 on the 3d. Thereafter until the 20th pressures in the central part of the cyclone were frequently below 29 inches. At Midway Island, on the contrary, the barometer was above the normal for the month. Hence the gradients were abnormally steep between the thirtieth and fifty-fifth parallels.

The Pacific-California anticyclone was well developed during a goodly part of the month, but was subject to many deep incursions of the Aleutian cyclone on its northern and western sides. However, over much of its eastern and southern area it showed an average pressure slightly above the normal.

The following table gives an indication of the barometric conditions at several island and coast stations in west longitudes:

TABLE 1.—Average, departures, and extremes of atmospheric pressure at sea level at indicated hours, North Pacific Ocean, November, 1928

| Stations                            | Average pressure | Departure from normal | Highest       | Date                   | Lowest        | Date  |
|-------------------------------------|------------------|-----------------------|---------------|------------------------|---------------|-------|
|                                     | <i>Inches</i>    | <i>Inch</i>           | <i>Inches</i> |                        | <i>Inches</i> |       |
| Dutch Harbor <sup>1</sup> .....     | 29.32            | -0.27                 | 30.06         | 23d.....               | 27.92         | 3d.   |
| St. Paul <sup>1,2</sup> .....       | 29.41            | -0.21                 | 30.06         | 23d <sup>3</sup> ..... | 28.28         | 3d.   |
| Kodiak <sup>1</sup> .....           | 29.30            | -0.24                 | 30.12         | 30th.....              | 28.12         | 2d.   |
| Midway Island <sup>1</sup> .....    | 30.14            | +0.07                 | 30.38         | 19th.....              | 29.74         | 28th. |
| Honolulu <sup>1</sup> .....         | 30.05            | +0.03                 | 30.23         | 12th.....              | 29.89         | 1st.  |
| Juneau <sup>1</sup> .....           | 29.74            | -0.02                 | 30.36         | 17th.....              | 28.86         | 3d.   |
| Tatoosh Island <sup>1,4</sup> ..... | 30.03            | +0.06                 | 30.70         | 17th.....              | 29.37         | 13th. |
| San Francisco <sup>1,4</sup> .....  | 30.13            | +0.03                 | 30.42         | 17th.....              | 29.65         | 13th. |
| San Diego <sup>1,4</sup> .....      | 30.05            | +0.05                 | 30.28         | 16th.....              | 29.82         | 5th.  |

<sup>1</sup> P. m. observations only.

<sup>2</sup> For 29 days.

<sup>3</sup> A. m. and p. m. observations.

<sup>4</sup> Corrected to 24-hour mean.

<sup>5</sup> Also on 24th.

November set in with high winds occurring along almost the entire width of the ocean above the fortieth parallel, and full storm to hurricane velocities blowing here and there over a considerable stretch of the upper steamship routes from the 1st to the 4th. While most of the more violent gales were due to the great temporary intensity of the permanent winter cyclone, those on the extreme west resulted from the presence of an Asiatic cyclone that, quitting the continent on the 2d, entered the sea as a powerful storm, via extreme northern Japan, on the 3d. In addition, anticyclonic gales of moderate to strong force blew in the neighborhood of the thirtieth parallel, west of the one hundred and eightieth meridian, during the same period. On the 11th a southerly gale of force 11 was encountered off the Oregon coast, in connection with a cyclone that later moved into British Columbia. From the 15th to the 17th, during another period of great intensification of the Aleutian cyclone, and while another violent extratropical storm was emerging upon the sea from northern Japan, gales of forces 11 to 12 again swept over an enormous area of the upper traveled routes between 140° W. and 170° E.

Aside from these winds of higher velocities, on several dates, lesser gales were of daily occurrence here and there over the upper waters of the Pacific. In some individual

5-degree squares between 45° and 50° N., both east and west of the one hundred and eightieth meridian, winds of force 8 or over occurred on at least 10 days of the month.

A report on the two typhoons of the month, by the Rev. José Coronas, of the Philippine Weather Bureau, is subjoined. It may be added that one of our observing steamers, the *Bessemer City*, Honolulu to Kobe, after experiencing continuous rain for 44 hours, ran across the front of the second typhoon in a northeast gale of force 10, near 32° N., 140° E., on the 29th.

One of the most interesting meteorological incidents of the month was the occurrence of a moderate to very strong norther over and far to the southward of the Gulf of Tehuantepec, from the 20th to 26th, coincident with the presence of a well-developed anticyclone over the United States. The strongest gale noted was from NNE., force 10, in 15° 33' N., 95° 39' W., on the 23d, although a 70-mile gale—a so-called "hurricane"—was reported by the press as having been encountered on the morning of the 24th by the U. S. S. *Maryland*, en route southward with President-elect Hoover on board. The master of the British tanker *Ontariolite*, Talara, Peru, to Vancouver, reported a high northeast sea and gale in low latitudes from after midnight of the 23d until 4 p. m. of the 24th. At noon of the 24th this vessel was in 11° 25' N., 97° 59' W.

At Honolulu the prevailing wind was from the east, and the maximum velocity was 36 miles from the east on the 4th.

Fog was infrequent over the ocean as a whole, and occurred on only a few scattered dates along the northern steamer passages. The most important fog area lay from the California coast to the one-hundred and thirty-fifth meridian, between latitudes 35° and 40° N., where it was reported on 10 days. It was observed on at least four days in coastal waters between 30° and 35° N., and in the Gulf of Tehuantepec on one day.

*Waterspouts.*—The following report of waterspouts was furnished by Mr. G. G. Foster, observer of the American steamer *Columbian*, J. McAvoy, master, Balboa to Los Angeles:

November 4, 1928. Waterspouts. Lat. 15° 24', N., long. 98° 32' W., from 15.53 to 16.02. Experienced a series of four water spouts, one at a time, first one largest, all starting from sea first, later from clouds, and joining each other two-thirds of distance to clouds. First spout vertical; succeeding ones progressing in inclination with tops to SE. of bottoms. Wind WNW. 5, small sea, temperature of air 80°, of water 83°, barometer 29.83, clouds Cu.Nb.

November 4. Lat. 15° 26' N., long. 98° 40' W., 16.01 to 16.14. Experienced two waterspouts on port hand. Both starting in clouds and reaching three-fourths way to water. Tails streaming to SE., with lightning around both. Starting at different times, but both ending together.

*Lunar rainbows.*—Mr. L. G. Vick, observer of the American steamer *Mauna Ala*, H. S. Sawyer, master, Kahului to Bellingham, reports as follows:

During the hours of 12 to 4 a. m., November 25-26, numerous lunar rainbows at intervals observed. Weather overcast, cloudy; light passing rain squalls. Moon full. (Position at 3.30 a. m., 26th, 47° 21' N., 127° 26' W.)

## SOUTH PACIFIC OCEAN

*Smoke.*—Mr. William H. Stewart, observer on board the American steamer *Ventura*, William R. Meyer, master, Pago Pago to Sydney, reports:

While standing in toward the N. S. W. coast, in the vicinity of Sydney, November 8, 1928, at 2 a. m., we encountered smoke due to the bush fires in Queensland, the wind being NW. At 5 a. m. the smoke became so thick the visibility was about 2 miles—impossible to take sights.