

XII. *A Letter from Dr. John Lining to C. Mortimer M.D. Sec.R.S. concerning the Weather in South-Carolina; with Abstracts of the Tables of his Meteorological Observations in Charles-Town.*

S I R,

Read May 6.
1748.

THO' I have not the Pleasure of a personal Acquaintance with you, yet as you are one of the Secretaries to the *Royal Society*, I take the Liberty to send you some Tables and Observations deduced from a Diary of the Weather, which I have kept for some Years past in this Town, which you may communicate to the *Royal Society*, if you think they will be acceptable. As an Account of the Instruments which I have used, and their Situation, is already published in the *Philosophical Transactions**, I shall not trouble you with a Repetition of those Affairs.

The Vicissitudes of the Weather, with respect to Heat and Cold, are perhaps no-where greater than in *Carolina*; and our Summer's Heat is probably not inferior to that under most Places of the Equator; nor is our Winter's Cold much less at some times than that in *Britain*.

From near eight Years Observation, the greatest Increase of the Heat of the Air, which I have discover'd in 24 or 30 Hours, in Spring, Summer, Autumn, and Winter, was 19, 24, 13, and 16 Degrees

* N^o. 470, p. 497-8.

Degrees of *Fahrenheit's* Thermometer; and the greatest Decreases of Heat, in the same Spaces of Time, in those Seasons, were 35, 32, 27 and 27 Degrees respectively. It frequently happens, that one Day is ten or more Degrees warmer than the preceding Day; but the Decreases of Heat are always greater and more sudden than its Increases. On the 10th of *January* 1745. at 2 *p. m.* the Mercury in the Thermometer was at 70; next Morning it had sunk to the 26th Degree; and on the 12th Day in the Morning it was at 15, which was the greatest and most sudden Change I have seen.

In Summer, the Heat of the shaded Air, about 2 or 3 in the Afternoon, is frequently between 90 and 95 Degrees; and on the 14th, 15th, and 16th of *June* 1738, at 3 *p. m.* it was 98; a Heat equal to the greatest Heat of the human Body in Health. In Winter I never but once saw the Thermometer so low as 15: Therefore the Difference between the most intense Heat and Cold of the shaded Air, in this Province, is 83 Degrees; which is a much greater Range than could well have been expected in this Latitude; and taking the Mean between those Extremes, 56 should be the temperate Degree of Heat in this Province: But the Sum of the thermometrical Altitudes, divided by the Number of Observations which I made for some Years together, gives 66, which may therefore more justly be reckoned the temperate Heat in *Carolina*, which exceeds 48, the temperate Heat in *England*, more than that exceeds the freezing Point.

The mean Heat of the shaded Air, in Spring, Summer, Autumn, and Winter, taken from the mean nocturnal Heat, and from the mean Heat at 2 or 3 *p. m.* is 61, 78, 71, and 52 Degrees.

The mean Heat of the shaded Air at 2 or 3 *p. m.* in Spring, Summer, Autumn, and Winter, is 65, 82, 75, 55 Degrees; and the mean nocturnal Heat in these Seasons is 57, 74, 68, and 49 Degrees. Therefore our Winter's nocturnal Heat, at a Medium, coincides nearly with the temperate Heat in *England*.

The Thermometer, when suspended five Feet from the Ground, and exposed to the direct Rays of the Sun, and to those reflected from our sandy Streets, has frequently rose in a few Minutes, from 15 to 26 Degrees, above what was at that time the Heat of the shaded Air (but I have never yet made that Experiment when the Heat of the shaded Air was above 88): When we are therefore exposed in the Streets to the Sun in Summer, we inspire Air from 4 to 28 Degrees warmer than the Heat of the human Body.

The Thermometer, when buried in the Sands of the Streets, when the Heat of the shaded Air was 88, rose in 5 Minutes to 108, tho' there was at the same time a moderate Wind.

In *June* 1738, when the Heat of the shaded Air was 98, the Thermometer sunk one Degree in my Arm-pits; but continued at 98 in my Hand and Mouth: From which we see what little Concern the Air has in cooling the Blood in the Lungs. Two Men who were then in the Streets (when the

Heat was probably 124 or 126 Degrees, as the shaded Air's Heat was then 98) dropp'd suddenly dead; and several Slaves in the Country, at Work in the Rice-Fields, shared the same Fate. I saw one of the Men immediately after he died; his Face, Neck, Breast, and Hands, were livid.

