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Mean Temperature Curves on Clear Days at Kew (1963-67)

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Introduction

Forecasts of temperature variations throughout the day and night at Kew are prepared by the London Weather Centre for a Gas Board. To assist the forecaster in deciding what types of temperature changes are likely at different times of the year, mean temperature curves for clear days have been plotted for each month of the year over a period of 5 years (1963-67).

Selection of Clear Days

Clear days were chosen according to the following criteria:- not more than $\frac{3}{8}$ cloud at 2400Z at London (Heathrow) Airport (no midnight observations are available for Kew) and at 0600Z at Kew, no fog, not more than $\frac{3}{8}$ medium or high cloud or $\frac{4}{8}$ cumulus at 1200Z and 1800Z the day before or the day after, no change in air mass from 0900Z the day before to 1500Z the following day. The temperature observations for each of the selected days were then plotted for each hour from 0900Z to 1500Z the next day and compared visually. Any curve containing some obvious peculiarity was rejected and the remainder were used for calculating the 5-year means. No account of wind speed or direction was taken, but only one or two of the final selection for all months had winds of more than 10 knots.

Discussion of Results

Throughout the year rises of temperature are more rapid than falls. Minimum temperatures occur at or just after sunrise. The time of the temperature maximum varies throughout the year, occurring at about 1400Z in Winter and 1600Z in Summer. The Saunders point of discontinuity ⁽¹⁾ is clearly visible but takes different forms in Summer and Winter. In Winter it appears (at about 2300Z) as a temporary isothermal step in the curve (lasting about $1\frac{1}{2}$ hours) which then resumes its former slope. In Summer the Saunders discontinuity occurs at about 2200Z as a permanent reduction in the rate of cooling.

.../In Summer

In Summer the mean curves are flattened near their maximum due to convection distributing the heat through a deeper layer, however individual curves oscillate wildly over a range of several degrees in convection conditions.

References

- (1) SAUNDERS, W.E.; Night cooling under clear skies. Quart. J. R. Met.Soc., London. 75, 1949, p.154.

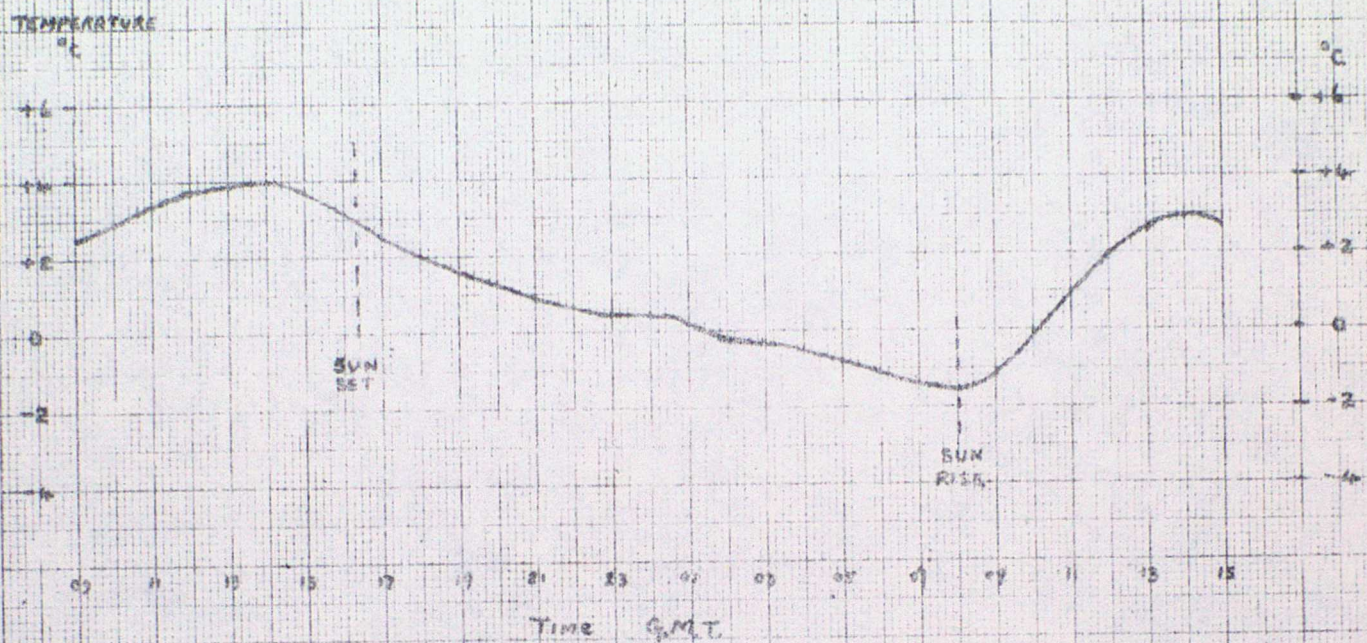
May 1969

Mean Hourly Temperatures on Clear Days at Kew (1963-67)

