

When the Weather Bureau began the publication of the Daily Weather Map of the Northern Hemisphere, on January 1, 1914, and it was decided to express the pressure data in dynamic units, one bar being equal to 1,000,000 dynes, the bureau used the conversion tables prepared by Bjerknes and Sandström, giving the millibar equivalents of barometric readings made in inches or millimeters of pure mercury. The values for gravity (980.617) and for the density of mercury (13.59545) used by these writers<sup>1</sup> in computing their tables differed slightly from generally recognized values, therefore new tables based on the revised constants have been computed for the range of pressures necessary in the map work, and these went into effect with the issue for May 1, 1914. The new values for gravity and for the density of mercury were furnished by the United States Bureau of Standards, Washington, D. C., and are as follows:

$g = 980.665$  dynes,  
 $\rho = 13.59593$  grams per cubic centimeter (adopted by International Bureau of Weights and Measures).

The height of a column of pure mercury at a temperature of 0° C. and under normal gravity, that will exert a pressure of 1 bar will, therefore, by equation (2) be—

$$\frac{1000}{\rho g} = 75.0016 \text{ centimeters.}$$

We also obtain from equation (2) the following equation for converting barometric heights  $h$ , in millimeters, into pressure in millibars,  $P_{mb}$ —

$$P_{mb} = 1.333305h \text{ millimeters.}$$

Since 1 inch equals 1/0.03937 millimeter, the pressure in millibars corresponding to a pressure in inches,  $h'$ , is

$$P_{mb} = \frac{1.333305}{0.03937} h',$$

$$= 33.86602 h' \text{ inches.}$$

Below are given barometric readings in both inches and millimeters of mercury with their equivalents in millibars.

TABLE 1.—Barometric inches into millibars.

Inches.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	Mb. 0.00	Mb. 0.34	Mb. 0.68	Mb. 1.02	Mb. 1.35	Mb. 1.69	Mb. 2.03	Mb. 2.37	Mb. 2.71	Mb. 3.05
0.1	3.39	3.73	4.06	4.40	4.74	5.08	5.42	5.76	6.10	6.43
0.2	6.77	7.11	7.45	7.79	8.13	8.47	8.81	9.14	9.48	9.82
0.3	10.16	10.50	10.84	11.18	11.51	11.85	12.19	12.53	12.87	13.21
0.4	13.55	13.89	14.22	14.56	14.90	15.24	15.58	15.92	16.26	16.59
0.5	16.93	17.27	17.61	17.95	18.29	18.63	18.96	19.30	19.64	19.98
0.6	20.32	20.66	21.00	21.34	21.67	22.01	22.35	22.69	23.03	23.37
0.7	23.71	24.04	24.38	24.72	25.06	25.40	25.74	26.08	26.42	26.76
0.8	27.09	27.43	27.77	28.11	28.45	28.79	29.12	29.46	29.80	30.14
0.9	30.48	30.82	31.16	31.50	31.83	32.17	32.51	32.85	33.19	33.53
1.0	33.87	.....	.....	.....	.....	.....	.....	.....	.....	.....

<sup>1</sup> Bjerknes, V., and others. Dynamic meteorology and hydrography. Part 1. Washington, 1910. p. 7. (Carnegie Instit. of Wash'n. Publication 88.)

TABLE 2.—Barometric inches into millibars.

