IGAEF

Intergalactic Astronomy Educators Fellowship

Small Astronomy Calendar for Amateur Astronomers

Year VI

2024

Let’s welcome our 2024 Small Astronomy Calendar Edition made by our **Intergalactic Astronomy Educators Fellowship (IGAEF)**’s team.

In 2022, many amateur astronomers asked for calculations for more specific geographical locations. This year we added new useful calculated positions and coordinates for everyone in the world to use.
You should check this calendar every month, specifically the lunar occultations pages for your observation point. There are many interesting and unique events that might not happen every year, because of the different parameters of the Moon orbit. Our hope is to fulfill your expectations. We would like to receive suggestions and feedback, both in English and Spanish. You can find the editor’s email in the last page of the calendar.
We appreciate your support and we are looking forward to having a good observational year, and a better and more complete calendar for this first year of a new decade.

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C A L E N D A R F O R 2024

January

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29		

March

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Easter Sunday: 2024 Mar 31

IGAEF

Intergalactic Astronomy Educators Fellowship

What is the Intergalactic Astronomy Educators Fellowship (IGAEF)?

Is the organization of people who like to promote, teach and disseminate astronomy, and is based in Miami. We like to invite whose research and educational interests lie within the broad spectrum of subjects comprising contemporary astronomy. Our mission is to support and share scientific understanding of the universe.

The Intergalactic Astronomy Educators Fellowship is working hard to inspire, guide and support astronomy teachers, educators and enthusiasts of all walks of life. We will continuously work to provide projects (or links to projects that already exist) to teachers, educators, students and all who are interested in learning. We enjoy sharing the love of astronomy through our many activities and through every spoken word. We will work tirelessly to accomplish these goals through volunteers, partners, and donors.

Our organization was established with the following goals in mind :

- To better our world's society through the knowledge and appreciation of astronomy.
- To show and teach about our world and our universe through the astronomer's views and perspectives.
- To disseminate the latest news and discoveries about astronomy.
- To promote observational activities.
- To explain the roles of astronomy and astronautics advisers.
- To better promote the connection between professionals, astronauts and engineers with those interested in astronomy and astronautics.
- To empower the teaching of astronomy and to spread its world-changing benefits.
- We will strive to accomplish our goals through all possible means, from using the latest knowledge data to providing a wide array of educational materials.
- We will strive to better our world in the advancement of space science and exploration by implementing these aforementioned goals.
- AND LASTLY, we pledge to teach and reinforce the practices of ethics, respect, and morality in an universal way, for the welfare of all of mankind.

Time Zones and Universal Time

Fomr: https://eclipse.gsfc.nasa.gov/SEhelp/TimeZone.html

Time can be measured in a number of ways. For instance, we can measure the passage of time via the orbital motion of Earth and other planets in the solar system (Dynamical Time). Or we can measure time based on the rotation of Earth on its axis with respect to the stars (Universal Time). Finally, we can measure time through the oscillations of atoms (International Atomic Time).

Universal Time or UT is the precise measure of time used as the basis for all civil time-keeping. Although their exact definitions differ, most readers can assume that Universal Time is equivalent to Greenwich Mean Time or GMT. Universal Time is actually based on the mean sidereal time as measured in Greenwich, England. It's also approximately equal to mean solar time from Greenwich.

Most astronomical calculations and predictions are usually presented in terms of Universal Time. In order to convert eclipse predictions from UT to local time, you need to know what time zone you are in. For North Americans, the conversion from UT to local time is as follows:

```
Atlantic Standard Time (AST) =  UT - 4 hours
Eastern Standard Time (EST)  =  UT - 5 hours
Central Standard Time (CST)  =  UT - 6 hours
Mountain Standard Time (MST) =  UT - 7 hours
Pacific Standard Time (PST)  =  UT - 8 hours
```

If Daylight Saving Time is in effect in the time zone, you must ADD one hour to the above standard times.

For example, let's assume that an eclipse begins in Toledo, Ohio on June 20 at 20:25 UT. Toledo is in the Eastern Standard Time zone, so:

```
Local Time = 20:25 - 5 hours
           = 15:25 (= 3:25 pm)
```

But since Toledo observes Daylight Saving Time in June, we must ADD one more hour to the above time. So the eclipse will begin at 16:25 (=4:25pm) local time.

Time zones for countries around the world can be determined with a special Time Zone Map courtesy of HM Nautical Almanac Office, Royal Greenwich Observatory. Just remember that you'll need to check with your travel agent or with a guide book to find out if Daylight Saving Time is practiced during that time of year.

Coordinated Universal Time (or UTC) is based on atomic time. It is synchronized and adjusted to stay within 0.9 seconds of Universal Time (UT). Occasionally, a "leap second" is added to UTC in order keep it in sync with UT (which varies due to Earth's rotation).

Phases of the Moon 2024

New Moon	First Quarter	Full Moon		Last Quarter
d h	d h	d h	⊕dist	d h
				Jan 4 3.5
Jan 11 11.9	Jan 18 3.9	Jan 25 17.9	(62.87)	Feb 2 23.3
Feb 9 23.0	Feb 16 15.1	Feb 24 12.5	(63.64)	Mar 3 15.3
Mar 10 9.0	Mar 17 4.2	Mar 25 7.0	(63.56)	Apr 2 3.2
Apr 8 18.4	Apr 15 19.3	Apr 23 23.9	(62.68)	May 1 11.4
May 8 3.5	May 15 11.9	May 23 13.9	(61.25)	May 30 17.2
Jun 6 12.8	Jun 14 5.3	Jun 22 1.2	(59.59)	Jun 28 21.9
Jul 5 23.0	Jul 13 22.8	Jul 21 10.2	(58.01)	Jul 28 2.9
Aug 4 11.3	Aug 12 15.2	Aug 19 18.4	(56.76)	Aug 26 9.5
Sep 3 1.9	Sep 11 6.0	Sep 18 2.6	(56.05)	Sep 24 18.9
Oct 2 18.9	Oct 10 18.9	Oct 17 11.5	(56.03)	Oct 24 8.2
Nov 1 12.8	Nov 9 5.9	Nov 15 21.5	(56.74)	Nov 23 1.5
Dec 1 6.3	Dec 8 15.4	Dec 15 9.1	(58.08)	Dec 22 22.3
Dec 30 22.4				

Moon at Perigee 2024

d h	d h	d h	d h
Jan 13 11	Feb 10 19	Mar 10 7	Apr 7 17
May 5 22	Jun 2 7	Jun 27 12	Jul 24 6
Aug 21 6	Sep 18 14	Oct 17 1	Nov 14 11
Dec 12 13			

Moon at Apogee 2024

d h	d h	d h	d h
Jan 1 15	Jan 29 8	Feb 25 15	Mar 23 15
Apr 20 3	May 17 20	Jun 14 14	Jul 12 8
Aug 9 1	Sep 5 15	Oct 2 20	Oct 29 23
Nov 26 12	Dec 24 8		

We invite you to visit our website

https://igaef.org/

IGAEF
Intergalactic Astronomy Educators Fellowship

Full of information, links and useful resources!

Including pages dedicated to children, activities, decision makers, and much more!

And you can help us with a donation from there!

Physical Ephemeris for the Moon 2024

Date	l	b	Axis	Coln	Lat	%ill
	°	°	°	°	°	
Jan 1	0.0	-4.7	20.8	145.9	-1.5	78
3	-2.7	-2.4	22.0	170.2	-1.5	61
5	-5.2	0.3	20.1	194.5	-1.5	42
7	-6.7	3.1	14.9	218.8	-1.5	23
9	-6.4	5.3	5.7	243.2	-1.5	8
11	-4.4	6.5	353.8	267.6	-1.5	0
13	-1.1	6.0	343.7	291.9	-1.5	3
15	2.2	4.0	338.6	316.3	-1.5	17
17	4.5	1.0	338.5	340.6	-1.5	37
19	5.7	-2.2	342.7	5.0	-1.5	59
21	5.8	-4.7	350.6	29.3	-1.5	79
23	5.2	-6.2	1.0	53.5	-1.5	93
25	3.8	-6.5	11.0	77.8	-1.5	99
27	1.9	-5.6	18.1	102.1	-1.5	99
29	-0.7	-3.7	21.5	126.3	-1.5	91
31	-3.5	-1.2	21.7	150.6	-1.5	77
Feb 2	-6.0	1.6	18.8	174.9	-1.4	59
4	-7.6	4.1	12.5	199.2	-1.4	40
6	-7.5	6.0	2.4	223.6	-1.4	20
8	-5.4	6.6	350.7	248.0	-1.3	6
10	-1.7	5.5	341.7	272.4	-1.3	0
12	2.2	2.9	338.1	296.8	-1.3	6
14	5.3	-0.4	339.5	321.1	-1.2	22
16	6.8	-3.5	345.2	345.5	-1.2	43
18	6.9	-5.7	354.4	9.8	-1.2	64
20	5.8	-6.6	5.0	34.1	-1.1	82
22	4.0	-6.3	14.0	58.4	-1.1	94
24	1.7	-4.9	19.7	82.7	-1.1	100
26	-1.0	-2.7	21.9	107.0	-1.0	98
28	-3.8	0.0	21.0	131.3	-1.0	90
Mar 1	-6.2	2.8	17.0	155.6	-0.9	75
3	-7.8	5.1	9.5	179.9	-0.9	57
5	-7.8	6.5	358.9	204.3	-0.8	36
7	-6.1	6.6	347.8	228.7	-0.8	16
9	-2.6	4.9	340.2	253.1	-0.7	3
11	1.4	1.9	338.0	277.5	-0.7	1
13	4.9	-1.6	340.8	301.9	-0.6	10
15	6.9	-4.6	347.9	326.3	-0.6	27
17	7.3	-6.3	358.2	350.7	-0.5	48
19	6.2	-6.8	8.7	15.1	-0.5	68
21	4.2	-6.0	16.6	39.4	-0.4	84
23	1.6	-4.2	20.9	63.7	-0.4	95
25	-1.2	-1.7	21.9	88.1	-0.3	100
27	-3.8	1.2	19.9	112.4	-0.3	97
29	-5.9	3.8	14.6	136.7	-0.2	88
31	-7.2	5.9	5.9	161.0	-0.1	72
Apr 2	-7.3	6.8	354.9	185.4	-0.1	51

Date	l	b	Axis	Coln	Lat	%ill
	°	°	°	°	°	
31	-7.2	5.9	5.9	161.0	-0.1	72
Apr 2	-7.3	6.8	354.9	185.4	-0.1	51
4	-5.8	6.3	344.9	209.8	0.0	30
6	-3.0	4.2	339.1	234.2	0.0	11
8	0.6	0.9	338.3	258.7	0.1	1
10	4.0	-2.6	342.3	283.1	0.1	2
12	6.3	-5.3	350.8	307.6	0.2	14
14	7.0	-6.7	1.8	332.0	0.2	32
16	6.1	-6.6	11.9	356.4	0.3	52
18	4.0	-5.4	18.5	20.8	0.4	71
20	1.3	-3.3	21.6	45.2	0.4	86
22	-1.5	-0.6	21.5	69.5	0.5	96
24	-3.8	2.2	18.4	93.9	0.5	100
26	-5.5	4.7	11.7	118.2	0.6	96
28	-6.2	6.4	1.8	142.6	0.6	84
30	-5.9	6.8	350.8	167.0	0.7	66
May 2	-4.6	5.7	342.3	191.4	0.7	44
4	-2.4	3.2	338.3	215.8	0.7	22
6	0.4	-0.2	339.0	240.3	0.8	6
8	3.3	-3.5	344.3	264.7	0.8	0
10	5.4	-5.8	353.9	289.2	0.9	5
12	6.2	-6.7	5.2	313.7	0.9	18
14	5.3	-6.2	14.5	338.1	1.0	36
16	3.3	-4.6	19.9	2.6	1.0	55
18	0.6	-2.3	21.9	27.0	1.1	73
20	-2.1	0.5	20.8	51.4	1.1	88
22	-4.2	3.2	16.5	75.8	1.2	97
24	-5.2	5.4	8.5	100.1	1.2	100
26	-5.2	6.6	357.6	124.5	1.2	94
28	-4.2	6.3	347.1	148.9	1.3	79
30	-2.7	4.7	340.3	173.3	1.3	58
Jun 1	-0.9	1.8	338.0	197.7	1.3	35
3	1.2	-1.5	340.2	222.2	1.3	16
5	3.3	-4.4	346.8	246.7	1.3	3
7	4.9	-6.2	357.3	271.2	1.4	0
9	5.3	-6.5	8.4	295.7	1.4	7
11	4.4	-5.6	16.6	320.2	1.4	21
13	2.3	-3.6	20.9	344.6	1.5	38
15	-0.4	-1.1	21.9	9.1	1.5	57
17	-3.1	1.6	19.8	33.5	1.5	75
19	-4.8	4.1	14.3	57.9	1.5	90
21	-5.4	6.0	5.1	82.3	1.5	99
23	-4.5	6.6	353.7	106.7	1.5	99
25	-2.8	5.7	344.1	131.1	1.5	89
27	-0.8	3.4	338.9	155.5	1.5	71
29	1.1	0.3	338.3	179.9	1.5	49
Jul 1	2.8	-2.8	342.1	204.3	1.5	27

Date	l	b	Axis	Coln	Lat	%ill
	°	°	°	°	°	
Jul 1	2.8	-2.8	342.1	204.3	1.5	27
3	4.1	-5.3	350.1	228.8	1.5	10
5	4.9	-6.4	1.0	253.3	1.5	1
7	4.8	-6.2	11.4	277.8	1.5	1
9	3.5	-4.8	18.4	302.3	1.5	9
11	1.3	-2.6	21.6	326.8	1.5	23
13	-1.5	0.1	21.5	351.3	1.5	41
15	-4.1	2.8	18.4	15.7	1.5	60
17	-5.8	5.0	11.8	40.1	1.5	78
19	-6.0	6.4	1.7	64.5	1.5	93
21	-4.6	6.4	350.3	88.9	1.5	100
23	-2.1	4.9	341.8	113.3	1.5	97
25	0.7	2.1	338.2	137.7	1.4	83
27	3.0	-1.2	339.3	162.1	1.4	63
29	4.6	-4.1	344.6	186.5	1.3	40
31	5.4	-6.0	353.9	211.0	1.3	20
Aug 2	5.5	-6.6	5.0	235.5	1.3	6
4	4.7	-5.8	14.2	260.0	1.3	0
6	3.0	-4.0	19.8	284.5	1.2	2
8	0.5	-1.5	21.9	309.0	1.2	11
10	-2.3	1.3	20.8	333.4	1.2	26
12	-4.9	3.8	16.7	357.9	1.2	44
14	-6.6	5.8	9.0	22.3	1.2	63
16	-6.8	6.7	358.3	46.7	1.1	82
18	-5.2	6.2	347.4	71.1	1.1	96
20	-2.2	4.0	340.2	95.4	1.0	100
22	1.3	0.8	338.1	119.8	1.0	93
24	4.3	-2.6	340.7	144.2	0.9	76
26	6.2	-5.2	347.8	168.6	0.9	54
28	6.8	-6.6	358.2	193.0	0.8	33
30	6.4	-6.5	8.8	217.5	0.7	15
Sep 1	4.9	-5.3	16.7	241.9	0.7	4
3	2.8	-3.0	20.9	266.4	0.7	0
5	0.1	-0.3	21.8	290.9	0.6	3
7	-2.8	2.4	19.7	315.3	0.6	13
9	-5.4	4.8	14.4	339.8	0.6	28
11	-7.1	6.4	5.7	4.2	0.5	47
13	-7.4	6.8	354.8	28.6	0.5	68
15	-5.9	5.8	344.9	53.0	0.4	86
17	-2.9	3.2	339.2	77.3	0.4	98
19	1.0	-0.3	338.3	101.6	0.3	99
21	4.6	-3.7	342.5	126.0	0.2	88
23	7.0	-6.0	351.2	150.3	0.1	69
25	7.8	-6.8	2.3	174.7	0.1	48
27	7.1	-6.2	12.2	199.1	0.0	28
29	5.2	-4.5	18.7	223.5	0.0	12
Oct 1	2.7	-2.0	21.6	248.0	-0.1	3

Date	l	b	Axis	Coln	Lat	%ill
	°	°	°	°	°	
Oct 1	2.7	-2.0	21.6	248.0	-0.1	3
3	-0.1	0.7	21.4	272.4	-0.1	0
5	-2.9	3.4	18.1	296.9	-0.2	4
7	-5.3	5.5	11.6	321.3	-0.2	15
9	-6.9	6.7	2.0	345.7	-0.2	32
11	-7.3	6.6	351.3	10.1	-0.3	52
13	-6.2	5.1	342.7	34.4	-0.3	73
15	-3.6	2.3	338.5	58.8	-0.4	91
17	0.1	-1.3	339.0	83.1	-0.5	100
19	4.0	-4.5	344.5	107.4	-0.5	97
21	6.8	-6.4	354.6	131.7	-0.6	83
23	7.9	-6.7	6.0	156.0	-0.7	64
25	7.3	-5.6	15.0	180.4	-0.7	43
27	5.3	-3.6	20.2	204.7	-0.8	25
29	2.5	-1.0	21.9	229.1	-0.8	11
31	-0.3	1.8	20.6	253.5	-0.9	2
Nov 2	-2.9	4.3	16.1	278.0	-0.9	0
4	-4.9	6.1	8.3	302.4	-0.9	6
6	-6.1	6.7	357.9	326.8	-1.0	18
8	-6.4	6.1	347.8	351.1	-1.0	37
10	-5.6	4.1	340.8	15.5	-1.0	58
12	-3.6	1.1	338.1	39.8	-1.1	79
14	-0.5	-2.3	339.9	64.1	-1.1	95
16	3.0	-5.1	346.8	88.3	-1.2	100
18	6.0	-6.5	357.9	112.6	-1.2	94
20	7.3	-6.3	9.2	136.9	-1.3	79
22	6.7	-4.8	17.2	161.2	-1.3	60
24	4.7	-2.5	21.1	185.5	-1.3	41
26	2.0	0.2	21.8	209.9	-1.4	24
28	-0.8	2.9	19.4	234.3	-1.4	10
30	-3.1	5.1	13.7	258.6	-1.4	2
Dec 2	-4.5	6.4	4.6	283.0	-1.4	1
4	-5.2	6.5	353.8	307.4	-1.4	8
6	-5.0	5.3	344.7	331.8	-1.4	22
8	-4.2	2.8	339.3	356.1	-1.5	43
10	-2.6	-0.3	338.2	20.4	-1.5	65
12	-0.2	-3.4	341.5	44.7	-1.5	85
14	2.6	-5.7	349.6	69.0	-1.5	97
16	5.0	-6.5	1.2	93.2	-1.5	99
18	6.1	-5.8	12.0	117.5	-1.5	92
20	5.6	-3.8	18.8	141.8	-1.5	77
22	3.7	-1.3	21.7	166.0	-1.6	59
24	1.0	1.4	21.3	190.4	-1.6	40
26	-1.7	3.9	17.9	214.7	-1.6	23
28	-3.8	5.7	11.0	239.1	-1.6	9
30	-4.8	6.6	1.0	263.4	-1.6	1
Jan 1	-4.6	6.1	350.2	287.8	-1.5	1

Local Time of MOONRISE 2024

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	22.50	.....	23.53	0.45	1.20	1.51	1.39	2.53	4.41	5.13	6.34	7.18
2	23.40	0.08	.....	1.45	2.02	2.25	2.21	3.52	5.35	6.04	7.30	8.16
3	.....	1.06	0.53	2.37	2.40	3.01	3.09	4.52	6.27	6.54	8.27	9.12
4	0.31	2.06	1.56	3.23	3.16	3.41	4.03	5.51	7.17	7.46	9.25	10.03
5	1.25	3.08	2.57	4.05	3.51	4.26	5.01	6.47	8.08	8.39	10.22	10.48
6	2.21	4.11	3.54	4.44	4.27	5.17	6.01	7.41	8.58	9.35	11.16	11.29
7	3.20	5.13	4.46	5.20	5.06	6.14	7.02	8.32	9.50	10.32	12.05	12.06
8	4.23	6.09	5.32	5.57	5.49	7.14	8.00	9.23	10.45	11.30	12.49	12.40
9	5.27	6.59	6.13	6.35	6.37	8.15	8.55	10.13	11.41	12.27	13.29	13.14
10	6.31	7.43	6.52	7.15	7.31	9.14	9.48	11.04	12.39	13.20	14.06	13.48
11	7.31	8.23	7.28	8.01	8.29	10.11	10.39	11.57	13.38	14.09	14.41	14.26
12	8.24	9.00	8.05	8.51	9.29	11.05	11.29	12.53	14.35	14.52	15.16	15.07
13	9.11	9.35	8.44	9.46	10.29	11.56	12.20	13.51	15.28	15.32	15.52	15.55
14	9.51	10.11	9.25	10.44	11.26	12.47	13.12	14.51	16.17	16.10	16.33	16.50
15	10.28	10.49	10.11	11.42	12.21	13.37	14.07	15.51	17.01	16.46	17.18	17.51
16	11.03	11.31	11.02	12.40	13.13	14.29	15.05	16.49	17.40	17.23	18.10	18.55
17	11.37	12.17	11.56	13.35	14.04	15.23	16.05	17.41	18.18	18.02	19.08	19.59
18	12.12	13.08	12.53	14.29	14.55	16.19	17.07	18.28	18.54	18.45	20.11	21.00
19	12.51	14.02	13.51	15.20	15.45	17.19	18.07	19.10	19.32	19.33	21.14	21.58
20	13.33	14.59	14.47	16.11	16.38	18.21	19.03	19.48	20.12	20.27	22.16	22.53
21	14.20	15.56	15.42	17.01	17.33	19.22	19.53	20.24	20.56	21.26	23.14	23.44
22	15.12	16.52	16.34	17.53	18.31	20.20	20.37	21.00	21.45	22.27	.....	.....
23	16.08	17.46	17.25	18.46	19.32	21.13	21.16	21.37	22.39	23.28	0.11	0.37
24	17.05	18.38	18.16	19.42	20.33	21.59	21.52	22.17	23.40	.....	1.04	1.27
25	18.02	19.29	19.06	20.40	21.32	22.40	22.27	23.01	.....	0.30	1.54	2.19
26	18.58	20.19	19.58	21.40	22.28	23.17	23.01	23.53	0.40	1.25	2.44	3.13
27	19.52	21.10	20.51	22.40	23.17	23.51	23.38	.....	1.39	2.18	3.35	4.09
28	20.43	22.02	21.47	23.38	.....	.....	.....	0.48	2.36	3.09	4.28	5.07
29	21.34	22.56	22.46	.....	0.01	0.26	0.20	1.46	3.30	4.00	5.22	6.06
30	22.24	.....	23.46	0.31	0.40	1.01	1.05	2.45	4.23	4.50	6.19	7.03
31	23.15	.....	.....	.....	1.16	.....	1.57	3.44	.....	5.41	.....	.....

..... **No phenomena occurs on this date**
----- **Moon continuously below the horizon**
********* **Moon continuously above the horizon**

Local Time of MOONSET 2024

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	11.00	10.54	10.00	11.06	12.14	14.19	15.22	17.23	18.08	17.38	17.39	17.43
2	11.28	11.25	10.38	12.12	13.19	15.22	16.27	18.13	18.39	18.06	18.16	18.37
3	11.56	12.03	11.24	13.18	14.23	16.27	17.32	18.56	19.07	18.34	18.58	19.36
4	12.24	12.45	12.19	14.26	15.27	17.33	18.33	19.34	19.35	19.04	19.47	20.38
5	12.56	13.36	13.20	15.33	16.31	18.40	19.29	20.07	20.02	19.38	20.42	21.41
6	13.30	14.35	14.27	16.39	17.36	19.45	20.17	20.37	20.31	20.16	21.41	22.43
7	14.10	15.41	15.37	17.45	18.44	20.45	20.59	21.05	21.02	21.00	22.43	23.44
8	14.58	16.52	16.47	18.51	19.52	21.38	21.35	21.32	21.37	21.50	23.47	.....
9	15.54	18.03	17.56	19.59	20.59	22.24	22.07	22.00	22.17	22.47	.....	0.45
10	16.57	19.13	19.03	21.06	22.02	23.03	22.36	22.30	23.04	23.49	0.50	1.47
11	18.07	20.20	20.09	22.14	22.59	23.37	23.04	23.02	23.58	.....	1.52	2.50
12	19.17	21.25	21.15	23.18	23.48	.....	23.31	23.40	.....	0.53	2.56	3.56
13	20.27	22.29	22.21	.....	.....	0.07	.....	.....	0.59	1.59	4.00	5.05
14	21.33	23.32	23.27	0.17	0.30	0.36	0.00	0.23	2.04	3.04	5.07	6.14
15	22.36	.....	.....	1.09	1.06	1.03	0.31	1.14	3.12	4.10	6.16	7.21
16	23.38	0.35	0.31	1.54	1.38	1.31	1.06	2.13	4.20	5.16	7.27	8.23
17	.....	1.38	1.31	2.33	2.07	2.01	1.46	3.18	5.27	6.23	8.37	9.16
18	0.39	2.39	2.26	3.07	2.35	2.34	2.34	4.26	6.33	7.32	9.42	10.02
19	1.40	3.37	3.14	3.38	3.03	3.11	3.30	5.35	7.40	8.43	10.39	10.40
20	2.42	4.29	3.56	4.06	3.31	3.55	4.32	6.43	8.47	9.52	11.28	11.13
21	3.44	5.15	4.33	4.33	4.02	4.46	5.39	7.49	9.56	10.59	12.09	11.43
22	4.44	5.55	5.05	5.01	4.37	5.45	6.48	8.54	11.04	11.58	12.44	12.11
23	5.40	6.31	5.35	5.30	5.16	6.49	7.55	9.59	12.10	12.50	13.15	12.39
24	6.31	7.03	6.03	6.02	6.03	7.55	9.00	11.04	13.12	13.34	13.44	13.08
25	7.16	7.32	6.30	6.38	6.56	9.02	10.04	12.10	14.08	14.12	14.11	13.38
26	7.55	7.59	6.58	7.19	7.55	10.07	11.07	13.16	14.55	14.45	14.39	14.12
27	8.29	8.27	7.28	8.07	8.59	11.09	12.09	14.21	15.36	15.14	15.08	14.51
28	9.00	8.55	8.01	9.01	10.05	12.11	13.13	15.19	16.11	15.42	15.39	15.36
29	9.29	9.26	8.38	10.02	11.09	13.15	14.20	16.11	16.42	16.09	16.15	16.28
30	9.57	.....	9.20	11.06	12.13	14.18	15.25	16.56	17.11	16.37	16.56	17.26
31	10.24	.....	10.10	.....	13.18	.....	16.26	17.34	.....	17.07	.....	.....

..... No phenomena occurs on this date
----- Moon continuously below the horizon
******* Moon continuously above the horizon**

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Local time of Planets Rise and Set 2024 (EST)

Date	Sun		Mercury		Venus		Mars		Jupiter		Saturn		Uranus		Neptune	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
2024 Jan 1	7 8	17 42	5 44	16 26	4 20	15 10	6 15	16 42	13 30	2 21	10 22	21 36	14 13	3 25	11 26	23 13
2024 Jan 6	7 9	17 46	5 31	16 11	4 28	15 13	6 12	16 38	13 10	2 2	10 4	21 18	13 53	3 4	11 6	22 54
2024 Jan 11	7 9	17 49	5 29	16 7	4 37	15 17	6 8	16 35	12 51	1 43	9 46	21 1	13 33	2 44	10 47	22 34
2024 Jan 16	7 9	17 53	5 34	16 9	4 45	15 22	6 5	16 32	12 28	1 20	9 28	20 44	13 13	2 24	10 27	22 15
2024 Jan 21	7 9	17 57	5 43	16 16	4 53	15 28	6 1	16 30	12 10	1 2	9 10	20 26	12 53	2 5	10 8	21 56
2024 Jan 26	7 7	18 1	5 53	16 26	5 0	15 35	5 57	16 27	11 51	0 44	8 52	20 9	12 33	1 45	9 49	21 37
2024 Jan 31	7 6	18 4	6 3	16 38	5 7	15 42	5 52	16 25	11 33	0 27	8 34	19 52	12 10	1 21	9 29	21 18
2024 Feb 5	7 3	18 8	6 14	16 53	5 13	15 50	5 48	16 23	11 15	0 10	8 16	19 35	11 50	1 2	9 10	20 59
2024 Feb 10	7 0	18 11	6 23	17 10	5 18	15 58	5 43	16 21	10 57	23 49	7 58	19 18	11 31	0 42	8 51	20 40
2024 Feb 15	6 57	18 15	6 33	17 29	5 23	16 6	5 37	16 19	10 40	23 33	7 40	19 1	11 11	0 23	8 32	20 21
2024 Feb 20	6 53	18 18	6 41	17 49	5 27	16 15	5 32	16 17	10 22	23 17	7 22	18 48	10 52	0 4	8 13	20 2
2024 Feb 25	6 49	18 21	6 49	18 10	5 29	16 24	5 26	16 16	10 5	23 1	7 4	18 31	10 33	23 41	7 54	19 43
2024 Mar 1	6 44	18 24	6 56	18 32	5 31	16 32	5 20	16 14	9 48	22 45	6 46	18 14	10 14	23 22	7 34	19 25
2024 Mar 6	6 39	18 26	7 3	18 56	5 33	16 41	5 13	16 12	9 31	22 29	6 29	17 57	9 54	23 3	7 15	19 6
2024 Mar 11	6 34	18 29	7 9	19 22	5 33	16 49	5 6	16 10	9 15	22 14	6 11	17 40	9 35	22 44	6 56	18 51
2024 Mar 16	6 29	18 31	7 12	19 42	5 33	16 58	4 59	16 8	8 58	21 59	5 53	17 23	9 16	22 25	6 37	18 32
2024 Mar 21	6 24	18 33	7 12	19 54	5 32	17 6	4 52	16 6	8 42	21 44	5 35	17 6	8 57	22 7	6 18	18 13
2024 Mar 26	6 19	18 36	7 5	19 56	5 31	17 14	4 45	16 4	8 25	21 29	5 17	16 49	8 38	21 48	5 59	17 54
2024 Mar 31	6 13	18 38	6 51	19 44	5 30	17 21	4 37	16 2	8 9	21 14	4 59	16 32	8 20	21 30	5 40	17 35
2024 Apr 5	6 8	18 40	6 30	19 18	5 28	17 29	4 29	16 0	7 53	20 59	4 41	16 15	8 1	21 11	5 21	17 17
2024 Apr 10	6 3	18 43	6 3	18 50	5 26	17 37	4 21	15 57	7 37	20 45	4 23	15 57	7 42	20 53	5 1	16 58
2024 Apr 15	5 58	18 45	5 37	18 13	5 25	17 44	4 13	15 55	7 22	20 30	4 5	15 40	7 23	20 34	4 42	16 39
2024 Apr 20	5 54	18 47	5 13	17 41	5 23	17 52	4 4	15 53	7 6	20 16	3 47	15 22	7 5	20 16	4 23	16 20
2024 Apr 25	5 49	18 50	4 54	17 17	5 22	18 0	3 56	15 50	6 50	20 2	3 29	15 5	6 46	19 57	4 4	16 1
2024 Apr 30	5 45	18 52	4 41	17 2	5 21	18 8	3 47	15 47	6 35	19 47	3 11	14 47	6 27	19 39	3 45	15 42
2024 May 5	5 42	18 55	4 31	16 56	5 20	18 16	3 39	15 45	6 19	19 33	2 52	14 29	6 9	19 21	3 26	15 23
2024 May 10	5 38	18 58	4 26	16 56	5 20	18 25	3 30	15 42	6 4	19 19	2 34	14 12	5 50	19 2	3 6	15 4
2024 May 15	5 36	19 0	4 23	17 1	5 21	18 34	3 22	15 39	5 48	19 4	2 15	13 54	5 31	18 48	2 47	14 45
2024 May 20	5 34	19 3	4 23	17 12	5 22	18 42	3 13	15 36	5 33	18 53	1 57	13 35	5 13	18 29	2 28	14 26
2024 May 25	5 32	19 6	4 27	17 28	5 24	18 51	3 5	15 34	5 17	18 39	1 38	13 17	4 54	18 11	2 8	14 6
2024 May 30	5 31	19 8	4 34	17 49	5 27	19 2	2 56	15 31	5 2	18 25	1 19	12 58	4 35	17 53	1 49	13 47

Local time of Planets Rise and Set 2024 (EST)

