XXVII. *Observations made at* Chiſlehurſt, *in* Kent, *in the Year* 1774. *By the Rev.* Francis Wollaſton, *LL.B. F.R.S.*

Redde, Mar. 16, 1775. HAVING now compleated my original deſign, and kept my clock going for a third year, without the leaſt touch of the oil, or any alteration whatſoever, I preſume the reſult of my obſervations to aſcertain the rate of its going, may not be an unacceptable addition to the former papers on that ſubject, delivered to this Society. The regular difference between the ſummer and winter months, and ſome degree of ſimilarity between thoſe differences, ſeems to ſhew a regularity in the cauſe. What that may be, is not fully to be aſcertained hereby; though it ſeems to have been difference of moiſture, rather than of heat. By comparing theſe three laſt years with that which I firſt gave, when the clock was in ſome degree foul, it ſeems as if it were moſt affected when the work is clean. Yet is not that quite certain; for the differences, which decreaſing gradually in the following table, would juſtify this concluſion, it may be obſerved, increaſe again in the laſt inſtance.

The

		per Day.	Diff.
		"	"
The firſt greateſt loſs was	Dec. 1770 or	— 1,9	
The next greateſt gain	June 1771	+ 2,4	4,3
The next greateſt loſs	Oct. 1771	— 1,9	4,3

The clock was cleaned November 1771, and might not be reckoned to get to any ſtated rate till the beginning of the next year; after which,

			Diff.
		"	"
The firſt greateſt loſs was	Feb. 1772 or	— 0,86	
The next greateſt gain	July 1772	+ 7,83	8,69
The next greateſt loſs	Jan. 1773	— 0,09	7,92
The next greateſt gain	Aug. 1773	+ 6,17	6,26
The next leaſt gain	Feb. 1774	+ 0,30	5,87
The next greateſt gain	Aug. 1774	+ 4,95	4,65
The next greateſt loſs to the end of that year,	Dec. 1774	— 0,90	5,85

Hereby July and Auguſt appear to be the months for greateſt acceleration, and January and February for retardation; contrary to the affection of metalline rods, but agreeable to the effect to be expected from moiſture upon wood. Yet this difference is not ſo great in any degree, nor (what is more material to obſervation) by any means ſo ſudden in its changes, as what is occaſioned by heat upon metals. And even this, perhaps, might be obviated by a ſtrong coat of varniſh on the rod, or ſome preparation of the wood itſelf. One thing it may be proper to mention, as an accidental experience I have had the laſt year; that a clock ſo fixed, with

with a pendulum of ſo ſimple conſtruction, is not eaſily affected by any tremulous motion of the building to which it is faſtened. In the months of March, April, and part of May, I had occaſion to make alterations in the top of my houſe, in order to gain more rooms in it; and notwithſtanding the great jarring neceſſarily conſequent upon taking off the old rafters, and laying on a new leaded roof, and new joiſts and floor over the obſervatory itſelf, the clock ſeems not to have been diſordered at all by it. Between February 7th and 20th there will appear an error in the calculation of gain, to any one who ſhall take the trouble to examine it: not that I believe there is really any error in it; but by an accident in winding the clock (not having put down the ſpring ſufficiently, which is intended to keep on the motion of the wheels,) there were 6″ loſt, as appeared by the aſſiſtant clock, which had been ſet with it juſt before. Theſe 6″ being allowed for, will reduce the loſs of $\overset{''}{2},1$ to a gain of $\overset{''}{3},9$ in that interval of thirteen days, $-\overset{''}{2},1+\overset{''}{6}=+\overset{''}{3},9$. In the months of February, March, and April, I was frequently from home; ſo that the ſtate of the thermometer and barometer, if I were to ſet them down, would be very imperfect. In the other months they are more compleat; yet there may, perhaps, in my abſence, have been ſome days in them either higher or lower than what are here given.