Inches.	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
28.0	Mb. 948.2	Mb. 948.6	Mb. 948.9	Mb. 949.3	Mb. 949.6	Mb. 949.9	Mb. 950.3	Mb. 950.6	Mb. 951.0	Mb. 951.3
28.1	951.6	952.0	952.3	952.6	953.0	953.3	953.7	954.0	954.3	954.7
28.2	955.0	955.4	955.7	956.0	956.4	956.7	957.1	957.4	957.7	958.1
28.3	958.4	958.7	959.1	959.4	959.8	960.1	960.4	960.8	961.1	961.5
28.4	961.8	962.1	962.5	962.8	963.1	963.5	963.8	964.2	964.5	964.8
28.5	965.2	965.5	965.9	966.2	966.5	966.9	967.2	967.6	967.9	968.2
28.6	968.6	968.9	969.2	969.6	969.9	970.3	970.6	970.9	971.3	971.6
28.7	972.0	972.3	972.6	973.0	973.3	973.6	974.0	974.3	974.7	975.0
28.8	975.3	975.7	976.0	976.4	976.7	977.0	977.4	977.7	978.0	978.4
28.9	978.7	979.1	979.4	979.7	980.1	980.4	980.8	981.1	981.4	981.8
29.0	982.1	982.5	982.8	983.1	983.5	983.8	984.1	984.5	984.8	985.2
29.1	985.5	985.8	986.2	986.5	986.9	987.2	987.5	987.9	988.2	988.5
29.2	988.9	989.2	989.6	989.9	990.2	990.6	990.9	991.3	991.6	991.9
29.3	992.3	992.6	992.9	993.3	993.6	994.0	994.3	994.6	995.0	995.3
29.4	995.7	996.0	996.3	996.7	997.0	997.4	997.7	998.0	998.4	998.7
29.5	999.0	999.4	999.7	1,000.1	1,000.4	1,000.7	1,001.1	1,001.4	1,001.8	1,002.1
29.6	1,002.4	1,002.8	1,003.1	1,003.4	1,003.8	1,004.1	1,004.5	1,004.8	1,005.1	1,005.5
29.7	1,005.8	1,006.2	1,006.5	1,006.9	1,007.2	1,007.5	1,007.9	1,008.2	1,008.5	1,008.9
29.8	1,009.2	1,009.5	1,009.9	1,010.2	1,010.6	1,010.9	1,011.2	1,011.6	1,011.9	1,012.3
29.9	1,012.6	1,012.9	1,013.3	1,013.6	1,013.9	1,014.3	1,014.6	1,015.0	1,015.3	1,015.6
30.0	1,016.0	1,016.3	1,016.7	1,017.0	1,017.3	1,017.7	1,018.0	1,018.3	1,018.7	1,019.0
30.1	1,019.4	1,019.7	1,020.0	1,020.4	1,020.7	1,021.1	1,021.4	1,021.7	1,022.1	1,022.4
30.2	1,022.8	1,023.1	1,023.4	1,023.8	1,024.1	1,024.4	1,024.8	1,025.1	1,025.5	1,025.8
30.3	1,026.1	1,026.5	1,026.8	1,027.2	1,027.5	1,027.8	1,028.2	1,028.5	1,028.9	1,029.2
30.4	1,029.5	1,029.9	1,030.2	1,030.5	1,030.9	1,031.2	1,031.6	1,031.9	1,032.2	1,032.6
30.5	1,032.9	1,033.3	1,033.6	1,033.9	1,034.3	1,034.6	1,034.9	1,035.3	1,035.6	1,036.0
30.6	1,036.3	1,036.6	1,037.0	1,037.3	1,037.7	1,038.0	1,038.3	1,038.7	1,039.0	1,039.3
30.7	1,039.7	1,040.0	1,040.4	1,040.7	1,041.1	1,041.4	1,041.7	1,042.1	1,042.4	1,042.7
30.8	1,043.1	1,043.4	1,043.7	1,044.1	1,044.4	1,044.8	1,045.1	1,045.5	1,045.8	1,046.1
30.9	1,046.5	1,046.8	1,047.1	1,047.5	1,047.8	1,048.2	1,048.5	1,048.9	1,049.2	1,049.5
31.0	1,049.8	1,050.2	1,050.5	1,050.9	1,051.2	1,051.5	1,051.9	1,052.2	1,052.6	1,052.9
31.1	1,053.2	1,053.6	1,053.9	1,054.2	1,054.6	1,054.9	1,055.3	1,055.6	1,055.9	1,056.3
31.2	1,056.6	1,057.0	1,057.3	1,057.7	1,058.0	1,058.3	1,058.7	1,059.0	1,059.3	1,059.7
31.3	1,060.0	1,060.3	1,060.7	1,061.0	1,061.4	1,061.7	1,062.1	1,062.4	1,062.7	1,063.1
31.4	1,063.4	1,063.7	1,064.1	1,064.4	1,064.7	1,065.1	1,065.4	1,065.8	1,066.1	1,066.4
31.5	1,066.8	1,067.1	1,067.5	1,067.8	1,068.1	1,068.5	1,068.8	1,069.1	1,069.5	1,069.8
31.6	1,070.2	1,070.5	1,070.9	1,071.2	1,071.5	1,071.9	1,072.2	1,072.5	1,072.9	1,073.2
31.7	1,073.6	1,073.9	1,074.2	1,074.6	1,074.9	1,075.2	1,075.6	1,075.9	1,076.3	1,076.6
31.8	1,076.9	1,077.2	1,077.6	1,077.9	1,078.3	1,078.6	1,078.9	1,079.3	1,079.6	1,080.0
31.9	1,080.3	1,080.7	1,081.0	1,081.3	1,081.7	1,082.0	1,082.4	1,082.7	1,083.0	1,083.4
32.0	1,083.7	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE 3.—Barometric millimeters into millibars.