Date	Sun		Mercury		Venus		Mars		Jupiter		Saturn		Uranus		Neptune	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
2024 Jun 4	5 30	19 10	4 47	18 15	5 31	19 10	2 48	15 28	4 47	18 10	1 0	12 40	4 17	17 34	1 30	13 28
2024 Jun 9	5 30	19 12	5 5	18 45	5 36	19 19	2 40	15 25	4 31	17 56	0 41	12 21	3 58	17 16	1 10	13 8
2024 Jun 14	5 30	19 14	5 28	19 22	5 42	19 27	2 31	15 22	4 16	17 42	0 22	12 2	3 39	16 57	0 51	12 49
2024 Jun 19	5 31	19 15	5 54	19 52	5 49	19 35	2 23	15 19	4 0	17 27	0 3	11 43	3 21	16 39	0 31	12 30
2024 Jun 24	5 32	19 16	6 22	20 15	5 56	19 42	2 15	15 16	3 45	17 13	23 39	11 23	3 2	16 20	0 12	12 10
2024 Jun 29	5 34	19 17	6 47	20 32	6 4	19 48	2 7	15 13	3 30	16 58	23 20	11 4	2 43	16 2	23 48	11 50
2024 Jul 4	5 35	19 17	7 8	20 43	6 12	19 53	2 0	15 10	3 14	16 43	23 0	10 44	2 24	15 43	23 28	11 31
2024 Jul 9	5 37	19 16	7 26	20 48	6 21	19 57	1 52	15 6	2 59	16 28	22 40	10 24	2 5	15 25	23 9	11 11
2024 Jul 14	5 40	19 15	7 39	20 48	6 30	20 0	1 45	15 3	2 43	16 13	22 20	10 4	1 46	15 6	22 49	10 51
2024 Jul 19	5 42	19 14	7 47	20 43	6 39	20 3	1 38	14 59	2 27	15 58	22 0	9 44	1 27	14 47	22 29	10 31
2024 Jul 24	5 44	19 11	7 50	20 34	6 48	20 4	1 30	14 56	2 11	15 43	21 40	9 23	1 8	14 28	22 9	10 12
2024 Jul 29	5 47	19 9	7 46	20 19	6 57	20 4	1 23	14 52	1 55	15 28	21 20	9 3	0 49	14 9	21 50	9 52
2024 Aug 3	5 49	19 6	7 34	19 59	7 5	20 4	1 17	14 48	1 39	15 12	21 0	8 42	0 30	13 50	21 30	9 32
2024 Aug 8	5 52	19 2	7 13	19 34	7 13	20 3	1 10	14 43	1 23	14 56	20 39	8 21	0 11	13 31	21 10	9 12
2024 Aug 13	5 54	18 58	6 42	19 3	7 21	20 2	1 3	14 39	1 7	14 40	20 19	8 0	23 47	13 12	20 50	8 52
2024 Aug 18	5 56	18 54	6 5	18 38	7 29	20 0	0 56	14 34	0 50	14 24	19 58	7 39	23 28	12 52	20 30	8 31
2024 Aug 23	5 58	18 49	5 28	18 10	7 37	19 58	0 50	14 29	0 33	14 7	19 38	7 18	23 8	12 33	20 10	8 11
2024 Aug 28	6 1	18 44	4 59	17 50	7 44	19 55	0 43	14 23	0 16	13 50	19 17	6 56	22 49	12 13	19 50	7 51
2024 Sep 2	6 3	18 39	4 45	17 41	7 52	19 53	0 37	14 17	23 56	13 33	18 56	6 35	22 29	11 54	19 30	7 31
2024 Sep 7	6 4	18 34	4 46	17 41	7 59	19 51	0 30	14 11	23 38	13 16	18 40	6 14	22 10	11 34	19 10	7 11
2024 Sep 12	6 6	18 28	4 58	17 47	8 7	19 48	0 23	14 4	23 20	12 58	18 19	5 52	21 50	11 14	18 54	6 50
2024 Sep 17	6 8	18 23	5 18	17 55	8 14	19 46	0 16	13 57	23 2	12 40	17 58	5 31	21 30	10 54	18 34	6 30
2024 Sep 22	6 10	18 17	5 40	18 3	8 22	19 45	0 9	13 49	22 44	12 22	17 37	5 10	21 10	10 34	18 14	6 10
2024 Sep 27	6 12	18 12	6 1	18 9	8 30	19 43	0 1	13 41	22 25	12 4	17 17	4 48	20 50	10 14	17 54	5 50
2024 Oct 2	6 14	18 6	6 21	18 14	8 38	19 43	23 52	13 32	22 6	11 45	16 56	4 27	20 30	9 54	17 34	5 29
2024 Oct 7	6 17	18 1	6 40	18 18	8 47	19 43	23 43	13 23	21 47	11 25	16 35	4 6	20 10	9 34	17 14	5 9
2024 Oct 12	6 19	17 56	6 57	18 21	8 56	19 44	23 35	13 13	21 27	11 5	16 15	3 45	19 49	9 13	16 54	4 49
2024 Oct 17	6 21	17 52	7 14	18 25	9 4	19 45	23 25	13 3	21 7	10 45	15 54	3 24	19 29	8 53	16 34	4 29
2024 Oct 22	6 24	17 47	7 30	18 28	9 13	19 48	23 16	12 52	20 46	10 25	15 34	3 4	19 9	8 32	16 14	4 8
2024 Oct 27	6 27	17 43	7 45	18 33	9 22	19 52	23 5	12 41	20 25	10 4	15 14	2 43	18 53	8 12	15 54	3 48
2024 Nov 1	6 30	17 40	8 0	18 37	9 30	19 56	22 54	12 29	20 4	9 43	14 54	2 23	18 32	7 51	15 34	3 28

Local time of Planets Rise and Set 2024 (EST)

Date	Sun		Mercury		Venus		Mars		Jupiter		Saturn		Uranus		Neptune	
	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
2024 Nov 6	6 33	17 37	8 13	18 42	9 39	20 1	22 42	12 16	19 43	9 21	14 34	2 3	18 12	7 31	15 14	3 8
2024 Nov 11	6 37	17 34	8 23	18 47	9 46	20 7	22 29	12 2	19 21	9 0	14 14	1 43	17 52	7 10	14 54	2 48
2024 Nov 16	6 40	17 32	8 30	18 50	9 53	20 14	22 15	11 48	18 59	8 38	13 54	1 23	17 31	6 50	14 34	2 28
2024 Nov 21	6 44	17 31	8 28	18 48	9 58	20 21	22 0	11 33	18 42	8 15	13 34	1 4	17 11	6 29	14 14	2 8
2024 Nov 26	6 47	17 30	8 13	18 35	10 3	20 29	21 44	11 17	18 19	7 53	13 11	0 41	16 50	6 8	13 54	1 48
2024 Dec 1	6 51	17 30	7 39	18 7	10 7	20 36	21 26	10 59	17 57	7 30	12 51	0 21	16 30	5 48	13 35	1 29
2024 Dec 6	6 55	17 31	6 49	17 26	10 9	20 44	21 7	10 41	17 35	7 7	12 32	0 3	16 10	5 27	13 15	1 9
2024 Dec 11	6 58	17 32	6 2	16 48	10 10	20 51	20 46	10 22	17 12	6 45	12 13	23 40	15 49	5 7	12 51	0 45
2024 Dec 16	7 1	17 34	5 34	16 24	10 10	20 58	20 24	10 1	16 50	6 22	11 54	23 22	15 29	4 46	12 32	0 26
2024 Dec 21	7 4	17 36	5 25	16 12	10 9	21 5	20 0	9 39	16 28	6 0	11 35	23 3	15 9	4 26	12 12	0 6
2024 Dec 26	7 6	17 39	5 27	16 9	10 7	21 11	19 35	9 16	16 5	5 37	11 17	22 45	14 49	4 5	11 53	23 43
2024 Dec 31	7 8	17 42	5 35	16 12	10 4	21 16	19 8	8 52	15 43	5 15	10 58	22 27	14 28	3 45	11 33	23 24

Diary of Astronomical Phenomena 2024

January

d	h			d	h		
1	15	Moon at apogee		14	10	Saturn 1.9N of Moon	
2	6	Mercury stationary		15	21	Neptune 0.8N of Moon	Occn
3	1	Earth at perihelion		18	3	FIRST QUARTER	
4	3	LAST QUARTER		18	19	Jupiter 2.5S of Moon	
5	1	Spica 1.8S of Moon		19	18	Uranus 2.8S of Moon	
8	15	Antares 0.8S of Moon	Occn	20	13	Pluto at conjunction	
8	18	Venus 5.6N of Moon		23	3	Moon furthest North (28.2)	
10	6	Moon furthest South (-28.2)		24	19	Pollux 1.7N of Moon	
10	8	Mars 4.1N of Moon		25	17	FULL MOON	
11	11	NEW MOON		27	10	Uranus stationary	
12	2	Pluto 2.1N of Moon		27	13	Mercury 0.3N of Mars	
12	21	Mercury greatest elong W(23)		27	19	Regulus 3.3S of Moon	
13	10	Moon at perigee		29	8	Moon at apogee	

February

d	h			d	h		
1	8	Spica 1.5S of Moon		15	6	Jupiter 2.9S of Moon	
2	23	LAST QUARTER		16	0	Uranus 3.1S of Moon	
5	0	Antares 0.6S of Moon	Occn	16	15	FIRST QUARTER	
5	12	Mercury 1.3N of Pluto		17	8	Venus 2.7N of Pluto	
6	16	Moon furthest South (-28.3)		19	8	Moon furthest North (28.4)	
7	20	Venus 5.3N of Moon		21	0	Pollux 1.6N of Moon	
8	7	Mars 4.1N of Moon		22	7	Venus 0.6N of Mars	
8	14	Pluto 2.1N of Moon		24	1	Regulus 3.2S of Moon	
8	23	Mercury 3.1N of Moon		24	12	FULL MOON	
9	22	NEW MOON		25	15	Moon at apogee	
10	18	Moon at perigee		28	7	Mercury superior conjunction	
11	1	Saturn 1.6N of Moon		28	14	Mercury 0.2S of Saturn	
12	7	Neptune 0.6N of Moon	Occn	28	15	Spica 1.3S of Moon	
14	6	Mars 1.9N of Pluto		28	21	Saturn at conjunction	

March

d	h			d	h		
3	8	Antares 0.4S of Moon	Occn	14	10	Uranus 3.2S of Moon	
3	15	LAST QUARTER		17	4	FIRST QUARTER	
5	1	Moon furthest South (-28.5)		17	11	Neptune at conjunction	
7	2	Pluto 2.1N of Moon		17	14	Moon furthest North (28.5)	

Diary of Astronomical Phenomena 2024

March

d	h			d	h		
8	6	Mars 3.2N of Moon		19	6	Pollux 1.5N of Moon	
8	15	Mercury 0.4N of Neptune		20	3	Equinox	
8	18	Venus 3.0N of Moon		21	23	Venus 0.3N of Saturn	
9	18	Saturn 1.3N of Moon		22	8	Regulus 3.3S of Moon	
10	6	Moon at perigee		23	15	Moon at apogee	
10	8	NEW MOON		24	20	Mercury greatest elong E(19)	
10	19	Neptune 0.4N of Moon	Occn	25	6	FULL MOON	Eclipse
11	3	Mercury 0.9N of Moon	Occn	26	21	Spica 1.3S of Moon	
13	23	Jupiter 3.3S of Moon		30	15	Antares 0.3S of Moon	Occn

April

d	h			d	h		
1	8	Moon furthest South (-28.6)		11	22	Mercury inferior conjunction	
1	22	Mercury stationary		13	22	Moon furthest North (28.6)	
2	3	LAST QUARTER		15	14	Pollux 1.5N of Moon	
3	12	Pluto 2.1N of Moon		15	19	FIRST QUARTER	
3	13	Venus 0.3S of Neptune		18	14	Regulus 3.3S of Moon	
6	5	Mars 1.7N of Moon		19	10	Mercury 1.7N of Venus	
6	10	Saturn 1.0N of Moon	Occn	20	2	Moon at apogee	
7	8	Neptune 0.3N of Moon	Occn	21	2	Jupiter 0.5S of Uranus	
7	16	Venus 0.4S of Moon	Occn	23	3	Spica 1.3S of Moon	
7	17	Moon at perigee		23	23	FULL MOON	
8	18	NEW MOON	Eclipse	24	8	Mercury stationary	
9	2	Mercury 1.9N of Moon		26	20	Antares 0.3S of Moon	Occn
10	19	Jupiter 3.7S of Moon		28	14	Moon furthest South (-28.5)	
10	20	Mars 0.4N of Saturn		29	4	Mars 0.0N of Neptune	
10	22	Uranus 3.4S of Moon		30	18	Pluto 2.0N of Moon	

May

d	h			d	h		
1	11	LAST QUARTER		15	11	FIRST QUARTER	
3	23	Saturn 0.7N of Moon	Occn	15	21	Regulus 3.2S of Moon	
4	4	Pluto stationary		17	19	Moon at apogee	
4	19	Neptune 0.2N of Moon	Occn	18	11	Venus 0.4S of Uranus	
5	2	Mars 0.2S of Moon	Occn	18	18	Jupiter at conjunction	
5	21	Moon at perigee		20	11	Spica 1.2S of Moon	
6	6	Mercury 3.4S of Moon		23	8	Venus 0.2N of Jupiter	
7	14	Venus 3.2S of Moon		23	13	FULL MOON	

Diary of Astronomical Phenomena 2024

May

d	h		d	h	
8	3	NEW MOON	24	3	Antares 0.4S of Moon Occn
8	11	Uranus 3.4S of Moon	25	19	Moon furthest South (-28.4)
8	16	Jupiter 4.1S of Moon	28	0	Pluto 1.8N of Moon
9	22	Mercury greatest elong W(26)	30	17	LAST QUARTER
11	7	Moon furthest North (28.5)	31	5	Mercury 1.3S of Uranus
12	22	Pollux 1.6N of Moon	31	8	Saturn 0.3N of Moon Occn
13	9	Uranus at conjunction			

June

d	h		d	h	
1	2	Neptune 0.0N of Moon Occn	14	13	Moon at apogee
1	2	Venus 5.3N of Aldebaran	14	16	Mercury superior conjunction
2	7	Moon at perigee	16	19	Spica 1.1S of Moon Occn
2	22	Mars 2.2S of Moon	17	13	Mercury 0.9N of Venus
4	9	Mercury 0.1S of Jupiter	20	11	Antares 0.3S of Moon Occn
4	15	Venus superior conjunction	20	20	Solstice
4	23	Uranus 3.6S of Moon	22	1	FULL MOON
5	12	Jupiter 4.5S of Moon	22	2	Moon furthest South (-28.4)
5	16	Mercury 4.5S of Moon	24	5	Pluto 1.5N of Moon
6	12	NEW MOON	27	11	Moon at perigee
6	13	Venus 4.5S of Moon	27	14	Saturn 0.1S of Moon Occn
7	16	Moon furthest North (28.4)	28	8	Neptune 0.3S of Moon Occn
8	5	Mercury 5.3N of Aldebaran	28	21	LAST QUARTER
9	7	Pollux 1.7N of Moon	28	22	Mercury 4.8S of Pollux
12	6	Regulus 3.0S of Moon	30	21	Saturn stationary
14	5	FIRST QUARTER			

July

d	h		d	h	
1	16	Mars 3.8S of Moon	15	14	Mars 0.5S of Uranus
2	8	Uranus 3.8S of Moon	17	20	Antares 0.2S of Moon Occn
3	2	Neptune stationary	19	10	Moon furthest South (-28.4)
3	7	Jupiter 4.9S of Moon	21	10	FULL MOON
5	0	Moon furthest North (28.4)	21	13	Pluto 1.4N of Moon
5	5	Earth at aphelion	22	4	Mercury greatest elong E(27)
5	22	NEW MOON	23	5	Pluto at opposition
6	10	Venus 5.6S of Pollux	24	6	Moon at perigee
6	15	Pollux 1.8N of Moon	24	20	Saturn 0.3S of Moon Occn

Diary of Astronomical Phenomena 2024

July

d	h			d	h		
6	16	Venus 3.8S of Moon		25	14	Neptune 0.5S of Moon	Occn
7	20	Mercury 3.1S of Moon		26	6	Mercury 2.2S of Regulus	
9	14	Regulus 2.8S of Moon		28	2	LAST QUARTER	
10	0	Jupiter 4.8N of Aldebaran		29	15	Uranus 4.0S of Moon	
12	7	Moon at apogee		30	9	Mars 4.9S of Moon	
13	22	FIRST QUARTER		30	22	Jupiter 5.3S of Moon	
14	3	Spica 0.8S of Moon	Occn				

August

d	h			d	h		
1	5	Moon furthest North (28.5)		15	19	Moon furthest South (-28.5)	
2	22	Pollux 1.8N of Moon		17	22	Pluto 1.5N of Moon	
4	7	Mercury stationary		19	1	Mercury inferior conjunction	
4	11	NEW MOON		19	18	FULL MOON	
4	17	Mars 4.9N of Aldebaran		21	2	Saturn 0.4S of Moon	Occn
5	5	Venus 1.0N of Regulus		21	5	Moon at perigee	
5	21	Regulus 2.7S of Moon		21	21	Neptune 0.6S of Moon	Occn
5	23	Venus 1.6S of Moon		25	22	Uranus 4.3S of Moon	
8	2	Mercury 5.8S of Venus		26	9	LAST QUARTER	
9	0	Moon at apogee		27	11	Jupiter 5.6S of Moon	
10	10	Spica 0.6S of Moon	Occn	27	23	Mars 5.3S of Moon	
12	15	FIRST QUARTER		28	0	Mercury stationary	
14	5	Antares 0.0N of Moon	Occn	28	10	Moon furthest North (28.6)	
14	15	Mars 0.3N of Jupiter		30	4	Pollux 1.7N of Moon	
14	15	Mercury 5.2S of Regulus					

September

d	h			d	h		
1	12	Mercury 4.6S of Moon		18	2	FULL MOON	Eclipse
1	15	Uranus stationary		18	7	Neptune 0.6S of Moon	Occn
2	4	Regulus 2.7S of Moon		18	8	Venus 2.4N of Spica	
3	1	NEW MOON		18	14	Moon at perigee	
5	5	Mercury greatest elong W(18)		21	0	Neptune at opposition	
5	9	Venus 1.0N of Moon	Occn	22	5	Uranus 4.3S of Moon	
5	14	Moon at apogee		22	12	Equinox	
6	17	Spica 0.5S of Moon	Occn	23	22	Jupiter 5.8S of Moon	
8	4	Saturn at opposition		24	17	Moon furthest North (28.7)	

Diary of Astronomical Phenomena 2024

September

d	h			d	h	
9	8	Mercury 0.5N of Regulus		24	18	LAST QUARTER
10	13	Antares 0.1N of Moon	Occn	25	12	Mars 4.8S of Moon
11	5	FIRST QUARTER		26	10	Pollux 1.6N of Moon
12	4	Moon furthest South (-28.7)		29	10	Regulus 2.7S of Moon
14	7	Pluto 1.6N of Moon		30	22	Mercury superior conjunction
17	10	Saturn 0.3S of Moon	Occn			

October

d	h			d	h		
2	18	NEW MOON	Eclipse	17	1	Moon at perigee	
2	20	Moon at apogee		17	11	FULL MOON	
2	22	Mercury 1.6N of Moon		18	22	Mars 5.7S of Pollux	
3	23	Spica 0.4S of Moon	Occn	19	14	Uranus 4.2S of Moon	
5	18	Venus 2.8N of Moon		21	7	Jupiter 5.7S of Moon	
7	19	Antares 0.2N of Moon	Occn	22	1	Moon furthest North (28.7)	
9	7	Jupiter stationary		23	17	Pollux 1.7N of Moon	
9	11	Moon furthest South (-28.7)		23	21	Mars 3.8S of Moon	
10	5	Mercury 2.4N of Spica		24	8	LAST QUARTER	
10	18	FIRST QUARTER		26	4	Venus 3.0N of Antares	
11	15	Pluto 1.6N of Moon		26	16	Regulus 2.6S of Moon	
12	2	Pluto stationary		29	23	Moon at apogee	
14	18	Saturn 0.1S of Moon	Occn	31	5	Spica 0.5S of Moon	Occn
15	17	Neptune 0.5S of Moon	Occn				

November

d	h			d	h		
1	12	NEW MOON		16	0	Mercury greatest elong E(23)	
3	6	Mercury 2.0N of Moon		16	6	Saturn stationary	
4	1	Antares 0.1N of Moon	Occn	17	2	Uranus at opposition	
4	23	Venus 3.1N of Moon		17	14	Jupiter 5.6S of Moon	
5	17	Moon furthest South (-28.6)		18	10	Moon furthest North (28.5)	
7	22	Pluto 1.5N of Moon		20	2	Pollux 1.8N of Moon	
9	5	FIRST QUARTER		20	22	Mars 2.3S of Moon	
10	11	Mercury 2.0N of Antares		22	23	Regulus 2.5S of Moon	
11	1	Saturn 0.1S of Moon	Occn	23	1	LAST QUARTER	
12	2	Neptune 0.6S of Moon	Occn	26	3	Mercury stationary	
14	11	Moon at perigee		26	11	Moon at apogee	
15	21	FULL MOON		27	12	Spica 0.4S of Moon	Occn

Diary of Astronomical Phenomena 2024

November

d	h	
15	23	Uranus 4.2S of Moon

December

d	h		d	h	
1	6	NEW MOON	14	18	Jupiter 5.4S of Moon
1	7	Antares 0.0N of Moon Occn	15	9	FULL MOON
2	1	Mercury 4.9N of Moon	15	20	Moon furthest North (28.4)
2	22	Moon furthest South (-28.5)	15	22	Mercury stationary
4	23	Venus 2.2N of Moon	17	12	Pollux 2.0N of Moon
5	4	Pluto 1.2N of Moon	18	9	Mars 0.8S of Moon Occn
6	2	Mercury inferior conjunction	20	8	Regulus 2.2S of Moon
7	14	Venus 0.9N of Pluto	21	9	Solstice
7	20	Jupiter at opposition	22	22	LAST QUARTER
7	20	Mars stationary	24	7	Moon at apogee
8	8	Saturn 0.3S of Moon Occn	24	20	Spica 0.2S of Moon Occn
8	10	Neptune stationary	25	9	Mercury greatest elong W(22)
8	15	FIRST QUARTER	28	15	Antares 0.1N of Moon Occn
9	8	Neptune 0.7S of Moon Occn	30	4	Moon furthest South (-28.4)
12	13	Moon at perigee	30	22	NEW MOON
13	7	Uranus 4.1S of Moon			

Lunar eclipses

[1]
2024 Mar 25 (TT)

[4]

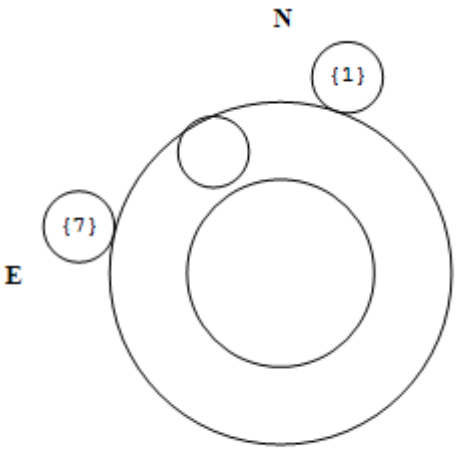
[7]
Occult 4.2023.11.30

L U N A R E C L I P S E on 2024 Mar 25 (TT)

	Event	UTC h	m	s	P.A. o	Overhead at Long o	Lat o
[1]	Moon Enters Penumbra	4	53	9	161	-72	-1
[4]	Maximum Eclipse	7	12	51		-106	-1
[7]	Moon Leaves Penumbra	9	33	0	257	-140	-2

Magnitude of Penumbral Eclipse = 0.958

delta T = 69.2 secs ±1s, Ephemeris = DE440



Occult 4.2023.11.30 **2024 Mar 25 (TT)**

Lunar eclipses

2024 Sep 18 (TT)

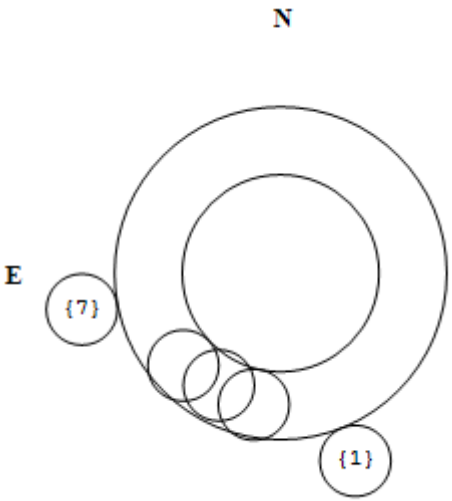
Occult 4.2023.11.3

L U N A R E C L I P S E on 2024 Sep 18 (TT)

	Event	UTC h	m	s	P.A. o	Overhead at Long o	Lat o
[1]	Moon Enters Penumbra	0	41	0	22	-12	-3
[2]	Moon Enters Umbra	2	12	44	348	-34	-3
[4]	Maximum Eclipse	2	44	16		-42	-3
[6]	Moon Leaves Umbra	3	16	24	313	-50	-2
[7]	Moon Leaves Penumbra	4	47	52	280	-72	-2

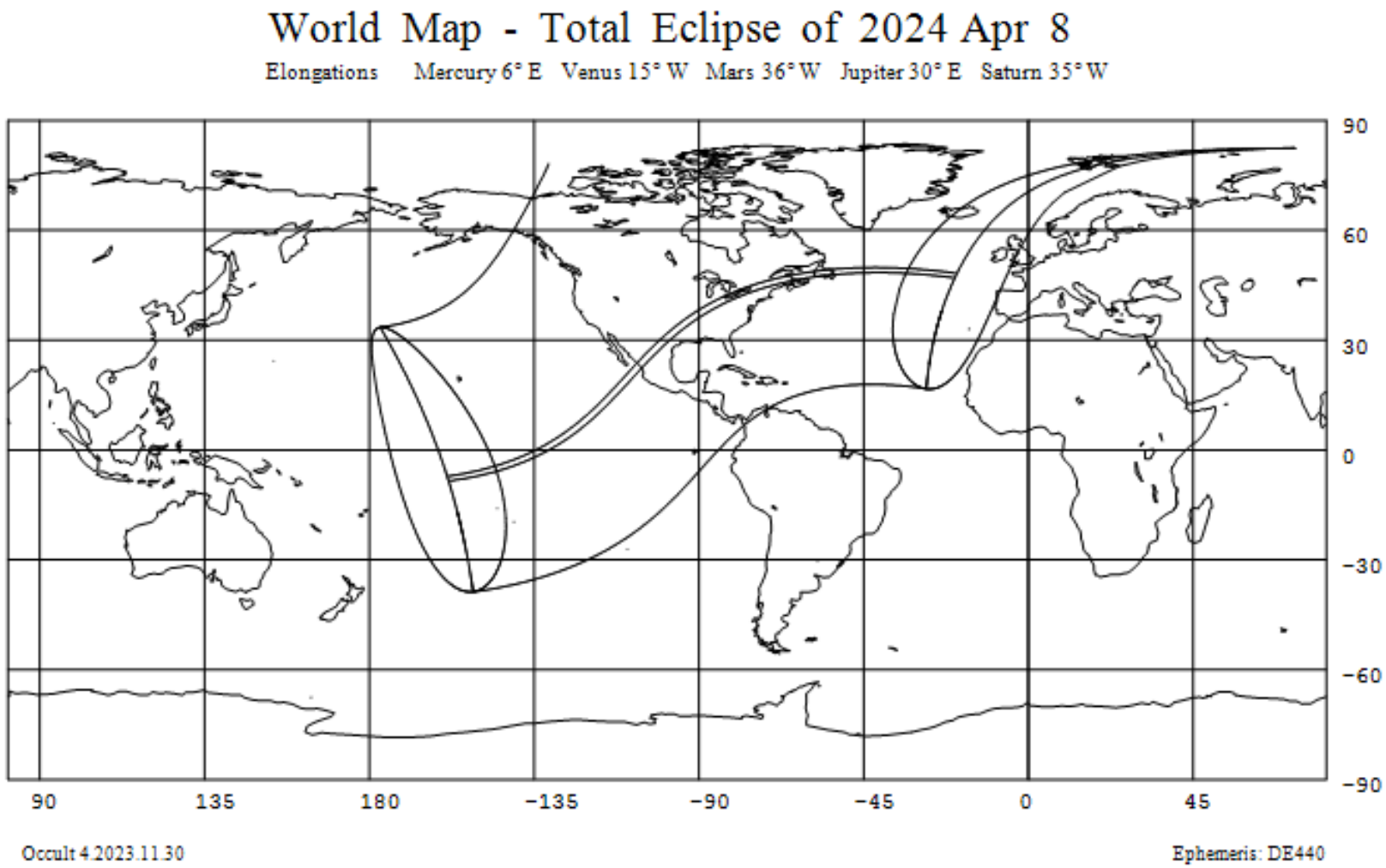
Magnitude of Umbral Eclipse = 0.087

delta T = 69.2 secs ±1s, Ephemeris = DE440

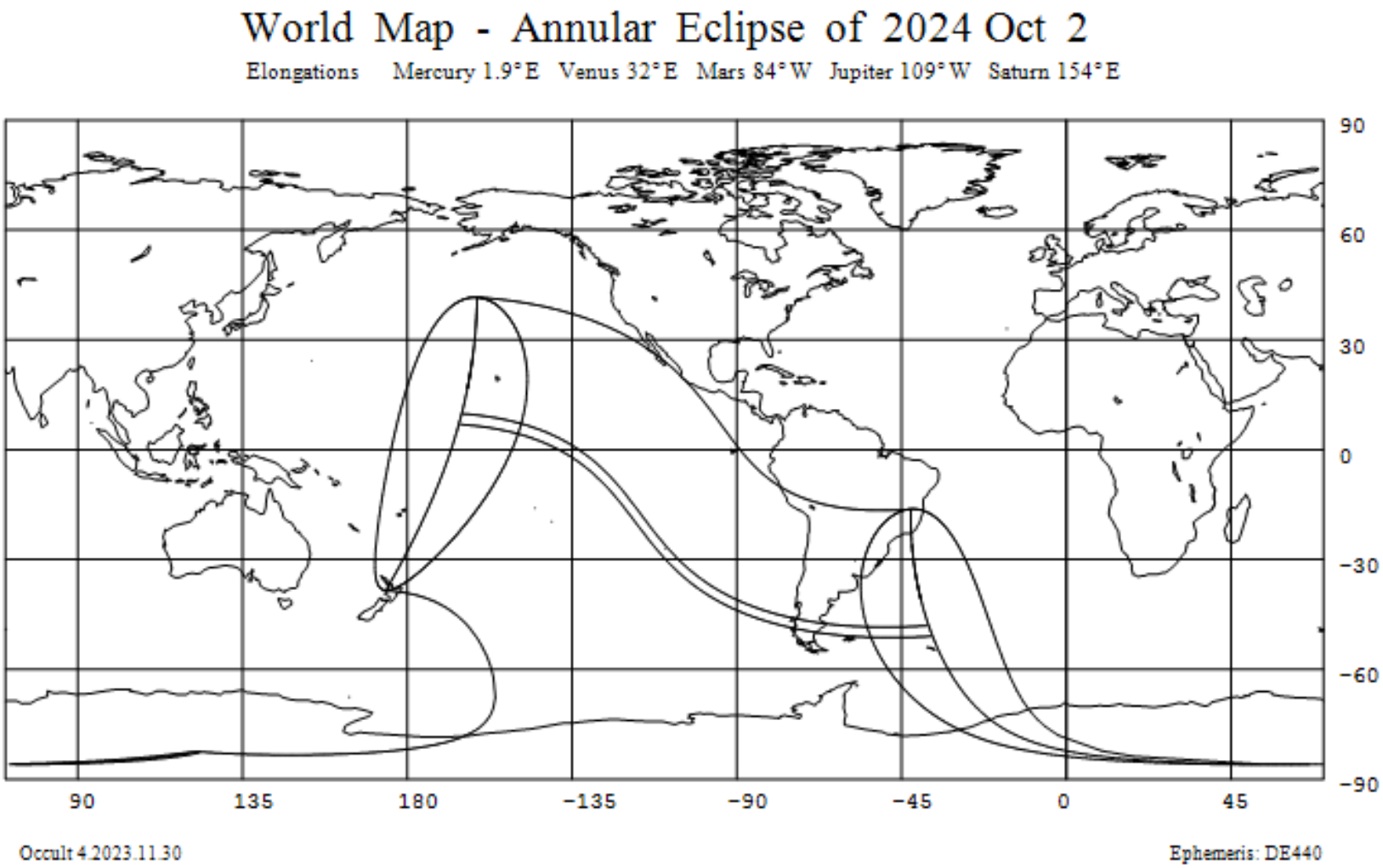


Occult 4.2023.11.30 **2024 Sep 18 (TT)**

Solar Eclipses



Solar Eclipses



Meteor Showers for 2024

The main two places where you can find a detailed list of the annual meteor showers are:

The **American Meteor Society:** https://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/
The meteor showers listed are the easiest to observe and provide the most activity.

The **International Meteor Organization (IMO):** https://www.imo.net/files/meteor-shower/cal2023.pdf
This is the most comprehensive list of meteor showers. Looks for the Table 5, pag 25. Next here, for those who can't access internet, a copy of the 2024 IMO calendar.

 Next Peak night **Jan 2-3, 2024**

Quadrantids (QUA) Active from December 28th to January 12th, 2024

The Quadrantids have the potential to be the strongest shower of the year but usually fall short due to the short length of maximum activity (6 hours) and the poor weather experienced during early January. The average hourly rates one can expect under dark skies is 25. These meteors usually lack persistent trains but often produce bright fireballs. Due to the high northerly declination (celestial latitude) these meteors are not well seen from the southern hemisphere.

Shower details - Radiant: 15:18 +49.5° - ZHR: 110 - **Velocity:** 25 miles/sec (medium - 41km/sec) - **Parent Object:** 2003 EH (Asteroid)

Next Peak - The Quadrantids will next peak on the Jan 2-3, 2024 night. On this night, the moon will be 61% full.

 Next Peak night **Apr 21-22, 2024**

Lyrids (LYR) Active from April 14th to April 30th, 2024

The Lyrids are a medium strength shower that usually produces good rates for three nights centered on the maximum. These meteors also usually lack persistent trains but can produce fireballs. These meteors are best seen from the northern hemisphere where the radiant is high in the sky at dawn. Activity from this shower can be seen from the southern hemisphere, but at a lower rate.

Shower details - Radiant: 18:04 +34° - ZHR: 18 - **Velocity:** 30 miles/sec (medium - 49km/sec) - **Parent Object:** C/1861 G1 (Thatcher)

Next Peak - The Lyrids will next peak on the Apr 21-22, 2024 night. On this night, the moon will be 96% full.

 Next Peak night **May 5-6, 2024**

eta Aquariids (ETA) Active from April 19th to May 28th, 2024

The Eta Aquariids are a strong shower when viewed from the southern tropics. From the equator northward, they usually only produce medium rates of 10-30 per hour just before dawn. Activity is good for a week centered the night of maximum activity. These are swift meteors that produce a high percentage of persistent trains, but few fireballs.

Shower details - Radiant: 22:32 -1° - ZHR: 50 - **Velocity:** 42 miles/sec (swift - 66.9km/sec) - **Parent Object:** 1P/Halley

Next Peak - The eta Aquariids will next peak on the May 5-6, 2024 night. On this night, the moon will be 6% full.

 Next Peak night **Jul 28-29, 2024**

Southern delta Aquariids (SDA) Active from July 12th to August 23rd, 2024

The Delta Aquariids are another strong shower best seen from the southern tropics. North of the equator the radiant is located lower in the southern sky and therefore rates are less than seen from further south. These meteors produce good rates for a week centered on the night of maximum. These are usually faint meteors that lack both persistent trains and fireballs.

Shower details - Radiant: 22:40 -16.4° - ZHR: 16 - **Velocity:** 26 miles/sec (medium - 41km/sec) - **Parent Object:** 96P/Machholz?

Next Peak - The Southern delta Aquariids will next peak on the Jul 28-29, 2024 night. On this night, the moon will be 40% full.