From the barometrical Table it appears, that the Barometer's mean Altitude, taken from its greatest and least Height, is 30.09 Inches; and that its Range is only 1.22 Inch. Wherefore our Atmosphere varies only $\frac{1}{27}$ Part in its Weight. In the warm Months, the mean barometrical Station, taken from its greatest and least Altitudes in these Months, is 30.09 Inches; and I have never yet seen its Range in these Months exceed $\frac{f.8}{100}$ Parts of an Inch: Therefore the Changes of our Atmosphere's Weight, in the warm Months, will have but little Effect upon human Constitutions, as the Difference between its greatest and least Pressure is but $\frac{1}{7}$ Part of that in cold Climates, where the Range of the Barometer is three Inches. May not the great Height of the Barometer in the warm Months in this Climate, proceed from the vast Quantity of Water, which is at that time supported in our Atmosphere, as the Exhalation is then very great; or may it not proceed from the Rarefaction of the Mercury? For the Weight of the mercurial Column, at equal Altitudes, will be different under different Degrees of Heat; and the Mercury may therefore be supported at equal Heights by Columns of Air of unequal Weights.

It appears, from the barometrical Table, that our Easterly or northerly Winds elevate the Mercury, and that our Southerly or Westerly Winds depress it; and I have as yet never observed the contrary. I beg you will be good enough to excuse this long Epistle, and believe that it comes from one who has a sincere Regard to the Improvement of Natural Knowledge, and one who is,

S I R,

Your most humble Servant,

John Lining.

A TABLE of the highest and lowest Stations of Fahrenheit's Mercurial Thermometer in the shaded Air, with the mean meridian and nocturnal Heat, taken after Dr. Jurin's Method.

	1738 Highest	1739 Lowest	1740 Highest	1742 Lowest	1738 Highest	1739 Lowest	Mean Altit. about 10 p. m. in the Heat of the Day	Mean Altit. about 10 p. m. in the Heat of the Day				
January	71	36	69	19	67	30	68	34	60	53	53	45
February	72	34	75	38	75	27	68	25	57	51	63	55
March	74	32	79	40	80	34	77	32	62	56	65	59
April	86	50	84	50	83	51	88	59	75	65	69	65
May	91	52	86	62	87	56	88	63	79	70	77	73
June	98	59	87	69	90	66	90	65	87	77	81	74
July	91	70	89	68	91	70	95	73	85	77	82	75
August	89	64	87	60	90	67	93	69	82	75	82	75
September	83	62	88	59	84	56	86	43	76	71	71	68
October	74	41	79	43	73	35	78	42	65	59	68	60
November	70	37	69	30	67	32	66	32	57	51	57	51
December	67	28	70	30	69	21	69	34	53	50	59	53
The Means									70	63	69	66

	1740		1742		Mean Altitude in the Heat of the Day		Mean Altitude in the Heat of the Day		Meridian Heat warmer than the Nights		Meridian and nocturnal Heat		Mean Heat taken from the Mean		R. Society's Thermometer		
	Mean Altit.		Mean Altit.		about 10 p. m.		in the Heat of the Day		about 10 p. m.		in the Heat of the Day		High		Lowest		
	in the Heat of the Day		in the Heat of the Day		in the Heat of the Day		in the Heat of the Day		in the Heat of the Day		in the Heat of the Day		in the Heat of the Day		in the Heat of the Day		
January	49	43	55	49	54	48	6	51	40	74	44	67	1739	1740	Lowest	High	Lowest
February	59	49	52	45	58	50	8	54	36	60	40	69	Lowest	High	Lowest	High	Lowest
March	63	54	60	53	62	50	6	59	35	63	34	65	High	Lowest	High	Lowest	High
April	74	65	77	67	74	66	8	70	32	55	33	55	High	Lowest	High	Lowest	High
May	78	70	79	70	78	71	7	75	31	46	31	50	High	Lowest	High	Lowest	High
June	83	74	83	72	84	74	10	79	31	42	28	44	High	Lowest	High	Lowest	High
July	86	76	86	79	85	77	8	81	29	42	27½	39	High	Lowest	High	Lowest	High
August	81	74	87	75	83	75	8	79	31	48	29	42	High	Lowest	High	Lowest	High
September	78	72	76	69	75	70	5	73	31	49	32	50	High	Lowest	High	Lowest	High
October	63	56	66	58	60	58	8	62	35	58	38	62½	High	Lowest	High	Lowest	High
November	56	50	53	40	56	50	6	53	42	67	42½	64	High	Lowest	High	Lowest	High
December	48	41	57	48	54	48	6	51	37	66	41	72	High	Lowest	High	Lowest	High
The Means	68	60	69	61	69	62	7	65½									

