

Abstract of Paper on the Diurnal Range of Temperature Variability at the Summit and Base of Ben Nevis, Lady Franklin Bay, and Hong Kong.
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The average variability of temperature at any place is obtained by taking the difference of temperature at the same hour on successive days, and taking the mean value of this difference irrespective of sign. With a view to ascertaining whether this variability varied with the hour selected for comparison, the hourly temperature records at four places have been examined, and the day to day change of temperature at each hour noted. The places are—the Ben Nevis Observatory, the Fort-William Observatory, the Hong Kong Observatory, and the Arctic Station at Lady Franklin Bay, lat. $81^{\circ} 44'$ N., long. $64^{\circ} 45'$ W. At each place one year's record was taken, which, though too short a time to give a true mean, yet gives a fair approximation towards it. The mean values for each hour of the twelve months at the four stations are given in the accompanying tables, the highest value in each month being put in heavy type and the lowest in italic.

The monthly mean values at the right hand of the tables show that there is little difference between Ben Nevis and Fort-William, except in July and August, when the former is markedly in excess. On the mean of the whole year, this day to day variability of temperature is one-tenth of a degree greater at Ben Nevis than at Fort-William, $3^{\circ} \cdot 8$ and $3^{\circ} \cdot 7$, notwithstanding that the diurnal range of temperature at the former place is little more than half that at the latter. Hong Kong has the lowest annual variability, $2^{\circ} \cdot 3$, and Lady Franklin Bay the highest, $5^{\circ} \cdot 1$. At the latter station, which has a day and night of four and a half months' duration, these day to day differences are greater during the nocturnal period than during the long day.

The hourly values at Ben Nevis on the mean of the year are highest from midnight to 9h., and lowest from 11h. to 18h. At Fort-William the same diurnal change occurs, but the difference between the maximum and minimum values is greater. At Fort-William during the summer months, from April to August, a second maximum appears between 14h. and 19h. On the summit of Ben Nevis, however, this second maximum is very small. During these months there is strong insolation in the afternoon hours; ascending currents flow up the sides of the hill, which bring an increased amount of cloud to the summit, and no doubt so exert a conserving influence on the temperature there. On the mean of the year the variability is greater at the summit than at the base of Ben Nevis, except during the five hours ending 6 A.M., but the diurnal range of the variability is greater at the base.

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At Lady Franklin Bay there is virtually no diurnal range of variability on the mean of the year. From February to May there is a morning maximum and afternoon minimum, but this effect is reversed during the other months of the year.

At Hong Kong the diurnal range of Temperature variability is of a comparatively simple and regular character, the values being above the mean of the day from 9h. to 17h. and below the mean during the rest of the day. The maximum occurs at 14h. and the minimum at midnight.

In the foregoing remarks no serious attempt has been made to grapple with difficulties which surround the satisfactory explanation of why the variability should be different at different hours of the day. It is obvious that solar radiation, through the varying altitudes of the sun, is one of the most potent factors; but more material is required than that here discussed.

