

THE CLINTON CATALOGUE.—The *Sidereal Messenger* for December announces that the great catalogue of 30,000 stars, upon which Dr. Peters and his assistant, Prof. Borst, have been engaged for several years past, is virtually completed, and ready for the press, and its publication is expected during the present winter. In the prosecution of this work Prof. Borst has gathered the stars from the various astronomical publications of the last fifty years, and reduced them to the epoch of the forthcoming catalogue.

OCCULTATIONS OF STARS BY PLANETS.—Herr A. Berberich calls attention in the *Astronomische Nachrichten*, No. 2814, to the importance of observations of occultations of stars by the planets, and supplies a list of stars which may possibly be occulted by either Venus, Mars, Jupiter, or Saturn, during the course of the present year. Such observations have been extremely rare, yet they would prove extremely important, for they would throw light on the extent and density of the planetary atmospheres, and would afford a means in the cases of Mars and Venus for the determination of parallax and diameter. Herr Berberich adds that in the case of the three outer planets the occultation of a star by the primary would afford a specially favourable opportunity for the determination of the positions of the satellites, since micrometer measures of their places as referred to the occulted star would be free from many errors to which the direct comparison of the planet and its satellites is exposed.

The following stars may possibly undergo occultation during the next fortnight:—

Planet.	G.M.T. of Con- junction in R.A.		Star.	Mag.	Pl - *	Δδ	Max Duration.
	h. m.	o					
♀	Jan. 5	16 29'2	S.D. -17 No. 4187	9.7	-0.13	6.0	
♀	9	18 1.4	18	4279	9.5 +1.05	5.8	
♂	12	3 41.4	4	3445	9.3 -0.18	7.4	
♂	12	8 32.3	19	4401	9.3 +0.84	5.7	
♀	14	18 40.8	19	4441	9.5 -0.19	5.6	
♀	15	1 31.9	20	4446	9.5 +0.38	5.5	
♀	17	23 22.5	20	4635	9.3 -0.57	5.4	

The maximum duration is the interval between immersion and emersion for a central occultation.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 JANUARY 8-14.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on January 8

Sun rises, 8h. 7m.; souths, 12h. 6m. 49.1s.; sets, 16h. 7m.: right asc. on meridian, 19h. 16.8m.; decl. 22° 17' S. Sidereal Time at Sunset, 23h. 18m.  
Moon (New on January 13, 9h.) rises, 2h. 14m.; souths, 7h. 34m.; sets, 12h. 44m.: right asc. on meridian, 14h. 43.4m.; decl. 10° 21' S.

Planet.	Rises.		Souths.		Sets.		Right asc. and declination on meridian.	
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
Mercury..	7 55	11 40	15 25	18 50.0	24 27	5	27	
Venus.....	4 36	9 1	13 26	16 10.3	18 29	5	29	
Mars.....	0 11	5 53	11 35	13 1.9	4 14	5	14	
Jupiter...	4 16	8 38	13 0	15 47.4	19 4	5	4	
Saturn....	17 28*	1 19	9 10	8 27.1	19 39	5	39	
Uranus...	0 23	5 55	11 27	13 4.3	6 8	5	8	
Neptune..	12 51	20 31	4 11*	3 42.5	17 56	5	56	

\* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultation of Star by the Moon (visible at Greenwich).

Jan.	Star.	Mag.	Disap.	Reap.	Corresponding angles from ver- tex to right for inverted image.	
					h. m.	h. m.
9	η Libræ	6	6 18	6 46	341	298
9	II	—	—	—	—	—
10	o	—	—	—	—	—

Jupiter in conjunction with and 4° 12' south of the Moon.  
Venus in conjunction with and 2° 16' south of the Moon.

Variable Stars.

Star.	R.A.		Decl.	h. m.
	h. m.	o		
U Cephei ...	0 52.4	81	16 N.	Jan. 10, 22 22 m
ζ Geminorum ...	6 57.5	20	44 N.	9, 3 0 m
R Canis Majoris...	7 14.5	16	12 S.	11, 22 53 m
U Monocerotis ...	7 25.5	9	33 S.	13, 2 9 m
S Cancrī ...	8 37.5	19	26 N.	11, m
R Leonis ...	9 41.5	11	57 N.	9, 23 12 m
R Ursæ Majoris...	10 36.7	69	22 N.	8, m
T Ursæ Majoris ...	12 31.3	60	6 N.	12, m
W Virginis ...	13 20.3	2	48 S.	8, 22 0 m
δ Libræ ...	14 55.0	8	4 S.	11, 4 34 m
U Coronæ ...	15 13.6	32	3 N.	8, 0 45 m
U Ophiuchi ..	17 10.9	1	20 N.	8, 4 38 m
T Vulpeculæ ...	20 46.7	27	50 N.	Jan. 11, 0 0 m
Y Cygni ...	20 47.6	34	14 N.	12, 1 0 m
W Cygni ...	21 31.8	44	53 N.	10, 21 7 m
δ Cephei ...	22 25.0	57	51 N.	13, 21 0 m
				14, m
				8, 4 0 m
				11, 22 0 m

M signifies maximum; m minimum.  
and at intervals of 20 8

Meteor-Showers.

Near	R.A.		Decl.	Date.
	h. m.	o		
ξ Virginis...	174	9	N.	January 11.
ζ Boötis ...	220	14	N.	Very swift; streaks.
β Boötis ...	222	42	N.	Very swift; streaks.

DUNÉR ON STARS WITH SPECTRA OF CLASS III. 1

I.

IN publishing a few days before his death the last part of his discoveries relating to the spectra of stars of the third class, D'Arrest pronounced the opinion that henceforward there would be nothing essential to add to the knowledge then possessed of the stellar spectra of this class in the northern heavens. When D'Arrest died, 123 well-developed objects of Class III.a were known, and counting all the objects known, 150; the stars known in Class III.b were 23. Actually, the well-developed stars of III.a are 214, and if all are reckoned, 475; the stars of III.b are 55 at least.

The number of objects in Class III. with which we are acquainted has been tripled by recent researches, but, besides, the relation between the numbers of the stars in the two lower classes has been considerably altered, considering that at present there are 8.5 stars III.a instead of 6.5, to 1 star III.b. However, we should commit a serious error if we drew the conclusion that in reality the spectra III.b were not more than nine times rarer than III.a. On account of the enormous width of the bands, one is able without any difficulty to recognize the nature of a spectrum III.b in very faint stars, which one is not able to do in III.a, unless in the rare objects of this class in which the bands are more marked and broader than usual.

I find this opinion confirmed by the fact that the researches of M. Vogel give more than 200 new spectra III.a, and have scarcely led to an acquaintance with one new spectrum III.b. It is very probable therefore that we are already acquainted with all these stars to the magnitude of 7.5 inclusive; this is rendered still more probable by the following table, which gives the number of the stars III.a and III.b belonging to different magnitudes:—

Magnituds.	Class III.a.		Class III.b.	
	Observed.	Calculated.	Observed.	Calculated.
1.0-1.9	2	1	0	0
2.0-2.9	5	3	0	0
3.0-3.9	9	11	0	0
4.0-4.9	31	28	0	1
5.0-5.9	88	90	2	2
6.0-6.9	134	380	11	8
7.0-7.9	151	—	18	24
8.0-8.9	37	—	14	—
9.0-9.9	18	—	10	—

\* We have already referred generally to M. Dunér's important memoir published in the Transactions of the Swedish Academy. We now give a translation of his general conclusions.—Ed.