Millimeters.	0	1	2	3	4	5	6	7	8	9
710	Mb. 946.6	Mb. 948.0	Mb. 949.3	Mb. 950.6	Mb. 952.0	Mb. 953.3	Mb. 954.6	Mb. 956.0	Mb. 957.3	Mb. 958.6
720	960.0	961.3	962.6	964.0	965.3	966.6	968.0	969.3	970.6	972.0
730	973.3	974.6	976.0	977.3	978.6	980.0	981.3	982.6	984.0	985.3
740	986.6	988.0	989.3	990.6	992.0	993.3	994.6	996.0	997.3	998.6
750	1,000.0	1,001.3	1,002.6	1,004.0	1,005.3	1,006.6	1,008.0	1,009.3	1,010.6	1,012.0
760	1,013.3	1,014.6	1,016.0	1,017.3	1,018.6	1,020.0	1,021.3	1,022.6	1,024.0	1,025.3
770	1,026.6	1,028.0	1,029.3	1,030.6	1,032.0	1,033.3	1,034.6	1,036.0	1,037.3	1,038.6
780	1,040.0	1,041.3	1,042.6	1,044.0	1,045.3	1,046.6	1,048.0	1,049.3	1,050.6	1,052.0
790	1,053.3	1,054.6	1,056.0	1,057.3	1,058.6	1,060.0	1,061.3	1,062.6	1,064.0	1,065.3
800	1,066.6	.....	.....	.....	.....	.....	.....	.....	.....	.....

THE BEAUFORT WIND SCALE.

The Weather Bureau is glad to profit by wise and practical suggestions, but occasional published items relative to the Beaufort wind scale, serve little useful purpose and leave the impression that their authors are not animated by the simple desire to serve the public at large. Not only has the Beaufort scale gradually come into use by observers both on land and sea, but every attempt to

dislodge it has seemed unwise. Even the International Permanent Committee on Meteorology has found nothing better for general use, although instruments may be at hand that will give the velocity in miles per hour at any spot where an anemometer happens to be established. The officials of all Government weather bureaus have suggested their various substitutes for the Beaufort scale, and numerous alterations have thus been made in the terms and definitions recommended to public use, but the Beaufort wind scale has not yet been given up.

The introduction of such alterations in the definitions of ordinary well-known English words has led to great confusion of records and usages. Our own daily weather charts are widely known over the world and local terms should be avoided. It is better to adhere to the terms and corresponding velocities of the well-known Beaufort scale when one has no freely exposed velocimeter or anemometer. There has been great improvement in anemometers, but that does not justify us in departing from the Beaufort scale for the use of the millions who have no such apparatus.

There have been many efforts to establish a scale of *ten* terms from calm to hurricane, as recommended by the International Meteorological Committee in 1873 and 1874; various scales have been suggested of nine, eight, seven, six, and four terms, respectively, and there have been numerous attempts to reduce each of these to the simple fundamental Beaufort scale of twelve terms, but the latter is still used. Nine fundamental terms of that original scale, i. e., calm, light, fresh, breeze, brisk, high, gale, storm, hurricane, and their additional modifications by the words gentle, moderate, strong, have proved to be sufficient for ordinary use, both at sea and on land. These terms are in ordinary use by English-speaking observers, as well as many other nations, all over the world; they are well defined in any modern dictionary, thereby forbidding any educated person from complaining that the terms are not understood. Those newspapers and correspondents who wish these terms translated into miles per hour should consult the ordinary popular works on meteorology. In general, it is sufficient to know that a moderate gale means a wind having a velocity of 35 to 45 miles per hour, from which we may count upward or downward, without any expensive apparatus.