HOURLY VARIABILITY OF TEMPERATURE AT THE BEN NEVIS OBSERVATORY DURING 1892.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mid-night.	Mean.
Jan.	4.8	5.2	5.3	5.4	5.2	5.2	5.0	5.0	4.7	4.3	4.3	4.0	4.1	4.3	4.7	4.8	4.4	4.4	4.5	4.7	4.6	4.7	4.8	5.1	4.6
Feb.	3.5	3.3	3.7	3.7	3.8	4.1	4.0	3.8	4.0	4.0	4.0	4.0	4.0	3.5	3.2	3.1	3.0	3.5	3.9	3.2	3.3	3.3	3.1	3.2	3.6
Mar.	4.2	4.3	4.4	4.4	4.5	4.4	4.5	5.1	4.6	4.8	4.7	4.6	4.4	4.2	4.2	4.0	3.5	3.2	3.4	3.5	3.4	3.7	4.0	4.1	4.2
Apr.	3.8	3.4	3.4	3.6	3.5	3.6	3.4	3.5	3.5	3.3	3.2	3.2	3.3	3.2	3.3	3.5	3.7	3.8	3.7	3.6	4.0	4.1	3.5	3.4	3.5
May	4.2	3.8	4.0	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.4	3.7	3.3	3.7	3.7	3.2	3.6	3.7	3.8	3.8	3.2	3.7	3.8	4.1	3.8
June	3.6	3.4	3.1	3.1	3.1	2.9	3.1	3.6	3.6	3.7	3.9	3.9	3.8	4.3	3.9	4.1	3.7	3.7	3.8	3.7	3.8	4.0	4.0	3.7	3.6
July	3.3	3.2	3.4	3.8	4.0	3.7	4.1	4.2	3.9	3.9	3.6	3.4	3.4	3.7	3.7	3.9	3.9	4.0	4.2	4.0	3.4	3.6	3.5	3.5	3.7
Aug.	3.8	3.7	3.8	3.8	3.7	3.5	3.2	3.3	3.2	3.1	2.9	3.1	2.7	2.7	2.7	3.0	3.0	3.1	3.5	3.5	3.6	3.7	3.7	3.7	3.3
Sept.	4.9	4.7	4.8	4.6	4.5	4.4	4.1	4.0	4.0	4.1	3.7	3.9	3.9	4.0	4.0	3.9	3.9	3.9	4.3	4.2	4.8	4.0	4.1	4.4	4.3
Oct.	3.2	3.2	3.4	3.5	3.5	3.6	3.4	3.4	3.0	2.9	2.9	2.6	2.6	2.7	2.8	2.9	3.0	3.0	2.9	2.9	2.7	2.8	2.9	3.0	3.0
Nov.	4.3	4.2	4.2	4.0	4.0	4.0	3.9	4.0	4.1	4.0	3.6	3.5	3.5	3.5	3.7	3.9	4.2	4.3	4.4	4.5	4.7	4.4	4.3	4.3	4.1
Dec.	3.9	3.8	3.9	3.9	3.9	3.7	4.0	4.2	4.2	4.2	4.3	4.7	4.3	4.2	4.1	4.1	4.1	4.2	4.4	4.5	4.3	4.2	4.2	4.1	4.1
Year	3.9	3.8	3.9	4.0	4.0	3.9	3.9	4.0	3.9	3.8	3.7	3.7	3.6	3.7	3.7	3.7	3.7	3.7	3.9	3.8	3.8	3.8	3.8	3.9	3.8

FORT-WILLIAM, 1892.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mid-night.	Mean.
Jan.	4.0	3.8	4.1	4.2	4.5	5.3	5.6	5.8	5.5	5.6	5.3	4.8	4.0	4.1	3.7	3.8	4.0	3.9	3.2	3.4	3.8	3.7	3.7	4.0	4.2
Feb.	3.8	4.1	4.3	4.7	4.6	4.3	4.0	4.0	3.6	3.4	3.1	3.0	2.9	2.4	2.4	3.0	2.6	3.0	2.9	3.5	3.6	3.8	3.6	3.7	3.5
Mar.	4.9	4.9	5.2	4.9	5.0	4.8	4.7	4.4	4.0	3.9	3.2	3.2	3.4	3.4	3.8	3.6	3.4	3.1	3.2	3.3	3.3	3.9	4.2	4.5	4.0
April	3.5	3.8	3.7	4.1	4.3	4.0	3.6	3.3	2.8	3.3	3.0	3.3	3.2	3.8	3.9	4.1	3.8	3.9	3.4	2.5	2.8	2.9	3.2	3.5	3.6
May	4.0	4.1	4.2	4.3	4.9	4.4	3.0	2.4	2.5	3.0	3.5	3.5	3.7	4.0	4.2	3.9	4.1	4.3	3.5	3.0	3.0	3.1	3.6	3.7	3.7
June	3.8	4.0	4.0	4.0	3.6	2.8	2.7	2.9	3.0	3.5	3.6	3.6	3.4	3.7	3.2	4.0	4.4	4.4	3.7	2.9	2.8	2.9	3.2	3.7	3.5
July	2.6	2.5	2.9	3.0	3.2	2.9	2.2	2.4	2.2	2.5	2.1	2.5	2.9	3.3	3.9	4.0	4.2	4.0	3.8	2.5	2.2	2.0	2.0	2.2	2.8
Aug.	2.8	2.9	2.9	3.0	2.8	2.8	2.4	2.2	2.0	2.1	2.4	2.4	2.7	3.1	3.4	3.0	2.7	2.7	1.9	2.0	1.9	2.1	2.7	2.8	2.6
Sept.	3.6	4.0	3.6	3.3	3.4	3.6	3.6	3.2	2.5	2.3	2.1	2.6	2.4	2.6	2.8	2.9	2.6	2.6	3.3	3.0	4.0	4.0	3.9	3.8	3.2
Oct.	3.2	3.4	3.4	3.7	4.0	3.9	4.2	4.4	4.0	3.7	3.5	3.1	2.7	2.7	2.6	2.7	2.7	3.0	3.1	3.0	2.8	3.1	3.2	3.3	3.3
Nov.	5.1	5.1	5.0	5.2	5.1	5.0	4.6	4.6	4.1	4.3	3.7	3.3	3.3	3.0	3.0	3.4	3.8	3.9	4.1	4.6	5.4	5.2	4.9	5.2	4.4
Dec.	4.5	4.6	4.8	5.3	4.6	4.7	4.7	4.4	4.8	5.0	4.6	4.2	3.8	3.7	3.6	3.9	4.0	4.0	3.9	4.0	4.2	4.4	4.8	4.8	4.4
Year	3.8	3.9	4.0	4.2	4.2	4.0	3.8	3.7	3.4	3.5	3.3	3.3	3.2	3.3	3.4	3.5	3.5	3.6	3.3	3.1	3.3	3.4	3.6	3.8	3.7