A TABLE of the highest and lowest Barometrical Stations; with the Directions which the Wind then had.

x A Northerly or Easterly Wind } preceded or succeeded.
 a A Southerly or Westerly Wind }

Jan.						30.48	N	29.88	SW	.60
Feb.						30.38	NE	29.68	S	.70
March						30.26	SE	29.58	S	.68
April	30.42	E	29.48	W	.94	30.38	Wx	29.78	WSW	.60
May	30.23	NE	29.85	S	.38	30.35	E	29.80	W	.55
June	30.20	NE	29.85	W	.35	30.30	E	29.98	SW	.32
July	30.13	SSWx	29.83	SW	.30	30.28	E	30.00	SW	.38
Aug.	30.18	E	29.88	SW	.30	30.38	NE	29.98	SW	.40
Sept.	30.33	NNE	29.85	SE	.48	30.38	E	29.88	NW	.50
Oct.	30.33	E	29.83	WNW	.50	30.45	E	29.68	W	.77
Nov.	30.58	N	29.72	S	.86	30.35	NE	29.58	W	.77
Dec.	30.60	N	29.93	W	.67	30.58	N	29.75	NNW	.83

Jan.	30.70	N	29.50	NW	.20	30.46	NNE	29.76	W	.70
Feb.	30.55	N	29.85	W	.70	30.54	NNE	29.72	WSW	.82
March	30.50	SE	29.65	W	.85	30.40	ENE	29.60	W	.80
April	30.32	E	29.75	N	.57	30.48	E	29.58	W	.90
May	30.28	E	29.85	S	.43	30.30	Sx	29.90	SSW	.40
June	30.18	Sx	29.86	S	.32	30.28	ESE	29.90	NE	.38
July	30.08	SSEx	29.85	SSW	.23	30.22	W	29.98	SW	.24
Aug.	30.26	E	29.85	W	.41	30.25	NE	29.95	N	.30
Sept.	30.28	NE	29.85	NE	.42	30.36	NE	29.86	S	.50
Oct.	30.32	NNE	29.72	SW	.60	30.50	N	29.95	W	.55
Nov.	30.51	N	29.72	S	.79	30.55	NNW	29.73	SW	.82
Dec.	30.60	ENE	29.86	SW	.74	30.58	NNE	29.65	WNW	.93

*A TABLE of the Depth of Rain, in Inches and
milleſimal Parts, which fell in Charleſtown.*

	1738	1739	1740	1741	1742
January	1 097	2 310	4 873	4 492	2 189
February	4 416	2 875	3 084	4 615	1 650
March	4 532	5 609	1 141	5 713	5 203
April	1 082	0 195	1 092	1 308	0 918
May	3 127	5 120	5 612	4 841	5 898
June	1 567	15 839	4 648	5 538	3 250
July	10 660	5 452	3 013	3 399	1 252
August	4 104	12 211	7 301	7 144	7 647
September	10 792	4 834	3 200	6 734	2 895
October	1 358	6 593	1 258	3 399	0 759
November	2 656	1 235	1 848	2 964	3 388
December	3 877	3 689	2 736	1 919	0 957
Total Depth	149.268	165.962	139.806	152.066	136.006

	1743	1744	1745	The Means	1746
January	3 172	1 994	0 863	2 624	1 144
February	2 435	3 063	7 739	3 735	2 701
March	0 621	0 582	3 229	3 329	1 628
April	5 292	2 866	3 842	2 074	1 128
May	2 535	2 871	1 832	3 979	3 988
June	1 903	5 814	9 510	6 009	4 109
July	7 738	8 437	6 771	5 840	9 895
August	3 767	4 202	9 339	6 964	6 114
September	4 686	5 657	0 754	4 944	0 932
October	1 672	1 595	2 962	2 450	
November	3 220	1 562	0 682	2 194	
December	2 706	9 680	2 623	3 523	
Total Depth	139.747	48.323	50.146	47.666	