 Next Peak night **Jul 28-29, 2024**

alpha Capricornids (CAP) Active from July 3rd to August 15th, 2024

The Alpha Capricornids are active from July 3 through August 15 with a "plateau-like" maximum centered on July 29. This shower is not very strong and rarely produces in excess of five shower members per hour. What is notable about this shower is the number of bright fireballs produced during its activity period. This shower is seen equally well on either side of the equator.

Shower details - Radiant: 20:28 -10.2° - ZHR: 5 - **Velocity:** 15 miles/sec (slow - 24km/sec) - **Parent Object:** 169P/NEAT

Next Peak - The alpha Capricornids will next peak on the Jul 28-29, 2024 night. On this night, the moon will be 40% full.

 Next Peak night **Aug 11-12, 2024**

Perseids (PER) Active from July 17th to August 24th, 2024

The Perseids are the most popular meteor shower as they peak on warm August nights as seen from the northern hemisphere. The Perseids are active from July 17 to August 24. They reach a strong maximum on August 12 or 13, depending on the year. Normal rates seen from rural locations range from 50-75 shower members per hour at maximum. The Perseids are particles released from comet 109P/Swift-Tuttle during its numerous returns to the inner solar system. They are called Perseids since the radiant (the area of the sky where the meteors seem to originate) is located near the prominent constellation of Perseus "the hero" when at maximum activity.

Shower details - Radiant: 03:12 +57.6° - ZHR: 100 - **Velocity:** 37 miles/sec (swift - 60km/sec) - **Parent Object:** 109P/Swift-Tuttle

Next Peak - The Perseids will next peak on the Aug 11-12, 2024 night. On this night, the moon will be 44% full.

 Next Peak night **Oct 9-10, 2024**

Southern Taurids (STA) **Active from September 10th to November 20th, 2024**

The Southern Taurids are a long-lasting shower that reaches a barely noticeable maximum on October 9 or 10. The shower is active for more than two months but rarely produces more than five shower members per hour, even at maximum activity. The Taurids (both branches) are rich in fireballs and are often responsible for increased number of fireball reports from September through November.

Shower details - Radiant: 02:08 +8.7° - ZHR: 5 - **Velocity:** 17 miles/sec (slow - 28km/sec) - **Parent Object:** 2P/Encke

Next Peak - The Southern Taurids will next peak on the Oct 9-10, 2024 night. On this night, the moon will be 42% full.

 Next Peak night **Oct 20-21, 2024**

Orionids (ORI) Active from October 2nd to November 7th, 2024

The Orionids are a medium strength shower that sometimes reaches high strength activity. In a normal year the Orionids produce 10-20 shower members at maximum. In exceptional years, such as 2006-2009, the peak rates were on par with the Perseids (50-75 per hour). Recent displays have produced low to average displays of this shower.

Shower details - Radiant: 06:20 +15.5° - ZHR: 20 - **Velocity:** 41 miles/sec (swift - 67km/sec) - **Parent Object:** 1P/Halley

Next Peak - The Orionids will next peak on the Oct 20-21, 2024 night. On this night, the moon will be 83% full.

 Next Peak night **Nov 11-12, 2024**

Northern Taurids (NTA) Active from October 20th to December 10th, 2024

This shower is much like the Southern Taurids, just active a bit later in the year. When the two showers are active simultaneously in late October and early November, there is sometimes an notable increase in the fireball activity. There seems to be a seven year periodicity with these fireballs. 2008 and 2015 both produced remarkable fireball activity.

Shower details - Radiant: 03:52 +22.7° - ZHR: 5 - **Velocity:** 18 miles/sec (medium - 30km/sec) - **Parent Object:** 2P/Encke

Next Peak - The Northern Taurids will next peak on the Nov 11-12, 2024 night. On this night, the moon will be 79% full.

 Next Peak night **Nov 16-17, 2024**

Leonids (LEO) Active from November 6th to November 30th, 2024

The Leonids are best known for producing meteor storms in the years of 1833, 1866, 1966, 1999, and 2001. These outbursts of meteor activity are best seen when the parent object, comet 55P/Tempel-Tuttle, is near perihelion (closest approach to the sun). Yet it is not the fresh material we see from the comet, but rather debris from earlier returns that also happen to be most dense at the same time. Unfortunately it appears that the earth will not encounter any dense clouds of debris until 2099. Therefore when the comet returns in 2031 and 2064, there will be no meteor storms, but perhaps several good displays of Leonid activity when rates are in excess of 100 per hour. The best we can hope for now until the year 2030 is peaks of around 15 shower members per hour and perhaps an occasional weak outburst when the earth passes near a debris trail. The Leonids are often bright meteors with a high percentage of persistent trains.

Shower details - Radiant: 10:08 +21.6° - ZHR: 15 - **Velocity:** 44 miles/sec (swift - 71km/sec) - **Parent Object:** 55P/Tempel-Tuttle

Next Peak - The Leonids will next peak on the Nov 16-17, 2024 night. On this night, the moon will be 98% full.

 Next Peak night **Dec 13-14, 2024**

Geminids (GEM) Active from December 11th to December 20th, 2024

The Geminids are usually the strongest meteor shower of the year and meteor enthusiasts are certain to circle December 13 and 14 on their calendars. This is the one major shower that provides good activity prior to midnight as the constellation of Gemini is well placed from 22:00 onward. The Geminids are often bright and intensely colored. Due to their medium-slow velocity, persistent trains are not usually seen. These meteors are also seen in the southern hemisphere, but only during the middle of the night and at a reduced rate.

Shower details - Radiant: 07:28 +32.2° - ZHR: 150 - **Velocity:** 22 miles/sec (medium - 35km/sec) - **Parent Object:** 3200 Phaethon (asteroid)

Next Peak - The Geminids will next peak on the Dec 13-14, 2024 night. On this night, the moon will be 97% full.

 Next Peak night **Dec 21-22, 2023**

Ursids (URS) Active from December 17th to December 26th, 2023 Currently active

The Ursids are often neglected due to the fact it peaks just before Christmas and the rates are much less than the Geminds, which peaks just a week before the Ursids. Observers will normally see 5-10 Ursids per hour during the late morning hours on the date of maximum activity. There have been occasional outbursts when rates have exceeded 25 per hour. These outbursts appear unrelated to the perihelion dates of comet 8P/Tuttle. This shower is strictly a northern hemisphere event as the radiant fails to clear the horizon or does so simultaneously with the start of morning twilight as seen from the southern tropics.

Shower details - Radiant: 14:28 +74.8° - ZHR: 10 - **Velocity:** 20 miles/sec (medium - 32km/sec) - **Parent Object:** 8P/Tuttle

Next Peak - The Ursids will next peak on the Dec 21-22, 2023 night. On this night, the moon will be 74% full.

Comets for 2024

Comet	Current brightness	Maximum date	Maximum brightness	Maximum visibility
062P Tsuchinshan	08.5	2023-12	08.5	90°N a 40°S
012P Pons-Brooks	09.0	2024-04	03.5	40°N a 60°S
C/2023 H2 Lemmon	09.5	2023-11	06.5	90°N a 40°S
C/2021 S3 PANSTARRS	11.0	2024-02	09.5	60°N a 60°S
103P Hartley	11.5	2023-10	08.0	90°N a 40°S
C/2023 A3 Tsuchinshan-ATLAS	14.5	2024-10	00.5	90°N a 40°S
013P Olbers	17.0	2024-07	07.0	50°N a 0°
C/2023 R2 PANSTARRS	17.0	2024-08	10.5	Not observable
C/2023 V4 Camarasa-Duszanowicz	17.5	2024-06	13.5	40°N a 20°N
154P Brewington	?	2024-06	10.0	50°N a 30°S

Pages with information about comets:
http://www.aerith.net/comet/future-n.html
http://www.aerith.net/comet/future-s.html
http://www.earthriseinstitute.org/inboundcoms.html
https://www.cometwatch.co.uk/future-comets-northern-hemisphere/
https://cometografia.es/proximos-cometas-brillantes/

Satellite Eclipses, occultations and transits - with the Planet

As moons orbit around a planet, they undergo eclipses, occultations and transits with the body of the planet. For Saturn, Uranus and Neptune, these events only occur when the equatorial plane of the planet is near to edge-on. This option is for computing these events.

The moons included in the predictions, and the frequency of events, are as follows:

Jupiter. Predictions are generated for Io, Europa, Ganymede and Callisto. Events involving Io, Europa and Ganymede occur continuously, whereas events involving Callisto do not occur for a period of around 3 years every 6 years.

Saturn. Predictions are generated for satellites 3 to 6, and 8 (Tethys, Dione, Rhea, Titan, and Iapetus). Events involving Mimas and Enceladus are not included as they are unlikelly to be observable, and are large in number. Events occur for a period of about 4 years every 14 years. In the first half of the 21st century, events occur between Sep 2007 & Oct 2011, Feb 2023 & Apr 2027, Nov 2036 & Aug 2041, and May 2052 to Mar 2057.

Events involving Iapetus occur about 12 months before the other satellites (and the time periods given above) because of the large inclination of the orbit. Because of the large inclination, additional events involving the transit of Iapetus, and of its shadow, on the rings of Saturn are included. The visibility of events against the rings on the 'far side' of Saturn involve two extra considerations that are unique to these events. They are whether, at an event time: the shadow of Iapetus on the rings is occulted by the disk of Saturn, and whether Iapetus is projected against the shadow of Saturn on the rings. These situations involve significant complexities in their determination, and are vary rare. They are not considered in the prediction; as a result it is possible for some Iapetus transit events to not be visible when they occur against the far side of the rings.

The predictions give the mid-time of the events. However the events are not instantaneous. For Jupiter's satellites the duration is typically several minutes. For Iapetus, the duration can be around 20 minutes.

Importantly, the output can be limited to only those events that are visible from our selected location (Miami)- that is, at the event time the planet's altitude > 0 deg, and Sun's altitude < -6 deg (civil twilight).

Explanation:

Satellites of Jupiter 2008 - March

1	12	48.1	2.Tr.E	11	11	37.2	1.Sh.I	24	10	58.9	4.Sh.E
2	15	15.1	1.Sh.I		12	45.8	1.Tr.I		15	10.0	2.Oc.R
3	12	35.1	1.Ec.D		12	54.1	3.Oc.R	25	13	5.5	3.Ec.D
4	11	57.9	1.Sh.E		13	51.5	1.Sh.E		15	24.4	1.Sh.I
	13	3.3	1.Tr.E		15	1.0	1.Tr.E	26	10	11.9	2.Tr.E
7	14	35.9	4.Sh.I	12	12	22.7	1.Oc.R		12	43.6	1.Ec.D
	15	3.9	3.Sh.I	15	13	9.4	2.Sh.I	27	11	7.8	1.Tr.I

The output is given in the form: day, hour, minute, satellite no, event type, phase
with the following symbols being used:

Satellite no. 1 2 3 4... 8

Event type Ec [eclipse]
Oc [occultation]
Tr [transit]
Sh [shadow transit]

Phase D [disappear]
R [reappear]
I [ingress]
E [egress]

For example, an event listed as:

23 12 23.5 2.Ec.R

means Satellite II reappears from eclipse at 12h 23.5m on the 23rd of the month.

Note that the day number is given only for the first event listed for that day.

Satellites of Jupiter 2024

January

1	14	9.6	2.Oc.D	11	8	58.3	1.Tr.I	21	2	33.8	1.Oc.D	8	16	40.6	2.Oc.D	18	10	52.3	1.Tr.I	28	4	28.6	1.Oc.D
	15	23.9	1.Oc.D		10	16.0	1.Sh.I		3	10.3	2.Tr.I		17	15.5	1.Oc.D		12	12.0	1.Sh.I		5	45.0	2.Tr.I
	16	31.7	2.Oc.R		11	8.6	1.Tr.E		4	49.5	3.Tr.I		19	3.6	2.Oc.R		13	2.7	1.Tr.E		7	59.5	1.Ec.R
	16	39.4	2.Ec.D		12	25.7	1.Sh.E		5	31.3	2.Tr.E		19	18.3	2.Ec.D		14	21.7	1.Sh.E		8	6.6	2.Tr.E
	18	46.9	1.Ec.R	12	5	56.7	2.Oc.D		5	48.3	2.Sh.I		20	42.2	1.Ec.R	19	8	5.2	1.Oc.D		8	24.2	2.Sh.I
	19	1.5	2.Ec.R		6	11.8	1.Oc.D		6	4.1	1.Ec.R		21	40.6	2.Ec.R		8	31.6	2.Oc.D		8	48.6	3.Tr.I
2	12	37.6	1.Tr.I		8	20.0	2.Oc.R		6	47.7	3.Tr.E	9	14	30.0	1.Tr.I		10	55.6	2.Oc.R		10	43.8	2.Sh.E
	13	51.0	1.Sh.I		8	37.3	2.Ec.D		8	7.8	2.Sh.E		15	47.0	1.Sh.I		11	16.2	2.Ec.D		10	48.8	3.Tr.E
	14	47.7	1.Tr.E		9	39.9	1.Ec.R		10	24.1	3.Sh.I		16	40.3	1.Tr.E		11	35.2	1.Ec.R		14	26.0	3.Sh.I
	16	0.9	1.Sh.E		10	59.7	2.Ec.R		12	4.1	3.Sh.E		17	56.8	1.Sh.E		13	38.7	2.Ec.R		16	5.8	3.Sh.E
3	6	59.0	3.Oc.D	13	3	26.8	1.Tr.I		23	49.8	1.Tr.I	10	10	45.1	3.Oc.D	20	5	21.1	1.Tr.I	29	1	45.5	1.Tr.I
	8	52.9	3.Oc.R		4	45.0	1.Sh.I	22	1	10.0	1.Sh.I		11	22.3	2.Tr.I		6	41.1	1.Sh.I		3	6.1	1.Sh.I
	8	53.3	2.Tr.I		5	37.1	1.Tr.E		2	0.2	1.Tr.E		11	43.6	1.Oc.D		7	31.5	1.Tr.E		3	56.0	1.Tr.E
	9	51.7	1.Oc.D		6	54.8	1.Sh.E		3	19.7	1.Sh.E		12	42.3	3.Oc.R		8	50.8	1.Sh.E		5	15.7	1.Sh.E
	11	12.8	2.Tr.E	14	0	37.7	2.Tr.I		21	2.4	1.Oc.D		13	42.4	2.Tr.E						22	57.5	1.Oc.D
	11	18.6	2.Sh.I		0	40.0	1.Oc.D		21	50.4	2.Oc.D		13	54.5	2.Sh.I					30	0	28.7	2.Oc.D
	12	3.7	3.Ec.D		0	55.0	3.Tr.I	23	0	14.7	2.Oc.R		15	11.0	1.Ec.R						2	28.4	1.Ec.R
	13	15.7	1.Ec.R		2	50.7	3.Tr.E		0	33.0	1.Ec.R		16	5.5	3.Ec.D						2	53.6	2.Oc.R
	13	38.0	2.Sh.E		2	58.1	2.Tr.E		0	36.1	2.Ec.D		16	13.9	2.Sh.E						3	14.9	2.Ec.D
	13	47.3	3.Ec.R		3	12.4	2.Sh.I		2	58.6	2.Ec.R		17	48.8	3.Ec.R						5	37.5	2.Ec.R
4	7	5.5	1.Tr.I		4	8.7	1.Ec.R		18	18.6	1.Tr.I										20	14.6	1.Tr.I
	8	19.9	1.Sh.I		5	31.8	2.Sh.E		19	39.1	1.Sh.I										21	35.1	1.Sh.I
	9	15.7	1.Tr.E		6	22.0	3.Sh.I		20	29.1	1.Tr.E										22	25.2	1.Tr.E
	10	29.8	1.Sh.E		8	2.2	3.Sh.E		21	48.7	1.Sh.E										23	44.8	1.Sh.E
5	3	24.4	2.Oc.D		21	55.2	1.Tr.I	24	15	31.1	1.Oc.D									31	17	26.5	1.Oc.D
	4	19.5	1.Oc.D		23	14.0	1.Sh.I		16	27.3	2.Tr.I										19	3.2	2.Tr.I
	5	46.9	2.Oc.R	15	0	5.5	1.Tr.E		18	34.1	3.Oc.D										20	57.2	1.Ec.R
	5	58.4	2.Ec.D		1	23.7	1.Sh.E		18	48.7	2.Tr.E										21	25.1	2.Tr.E
	7	44.5	1.Ec.R		19	8.4	1.Oc.D		19	1.8	1.Ec.R										21	42.2	2.Sh.I
	8	20.6	2.Ec.R		19	14.3	2.Oc.D		19	6.2	2.Sh.I										22	35.6	3.Oc.D
6	1	33.7	1.Tr.I		21	37.9	2.Oc.R		20	36.1	3.Oc.R												
	2	49.0	1.Sh.I		21	57.2	2.Ec.D		21	25.8	2.Sh.E												
	3	43.9	1.Tr.E		22	37.6	1.Ec.R	25	0	10.1	3.Ec.D												
	4	58.8	1.Sh.E	16	0	19.6	2.Ec.R		1	52.9	3.Ec.R												
	21	4.9	3.Tr.I		16	23.8	1.Tr.I		12	47.5	1.Tr.I												
	22	7.5	2.Tr.I		17	43.0	1.Sh.I		14	8.0	1.Sh.I												
	22	47.5	1.Oc.D		18	34.1	1.Tr.E		14	58.0	1.Tr.E												
	22	57.6	3.Tr.E		19	52.7	1.Sh.E		16	17.7	1.Sh.E												
7	0	27.3	2.Tr.E	17	13	36.8	1.Oc.D	26	9	59.8	1.Oc.D												
	0	36.5	2.Sh.I		13	53.7	2.Tr.I		11	8.8	2.Oc.D												
	2	13.4	1.Ec.R		14	36.7	3.Oc.D		13	30.6	1.Ec.R												
	2	19.3	3.Sh.I		16	14.4	2.Tr.E		13	33.4	2.Oc.R												
	2	55.9	2.Sh.E		16	30.3	2.Sh.I		13	55.1	2.Ec.D												
	3	59.7	3.Sh.E		16	36.5	3.Oc.R		16	17.7	2.Ec.R												
	20	1.7	1.Tr.I		17	6.4	1.Ec.R	27	7	16.5	1.Tr.I												
	21	17.9	1.Sh.I		18	49.8	2.Sh.E		8	37.1	1.Sh.I												
	22	12.0	1.Tr.E		20	7.4	3.Ec.D		9	27.0	1.Tr.E												
	23	27.8	1.Sh.E		21	50.4	3.Ec.R		10	46.8	1.Sh.E												

February

1	0	1.9	2.Sh.E	11	8	21.4	1.Oc.D	21	2	8.0	1.Tr.I
	0	39.4	3.Oc.R		11	0.6	2.Tr.I		3	23.0	1.Sh.I
	4	12.1	3.Ec.D		11	50.3	1.Ec.R		4	18.9	1.Tr.E
	5	54.8	3.Ec.R		13	23.3	2.Tr.E		5	32.8	1.Sh.E
	14	43.7	1.Tr.I		13	36.1	2.Sh.I		23	18.3	1.Oc.D
	16	4.1	1.Sh.I		15	56.1	2.Sh.E	22	2	43.4	1.Ec.R
	16	54.3	1.Tr.E		17	0.5	3.Tr.I		3	2.1	2.Tr.I
	18	13.7	1.Sh.E		19	3.5	3.Tr.E		5	25.5	2.Tr.E
2	11	55.5	1.Oc.D		22	30.3	3.Sh.I		5	30.1	2.Sh.I
	13	48.2	2.Oc.D	12	0	10.0	3.Sh.E		7	50.6	2.Sh.E
	15	26.1	1.Ec.R		5	39.8	1.Tr.I		11	4.4	3.Oc.D
	16	13.3	2.Oc.R		6	58.1	1.Sh.I		13	11.0	3.Oc.R
	16	33.9	2.Ec.D		7	50.6	1.Tr.E		16	17.2	3.Ec.D
	18	56.5	2.Ec.R		9	7.8	1.Sh.E		17	59.9	3.Ec.R
3	9	13.0	1.Tr.I	13	2	50.8	1.Oc.D		20	37.7	1.Tr.I
	10	33.1	1.Sh.I		5	51.4	2.Oc.D		21	51.9	1.Sh.I

	11	23.6	1.Tr.E
	12	42.8	1.Sh.E
4	6	24.5	1.Oc.D
	8	21.8	2.Tr.I
	9	54.9	1.Ec.R
	10	44.0	2.Tr.E
	11	0.1	2.Sh.I
	12	52.4	3.Tr.I
	13	19.9	2.Sh.E
	14	54.2	3.Tr.E
	18	28.1	3.Sh.I
	20	7.8	3.Sh.E
5	3	42.1	1.Tr.I
	5	2.1	1.Sh.I
	5	52.8	1.Tr.E
	7	11.8	1.Sh.E
6	0	53.7	1.Oc.D
	3	9.1	2.Oc.D
	4	23.8	1.Ec.R
	5	34.5	2.Oc.R
	5	53.7	2.Ec.D
	8	16.4	2.Ec.R
	22	11.5	1.Tr.I
	23	31.1	1.Sh.I
7	0	22.2	1.Tr.E
	1	40.8	1.Sh.E
	19	22.9	1.Oc.D
	21	41.0	2.Tr.I
	22	52.6	1.Ec.R
8	0	3.4	2.Tr.E
	0	18.1	2.Sh.I
	2	38.1	2.Sh.E
	2	41.9	3.Oc.D
	4	47.0	3.Oc.R
	8	14.3	3.Ec.D
	9	57.0	3.Ec.R
	16	40.9	1.Tr.I
	18	0.1	1.Sh.I
	18	51.6	1.Tr.E
	20	9.8	1.Sh.E
9	13	52.1	1.Oc.D
	16	29.6	2.Oc.D
	17	21.5	1.Ec.R
	18	55.2	2.Oc.R
	19	12.6	2.Ec.D
	21	35.4	2.Ec.R
10	11	10.3	1.Tr.I
	12	29.1	1.Sh.I
	13	21.1	1.Tr.E
	14	38.8	1.Sh.E

	6	19.2	1.Ec.R
	8	17.2	2.Oc.R
	8	32.2	2.Ec.D
	10	55.1	2.Ec.R
14	0	9.3	1.Tr.I
	1	27.1	1.Sh.I
	2	20.2	1.Tr.E
	3	36.8	1.Sh.E
	21	20.2	1.Oc.D
15	0	20.7	2.Tr.I
	0	48.0	1.Ec.R
	2	43.6	2.Tr.E
	2	54.1	2.Sh.I
	5	14.3	2.Sh.E
	6	51.4	3.Oc.D
	8	57.4	3.Oc.R
	12	15.9	3.Ec.D
	13	58.5	3.Ec.R
	18	38.9	1.Tr.I
	19	56.0	1.Sh.I
	20	49.8	1.Tr.E
	22	5.8	1.Sh.E
16	15	49.6	1.Oc.D
	19	12.8	2.Oc.D
	19	16.9	1.Ec.R
	21	38.7	2.Oc.R
	21	51.1	2.Ec.D
17	0	14.0	2.Ec.R
	13	8.6	1.Tr.I
	14	25.1	1.Sh.I
	15	19.5	1.Tr.E
	16	34.8	1.Sh.E
18	10	19.2	1.Oc.D
	13	41.2	2.Tr.I
	13	45.7	1.Ec.R
	16	4.4	2.Tr.E
	16	12.1	2.Sh.I
	18	32.5	2.Sh.E
	21	13.3	3.Tr.I
	23	17.1	3.Tr.E
19	2	33.2	3.Sh.I
	4	13.0	3.Sh.E
	7	38.2	1.Tr.I
	8	54.0	1.Sh.I
	9	49.1	1.Tr.E
	11	3.8	1.Sh.E
20	4	48.7	1.Oc.D
	8	14.6	1.Ec.R
	8	35.4	2.Oc.D
	11	1.5	2.Oc.R
	11	10.7	2.Ec.D
	13	33.6	2.Ec.R

	22	48.7	1.Tr.E
23	0	1.8	1.Sh.E
	17	48.0	1.Oc.D
	21	12.3	1.Ec.R
	21	57.6	2.Oc.D
24	0	23.9	2.Oc.R
	0	29.5	2.Ec.D
	2	52.5	2.Ec.R
	15	7.6	1.Tr.I
	16	21.0	1.Sh.I
	17	18.6	1.Tr.E
	18	30.8	1.Sh.E
25	12	17.7	1.Oc.D
	15	41.1	1.Ec.R
	16	23.4	2.Tr.I
	18	47.0	2.Tr.E
	18	48.2	2.Sh.I
	21	8.9	2.Sh.E
26	1	28.8	3.Tr.I
	3	33.2	3.Tr.E
	6	35.4	3.Sh.I
	8	15.3	3.Sh.E
	9	37.4	1.Tr.I
	10	49.9	1.Sh.I
	11	48.4	1.Tr.E
	12	59.7	1.Sh.E
27	6	47.5	1.Oc.D
	10	10.0	1.Ec.R
	11	20.9	2.Oc.D
	13	47.3	2.Oc.R
	13	49.0	2.Ec.D
	16	12.1	2.Ec.R
28	4	7.3	1.Tr.I
	5	18.9	1.Sh.I
	6	18.4	1.Tr.E
	7	28.7	1.Sh.E
29	1	17.2	1.Oc.D
	4	38.8	1.Ec.R
	5	45.1	2.Tr.I
	8	6.2	2.Sh.I
	8	8.9	2.Tr.E
	10	27.1	2.Sh.E
	15	20.7	3.Oc.D
	17	27.6	3.Oc.R
	20	18.8	3.Ec.D
	22	1.5	3.Ec.R
	22	37.2	1.Tr.I
	23	47.8	1.Sh.I

March

1	0	48.3	1.Tr.E
	1	57.7	1.Sh.E
	19	47.0	1.Oc.D
	23	7.7	1.Ec.R
2	0	43.7	2.Oc.D
	5	30.9	2.Ec.R
	17	7.2	1.Tr.I
	18	16.8	1.Sh.I
	19	18.4	1.Tr.E
	20	26.7	1.Sh.E
3	14	16.9	1.Oc.D
	17	36.5	1.Ec.R
	19	7.1	2.Tr.I
	21	24.3	2.Sh.I
	21	31.2	2.Tr.E
	23	45.3	2.Sh.E
4	5	47.7	3.Tr.I
	7	52.3	3.Tr.E
	10	37.6	3.Sh.I
	11	37.2	1.Tr.I
	12	17.8	3.Sh.E
	12	45.7	1.Sh.I
	13	48.3	1.Tr.E
	14	55.6	1.Sh.E
5	8	46.8	1.Oc.D
	12	5.4	1.Ec.R
	14	7.6	2.Oc.D
	18	50.3	2.Ec.R
6	6	7.2	1.Tr.I
	7	14.6	1.Sh.I
	8	18.4	1.Tr.E
	9	24.6	1.Sh.E
7	3	16.8	1.Oc.D
	6	34.2	1.Ec.R
	8	29.5	2.Tr.I
	10	42.4	2.Sh.I
	10	53.8	2.Tr.E
	13	3.6	2.Sh.E
	19	40.1	3.Oc.D
	21	47.0	3.Oc.R
8	0	20.4	3.Ec.D
	0	37.3	1.Tr.I
	1	43.5	1.Sh.I
	2	3.2	3.Ec.R
	2	48.5	1.Tr.E
	3	53.5	1.Sh.E
	21	46.7	1.Oc.D
9	1	3.0	1.Ec.R
	3	31.1	2.Oc.D
	8	9.0	2.Ec.R

11	0	0.5	2.Sh.I
	0	16.7	2.Tr.E
	2	21.9	2.Sh.E
	10	8.4	3.Tr.I
	12	13.2	3.Tr.E
	13	37.5	1.Tr.I
	14	39.1	3.Sh.I
	14	41.4	1.Sh.I
	15	48.8	1.Tr.E
	16	19.6	3.Sh.E
	16	51.4	1.Sh.E
12	10	46.8	1.Oc.D
	14	0.7	1.Ec.R
	16	55.5	2.Oc.D
	21	28.4	2.Ec.R
13	8	7.7	1.Tr.I
	9	10.3	1.Sh.I
	10	19.0	1.Tr.E
	11	20.4	1.Sh.E
14	5	16.9	1.Oc.D
	8	29.5	1.Ec.R
	11	15.1	2.Tr.I
	13	18.6	2.Sh.I
	13	39.8	2.Tr.E
	15	40.1	2.Sh.E
15	0	2.9	3.Oc.D
	2	9.6	3.Oc.R
	2	37.9	1.Tr.I
	3	39.2	1.Sh.I
	4	22.7	3.Ec.D
	4	49.2	1.Tr.E
	5	49.3	1.Sh.E
	6	5.6	3.Ec.R
	23	47.0	1.Oc.D
16	2	58.4	1.Ec.R
	6	19.4	2.Oc.D
	10	47.0	2.Ec.R
	21	8.1	1.Tr.I
	22	8.2	1.Sh.I
	23	19.5	1.Tr.E
17	0	18.3	1.Sh.E
	18	17.1	1.Oc.D
	21	27.2	1.Ec.R
18	0	38.4	2.Tr.I
	2	36.7	2.Sh.I
	3	3.3	2.Tr.E
	4	58.5	2.Sh.E
	14	31.3	3.Tr.I
	15	38.3	1.Tr.I
	16	36.0	3.Tr.E

21	7	17.5	1.Oc.D
	10	24.8	1.Ec.R
	14	1.9	2.Tr.I
	15	54.8	2.Sh.I
	16	27.1	2.Tr.E
	18	16.8	2.Sh.E
22	4	27.2	3.Oc.D
	4	38.9	1.Tr.I
	5	34.8	1.Sh.I
	6	33.6	3.Oc.R
	6	50.3	1.Tr.E
	7	45.0	1.Sh.E
	8	24.3	3.Ec.D
	10	7.4	3.Ec.R
23	1	47.7	1.Oc.D
	4	53.7	1.Ec.R
	9	8.6	2.Oc.D
	13	24.7	2.Ec.R
	23	9.2	1.Tr.I
24	0	3.7	1.Sh.I
	1	20.7	1.Tr.E
	2	14.0	1.Sh.E
	20	17.9	1.Oc.D
	23	22.5	1.Ec.R
25	3	25.7	2.Tr.I
	5	13.0	2.Sh.I
	5	51.1	2.Tr.E
	7	35.2	2.Sh.E
	17	39.5	1.Tr.I
	18	32.5	1.Sh.I
	18	56.5	3.Tr.I
	19	51.0	1.Tr.E
	20	42.8	1.Sh.E
	21	0.9	3.Tr.E
	22	41.8	3.Sh.I
26	0	22.9	3.Sh.E
	14	48.2	1.Oc.D
	17	51.3	1.Ec.R
	22	33.7	2.Oc.D
27	2	43.8	2.Ec.R
	12	9.9	1.Tr.I
	13	1.4	1.Sh.I
	14	21.4	1.Tr.E
	15	11.7	1.Sh.E
28	9	18.5	1.Oc.D
	12	20.1	1.Ec.R
	16	49.7	2.Tr.I
	18	31.1	2.Sh.I
	19	15.3	2.Tr.E
	20	53.5	2.Sh.E

19	7.4	1.Tr.I	16	37.0	1.Sh.I	29	6	40.2	1.Tr.I		
20	12.5	1.Sh.I	17	49.7	1.Tr.E		7	30.3	1.Sh.I		
21	18.7	1.Tr.E	18	40.3	3.Sh.I		8	51.7	1.Tr.E		
22	22.5	1.Sh.E	18	47.2	1.Sh.E		8	53.6	3.Oc.D		
10 16	16.7	1.Oc.D	20	21.1	3.Sh.E		9	40.6	1.Sh.E		
19	31.8	1.Ec.R	19 12	47.3	1.Oc.D		10	59.6	3.Oc.R		
21	52.1	2.Tr.I	15	56.0	1.Ec.R		12	26.0	3.Ec.D		
			19	44.2	2.Oc.D		14	9.4	3.Ec.R		
			20 0	6.2	2.Ec.R	30	3	48.8	1.Oc.D		
			10	8.6	1.Tr.I		6	48.9	1.Ec.R		
			11	5.9	1.Sh.I		11	58.4	2.Oc.D		
			12	20.0	1.Tr.E		16	2.3	2.Ec.R		
			13	16.1	1.Sh.E	31	1	10.7	1.Tr.I		
							1	59.2	1.Sh.I		
							3	22.2	1.Tr.E		
							4	9.5	1.Sh.E		
							22	19.1	1.Oc.D		

April

1 1	17.7	1.Ec.R	11 13	21.6	1.Oc.D	21	7	16.3	1.Tr.I		
6	13.9	2.Tr.I	16	10.5	1.Ec.R		7	44.8	1.Sh.I		
7	49.3	2.Sh.I	22	27.8	2.Tr.I		9	27.9	1.Tr.E		
8	39.8	2.Tr.E	23	43.9	2.Sh.I		9	55.4	1.Sh.E		
10	12.0	2.Sh.E	12 0	54.2	2.Tr.E	22	4	24.5	1.Oc.D		
19	41.0	1.Tr.I	2	7.1	2.Sh.E		7	3.2	1.Ec.R		
20	28.0	1.Sh.I	10	43.7	1.Tr.I		14	43.3	2.Tr.I		
21	52.5	1.Tr.E	11	20.9	1.Sh.I		15	38.8	2.Sh.I		
22	38.3	1.Sh.E	12	55.3	1.Tr.E		17	10.3	2.Tr.E		
23	23.4	3.Tr.I	13	31.4	1.Sh.E		18	2.7	2.Sh.E		
2 1	27.4	3.Tr.E	17	49.4	3.Oc.D	23	1	46.7	1.Tr.I		
2	43.2	3.Sh.I	19	54.2	3.Oc.R		2	13.5	1.Sh.I		
4	24.7	3.Sh.E	20	27.8	3.Ec.D		3	58.3	1.Tr.E		
16	49.5	1.Oc.D	22	11.8	3.Ec.R		4	24.1	1.Sh.E		
19	46.6	1.Ec.R	13 7	52.0	1.Oc.D		12	52.9	3.Tr.I		
3 1	23.7	2.Oc.D	10	39.3	1.Ec.R		14	47.9	3.Sh.I		
5	21.1	2.Ec.R	17	39.2	2.Oc.D		14	55.5	3.Tr.E		
14	11.5	1.Tr.I	21	16.6	2.Ec.R		16	30.9	3.Sh.E		
14	56.8	1.Sh.I	14 5	14.2	1.Tr.I		22	55.0	1.Oc.D		
16	23.0	1.Tr.E	5	49.7	1.Sh.I	24	1	32.0	1.Ec.R		
17	7.2	1.Sh.E	7	25.8	1.Tr.E		9	55.6	2.Oc.D		
4 11	19.9	1.Oc.D	8	0.2	1.Sh.E		13	11.8	2.Ec.R		
14	15.3	1.Ec.R	15 2	22.5	1.Oc.D		20	17.3	1.Tr.I		
19	38.3	2.Tr.I	5	8.1	1.Ec.R		20	42.3	1.Sh.I		
21	7.5	2.Sh.I	11	52.9	2.Tr.I		22	28.9	1.Tr.E		
22	4.4	2.Tr.E	13	2.3	2.Sh.I		22	52.9	1.Sh.E		
23	30.3	2.Sh.E	14	19.5	2.Tr.E	25	17	25.5	1.Oc.D		
5 8	41.9	1.Tr.I	15	25.7	2.Sh.E		20	0.8	1.Ec.R		
9	25.6	1.Sh.I	23	44.7	1.Tr.I	26	4	8.6	2.Tr.I		
10	53.4	1.Tr.E	16 0	18.5	1.Sh.I		4	57.0	2.Sh.I		
11	36.0	1.Sh.E	1	56.3	1.Tr.E		6	35.8	2.Tr.E		
13	21.0	3.Oc.D	2	29.0	1.Sh.E		7	21.0	2.Sh.E		

