

British S. S. *Lexington*:

Gale began on the 12th, wind SSE. Lowest barometer 29.06 inches at midnight on the 13th, wind S., in latitude 46° 27' N., longitude 41° 27' W. End on the 14th, wind N. Highest force of wind, 11; shifts SSE.-S.-SW.-W.

British S. S. *Kenbane Head*:

Gale began on the 15th, wind W. Lowest barometer 29.22 inches at 10 a. m. on the 15th, wind WNW., 10, in latitude 43° 16' N., longitude 46° W. End on the 16th, wind N. Highest force of wind, 11; shifts W.-WNW.

From the evening of the 15th until the morning of the 16th northerly gales again occurred off Hatteras, as shown by following report from American S. S. *El Estero*:

At 7 p. m. on the 15th in latitude 33° 03' N., longitude 76° 46' W., barometer 29.74 inches, wind NW., 7; rough and choppy sea, overcast and squally. At 7:30 p. m. wind shifted N., 9, sky clearing, frequent squalls, barometer rising. From 10 p. m. to 2 a. m. on the 16th, wind N., 10, clear since 10 p. m. At 2 a. m. on the 16th in latitude 33° 51' N., longitude 76° 09' W., barometer 29.89 inches, wind N., 10; very heavy and rough sea, weather clear. 10 a. m. fresh N. wind, end of gale.

On the 18th there was a LOW central near latitude 30° N., longitude 50° W., and northwesterly gales prevailed over a limited area in the vicinity of the Bermudas. This disturbance moved slowly eastward and by the 20th had apparently filled in, as it did not appear within the limits of the chart. Storm log:

American S. S. *Devolante*:

Gale began on the 18th, wind SSW. Lowest barometer 29.31 inches at noon on the 18th, wind SSW., 7, in latitude 37° 07' N., longitude 46° 41' W. End at midnight on the 19th, wind SSE. Highest force of wind 10; shifts S.-SSW. Continuous rain throughout the gale with heavy, rough sea.

A disturbance that was central near Philadelphia on the 20th moved northeastward, and on the 21st the center was near Eastport, Me. Southerly gales prevailed along the American coast on both of these dates, while on the 21st the storm area extended as far east as the 60th meridian. Storm logs:

Dutch S. S. *Alkmaar*:

Gale began on the 20th, wind S. Lowest barometer 29.58 inches at 8 p. m., on the 20th, wind SSE., 10, in latitude 34° 59' N., longitude, 69° 34' W. End on the 21st. Highest force of wind, 11, S.; shifts SSE.-S.-SSW.

Belgian S. S. *Gothland*:

Gale began on the 20th, wind SSE. Lowest barometer 29.70 inches on the 20th, wind SSE., in latitude 40° 40' N., longitude 67° W. End on the 21st. Highest force of wind 10; shifts not given.

On the 22d and 23d the conditions were comparatively featureless, except that a few vessels along the European coast, between the 30th and 50th parallels, reported moderate northerly gales.

On the 24th and 25th a depression over Scotland was responsible for heavy weather in the region between 40° and 60° N., and 2° and 25° W. By the 26th the center of this LOW was somewhere over the North Sea, and winds of gale force were restricted to a small area in the southwest quadrants. Storm logs:

Norwegian S. S. *Ranenfjord*:

Gale began on the 24th, wind SSE. Lowest barometer 29.14 inches at noon on the 25th, in latitude 59° 33' N., longitude 1° 35' W. End on the 25th, wind ESE. Highest force of wind 11; shifts 4 points.

British S. S. *Vasconia*:

Gale began on the 24th, wind WNW. Lowest barometer 29.73 inches at 10 a. m. on the 26th, wind NNW., 10, in latitude 49° 27' N., longitude 13° 19' W. End on the 26th, wind NNW. Highest force of wind 10; shifts NW.-WNW.

On the 27th and 28th moderate weather prevailed over practically the entire ocean, with uniformly high pressure south of the 50th parallel.

On the 29th there was a disturbance of limited extent and intensity over the eastern part of the steamer lanes, accompanied by snow and hail.

On the 30th there was a LOW central about 10° east of St. Johns, Newfoundland. This remained nearly stationary during the next 24 hours, although increasing considerably in intensity and extent, as on the 31st, the storm area covered the region between the 35th and 50th parallels and the 40th and 50th meridians, while a few vessels experienced heavy weather outside these limits. Storm logs:

British S. S. *Alpine Range*:

Gale began on the 29th, wind WSW. Lowest barometer 29.36 inches at 10 a. m. on the 31st, wind NW., 9, in latitude 43° 21' N., longitude 41° 13' W. End on the 31st, wind NW. Highest force of wind 9; shifts WSW.-SW.-N.-NW.

