

“ Chameleon Barometer ”

IN my first communication (vol. xi. p. 307) upon this subject, I stated that the actual temperature had apparently no effect upon the colour of the paper. Since then I have had reason to change my opinion. During the late severe weather I have had better opportunities of studying the behaviour during frost, and I have observed that though in summer the paper will remain red for a difference of 3° between the thermometers, in very cold weather it is only red when that difference falls to 0°, or perhaps 5°. This seems to agree with the fact that cold air cannot dissolve so much aqueous vapour as warm air. A. PERCY SMITH
Rugby, March 6

OUR ASTRONOMICAL COLUMN

TOTAL SOLAR ECLIPSE OF 878, OCTOBER 29.—In a communication to the *Times* in August 1872, this eclipse, in the days of King Alfred, was pointed out by the Rev. S. J. Johnson, of Upton Helions, Devon, as having been probably total in London. In the Saxon Chronicle it is merely stated that “the sun was eclipsed one hour of the day,” without reference to any phenomena of totality; the *Chronicon Scotorum* records “a dark noon;” in the *Annales Fuldenses* we read: “Sol quoque in 4 Kal. Novembris post horam nonam ita obscuratus est per dimidium horam, ut stellæ in cœlo apparent et omninoctem sibi imminere putarent.” This night-like appearance of nature clearly indicates that the eclipse was total at Fulda (Hesse-Cassel), and if our calculations assign elements for the eclipse, which show totality at this spot, it may fairly be assumed that they will give very nearly the true phase for London. Correcting the arguments of Damoiseau’s Lunar Tables of 1824, so as to bring them into agreement with Hansen for moon and Le Verrier for sun, and taking the minor equations from the Tables, we find the following elements for 878, Oct. 29:—

Conjunction in R.A., oh. 51m. 24s. M. T. at Greenwich.

R.A.	...	...	...	...	218	6	11
Moon’s hourly motion in R.A.	...	...	...	...	37	25	
Sun’s	...	...	...	...	2	29	
Moon’s Declination	...	...	...	...	14	6	44 S.
Sun’s	...	...	...	...	15	4	40 S.
Moon’s hourly motion in Decl.	...	...	...	...	8	25	S.
Sun’s	...	...	...	...	0	48	S.
Moon’s horizontal parallax	...	...	...	...	60	35	
Sun’s	...	...	...	...	0	9	
Moon’s true semi-diameter	...	...	...	...	16	31	
Sun’s	...	...	...	...	16	12	

Assuming the position of Fulda to be in longitude oh. 38m. 41s. E., and latitude 50° 33’7, we find by direct calculation from the above elements a total eclipse, totality commencing at 2h. 9m. 32s. local mean time, and continuing 1m. 41s. with the sun at an altitude of 19°. The partial phase began at oh. 56m. and ended at 3h. 24m. The Fulda annalist has “post horam nonam” for the time of the eclipse, but the times we have found cannot be very much in error. The sun rose at Fulda on this day at 7h. 12m. apparent time, or at 6h. 57m. mean time, so that the ninth hour from sunrise would be 4 P.M. To reconcile this difference, Dr. Hartwig, of Leipsic (who calculated the eclipse in 1853 from the best data then available, without finding it quite total at Fulda), conjectured that the author of the Chronicle might have reckoned his time from the commencement of twilight at the beginning of the month. However this may be, our elements, which may be expected to be pretty near the truth, have indicated a very measurable duration of totality at Fulda. Calculating now for London (St. Paul’s), we again find a total eclipse commencing at 1h. 16m. 20s. mean time, and ending at 1h. 18m. 10s., or with a duration of 1m. 50s. If any reader should have the curiosity to examine the track of totality further, the following formulæ will assist

him. Putting l for the geocentric latitude of place, and L for its longitude from Greenwich, reckoned positive eastward, t for Greenwich mean time—

$$\begin{aligned} \cos. w = 136.5560 - [2.13760] \sin. l + [1.70924] \cos. l \cos. (L + 155.3177) \\ l = 1h. 17m. 15s. \mp [1.76681] \sin. w - [3.32433] \sin. l \\ - [3.91281] \cos. l \cos. (L + 109.1074) \end{aligned}$$

Upper sign for beginning of totality, lower one for ending; the quantities within the brackets are logarithms.

The Rev. S. J. Johnson found no other total eclipse in London during the long interval from 878 to 1715, and we are able to confirm his inference that there is not likely to be another one visible in the metropolis for five hundred years from the present time. Less than seven years after the eclipse of 878, or on June 16, 885, a very great eclipse passed over Scotland and Ireland. By a similar accurate computation to that detailed above, it is found to have been total not far from Nairn, and the duration of totality was little less than five minutes, a most unusual length for so high a latitude. In *Chronicon Scotorum* we read, “The stars were seen in heavens.”

ENCKE’S COMET.—The ephemeris of this comet for the present appearance, communicated by Dr. von Asten, of Pulkova, to the St. Petersburg Academy, not having been yet transferred to the *Astronomische Nachrichten*, where such matters are commonly looked for, we continue our reduction of the places to 8 P.M. Greenwich time for the period when the comet is likely to be most easily found in these latitudes:—

	R.A.	N.P.D.	DISTANCE
	h. m. s.	°	from Earth.
March 20	1 19 27	75 0 0	1'433
„ 22	1 25 58	74 32'8	
„ 24	1 32 43	74 6'7	1'350
„ 26	1 39 41	73 42'3	
„ 28	1 46 50	73 20'4	1'258
„ 30	1 54 8	73 2'1	
April 1	2 1 28	72 48'8	1'156
„ 3	2 8 42	72 42'4	
„ 5	2 15 37	72 45'3	1'042
„ 7	2 21 53	73 0'5	
„ 9	2 27 1	73 31'9	0'918

The distance from the earth is expressed, as usual, in parts of the earth’s mean distance from the sun.

VARIABLE STARS.—Next week we shall give the times of maxima and minima of the better known variable stars for two or three months in advance, calculated from the elements in Prof. Schönfeld’s last catalogue. It does not appear that an ephemeris for 1875 has been circulated as in several previous years.

THE FRENCH TRANSIT EXPEDITION TO NEW CALEDONIA

WE have received the following interesting communication from a correspondent:—

The French Transit of Venus Expedition to New Caledonia was the result of an after-thought on the part of the French Academy, which only took a definite form in the shape of active preparations for the great event in May last, months, if not years, after the other stations had been fixed on and the construction of the necessary instruments commenced. The New Caledonian observers were consequently at a great disadvantage, being obliged to complete all their arrangements within the short space of ten weeks, and to start for this *Ultima Thule* of civilisation in the middle of July. Everything, however, was got in readiness at home with so much care and despatch that nothing of the slightest importance, either in the astronomical or photographic department of the expedition, has been found wanting. The observatory has been fitted up and the observations made with as much completeness as if the centre of France, and not a convict settlement at the very opposite extremity of the