15	26.3	3.Oc.R	8	22.3	3.Tr.I	14	47.8	1.Tr.I			
16	27.0	3.Ec.D	10	25.3	3.Tr.E	15	11.0	1.Sh.I			
18	10.7	3.Ec.R	10	46.6	3.Sh.I	16	59.4	1.Tr.E			
6 5	50.3	1.Oc.D	12	29.0	3.Sh.E	17	21.6	1.Sh.E			
8	44.2	1.Ec.R	20	53.0	1.Oc.D	27 2	49.8	3.Oc.D			
14	48.6	2.Oc.D	23	36.9	1.Ec.R	6	14.5	3.Ec.R			
18	39.6	2.Ec.R	17 7	4.8	2.Oc.D	11	56.1	1.Oc.D			
7 3	12.4	1.Tr.I	10	35.2	2.Ec.R	14	29.6	1.Ec.R			
3	54.5	1.Sh.I	18	15.2	1.Tr.I	23	20.9	2.Oc.D			
5	23.9	1.Tr.E	18	47.3	1.Sh.I	28 2	30.0	2.Ec.R			
6	4.9	1.Sh.E	20	26.8	1.Tr.E	9	18.3	1.Tr.I			
8 0	20.7	1.Oc.D	20	57.8	1.Sh.E	9	39.8	1.Sh.I			
3	12.9	1.Ec.R	18 15	23.5	1.Oc.D	11	29.9	1.Tr.E			
9	3.1	2.Tr.I	18	5.7	1.Ec.R	11	50.4	1.Sh.E			
10	25.8	2.Sh.I	19 1	17.9	2.Tr.I	29 6	26.6	1.Oc.D			
11	29.3	2.Tr.E	2	20.4	2.Sh.I	8	58.3	1.Ec.R			
12	48.8	2.Sh.E	3	44.7	2.Tr.E	17	34.2	2.Tr.I			
21	42.8	1.Tr.I	4	44.0	2.Sh.E	18	15.4	2.Sh.I			
22	23.3	1.Sh.I	12	45.7	1.Tr.I	20	1.6	2.Tr.E			
23	54.3	1.Tr.E	13	16.0	1.Sh.I	20	39.7	2.Sh.E			
9 0	33.7	1.Sh.E	14	57.3	1.Tr.E	30 3	48.8	1.Tr.I			
3	52.6	3.Tr.I	15	26.6	1.Sh.E	4	8.5	1.Sh.I			
5	56.2	3.Tr.E	22	19.2	3.Oc.D	6	0.4	1.Tr.E			
6	45.4	3.Sh.I	20 0	23.3	3.Oc.R	6	19.1	1.Sh.E			
8	27.3	3.Sh.E	0	28.8	3.Ec.D	17	23.5	3.Tr.I			
18	51.1	1.Oc.D	2	13.1	3.Ec.R	18	48.5	3.Sh.I			
21	41.8	1.Ec.R	9	54.0	1.Oc.D	19	25.5	3.Tr.E			
10 4	14.1	2.Oc.D	12	34.5	1.Ec.R	20	32.0	3.Sh.E			
7	58.3	2.Ec.R	20	30.0	2.Oc.D						
16	13.3	1.Tr.I	23	53.4	2.Ec.R						
16	52.1	1.Sh.I									
18	24.8	1.Tr.E									
19	2.6	1.Sh.E									

May

1 0	57.2	1.Oc.D	11 11	53.4	3.Oc.D	21 2	5.7	2.Sh.I			
3	27.1	1.Ec.R	14	18.0	3.Ec.R	2	9.0	2.Tr.I			
12	46.5	2.Oc.D	16	0.6	1.Oc.D	4	31.0	2.Sh.E			
15	48.3	2.Ec.R	18	19.6	1.Ec.R	4	37.4	2.Tr.E			
22	19.4	1.Tr.I	12 5	2.5	2.Oc.D	9	52.6	1.Sh.I			
22	37.2	1.Sh.I	7	42.4	2.Ec.R	9	55.0	1.Tr.I			
2 0	31.0	1.Tr.E	13	22.5	1.Tr.I	12	3.3	1.Sh.E			
0	47.9	1.Sh.E	13	29.4	1.Sh.I	12	6.4	1.Tr.E			
19	27.7	1.Oc.D	15	34.1	1.Tr.E	22 6	49.8	3.Sh.I			
21	55.8	1.Ec.R	15	40.1	1.Sh.E	6	57.0	3.Tr.I			
3 6	59.7	2.Tr.I	13 10	31.1	1.Oc.D	7	0.7	1.Ec.D			
7	33.6	2.Sh.I	12	48.3	1.Ec.R	8	35.0	3.Sh.E			
9	27.2	2.Tr.E	23	17.2	2.Tr.I	8	57.5	3.Tr.E			
9	58.0	2.Sh.E	23	28.9	2.Sh.I	9	16.1	1.Oc.R			
16	49.9	1.Tr.I	14 1	45.3	2.Tr.E	21	11.1	2.Ec.D			
17	5.9	1.Sh.I	1	53.8	2.Sh.E	23	46.1	2.Oc.R			

	19	1.5	1.Tr.E
	19	16.6	1.Sh.E
4	7	21.8	3.Oc.D
	10	16.6	3.Ec.R
	13	58.3	1.Oc.D
	16	24.6	1.Ec.R
5	2	11.8	2.Oc.D
	5	6.3	2.Ec.R
	11	20.4	1.Tr.I
	11	34.7	1.Sh.I
	13	32.0	1.Tr.E
	13	45.3	1.Sh.E
6	8	28.8	1.Oc.D
	10	53.3	1.Ec.R
	20	25.6	2.Tr.I
	20	52.1	2.Sh.I
	22	53.3	2.Tr.E
	23	16.7	2.Sh.E
7	5	50.9	1.Tr.I
	6	3.3	1.Sh.I
	8	2.5	1.Tr.E
	8	14.0	1.Sh.E
	21	54.3	3.Tr.I
	22	48.8	3.Sh.I
	23	55.8	3.Tr.E
8	0	32.9	3.Sh.E
	2	59.5	1.Oc.D
	5	22.1	1.Ec.R
	15	37.2	2.Oc.D
	18	24.4	2.Ec.R
9	0	21.5	1.Tr.I
	0	32.0	1.Sh.I
	2	33.0	1.Tr.E
	2	42.7	1.Sh.E
	21	30.0	1.Oc.D
	23	50.8	1.Ec.R
10	9	51.2	2.Tr.I
	10	10.3	2.Sh.I
	12	19.1	2.Tr.E
	12	35.1	2.Sh.E
	18	52.0	1.Tr.I
	19	0.7	1.Sh.I
	21	3.5	1.Tr.E
	21	11.4	1.Sh.E

	7	53.0	1.Tr.I
	7	58.0	1.Sh.I
	10	4.5	1.Tr.E
	10	8.7	1.Sh.E
15	2	25.7	3.Tr.I
	2	49.3	3.Sh.I
	4	26.6	3.Tr.E
	4	33.9	3.Sh.E
	5	1.7	1.Oc.D
	7	17.1	1.Ec.R
	18	27.8	2.Oc.D
	21	0.4	2.Ec.R
16	2	23.5	1.Tr.I
	2	26.7	1.Sh.I
	4	35.0	1.Tr.E
	4	37.4	1.Sh.E
	23	32.3	1.Oc.D
17	1	45.8	1.Ec.R
	12	42.9	2.Tr.I
	12	47.1	2.Sh.I
	15	11.1	2.Tr.E
	15	12.2	2.Sh.E
	20	54.0	1.Tr.I
	20	55.3	1.Sh.I
	23	5.5	1.Tr.E
	23	6.0	1.Sh.E
18	16	25.2	3.Oc.D
	18	2.9	1.Oc.D
	18	26.8	3.Oc.R
	20	14.9	1.Oc.R
19	7	53.0	2.Oc.D
	10	20.9	2.Oc.R
	15	24.0	1.Sh.I
	15	24.5	1.Tr.I
	17	34.7	1.Sh.E
	17	36.0	1.Tr.E
20	12	31.9	1.Ec.D
	14	45.4	1.Oc.R

23	4	21.3	1.Sh.I
	4	25.4	1.Tr.I
	6	31.9	1.Sh.E
	6	36.9	1.Tr.E
24	1	29.4	1.Ec.D
	3	46.6	1.Oc.R
	15	23.9	2.Sh.I
	15	34.7	2.Tr.I
	17	49.3	2.Sh.E
	18	3.3	2.Tr.E
	22	49.9	1.Sh.I
	22	55.9	1.Tr.I
25	1	0.5	1.Sh.E
	1	7.3	1.Tr.E
	19	58.1	1.Ec.D
	20	33.5	3.Ec.D
	22	17.2	1.Oc.R
	22	57.4	3.Oc.R
26	10	28.7	2.Ec.D
	13	11.2	2.Oc.R
	17	18.5	1.Sh.I
	17	26.4	1.Tr.I
	19	29.2	1.Sh.E
	19	37.8	1.Tr.E
27	14	26.7	1.Ec.D
	16	47.7	1.Oc.R
28	4	42.6	2.Sh.I
	5	0.9	2.Tr.I
	7	8.2	2.Sh.E
	7	29.7	2.Tr.E
	11	47.1	1.Sh.I
	11	56.8	1.Tr.I
	13	57.8	1.Sh.E
	14	8.2	1.Tr.E
29	8	55.5	1.Ec.D
	10	51.0	3.Sh.I
	11	18.3	1.Oc.R
	11	28.9	3.Tr.I
	12	36.9	3.Sh.E
	13	29.0	3.Tr.E
	23	46.4	2.Ec.D
30	2	36.2	2.Oc.R
	6	15.7	1.Sh.I
	6	27.2	1.Tr.I
	8	26.4	1.Sh.E
	8	38.6	1.Tr.E
31	3	24.1	1.Ec.D
	5	48.8	1.Oc.R
	18	0.8	2.Sh.I
	18	26.5	2.Tr.I
	20	26.5	2.Sh.E
	20	55.4	2.Tr.E

June

1	0	44.3	1.Sh.I
	0	57.6	1.Tr.I
	2	54.9	1.Sh.E
	3	9.0	1.Tr.E
	21	52.8	1.Ec.D
2	0	19.3	1.Oc.R
	0	33.5	3.Ec.D
	3	27.7	3.Oc.R
	13	3.9	2.Ec.D
	16	1.1	2.Oc.R
	19	13.0	1.Sh.I
	19	28.0	1.Tr.I
	21	23.5	1.Sh.E
	21	39.4	1.Tr.E
3	16	21.5	1.Ec.D
	18	49.8	1.Oc.R
4	7	19.6	2.Sh.I
	7	52.8	2.Tr.I
	9	45.5	2.Sh.E
	10	21.8	2.Tr.E
	13	41.5	1.Sh.I
	13	58.4	1.Tr.I
	15	52.1	1.Sh.E
	16	9.7	1.Tr.E
5	10	50.2	1.Ec.D
	13	20.4	1.Oc.R
	14	51.3	3.Sh.I
	15	59.6	3.Tr.I
	16	37.9	3.Sh.E
	17	59.3	3.Tr.E
6	2	21.5	2.Ec.D
	5	25.9	2.Oc.R
	8	10.1	1.Sh.I
	8	28.8	1.Tr.I
	10	20.7	1.Sh.E
	10	40.0	1.Tr.E
7	5	18.8	1.Ec.D
	7	50.8	1.Oc.R
	20	37.7	2.Sh.I
	21	18.3	2.Tr.I
	23	3.7	2.Sh.E
	23	47.4	2.Tr.E
8	2	38.7	1.Sh.I
	2	59.1	1.Tr.I
	4	49.2	1.Sh.E
	5	10.4	1.Tr.E
	23	47.5	1.Ec.D
9	2	21.3	1.Oc.R
	4	33.9	3.Ec.D
	7	57.8	3.Oc.R

11	9	56.6	2.Sh.I
	10	44.4	2.Tr.I
	12	22.8	2.Sh.E
	13	13.7	2.Tr.E
	15	35.8	1.Sh.I
	15	59.8	1.Tr.I
	17	46.4	1.Sh.E
	18	11.0	1.Tr.E
12	12	44.8	1.Ec.D
	15	22.3	1.Oc.R
	18	51.6	3.Sh.I
	20	29.6	3.Tr.I
	20	38.9	3.Sh.E
	22	29.1	3.Tr.E
13	4	56.4	2.Ec.D
	8	15.1	2.Oc.R
	10	4.4	1.Sh.I
	10	30.1	1.Tr.I
	12	14.9	1.Sh.E
	12	41.2	1.Tr.E
14	7	13.5	1.Ec.D
	9	52.7	1.Oc.R
	23	14.8	2.Sh.I
15	0	9.8	2.Tr.I
	1	41.1	2.Sh.E
	2	39.2	2.Tr.E
	4	32.9	1.Sh.I
	5	0.3	1.Tr.I
	6	43.4	1.Sh.E
	7	11.5	1.Tr.E
16	1	42.2	1.Ec.D
	4	23.1	1.Oc.R
	8	34.1	3.Ec.D
	10	22.9	3.Ec.R
	10	27.1	3.Oc.D
	12	27.4	3.Oc.R
	18	13.7	2.Ec.D
	21	39.5	2.Oc.R
	23	1.5	1.Sh.I
	23	30.6	1.Tr.I
17	1	12.0	1.Sh.E
	1	41.7	1.Tr.E
	20	10.7	1.Ec.D
	22	53.5	1.Oc.R
18	12	33.7	2.Sh.I
	13	35.8	2.Tr.I
	15	0.1	2.Sh.E
	16	5.4	2.Tr.E
	17	30.0	1.Sh.I
	18	0.8	1.Tr.I

21	9	8.1	1.Ec.D
	11	54.3	1.Oc.R
22	1	51.9	2.Sh.I
	3	1.0	2.Tr.I
	4	18.4	2.Sh.E
	5	30.6	2.Tr.E
	6	27.1	1.Sh.I
	7	1.2	1.Tr.I
	8	37.5	1.Sh.E
	9	12.3	1.Tr.E
23	3	36.7	1.Ec.D
	6	24.7	1.Oc.R
	12	35.1	3.Ec.D
	14	24.6	3.Ec.R
	14	56.6	3.Oc.D
	16	56.8	3.Oc.R
	20	48.4	2.Ec.D
24	0	27.9	2.Oc.R
	0	55.7	1.Sh.I
	1	31.4	1.Tr.I
	3	6.0	1.Sh.E
	3	42.4	1.Tr.E
	22	5.3	1.Ec.D
25	0	55.0	1.Oc.R
	15	10.8	2.Sh.I
	16	26.8	2.Tr.I
	17	37.4	2.Sh.E
	18	56.6	2.Tr.E
	19	24.2	1.Sh.I
	20	1.6	1.Tr.I
	21	34.5	1.Sh.E
	22	12.6	1.Tr.E
26	16	34.0	1.Ec.D
	19	25.3	1.Oc.R
27	2	50.7	3.Sh.I
	4	39.4	3.Sh.E
	5	25.4	3.Tr.I
	7	24.6	3.Tr.E
	10	5.6	2.Ec.D
	13	51.7	2.Oc.R
	13	52.7	1.Sh.I
	14	31.7	1.Tr.I
	16	3.0	1.Sh.E
	16	42.7	1.Tr.E
28	11	2.6	1.Ec.D
	13	55.6	1.Oc.R
29	4	29.0	2.Sh.I
	5	51.7	2.Tr.I
	6	55.7	2.Sh.E
	8	21.2	1.Sh.I

	15	38.9	2.Ec.D		19	40.5	1.Sh.E		8	21.6	2.Tr.E
	18	50.6	2.Oc.R		20	11.9	1.Tr.E		9	1.8	1.Tr.I
	21	7.3	1.Sh.I	19	14	39.5	1.Ec.D		10	31.5	1.Sh.E
	21	29.4	1.Tr.I		17	23.9	1.Oc.R		11	12.7	1.Tr.E
	23	17.8	1.Sh.E		22	51.3	3.Sh.I	30	5	31.3	1.Ec.D
	23	40.7	1.Tr.E	20	0	39.2	3.Sh.E		8	25.9	1.Oc.R
10	18	16.1	1.Ec.D		0	58.1	3.Tr.I		16	35.2	3.Ec.D
	20	51.7	1.Oc.R		2	57.4	3.Tr.E		18	25.6	3.Ec.R
					7	31.1	2.Ec.D		19	24.3	3.Oc.D
					11	3.7	2.Oc.R		21	24.5	3.Oc.R
					11	58.6	1.Sh.I		23	22.8	2.Ec.D
					12	31.0	1.Tr.I				
					14	9.0	1.Sh.E				
					14	42.1	1.Tr.E				

July

1	2	49.7	1.Sh.I	11	10	50.1	3.Sh.I	21	11	14.5	1.Ec.D
	3	15.5	2.Oc.R		12	40.2	3.Sh.E		14	27.2	1.Oc.R
	3	31.9	1.Tr.I		14	16.8	3.Tr.I	22	4	34.3	3.Ec.D
	5	0.0	1.Sh.E		15	14.2	2.Ec.D		6	27.3	3.Ec.R
	5	42.8	1.Tr.E		16	15.9	3.Tr.E		7	5.3	2.Ec.D
	23	59.8	1.Ec.D		17	40.6	1.Sh.I		8	31.4	1.Sh.I
2	2	56.1	1.Oc.R		18	31.8	1.Tr.I		8	37.0	3.Oc.D
	17	48.0	2.Sh.I		19	25.5	2.Oc.R		9	30.7	1.Tr.I
	19	17.2	2.Tr.I		19	50.8	1.Sh.E		10	37.8	3.Oc.R
	20	14.8	2.Sh.E		20	42.5	1.Tr.E		10	41.4	1.Sh.E
	21	18.2	1.Sh.I	12	14	51.5	1.Ec.D		11	33.5	2.Oc.R
	21	47.3	2.Tr.E		17	57.1	1.Oc.R		11	41.2	1.Tr.E
	22	1.9	1.Tr.I	13	9	43.3	2.Sh.I	23	5	43.0	1.Ec.D
	23	28.5	1.Sh.E		11	31.2	2.Tr.I		8	57.1	1.Oc.R
3	0	12.8	1.Tr.E		12	9.1	1.Sh.I	24	1	39.5	2.Sh.I
	18	28.5	1.Ec.D		12	10.5	2.Sh.E		2	59.8	1.Sh.I
	21	26.4	1.Oc.R		13	1.7	1.Tr.I		3	44.2	2.Tr.I
4	6	50.4	3.Sh.I		14	1.5	2.Tr.E		4	0.4	1.Tr.I
	8	39.8	3.Sh.E		14	19.2	1.Sh.E		4	7.0	2.Sh.E
	9	51.9	3.Tr.I		15	12.4	1.Tr.E		5	9.8	1.Sh.E
	11	51.0	3.Tr.E	14	9	20.1	1.Ec.D		6	10.9	1.Tr.E
	12	39.9	2.Ec.D		12	27.2	1.Oc.R		6	14.7	2.Tr.E
	15	46.7	1.Sh.I	15	0	34.9	3.Ec.D	25	0	11.6	1.Ec.D
	16	32.0	1.Tr.I		2	27.1	3.Ec.R		3	27.0	1.Oc.R
	16	39.0	2.Oc.R		4	14.8	3.Oc.D		18	50.1	3.Sh.I
	17	56.9	1.Sh.E		4	31.3	2.Ec.D		20	22.3	2.Ec.D
	18	42.8	1.Tr.E		6	15.3	3.Oc.R		20	41.8	3.Sh.E
5	12	57.1	1.Ec.D		6	37.6	1.Sh.I		21	28.3	1.Sh.I
	15	56.6	1.Oc.R		7	31.6	1.Tr.I		22	30.0	1.Tr.I
6	7	6.1	2.Sh.I		8	47.7	1.Sh.E		23	2.1	3.Tr.I
	8	41.8	2.Tr.I		8	48.4	2.Oc.R		23	38.2	1.Sh.E
	9	33.1	2.Sh.E		9	42.2	1.Tr.E	26	0	40.5	1.Tr.E
	10	15.2	1.Sh.I	16	3	48.7	1.Ec.D		0	55.7	2.Oc.R
	11	2.0	1.Tr.I		6	57.2	1.Oc.R		1	1.4	3.Tr.E
	11	11.9	2.Tr.E		23	2.4	2.Sh.I		18	40.2	1.Ec.D

	12	25.4	1.Sh.E	17	0	56.1	2.Tr.I		21	56.8	1.Oc.R
	13	12.8	1.Tr.E		1	6.0	1.Sh.I	27	14	57.7	2.Sh.I
7	7	25.7	1.Ec.D		1	29.6	2.Sh.E		15	56.7	1.Sh.I
	10	26.8	1.Oc.R		2	1.4	1.Tr.I		16	59.6	1.Tr.I
	20	35.4	3.Ec.D		3	16.1	1.Sh.E		17	7.3	2.Tr.I
	22	26.7	3.Ec.R		3	26.5	2.Tr.E		17	25.2	2.Sh.E
	23	50.6	3.Oc.D		4	12.0	1.Tr.E		18	6.6	1.Sh.E
8	1	51.0	3.Oc.R		22	17.3	1.Ec.D		19	10.1	1.Tr.E
	1	57.1	2.Ec.D	18	1	27.3	1.Oc.R		19	38.0	2.Tr.E
	4	43.7	1.Sh.I		14	50.6	3.Sh.I	28	13	8.8	1.Ec.D
	5	32.0	1.Tr.I		16	41.5	3.Sh.E		16	26.6	1.Oc.R
	6	2.4	2.Oc.R		17	48.3	2.Ec.D	29	8	34.1	3.Ec.D
	6	53.9	1.Sh.E		18	40.9	3.Tr.I		9	39.3	2.Ec.D
	7	42.7	1.Tr.E		19	34.5	1.Sh.I		10	25.1	1.Sh.I
9	1	54.3	1.Ec.D		20	31.2	1.Tr.I		10	28.0	3.Ec.R
	4	56.9	1.Oc.R		20	40.1	3.Tr.E		11	29.2	1.Tr.I
	20	25.2	2.Sh.I		21	44.5	1.Sh.E		12	35.1	1.Sh.E
	22	7.0	2.Tr.I		22	11.1	2.Oc.R		12	57.8	3.Oc.D
	22	52.2	2.Sh.E		22	41.8	1.Tr.E		13	39.7	1.Tr.E
	23	12.2	1.Sh.I	19	16	45.9	1.Ec.D		14	17.6	2.Oc.R
10	0	1.9	1.Tr.I		19	57.2	1.Oc.R		14	58.7	3.Oc.R
	0	37.3	2.Tr.E	20	12	20.5	2.Sh.I	30	7	37.3	1.Ec.D
	1	22.3	1.Sh.E		14	2.9	1.Sh.I		10	56.3	1.Oc.R
	2	12.7	1.Tr.E		14	19.8	2.Tr.I	31	4	16.7	2.Sh.I
	20	22.9	1.Ec.D		14	47.8	2.Sh.E		4	53.6	1.Sh.I
	23	27.1	1.Oc.R		15	0.9	1.Tr.I		5	58.8	1.Tr.I
					16	13.0	1.Sh.E		6	31.2	2.Tr.I
					16	50.3	2.Tr.E		6	44.3	2.Sh.E
					17	11.5	1.Tr.E		7	3.5	1.Sh.E
									8	9.2	1.Tr.E
									9	1.9	2.Tr.E

August

1	2	5.9	1.Ec.D	11	1	9.8	2.Tr.E	21	10	34.4	1.Sh.I
	5	26.1	1.Oc.R		16	57.3	1.Ec.D		11	50.2	1.Tr.I
	22	49.7	3.Sh.I		20	23.6	1.Oc.R		12	7.9	2.Sh.I
	22	56.2	2.Ec.D	12	14	12.4	1.Sh.I		12	44.1	1.Sh.E
	23	22.0	1.Sh.I		14	47.1	2.Ec.D		14	0.4	1.Tr.E
2	0	28.3	1.Tr.I		15	24.5	1.Tr.I		14	36.1	2.Sh.E
	0	42.3	3.Sh.E		16	22.2	1.Sh.E		14	44.4	2.Tr.I
	1	31.9	1.Sh.E		16	34.1	3.Ec.D		17	15.3	2.Tr.E
	2	38.7	1.Tr.E		17	34.8	1.Tr.E	22	7	48.5	1.Ec.D
	3	21.1	3.Tr.I		18	29.9	3.Ec.R		11	19.4	1.Oc.R
	3	39.2	2.Oc.R		19	42.3	2.Oc.R	23	5	2.8	1.Sh.I
	5	20.6	3.Tr.E		21	32.4	3.Oc.D		6	19.2	1.Tr.I
	20	34.4	1.Ec.D		23	33.9	3.Oc.R		6	37.8	2.Ec.D
	23	55.8	1.Oc.R	13	11	25.7	1.Ec.D		7	12.5	1.Sh.E
3	17	34.8	2.Sh.I		14	53.0	1.Oc.R		8	29.3	1.Tr.E
	17	50.4	1.Sh.I	14	8	40.8	1.Sh.I		9	6.1	2.Ec.R
	18	57.8	1.Tr.I		9	30.9	2.Sh.I		9	11.3	2.Oc.D
	19	53.8	2.Tr.I		9	53.8	1.Tr.I		10	46.5	3.Sh.I
	20	0.3	1.Sh.E		10	50.6	1.Sh.E		11	42.3	2.Oc.R

	20	2.6	2.Sh.E		11	58.9	2.Sh.E		12	41.7	3.Sh.E											7	44.4	1.Oc.R
	21	8.1	1.Tr.E		12	1.4	2.Tr.I		16	1.0	3.Tr.I													
	22	24.6	2.Tr.E		12	4.0	1.Tr.E		18	1.0	3.Tr.E													
4	15	3.0	1.Ec.D		14	32.3	2.Tr.E	24	2	16.9	1.Ec.D													
	18	25.5	1.Oc.R	15	5	54.3	1.Ec.D		5	48.5	1.Oc.R													
5	12	13.2	2.Ec.D		9	22.4	1.Oc.R		23	31.1	1.Sh.I													
	12	18.8	1.Sh.I	16	3	9.2	1.Sh.I	25	0	48.1	1.Tr.I													
	12	33.7	3.Ec.D		4	3.9	2.Ec.D		1	25.9	2.Sh.I													
	13	27.2	1.Tr.I		4	22.9	1.Tr.I		1	40.9	1.Sh.E													
	14	28.6	3.Ec.R		5	19.0	1.Sh.E		2	58.3	1.Tr.E													
	14	28.7	1.Sh.E		6	33.2	1.Tr.E		3	54.2	2.Sh.E													
	15	37.6	1.Tr.E		6	47.3	3.Sh.I		4	4.7	2.Tr.I													
	17	0.5	2.Oc.R		8	41.7	3.Sh.E		6	35.7	2.Tr.E													
	17	16.0	3.Oc.D		9	2.7	2.Oc.R		20	45.5	1.Ec.D													
	19	17.2	3.Oc.R		11	50.3	3.Tr.I	26	0	17.6	1.Oc.R													
6	9	31.5	1.Ec.D		13	50.1	3.Tr.E		17	59.5	1.Sh.I													
	12	55.0	1.Oc.R	17	0	22.8	1.Ec.D		19	17.0	1.Tr.I													
7	6	47.2	1.Sh.I		3	51.7	1.Oc.R		19	54.7	2.Ec.D													
	6	53.8	2.Sh.I		21	37.6	1.Sh.I		20	9.2	1.Sh.E													
	7	56.6	1.Tr.I		22	49.0	2.Sh.I		21	27.1	1.Tr.E													
	8	57.1	1.Sh.E		22	52.1	1.Tr.I		22	23.2	2.Ec.R													
	9	17.0	2.Tr.I		23	47.4	1.Sh.E		22	30.5	2.Oc.D													
	9	21.6	2.Sh.E	18	1	2.3	1.Tr.E	27	0	33.4	3.Ec.D													
	10	6.9	1.Tr.E		1	17.1	2.Sh.E		1	1.6	2.Oc.R													
	11	47.8	2.Tr.E		1	22.7	2.Tr.I		2	31.2	3.Ec.R													
8	4	0.1	1.Ec.D		3	53.6	2.Tr.E		5	54.6	3.Oc.D													
	7	24.6	1.Oc.R		18	51.4	1.Ec.D		7	56.6	3.Oc.R													
9	1	15.6	1.Sh.I		22	21.0	1.Oc.R		15	14.0	1.Ec.D													
	1	30.1	2.Ec.D	19	16	6.0	1.Sh.I		18	46.6	1.Oc.R													
	2	26.0	1.Tr.I		17	20.9	2.Ec.D	28	12	27.9	1.Sh.I													
	2	48.6	3.Sh.I		17	21.1	1.Tr.I		13	45.8	1.Tr.I													
	3	25.4	1.Sh.E		18	15.7	1.Sh.E		14	37.6	1.Sh.E													
	4	36.3	1.Tr.E		19	31.3	1.Tr.E		14	44.8	2.Sh.I													
	4	42.0	3.Sh.E		19	49.0	2.Ec.R		15	56.0	1.Tr.E													
	6	21.6	2.Oc.R		19	51.8	2.Oc.D		17	13.2	2.Sh.E													
	7	37.1	3.Tr.I		20	33.7	3.Ec.D		17	25.6	2.Tr.I													
	9	36.7	3.Tr.E		22	22.7	2.Oc.R		19	56.6	2.Tr.E													
	22	28.7	1.Ec.D		22	30.5	3.Ec.R	29	9	42.6	1.Ec.D													
10	1	54.1	1.Oc.R	20	1	45.1	3.Oc.D		13	15.6	1.Oc.R													
	19	44.0	1.Sh.I		3	46.9	3.Oc.R	30	6	56.3	1.Sh.I													
	20	11.9	2.Sh.I		13	19.9	1.Ec.D		8	14.6	1.Tr.I													
	20	55.3	1.Tr.I		16	50.2	1.Oc.R		9	6.0	1.Sh.E													
	21	53.8	1.Sh.E						9	11.6	2.Ec.D													
	22	39.0	2.Tr.I						10	24.7	1.Tr.E													
	22	39.8	2.Sh.E						11	40.3	2.Ec.R													
	23	5.5	1.Tr.E						11	49.2	2.Oc.D													
									14	20.5	2.Oc.R													
									14	45.6	3.Sh.I													
									16	41.8	3.Sh.E													
									20	8.4	3.Tr.I													
									22	8.5	3.Tr.E													
								31	4	11.0	1.Ec.D													

September

1	1	24.6	1.Sh.I	11	16	14.8	1.Sh.I	21	2	43.6	3.Sh.I												
	2	43.3	1.Tr.I		17	34.5	1.Tr.I		4	43.1	3.Sh.E												
	3	34.4	1.Sh.E		18	24.6	1.Sh.E		8	8.4	3.Tr.I												
	4	2.8	2.Sh.I		19	44.6	1.Tr.E		9	53.1	1.Ec.D												
	4	53.5	1.Tr.E		19	58.3	2.Sh.I		10	8.7	3.Tr.E												
	6	31.3	2.Sh.E		22	27.3	2.Sh.E		13	26.4	1.Oc.R												
	6	45.1	2.Tr.I		22	42.3	2.Tr.I	22	7	4.9	1.Sh.I												
	9	16.1	2.Tr.E	12	1	13.4	2.Tr.E		8	23.5	1.Tr.I												
	22	39.6	1.Ec.D		13	30.7	1.Ec.D		9	14.9	1.Sh.E												
2	2	13.4	1.Oc.R		17	5.1	1.Oc.R		10	33.7	1.Tr.E												
	19	53.0	1.Sh.I	13	10	43.1	1.Sh.I		11	52.8	2.Sh.I												
	21	12.0	1.Tr.I		12	2.8	1.Tr.I		14	22.2	2.Sh.E												
	22	2.7	1.Sh.E		12	53.0	1.Sh.E		14	34.0	2.Tr.I												
	22	28.5	2.Ec.D		14	13.0	1.Tr.E		17	5.2	2.Tr.E												
	23	22.1	1.Tr.E		14	19.5	2.Ec.D	23	4	21.7	1.Ec.D												
3	0	57.4	2.Ec.R		16	48.8	2.Ec.R		7	54.6	1.Oc.R												
	1	7.5	2.Oc.D		17	0.0	2.Oc.D	24	1	33.2	1.Sh.I												
	3	38.9	2.Oc.R		19	31.6	2.Oc.R		2	51.4	1.Tr.I												
	4	32.4	3.Ec.D		22	44.6	3.Sh.I		3	43.3	1.Sh.E												
	6	31.3	3.Ec.R	14	0	42.9	3.Sh.E		5	1.6	1.Tr.E												
	10	0.1	3.Oc.D		4	12.8	3.Tr.I		6	10.5	2.Ec.D												
	12	2.3	3.Oc.R		6	13.0	3.Tr.E		8	40.5	2.Ec.R												
	17	8.1	1.Ec.D		7	59.1	1.Ec.D		8	48.0	2.Oc.D												
	20	42.1	1.Oc.R		11	33.5	1.Oc.R		11	19.9	2.Oc.R												
4	14	21.4	1.Sh.I	15	5	11.5	1.Sh.I		16	30.0	3.Ec.D												
	15	40.6	1.Tr.I		6	31.1	1.Tr.I		18	32.2	3.Ec.R												
	16	31.1	1.Sh.E		7	21.4	1.Sh.E		21	53.8	3.Oc.D												
	17	21.7	2.Sh.I		8	41.2	1.Tr.E		22	50.1	1.Ec.D												
	17	50.8	1.Tr.E		9	16.2	2.Sh.I		23	56.0	3.Oc.R												
	19	50.3	2.Sh.E		11	45.3	2.Sh.E	25	2	22.5	1.Oc.R												
	20	5.0	2.Tr.I		11	59.8	2.Tr.I		20	1.6	1.Sh.I												
	22	36.0	2.Tr.E		14	31.0	2.Tr.E		21	19.3	1.Tr.I												
5	11	36.6	1.Ec.D	16	2	27.7	1.Ec.D		22	11.7	1.Sh.E												
	15	10.8	1.Oc.R		6	1.9	1.Oc.R		23	29.6	1.Tr.E												
6	8	49.7	1.Sh.I		23	39.8	1.Sh.I	26	1	11.4	2.Sh.I												
	10	9.2	1.Tr.I	17	0	59.3	1.Tr.I		3	41.0	2.Sh.E												
	10	59.5	1.Sh.E		1	49.7	1.Sh.E		3	50.5	2.Tr.I												
	11	45.5	2.Ec.D		3	9.4	1.Tr.E		6	21.7	2.Tr.E												
	12	19.3	1.Tr.E		3	36.4	2.Ec.D		17	18.7	1.Ec.D												
	14	14.5	2.Ec.R		6	6.0	2.Ec.R		20	50.5	1.Oc.R												
	14	25.5	2.Oc.D		6	16.5	2.Oc.D	27	14	29.9	1.Sh.I												
	16	56.9	2.Oc.R		8	48.2	2.Oc.R		15	47.1	1.Tr.I												
	18	45.5	3.Sh.I		12	30.7	3.Ec.D		16	40.1	1.Sh.E												
	20	42.8	3.Sh.E		14	31.8	3.Ec.R		17	57.4	1.Tr.E												
7	0	13.0	3.Tr.I		18	0.1	3.Oc.D		19	27.6	2.Ec.D												
	2	13.2	3.Tr.E		20	2.4	3.Oc.R		21	57.8	2.Ec.R												
	6	5.1	1.Ec.D		20	56.1	1.Ec.D		22	3.0	2.Oc.D												
	9	39.5	1.Oc.R	18	0	30.1	1.Oc.R	28	0	34.9	2.Oc.R												
8	3	18.1	1.Sh.I		18	8.2	1.Sh.I		6	42.2	3.Sh.I												