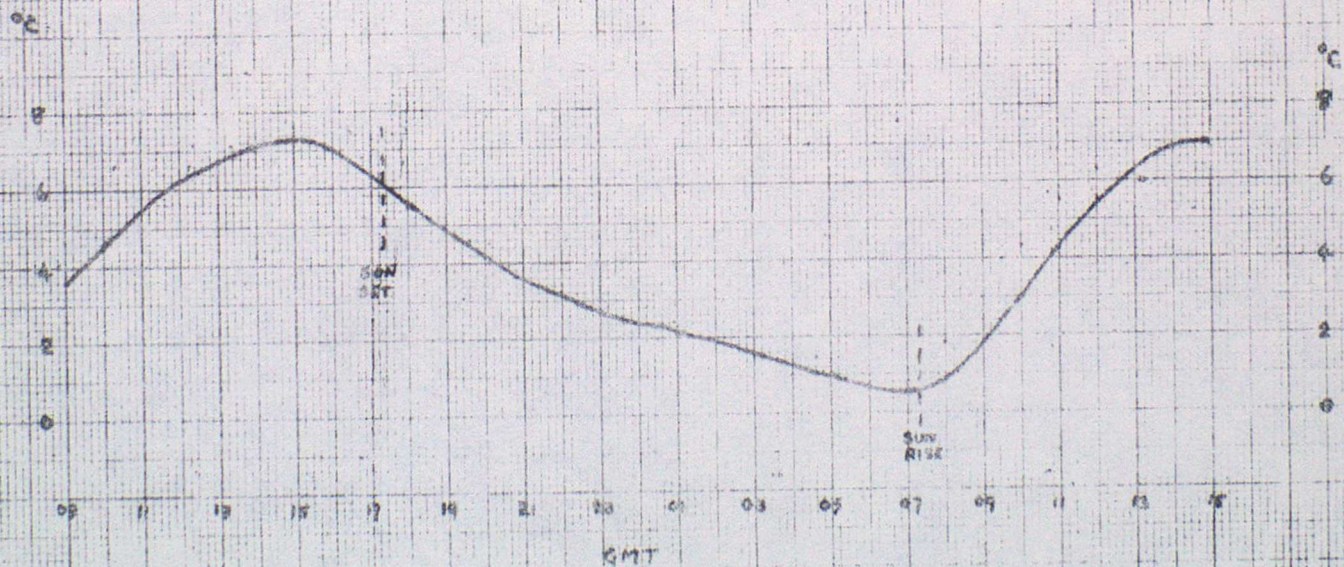
Time G.M.T.	J	F	M	A	M	J	J	A	S	O	N	D	
09	2.5	3.6	4.3	7.7	13.7	16.0	17.7	16.6	13.2	10.9	6.1	4.2	
10	2.9	4.5	5.2	9.8	14.6	17.1	18.9	17.8	14.5	12.1	7.2	4.5	
11	3.4	5.4	6.4	11.0	15.7	18.1	19.7	18.9	15.6	13.1	7.9	5.0	
12	3.7	6.2	7.3	12.0	16.5	19.2	20.4	20.1	16.6	13.6	8.8	5.5	
13	3.9	6.7	8.0	12.9	17.2	19.8	21.4	20.8	17.4	14.2	9.1	5.9	
14	4.0	7.0	8.4	13.5	17.6	20.3	22.2	21.3	17.9	14.5	9.1	5.7	
15	3.7	7.3	8.4	14.0	18.0	20.8	22.5	21.5	18.2	14.3	9.0	5.5	
16	3.2	7.0	8.0	14.4	18.2	20.6	22.8	21.5	18.1	13.8	8.6	5.1	
17	2.5	6.3	7.3	14.2	17.9	20.4	22.6	21.2	17.6	12.8	7.9	4.4	
18	2.0	5.5	6.3	13.6	17.1	20.1	22.3	20.5	16.3	11.8	7.5	3.9	
19	1.6	4.9	5.2	12.3	15.9	19.3	21.4	19.0	14.9	11.0	6.8	3.4	
20	1.3	4.2	4.4	10.5	14.3	17.7	19.5	17.5	13.9	10.4	6.5	2.9	
21	0.9	3.6	3.6	9.4	12.7	16.1	18.0	16.3	13.0	10.0	6.0	2.4	
22	0.7	3.2	2.9	8.4	11.8	14.9	16.7	15.2	12.2	9.4	5.5	1.9	
23	0.5	2.7	2.6	7.8	10.7	14.0	16.0	14.5	11.3	9.0	5.1	1.7	
24	0.5	2.4	2.3	7.2	9.9	12.9	15.2	13.8	10.8	8.6	4.8	1.6	
01	0.2	2.1	2.1	6.4	9.2	12.1	14.4	13.2	10.1	8.5	4.3	1.1	
02	-0.2	1.9	1.8	5.9	8.6	11.7	13.8	12.6	9.8	8.3	3.9	0.7	
03	-0.3	1.5	1.4	5.3	7.8	11.2	13.1	12.2	9.2	8.0	3.6	0.1	
04	-0.5	1.3	1.0	4.8	7.6	10.8	12.7	11.8	8.8	7.7	3.4	0.1	
05	-0.8	1.0	0.9	4.4	7.9	11.5	13.3	11.4	8.4	7.4	2.9	-0.2	
