

MONTHLY MEAN TEMPERATURES AT AREQUIPA, PERU.

By ALFRED J. HENRY, Meteorologist.

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The record of monthly mean temperature made at Arequipa, Peru, under the direction of Harvard College Observatory, Prof. Solon I. Bailey, Acting Director, are of very considerable interest to students of temperature distribution. Any one who has worked over the problem especially, as regards the Southern Hemisphere, is at once struck with the wide meshes of the network of reliable temperature observing stations in that hemisphere.

Through the courtesy of Prof. Bailey, the Weather Bureau has been supplied with a manuscript copy of the records of temperature as observed at Arequipa for the period 1896-1919, thus supplementing the published record which concludes with 1896. Arctowski¹ has published monthly means for Arequipa computed by the formula $\frac{1}{4}(8_a + 2_p + 8_p + 8_p)$, for the years 1900-1910, both inclusive. When the attempt was made to bring this record down to date, it was discovered that the observing hours had been changed at the close of 1911, from 8 a. m., 2 and 8 p. m. to 10 a. m., and 10 p. m. Since it was not easy to obtain a correction that would enable us to combine the two series, it was determined to compute new monthly means from the daily extremes (max. + min. ÷ 2),² which were available for the entire period of observations, save only the 12 months, April, 1909-March, 1910, for which the record of minimum temperature is missing. In order to fill this gap, the means of the $(8_a + 2_p + 8_p + 8_p)$ ³, as given by Arctowski³ were corrected by adding 1° F. to the means for the months May to July, it having been shown that the means computed from the daily extremes for these months averaged about 1° higher than those computed from the 8 a. m., 2 and 8 p. m. observations. For the remaining months the monthly means computed from the two separate methods agreed within a small fraction of a degree Fahrenheit.

The Arequipa record was discussed in a paper by the writer in the February, 1921, REVIEW,⁴ and it was there pointed out that the variations in the annual means at that place synchronized very well with those of Habana and indeed other far distant points.

It is interesting to note that the synchronism existing especially between Arequipa and Habana prior to 1910

also continues to 1912, both stations showing a very well marked maximum in that year. Thereafter, however, the two curves diverge very widely. Arequipa reaching a second maximum in 1915, a decided minimum in 1916-17 and a third maximum in the summer of 1918-19; the last named was the greatest heat maximum experienced during the period of observations. It will be interesting to note whether these two heat maxima at Arequipa and the decided minimum of 1916-17 were experienced at other points in the Southern Hemisphere. It may be remembered that severe cold was experienced in the Northern Hemisphere during the winter of 1917-18, about 6 months later than in the Southern Hemisphere.

The complete table follows:

Monthly mean temperature (max. + min. ÷ 2), at Arequipa, Peru (° F.)

[Latitude, 16° 24' S.; longitude, 79° 46' W.; elevation, 8,040 feet.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual.
1888.....											60.8	60.2	
1889.....	62.2	62.2	59.5	58.3	55.0	54.1	53.5	53.6	56.3	54.6	55.4	55.4	56.7
1890.....	58.6	57.3	57.2	55.6	53.8	51.2							
1891.....													
1892.....	58.4	58.1	58.4	57.8	56.6	57.4	57.4	56.5	58.2	57.2	55.8	58.0	57.5
1893.....	56.0	57.7	56.4	56.8	55.3	54.4	55.8	55.8	57.6	57.6	56.4	57.6	56.4
1894.....	57.4	58.3	57.1	57.0	57.2	57.6	57.2	57.6	58.0	57.1	58.0	57.8	57.5
1895.....	58.0	57.6	57.3	57.5	57.5	58.8	58.2	57.8	59.3	58.0	58.2	59.3	58.1
1896.....	58.2	59.4	58.0	59.4	58.4	58.2	58.2	59.0	57.8	59.0	58.0	59.2	58.6
1897.....	60.1	60.0	58.6	58.7	57.4	57.4	57.2	58.0	59.4	58.7	58.6	58.0	58.5
1898.....	58.0	55.9	57.4	58.0	58.1	57.0	57.1	55.6	58.1	57.6	57.2	57.5	57.3
1899.....	57.2	56.8	57.2	58.4	58.6	57.1	56.6	57.7	60.6	58.1	58.4	59.4	58.0
1900.....	59.2	60.1	60.8	60.0	58.6	58.6	57.0	58.6	59.1	59.0	59.2	59.4	59.1
1901.....	58.3	59.6	58.3	58.9	59.4	57.7	57.2	59.0	59.2	58.8	57.6	58.2	58.5
1902.....	58.2	58.2	58.2	58.7	59.4	57.2	59.0	58.0	59.2	58.4	58.8	59.4	58.6
1903.....	59.6	61.4	58.6	57.2	57.2	56.4	57.1	56.6	58.6	57.4	56.4	56.0	57.7
1904.....	56.6	56.6	56.5	57.0	56.6	54.4	56.8	57.8	57.9	57.4	58.1	58.2	57.0
1905.....	58.2	59.5	57.1	58.2	58.7	58.9	58.2	57.7	58.0	59.0	58.4	57.8	58.3
1906.....	58.7	59.0	58.4	59.0	58.2	56.1	57.0	57.2	58.8	56.8	58.4	56.5	57.8
1907.....	57.6	56.2	58.8	57.0	58.1	57.4	56.6	57.4	58.6	57.8	58.2	59.0	57.7
1908.....	59.0	57.8	58.4	58.4	58.9	58.4	56.4	56.4	57.4	56.2	57.0	57.5	57.6
1909.....	57.4	57.0	58.4	56.7	55.7	55.1	56.8	56.2	58.7	58.0	57.3	57.5	57.1
1910.....	55.8	56.1	55.2	58.6	57.2	57.8	56.6	57.3	58.1	57.2	58.0	57.6	57.2
1911.....	57.2	59.3	56.2	58.4	58.0	57.1	58.0	58.1	59.4	59.2	58.6	60.3	58.4
1912.....	61.1	60.0	60.3	59.4	59.5	58.4	56.9	58.0	58.2	57.7	56.4	58.2	58.7
1913.....	58.4	58.7	58.2	57.2	57.2	56.8	58.3	57.0	57.2	58.1	58.8	59.3	57.9
1914.....	58.7	60.2	59.4	58.5	59.8	58.4	57.9	58.6	58.2	57.2	57.6	60.0	58.7
1915.....	60.8	60.0	61.7	61.4	61.2	57.9	57.6	58.4	58.2	58.6	57.5	58.8	59.3
1916.....	58.7	57.2	57.4	57.2	57.6	55.4	54.8	55.7	58.2	57.2	55.1	56.5	56.7
1917.....	56.4	54.8	57.6	56.5	55.9	55.8	56.1	57.3	56.4	57.2	57.0	55.6	56.4
1918.....	57.0	58.2	56.7	56.8	58.2	58.2	58.4	59.0	58.4	58.6	61.2	63.7	58.7
1919.....	61.1	61.4	60.6	59.4	59.2	59.2	58.1	58.7	59.1	60.0	58.6	58.8	59.5
1920.....	58.7	58.1	58.2	59.6	57.7	58.0	58.9	57.6	58.3	58.1	58.1	59.2	58.4
Means.....	58.4	58.5	58.1	58.1	57.8	57.0	57.0	57.4	58.4	57.9	58.4	57.9	57.9

¹ Bulletin American Geographical Society, 44: 599.

² In this connection, see C. E. P. Brooks: True mean temperature, MO. WEATHER REV., April, 1921, p. 226.

³ Loc. cit.

⁴ Pages 62-70.