	4	37.7	1.Tr.I		19	27.4	1.Tr.I		8	42.9	3.Sh.E
	5	27.9	1.Sh.E		20	18.1	1.Sh.E		11	47.1	1.Ec.D
	6	39.6	2.Sh.I		21	37.6	1.Tr.E		11	59.2	3.Tr.I
	6	47.8	1.Tr.E		22	34.9	2.Sh.I		13	59.3	3.Tr.E
	9	8.4	2.Sh.E	19	1	4.2	2.Sh.E		15	18.3	1.Oc.R
	9	23.5	2.Tr.I		1	17.5	2.Tr.I	29	8	58.3	1.Sh.I
	11	54.6	2.Tr.E		3	48.7	2.Tr.E		10	14.8	1.Tr.I
9	0	33.7	1.Ec.D		15	24.7	1.Ec.D		11	8.5	1.Sh.E
	4	8.1	1.Oc.R		18	58.3	1.Oc.R		12	25.1	1.Tr.E
	21	46.4	1.Sh.I	20	12	36.5	1.Sh.I		14	29.2	2.Sh.I
	23	6.1	1.Tr.I		13	55.5	1.Tr.I		16	59.0	2.Sh.E
	23	56.2	1.Sh.E		14	46.5	1.Sh.E		17	5.8	2.Tr.I
10	1	2.5	2.Ec.D		16	5.7	1.Tr.E		19	37.0	2.Tr.E
	1	16.2	1.Tr.E		16	53.5	2.Ec.D	30	6	15.7	1.Ec.D
	3	31.6	2.Ec.R		19	23.2	2.Ec.R		9	46.2	1.Oc.R
	3	42.9	2.Oc.D		19	32.5	2.Oc.D				
	6	14.5	2.Oc.R		22	4.3	2.Oc.R				
	8	31.3	3.Ec.D								
	10	31.3	3.Ec.R								
	14	1.9	3.Oc.D								
	16	4.1	3.Oc.R								
	19	2.1	1.Ec.D								
	22	36.6	1.Oc.R								

October

1	3	26.6	1.Sh.I	11	0	31.3	1.Oc.R	21	0	26.7	2.Tr.I
	4	42.5	1.Tr.I		18	16.8	1.Sh.I		0	48.9	2.Sh.E
	5	36.9	1.Sh.E		19	27.1	1.Tr.I		2	58.0	2.Tr.E
	6	52.8	1.Tr.E		20	27.4	1.Sh.E		11	57.8	1.Ec.D
	8	44.8	2.Ec.D		21	37.6	1.Tr.E		15	13.9	1.Oc.R
	11	15.1	2.Ec.R	12	0	36.3	2.Ec.D	22	9	7.1	1.Sh.I
	11	17.6	2.Oc.D		5	29.7	2.Oc.R		10	9.1	1.Tr.I
	13	49.5	2.Oc.R		14	39.7	3.Sh.I		11	18.0	1.Sh.E
	20	30.2	3.Ec.D		15	35.2	1.Ec.D		12	19.9	1.Tr.E
	22	33.4	3.Ec.R		16	42.8	3.Sh.E		16	28.4	2.Ec.D
2	0	44.2	1.Ec.D		18	58.5	1.Oc.R		21	5.1	2.Oc.R
	1	43.7	3.Oc.D		19	27.2	3.Tr.I	23	6	26.3	1.Ec.D
	3	45.8	3.Oc.R		21	27.0	3.Tr.E		8	27.9	3.Ec.D
	4	13.8	1.Oc.R	13	12	45.2	1.Sh.I		9	40.7	1.Oc.R
	21	55.0	1.Sh.I		13	54.3	1.Tr.I		10	34.7	3.Ec.R
	23	10.1	1.Tr.I		14	55.8	1.Sh.E		12	41.6	3.Oc.D
3	0	5.3	1.Sh.E		16	4.8	1.Tr.E		14	42.9	3.Oc.R
	1	20.5	1.Tr.E		19	41.7	2.Sh.I	24	3	35.5	1.Sh.I
	3	47.7	2.Sh.I		22	2.2	2.Tr.I		4	36.0	1.Tr.I
	6	17.7	2.Sh.E		22	12.4	2.Sh.E		5	46.5	1.Sh.E
	6	21.1	2.Tr.I	14	0	33.4	2.Tr.E		6	46.8	1.Tr.E
	8	52.3	2.Tr.E		10	3.7	1.Ec.D		11	36.1	2.Sh.I
	19	12.7	1.Ec.D		13	25.8	1.Oc.R		13	38.3	2.Tr.I
	22	41.5	1.Oc.R	15	7	13.5	1.Sh.I		14	7.5	2.Sh.E
4	16	23.3	1.Sh.I		8	21.3	1.Tr.I		16	9.6	2.Tr.E
	17	37.6	1.Tr.I		9	24.2	1.Sh.E	25	0	54.8	1.Ec.D
	18	33.7	1.Sh.E		10	31.9	1.Tr.E		4	7.5	1.Oc.R
	19	48.0	1.Tr.E		13	53.6	2.Ec.D		22	3.9	1.Sh.I
	22	1.9	2.Ec.D		18	42.1	2.Oc.R		23	2.6	1.Tr.I
5	3	3.4	2.Oc.R	16	4	29.0	3.Ec.D	26	0	15.0	1.Sh.E
	10	40.7	3.Sh.I		4	32.2	1.Ec.D		1	13.5	1.Tr.E
	12	42.6	3.Sh.E		6	34.5	3.Ec.R		5	45.8	2.Ec.D
	13	41.2	1.Ec.D		7	52.9	1.Oc.R		10	15.7	2.Oc.R
	15	45.3	3.Tr.I		9	7.4	3.Oc.D		19	23.3	1.Ec.D
	17	9.0	1.Oc.R		11	9.1	3.Oc.R		22	34.2	1.Oc.R
	17	45.3	3.Tr.E	17	1	41.9	1.Sh.I		22	38.6	3.Sh.I
6	10	51.7	1.Sh.I		2	48.4	1.Tr.I	27	0	44.4	3.Sh.E
	12	5.1	1.Tr.I		3	52.7	1.Sh.E		2	37.2	3.Tr.I
	13	2.1	1.Sh.E		4	59.1	1.Tr.E		4	36.7	3.Tr.E
	14	15.5	1.Tr.E		9	0.1	2.Sh.I		16	32.3	1.Sh.I
	17	5.5	2.Sh.I		11	15.0	2.Tr.I		17	29.3	1.Tr.I
	19	35.2	2.Tr.I		11	31.0	2.Sh.E		18	43.5	1.Sh.E
	19	35.8	2.Sh.E		13	46.3	2.Tr.E		19	40.2	1.Tr.E
	22	6.5	2.Tr.E		23	0.7	1.Ec.D	28	0	53.9	2.Sh.I
7	8	9.7	1.Ec.D	18	2	20.0	1.Oc.R		2	48.8	2.Tr.I
	11	36.6	1.Oc.R		20	10.3	1.Sh.I		3	25.5	2.Sh.E
8	5	20.1	1.Sh.I		21	15.4	1.Tr.I		5	20.1	2.Tr.E
	6	32.5	1.Tr.I		22	21.1	1.Sh.E		13	51.9	1.Ec.D
	7	30.5	1.Sh.E		23	26.1	1.Tr.E		17	0.8	1.Oc.R
	8	42.9	1.Tr.E	19	3	11.0	2.Ec.D	29	11	0.7	1.Sh.I
	11	19.1	2.Ec.D		7	53.8	2.Oc.R		11	55.9	1.Tr.I
	16	16.9	2.Oc.R		17	29.2	1.Ec.D		13	11.9	1.Sh.E
9	0	29.5	3.Ec.D		18	38.7	3.Sh.I		14	6.8	1.Tr.E
	2	33.9	3.Ec.R		20	43.1	3.Sh.E		19	3.3	2.Ec.D
	2	38.2	1.Ec.D		20	46.9	1.Oc.R		23	25.9	2.Oc.R
	5	28.0	3.Oc.D		23	4.1	3.Tr.I	30	8	20.4	1.Ec.D
	6	3.9	1.Oc.R	20	1	3.8	3.Tr.E		11	27.4	1.Oc.R
	7	29.8	3.Oc.R		14	38.7	1.Sh.I		12	26.9	3.Ec.D
	23	48.5	1.Sh.I		15	42.3	1.Tr.I		14	34.8	3.Ec.R
10	0	59.8	1.Tr.I		16	49.6	1.Sh.E		16	11.1	3.Oc.D
	1	59.0	1.Sh.E		17	53.0	1.Tr.E		18	12.2	3.Oc.R
	3	10.3	1.Tr.E		22	17.8	2.Sh.I	31	5	29.2	1.Sh.I
	6	24.0	2.Sh.I						6	22.4	1.Tr.I
	8	49.3	2.Tr.I						7	40.5	1.Sh.E
	8	54.4	2.Sh.E						8	33.4	1.Tr.E
	11	20.5	2.Tr.E						14	12.1	2.Sh.I
	21	6.7	1.Ec.D						15	59.2	2.Tr.I
									16	43.9	2.Sh.E
									18	30.5	2.Tr.E

November

1	2	48.9	1.Ec.D	11	6	5.7	2.Sh.I	21	0	26.5	3.Ec.D
	5	53.9	1.Oc.R		7	26.5	2.Tr.I		4	18.7	3.Oc.R
	23	57.6	1.Sh.I		8	38.2	2.Sh.E		11	11.0	1.Sh.I
2	0	48.9	1.Tr.I		9	57.8	2.Tr.E		11	36.7	1.Tr.I
	2	9.0	1.Sh.E		17	40.3	1.Ec.D		13	23.1	1.Sh.E
	2	59.9	1.Tr.E		20	31.8	1.Oc.R		13	48.2	1.Tr.E
	8	20.8	2.Ec.D	12	14	48.3	1.Sh.I		21	59.7	2.Sh.I
	12	35.5	2.Oc.R		15	26.5	1.Tr.I		22	50.2	2.Tr.I

	21	17.5	1.Ec.D		17	0.2	1.Sh.E	22	0	32.8	2.Sh.E
3	0	20.3	1.Oc.R		17	37.8	1.Tr.E		1	21.5	2.Tr.E
	2	37.8	3.Sh.I	13	0	13.9	2.Ec.D		8	31.7	1.Ec.D
	4	44.9	3.Sh.E		4	1.9	2.Oc.R		11	7.9	1.Oc.R
	6	4.8	3.Tr.I		12	8.8	1.Ec.D	23	5	39.5	1.Sh.I
	8	4.3	3.Tr.E		14	57.9	1.Oc.R		6	2.6	1.Tr.I
	18	26.0	1.Sh.I		20	26.0	3.Ec.D		7	51.7	1.Sh.E
	19	15.3	1.Tr.I		22	36.4	3.Ec.R		8	14.1	1.Tr.E
	20	37.5	1.Sh.E		22	58.3	3.Oc.D		16	7.5	2.Ec.D
	21	26.4	1.Tr.E	14	0	59.3	3.Oc.R		19	24.9	2.Oc.R
4	3	29.8	2.Sh.I		9	16.9	1.Sh.I	24	3	0.3	1.Ec.D
	5	8.6	2.Tr.I		9	52.6	1.Tr.I		5	33.8	1.Oc.R
	6	1.9	2.Sh.E		11	28.8	1.Sh.E		14	35.2	3.Sh.I
	7	40.0	2.Tr.E		12	4.0	1.Tr.E		16	4.4	3.Tr.I
	15	46.0	1.Ec.D		19	23.9	2.Sh.I		16	46.4	3.Sh.E
	18	46.8	1.Oc.R		20	34.8	2.Tr.I		18	4.6	3.Tr.E
5	12	54.4	1.Sh.I		21	56.6	2.Sh.E	25	0	8.1	1.Sh.I
	13	41.6	1.Tr.I		23	6.2	2.Tr.E		0	28.5	1.Tr.I
	15	6.0	1.Sh.E	15	6	37.4	1.Ec.D		2	20.4	1.Sh.E
	15	52.7	1.Tr.E		9	24.0	1.Oc.R		2	40.1	1.Tr.E
	21	38.5	2.Ec.D	16	3	45.4	1.Sh.I		11	17.5	2.Sh.I
6	1	44.8	2.Oc.R		4	18.7	1.Tr.I		11	57.3	2.Tr.I
	10	14.5	1.Ec.D		5	57.3	1.Sh.E		13	50.8	2.Sh.E
	13	13.1	1.Oc.R		6	30.1	1.Tr.E		14	28.7	2.Tr.E
	16	26.5	3.Ec.D		13	31.7	2.Ec.D		21	28.9	1.Ec.D
	18	35.6	3.Ec.R		17	9.8	2.Oc.R		23	59.8	1.Oc.R
	19	36.7	3.Oc.D	17	1	5.9	1.Ec.D	26	18	36.7	1.Sh.I
	21	37.7	3.Oc.R		3	50.0	1.Oc.R		18	54.4	1.Tr.I
7	7	22.9	1.Sh.I		10	36.1	3.Sh.I		20	49.0	1.Sh.E
	8	7.9	1.Tr.I		12	45.9	3.Sh.E		21	6.0	1.Tr.E
	9	34.6	1.Sh.E		12	47.7	3.Tr.I	27	5	25.7	2.Ec.D
	10	19.1	1.Tr.E		14	47.5	3.Tr.E		8	32.3	2.Oc.R
	16	48.0	2.Sh.I		22	13.9	1.Sh.I		15	57.5	1.Ec.D
	18	17.9	2.Tr.I		22	44.7	1.Tr.I		18	25.6	1.Oc.R
	19	20.2	2.Sh.E	18	0	25.9	1.Sh.E	28	4	26.2	3.Ec.D
	20	49.3	2.Tr.E		0	56.2	1.Tr.E		7	35.1	3.Oc.R
8	4	43.1	1.Ec.D		8	41.6	2.Sh.I		13	5.3	1.Sh.I
	7	39.4	1.Oc.R		9	42.5	2.Tr.I		13	20.3	1.Tr.I
9	1	51.4	1.Sh.I		11	14.5	2.Sh.E		15	17.6	1.Sh.E
	2	34.2	1.Tr.I		12	13.9	2.Tr.E		15	31.9	1.Tr.E
	4	3.1	1.Sh.E		19	34.5	1.Ec.D	29	0	35.6	2.Sh.I
	4	45.4	1.Tr.E		22	16.0	1.Oc.R		1	4.5	2.Tr.I
	10	56.1	2.Ec.D	19	16	42.4	1.Sh.I		3	9.1	2.Sh.E
	14	53.4	2.Oc.R		17	10.7	1.Tr.I		3	35.8	2.Tr.E
	23	11.6	1.Ec.D		18	54.5	1.Sh.E		10	26.1	1.Ec.D
10	2	5.6	1.Oc.R		19	22.1	1.Tr.E		12	51.5	1.Oc.R
	6	37.2	3.Sh.I	20	2	49.7	2.Ec.D	30	7	33.9	1.Sh.I
	8	45.6	3.Sh.E		6	17.6	2.Oc.R		7	46.1	1.Tr.I
	9	28.3	3.Tr.I		14	3.1	1.Ec.D		9	46.3	1.Sh.E
	11	27.8	3.Tr.E		16	42.0	1.Oc.R		9	57.8	1.Tr.E
	20	19.9	1.Sh.I						18	43.6	2.Ec.D
	21	0.4	1.Tr.I						21	39.2	2.Oc.R
	22	31.6	1.Sh.E								
	23	11.6	1.Tr.E								

December

1	4	54.7	1.Ec.D	11	0	33.1	1.Tr.E	21	12	57.1	1.Tr.I
	7	17.3	1.Oc.R		0	38.4	1.Sh.E		13	18.1	1.Sh.I
	18	35.0	3.Sh.I		10	28.2	2.Oc.D		15	9.0	1.Tr.E
	19	19.6	3.Tr.I		13	13.4	2.Ec.R		15	30.8	1.Sh.E
	20	47.4	3.Sh.E		19	40.6	1.Oc.D	22	1	50.1	2.Oc.D
	21	20.4	3.Tr.E		21	59.0	1.Ec.R		5	9.2	2.Ec.R
2	2	2.5	1.Sh.I	12	12	1.5	3.Oc.D		10	16.3	1.Oc.D
	2	12.0	1.Tr.I		14	40.9	3.Ec.R		12	51.1	1.Ec.R
	4	15.0	1.Sh.E		16	47.2	1.Tr.I	23	5	5.1	3.Tr.I
	4	23.7	1.Tr.E		16	54.5	1.Sh.I		6	36.1	3.Sh.I
	13	53.4	2.Sh.I		18	59.0	1.Tr.E		7	9.5	3.Tr.E
	14	11.2	2.Tr.I		19	7.1	1.Sh.E		7	23.3	1.Tr.I
	16	27.0	2.Sh.E	13	5	31.7	2.Tr.I		7	46.9	1.Sh.I
	16	42.6	2.Tr.E		5	47.4	2.Sh.I		8	52.1	3.Sh.E
	23	23.4	1.Ec.D		8	3.0	2.Tr.E		9	35.1	1.Tr.E
3	1	43.2	1.Oc.R		8	21.4	2.Sh.E		9	59.6	1.Sh.E
	20	31.1	1.Sh.I		14	6.5	1.Oc.D		20	53.0	2.Tr.I
	20	37.8	1.Tr.I		16	27.7	1.Ec.R		21	41.1	2.Sh.I
	22	43.6	1.Sh.E	14	11	13.1	1.Tr.I		23	24.5	2.Tr.E
	22	49.5	1.Tr.E		11	23.2	1.Sh.I	24	0	15.3	2.Sh.E
4	8	1.9	2.Ec.D		13	25.0	1.Tr.E		4	42.4	1.Oc.D
	10	46.4	2.Oc.R		13	35.8	1.Sh.E		7	19.8	1.Ec.R
	17	52.0	1.Ec.D		23	35.2	2.Oc.D	25	1	49.4	1.Tr.I
	20	9.0	1.Oc.R	15	2	31.8	2.Ec.R		2	15.6	1.Sh.I
5	8	26.1	3.Ec.D		8	32.4	1.Oc.D		4	1.2	1.Tr.E
	10	50.4	3.Oc.R		10	56.4	1.Ec.R		4	28.3	1.Sh.E
	14	59.8	1.Sh.I	16	1	49.2	3.Tr.I		14	58.2	2.Oc.D
	15	3.7	1.Tr.I		2	35.9	3.Sh.I		18	28.2	2.Ec.R
	17	12.3	1.Sh.E		3	52.2	3.Tr.E		23	8.4	1.Oc.D
	17	15.5	1.Tr.E		4	50.7	3.Sh.E	26	1	48.5	1.Ec.R
6	3	11.5	2.Sh.I		5	39.1	1.Tr.I		18	32.6	3.Oc.D
	3	18.1	2.Tr.I		5	51.9	1.Sh.I		20	15.6	1.Tr.I
	5	45.2	2.Sh.E		7	51.0	1.Tr.E		20	44.4	1.Sh.I
	5	49.4	2.Tr.E		8	4.6	1.Sh.E		22	27.5	1.Tr.E
	12	20.6	1.Ec.D		18	38.5	2.Tr.I		22	43.2	3.Ec.R
	14	34.8	1.Oc.R		19	5.2	2.Sh.I		22	57.1	1.Sh.E
7	9	28.4	1.Sh.I		21	9.9	2.Tr.E	27	10	0.8	2.Tr.I
	9	29.6	1.Tr.I		21	39.3	2.Sh.E		10	59.0	2.Sh.I
	11	41.0	1.Sh.E	17	2	58.3	1.Oc.D		12	32.2	2.Tr.E
	11	41.3	1.Tr.E		5	25.1	1.Ec.R		13	33.3	2.Sh.E
	21	20.0	2.Ec.D	18	0	5.0	1.Tr.I		17	34.6	1.Oc.D
	23	54.6	2.Ec.R		0	20.6	1.Sh.I		20	17.2	1.Ec.R
8	6	48.9	1.Oc.D		2	16.9	1.Tr.E	28	14	41.8	1.Tr.I
	9	1.7	1.Ec.R		2	33.3	1.Sh.E		15	13.2	1.Sh.I
	22	33.9	3.Tr.I		12	42.7	2.Oc.D		16	53.7	1.Tr.E
	22	35.0	3.Sh.I		15	50.7	2.Ec.R		17	25.9	1.Sh.E
9	0	35.6	3.Tr.E		21	24.3	1.Oc.D	29	4	6.2	2.Oc.D
	0	48.6	3.Sh.E		23	53.7	1.Ec.R		7	46.8	2.Ec.R

	3	55.4	1.Tr.I	19	15	15.9	3.Oc.D		12	0.8	1.Oc.D
	3	57.1	1.Sh.I		18	31.1	1.Tr.I		14	45.9	1.Ec.R
	6	7.2	1.Tr.E		18	41.7	3.Ec.R	30	8	23.3	3.Tr.I
	6	9.7	1.Sh.E		18	49.4	1.Sh.I		9	8.2	1.Tr.I
	16	24.7	2.Tr.I		20	43.0	1.Tr.E		9	42.0	1.Sh.I
	16	29.3	2.Sh.I		21	2.1	1.Sh.E		10	29.4	3.Tr.E
	18	56.1	2.Tr.E	20	7	45.7	2.Tr.I		10	36.4	3.Sh.I
	19	3.2	2.Sh.E		8	23.2	2.Sh.I		11	20.1	1.Tr.E
10	1	14.8	1.Oc.D		10	17.1	2.Tr.E		11	54.7	1.Sh.E
	3	30.4	1.Ec.R		10	57.4	2.Sh.E		12	53.6	3.Sh.E
	22	21.3	1.Tr.I		15	50.3	1.Oc.D		23	8.8	2.Tr.I
	22	25.8	1.Sh.I		18	22.4	1.Ec.R	31	0	16.9	2.Sh.I
									1	40.3	2.Tr.E
									2	51.3	2.Sh.E
									6	27.0	1.Oc.D
									9	14.7	1.Ec.R

Mizar and Alcor:

Satellites of Saturn 2024

January

1	14 38.0	3.Tr.I	
	14 54.7	3.Sh.I	
	16 38.1	3.Tr.E	
	17 23.9	3.Sh.E	
2	2 45.5	4.Ec.D	
	4 35.1	4.Ec.R	
	13 17.0	3.Oc.D	
	16 3.5	3.Ec.R	
3	11 34.4	4.Sh.I	
	11 57.0	3.Tr.I	
	12 13.6	3.Sh.I	
	13 23.7	4.Sh.E	
	13 58.6	3.Tr.E	
	14 43.1	3.Sh.E	
4	10 36.1	3.Oc.D	
	13 22.7	3.Ec.R	
	20 27.1	4.Ec.D	
	22 18.2	4.Ec.R	
5	9 16.1	3.Tr.I	
	9 32.5	3.Sh.I	
	11 19.1	3.Tr.E	
	12 2.2	3.Sh.E	
6	5 16.0	4.Sh.I	
	7 6.8	4.Sh.E	
	7 55.2	3.Oc.D	
	10 41.9	3.Ec.R	
7	6 35.2	3.Tr.I	
	6 51.5	3.Sh.I	
	8 39.6	3.Tr.E	
	9 21.4	3.Sh.E	
	14 8.7	4.Ec.D	
	16 1.2	4.Ec.R	
8	5 14.4	3.Oc.D	
	8 1.0	3.Ec.R	
	22 57.6	4.Sh.I	
9	0 49.8	4.Sh.E	
	3 54.3	3.Tr.I	
	4 10.4	3.Sh.I	
	6 0.2	3.Tr.E	
	6 40.6	3.Sh.E	
10	2 33.5	3.Oc.D	
	5 20.2	3.Ec.R	
	7 50.3	4.Ec.D	
	9 44.2	4.Ec.R	
11	1 13.5	3.Tr.I	
	1 29.3	3.Sh.I	
	3 20.8	3.Tr.E	
	3 59.8	3.Sh.E	
	16 39.2	4.Sh.I	
	18 32.8	4.Sh.E	
	23 52.7	3.Oc.D	
12	2 39.3	3.Ec.R	
	22 32.7	3.Tr.I	
	22 48.2	3.Sh.I	
13	0 41.4	3.Tr.E	
	1 18.9	3.Sh.E	
	1 32.0	4.Ec.D	
	3 27.2	4.Ec.R	
	21 11.9	3.Oc.D	
	23 58.5	3.Ec.R	
14	10 20.8	4.Sh.I	
	12 15.8	4.Sh.E	
	19 51.9	3.Tr.I	
	20 7.1	3.Sh.I	
	22 1.9	3.Tr.E	
	22 38.1	3.Sh.E	
15	18 31.1	3.Oc.D	
	19 13.6	4.Ec.D	
	21 10.1	4.Ec.R	
	21 17.6	3.Ec.R	
16	17 11.1	3.Tr.I	
	17 26.0	3.Sh.I	
	19 22.5	3.Tr.E	
	19 57.2	3.Sh.E	
17	4 2.4	4.Sh.I	
	5 58.8	4.Sh.E	
	15 50.3	3.Oc.D	
	18 36.7	3.Ec.R	
18	12 55.2	4.Ec.D	
	14 30.3	3.Tr.I	
	14 44.8	3.Sh.I	
	14 53.1	4.Ec.R	
	16 43.2	3.Tr.E	
	17 16.3	3.Sh.E	
19	13 9.6	3.Oc.D	
	15 55.9	3.Ec.R	
	21 44.0	4.Sh.I	
	22 2.0	4.Tr.I	
	22 16.0	4.Tr.E	
	23 41.7	4.Sh.E	
21	6 36.8	4.Ec.D	
	8 36.0	4.Ec.R	
	10 28.9	3.Oc.D	
	13 15.0	3.Ec.R	
22	9 8.8	3.Tr.I	
	9 22.6	3.Sh.I	
	11 24.4	3.Tr.E	
	11 54.6	3.Sh.E	
	15 25.6	4.Sh.I	
	15 32.6	4.Tr.I	
	16 13.9	4.Tr.E	
	17 24.6	4.Sh.E	
23	7 48.1	3.Oc.D	
	10 34.1	3.Ec.R	
24	0 18.4	4.Ec.D	
	2 18.8	4.Ec.R	
	6 28.1	3.Tr.I	
	6 41.5	3.Sh.I	
	8 45.0	3.Tr.E	
	9 13.7	3.Sh.E	
25	5 7.5	3.Oc.D	
	7 53.2	3.Ec.R	
	9 7.2	4.Sh.I	
	9 9.5	4.Tr.I	
	10 5.6	4.Tr.E	
	11 7.5	4.Sh.E	
26	3 47.5	3.Tr.I	
	4 0.3	3.Sh.I	
	6 5.6	3.Tr.E	
	6 32.8	3.Sh.E	
	17 59.9	4.Oc.D	
	20 1.7	4.Ec.R	
27	2 26.8	3.Oc.D	
	5 12.3	3.Ec.R	
28	1 6.8	3.Tr.I	
	1 19.2	3.Sh.I	
	2 48.1	4.Tr.I	
	2 48.7	4.Sh.I	
	3 26.3	3.Tr.E	
	3 51.9	3.Sh.E	
	3 55.7	4.Tr.E	
	4 50.3	4.Sh.E	
	23 46.2	3.Oc.D	
29	2 31.4	3.Ec.R	
	11 39.3	4.Oc.D	
	13 44.5	4.Ec.R	
20	11 49.6	3.Tr.I	
	12 3.7	3.Sh.I	
	14 3.8	3.Tr.E	
	14 35.5	3.Sh.E	
	22 26.1	3.Tr.I	
	22 38.0	3.Sh.I	
30	0 46.9	3.Tr.E	
	1 11.0	3.Sh.E	
	20 27.6	4.Tr.I	
	20 30.3	4.Sh.I	
	21 5.5	3.Oc.D	
	21 44.9	4.Tr.E	
	22 33.2	4.Sh.E	
	23 50.5	3.Ec.R	
31	19 45.5	3.Tr.I	
	19 56.9	3.Sh.I	
	22 7.5	3.Tr.E	
	22 30.1	3.Sh.E	

February

1	5 19.4	4.Oc.D	
	7 27.3	4.Ec.R	
	18 24.9	3.Oc.D	
	21 9.5	3.Ec.R	
2	14 7.8	4.Tr.I	
	14 11.9	4.Sh.I	
	15 33.5	4.Tr.E	
	16 16.0	4.Sh.E	
	17 4.9	3.Tr.I	
	17 15.7	3.Sh.I	
	19 28.1	3.Tr.E	
	19 49.2	3.Sh.E	
3	15 44.3	3.Oc.D	
	18 28.6	3.Ec.R	
	22 59.9	4.Oc.D	
4	1 10.1	4.Ec.R	
	14 24.3	3.Tr.I	
	14 34.6	3.Sh.I	
	16 48.7	3.Tr.E	
	17 8.2	3.Sh.E	
5	7 48.4	4.Tr.I	
	7 53.5	4.Sh.I	
	9 21.7	4.Tr.E	
	9 58.7	4.Sh.E	
	13 3.7	3.Oc.D	
	15 47.6	3.Ec.R	
6	11 43.7	3.Tr.I	
	11 53.4	3.Sh.I	
	14 9.3	3.Tr.E	
	14 27.3	3.Sh.E	
	16 40.9	4.Oc.D	
	18 52.9	4.Ec.R	
7	10 23.2	3.Oc.D	
	13 6.7	3.Ec.R	
8	1 29.4	4.Tr.I	
11	5 2.1	3.Oc.D	
	7 44.8	3.Ec.R	
12	3 42.1	3.Tr.I	
	3 49.8	3.Sh.I	
	4 3.6	4.Oc.D	
	6 11.1	3.Tr.E	
	6 18.3	4.Ec.R	
	6 24.4	3.Sh.E	
13	2 21.5	3.Oc.D	
	5 3.8	3.Ec.R	
	12 52.2	4.Tr.I	
	12 58.1	4.Sh.I	
	14 44.6	4.Tr.E	
	15 6.9	4.Sh.E	
14	1 1.5	3.Tr.I	
	1 8.6	3.Sh.I	
	3 31.7	3.Tr.E	
	3 43.5	3.Sh.E	
	21 45.3	4.Oc.D	
	23 41.0	3.Oc.D	
15	0 1.0	4.Ec.R	
	2 22.8	3.Ec.R	
	22 21.0	3.Tr.I	
	22 27.4	3.Sh.I	
16	0 52.2	3.Tr.E	
	1 2.5	3.Sh.E	
	6 33.9	4.Tr.I	
	6 39.7	4.Sh.I	
	8 31.8	4.Tr.E	
	8 49.6	4.Sh.E	
	21 0.5	3.Oc.D	
	23 41.8	3.Ec.R	
17	15 27.2	4.Oc.D	
	17 43.7	4.Ec.R	
	19 40.5	3.Tr.I	
21	14 19.5	3.Tr.I	
	14 23.8	3.Sh.I	
	16 53.8	3.Tr.E	
	16 59.5	3.Sh.E	
	17 57.9	4.Tr.I	
	18 2.7	4.Sh.I	
	20 5.7	4.Tr.E	
	20 14.9	4.Sh.E	
22	12 59.1	3.Oc.D	
	15 38.8	3.Ec.R	
23	2 51.4	4.Oc.D	
	5 8.9	4.Ec.R	
	11 39.1	3.Tr.I	
	11 42.5	3.Sh.I	
	14 14.3	3.Tr.E	
	14 18.4	3.Sh.E	
24	10 18.6	3.Oc.D	
	11 40.1	4.Tr.I	
	11 44.3	4.Sh.I	
	12 57.8	3.Ec.R	
	13 52.4	4.Tr.E	
	13 57.5	4.Sh.E	
25	8 58.6	3.Tr.I	
	9 1.3	3.Sh.I	
	11 34.8	3.Tr.E	
	11 37.4	3.Sh.E	
	20 33.7	4.Oc.D	
	22 51.5	4.Ec.R	
26	7 38.1	3.Oc.D	
	10 16.7	3.Ec.R	
27	5 22.4	4.Tr.I	
	5 25.8	4.Sh.I	
	6 18.1	3.Tr.I	
	6 20.1	3.Sh.I	
	7 38.9	4.Tr.E	