06	-1.1	0.7	0.6	4.9	9.3	12.9	14.7	12.0	8.4	7.1	2.7	-0.3	
07	-1.4	0.6	0.9	6.3	11.3	14.0	16.0	13.5	9.3	7.2	2.6	-0.6	
08	-1.5	0.8	2.0	8.0	13.2	15.4	17.7	15.1	10.8	8.3	3.2	-0.4	
09	-1.2	1.8	3.4	9.6	14.9	16.8	19.1	16.3	12.5	9.8	4.2	0.3	
10	-0.1	3.0	5.1	11.2	16.1	18.1	20.3	17.9	14.3	11.3	5.7	1.3	
11	1.0	4.3	6.7	12.7	17.4	19.3	21.2	19.0	15.8	12.4	6.8	2.5	
12	2.0	5.5	7.9	14.0	18.4	20.1	22.1	19.7	17.2	13.2	7.8	3.6	
13	2.6	6.3	8.6	15.0	19.0	20.8	22.6	20.4	18.3	13.6	8.3	4.4	
14	2.9	6.8	9.1	15.7	19.5	21.1	23.4	21.3	18.9	13.8	8.7	4.8	
15	2.7	6.9	9.4	16.0	19.8	21.3	23.6	21.7	19.3	13.9	8.6	5.3	
No. of cases	13	14	14	11	18	15	19	26	15	19	15	15	
Approximate time of sunrise (mid-month)	0800	0715	0610	0500	0405	0340	0400	0445	0535	0625	0720	0800	
Approximate time of sunset (mid-month)	1620	1715	1805	1900	1950	2020	2010	1920	1815	1705	1610	1550	
Clear Days { Abs Max	7.4	10.5	19.9	19.1	26.6	25.8	26.7	27.7	24.8	19.0	14.4	8.7	
Days { Abs Min	-6.1	-5.0	-2.2	-0.7	-0.8	8.5	9.0	6.7	5.5	2.4	-2.8	-5.6	
All Days {	Abs Max	13.3	13.6	22.0	20.7	27.1	27.2	29.3	28.1	24.8	24.3	15.6	14.1
	Abs Min	-9.7	-6.4	-5.6	-1.4	-1.2	6.0	7.0	6.2	4.9	-0.2	-3.3	-6.1
	Mean Max	5.1	6.8	10.0	12.7	16.9	20.2	21.3	20.7	18.5	14.1	9.8	7.3
	Mean Min	1.6	2.7	3.9	5.8	8.6	11.6	13.1	12.5	10.8	8.4	5.2	3.2

