adjoining hollow in the belt and of the equatorial spots have conformed very closely with the rates upon which systems I and II are based in the ephemerides alluded to.

The dark spot in the N-tropical zone of Jupiter mentioned by J. Comas Solá, *Astr. Nachr.* 3719, and by the Rev. T. E. R. Phillips, *Astr. Nachr.* 3724, was of very temporary character for it rapidly grew faint and disappeared altogether.

Many observers will probably have remarked a dark mass or irregular group of spots lying on the southern borders of the great southern equatorial belt. This has recently formed a prominent feature and was situated in longitude $232^{\circ}8$ (system II) on Aug. 3 and in $217^{\circ}0$ on Sept. 1 so that its rotation period is about $9^h 55^m 20^s$. There was a somewhat similar outbreak of spots in the same zone

in the early part of June 1889 seen by Mr. A. S. Williams and they formed the subject of an interesting contribution from his pen in *Monthly Notices* Vol. L, p. 520 to 522. The more rapid velocity of these objects caused them to overtake the ellipse of the red spot in July 1890 when they were immediately diverted to the south and drifted along the southern edge of the ellipse. — It remains to be seen whether the present outbreak will retain a visible form until its swifter motion enables it to overtake the red spot in about 9 months from the present time viz in 1902 June and whether the experiences of 1890 will be repeated. It is curious that these disturbances occurred at intervals of 12 years and suggestive that if they are recurrent the period is coincident with that of a revolution of Jupiter round the sun.

Bishopston, Bristol, 1901 Sept. 6.

W. F. Denning.

Observations of meteors in July and August 1901.

By W. F. Denning.

Between July 15 and 24 during 14 hours of watching 95 meteors were seen of which the paths of 72 were registered. Between Aug. 10 and 22, when fortunately there occurred a series of very clear nights, during 34 hours of watching 401 meteors were observed of which 242 were registered. The Perseids furnished a display perhaps a little stronger than the average and decidedly more of its meteors were noticed on Aug. 11 than on Aug. 10 while the maxi-

mum was probably attained on the morning of Aug. 13 but at that time the sky was much clouded at Bristol and fair comparisons could not be made. The first Perseids were recognized on July 21 and the last on Aug. 21; the radiant point exhibited the usual movement of about 1° per day to the ENE. There were a great number of minor showers among them being the following:

July 18-24	$2^{\circ} + 43\frac{1}{2}^{\circ}$	5	Rapid
„ 15-21	23 +44	4	Rapid, streaks
Aug. 15-21	24 +43	5	
„ 10-19	63 +30	6	
„ 10-20	106 +52	5	„ „
„ 11-20	263 +62	7	Slow
„ 10-15	269 +47	7	„
„ 10-20	280 +81	5	Rapid, short paths
„ 10-21	290 +53	10	Slow
July 19-24	290 +24	8	„
„ 15-24	304 - 8	6	„

Aug. 10-22	$310^{\circ} + 61^{\circ}$	11	Slow
July 15-21	311 +13	5	„
Aug. 11-13	312 +13	5	
July 15-20	317 +31	5	„
Aug. 10-22	335 + 1	15	Slowish, faint
„ 10-20	335 +73	13	Rapid, white
„ 15-21	345 0	7	Rapid
„ 15-19	349 +48	5	„
„ 10-21	350 -14	10	Slowish
„ 10-21	353 +31	6	„

There were other radiants in July at $29^{\circ} + 36^{\circ}$ and $20^{\circ} + 5^{\circ}$ and in August at $14^{\circ} + 7^{\circ}$, $33^{\circ} + 18^{\circ}$, $42^{\circ} + 12^{\circ}$, $47^{\circ} + 43^{\circ}$, $57^{\circ} + 9^{\circ}$, $71^{\circ} + 52^{\circ}$ &c.

A large number of interesting meteors were doubly observed in England during the period from Aug. 10 to 21 and I have computed the following real paths:

No.	Date 1901	Gr. M. T.	Mags.	Height at beginning miles	Height at ending miles	Length of Path miles	Velocity in miles per sec.	Radiant	Observers
1	Aug. 10	$10^h 41^m$	3-2	88	68	21	25	$278^{\circ} + 67^{\circ}$	A. S. H., W. F. D.
2	„	10 58	3-2-2	57	52	25	15	$352 - 14$	A. S. H., J. H. B., W. F. D.
3	„	12 0 $\frac{1}{2}$	1-1	76	51	36	50	$44 + 58\frac{1}{2}$	A. S. H., W. F. D.
4	„	12 16	2-1	69	50	27	39	$42 + 57$	A. S. H., W. F. D.
5	„	12 19	3-2	72	60	33	25	$149 + 60$	A. S. H., W. F. D.
6	„	13 18	1-24	70	47	31	31	$45 + 56$	O. A. Le Bean, W. F. D.
7	„	13 34	1->1	63	29	48	16	$269 + 47$	O. A. Le Bean, W. F. D.
8	Aug. 11	11 2	$2 \times \varphi - \equiv \gg$	95	56	64	v. rapid	$45 + 58$	D. E. Packer, W. F. D.
9	„	11 33 $\frac{1}{2}$	24-24	94	59	55	42	$45 + 57$	D. E. Packer, W. F. D.

