

The shower was observed by the writer this year on the evenings of the 8th and 9th (the sky being unfortunately overcast on the 10th and 11th), and the display found to be a feeble one.

A three-hours' watch on the 8th, from 9 to 12h., revealed 37 meteors. Of these, 16 were Perseids, giving an hourly rate of Perseids (allowing for time spent in registering such tracks as were well observed) 6, and for all meteors 14.

The following table shows the number of meteors recorded each hour on the 8th during the watch, and also the calculated horary number for one observer looking towards the East:

Duration of Watch.		Length of Watch.	No. of Meteors seen.	Perseids.	Calculated Horary No.		State of Sky.
From	To				All Meteors.	Perseids.	
h. m.	h. m.	h.					
9 0	10 0	1	9	6	10	7	Very Clear.
10 0	11 0	1	11	3	13	4	
11 0	12 0	1	17	7	20	8	
9	12h.	3h.	37	16	14	6	

The magnitude of those recorded were as follows:

	=2f	> 1Mag.	*=1Mag.	=2Mag.	=3Mag.	=4 and fainter.	Total.
Perseids...	1	1	3	6	2	3	16
Others.....	0	0	2	4	6	9	21
Total....	1	1	5	10	8	12	37

The radiant point of the Perseids was deduced as at R. A.  $38^{\circ}+56^{\circ}$ . Two showers in Cepheus furnished the majority of the uncorformable meteors recorded, their deduced positions being at R. A.  $5^{\circ}+75^{\circ}$  and R. A.  $332^{\circ}+60^{\circ}$ . The evening of the 9th was generally clear (a few clouds at times but slightly interfering with the observations), and a watch of four hours, from 9 to 13h., was sustained, 91 meteors being recorded. Of these, 54 or 59.4 per cent. were Perseids, 12 or 13 per cent. Cassiopeids, and 25 or 27.3 per cent. belonged to feebler showers in Andromeda, etc.

The number recorded each half hour, and the calculated horary number, were as follows:

Duration of Watch.		Length of Watch.	No. of Meteors seen.	Perseids.	Cassiopeids.	Calculated Horary No.		State of Sky.
From	To					All Meteors.	Perseids.	
h. m.	h. m.	m.						
9 0	9 30	30	9	5	2	22	12	Clear.
9 30	10 0	"	10	8	0	24	19	
10 0	10 30	"	10	6	3	25	14	Few Cl'ds.
10 30	11 0	"	11	7	2	26	16	Clear.
11 0	11 30	"	14	10	2	35	23	Few Cl'ds.
11 30	12 0	"	15	7	2	37	16	Clear.
12 0	12 30	"	11	5	1	26	12	Clear.
12 30	13 0	"	11	6	0	26	14	
9	13h.	4h.	91	54	12	28	16	

Meteors thus appeared thickest between 11 and 12h., when the hourly rate for all meteors was about 36, and of Perseids 20. The shower in Cassiopeia appears of considerable intensity, and probably the

confounding of these meteors (Cassiopeids) with the true Perseids (the two radiants lying approximately near one another) may account for the large hourly rate of meteors being recorded as belonging to the Perseids by ordinary and occasional observers not discriminating enough, or who are not aware that two distinct showers exist in this region of the sky. The magnitude of those recorded on the 9th were as follows:

	=2f	or >	1Mag.	*=1Mag.	=2Mag.	=3Mag.	=4 and fainter.	Total.
Perseids...	4	5	8	13	9	15	=	54
Others.....	1	0	4	2	7	23	=	37
Total....	5	5	12	15	16	38	=	91

The radiant point of the main Perseid stream was very accurately deduced from several very short tracks near the focus, and from one perfectly stationary meteor of the 1st mag., visible two seconds and very exactly noted, as at R. A.  $44\frac{3}{4}^{\circ}+56\frac{1}{4}^{\circ}$ . A secondary Perseid radiant was reduced from a few short tracks, and one very nearly stationary meteor, as at R. A.  $55^{\circ}+57^{\circ}$ . Among the bright meteors recorded was one at 12h. 55m., which equalled ♀ (Venus) in brightness, and was of a blue color, with path from R. A.  $260^{\circ}+67\frac{1}{2}^{\circ}$  to  $212^{\circ}+66^{\circ}$ . This meteor came from the direction of Cygnus. A letter received from Mr. W. F. Denning, F. R. A. S., of Bristol, England, informs the writer that the shower was well observed in England. Mr. Denning at Bristol recorded from August 6 to 13, inclusive, 419 ♀ during a period of 16½h. watching, and of these 240 were Perseids. He found the hourly rate of all meteors on the 9th to be 44, and of Perseids 28. On the 10th (when it was foggy) 34 and 28, respectively. The radiant point appeared to shift in R. A. (increasing) every night, for while on August 6 it was at R. A.  $38^{\circ}+56^{\circ}$  and August 7-8 at R. A.  $41^{\circ}+55^{\circ}$ , it was at R. A.  $48^{\circ}+57^{\circ}$  on August 11-12, and at R. A.  $49\frac{1}{2}^{\circ}+57\frac{1}{2}^{\circ}$  on August 13th. The meteors were also successfully observed at the Royal Observatory, Greenwich, where the greatest hourly number on the 10th was determined to be about 25, and also by Major Tupman, Mr. Corder, and other prominent observers.

CAMBRIDGEPORT, Sept. 12, 1880.

## AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, 1880.

(Continuation of papers read.)

### NOTES ON JAPANESE PULMONIFERA.

By PROF. EDW. S. MORSE.

In this communication Mr. Morse called attention to the occurrence of a number of species of land snails in Yesso, identical with forms occurring in New England.

He also showed the occurrence of two species of slugs in Japan, which are also common in New England.

While he had met with most of the fresh water genera of Pulmonifera in Japan, he had never yet found an example of *Physa*.

### PROBLEMS IN WATSON'S CO-ORDINATES.

By THOMAS HILL, D.D., LL.D.

In this paper Dr. Hill investigates the equation  $p=A(a-b\sin. m)^n$ ; giving his principal attention to the case in which  $b=m=1$ , and  $n=-1$ , which represents a curve like a figure 8 with its top concave, somewhat like the sign for Taurus. When  $a=0$ , this becomes a parabola; and when  $a>2$ , an