American S. S. *Eastern Dawn*:

Gale began on the 31st, wind SSW., 7. Lowest barometer 28.83 inches at 8 p. m. on the 31st, wind SSW., 7, in latitude 43° 46' N., longitude 39° 51' W. End on April 2, wind NW. Highest force of wind 10, NNW.; shifts SSW.-NNW.

NORTH PACIFIC OCEAN.

By F. G. TINGLEY.

The month of March opened with the North Pacific anticyclone somewhat southwest of its usual position and a well-defined depression over the Gulf of Alaska. By the 4th the anticyclone had extended eastward and was encroaching on the California coast, while the depression had moved inland and lost energy. A fresh depression appeared over the Aleutians. Following this date there was a general increase in pressure over middle latitudes of the eastern part of the ocean, an isobar of 30.50 inches appearing on the maps of the 6th-9th. During the same period the Aleutian depression moved slowly east-southeastward to the continent.

On the evening of the 11th pressure was rising strongly over the western Aleutians and a depression covered the Gulf of Alaska. The North Pacific anticyclone was south of its usual position. On the morning of the 13th the barometer at Dutch Harbor stood at 30.60 inches. Pressure continued above normal in this region until the 22d, while a depression of varying intensity lingered near the British Columbia coast. During this period the anticyclone moved inland on the California coast and a depression formed in its rear, apparently on the 18th, near the Hawaiian Islands. This latter depression moved leisurely east-northeastward to the continent, passing inland on the 23d.

The high pressure over the Aleutians gave way on the 23d to a depression from the westward, and thereafter to the close of the month this region was covered by a great cyclone, in the eastern part of which a series of depressions formed and moved east-southeastward to the continent. On the morning of the 31st the barometer at Dutch Harbor registered the low reading of 28.20 inches, approximately 1.56 inches below normal.

Over the western part of the ocean meanwhile a steady stream of depressions of varying magnitude was moving eastward, after having passed over or near Japan. During the period from the 1st to the 24th no fewer than 19 separate disturbances were charted by the Imperial

Marine Observatory at Kobe. Some of these combined, however, as they progressed eastward. Among the more important of these disturbances may be mentioned the following: The depression which traveled along the south coast of Japan on the 4th, eastern time; one which moved from the vicinity of Shanghai to the Okhotsk Sea, where it was central on the 18th; one which moved across the Japan Sea on the 20th, causing heavy gales, and disappeared east of the Kuril Islands on the 23d; one which passed over Japan on the 24th and moved northeastward across the Pacific. It is probable that still another depression quickly followed that of the 24th since the latter would scarcely account for the storm encountered on the 29th in longitude 167° E. by the Dutch S. S. *Arakan*, which will be referred to later.

The depressions on the Asiatic side during the first part of the month appear to have been directed either toward the Okhotsk Sea or the middle latitudes of the ocean. Those of the third decade traveled in the direction of the Aleutian Islands.

As a result of the cyclonic activity during the month many gales were experienced by vessels which furnish meteorological reports to the Weather Bureau. It is probable that the number of gales during the month was above the average, but a strict comparison is not possible with the data available. During the first week of the month they were chiefly reported from the region west of the 180th meridian, during the second and third weeks in mid-ocean, and in the last week west of the 170th meridian, W. longitude.

The following reports have been selected as representative of those received:

American S. S. *Pine Tree State* (since renamed *President Grant*), Capt. M. M. Jensey, Observer H. V. Van Dusen. While proceeding from Yokohama to Kobe the *Pine Tree State* was involved in the storm which passed along the south coast of Japan on the 4th, eastern time.

March 3, 33° 50' N., 137° 10' E., weather extremely sticky, inky clouds, very clear. Increasing easterly wind to strong gale, rough sea; barometer dropping fast but not far. March 4, 8:15 a. m. (L. M. T.), 33° 25' N., 135° 30' E., wind suddenly dropped to dead calm, very rough sea. Wind suddenly sprung up from north, whole gale. Visibility during this small typhoon very poor. Heavy rain at intervals.

Japanese S. S. *Mandasan Maru*, Capt. Tatsuzo Itoh, Yokohama for San Francisco.

Gale began on 4th, wind E., lowest barometer, 29.65 inches, occurred when in 39° 36.5' N., 147° 9.5' E., wind at time being ENE., force 9. Gale ended on 5th, wind NW.

American S. S. *West Jessup*, Capt. G. A. Whitehead, Observer C. Baker, Japan for Seattle. This vessel on the 12th was on the southern edge of a depression having its center over Sitka, Alaska, with a strong high-pressure area over the Aleutians and one of moderate strength northeast of the Hawaiian Islands.