MEAN TEMPERATURE CURVE ON CLEAR DAYS AT KEW (1963-67)

JANUARY (13 CASES)

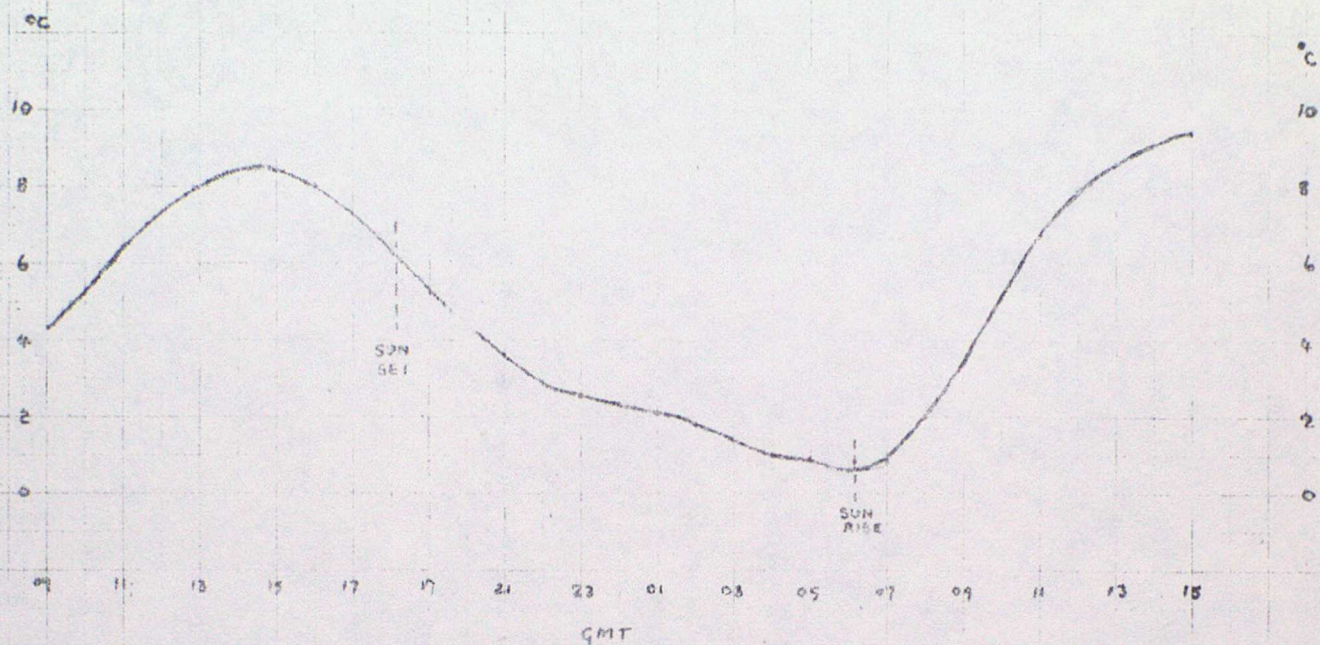


FEBRUARY (14 CASES)

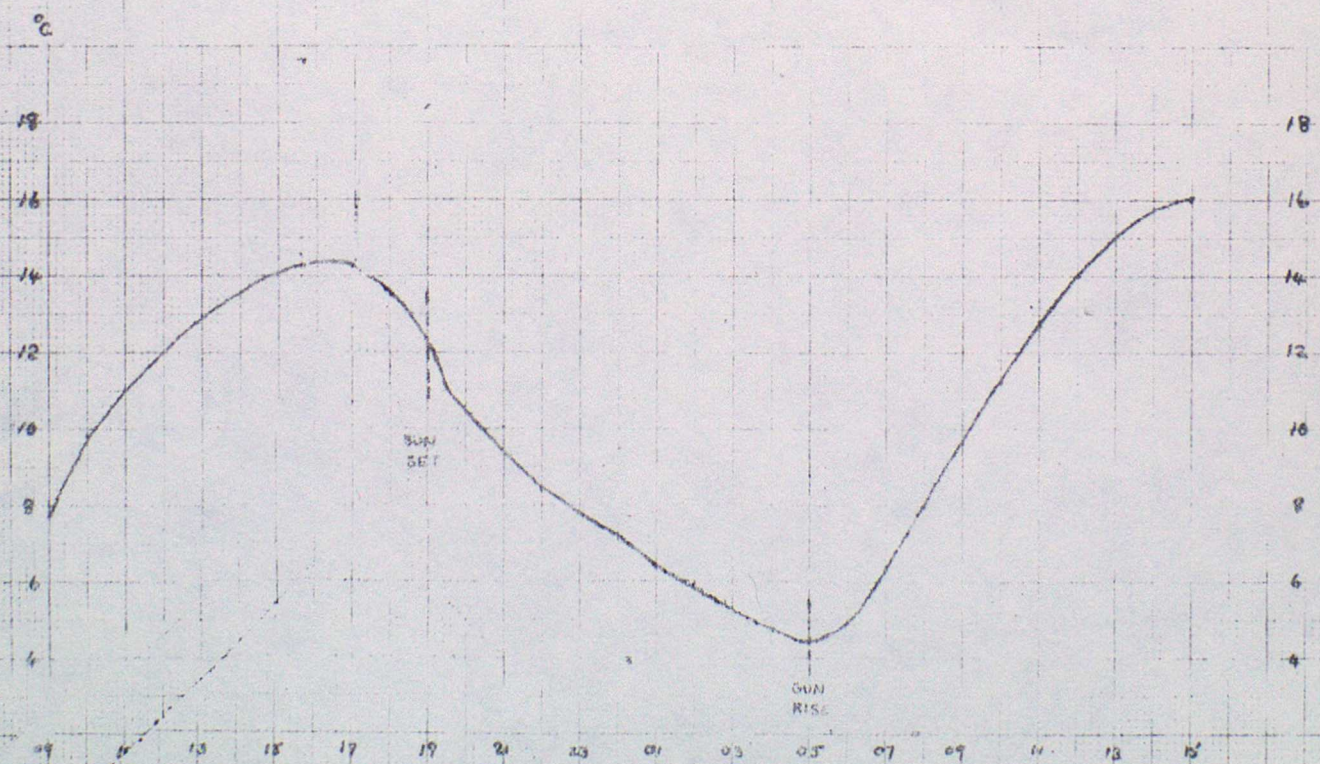


MEAN TEMPERATURE CURVE ON CLEAR DAYS AT KEW (1963-1967)