	1	35.0	4.Sh.I		19	46.2	3.Sh.I		7	40.1	4.Sh.E
	3	9.6	4.Tr.E		22	12.8	3.Tr.E		8	55.3	3.Tr.E
	3	41.5	4.Sh.E		22	21.5	3.Sh.E		8	56.4	3.Sh.E
	9	3.2	3.Tr.I	18	18	20.0	3.Oc.D	28	4	57.7	3.Oc.D
	9	12.2	3.Sh.I		21	0.8	3.Ec.R		7	35.7	3.Ec.R
	11	29.9	3.Tr.E	19	0	15.8	4.Tr.I		14	16.1	4.Oc.D
	11	46.3	3.Sh.E		0	21.2	4.Sh.I		16	34.9	4.Oc.R
9	7	42.6	3.Oc.D		2	18.8	4.Tr.E	29	3	37.7	3.Tr.I
	10	22.1	4.Oc.D		2	32.3	4.Sh.E		3	38.8	3.Sh.I
	10	25.7	3.Ec.R		17	0.0	3.Tr.I		6	15.3	3.Sh.E
	12	35.6	4.Ec.R		17	5.0	3.Sh.I		6	15.7	3.Tr.E
10	6	22.6	3.Tr.I		19	33.3	3.Tr.E		23	4.9	4.Tr.I
	6	31.0	3.Sh.I		19	40.5	3.Sh.E		23	7.3	4.Sh.I
	8	50.5	3.Tr.E	20	9	9.2	4.Oc.D				
	9	5.4	3.Sh.E		11	26.3	4.Ec.R				
	19	10.7	4.Tr.I		15	39.6	3.Oc.D				
	19	16.6	4.Sh.I		18	19.8	3.Ec.R				
	20	57.2	4.Tr.E								
	21	24.2	4.Sh.E								

March

1	1	22.6	4.Sh.E	11	11	31.2	3.Sh.I	21	0	43.3	3.Sh.E
	1	25.4	4.Tr.E		11	35.0	3.Tr.I		0	59.1	3.Tr.E
	2	17.2	3.Oc.D		12	54.5	5.Tr.I		11	50.9	4.Ec.D
	4	55.8	3.Oc.R		13	48.7	5.Tr.E		14	42.1	4.Oc.R
2	0	57.2	3.Tr.I		14	8.9	3.Sh.E		20	43.7	3.Ec.D
	0	57.6	3.Sh.I		14	17.9	3.Tr.E		23	39.1	3.Oc.R
	3	34.3	3.Sh.E		21	53.2	4.Sh.I	22	19	23.3	3.Sh.I
	3	36.1	3.Tr.E		21	55.4	4.Tr.I		19	32.4	3.Tr.I
	7	58.6	4.Oc.D	12	0	12.6	4.Sh.E		19	45.1	5.Oc.D
	10	21.2	4.Oc.R		0	29.9	4.Tr.E		20	39.0	4.Sh.I
	23	36.7	3.Ec.D		10	10.3	3.Ec.D		20	46.9	4.Tr.I
3	2	16.2	3.Oc.R		12	57.9	3.Oc.R		21	45.5	5.Oc.R
	16	47.4	4.Tr.I	13	6	46.5	4.Ec.D		22	2.1	3.Sh.E
	16	48.8	4.Sh.I		8	49.9	3.Sh.I		22	19.3	3.Tr.E
	19	5.2	4.Sh.E		8	54.6	3.Tr.I		23	2.3	4.Sh.E
	19	11.7	4.Tr.E		9	25.3	4.Oc.R		23	32.4	4.Tr.E
	22	16.3	3.Sh.I		11	27.8	3.Sh.E	23	18	2.4	3.Ec.D
	22	16.8	3.Tr.I		11	38.2	3.Tr.E		20	59.2	3.Oc.R
4	0	53.2	3.Sh.E		19	0.4	5.Oc.D	24	5	32.3	4.Ec.D
	0	56.5	3.Tr.E		20	15.8	5.Oc.R		8	27.5	4.Oc.R
	20	55.4	3.Ec.D	14	7	29.0	3.Ec.D		16	42.0	3.Sh.I
	23	36.6	3.Oc.R		10	18.2	3.Oc.R		16	51.9	3.Tr.I
5	1	41.2	4.Oc.D		15	34.7	4.Sh.I		19	21.0	3.Sh.E
	4	7.4	4.Oc.R		15	38.2	4.Tr.I		19	39.4	3.Tr.E
	19	35.0	3.Sh.I		17	55.1	4.Sh.E	25	1	58.7	5.Tr.I
	19	36.3	3.Tr.I		18	15.7	4.Tr.E		4	6.4	5.Tr.E
	22	12.1	3.Sh.E	15	6	8.6	3.Sh.I		14	20.5	4.Sh.I
	22	16.9	3.Tr.E		6	14.1	3.Tr.I		14	29.8	4.Tr.I
6	10	30.0	4.Tr.I		8	46.7	3.Sh.E		15	21.1	3.Ec.D

	10	30.3	4.Sh.I		8	58.5	3.Tr.E		16	44.6	4.Sh.E
	12	47.7	4.Sh.E	16	0	27.9	4.Ec.D		17	17.7	4.Tr.E
	12	57.9	4.Tr.E		1	11.1	5.Tr.I		18	19.3	3.Oc.R
	18	14.2	3.Ec.D		2	39.3	5.Tr.E	26	14	0.7	3.Sh.I
	20	56.9	3.Oc.R		3	11.0	4.Oc.R		14	11.4	3.Tr.I
7	16	53.7	3.Sh.I		4	47.7	3.Ec.D		16	39.8	3.Sh.E
	16	55.9	3.Tr.I		7	38.5	3.Oc.R		16	59.5	3.Tr.E
	19	23.5	4.Ec.D	17	3	27.3	3.Sh.I		23	13.7	4.Ec.D
	19	31.1	3.Sh.E		3	33.7	3.Tr.I	27	2	12.8	4.Oc.R
	19	37.3	3.Tr.E		6	5.5	3.Sh.E		8	11.0	5.Oc.D
	21	53.5	4.Oc.R		6	18.7	3.Tr.E		10	26.8	5.Oc.R
8	15	32.9	3.Ec.D		9	16.1	4.Sh.I		12	39.7	3.Ec.D
	18	17.3	3.Oc.R		9	21.1	4.Tr.I		15	39.4	3.Oc.R
9	4	11.8	4.Sh.I		11	37.5	4.Sh.E	28	8	1.9	4.Sh.I
	4	12.7	4.Tr.I		12	1.4	4.Tr.E		8	12.8	4.Tr.I
	6	30.2	4.Sh.E	18	2	6.4	3.Ec.D		10	27.0	4.Sh.E
	6	43.9	4.Tr.E		4	58.7	3.Oc.R		11	2.9	4.Tr.E
	6	51.4	5.Oc.D		7	21.1	5.Oc.D		11	19.3	3.Sh.I
	7	16.7	5.Oc.R		9	2.4	5.Oc.R		11	30.9	3.Tr.I
	14	12.5	3.Sh.I		18	9.4	4.Ec.D		13	58.7	3.Sh.E
	14	15.5	3.Tr.I		20	56.6	4.Oc.R		14	19.5	3.Tr.E
	16	50.0	3.Sh.E	19	0	46.0	3.Sh.I	29	9	58.4	3.Ec.D
	16	57.6	3.Tr.E		0	53.3	3.Tr.I		12	59.5	3.Oc.R
10	12	51.6	3.Ec.D		3	24.4	3.Sh.E		14	25.1	5.Tr.I
	13	5.0	4.Ec.D		3	38.9	3.Tr.E		16	46.9	5.Tr.E
	15	37.6	3.Oc.R		23	25.1	3.Ec.D		16	55.2	4.Ec.D
	15	39.5	4.Oc.R	20	2	18.9	3.Oc.R		19	57.9	4.Oc.R
					2	57.6	4.Sh.I	30	8	38.0	3.Sh.I
					3	3.9	4.Tr.I		8	50.5	3.Tr.I
					5	19.9	4.Sh.E		11	17.5	3.Sh.E
					5	46.9	4.Tr.E		11	39.6	3.Tr.E
					13	34.0	5.Tr.I	31	1	43.3	4.Sh.I
					15	24.5	5.Tr.E		1	55.8	4.Tr.I
					22	4.6	3.Sh.I		4	9.3	4.Sh.E
					22	12.8	3.Tr.I		4	48.0	4.Tr.E
									7	17.0	3.Ec.D
									10	19.5	3.Oc.R
									20	37.7	5.Oc.D
									23	6.2	5.Oc.R

April

1	5	56.6	3.Sh.I	11	0	28.9	4.Sh.I	21	1	41.7	3.Ec.D
	6	10.0	3.Tr.I		0	47.7	4.Tr.I		4	45.9	5.Tr.I
	8	36.3	3.Sh.E		2	58.3	4.Sh.E		4	51.0	5.Sh.I
	8	59.6	3.Tr.E		3	47.2	4.Tr.E		4	57.7	3.Oc.R
	10	36.6	4.Ec.D		15	8.7	3.Ec.D		5	33.3	5.Sh.E
	13	42.9	4.Oc.R		18	19.0	3.Oc.R		7	52.4	5.Tr.E
2	4	35.6	3.Ec.D	12	3	48.5	5.Tr.I		23	14.4	4.Sh.I
	7	39.5	3.Oc.R		6	40.9	5.Tr.E		23	39.4	4.Tr.I

April

16	47.3	3.Tr.I	3	24.3	3.Tr.I	16	55.6	3.Tr.E		16	29.8	3.Sh.I
	19	24.7	4.Sh.I	9	22.2	4.Ec.D	22	0 21.4	3.Sh.I		19	10.3	3.Sh.E
	19	38.8	4.Tr.I	12	41.9	4.Oc.R		0 43.7	3.Tr.I		19	39.1	3.Tr.E
	21	51.6	4.Sh.E	13	48.4	3.Sh.I		1 47.1	4.Sh.E				
	22	33.0	4.Tr.E	14	6.8	3.Tr.I		2 44.4	4.Tr.E				
3	2	52.3	5.Tr.I	16	29.1	3.Sh.E		3 2.8	3.Sh.E				
	3	15.3	3.Sh.I	16	58.9	3.Tr.E		3 37.4	3.Tr.E				
	3	29.5	3.Tr.I	13	12 27.3	3.Ec.D		23 0.3	3.Ec.D				
	5	25.9	5.Tr.E	15	38.8	3.Oc.R	23	2 17.4	3.Oc.R				
	5	55.1	3.Sh.E	18	10.3	4.Sh.I		8 7.7	4.Ec.D				
	6	19.5	3.Tr.E	18	30.7	4.Tr.I		10 58.6	5.Ec.D				
4	1	54.3	3.Ec.D	20	40.6	4.Sh.E		11 38.9	4.Oc.R				
	4	18.0	4.Ec.D	21	31.7	4.Tr.E		14 9.1	5.Oc.R				
	4	59.5	3.Oc.R	14	10 2.0	5.Oc.D		21 40.0	3.Sh.I				
	7	27.9	4.Oc.R	11	7.0	3.Sh.I		22 3.0	3.Tr.I				
5	0	33.9	3.Sh.I	11	26.2	3.Tr.I	24	0 21.6	3.Sh.E				
	0	48.9	3.Tr.I	12	58.7	5.Oc.R		0 57.0	3.Tr.E				
	3	13.9	3.Sh.E	13	47.8	3.Sh.E		16 55.8	4.Sh.I				
	3	39.5	3.Tr.E	14	18.7	3.Tr.E		17 22.3	4.Tr.I				
	9	5.5	5.Oc.D	15	3 3.6	4.Ec.D		19 29.3	4.Sh.E				
	11	44.8	5.Oc.R	6	26.3	4.Oc.R		20 18.8	3.Ec.D				
	13	6.1	4.Sh.I	9	45.9	3.Ec.D		20 28.4	4.Tr.E				
	13	21.7	4.Tr.I	12	58.6	3.Oc.R		23 36.9	3.Oc.R				
	15	33.8	4.Sh.E	16	8 25.6	3.Sh.I	25	17 11.1	5.Sh.I				
	16	17.8	4.Tr.E	8	45.6	3.Tr.I		17 14.5	5.Tr.I				
	23	12.9	3.Ec.D	11	6.6	3.Sh.E		18 6.9	5.Sh.E				
6	2	19.4	3.Oc.R	11	38.4	3.Tr.E		18 58.6	3.Sh.I				
	21	52.5	3.Sh.I	11	51.7	4.Sh.I		19 22.3	3.Tr.I				
	21	59.4	4.Ec.D	12	13.6	4.Tr.I		20 26.7	5.Tr.E				
	22	8.4	3.Tr.I	14	22.8	4.Sh.E		21 40.3	3.Sh.E				
7	0	32.7	3.Sh.E	15	16.0	4.Tr.E		22 16.6	3.Tr.E				
	0	59.4	3.Tr.E	16	16.8	5.Tr.I	26	1 49.0	4.Ec.D				
	1	12.6	4.Oc.R	16	34.8	5.Sh.I		5 22.9	4.Oc.R				
	15	20.2	5.Tr.I	16	54.6	5.Sh.E		17 37.4	3.Ec.D				
	18	3.9	5.Tr.E	19	16.8	5.Tr.E		20 56.5	3.Oc.R				
	20	31.5	3.Ec.D	17	7 4.5	3.Ec.D	27	10 37.1	4.Sh.I				
	23	39.3	3.Oc.R	10	18.3	3.Oc.R		11 5.1	4.Tr.I				
8	6	47.5	4.Sh.I	20	45.0	4.Ec.D		13 11.4	4.Sh.E				
	7	4.7	4.Tr.I	18	0 10.6	4.Oc.R		14 12.3	4.Tr.E				
	9	16.1	4.Sh.E	5	44.2	3.Sh.I		16 17.1	3.Sh.I				
	10	2.6	4.Tr.E	6	5.0	3.Tr.I		16 41.6	3.Tr.I				
	19	11.2	3.Sh.I	8	25.3	3.Sh.E		18 59.0	3.Sh.E				
	19	27.9	3.Tr.I	8	58.1	3.Tr.E		19 36.1	3.Tr.E				
	21	51.5	3.Sh.E	22	30.5	5.Oc.D		23 20.3	5.Ec.D				
	22	19.3	3.Tr.E	19	1 34.2	5.Oc.R	28	2 43.4	5.Oc.R				
9	15	40.8	4.Ec.D	4	23.1	3.Ec.D		14 56.0	3.Ec.D				
	17	50.1	3.Ec.D	5	33.1	4.Sh.I		18 16.0	3.Oc.R				
	18	57.3	4.Oc.R	5	56.5	4.Tr.I		19 30.4	4.Ec.D				
	20	59.2	3.Oc.R	7	38.0	3.Oc.R		23 6.7	4.Oc.R				
	21	33.3	5.Oc.D	8	4.9	4.Sh.E	29	13 35.7	3.Sh.I				
10	0	21.9	5.Oc.R	9	0.3	4.Tr.E		14 0.8	3.Tr.I				

May

20	3	2.8	3.Sh.I		16	17.8	3.Sh.E	1	10	54.3	3.Sh.I	11	0	10.0	3.Sh.E
	5	44.1	3.Sh.E	30	4	18.5	4.Sh.I		11	20.1	3.Tr.I		0	51.8	3.Tr.E
	6	17.8	3.Tr.E		4	47.8	4.Tr.I		13	11.7	4.Ec.D		3	3.8	4.Sh.I
	14	26.3	4.Ec.D		5	33.1	5.Sh.I		13	36.5	3.Sh.E		3	38.4	4.Tr.I
	17	54.8	4.Oc.R		5	43.5	5.Tr.I		14	15.1	3.Tr.E		5	41.9	4.Sh.E
					6	39.3	5.Sh.E		16	50.4	4.Oc.R		6	49.8	4.Tr.E
					6	53.5	4.Sh.E	2	9	33.1	3.Ec.D		12	29.0	5.Ec.D
					7	56.0	4.Tr.E		11	42.6	5.Ec.D		16	21.5	5.Oc.R
					9	0.6	5.Tr.E		12	55.0	3.Oc.R		20	5.8	3.Ec.D
					12	14.5	3.Ec.D		15	16.7	5.Oc.R		23	31.7	3.Oc.R
					15	35.5	3.Oc.R		21	59.8	4.Sh.I	12	11	57.1	4.Ec.D
									22	30.6	4.Tr.I		15	44.0	4.Oc.R
								3	0	35.6	4.Sh.E		18	45.6	3.Sh.I
									1	39.7	4.Tr.E		19	15.0	3.Tr.I
									8	12.8	3.Sh.I		21	28.7	3.Sh.E
									8	39.3	3.Tr.I		22	11.0	3.Tr.E
									10	55.2	3.Sh.E	13	11	19.1	6.Tr.I
									11	34.5	3.Tr.E		13	0.5	6.Tr.E
								4	6	51.6	3.Ec.D		17	24.3	3.Ec.D
									6	53.1	4.Ec.D		18	42.4	5.Sh.I
									10	14.4	3.Oc.R		19	9.5	5.Tr.I
									10	34.0	4.Oc.R		20	12.4	5.Sh.E
									17	55.6	5.Sh.I		20	45.2	4.Sh.I
									18	12.1	5.Tr.I		20	50.9	3.Oc.R
									19	10.8	5.Sh.E		21	20.8	4.Tr.I
									21	33.6	5.Tr.E		22	37.9	5.Tr.E
								5	5	31.4	3.Sh.I		23	23.9	4.Sh.E
									5	58.5	3.Tr.I	14	0	32.9	4.Tr.E
									8	13.9	3.Sh.E		16	4.2	3.Sh.I
									8	53.9	3.Tr.E		16	34.0	3.Tr.I
									15	41.2	4.Sh.I		18	47.4	3.Sh.E
									16	13.2	4.Tr.I		19	30.2	3.Tr.E
									18	17.7	4.Sh.E	15	5	38.4	4.Ec.D
									19	23.2	4.Tr.E		9	27.0	4.Oc.R
								6	4	10.2	3.Ec.D		14	42.9	3.Ec.D
									7	33.8	3.Oc.R		18	10.1	3.Oc.R
								7	0	5.8	5.Ec.D	16	0	53.0	5.Ec.D
									0	34.4	4.Ec.D		4	53.2	5.Oc.R
									2	50.0	3.Sh.I		13	22.7	3.Sh.I

21	6	38.5	3.Ec.D		16	17.8	3.Sh.E		6	39.3	5.Sh.I		13	24.7	6.Oc.R
	10	1.7	6.Oc.D	30	4	18.5	4.Sh.I		6	53.5	4.Sh.E	22	1	49.1	4.Sh.I
	10	7.4	3.Oc.R		4	47.8	4.Tr.I		7	56.0	4.Tr.E		2	27.8	4.Tr.I
	13	24.7	6.Oc.R		5	33.1	5.Sh.I		9	0.6	5.Tr.E		4	30.0	4.Sh.E
22	1	49.1	4.Sh.I		5	43.5	5.Tr.I		12	14.5	3.Ec.D		5	18.3	3.Sh.I
	2	27.8	4.Tr.I		6	39.3	5.Sh.E		15	35.5	3.Oc.R		5	41.5	4.Tr.E
	4	30.0	4.Sh.E		6	53.5	4.Sh.E						5	50.0	3.Tr.I
	5	18.3	3.Sh.I		7	56.0	4.Tr.E						8	2.1	3.Sh.E
	5	41.5	4.Tr.E		9	0.6	5.Tr.E						8	46.6	3.Tr.E
	5	50.0	3.Tr.I		12	14.5	3.Ec.D						19	30.4	5.Sh.I
	8	2.1	3.Sh.E		15	35.5	3.Oc.R						20	6.1	5.Tr.I
	8	46.6	3.Tr.E										21	12.6	5.Sh.E
	19	30.4	5.Sh.I										23	39.5	5.Tr.E
	20	6.1	5.Tr.I									23	3	57.0	3.Ec.D
	21	12.6	5.Sh.E										7	26.4	3.Oc.R
	23	39.5	5.Tr.E										10	42.4	4.Ec.D
23	3	57.0	3.Ec.D										14	35.5	4.Oc.R
	7	26.4	3.Oc.R									24	2	36.8	3.Sh.I
	10	42.4	4.Ec.D										3	8.9	3.Tr.I
	14	35.5	4.Oc.R										5	20.8	3.Sh.E
24	2	36.8	3.Sh.I										6	5.6	3.Tr.E
	3	8.9	3.Tr.I										19	30.4	4.Sh.I
	5	20.8	3.Sh.E										20	10.0	4.Tr.I
	6	5.6	3.Tr.E										22	12.0	4.Sh.E
	19	30.4	4.Sh.I										23	24.1	4.Tr.E
	20	10.0	4.Tr.I									25	1	15.5	3.Ec.D
	22	12.0	4.Sh.E										1	41.0	5.Ec.D
	23	24.1	4.Tr.E										4	45.4	3.Oc.R
25	1	15.5	3.Ec.D										5	53.9	5.Oc.R
	1	41.0	5.Ec.D										23	55.4	3.Sh.I
	4	45.4	3.Oc.R									26	0	27.7	3.Tr.I
	5	53.9	5.Oc.R										2	39.4	3.Sh.E
	23	55.4	3.Sh.I										3	24.6	3.Tr.E
26	0	27.7	3.Tr.I										4	23.7	4.Ec.D
	2	39.4	3.Sh.E										8	18.1	4.Oc.R
	3	24.6	3.Tr.E										22	34.0	3.Ec.D
	4	23.7	4.Ec.D												
	8	18.1	4.Oc.R												
	22	34.0	3.Ec.D												

May

	3	17.6	3.Tr.I		13	53.1	3.Tr.I	27	2	4.4	3.Oc.R		15	54.1	3.Sh.E		7	47.6	5.Oc.R		13	45.8	3.Tr.E
	3	49.7	5.Oc.R		14	26.5	4.Sh.I		7	54.4	5.Sh.I		16	40.0	3.Tr.E		22	20.7	3.Ec.D	22	7	55.7	6.Oc.D
	4	17.4	4.Oc.R		15	3.3	4.Tr.I		8	33.7	5.Tr.I	3	2	29.9	5.Ec.D		23	19.7	4.Sh.I		8	53.3	3.Ec.D
	5	32.6	3.Sh.E		16	6.1	3.Sh.E		9	42.1	5.Sh.E		6	52.1	5.Oc.R	13	0	2.8	4.Tr.I		12	23.3	6.Oc.R
	6	13.2	3.Tr.E		16	49.4	3.Tr.E		12	9.0	5.Tr.E		9	27.7	4.Ec.D		1	53.0	3.Oc.R		12	25.3	3.Oc.R
8	1	28.7	3.Ec.D		17	6.0	4.Sh.E		13	11.8	4.Sh.I		11	48.1	3.Ec.D		2	6.0	4.Sh.E		13	17.1	4.Ec.D
	4	53.1	3.Oc.R		18	15.9	4.Tr.E		13	52.1	4.Tr.I		13	25.0	4.Oc.R		3	18.7	4.Tr.E		17	16.4	4.Oc.R
	9	22.5	4.Sh.I	17	12	1.4	3.Ec.D		15	54.1	4.Sh.E		15	19.7	3.Oc.R		21	0.5	3.Sh.I	23	7	33.1	3.Sh.I
	9	55.8	4.Tr.I		15	29.2	3.Oc.R		17	6.6	4.Tr.E	4	10	28.0	3.Sh.I		21	34.7	3.Tr.I		8	6.8	3.Tr.I
	11	59.8	4.Sh.E		23	19.7	4.Ec.D		21	13.9	3.Sh.I		11	1.6	3.Tr.I		23	46.0	3.Sh.E		10	19.3	3.Sh.E
	13	6.5	4.Tr.E	18	3	10.0	4.Oc.R		21	46.6	3.Tr.I		13	12.7	3.Sh.E	14	0	32.0	3.Tr.E		10	22.9	5.Sh.I
9	0	8.5	3.Sh.I		7	6.1	5.Sh.I		23	58.1	3.Sh.E		13	58.8	3.Tr.E		8	13.0	4.Ec.D		11	4.2	3.Tr.E
	0	36.8	3.Tr.I		7	37.7	5.Tr.I	28	0	43.5	3.Tr.E		18	15.7	4.Sh.I		8	55.1	6.Tr.I		11	13.7	5.Tr.I
	2	51.3	3.Sh.E		8	42.4	5.Sh.E		19	52.5	3.Ec.D		18	57.9	4.Tr.I		9	33.0	5.Sh.I		12	37.7	5.Sh.E
	3	32.5	3.Tr.E		10	41.2	3.Sh.I		22	5.0	4.Ec.D		21	0.0	4.Sh.E		10	21.9	5.Tr.I		14	54.2	5.Tr.E
	6	18.9	5.Sh.I		11	8.8	5.Tr.E		23	23.3	3.Oc.R		22	13.3	4.Tr.E		11	39.6	5.Sh.E		22	5.0	4.Sh.I
	6	41.0	5.Tr.I		11	12.1	3.Tr.I	29	2	0.5	4.Oc.R	5	8	43.4	5.Sh.I		12	12.3	4.Oc.R		22	47.9	4.Tr.I
	7	41.8	5.Sh.E		13	24.7	3.Sh.E		9	56.8	6.Tr.I		9	6.6	3.Ec.D		13	18.4	6.Tr.E	24	0	53.8	4.Sh.E
	10	6.2	5.Tr.E		14	8.5	3.Tr.E		13	42.3	6.Tr.E		9	28.4	5.Tr.I		14	1.7	5.Tr.E		2	4.2	4.Tr.E
	18	15.8	4.Ec.D	19	8	7.8	4.Sh.I		14	5.4	5.Ec.D		10	41.1	5.Sh.E		19	39.2	3.Ec.D		6	11.8	3.Ec.D
	22	0.8	4.Oc.R		8	45.6	4.Tr.I		18	23.4	5.Oc.R		12	38.5	3.Oc.R		23	11.6	3.Oc.R		9	43.6	3.Oc.R
	22	47.3	3.Ec.D		9	19.9	3.Ec.D		18	32.4	3.Sh.I		13	6.6	5.Tr.E	15	17	1.0	4.Sh.I	25	4	51.7	3.Sh.I
10	2	12.4	3.Oc.R		10	48.0	4.Sh.E		19	5.4	3.Tr.I	6	3	9.0	4.Ec.D		17	44.2	4.Tr.I		5	25.1	3.Tr.I
	21	27.1	3.Sh.I		11	58.8	4.Tr.E		21	16.8	3.Sh.E		7	7.0	4.Oc.R		18	19.1	3.Sh.I		6	58.4	4.Ec.D
	21	55.9	3.Tr.I		12	48.3	3.Oc.R		22	2.4	3.Tr.E		7	46.5	3.Sh.I		18	53.2	3.Tr.I		7	38.0	3.Sh.E
				20	7	59.8	3.Sh.I	30	6	53.1	4.Sh.I		8	20.3	3.Tr.I		19	47.9	4.Sh.E		8	22.5	3.Tr.E
					8	31.0	3.Tr.I		7	34.1	4.Tr.I		9	0.7	6.Oc.D		21	0.3	4.Tr.E		10	57.5	4.Oc.R
					10	43.4	3.Sh.E		9	36.1	4.Sh.E		10	31.4	3.Sh.E		21	4.7	3.Sh.E		16	34.1	5.Ec.D
					11	27.6	3.Tr.E		10	48.9	4.Tr.E		11	17.5	3.Tr.E		21	50.5	3.Tr.E		21	6.3	5.Oc.R
					13	16.8	5.Ec.D		17	11.1	3.Ec.D		13	13.2	6.Oc.R	16	15	44.3	5.Ec.D	26	3	30.4	3.Ec.D
					17	1.1	4.Ec.D		20	42.1	3.Oc.R	7	6	25.1	3.Ec.D		16	57.7	3.Ec.D		7	1.9	3.Oc.R
					17	23.7	5.Oc.R	31	15	46.4	4.Ec.D		9	57.2	3.Oc.R		20	14.8	5.Oc.R		15	46.3	4.Sh.I
					20	52.8	4.Oc.R		15	50.9	3.Sh.I		11	57.0	4.Sh.I		20	30.1	3.Oc.R		16	29.0	4.Tr.I
									16	24.2	3.Tr.I		12	39.6	4.Tr.I	17	1	54.4	4.Ec.D		18	35.8	4.Sh.E
									18	35.4	3.Sh.E		14	42.0	4.Sh.E		5	53.8	4.Oc.R		19	45.2	4.Tr.E
									19	21.2	3.Tr.E		14	54.6	5.Ec.D		15	37.6	3.Sh.I	27	2	10.2	3.Sh.I
									19	42.8	4.Oc.R		15	55.2	4.Tr.E		16	11.6	3.Tr.I		2	43.4	3.Tr.I
									20	19.0	5.Sh.I		19	20.4	5.Oc.R		18	23.3	3.Sh.E		4	56.6	3.Sh.E
									21	1.4	5.Tr.I	8	5	5.0	3.Sh.I		19	9.0	3.Tr.E		5	40.7	3.Tr.E
									22	11.8	5.Sh.E		5	38.9	3.Tr.I	18	10	42.3	4.Sh.I		22	47.8	5.Sh.I
													7	50.0	3.Sh.E		11	25.6	4.Tr.I		23	38.7	5.Tr.I
													8	36.2	3.Tr.E		13	29.9	4.Sh.E	28	0	39.8	4.Ec.D
													20	50.3	4.Ec.D		14	16.3	3.Ec.D		0	48.9	3.Ec.D

June

1	0	38.3	5.Tr.E	11	1	2.2	3.Ec.D	21	4	9.0	5.Ec.D	9	0	48.9	4.Oc.R		14	41.7	4.Tr.E		1	6.4	5.Sh.E
	14	29.6	3.Ec.D		4	34.5	3.Oc.R		4	23.7	4.Sh.I		3	43.7	3.Ec.D		17	48.5	3.Oc.R		3	19.2	5.Tr.E
	18	1.0	3.Oc.R		14	31.7	4.Ec.D		5	6.8	4.Tr.I		7	15.8	3.Oc.R		21	57.7	5.Sh.I		4	20.2	3.Oc.R
2	0	34.4	4.Sh.I		18	30.7	4.Oc.R		7	11.9	4.Sh.E		21	8.2	5.Sh.I		22	47.8	5.Tr.I		4	38.5	4.Oc.R
	1	16.0	4.Tr.I		23	42.0	3.Sh.I		8	23.0	4.Tr.E		21	55.5	5.Tr.I	19	0	8.5	5.Sh.E		23	28.7	3.Sh.I
	3	18.0	4.Sh.E	12	0	16.1	3.Tr.I		8	40.7	5.Oc.R		23	10.5	5.Sh.E		2	28.1	5.Tr.E	29	0	1.7	3.Tr.I
	4	31.2	4.Tr.E		2	27.4	3.Sh.E		10	14.6	3.Sh.I	10	1	34.6	5.Tr.E		12	56.1	3.Sh.I		2	15.3	3.Sh.E
	13	9.4	3.Sh.I		3	13.4	3.Tr.E		10	48.4	3.Tr.I		2	23.5	3.Sh.I		13	30.1	3.Tr.I		2	59.0	3.Tr.E
	13	42.9	3.Tr.I		3	19.1	5.Ec.D		13	0.6	3.Sh.E		2	57.5	3.Tr.I		15	42.0	3.Sh.E		9	27.7	4.Sh.I

June

5	8.7	3.Sh.E	16	27.4	3.Tr.E	10	9.9	4.Tr.I	13	14.4	3.Tr.I
5	38.3	4.Sh.I	19	35.7	4.Ec.D	12	17.8	4.Sh.E	15	30.0	3.Sh.E
5	54.8	3.Tr.E	23	35.2	4.Oc.R	13	26.1	4.Tr.E	16	11.5	3.Tr.E
6	21.2	4.Tr.I	20	11 34.8	3.Ec.D	22	7.4	3.Ec.D	23	38.2	5.Sh.I
8	24.0	4.Sh.E	15	6.9	3.Oc.R	30	1 38.4	3.Oc.R	7	0 28.0	5.Tr.I
9	37.0	4.Tr.E					4 59.2	5.Ec.D	2	3.9	5.Sh.E
							7 45.9	6.Tr.I	4	7.7	5.Tr.E
							9 31.2	5.Oc.R	11	21.6	3.Ec.D
							12 13.3	6.Tr.E	14	31.8	4.Sh.I
							18 21.2	4.Ec.D	14	50.8	3.Oc.R
							20 47.2	3.Sh.I	15	12.1	4.Tr.I
							21 19.9	3.Tr.I	17	23.7	4.Sh.E
							22 19.4	4.Oc.R	18	28.1	4.Tr.E
							23 34.0	3.Sh.E	8	6 40.1	6.Oc.D