HOURLY VARIABILITY OF TEMPERATURE—*continued.*

HONG KONG, 1893.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mid-night.	Mean.
Jan.	2.7	2.8	2.6	2.6	2.7	2.7	2.8	3.3	3.9	4.2	4.1	4.0	3.9	3.9	3.8	3.6	3.4	3.2	3.1	2.8	2.7	2.9	2.8	2.8	3.2
Feb.	2.2	2.2	2.2	2.3	2.4	2.2	2.1	1.9	2.1	2.4	2.5	2.4	2.6	3.0	2.7	2.6	2.2	2.0	1.9	2.0	2.0	1.8	2.0	1.9	2.4
Mar.	2.7	2.6	2.6	2.7	2.8	2.7	2.9	3.3	3.9	4.0	4.0	4.6	4.4	4.4	4.3	4.2	3.7	3.3	2.6	2.8	2.7	2.8	2.9	2.6	3.3
April	2.4	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.6	2.9	3.4	3.7	3.5	3.2	3.4	3.4	3.1	2.7	2.4	2.4	2.3	2.4	2.2	2.4	2.7
May	1.6	1.6	1.6	1.5	1.6	1.6	1.6	2.1	2.2	2.3	2.7	3.3	3.2	2.9	2.7	2.4	2.1	1.7	1.8	1.5	1.8	1.9	1.8	1.8	2.0
June	0.6	0.8	0.9	1.2	1.2	1.5	1.4	1.7	1.8	1.7	2.3	2.8	2.2	2.4	2.5	1.7	1.7	1.6	1.0	1.0	0.8	0.8	0.7	0.7	1.4
July	1.4	1.3	1.6	1.5	1.8	1.9	2.0	2.4	2.9	3.1	3.1	4.0	4.1	4.0	3.5	3.5	2.9	2.2	2.1	1.8	1.8	1.8	1.6	1.5	2.4
Aug.	1.6	1.4	1.5	1.3	1.4	1.5	2.0	2.6	2.6	2.6	2.8	2.2	2.2	3.0	1.9	1.9	1.9	1.8	1.5	1.4	1.2	1.3	1.2	1.2	1.8
Sept.	1.9	2.0	2.0	2.0	1.9	1.9	2.4	2.8	3.1	3.8	3.4	3.4	3.7	4.0	3.4	2.6	2.9	2.0	1.8	1.8	1.8	1.7	1.8	1.6	2.5
Oct.	1.9	1.7	1.8	1.9	1.8	1.8	1.6	2.1	2.1	2.1	2.2	1.9	2.1	2.0	1.9	1.5	1.1	1.3	1.3	1.5	1.8	1.9	2.0	2.0	1.8
Nov.	1.4	1.5	1.4	1.5	1.6	1.5	1.6	1.6	1.7	1.3	1.8	2.1	2.2	2.0	1.8	2.0	1.6	1.5	1.1	1.3	1.3	1.4	1.3	1.4	1.6
Dec.	2.0	2.3	2.4	2.7	2.8	2.7	2.7	2.1	2.4	2.7	3.0	3.1	3.3	3.4	3.5	2.8	2.5	1.9	2.1	2.0	2.3	2.1	2.1	2.1	2.6
Year	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.4	2.6	2.8	2.9	3.1	3.1	3.2	3.0	2.7	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.8	2.3