	Clock + too faſt. — too ſlow. for mean ſol. time.	Numb. of Days.	Gain + or Loſs —	Rate *per* Day.	Throwing out	
					South ſide.	North ſide.
1773.	′ ″		″	″	° ′	° ′
Dec. 27	Clock + 32 19,7					
1774.		7	+ 7,2	+ 1,03		
Jan. 3	+ 32 26,9				1 25	1 28
Feb. 7	+ 32 41,7	35	+ 14,8	+ 0,42		
	Loſs in winding 6″	13	+ 3,9	+ 0,30	1 27	1 29
13						
20	+ 32 39,6	20	+ 6,0	+ 0,30	1 35	1 38
Mar. 12	+ 32 45,6	8	+ 2,4	+ 0,30	1 28	1 31
20	+ 32 48,0	13	+ 5,1	+ 0,39	1 40	1 43
April 2	+ 32 53,1	29	+ 52,0	+ 1,79	1 35	1 40
May 1	+ 33 45,1	25	+ 70,1	+ 2,80	1 36	1 40
26	+ 34 55,2	13	+ 45,4	+ 3,49	1 40	1 43
June 8	+ 35 40,6	14	+ 49,9	+ 3,57	1 38	1 42
22	+ 36 30,5	9	+ 37,3	+ 4,14	1 36	1 40
July 1	+ 37 7,8	31	+ 134,7	+ 4,34	1 37	1 40
Auguſt 1	+ 39 22,5	18	+ 86,9	+ 4,83		
19	+ 40 49,4	15	+ 74,3	+ 4,95	1 32	1 35
Sept. 3	+ 42 3,7	9	+ 33,3	+ 4,70	1 35	1 38
12	+ 42 37,0	21	+ 68,3	+ 3,25	1 35	1 38
Oct. 3	+ 43 45,3	12	+ 23,9	+ 1,99	1 33	1 36
15	+ 44 9,2	14	+ 28,7	+ 2,05	1 30	1 33
29	+ 44 37,9	14	+ 29,8	+ 2,11	1 30	1 33
Nov. 12	+ 45 7,7	23	+ 19,4	+ 0,84		
Dec. 5	+ 45 27,1	8	— 1,7	— 0,21		
13	+ 45 25,4	11	— 6,9	— 0,63		
24	+ 45 18,5	8	— 7,2	— 0,90	1 20	1 23
1775.						
Jan. 1	+ 45 11,3					

1774.		Thermometer without doors expoſed to the North. Hor. 8 A. M.	Hor. 2. P. M.	Hor. 11. P. M.	Therm. near the clock. Hor. 9. A. M.	Barometer on the ground floor.	Hygrom. near the clock.
Jan.	Higheſt	48	50	48	47	29,85	70
	Loweſt	23,5	29	23	31	28,67	34
May	Higheſt	60	67	53	57	29,98	23
	Loweſt	45	45,5	40	47	29,10	10
June	Higheſt	70	74	60	65	30,11	20
	Loweſt	51	55	47	51	29,24	9
July	Higheſt	72	82	60	65	30,14	19
	Loweſt	57	57	50	53	29,52	7
Auguſt	Higheſt	70	76	63	65	30,12	34
	Loweſt	57	61	50	53	29,32	5
Sept.	Higheſt	70	72	60	63	30,06	32
	Loweſt	49	51	46	51	29,915	11
Oct.	Higheſt	56	64	54	55	30,37	27
	Loweſt	39	45	39	44	29,23	13
Nov.	Higheſt	54	59	51	49	30,06	42
	Loweſt	31,5	33	31	34	29,02	20
Dec.	Higheſt	50	53	51	45	30,54	70
	Loweſt	21	30,5	25	30	28,95	27

Accidents of weather and various avocations have prevented me from making any other obſervations in the courſe of the laſt year; excepting the ſecond diſappearance of Saturn's ring, and re-appearance of it again, both of which I was fortunate enough to obſerve. I had ſeen the ring many times after its firſt re-appearance; and obſerved it to be leſſening again, till it was become but a mere

a mere thread of light, Monday, April 4, though certainly viſible then. Tueſday, April 5, the evening was very clear, yet no ring could I perceive with my $3\frac{1}{2}$ feet achromatic teleſcope; nor from that time did I ſee any thing of it (but, during part of the interval, the appearance of a dark belt acroſs the planet,) till Thurſday, June 30, when I thought I ſaw the preceding *anſa*. Saturday, July 2, I am ſure I ſaw the whole ring again, as a thread of light; and as the preceding *anſa*, or end of that thread, appeared larger than the ſubſequent one, it probably was viſible, and not only a deception, when I fancied I perceived it before. In theſe obſervations it deſerves to be remarked, that the magnifying power of 100 ſeemed, from its brightneſs, to ſhew the thread of the ring more viſibly than 150.

Chiſlehurſt,
Jan. 1775.

FRANCIS WOLLASTON.