July

1	0 17.2	3.Tr.E	11	5 58.7	3.Ec.D	21	6 58.8	4.Sh.I	10	1.4	3.Sh.I
	19 26.0	3.Ec.D		9 26.8	3.Oc.R		7 34.0	4.Tr.I	10	32.5	3.Tr.I
	22 56.6	3.Oc.R		12 3.7	5.Sh.I		9 53.6	4.Sh.E	10	59.5	6.Oc.R
2	3 9.0	4.Sh.I		12 52.4	5.Tr.I		10 48.8	4.Tr.E	12	48.6	3.Sh.E
	3 50.8	4.Tr.I		14 32.8	5.Sh.E		15 11.3	3.Sh.I	13	29.6	3.Tr.E
	5 59.7	4.Sh.E		16 31.2	5.Tr.E		15 38.2	3.Tr.I	23	25.4	4.Ec.D
	7 6.9	4.Tr.E		17 6.8	4.Ec.D		17 59.5	3.Sh.E	9	3 21.1	4.Oc.R
	11 13.1	5.Sh.I		21 1.5	4.Oc.R		18 34.8	3.Tr.E	5	49.8	5.Ec.D
	12 3.8	5.Tr.I	12	4 38.5	3.Sh.I	22	13 50.2	3.Ec.D	8	40.2	3.Ec.D
	13 35.3	5.Sh.E		5 8.5	3.Tr.I		15 52.6	4.Ec.D	10	19.1	5.Oc.R
	15 44.0	5.Tr.E		7 26.0	3.Sh.E		17 13.9	3.Oc.R	12	8.8	3.Oc.R
	18 5.8	3.Sh.I		8 5.5	3.Tr.E		19 6.1	5.Ec.D	10	7 19.9	3.Sh.I
	18 38.1	3.Tr.I	13	1 54.6	4.Sh.I		19 41.6	4.Oc.R	7	50.5	3.Tr.I
	20 52.6	3.Sh.E		2 33.2	4.Tr.I		23 25.8	5.Oc.R	8	13.2	4.Sh.I
	21 35.3	3.Tr.E		3 17.3	3.Ec.D	23	12 29.9	3.Sh.I	8	52.7	4.Tr.I
3	12 2.6	4.Ec.D		4 47.6	4.Sh.E		12 56.1	3.Tr.I	10	7.3	3.Sh.E
	16 0.1	4.Oc.R		5 48.8	4.Tr.E		15 18.2	3.Sh.E	10	47.6	3.Tr.E
	16 44.5	3.Ec.D		6 44.8	3.Oc.R		15 52.6	3.Tr.E	11	5.7	4.Sh.E
	20 14.7	3.Oc.R		18 15.0	5.Ec.D	24	0 40.3	4.Sh.I	12	8.5	4.Tr.E
4	15 24.3	3.Sh.I		22 41.8	5.Oc.R		1 14.1	4.Tr.I			
	15 56.2	3.Tr.I	14	1 57.0	3.Sh.I		3 35.6	4.Sh.E			
	17 24.4	5.Ec.D		2 26.5	3.Tr.I		4 28.6	4.Tr.E			
	18 11.3	3.Sh.E		4 44.7	3.Sh.E		5 16.7	6.Oc.D			
	18 53.5	3.Tr.E		5 23.5	3.Tr.E		9 0.0	6.Oc.R			
	20 50.4	4.Sh.I		10 48.2	4.Ec.D		11 8.8	3.Ec.D			
	21 31.5	4.Tr.I		14 41.7	4.Oc.R		14 31.6	3.Oc.R			
	21 55.4	5.Oc.R	15	0 35.9	3.Ec.D	25	1 20.2	5.Sh.I			
	23 41.7	4.Sh.E		4 2.6	3.Oc.R		2 2.5	5.Tr.I			
5	0 47.6	4.Tr.E		19 36.0	4.Sh.I		3 58.8	5.Sh.E			
	14 3.1	3.Ec.D		20 13.5	4.Tr.I		5 37.3	5.Tr.E			
	17 32.8	3.Oc.R		22 29.6	4.Sh.E		9 34.1	4.Ec.D			
6	5 44.0	4.Ec.D		23 15.6	3.Sh.I		9 48.5	3.Sh.I			
	9 40.7	4.Oc.R		23 28.9	4.Tr.E		10 13.9	3.Tr.I			
	12 42.8	3.Sh.I		23 44.5	3.Tr.I		12 36.9	3.Sh.E			

16	0 29.0	5.Sh.I		13 10.3	3.Tr.E						
1	15.9	5.Tr.I		13 21.3	4.Oc.R						
2	3.4	3.Sh.E	26	8 27.4	3.Ec.D						
2	41.4	3.Tr.E		11 49.3	3.Oc.R						
3	1.4	5.Sh.E		18 21.7	4.Sh.I						
4	53.7	5.Tr.E		18 54.2	4.Tr.I						
6	26.8	6.Tr.I		21 17.7	4.Sh.E						
10	28.1	6.Tr.E		22 8.3	4.Tr.E						
21	54.4	3.Ec.D	27	7 7.0	3.Sh.I						
17	1 20.5	3.Oc.R		7 31.7	3.Tr.I						
4	29.7	4.Ec.D		7 31.9	5.Ec.D						
8	21.8	4.Oc.R		9 55.7	3.Sh.E						
20	34.1	3.Sh.I		10 28.0	3.Tr.E						
21	2.4	3.Tr.I		11 47.0	5.Oc.R						
23	22.1	3.Sh.E	28	3 15.6	4.Ec.D						
23	59.2	3.Tr.E		5 46.0	3.Ec.D						
18	6 40.8	5.Ec.D		7 0.9	4.Oc.R						
11	4.4	5.Oc.R		9 6.9	3.Oc.R						
13	17.4	4.Sh.I	29	4 25.6	3.Sh.I						
13	53.8	4.Tr.I		4 49.5	3.Tr.I						
16	11.6	4.Sh.E		7 14.4	3.Sh.E						
17	8.9	4.Tr.E		7 45.6	3.Tr.E						
19	13.0	3.Ec.D		12 3.2	4.Sh.I						
22	38.3	3.Oc.R		12 34.2	4.Tr.I						
19	17 52.7	3.Sh.I		13 45.7	5.Sh.I						
18	20.3	3.Tr.I		14 25.1	5.Tr.I						
20	40.8	3.Sh.E		14 59.7	4.Sh.E						
21	17.0	3.Tr.E		15 47.8	4.Tr.E						
22	11.2	4.Ec.D		16 27.2	5.Sh.E						
20	2 1.7	4.Oc.R		17 57.9	5.Tr.E						
12	54.4	5.Sh.I	30	3 4.6	3.Ec.D						
13	39.2	5.Tr.I		6 24.5	3.Oc.R						
15	30.0	5.Sh.E		20 57.2	4.Ec.D						
16	31.6	3.Ec.D	31	0 40.4	4.Oc.R						
17	15.7	5.Tr.E		1 44.3	3.Sh.I						
19	56.1	3.Oc.R		2 7.3	3.Tr.I						
				4 33.1	3.Sh.E						
				5 3.2	3.Tr.E						
				19 57.6	5.Ec.D						

August

1	0 7.4	5.Oc.R	11	9 36.0	3.Sh.I	21	3 55.2	5.Sh.I			
	0 23.3	3.Ec.D		9 53.5	3.Tr.I		4 16.5	5.Tr.I			
	3 42.1	3.Oc.R		12 25.7	3.Sh.E		6 50.2	5.Sh.E			
	5 10.5	6.Tr.I		12 48.3	3.Tr.E		7 33.7	5.Tr.E			
	5 44.7	4.Sh.I	12	3 3.4	5.Sh.I		18 30.0	4.Ec.D			
	6 14.1	4.Tr.I		3 32.5	5.Tr.I		18 48.7	3.Ec.D			
	7 53.4	6.Tr.E		4 30.9	4.Sh.I		21 53.1	4.Oc.R			
	8 41.7	4.Sh.E		4 53.3	4.Tr.I		21 53.8	3.Oc.R			
	9 27.3	4.Tr.E		5 53.2	5.Sh.E	22	17 28.2	3.Sh.I			

August

	23	2.9	3.Sh.I		6	57.2	5.Tr.E		17	39.3	3.Tr.I		11	13.5	4.Tr.I		9	35.7	4.Sh.I		6	43.1	3.Sh.I
	23	25.0	3.Tr.I		7	30.0	4.Sh.E		20	18.5	3.Sh.E		12	17.4	3.Sh.I		9	52.3	4.Tr.I		6	49.8	3.Tr.I
2	1	51.9	3.Sh.E		8	4.0	4.Tr.E		20	32.5	3.Tr.E		12	35.8	3.Tr.I		12	36.4	4.Sh.E		7	47.4	5.Sh.E
	2	20.8	3.Tr.E		8	15.2	3.Ec.D	23	3	17.4	4.Sh.I		13	47.9	4.Sh.E		13	0.7	4.Tr.E		8	8.9	5.Tr.E
	14	38.7	4.Ec.D		11	27.0	3.Oc.R		3	31.9	4.Tr.I		14	25.0	4.Tr.E		20	9.4	3.Sh.I		9	33.9	3.Sh.E
	18	19.8	4.Oc.R	13	6	54.7	3.Sh.I		6	18.5	4.Sh.E		15	6.9	3.Sh.E		20	21.7	3.Tr.I		9	41.7	3.Tr.E
	21	41.9	3.Ec.D		7	11.1	3.Tr.I		6	39.4	4.Tr.E		15	30.8	3.Tr.E		22	59.7	3.Sh.E	31	5	22.4	3.Ec.D
3	0	59.7	3.Oc.R		9	44.5	3.Sh.E		10	7.5	5.Ec.D		20	49.4	5.Ec.D		23	15.2	3.Tr.E		8	20.3	3.Oc.R
	2	11.6	5.Sh.I		10	5.7	3.Tr.E		13	41.9	5.Oc.R	10	0	46.8	5.Oc.R						8	22.5	4.Sh.I
	2	47.8	5.Tr.I		13	25.0	4.Ec.D		16	7.4	3.Ec.D		10	56.5	3.Ec.D						8	30.8	4.Tr.I
	4	56.0	5.Sh.E		16	56.4	4.Oc.R		19	11.1	3.Oc.R		14	9.6	3.Oc.R						11	25.0	4.Sh.E
	6	18.3	5.Tr.E	14	5	33.9	3.Ec.D	24	12	11.7	4.Ec.D		19	43.4	4.Ec.D						11	35.4	4.Tr.E
	20	21.5	3.Sh.I		8	44.4	3.Oc.R		14	46.9	3.Sh.I		23	17.4	4.Oc.R								
	20	42.7	3.Tr.I		9	15.2	5.Ec.D		14	56.9	3.Tr.I												
	23	10.6	3.Sh.E		13	5.5	5.Oc.R		15	31.8	4.Oc.R												
	23	26.2	4.Sh.I		22	12.5	4.Sh.I		17	37.3	3.Sh.E												
	23	38.4	3.Tr.E		22	33.0	4.Tr.I		17	49.8	3.Tr.E												
	23	54.0	4.Tr.I	15	1	12.1	4.Sh.E	25	13	26.1	3.Ec.D												
4	2	23.8	4.Sh.E		1	43.0	4.Tr.E		16	21.6	5.Sh.I												
	3	6.6	4.Tr.E		4	13.4	3.Sh.I		16	28.4	3.Oc.R												
	19	0.5	3.Ec.D		4	28.8	3.Tr.I		16	38.8	5.Tr.I												
	22	17.2	3.Oc.R		7	3.3	3.Sh.E		19	18.9	5.Sh.E												
5	8	20.3	4.Ec.D		7	23.1	3.Tr.E		19	51.6	5.Tr.E												
	8	23.4	5.Ec.D	16	2	52.5	3.Ec.D		20	59.0	4.Sh.I												
	11	59.1	4.Oc.R		6	1.8	3.Oc.R		21	11.5	4.Tr.I												
	12	27.4	5.Oc.R		7	6.7	4.Ec.D	26	0	0.7	4.Sh.E												
	17	40.1	3.Sh.I		10	35.4	4.Oc.R		0	18.1	4.Tr.E												
	18	0.5	3.Tr.I		15	29.2	5.Sh.I		12	5.6	3.Sh.I												
	20	29.4	3.Sh.E		15	54.4	5.Tr.I		12	14.5	3.Tr.I												
	20	55.9	3.Tr.E		18	21.6	5.Sh.E		14	56.2	3.Sh.E												
6	16	19.2	3.Ec.D		19	15.6	5.Tr.E		15	7.1	3.Tr.E												
	17	7.8	4.Sh.I	17	1	32.1	3.Sh.I	27	5	53.4	4.Ec.D												
	17	33.8	4.Tr.I		1	46.4	3.Tr.I		9	10.5	4.Oc.R												
	19	34.7	3.Oc.R		4	22.1	3.Sh.E		10	44.9	3.Ec.D												
	20	5.8	4.Sh.E		4	40.5	3.Tr.E		13	45.7	3.Oc.R												
	20	45.8	4.Tr.E		15	54.1	4.Sh.I		22	33.8	5.Ec.D												
7	14	37.2	5.Sh.I		16	12.6	4.Tr.I	28	1	59.6	5.Oc.R												
	14	58.7	3.Sh.I		18	54.2	4.Sh.E		9	24.3	3.Sh.I												
	15	9.9	5.Tr.I		19	21.9	4.Tr.E		9	32.1	3.Tr.I												
	15	18.1	3.Tr.I	18	0	11.2	3.Ec.D		12	15.0	3.Sh.E												
	17	24.3	5.Sh.E		3	19.2	3.Oc.R		12	24.4	3.Tr.E												
	17	48.1	3.Sh.E		21	41.6	5.Ec.D		14	40.8	4.Sh.I												
	18	13.4	3.Tr.E		22	50.7	3.Sh.I		14	51.2	4.Tr.I												
	18	37.7	5.Tr.E		23	4.0	3.Tr.I		17	42.8	4.Sh.E												
8	2	1.8	4.Ec.D	19	0	48.3	4.Ec.D		17	56.8	4.Tr.E												
	5	38.3	4.Oc.R		1	24.2	5.Oc.R	29	8	3.6	3.Ec.D												
	13	37.8	3.Ec.D		1	40.9	3.Sh.E		11	3.0	3.Oc.R												
	16	52.2	3.Oc.R		1	57.8	3.Tr.E		23	35.2	4.Ec.D												
9	4	4.3	6.Oc.D		4	14.2	4.Oc.R	30	2	49.2	4.Oc.R												
	6	10.9	6.Oc.R		21	30.0	3.Ec.D		4	47.7	5.Sh.I												
	10	49.3	4.Sh.I	20	0	36.5	3.Oc.R		5	0.9	5.Tr.I												

September

1	4	1.9	3.Sh.I	11	7	9.6	4.Tr.I	21	0	15.2	4.Ec.R												
	4	7.4	3.Tr.I		7	9.6	4.Sh.I		2	41.4	3.Ec.R												
	6	52.8	3.Sh.E		10	9.6	4.Tr.E		18	55.3	5.Tr.I												
	6	58.9	3.Tr.E		10	13.9	4.Sh.E		19	0.4	5.Sh.I												
	11	0.1	5.Ec.D		13	14.4	3.Oc.D		21	32.5	5.Tr.E												
	14	16.7	5.Oc.R		16	6.6	3.Ec.R		22	10.8	5.Sh.E												
	17	16.9	4.Ec.D	12	11	53.4	3.Tr.I		22	22.1	3.Tr.I												
	20	27.8	4.Oc.R		11	54.6	3.Sh.I		22	28.9	3.Sh.I												
2	2	41.1	3.Ec.D		14	42.5	3.Tr.E	22	1	9.1	3.Tr.E												
	5	37.5	3.Oc.R		14	46.1	3.Sh.E		1	20.8	3.Sh.E												
3	1	20.6	3.Sh.I		16	3.1	4.Oc.D		5	49.0	4.Tr.I												
	1	25.0	3.Tr.I		18	7.3	5.Sh.I		5	57.1	4.Sh.I												
	2	4.2	4.Sh.I		18	8.9	5.Tr.I		8	43.9	4.Tr.E												
	2	10.5	4.Tr.I		19	8.3	4.Ec.R		9	3.1	4.Sh.E												
	4	11.6	3.Sh.E		20	59.6	5.Tr.E		21	0.9	3.Oc.D												
	4	16.2	3.Tr.E		21	13.6	5.Sh.E	23	0	0.3	3.Ec.R												
	5	7.2	4.Sh.E	13	10	32.1	3.Oc.D		14	42.6	4.Oc.D												
	5	13.9	4.Tr.E		13	25.6	3.Ec.R		17	57.5	4.Ec.R												
	17	14.2	5.Sh.I	14	0	49.4	4.Tr.I		19	39.9	3.Tr.I												
	17	23.5	5.Tr.I		0	51.5	4.Sh.I		19	47.8	3.Sh.I												
	20	16.2	5.Sh.E		3	48.1	4.Tr.E		22	26.4	3.Tr.E												
	20	26.1	5.Tr.E		3	56.2	4.Sh.E		22	39.8	3.Sh.E												
	23	59.9	3.Ec.D		9	11.1	3.Tr.I	24	1	6.2	5.Oc.D												
4	2	54.8	3.Oc.R		9	13.5	3.Sh.I		4	24.4	5.Ec.R												
	10	58.7	4.Ec.D		11	59.8	3.Tr.E		18	18.7	3.Oc.D												
	14	6.4	4.Oc.R		12	5.1	3.Sh.E		21	19.3	3.Ec.R												
	22	39.4	3.Sh.I	15	0	19.3	5.Oc.D		23	29.0	4.Tr.I												
	22	42.7	3.Tr.I		3	26.9	5.Ec.R		23	39.1	4.Sh.I												
5	1	30.5	3.Sh.E		7	49.8	3.Oc.D	25	2	22.6	4.Tr.E												
	1	33.5	3.Tr.E		9	42.9	4.Oc.D		2	45.4	4.Sh.E												
	19	46.0	4.Sh.I		10	44.5	3.Ec.R		16	57.7	3.Tr.I												
	19	50.1	4.Tr.I		12	50.5	4.Ec.R		17	6.6	3.Sh.I												
	21	18.7	3.Ec.D	16	6	28.8	3.Tr.I		19	43.8	3.Tr.E												
	22	49.4	4.Sh.E		6	32.3	3.Sh.I		19	58.8	3.Sh.E												
	22	52.5	4.Tr.E		9	17.1	3.Tr.E	26	7	19.2	5.Tr.I												
	23	26.6	5.Ec.D		9	24.0	3.Sh.E		7	27.3	5.Sh.I												
6	0	12.0	3.Oc.R		18	29.2	4.Tr.I		8	22.7	4.Oc.D												

September

2	33.8	5.Oc.R	18	33.3	4.Sh.I	9	49.3	5.Tr.E	8	53.6	3.Tr.E
19	58.2	3.Sh.I	21	26.7	4.Tr.E	10	39.6	5.Sh.E	9	14.7	3.Sh.E
20	0.3	3.Tr.I	21	38.5	4.Sh.E	11	39.9	4.Ec.R	4	4 48.2	3.Oc.D
22	49.4	3.Sh.E	17	5 7.6	3.Oc.D	15	36.5	3.Oc.D	7	54.3	3.Ec.R
22	50.7	3.Tr.E	6	31.8	5.Tr.I	18	38.3	3.Ec.R	13	23.2	4.Oc.D
7	4 40.5	4.Ec.D	6	33.7	5.Sh.I	27	14 15.6	3.Tr.I	16	47.0	4.Ec.R
7	44.9	4.Oc.R	8	3.4	3.Ec.R	14	25.5	3.Sh.I	5	3 27.3	3.Tr.I
18	37.5	3.Ec.D	9	16.0	5.Tr.E	17	1.2	3.Tr.E	3	41.2	3.Sh.I
21	29.3	3.Oc.R	9	42.1	5.Sh.E	17	9.0	4.Tr.I	6	11.1	3.Tr.E
8	5 40.4	5.Sh.I	18	3 22.7	4.Oc.D	17	17.8	3.Sh.E	6	33.7	3.Sh.E
5	45.8	5.Tr.I	3	46.5	3.Tr.I	17	21.0	4.Sh.I	8	8.0	5.Tr.I
8	42.6	5.Tr.E	3	51.2	3.Sh.I	20	1.4	4.Tr.E	8	21.2	5.Sh.I
8	44.6	5.Sh.E	6	32.9	4.Ec.R	20	27.7	4.Sh.E	10	23.1	5.Tr.E
13	27.8	4.Sh.I	6	34.4	3.Tr.E	28	12 54.4	3.Oc.D	11	37.1	5.Sh.E
13	29.8	4.Tr.I	6	42.9	3.Sh.E	13	30.3	5.Oc.D	22	9.6	4.Tr.I
16	31.0	4.Tr.E	19	2 25.3	3.Oc.D	15	57.3	3.Ec.R	22	27.0	4.Sh.I
16	31.7	4.Sh.E	5	22.4	3.Ec.R	16	53.3	5.Ec.R	6	0 58.2	4.Tr.E
17	17.0	3.Sh.I	12	9.1	4.Tr.I	29	2 2.8	4.Oc.D	1	34.8	4.Sh.E
17	18.0	3.Tr.I	12	15.2	4.Sh.I	5	22.2	4.Ec.R	2	6.1	3.Oc.D
20	8.0	3.Tr.E	12	42.8	5.Oc.D	11	33.5	3.Tr.I	5	13.3	3.Ec.R
20	8.3	3.Sh.E	15	5.3	4.Tr.E	11	44.4	3.Sh.I	7	0 45.3	3.Tr.I
9	15 56.3	3.Ec.D	15	20.8	4.Sh.E	14	18.7	3.Tr.E	1	0.1	3.Sh.I
18	47.7	3.Ec.R	15	55.9	5.Ec.R	14	36.7	3.Sh.E	3	28.7	3.Tr.E
22	22.3	4.Ec.D	20	1 4.3	3.Tr.I	30	10 12.3	3.Oc.D	3	52.8	3.Sh.E
10	1 26.0	4.Ec.R	1	10.0	3.Sh.I	10	49.2	4.Tr.I	7	3.5	4.Oc.D
11	53.1	5.Ec.D	3	51.7	3.Tr.E	11	3.0	4.Sh.I	10	29.4	4.Ec.R
14	35.7	3.Tr.I	4	1.9	3.Sh.E	13	16.3	3.Ec.R	14	19.3	5.Oc.D
14	35.8	3.Sh.I	21	2.7	4.Oc.D	13	40.2	4.Tr.E	17	50.9	5.Ec.R
14	58.5	5.Ec.R	23	43.1	3.Oc.D	14	10.1	4.Sh.E	23	24.1	3.Oc.D
17	25.3	3.Tr.E				19	43.3	5.Tr.I	8	2 32.4	3.Ec.R
17	27.2	3.Sh.E				19	54.1	5.Sh.I	15	50.0	4.Tr.I
						22	6.0	5.Tr.E	16	9.0	4.Sh.I
						23	8.3	5.Sh.E	18	37.3	4.Tr.E
									19	17.2	4.Sh.E
									22	3.3	3.Tr.I
									22	19.1	3.Sh.I
									9	0 46.3	3.Tr.E
									1	11.8	3.Sh.E
									20	32.6	5.Tr.I
									20	42.1	3.Oc.D
									20	47.9	5.Sh.I
									22	40.3	5.Tr.E
									23	51.4	3.Ec.R
									10	0 5.6	5.Sh.E
									0	43.8	4.Oc.D
									4	11.8	4.Ec.R
									19	21.4	3.Tr.I
									19	38.1	3.Sh.I
									22	4.0	3.Tr.E
									22	30.8	3.Sh.E

October

1	8 51.4	3.Tr.I	11	9 30.4	4.Tr.I	21	3 1.6	4.Ec.R	14	3 10.9	4.Tr.I
9	3.4	3.Sh.I	9	51.1	4.Sh.I	3	35.3	5.Oc.D	3	33.2	4.Sh.I
11	36.1	3.Tr.E	12	16.6	4.Tr.E	4	31.0	3.Oc.D	5	56.0	4.Tr.E
11	55.7	3.Sh.E	12	59.6	4.Sh.E	7	17.3	5.Ec.R	6	42.0	4.Sh.E
19	42.9	4.Oc.D	18	0.2	3.Oc.D	7	45.8	3.Ec.R	8	58.2	5.Tr.I
23	4.6	4.Ec.R	21	10.5	3.Ec.R	22	3 10.4	3.Tr.I	9	15.3	5.Sh.I
2	7 30.2	3.Oc.D	12	2 44.3	5.Oc.D	3	31.9	3.Sh.I	10	58.6	5.Tr.E
10	35.3	3.Ec.R	6	19.6	5.Ec.R	5	50.7	3.Tr.E	12	34.7	5.Sh.E
3	1 54.4	5.Oc.D	16	39.5	3.Tr.I	6	25.1	3.Sh.E	13	57.6	3.Tr.I
4	29.4	4.Tr.I	16	57.0	3.Sh.I	8	12.8	4.Tr.I	14	16.0	3.Sh.I
4	45.0	4.Sh.I	18	24.3	4.Oc.D	8	39.5	4.Sh.I	16	39.4	3.Tr.E
5	21.9	5.Ec.R	19	21.6	3.Tr.E	10	55.0	4.Tr.E	17	8.9	3.Sh.E
6	9.3	3.Tr.I	19	49.9	3.Sh.E	11	49.3	4.Sh.E	15	12 4.8	4.Oc.D
6	22.3	3.Sh.I	21	54.3	4.Ec.R	23	1 49.2	3.Oc.D	12	36.4	3.Oc.D
7	19.2	4.Tr.E	13	15 18.3	3.Oc.D	5	4.9	3.Ec.R	15	36.7	4.Ec.R
7	52.4	4.Sh.E	18	29.5	3.Ec.R	9	49.3	5.Tr.I	15	48.6	3.Ec.R
									16	11 15.7	3.Tr.I
									11	35.0	3.Sh.I
									13	57.1	3.Tr.E
									14	27.9	3.Sh.E
									15	9.5	5.Oc.D
									18	48.3	5.Ec.R
									20	51.4	4.Tr.I
									21	15.2	4.Sh.I
									23	35.5	4.Tr.E
									17	0 24.4	4.Sh.E
									9	54.6	3.Oc.D
									13	7.7	3.Ec.R
									18	5 45.4	4.Oc.D
									8	33.9	3.Tr.I
									8	53.9	3.Sh.I
									9	19.2	4.Ec.R
									11	14.9	3.Tr.E
									11	47.0	3.Sh.E
									21	23.5	5.Tr.I
									21	42.2	5.Sh.I
									23	16.9	5.Tr.E
									19	1 3.3	5.Sh.E
									7	12.8	3.Oc.D
									10	26.7	3.Ec.R
									14	32.1	4.Tr.I
									14	57.4	4.Sh.I
									17	15.2	4.Tr.E
									18	6.8	4.Sh.E
									20	5 52.1	3.Tr.I
									6	12.9	3.Sh.I
									8	32.8	3.Tr.E
									9	6.1	3.Sh.E
									23	26.1	4.Oc.D
									10	9.5	5.Sh.I
									11	36.3	5.Tr.E
									13	32.2	5.Sh.E
									17	6.9	4.Oc.D
									20	44.1	4.Ec.R
									24	0 28.6	3.Tr.I
									0	50.9	3.Sh.I
									3	8.7	3.Tr.E
									3	44.2	3.Sh.E
									23	7.5	3.Oc.D
									25	1 53.6	4.Tr.I
									2	21.6	4.Sh.I
									2	24.0	3.Ec.R
									4	35.0	4.Tr.E
									5	31.7	4.Sh.E
									16	0.9	5.Oc.D
									19	46.0	5.Ec.R
									21	46.9	3.Tr.I
									22	10.0	3.Sh.I
									26	0 26.7	3.Tr.E
									1	3.3	3.Sh.E
									10	47.7	4.Oc.D
									14	26.6	4.Ec.R
									20	25.8	3.Oc.D
									23	43.1	3.Ec.R
									27	19 5.3	3.Tr.I
									19	29.0	3.Sh.I
									19	34.4	4.Tr.I
									20	3.8	4.Sh.I
									21	32.9	6.Ec.D
									21	44.8	3.Tr.E
									22	15.1	4.Tr.E
									22	15.2	5.Tr.I
									22	22.4	3.Sh.E
									22	36.8	5.Sh.I
									22	41.3	6.Ec.R
									23	14.2	4.Sh.E
									23	56.6	5.Tr.E
									28	2 1.0	5.Sh.E
									17	44.2	3.Oc.D
									21	2.2	3.Ec.R
									29	4 28.6	4.Oc.D
									8	9.1	4.Ec.R
									16	23.6	3.Tr.I
									16	48.0	3.Sh.I
									19	2.9	3.Tr.E
									19	41.5	3.Sh.E
									30	4 26.9	5.Oc.D
									8	15.0	5.Ec.R
									13	15.4	4.Tr.I
									13	45.9	4.Sh.I

October

	15	2.5	3.Oc.D
	15	55.5	4.Tr.E
	16	56.7	4.Sh.E
	18	21.3	3.Ec.R
31	13	42.1	3.Tr.I
	14	7.0	3.Sh.I
	16	21.0	3.Tr.E
	17	0.6	3.Sh.E
	22	9.6	4.Oc.D

November

1	1	51.6	4.Ec.R
	10	41.0	5.Tr.I
	11	4.1	5.Sh.I
	12	17.9	5.Tr.E
	12	20.9	3.Oc.D
	14	29.8	5.Sh.E
	15	40.4	3.Ec.R
2	6	56.4	4.Tr.I
	7	28.1	4.Sh.I
	9	36.0	4.Tr.E
	10	39.1	4.Sh.E
	11	0.5	3.Tr.I
	11	26.1	3.Sh.I
	13	39.3	3.Tr.E
	14	19.7	3.Sh.E
3	9	39.4	3.Oc.D
	12	59.5	3.Ec.R
	15	50.6	4.Oc.D
	16	52.4	5.Oc.D
	19	34.1	4.Ec.R
	20	43.6	5.Ec.R
4	8	19.0	3.Tr.I
	8	45.1	3.Sh.I
	10	57.6	3.Tr.E
	11	38.8	3.Sh.E
	21	43.0	6.Sh.I
	22	14.6	6.Sh.E
5	0	37.5	4.Tr.I
	1	10.3	4.Sh.I
	3	16.7	4.Tr.E
	4	21.6	4.Sh.E
	6	57.9	3.Oc.D
	10	18.7	3.Ec.R
	23	6.9	5.Tr.I
	23	31.6	5.Sh.I
6	0	40.6	5.Tr.E
	2	58.7	5.Sh.E
	5	37.5	3.Tr.I
	6	4.1	3.Sh.I
	8	15.9	3.Tr.E
11	2	16.1	3.Ec.R
	20	54.3	4.Oc.D
	21	33.2	3.Tr.I
	22	1.3	3.Sh.I
12	0	11.3	3.Tr.E
	0	41.7	4.Ec.R
	0	55.2	3.Sh.E
	17	43.6	5.Oc.D
	19	58.3	6.Ec.D
	20	12.1	3.Oc.D
	21	41.5	5.Ec.R
	22	39.4	6.Ec.R
	23	35.2	3.Ec.R
13	5	41.2	4.Tr.I
	6	17.0	4.Sh.I
	8	20.0	4.Tr.E
	9	29.1	4.Sh.E
	18	51.8	3.Tr.I
	19	20.4	3.Sh.I
	21	29.8	3.Tr.E
	22	14.4	3.Sh.E
14	14	35.6	4.Oc.D
	17	30.8	3.Oc.D
	18	24.3	4.Ec.R
	20	54.3	3.Ec.R
	23	57.8	5.Tr.I
15	0	26.6	5.Sh.I
	1	30.0	5.Tr.E
	3	56.5	5.Sh.E
	16	10.5	3.Tr.I
	16	39.4	3.Sh.I
	18	48.5	3.Tr.E
	19	33.5	3.Sh.E
	23	22.6	4.Tr.I
	23	59.2	4.Sh.I
16	2	1.4	4.Tr.E
	3	11.7	4.Sh.E
	14	49.4	3.Oc.D
	18	13.5	3.Ec.R
17	6	8.7	5.Oc.D
21	8	6.7	3.Tr.I
	8	36.6	3.Sh.I
	10	44.7	3.Tr.E
	10	45.6	4.Tr.I
	11	23.7	4.Sh.I
	11	30.9	3.Sh.E
	13	24.9	4.Tr.E
	14	36.7	4.Sh.E
	18	33.9	5.Oc.D
	22	39.3	5.Ec.R
22	6	45.7	3.Oc.D
	10	10.9	3.Ec.R
	19	40.1	4.Oc.D
	23	31.9	4.Ec.R
23	5	25.5	3.Tr.I
	5	55.7	3.Sh.I
	8	3.6	3.Tr.E
	8	50.0	3.Sh.E
24	0	47.6	5.Tr.I
	1	21.5	5.Sh.I
	2	24.7	5.Tr.E
	4	4.5	3.Oc.D
	4	27.3	4.Tr.I
	4	54.1	5.Sh.E
	5	5.9	4.Sh.I
	7	7.0	4.Tr.E
	7	30.1	3.Ec.R
	8	19.3	4.Sh.E
25	2	44.3	3.Tr.I
	3	14.8	3.Sh.I
	5	22.5	3.Tr.E
	6	9.2	3.Sh.E
	13	21.8	4.Oc.D
	17	14.5	4.Ec.R
26	1	23.3	3.Oc.D
	4	49.2	3.Ec.R
	6	58.5	5.Oc.D
	11	8.0	5.Ec.R
	22	8.9	4.Tr.I
	22	48.2	4.Sh.I
	8	57.9	3.Sh.E
	9	31.8	4.Oc.D
	13	16.7	4.Ec.R
7	4	16.4	3.Oc.D
	7	37.8	3.Ec.R
	18	18.7	4.Tr.I
	18	52.5	4.Sh.I
	20	57.6	4.Tr.E
	22	4.1	4.Sh.E
8	2	56.0	3.Tr.I
	3	23.2	3.Sh.I
	5	18.3	5.Oc.D
	5	34.3	3.Tr.E
	6	17.0	3.Sh.E
	9	12.7	5.Ec.R
9	1	34.9	3.Oc.D
	3	13.0	4.Oc.D
	4	56.9	3.Ec.R
	6	59.2	4.Ec.R
10	0	14.6	3.Tr.I
	0	42.2	3.Sh.I
	2	52.8	3.Tr.E
	3	36.1	3.Sh.E
	11	32.2	5.Tr.I
	11	58.8	5.Sh.I
	11	59.9	4.Tr.I
	12	34.7	4.Sh.I
	13	4.2	5.Tr.E
	14	38.7	4.Tr.E
	15	27.3	5.Sh.E
	15	46.6	4.Sh.E
	22	53.5	3.Oc.D
8	17.1	4.Oc.D	
10	10.3	5.Ec.R	
12	6.8	4.Ec.R	
13	29.2	3.Tr.I	
13	58.5	3.Sh.I	
16	7.2	3.Tr.E	
16	52.6	3.Sh.E	
18	12	8.2	3.Oc.D
	15	32.6	3.Ec.R
	17	4.1	4.Tr.I
	17	41.4	4.Sh.I
	19	43.1	4.Tr.E
	20	54.2	4.Sh.E
19	10	47.9	3.Tr.I
	11	17.6	3.Sh.I
	12	22.6	5.Tr.I
	12	53.8	5.Sh.I
	13	25.9	3.Tr.E
	13	56.5	5.Tr.E
	14	11.8	3.Sh.E
	16	25.1	5.Sh.E
20	1	58.6	4.Oc.D
	5	49.4	4.Ec.R
	9	26.9	3.Oc.D
	12	51.8	3.Ec.R
	19	52.3	6.Sh.I
	22	35.9	6.Sh.E
27	0	3.2	3.Tr.I
	0	33.9	3.Sh.I
	0	49.2	4.Tr.E
	2	1.8	4.Sh.E
	2	41.5	3.Tr.E
	3	28.3	3.Sh.E
	22	42.2	3.Oc.D
28	2	8.4	3.Ec.R
	7	3.5	4.Oc.D
	10	57.0	4.Ec.R
	13	12.3	5.Tr.I
	13	49.0	5.Sh.I
	14	54.2	5.Tr.E
	17	22.8	5.Sh.E
	18	45.2	6.Ec.D
	21	22.0	3.Tr.I
	21	52.9	3.Sh.I
	22	16.5	6.Ec.R
29	0	0.5	3.Tr.E
	0	47.5	3.Sh.E
	15	50.7	4.Tr.I
	16	30.5	4.Sh.I
	18	31.6	4.Tr.E
	19	44.3	4.Sh.E
	20	1.1	3.Oc.D
	23	27.5	3.Ec.R
30	18	41.0	3.Tr.I
	19	12.0	3.Sh.I
	19	23.4	5.Oc.D
	21	19.6	3.Tr.E
	22	6.6	3.Sh.E
	23	37.0	5.Ec.R