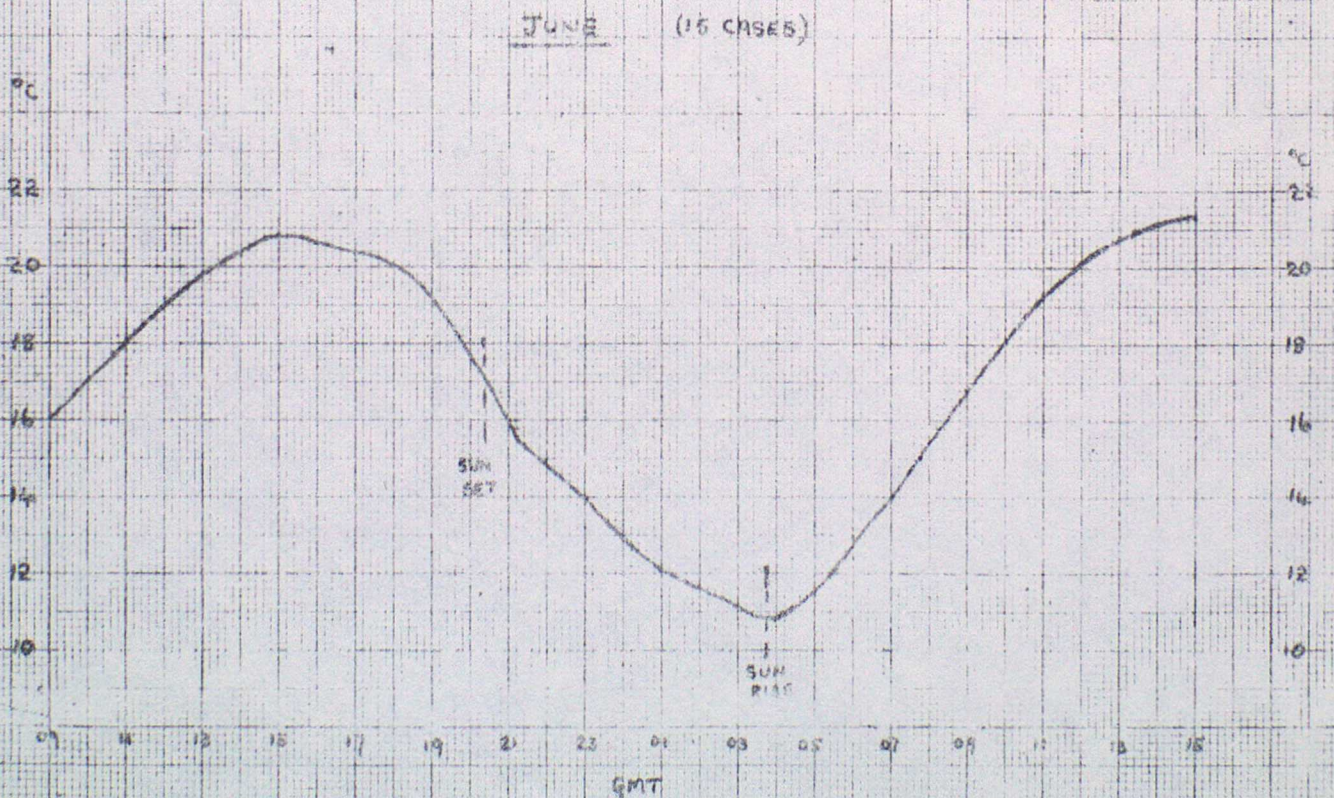
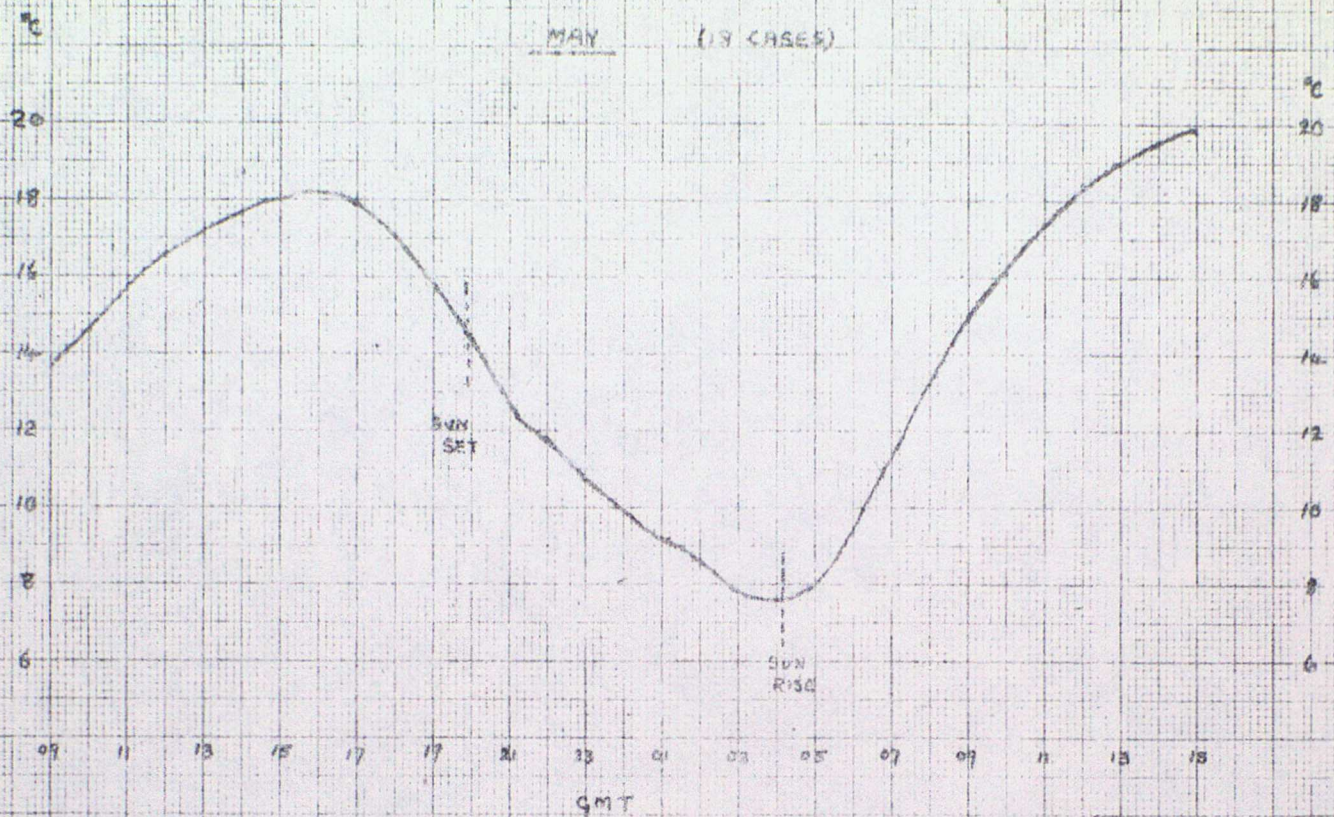
MARCH (16 CASES)