Gale began on the 11th, wind W., lowest barometer, 29.83 inches, occurred at 6 p. m. of the 12th in 50° 10' N., 145° 30' W., wind at time NW. Highest force of wind 11, shifts W. to NW., gale ended 10 p. m. of 12th.

American S. S. *Bessemer City*, Capt. John Murphy, Observer R. B. Rogers, jr., Los Angeles for Yokohama. During the period from the 9th to the 16th, when between 174° 55' W. and 155° E., this vessel experienced a succession of gales associated with the strong rise of pressure over the Aleutians. The highest force was recorded on the 16th, 11, WSW. The barometer at this time stood at about 28.93 inches, the vessel being in a depression in the rear of the anticyclone.

Dutch S. S. *Arakan*, Capt. Samuel Van Ronkel, Ob-

server J. H. C. L. Baan, Manila for San Francisco. On the 29th the *Arakan* was involved in a deep depression, evidently the same one which appeared at Dutch Harbor on the 31st. Captain Van Ronkel has submitted a very complete report of this storm as observed on his vessel. The influence of the storm began to be felt on the 28th, when the *Arakan* was in 37° 52' N., 160° 3' E. The lowest barometer recorded was 28.47 inches at 5 a. m. of the 30th, the wind at the time being NW., 4. A remarkable feature of the storm, states Captain Van Ronkel was that neither the force of the wind nor its direction gave any indication as to the nearness or direction of the center. After the center had passed the wind freshened rapidly and by 11 a. m. was blowing with force 10-11 from WNW.

Date and hour.	Lat. N.	Long. E.	Bar.	Wind.	Weather.
Mar. 28:					
12 noon...	37 52	160 3	29.79	SW. by W., 4.	Overcast. Nb., 10.
4 p. m.	38 10	160 45	29.68	SW. by W., 5.	Sky var., clearing and overcast. Some rain.
8 p. m.	38 21	161 3	29.63	W., 5.	Overcast. Nb., 10.
12 mid.	38 5	162 26	29.58	NNW., 2.	Nb., 10. Great humidity.
Mar. 29:					
4 a. m.	38 49	163 9	29.58	NNE., 1.	Nb., 10. Rain.
8 a. m.	39 3	163 52	29.40	ENE., 1.	Continuous rain.
12 noon....	39 5	164 33	29.21	E., 3.	Nb., 10. Rain. Light SW. swell.
4 p. m.	39 27	165 13	28.92	SSE., 4.	Same conditions.
8 p. m.	39 35	166 1	28.82	SW., 3.	Rain until 10.30, afterward clearing and stars visible till close to horizon. Sheet lightning all around. Light southwesterly swell.
12 mid.	39 48	166 41	28.63	S., 2.	Clear sky. Sheet lightning all around; lightning in NE. WNW. swell.
Mar. 30:					
4 a. m.	40 1	167 23	28.49	NW., 3.	Clear till 6.30, then overcast. Some rain.
5 a. m.			28.47	NW., 4.	Wind rising fast after 6 o'clock. Thick rain. Very low visibility.
9 a. m.	40 7	168 4	28.66	NNW., 8-9.	Gale. Sky overcast, heavy showers; squally after 11 o'clock. Visibility better.
12 noon....	40 13	168 16	29.00	WNW., 10-11.	Squally with hail and rain.

The report continues to noon of April 1, the gale gradually abating. It is interesting to note that during the storm Captain Van Ronkel was in radio communication with the steamships *City of Victoria*, *Canadian Winner*, and *Shabonee*. The first-named vessel reported a barometer reading of 28.14 inches between 2 and 6 p. m. on March 30 in 42° 7' N., 172° 44' E.

Pressure at Midway Island was above normal during the first decade and below normal thereafter. The highest pressure recorded was 30.24 inches on the 8th, the lowest 29.76 inches on the 29th. At Honolulu pressure was above normal during the first and third decade and below during the second. The departures were not pronounced. Conditions at Dutch Harbor have already been described.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

British Isles.—The general rainfall for March, expressed as a percentage of the average was: England and Wales, 103; Scotland, 76; Ireland, 72; British Isles, 86.

In London (Camden Square) the mean temperature for March was 41.8° F., or 0.3° F. below the average; the duration of rainfall, 42.2 hours, and the evaporation 0.96 inch.¹

France.—Paris, March 9.—Nearly all France has suffered heavily from the unusually violent storm which began three days ago, causing heavy material damage

¹ Meteorological Magazine, April, 1922.