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XIII. *On the Temperature of a Room indicated by two Thermometers at different Altitudes.* By JOHN MURRAY, F.L.S. M.W.S. &c. &c.

To Dr. Tilloch.

SIR, — ON my return from the Continent in 1819, I brought with me Breguet's "*Thermomètre Métallique*,"—an instrument susceptible of the most delicate sensibility, and with which I have made many interesting experiments. In a still room without a fire, in the summer months, it readily communicated the difference in temperature between the floor and a chair, and this last and the table.

The phenomena induced me to make a series of experiments on the difference of temperature indicated by two thermometers at different altitudes, yet otherwise under similar circumstances.

In the first series of experiments made at Nottingham from the 21st to the 28th October last inclusive, I was surprised to find, that any deviation from its uniformity had an immediate relation to the radiation of the terrestrial temperature to the heavens;—indeed, I am much deceived if the difference in question may not be found as accurate a guide as the barometer itself. Since I came to London, I have kept a pretty accurate register of the difference between two thermometers: one placed with its bulb on the floor, and the other suspended $6\frac{1}{2}$ feet above it, embracing the period between 5th and 24th November. On the 11th I began first to note the phenomena of the weather in correspondence with these changes, and it will be there seen, that when the difference exceeds 2° to $2\cdot5$ F. the weather has been variable and wet. The following comprise the results of the observations in a tabular form.

The following experiments were made at Nottingham with thin calico curtains to the windows of my room.

Date of Obser.	Hour.	Pos. of Therm.	Temp. indicated.	Dif. be- tween
1821.	H. M.			
Oct 21	9 30 A. M.	Floor	56 $\cdot$ 5 F.	1 $\circ$ F.
		$6\frac{1}{2}$ feet	57 $\cdot$ 5	
	9 30 P. M.	Floor	58	1 $\cdot$ 5
		$6\frac{1}{2}$ feet	59 $\cdot$ 5	
24	7 30 P. M.	Floor	59	2
		$6\frac{1}{2}$ feet	61	
25	2 P. M.	Floor	59	2
		$6\frac{1}{2}$ feet	61	
	8 P. M.	Floor	60 $\cdot$ 5	3 $\cdot$ 5
		$6\frac{1}{2}$ feet	64	
26	10 30 P. M.	Floor	63	2 $\cdot$ 5
		$6\frac{1}{2}$ feet	66	
28	9 P. M.	Floor	70 $\cdot$ 5	2
		$6\frac{1}{2}$ feet	72 $\cdot$ 7	

Note of experiments made in London, with two Thermometers at different altitudes.—Shutters of wood to the room.

Date of Obser.	Period of Day.	Pos. of Therm.	Temp. indicated.	Dif. between.	Weather.
1821.	H. M.				
Nov. 5	9 30 A. M.	Floor	53° 5 F.	1° 5 F.	
		6½ feet	55		
	7 P. M.	Floor	55·5	3·5	
		6½ feet	59		
	6 9 15 A. M.	Floor	53	2·25	
		6½ feet	55·25		
	9 30 P. M.	Floor	54·5	2·5	
		6½ feet	57		
	7 9 A. M.	Floor	54·5	2·5	
		6½ feet	57		
	5 P. M.	Floor	54	2·5	
		6½ feet	56·5		
	8 9 30 A. M.	Floor	55·5	2·5	
		6½ feet	58		
	6 15 P. M.	Floor	55·5	3·5	
		6½ feet	59		
	9 9 30 A. M.	Floor	54	2·5	
		6½ feet	56·5		
	5 30 P. M.	Floor	55	2	
		6½ feet	57		
	10 10 30 A. M.	Floor	56	2·5	
		6½ feet	58·5		
	7 30 P. M.	Floor	59·5	3	
		6½ feet	62·5		
	11 9 30 A. M.	Floor	59·5	1	
		6½ feet	60·5		
	8 P. M.	Floor	63·5	5·5	Continued rain
		6½ feet	69		
	12 9 30 A. M.	Floor	59·5	2·5	Fine
		6½ feet	62		
	5 30 P. M.	Floor	59	2·5	Clear evening
		6½ feet	61·5		
	13 9 15 A. M.	Floor	56	2	Foggy
		6½ feet	58		
	9 30 P. M.	Floor	61	4	Slight rain, and during the [night incessant.
		6½ feet	65·5		
	14 9 30 A. M.	Floor	62·5	2·5	Cloudy
		6½ feet	65		
	6 P. M.	Floor	64	3·5	Rain
		6½ feet	67·5		
	10 P. M.	Floor	64	4	Rain
		6½ feet	68		
	15 10 A. M.	Floor	64	4	Rain
		6½ feet	68		
	6 30 P. M.	Floor	64	4	Rain
		6½ feet	68		
	16 9 30 A. M.	Floor	61·25	3·5	Cloudy and rain
		6½ feet	64·75		
	1 P. M.	Floor	63	4	Rain
		6½ feet	67		

Date of Obser.	Period of Day.	Pos. o. Therm.	Temp. indicated.	Dif. be- tween.	Weather.
1821.	H. M.				
Nov. 16	9 P. M.	Floor	64 F.	2.5 F.	Clear star-light sky
		6½ feet	66.5		
17	9 30 A. M.	Floor	60	2.5	Bright unclouded sky
		6½ feet	62.5		
	6 30 P. M.	Floor	62	3.5	Some rain
		6½ feet	65.5		
	10 20 P. M.	Floor	63	5	Constant heavy rain
		6½ feet	68		
18	10 20 A. M.	Floor	61.5	2.5	Fine day
		6½ feet	64		
19	10 A. M.	Floor	59	4	Rain
		6½ feet	63		
	6 P. M.	Floor	58	4	Rain
		6½ feet	62		
	9 P. M.	Floor	61	2.5	Clear sky
		6½ feet	63.5		
20	10 A. M.	Floor	58	2.5	Fine day
		6½ feet	60		
21	10 A. M.	Floor	60	2.5	Fine day
		6½ feet	62.5		
	8 P. M.	Floor	58	5.5	Continued rain during the
		6½ feet	63.5		[night
22	9 30 A. M.	Floor	57	2.5	Cloudy, but dry
		6½ feet	59.5		
	6 10 P. M.	Floor	60	4	Rain during the night
		6½ feet	64		
23	9 20 A. M.	Floor	59.5	2.5	Cloudy, but dry
		6½ feet	62		
	6 P. M.	Floor	59.5	2.5	Fine evening
		6½ feet	62		
24	9 P. M.	Floor	57	2.5	Good day
		6½ feet	59.5		

I have only to regret occasional omissions, and that my avocations did not permit me to attend to more regular intervals of time.—The question appears to me to be a curious one, and to solicit further and more delicate attention. The correspondence is remarkable, though it will doubtless be violated by circumstances, which in the present state of our meteorological science cannot perhaps be always or altogether estimated.

I have the honour to be, sir,

Your most obedient and very humble servant,

J. MURRAY.

Surry Institution, January 11, 1822.