LADY FRANKLIN BAY, 1882.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mid-night.	Mean.
Jan.	7.2	7.0	7.2	6.3	6.6	6.4	6.3	6.3	5.7	5.8	6.8	7.6	8.4	7.5	8.2	7.6	6.8	7.4	7.5	7.0	7.2	6.6	6.8	7.2	7.0
Feb.	5.6	6.0	7.0	7.1	6.8	6.6	6.2	6.7	6.5	6.7	6.8	7.6	6.3	7.0	6.4	7.5	6.6	6.1	5.9	5.6	5.1	5.3	5.6	5.4	6.4
Mar.	7.7	7.7	8.0	8.1	8.1	8.4	7.8	8.7	8.0	7.2	6.8	6.5	6.4	6.4	5.7	6.1	6.0	6.9	5.8	7.3	6.6	6.8	7.0	7.6	7.2
April	9.1	9.3	9.3	7.8	8.6	9.2	8.0	7.4	8.0	7.6	7.1	6.6	6.5	6.4	5.8	5.2	5.0	4.9	5.3	5.4	6.6	7.0	6.6	7.8	7.5
May	4.4	4.4	4.8	4.4	4.8	4.9	4.9	4.7	4.6	4.4	4.8	4.4	4.1	4.2	4.1	4.1	3.8	3.4	3.7	3.9	3.6	4.0	4.2	4.5	4.3
June	3.0	2.8	2.8	2.9	3.1	3.3	3.0	3.2	2.7	2.3	2.9	3.0	3.3	3.4	3.2	2.8	3.0	3.0	2.4	2.2	2.7	3.1	2.9	3.0	2.9
July	2.1	2.2	2.0	2.1	2.2	2.0	2.6	2.3	3.0	2.9	3.3	3.3	2.8	2.8	2.9	2.9	2.8	2.7	2.7	2.5	2.5	2.4	2.3	2.2	2.6
Aug.	2.2	2.2	2.2	2.4	2.7	2.7	2.7	2.6	3.2	2.7	3.6	3.1	2.8	2.2	2.0	2.6	2.7	2.4	2.4	2.1	2.4	2.6	2.4	2.2	2.5
Sept.	4.4	4.3	4.4	4.2	4.2	4.4	4.0	3.6	3.7	3.5	3.3	3.4	3.2	3.2	3.4	3.7	3.3	3.7	4.2	4.5	4.6	4.5	4.5	4.7	4.0
Oct.	4.3	4.3	4.4	4.2	4.1	3.7	3.6	3.6	3.7	3.8	4.1	4.0	4.9	5.6	5.9	5.9	6.0	5.7	5.5	5.4	5.0	4.8	5.7	4.9	4.7
Nov.	5.0	5.2	5.7	5.4	5.6	6.0	5.3	5.1	5.2	4.5	4.2	5.1	5.4	5.1	5.2	6.0	5.0	5.6	6.1	5.3	5.2	5.5	5.9	5.2	5.3
Dec.	5.9	6.0	6.0	6.5	6.8	7.5	7.3	6.6	6.8	7.0	7.2	6.6	6.7	7.6	8.0	7.7	6.9	7.3	8.0	7.5	7.0	7.3	5.8	6.8	7.0
Year	5.1	5.1	5.3	5.1	5.3	5.4	5.1	5.1	5.1	4.9	5.1	5.1	5.1	5.1	5.1	5.1	4.8	4.9	5.0	4.9	4.9	5.0	5.0	5.1	5.1