APRIL (11 CASES)

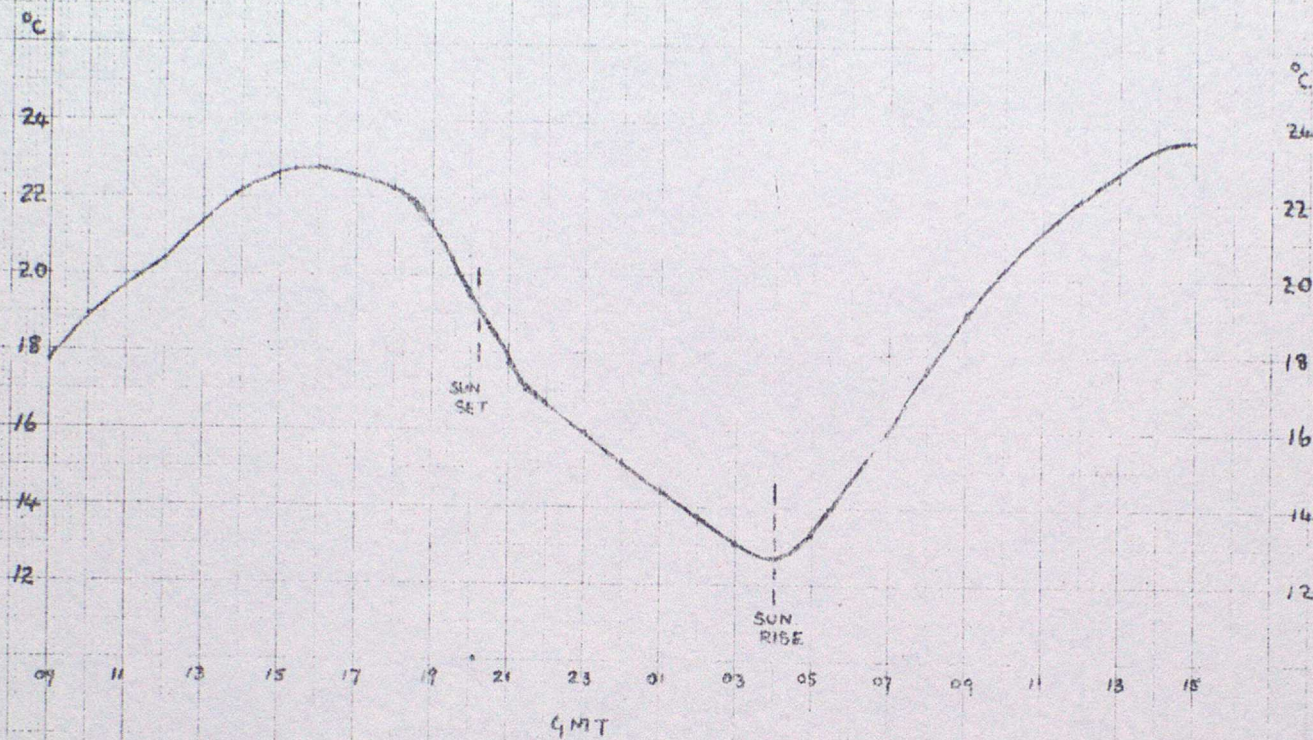


MEAN TEMPERATURE CURVE ON CLEAR DAYS AT KEY (1963-67)

