thereafter on June 19, purple glows were observed on the mastheads and aerials.

TYPHOONS AND DEPRESSIONS OVER THE FAR EAST, JUNE 1938

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Typhoons of June 22–27 and June 25–July 1, 1938.—The pressure values reported over the Philippines were very high during the first two-thirds of the month and began to fall on June 20, after which there were signs that a low pressure area was in existence between the Archipelago and the Mariana Islands. Not until June 22, however, did a definite center manifest itself, appearing about 500 miles east-northeast of Manila. Moving about 250 miles along a west-northwesterly course and then changing to a northerly one, the disturbance, on the morning of June 24, reached the extreme eastern section of the Balintang Channel, where it was powerful enough to be classified as a typhoon. A sudden change of direction to the east followed, and then, during the afternoon hours of June 25, a shift to the northeast brought the typhoon to the regions half way between the northern Nansei Islands and the Bonins, where the storm disappeared.

While the storm described above was intensifying, another weak center appeared west of the Mariana Islands. It moved along a west-northwesterly track to the locality of latitude 20° N., longitude 130° E., where it intensified as it changed its direction to the north-northeast (morning hours of June 27). During the next few days the storm moved toward Japan, being central about 100 miles southeast of the coastline on June 30, 6 a. m. (Manila time). A change to the east-northeast kept the center from passing over land, and then an inclination to the northeast combined with a more rapid movement carried the disturbance on toward the Aleutian Islands.

Both of the above typhoons were well developed. After June 25, when the centers were more than 200 miles away from northern portions of the Archipelago, pressure values between 749.5 mm. and 752 mm (29.508 in. and 29.606 in.) were maintained for four or five days. On June 29, Oshima and Naha, Nansei Islands, had values of 748 mm and 749 mm (29.449 in. and 29.488 in.) as the typhoon passed to the east.

On June 29 and 30, great destruction resulted in Japan, according to news dispatches. About 100 lives were lost, many more persons were missing, and thousands of houses were destroyed. Railroads suffered much damage, tracks being washed away by the floods and landslides. In the Philippines, rainy weather prevailed during this period, causing the loss of three lives and considerable flood damage.

Connected with a description of these two typhoons, a few remarks concerning the air streams surrounding the centers might be of interest. On June 20 the front between the southwest monsoon air (TE) and the trade wind air (TM), which had been quasi-stationary over the southern part of the China Sea, moved in a northeasterly direction across the Philippines and relocated itself over the Pacific, extending from the Continent across the locality of the Balintang Channel and over the Pacific to the northern part of the Mariana Islands. The two typhoons developed along this front; the first at the western part; the second over the eastern portion. The upper wind data available indicate that the southwest monsoon air was an important factor in the development of the two typhoons. During the whole period, there was a steady southwest-quadrant current over the Straits Settlements, Siam, Indochina, Hong Kong, and the Philippines. Velocities reported on June 20 were under 40 k. p. h. and afterwards they steadily increased to values between 50 and 70 k. p. h. (these velocities occurring on June 27 to 29). Then they gradually weakened as the second typhoon approached Japan. Other air streams moving toward the storm centers did not equal these velocities. At Guam, with southwesterly winds changing to southeasterly, velocities did not rise above 45 k. p. h. The U. S. S. *Ramapo* was able to give information northeast of the center and reported weak southeast winds. At Shanghai, (west-northwest and west of the typhoon) the U. S. S. *Augusta* has southwesterly winds until June 27 when they changed to southeast quadrant, velocities always under 45 k. p. h. These upper air observations were made (except in the case of Guam) much closer to the center than Siam or Indochina, at which places much stronger winds were reported.

Another interesting air stream to be noted is an easterly current aloft over the northern part of the Philippines and Indochina, this current flowing above the southwesterly winds. At Aparri, a station in northern Luzon, the southwesterly current varied in thickness from 1700 *m* to 3700 *m* with easterly winds above it. At Manila, the easterly movement of the high clouds showed the existence of this current but only one balloon ascent (that of June 25, afternoon) reached the easterly current, altitude 4400 *m*. Over Indochina, the easterly current, according to the pilots available, was never below 6500 *m*. At Hong Kong, likewise, the easterly winds were high, 5000 *m* or 6000 *m*. These few remarks are given to show the existence of that air stream above the more active, as shown by velocities, southwesterly current at the lower levels.

SEA SURFACE TEMPERATURE SUMMARY FOR THE VICINITY OF THE GRAND BANKS, 1912–31

By GILES SLOCUM

The area embraced in this summary comprises nine 1° squares, namely: From 45° North to 46° North, 50° West to 55° West; from 46° North to 48° North, 50° West to 52° West.