The adoption of the Beaufort scale in 1905 by the instructions of the former chief of the Weather Bureau, as also its continued usage by the orders of the present chief in 1914, assure us that there is good reason for its general use. If one has no anemometer and wishes to use a 10-scale, he may group the latter part of the Beaufort and call that the end or No. 10 of his own scale.

We note that lately the British Meteorological Office has adopted as definitions of the respective terms of the Beaufort scale the approximate equivalent values in meters per second. These are here given for the information of the reader; and the comparison between all these shows that while retaining the terms of the Beaufort scale, there have also been great differences between those who have attempted to convert it into observed velocity or pressure.

Adopted velocities.				
Beaufort wind scale.		Meters per second.	Miles per hour.	
No.	Terms.	Hann.	Milham.	Weather Bureau, Feb., 1914.
0	Calm.....	Calm.	0	0 to 3
1	Light air.....	1.7	3	3 to 8
2	Light breeze.....	3.1	13	8 to 13
3	Gentle breeze.....	4.8	18	13 to 18
4	Moderate breeze.....	6.7	23	18 to 23
5	Fresh breeze.....	8.8	25	23 to 28
6	Strong breeze.....	10.7	34	28 to 34
7	Moderate gale.....	12.9	40	34 to 40
8	Fresh gale.....	15.4	48	40 to 48
9	Strong gale.....	18.0	56	48 to 56
10	Whole gale.....	21.0	65	56 to 65
11	Storm.....	30	75	65 to 75
12	Hurricane.....	50	90	75 or over.

As used by British Meteorological Office.					
Beaufort No.	Miles per hour.	Meters per second.	Feet per second.	Pressures. <sup>1</sup>	
				Pounds per square foot.	Millibars.
0	Less than 1	Less than 0.3	Less than 2	0.00	0.00
1	1-3	0.3-1.5	2-5	0.01	0.01
2	4-7	1.6-3.3	6-11	0.08	0.04
3	8-12	3.4-5.4	12-18	0.28	0.13
4	13-18	5.5-8.0	19-27	0.67	0.32
5	19-24	8.1-10.7	28-36	1.31	0.62
6	25-31	10.8-13.8	37-46	2.3	1.1
7	32-38	13.9-17.1	47-56	3.6	1.7
8	39-46	17.2-20.7	57-68	5.4	2.6
9	47-54	20.8-24.4	69-80	7.7	3.7
10	55-63	24.5-28.4	81-93	10.5	5.0
11	64-75	28.5-33.5	94-110	14.0	6.7
12	Above 75	33.6 or above.	Above 110	17.0 or over.	8.1 or over.

<sup>1</sup> These figures are computed for air of standard density; they diminish as we ascend in the atmosphere, they increase with the momentum of any rain that is driven with the wind.—[C. A.]

**ICE PATROL OVER THE NORTH ATLANTIC OCEAN.**

By EDWARD H. BOWIE, District Forecaster.

[Dated United States Weather Bureau, Washington, May 13, 1914.]

Commissioners appointed by the several nations to make recommendations concerning "The safety of life at sea" held meetings at London, England, during the period November 12, 1913, to January 20, 1914, and, besides adopting regulations concerning the equipment of vessels, etc., proposed a patrol of the North Atlantic Ocean in the region of the steamer routes for the observation and study of ice conditions and for the destruction of derelicts. Each nation that was a party to the commission agreed to bear its proportionate part of the expenses of the patrol and the United States was invited to inaugurate and maintain such a service in 1914 in the following language:

The Government of the United States is invited to undertake the three services of derelict destruction, study and observation of ice conditions, and ice patrol, etc.

During the spring and early summer of 1913, previously to the meeting of the commission, work of this character was conducted by the S. S. *Scotia*. During the present year, however, the work is being conducted by the revenue