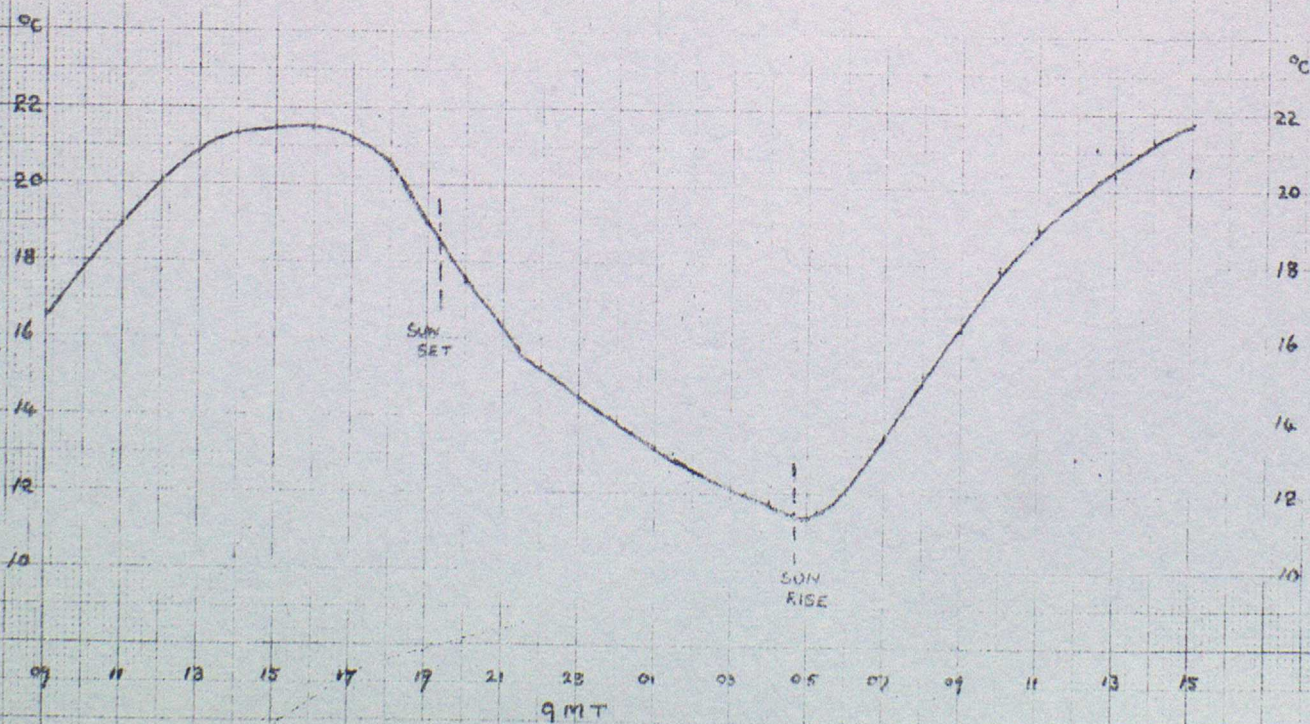


MEAN TEMPERATURE CURVE ON CLEAR DAYS AT KEW (1963-67)

JULY (19 CASES)