No.	Date 1901	Gr. M. T.	Mags.	Height at beginning miles	Height at ending miles	Length of Path miles	Velocity in miles per sec.	Radiant	Observers
10	Aug. 15	10 ^h 6 ^{1/2} ^m	4 - 3	77	58	38	60	56° + 58°	J. H. B., W. F. D.
11	"	10 48	2 - ♀	81	61	37	41	52 + 53	J. H. B., A. King
12	Aug. 17	10 12	3 - 2	72	66	27 ^{1/2}	45	58 + 34	A. S. H., W. F. D.
13	"	11 5	2 ^{1/2} - 2	58	53	22	32	95 + 46	A. S. H., C. L. Brook
14	Aug. 18	13 24 ^{1/4}	4 - 3	62	50	28	15	106 + 52	A. S. H., W. F. D.
15	Aug. 19	13 41 ^{1/4}	2 - 2	64	50	18	28	337 + 3	A. S. H., W. F. D.
16	Aug. 20	11 14	> 2	56	33	44	13	213 + 49	C. J. Spencer, W. F. D.
17	"	12 0	2 - 2	64	58	17	23	347 - 15	A. S. H., W. F. D.
18	Aug. 21	10 19	2 - > 1	63	52	20	25	341 + 5	A. King, W. F. D.
19	"	11 7 ^{1/2}	3 - 1	71	60	34	40	51 + 27	C. L. Brook, W. F. D.

Nos. 2 and 16 are remarkable for their very slow motions, the observed velocities being not more than half parabolic speed.

Nos. 3, 4, 6, 8, 9, 10 and 11 were Perseids.

Nos. 2 and 17 were directed from an apparently new shower in Aquarius at about 350° - 14°.

The abbreviations in the last column headed 'observers' are

A. S. H. Prof. A. S. Herschel, Slough
J. H. B. J. H. Bridger, Farnborough
W. F. D. W. F. Denning, Bristol.

Two of the most important features ascertained from this years observations are that the Perseids certainly continue visible until Aug. 21 and that meteors differing greatly in their relative velocities diverge from the same radiants.

Bright meteors or meteors from radiants in unusual positions or little known were recorded at Bristol as follows:

1901	Gr. M. T.	Mag.	From α δ	To α δ	Path	Notes	Radiant
July 15	13 ^h 5 ^m	> 1	270° + 53°	248 ^{1/2} ° + 32°	25°	rapid, streak	29° + 36° or Perseid
July 18	13 43	2	102 + 64	90 + 59 ^{1/2}	7	slowish, streak	133° + 69°
July 19	11 41	1	335 + 68	289 + 67 ^{1/4}	17 ^{1/2}	v. rapid, streak	29° + 36° or Perseid
July 21	13 43	1	349 ^{1/2} + 15	341 + 1 ^{1/2}	16	v. rapid, streak	Perseid
Aug. 10	11 34	1	55 + 75 ^{1/2}	217 + 75	29	v. rapid, streak	43° + 12°
"	12 0	1	32 + 58 ^{1/2}	24 + 58	4	rapid, streak	Perseid
"	12 47	2	331 ^{1/2} + 6 ^{1/2}	324 ^{1/2} - 6	15	v. rapid, streak	Perseid
"	12 52	4	356 + 57	359 ^{1/2} + 38	19	slow, train	193° + 57°
"	13 0	2	33 - 4	32 - 12	8	v. rapid, streak	Perseid
"	13 17 ^{1/2}	> 2	333 + 60	302 + 45 ^{1/2}	22 ^{1/2}	v. rapid, streak	Perseid
"	13 33	1	62 + 22 ^{1/2}	66 + 11 ^{1/4}	12	v. v. slow, train	269° + 47°
Aug. 11	9 50	1	320 + 16	307 - 4	23	rapid, streak	Perseid
"	10 34	1	11 + 10	6 - 4	15	rapid, streak	Perseid
"	11 2	2 × ♀	353 ^{1/2} + 7	343 - 14	23	rapid, streak	Perseid
"	11 34	2	43 + 79	232 + 73	28	rapid, streak	Perseid
"	11 56	♀	120 + 74	160 + 65	16	rapid, streak	Perseid
"	12 5	1	29 + 54 ^{1/2}	20 ^{1/2} + 50 ^{1/2}	6	slowish, streak	Perseid
Aug. 12	14 4	2	46 - 5	46 - 15	10	rapid, streak	Perseid
Aug. 16	13 11	1	15 + 38	7 + 28	12	rapid, streak	Perseid
Aug. 18	11 29	2	3 + 53	285 + 45	48	rapid, streak	57° + 9°
Aug. 19	11 49	2	347 - 12	358 - 8 ^{1/2}	11 ^{1/2}	v. v. slow	310 - 20
"	14 5	2	322 + 48 ^{1/2}	338 ^{1/2} + 41	14	v. slow, train	290 + 53
Aug. 20	9 37	> 1	359 + 23	1 + 18 ^{1/2}	5	rapid, train	310 + 61
"	10 16	> 1	349 + 43	327 ^{1/2} + 19 ^{1/2}	29	rapid, streak	Perseid
"	11 8	> 1	307 + 39	302 + 32	8	rapid	329° + 61°
"	11 14	> 2	214 + 70	218 + 84	14	v. slow, train	213 + 49
Aug. 21	11 9	2	89 ^{1/2} + 71 ^{1/2}	201 + 68 ^{1/4}	33	rapid, streak	57 + 9
"	13 27	> 1	302 + 49	312 ^{1/2} + 45	8	slow, train	290 + 53
"	13 37	> 1	42 + 2	68 + 9 ^{1/2}	26 ^{1/2}	slow, train	350 - 14
Aug. 22	11 29	2	224 + 65	166 + 67 ^{1/4}	22 ^{1/2}	v. slow	283 - 12

Bishopston, Bristol, 1901 Sept. 13.

W. F. Denning.