This area lies to the south and east of Newfoundland, and is within the Labrador Current. The surface water in this region is colder than in any part of the North Atlantic Ocean farther eastward at the same or lower latitudes. It is not as cold as the surface water of the Gulf of St. Lawrence, or that of the North Pacific Ocean at the same latitude in the vicinity of Hokkaido and Chishima. It is colder than the surface water of the Sea of Okotschk and the northern part of the Gulf of Tartary in summer, but is warmer in winter; and it is colder in winter [1] than the cold surface water of the polar

[1] Winter and summer refer to the cold and warm seasons, respectively, of the hemisphere concerned.

current in the South Atlantic Ocean east of Patagonia, and warmer in summer.

This portion of the Labrador Current is therefore not a uniquely cold body of water, latitude considered, although it is an example of water having a rather extreme negative temperature anomaly as compared with the normal surface temperature for the latitude. It may be classed as a typical east coast cold current, such as is found in middle latitudes in all three cases where a continent extends poleward beyond 45° latitude.

During the winter, the water in the area is often partially frozen at the surface, and is therefore perilous for navigation. For this reason, sea traffic is very seasonal, and few observations are made in February, March, or April. Because of the dearth of observations during these months, it has not been possible to compute monthly mean temperatures for the area which are significant beyond integral values (°F.) for these 3 months. Similarly, as the table shows, under the caption, "Total Number of Observations", there have been too few observations during all months of the 8 years, 1916 to 1923, inclusive, to make monthly mean temperature values that justify closer approximation than to whole degrees. There are 16 gaps in the table, representing months with no extant observations of sea-temperature. For all months outside these three categories, temperatures have been computed to tenths of a degree.

This is the eleventh of a series of temperature history tabulations of this character, showing sea-surface temperatures for small areas in American and western North Atlantic waters. The first of the series appeared in the November 1934 issue of the MONTHLY WEATHER REVIEW, and the last previous tabulation appeared in the December 1937 issue.[2]

Monthly and annual mean sea-surface temperatures at the Grand Banks, 1912 to 1931, inclusive

Year	Total number of observations	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual [1]
1912	321	33.2	30	28	32	34.5	40.4	46.2	51.0	52.2	45.8	42.3	37.2	39.4
1913	293	33.9	30	34	36	36.1	40.1	44.8	54.2	55.2	54.5	43.4	39.6	41.8
1914	234	35.3	28	40	34	35.7	38.0	46.1	51.9	52.5	46.8	42.5	35.5	40.5
1915	210	32.5	31	30	30	34.4	41.1	46.1	51.3	52.0	48.4	40.3	39.0	39.7
1916	129	32	32	31	32	38	47	53	55	55	49	41	39	42.1
1917	61	36	([2])	32	([2])	34	46	54	63	56	52	([2])	41	44.0
1918	13	([2])	([2])	32	([2])	32	43	([2])	([2])	52	52	39	36	40.5
1919	90	34	31	31	32	36	38	48	53	57	51	39	37	40.5
1920	97	34	33	([2])	33	38	41	50	60	54	52	41	36	42.1
1921	102	34	([2])	44	36	34	42	50	57	54	48	41	36	42.4
1922	97	34	36	37	32	35	41	51	57	59	50	42	35	42.3
1923	97	32	([2])	([2])	27	38	41	43	52	54	51	49	41	41.1
1924	157	36.5	35	([2])	35	39.1	41.8	53.1	59.4	58.7	51.5	42.2	41.3	44.1
1925	160	34.4	34	35	34	36.9	40.0	55.9	59.0	55.4	47.5	39.1	36.5	42.3
1926	151	33.8	32	32	32	36.3	40.2	46.3	55.2	54.6	51.3	44.6	42.1	41.7
1927	159	38.8	32	36	36	36.4	41.2	54.0	60.7	54.8	52.1	([2])	41.2	43.9
1928	187	34.9	31	33	([2])	35.4	42.6	55.8	56.4	57.5	50.1	([2])	42.1	43.0
1929	184	34.3	33	34	30	35.5	41.6	47.5	59.4	54.0	51.5	44.6	37.7	41.8
1930	173	33.7	32	38	32	37.2	42.8	55.5	56.6	55.5	50.5	41.5	37.8	42.8
1931	195	37.2	35	36	39	39.3	43.9	58.1	59.2	57.7	51.7	44.7	36.1	44.8
Number of years of record		19	16	17	17	20	20	19	19	20	20	17	20	20
Mean (1912–31)[1]		34.4	32.1	34.3	33.0	36.1	41.7	50.5	56.4	55.1	50.4	42.2	38.4	42.0

[1] Means were computed, using interpolated values for missing months. All monthly means were carried to one decimal place when computing annual and period means, which latter are, therefore, not exact means of figures given in the body of the table.
[2] No data.

[2] The statement in the December 1937 issue, that the tabulation in that number was the ninth of the series, is in error. It was the tenth.