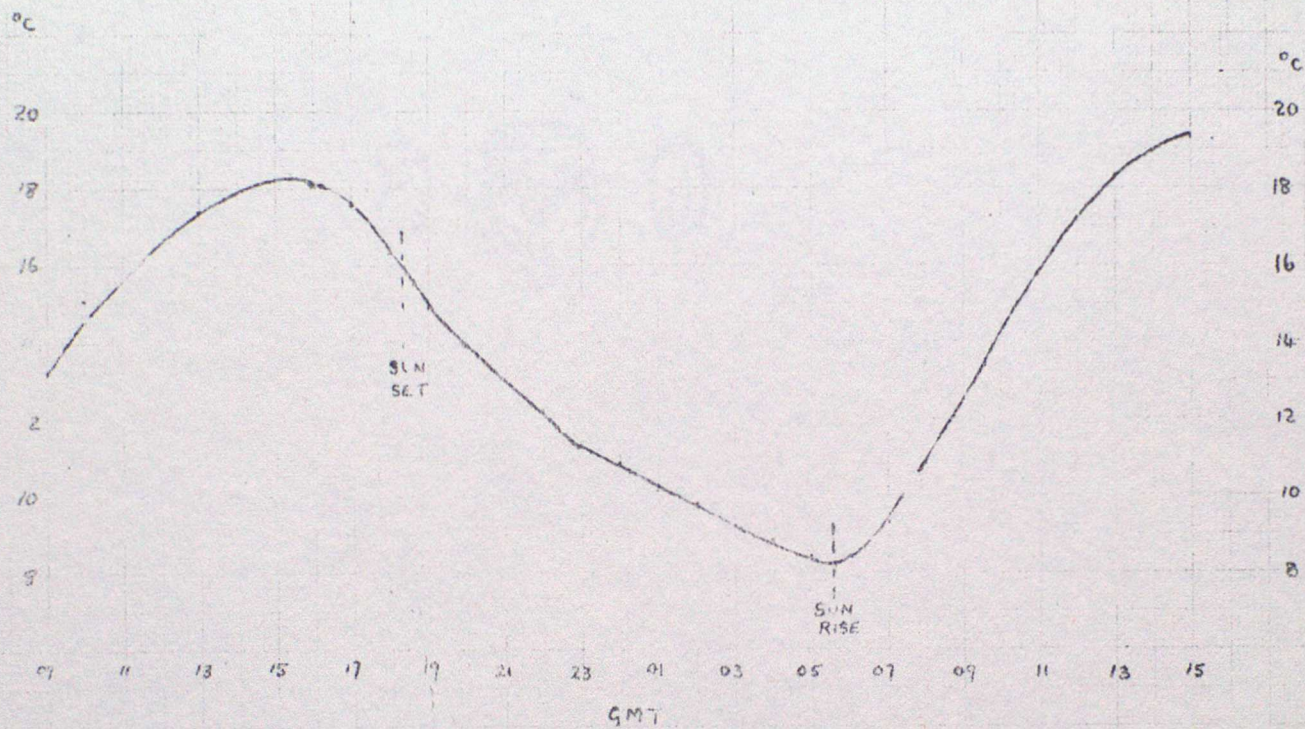


AUGUST (26 CASES)

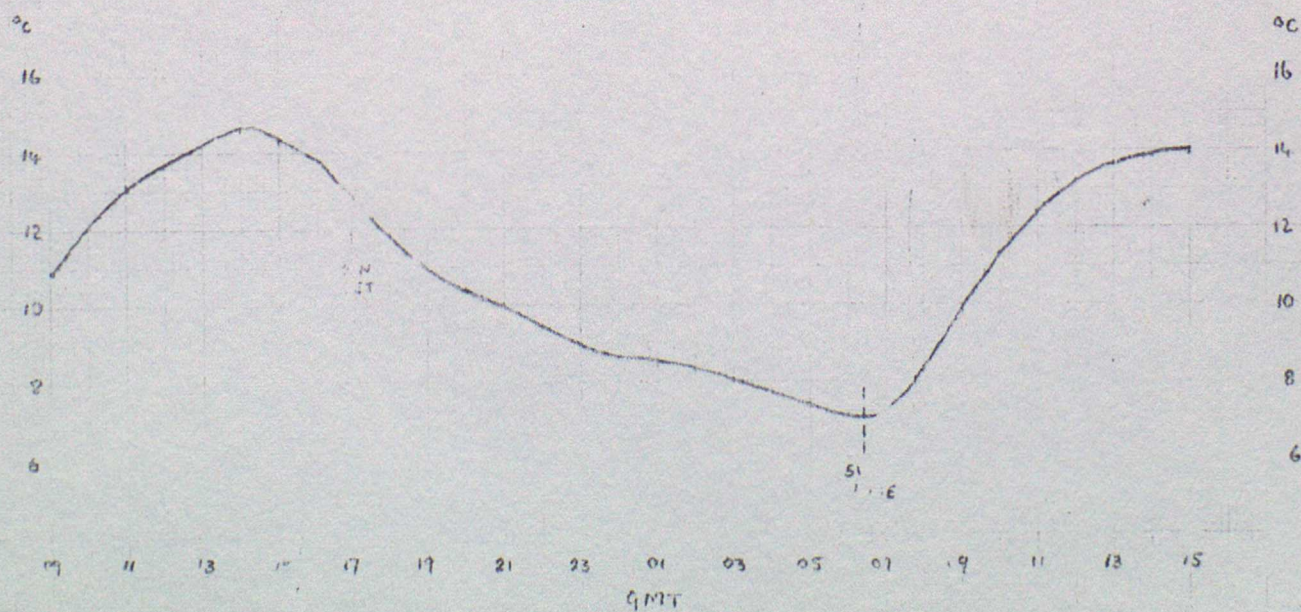


MEAN TEMPERATURE CURVE ON CLEAR DAYS AT KEW (1963-67)

SEPTEMBER (15 CASES)



OCTOBER (19 CASES)



MEAN TEMPERATURE CURVE ON CLEAR DAYS AT NEW

(1963-67)

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