December

1	0	45.3	4.Oc.D
	4	39.6	4.Ec.R
	17	20.0	3.Oc.D
	20	46.7	3.Ec.R
2	9	32.5	4.Tr.I
	10	12.8	4.Sh.I
	12	14.2	4.Tr.E
	13	26.9	4.Sh.E
	15	59.9	3.Tr.I
	16	31.1	3.Sh.I
	18	38.7	3.Tr.E
	19	25.8	3.Sh.E
3	1	37.1	5.Tr.I
	2	16.6	5.Sh.I
	3	24.7	5.Tr.E
	5	51.7	5.Sh.E
	14	39.0	3.Oc.D
	18	5.8	3.Ec.R
11	3	55.1	3.Oc.D
	7	22.4	3.Ec.R
	23	33.4	4.Oc.D
12	2	27.0	5.Tr.I
	2	35.1	3.Tr.I
	3	6.5	3.Sh.I
	3	11.7	5.Sh.I
	3	29.8	4.Ec.R
	4	28.6	5.Tr.E
	5	15.2	3.Tr.E
	6	1.6	3.Sh.E
	6	49.2	5.Sh.E
13	1	14.2	3.Oc.D
	4	41.6	3.Ec.R
	8	20.7	4.Tr.I
	9	1.9	4.Sh.I
	11	6.3	4.Tr.E
	12	17.0	4.Sh.E
21	3	18.4	5.Tr.I
	4	7.1	5.Sh.I
	5	35.6	5.Tr.E
	7	46.8	5.Sh.E
	13	11.0	3.Tr.I
	13	27.6	4.Tr.I
	13	41.9	3.Sh.I
	14	8.7	4.Sh.I
	15	52.8	3.Tr.E
	16	16.9	4.Tr.E
	16	37.3	3.Sh.E
	17	24.6	4.Sh.E
22	11	50.2	3.Oc.D
	15	17.3	3.Ec.R
	17	33.7	6.Sh.I
	21	55.4	6.Sh.E
	22	22.7	4.Oc.D
23	2	19.9	4.Ec.R

December

	18	27.2	4.Oc.D		23	54.2	3.Tr.I		9	30.5	5.Oc.D
	22	22.1	4.Ec.R	14	0	25.6	3.Sh.I		10	30.2	3.Tr.I
4	13	18.9	3.Tr.I		2	34.6	3.Tr.E		11	1.0	3.Sh.I
	13	50.2	3.Sh.I		3	20.7	3.Sh.E		13	12.4	3.Tr.E
	15	57.9	3.Tr.E		8	38.6	5.Oc.D		13	56.4	3.Sh.E
	16	44.9	3.Sh.E		13	3.3	5.Ec.R		14	0.8	5.Ec.R
5	3	14.5	4.Tr.I		17	15.6	4.Oc.D	24	7	10.1	4.Tr.I
	3	55.0	4.Sh.I		17	39.3	6.Ec.D		7	51.0	4.Sh.I
	5	57.0	4.Tr.E		21	12.3	4.Ec.R		9	9.5	3.Oc.D
	7	9.4	4.Sh.E		21	46.4	6.Ec.R		10	0.7	4.Tr.E
	7	48.1	5.Oc.D		22	33.4	3.Oc.D		11	7.1	4.Sh.E
	11	58.0	3.Oc.D	15	2	0.7	3.Ec.R		12	36.5	3.Ec.R
	12	5.6	5.Ec.R		21	13.4	3.Tr.I	25	7	49.5	3.Tr.I
	15	25.0	3.Ec.R		21	44.7	3.Sh.I		8	20.0	3.Sh.I
6	10	37.9	3.Tr.I		23	54.1	3.Tr.E		10	32.1	3.Tr.E
	11	9.3	3.Sh.I	16	0	39.9	3.Sh.E		11	15.6	3.Sh.E
	12	9.2	4.Oc.D		2	2.9	4.Tr.I		15	44.9	5.Tr.I
	13	17.1	3.Tr.E		2	44.2	4.Sh.I		16	5.2	4.Oc.D
	14	4.1	3.Sh.E		4	49.7	4.Tr.E		16	34.9	5.Sh.I
	16	4.7	4.Ec.R		5	59.5	4.Sh.E		18	10.0	5.Tr.E
	18	38.6	6.Sh.I		14	52.8	5.Tr.I		20	2.4	4.Ec.R
	22	20.0	6.Sh.E		15	39.7	5.Sh.I		20	15.7	5.Sh.E
7	9	17.0	3.Oc.D		17	2.1	5.Tr.E	26	6	28.8	3.Oc.D
	12	44.1	3.Ec.R		19	18.3	5.Sh.E		9	55.6	3.Ec.R
	14	2.1	5.Tr.I		19	52.6	3.Oc.D	27	0	52.7	4.Tr.I
	14	44.3	5.Sh.I		23	19.9	3.Ec.R		1	33.3	4.Sh.I
	15	56.4	5.Tr.E	17	10	57.9	4.Oc.D		3	44.7	4.Tr.E
	18	20.6	5.Sh.E		14	54.8	4.Ec.R		4	49.6	4.Sh.E
	20	56.5	4.Tr.I		18	32.5	3.Tr.I		5	8.8	3.Tr.I
	21	37.3	4.Sh.I		19	3.7	3.Sh.I		5	39.1	3.Sh.I
	23	39.9	4.Tr.E		21	13.6	3.Tr.E		7	51.9	3.Tr.E
8	0	51.9	4.Sh.E		21	59.0	3.Sh.E		8	34.7	3.Sh.E
	7	56.9	3.Tr.I	18	17	11.8	3.Oc.D		21	56.9	5.Oc.D
	8	28.3	3.Sh.I		19	45.2	4.Tr.I	28	2	29.4	5.Ec.R
	10	36.4	3.Tr.E		20	26.4	4.Sh.I		3	48.2	3.Oc.D
	11	23.2	3.Sh.E		20	39.0	3.Ec.R		7	14.7	3.Ec.R
9	5	51.3	4.Oc.D		21	4.2	5.Oc.D		9	47.9	4.Oc.D
	6	36.0	3.Oc.D		22	33.2	4.Tr.E		13	44.9	4.Ec.R
	9	47.2	4.Ec.R		23	42.1	4.Sh.E	29	2	28.2	3.Tr.I
	10	3.3	3.Ec.R	19	1	32.0	5.Ec.R		2	58.2	3.Sh.I
	20	13.4	5.Oc.D		15	51.7	3.Tr.I		5	11.6	3.Tr.E
10	0	34.7	5.Ec.R		16	22.8	3.Sh.I		5	53.9	3.Sh.E
	5	16.0	3.Tr.I		18	33.2	3.Tr.E		18	35.3	4.Tr.I
	5	47.4	3.Sh.I		19	18.2	3.Sh.E		19	15.6	4.Sh.I
	7	55.8	3.Tr.E	20	4	40.3	4.Oc.D		21	28.7	4.Tr.E
	8	42.4	3.Sh.E		8	37.4	4.Ec.R		22	32.1	4.Sh.E
	14	38.5	4.Tr.I		14	31.0	3.Oc.D	30	1	7.5	3.Oc.D
	15	19.6	4.Sh.I		17	58.2	3.Ec.R		4	11.5	5.Tr.I
	17	23.0	4.Tr.E						4	33.8	3.Ec.R
	18	34.5	4.Sh.E						5	2.5	5.Sh.I
									6	44.7	5.Tr.E
									8	44.3	5.Sh.E
									16	37.4	6.Ec.D
									21	12.2	6.Ec.R
									23	47.5	3.Tr.I
								31	0	17.2	3.Sh.I
									2	31.4	3.Tr.E
									3	13.0	3.Sh.E
									3	30.6	4.Oc.D
									7	27.4	4.Ec.R
									22	26.9	3.Oc.D

Mutual Eclipses and Occultations of Planetary Satellites 2024
Saturn:

Year	M	D	h	m	s	Event Type	Ph	Dur	dMag	%Ill	Sep	PA	MinD
2024	5	20	3	45	2	(III) occ (II)	P	309	0.1	93.2	31.1	96	0.082
2024	5	26	2	23	38	(II) occ (I)	P	145	0.2	83.6	25.6	273	0.027
2024	6	8	22	57	24	(II) occ (III)	P	138	0.0	96.3	34.2	275	0.091
2024	6	24	1	33	52	(II) occ (III)	P	52	0.0	99.9	34.6	275	0.113
2024	9	29	13	42	5	(I) occ (II)	P	437	0.1	92.9	11.7	289	0.055
2024	10	14	13	16	52	(I) ecl (II)	A	353	1.0	39.7	24.2	281	0.001
2024	10	14	13	16	52	(I) ecl (II)	A	353	1.0	39.7	24.2	281	0.001
2024	10	29	14	46	33	(I) ecl (II)	P	234	0.6	59.4	24.8	281	0.024
2024	10	29	14	46	33	(I) ecl (II)	P	234	0.6	59.4	24.8	281	0.024
2024	11	13	16	23	58	(I) ecl (II)	P	180	0.4	70.6	24.8	281	0.033
2024	11	13	16	23	58	(I) ecl (II)	P	179	0.4	70.6	24.8	281	0.033
2024	11	16	11	58	31	(I) ecl (III)	E	97	0.0	99.9	24.2	282	0.109
2024	11	16	11	58	31	(I) ecl (III)	E	97	0.0	99.9	24.2	282	0.109
2024	11	18	9	18	55	(I) ecl (III)	P	192	0.1	94.3	24.0	282	0.078
2024	11	20	6	39	41	(I) ecl (III)	A	246	0.1	87.2	23.8	282	0.050
2024	11	22	4	0	53	(I) ecl (III)	A	283	0.2	86.5	23.5	282	0.025
2024	11	22	4	0	53	(I) ecl (III)	A	282	0.2	86.5	23.5	282	0.025
2024	11	24	1	22	36	(I) ecl (III)	A	312	0.2	86.5	23.2	282	0.005
2024	11	24	1	22	36*	(I) ecl (III)	A	310	0.2	86.5	23.2	282	0.005
2024	11	25	22	44	58	(I) ecl (III)	A	339	0.2	86.5	22.8	283	0.011
2024	11	27	20	8	11	(I) ecl (III)	A	371	0.2	86.5	22.4	283	0.022
2024	11	27	20	8	11	(I) ecl (III)	A	368	0.2	86.5	22.4	283	0.022
2024	11	28	18	5	16	(I) ecl (II)	P	136	0.2	86.2	24.6	281	0.046
2024	11	29	17	32	33	(I) ecl (III)	A	414	0.2	86.5	21.9	283	0.027
2024	11	29	17	32	33	(I) ecl (III)	A	418	0.2	86.5	21.9	283	0.027
2024	12	1	14	58	37	(I) ecl (III)	A	498	0.2	86.5	21.2	283	0.024
2024	12	3	12	27	31	(I) ecl (III)	A	650	0.2	86.4	20.3	284	0.009
2024	12	9	14	23	36	(III) ecl (IV)	P	5190	1.1	36.7	34.2	89	0.040
2024	12	13	19	48	54	(I) ecl (II)	E	19	0.0	100.0	24.3	280	0.073
2024	12	13	19	48	54*	(I) ecl (II)	E	19	0.0	100.0	24.3	280	0.073
2024	12	22	0	48	17	(IV) ecl (III)	P	415	0.1	88.0	40.7	274	0.122
2024	12	26	2	29	54	(II) ecl (III)	A	671	0.3	78.0	27.8	279	0.015
2024	12	26	2	29	54	(II) ecl (III)	A	671	0.3	78.0	27.8	279	0.015
2024	12	26	2	29	54	(II) ecl (III)	A	670	0.3	78.0	27.8	279	0.015

The events found in the search are displayed in two boxes. The left box gives the details of all events found. The right box gives the contact times for any highlighted event. A typical prediction line (with the header line) is as follows. It involves satellites of Jupiter.

```
Year  M  D  h  m  s  Event Type     Ph   Dur dMag  %Ill   Sep  PA  MinD
2015  3  9 14 22 39  (I) ecl (II)    P   250  0.4  68.3  30.9 291  0.522
```

The information contained in the prediction line is:

Column	Meaning
Year M D h m s	Year, month, day, hour, minute and second for mid-event. Time is UT. An asterisk following this time indicates that the moons come close but do not cross each other
Event Type	The event description. The first mentioned moon either eclipses (ecl) or occults (occ) the second mentioned moon. In this example, (II) eclipses (III)
Ph	The kind of event: M = Miss E = Penumbral eclipse P = Partial eclipse/occultation T = Total eclipse/occultation, where the eclipsed/occulted moon is fully obscured A = Annular eclipse/occultation, where the umbral eclipse shadow, or occulting moon, fully enters the disk of the eclipsed/occulted moon. Following the event kind, there can be an additional letter with the following meanings: e =occultation, with the occulting satellite being in Jupiter's shadow. Event will be visible f = occultation, with the occulted satellite being in Jupiter's shadow. Event will not be visible g = occultation, with both satellites being in Jupiter's shadow. Only observableif the satellites are detectable in the shadow h = hidden. The eclipsed/occulted moon is either in the planet's shadow, or behind the planet. t = transiting. The eclipsed/occulted moon is transiting the planet. The code 'h' will only appear if the check box to 'Include hidden events' is checked.
Dur	The duration, in seconds.
dMag	The magnitude drop. In the case of occultations, it is in comparison to the combined magnitude of the two moons. A value of 9.99 indicates a total eclipse.
%Ill	The illumination at maximum eclipse or occultation, as a percentage of the full illumination of the moon alone (eclipses) or of both moons (occultations).
Sep	Distance (arcsecs) of the eclipsed/occulted satellite from the centre of the planet.
PA	PA (deg) of the eclipsed/occulted satellite with respect to the planet.
MinD	The minimum separation of the centres of the satellites, or satellite and shadow - in arc secs.

Julian Day Number, Apparent Sidereal Time, Obliquity of the Ecliptic, and UT of Solar transit on the Greenwich meridian 2024

Date	Julian day	Sidereal Time h m s	Solar Transit h m s	Ecliptic o ' "
2024 Jan 1	2460310.5	6 40 36	12 3 19	23 26 18.3
2024 Jan 6	2460315.5	7 0 19	12 5 36	23 26 18.3
2024 Jan 11	2460320.5	7 20 2	12 7 43	23 26 18.2
2024 Jan 16	2460325.5	7 39 45	12 9 35	23 26 18.5
2024 Jan 21	2460330.5	7 59 27	12 11 9	23 26 18.4
2024 Jan 26	2460335.5	8 19 10	12 12 24	23 26 18.6
2024 Jan 31	2460340.5	8 38 53	12 13 20	23 26 18.8
2024 Feb 5	2460345.5	8 58 36	12 13 55	23 26 18.7
2024 Feb 10	2460350.5	9 18 19	12 14 11	23 26 18.9
2024 Feb 15	2460355.5	9 38 1	12 14 7	23 26 19.1
2024 Feb 20	2460360.5	9 57 44	12 13 44	23 26 19.0
2024 Feb 25	2460365.5	10 17 27	12 13 5	23 26 19.3
2024 Mar 1	2460370.5	10 37 10	12 12 12	23 26 19.3
2024 Mar 6	2460375.5	10 56 52	12 11 6	23 26 19.2
2024 Mar 11	2460380.5	11 16 35	12 9 51	23 26 19.5
2024 Mar 16	2460385.5	11 36 18	12 8 28	23 26 19.3
2024 Mar 21	2460390.5	11 56 1	12 7 0	23 26 19.4
2024 Mar 26	2460395.5	12 15 44	12 5 30	23 26 19.5
2024 Mar 31	2460400.5	12 35 26	12 3 59	23 26 19.3
2024 Apr 5	2460405.5	12 55 9	12 2 32	23 26 19.4
2024 Apr 10	2460410.5	13 14 52	12 1 10	23 26 19.3
2024 Apr 15	2460415.5	13 34 35	11 59 55	23 26 19.1
2024 Apr 20	2460420.5	13 54 17	11 58 48	23 26 19.3
2024 Apr 25	2460425.5	14 14 0	11 57 52	23 26 19.1
2024 Apr 30	2460430.5	14 33 43	11 57 9	23 26 18.9
2024 May 5	2460435.5	14 53 26	11 56 39	23 26 19.0
2024 May 10	2460440.5	15 13 9	11 56 23	23 26 18.7
2024 May 15	2460445.5	15 32 51	11 56 22	23 26 18.7
2024 May 20	2460450.5	15 52 34	11 56 34	23 26 18.7
2024 May 25	2460455.5	16 12 17	11 56 59	23 26 18.4
2024 May 30	2460460.5	16 32 0	11 57 37	23 26 18.5
2024 Jun 4	2460465.5	16 51 42	11 58 25	23 26 18.5
2024 Jun 9	2460470.5	17 11 25	11 59 22	23 26 18.3
2024 Jun 14	2460475.5	17 31 8	12 0 24	23 26 18.5
2024 Jun 19	2460480.5	17 50 51	12 1 29	23 26 18.3
2024 Jun 24	2460485.5	18 10 34	12 2 34	23 26 18.3
2024 Jun 29	2460490.5	18 30 16	12 3 35	23 26 18.5

Julian Day Number, Apparent Sidereal Time, Obliquity of the Ecliptic, and UT of Solar transit on the Greenwich meridian 2024

Date	Julian day	Sidereal Time	Solar Transit	Ecliptic
		h m s	h m s	o ' "
2024 Jul 4	2460495.5	18 49 59	12 4 32	23 26 18.3
2024 Jul 9	2460500.5	19 9 42	12 5 20	23 26 18.5
2024 Jul 14	2460505.5	19 29 25	12 5 58	23 26 18.6
2024 Jul 19	2460510.5	19 49 8	12 6 22	23 26 18.5
2024 Jul 24	2460515.5	20 8 50	12 6 32	23 26 18.8
2024 Jul 29	2460520.5	20 28 33	12 6 28	23 26 18.8
2024 Aug 3	2460525.5	20 48 16	12 6 10	23 26 18.8
2024 Aug 8	2460530.5	21 7 59	12 5 36	23 26 19.1
2024 Aug 13	2460535.5	21 27 41	12 4 47	23 26 19.0
2024 Aug 18	2460540.5	21 47 24	12 3 45	23 26 19.1
2024 Aug 23	2460545.5	22 7 7	12 2 30	23 26 19.3
2024 Aug 28	2460550.5	22 26 50	12 1 5	23 26 19.2
2024 Sep 2	2460555.5	22 46 33	11 59 31	23 26 19.4
2024 Sep 7	2460560.5	23 6 15	11 57 51	23 26 19.5
2024 Sep 12	2460565.5	23 25 58	11 56 6	23 26 19.3
2024 Sep 17	2460570.5	23 45 41	11 54 18	23 26 19.6
2024 Sep 22	2460575.5	0 5 24	11 52 31	23 26 19.5
2024 Sep 27	2460580.5	0 25 6	11 50 48	23 26 19.4
2024 Oct 2	2460585.5	0 44 49	11 49 10	23 26 19.6
2024 Oct 7	2460590.5	1 4 32	11 47 40	23 26 19.4
2024 Oct 12	2460595.5	1 24 15	11 46 21	23 26 19.3
2024 Oct 17	2460600.5	1 43 58	11 45 14	23 26 19.4
2024 Oct 22	2460605.5	2 3 40	11 44 23	23 26 19.1
2024 Oct 27	2460610.5	2 23 23	11 43 48	23 26 19.2
2024 Nov 1	2460615.5	2 43 6	11 43 33	23 26 19.1
2024 Nov 6	2460620.5	3 2 49	11 43 38	23 26 18.8
2024 Nov 11	2460625.5	3 22 31	11 44 4	23 26 18.9
2024 Nov 16	2460630.5	3 42 14	11 44 50	23 26 18.7
2024 Nov 21	2460635.5	4 1 57	11 45 57	23 26 18.6
2024 Nov 26	2460640.5	4 21 40	11 47 25	23 26 18.6
2024 Dec 1	2460645.5	4 41 23	11 49 11	23 26 18.4
2024 Dec 6	2460650.5	5 1 5	11 51 13	23 26 18.4
2024 Dec 11	2460655.5	5 20 48	11 53 27	23 26 18.4
2024 Dec 16	2460660.5	5 40 31	11 55 49	23 26 18.2
2024 Dec 21	2460665.5	6 0 14	11 58 17	23 26 18.4
2024 Dec 26	2460670.5	6 19 57	12 0 46	23 26 18.3
2024 Dec 31	2460675.5	6 39 39	12 3 12	23 26 18.2

Sun, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	Po o	Bo o	Lo o	Carrington Rotation #
2024 Jan 1	18 42 15.6683	-23 4 50.282	0.98331839	1951.8	2.31	-2.94	227.71	2279
2024 Jan 6	19 4 17.2929	-22 36 50.406	0.98332964	1951.8	-0.11	-3.51	161.86	2279
2024 Jan 11	19 26 8.5289	-21 57 38.918	0.98345692	1951.5	-2.52	-4.06	96.01	2279
2024 Jan 16	19 47 45.7365	-21 7 44.100	0.98367720	1951.1	-4.88	-4.58	30.18	2279
2024 Jan 21	20 9 5.8075	-20 7 43.195	0.98400544	1950.5	-7.18	-5.06	324.34	2280
2024 Jan 26	20 30 6.8981	-18 58 18.404	0.98447289	1949.5	-9.40	-5.50	258.51	2280
2024 Jan 31	20 50 48.2081	-17 40 14.135	0.98508730	1948.3	-11.53	-5.90	192.67	2280
2024 Feb 5	21 11 9.5386	-16 14 16.933	0.98583027	1946.8	-13.54	-6.25	126.84	2280
2024 Feb 10	21 31 11.0323	-14 41 16.122	0.98666662	1945.2	-15.43	-6.55	61.01	2280
2024 Feb 15	21 50 52.9514	-13 2 5.141	0.98756860	1943.4	-17.20	-6.80	355.18	2281
2024 Feb 20	22 10 16.0864	-11 17 39.141	0.98855110	1941.5	-18.82	-6.99	289.33	2281
2024 Feb 25	22 29 22.1567	- 9 28 50.017	0.98963770	1939.4	-20.29	-7.14	223.48	2281
2024 Mar 1	22 48 13.4246	- 7 36 26.604	0.99082954	1937.0	-21.62	-7.22	157.62	2281
2024 Mar 6	23 6 52.3418	- 5 41 16.371	0.99210357	1934.5	-22.78	-7.25	91.75	2281
2024 Mar 11	23 25 21.2616	- 3 44 7.559	0.99341805	1932.0	-23.79	-7.23	25.87	2281
2024 Mar 16	23 43 42.2217	- 1 45 51.239	0.99474528	1929.4	-24.63	-7.15	319.98	2282
2024 Mar 21	0 1 57.4444	0 12 42.915	0.99610095	1926.8	-25.29	-7.01	254.07	2282
2024 Mar 26	0 20 9.6066	2 10 49.998	0.99750344	1924.1	-25.79	-6.82	188.13	2282
2024 Mar 31	0 38 21.5491	4 7 47.913	0.99895107	1921.3	-26.11	-6.59	122.18	2282
2024 Apr 5	0 56 36.0307	6 2 55.194	1.00041743	1918.5	-26.25	-6.30	56.22	2282
2024 Apr 10	1 14 55.3936	7 55 28.190	1.00185728	1915.7	-26.21	-5.97	350.23	2283
2024 Apr 15	1 33 21.3998	9 44 40.314	1.00324839	1913.0	-25.99	-5.60	284.22	2283
2024 Apr 20	1 51 55.7925	11 29 47.368	1.00460798	1910.5	-25.58	-5.18	218.19	2283
2024 Apr 25	2 10 40.4632	13 10 8.943	1.00595291	1907.9	-24.99	-4.73	152.14	2283
2024 Apr 30	2 29 37.2365	14 45 6.565	1.00728192	1905.4	-24.22	-4.25	86.07	2283
2024 May 5	2 48 47.5998	16 14 1.759	1.00856618	1903.0	-23.26	-3.74	19.99	2283
2024 May 10	3 8 12.2382	17 36 13.990	1.00976145	1900.7	-22.13	-3.20	313.88	2284
2024 May 15	3 27 50.9891	18 51 2.603	1.01085446	1898.6	-20.83	-2.64	247.76	2284
2024 May 20	3 47 43.4511	19 57 51.395	1.01186460	1896.8	-19.37	-2.07	181.63	2284
2024 May 25	4 7 49.1079	20 56 8.810	1.01281067	1895.0	-17.75	-1.48	115.48	2284
2024 May 30	4 28 7.2249	21 45 26.890	1.01369355	1893.3	-15.99	-0.88	49.32	2284
2024 Jun 4	4 48 36.5258	22 25 19.972	1.01448250	1891.9	-14.11	-0.28	343.15	2285
2024 Jun 9	5 9 14.7342	22 55 24.909	1.01513901	1890.6	-12.11	0.32	276.98	2285
2024 Jun 14	5 29 58.8804	23 15 24.335	1.01565947	1889.7	-10.02	0.93	210.80	2285
2024 Jun 19	5 50 46.0019	23 25 8.380	1.01606621	1888.9	-7.86	1.52	144.61	2285
2024 Jun 24	6 11 33.3640	23 24 33.715	1.01638258	1888.3	-5.65	2.10	78.43	2285
2024 Jun 29	6 32 18.5150	23 13 42.130	1.01661139	1887.9	-3.39	2.67	12.24	2285
2024 Jul 4	6 52 58.8863	22 52 39.891	1.01672093	1887.7	-1.13	3.22	306.06	2286
2024 Jul 9	7 13 31.5158	22 21 39.520	1.01668180	1887.8	1.13	3.75	239.89	2286
2024 Jul 14	7 33 53.6094	21 41 0.636	1.01649880	1888.1	3.37	4.25	173.72	2286
2024 Jul 19	7 54 3.0694	20 51 8.218	1.01619819	1888.7	5.57	4.73	107.56	2286
2024 Jul 24	8 13 58.6524	19 52 30.326	1.01580926	1889.4	7.71	5.17	41.41	2286

Sun, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	Po o	Bo o	Lo o	Carrington Rotation #
2024 Jul 29	8 33 39.9025	18 45 36.142	1.01533494	1890.3	9.77	5.57	335.27	2287
2024 Aug 3	8 53 6.5039	17 30 57.551	1.01474440	1891.4	11.76	5.94	269.14	2287
2024 Aug 8	9 12 18.1255	16 9 11.145	1.01401842	1892.7	13.65	6.27	203.02	2287
2024 Aug 13	9 31 14.8581	14 40 56.519	1.01316833	1894.3	15.44	6.55	136.92	2287
2024 Aug 18	9 49 57.4503	13 6 53.797	1.01222525	1896.1	17.12	6.79	70.83	2287
2024 Aug 23	10 8 27.4012	11 27 41.324	1.01122402	1898.0	18.67	6.98	4.75	2287
2024 Aug 28	10 26 46.7522	9 43 55.269	1.01016534	1899.9	20.10	7.12	298.68	2288
2024 Sep 2	10 44 57.3889	7 56 14.344	1.00902151	1902.1	21.40	7.21	232.64	2288
2024 Sep 7	11 3 1.0541	6 5 20.739	1.00778198	1904.4	22.55	7.25	166.60	2288
2024 Sep 12	11 20 59.6587	4 11 57.710	1.00646278	1906.9	23.57	7.24	100.58	2288
2024 Sep 17	11 38 55.4448	2 16 47.574	1.00510026	1909.5	24.42	7.17	34.56	2288
2024 Sep 22	11 56 51.1579	0 20 29.578	1.00373226	1912.1	25.13	7.05	328.56	2289
2024 Sep 27	12 14 49.7653	- 1 36 18.089	1.00235550	1914.8	25.66	6.88	262.57	2289
2024 Oct 2	12 32 53.8322	- 3 32 52.725	1.00094647	1917.4	26.03	6.66	196.59	2289
2024 Oct 7	12 51 5.6244	- 5 28 27.984	0.99949996	1920.2	26.23	6.39	130.62	2289
2024 Oct 12	13 9 27.3138	- 7 22 16.187	0.99803482	1923.0	26.24	6.07	64.65	2289
2024 Oct 17	13 28 1.1574	- 9 13 30.369	0.99659170	1925.8	26.07	5.71	358.70	2290
2024 Oct 22	13 46 49.7223	-11 1 26.075	0.99520692	1928.5	25.71	5.30	292.75	2290
2024 Oct 27	14 5 55.4504	-12 45 17.579	0.99387253	1931.1	25.15	4.85	226.81	2290
2024 Nov 1	14 25 20.0625	-14 24 14.408	0.99256792	1933.6	24.40	4.36	160.87	2290
2024 Nov 6	14 45 4.6290	-15 57 23.712	0.99128889	1936.1	23.46	3.84	94.95	2290
2024 Nov 11	15 5 9.6850	-17 23 52.819	0.99005505	1938.5	22.32	3.29	29.03	2290
2024 Nov 16	15 25 35.4815	-18 42 51.908	0.98890875	1940.8	20.98	2.71	323.11	2291
2024 Nov 21	15 46 22.2113	-19 53 34.955	0.98787964	1942.8	19.47	2.11	257.20	2291
2024 Nov 26	16 7 29.3961	-20 55 16.656	0.98695486	1944.6	17.78	1.49	191.29	2291
2024 Dec 1	16 28 55.4079	-21 47 12.763	0.98611331	1946.3	15.92	0.86	125.40	2291
2024 Dec 6	16 50 37.5969	-22 28 43.409	0.98534744	1947.8	13.91	0.22	59.51	2291
2024 Dec 11	17 12 32.5560	-22 59 16.043	0.98467583	1949.1	11.78	-0.42	353.63	2292
2024 Dec 16	17 34 36.7103	-23 18 27.330	0.98413864	1950.2	9.54	-1.06	287.75	2292
2024 Dec 21	17 56 46.6159	-23 26 2.109	0.98375509	1951.0	7.22	-1.69	221.88	2292
2024 Dec 26	18 18 58.4470	-23 21 52.300	0.98350709	1951.4	4.84	-2.31	156.01	2292
2024 Dec 31	18 41 7.8886	-23 5 58.557	0.98336927	1951.7	2.43	-2.91	90.16	2292

The data produced in the ephemeris is:

Right Asc. right ascension, in hours, min, sec.

Declination declination, in deg, min, sec

Distance the geocentric distance to the planet, in AU

dia the planet's apparent equatorial diameter, in arc sec

Po Position Angle of the Sun's north pole

Bo Latitude of the earth, referred to the Sun's equator

Lo Longitude of the central meridian of the Sun

Carrington Rotation # The current Carrington Solar Rotation number - in continuation of the series that started on 1983 Nov 9.946

Mercury, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jan 1	17 25 45.2106	-20 7 56.129	0.77756941	8.6	0.5	18.0w	117	27.0	102.9	-6.96	9.29	0.03
2024 Jan 6	17 29 36.5308	-20 40 37.455	0.87963145	7.6	-0.1	22.1w	95	45.7	99.4	-6.56	8.84	0.02
2024 Jan 11	17 45 7.5367	-21 32 43.724	0.98212647	6.8	-0.3	23.4w	78	60.0	95.7	-6.20	7.03	0.01
2024 Jan 16	18 7 41.3249	-22 21 11.177	1.07529129	6.2	-0.3	23.2w	66	70.2	91.7	-5.91	4.35	0.00
2024 Jan 21	18 34 29.2706	-22 52 19.678	1.15615958	5.8	-0.2	22.2w	57	77.5	87.4	-5.69	1.14	-0.01
2024 Jan 26	19 3 55.0794	-22 58 34.370	1.22444551	5.5	-0.2	20.5w	49	83.0	82.8	-5.52	357.61	-0.02
2024 Jan 31	19 35 2.0212	-22 35 37.491	1.28067052	5.2	-0.3	18.4w	42	87.2	78.0	-5.37	353.91	-0.02
2024 Feb 5	20 7 14.9017	-21 40 56.837	1.32539258	5.0	-0.4	16.0w	36	90.6	72.9	-5.23	350.17	-0.03
2024 Feb 10	20 40 11.3679	-20 12 59.983	1.35885604	4.9	-0.5	13.4w	30	93.4	67.6	-5.11	346.51	-0.03
2024 Feb 15	21 13 37.8333	-18 10 52.135	1.38077929	4.8	-0.7	10.3w	23	95.9	61.5	-5.00	343.04	-0.04
2024 Feb 20	21 47 27.6841	-15 34 5.951	1.39013714	4.8	-1.0	7.0w	16	98.0	53.1	-4.89	339.84	-0.03
2024 Feb 25	22 21 39.3579	-12 22 46.070	1.38482088	4.8	-1.5	3.5w	9	99.4	33.3	-4.80	337.01	-0.03
2024 Mar 1	22 56 12.0425	- 8 38 5.906	1.36128445	4.9	-1.8	2.2e	6	99.7	297.4	-4.74	334.66	-0.02
2024 Mar 6	23 30 56.2595	- 4 24 4.704	1.31448112	5.1	-1.6	6.1e	18	97.6	257.6	-4.71	332.88	-0.01
2024 Mar 11	0 5 14.4847	0 9 17.870	1.23900851	5.4	-1.3	10.7e	35	90.9	248.6	-4.76	331.75	0.01
2024 Mar 16	0 37 32.5337	4 41 53.510	1.13300353	5.9	-1.1	14.9e	56	77.9	244.6	-4.90	331.31	0.02
2024 Mar 21	1 5 7.2610	8 43 23.969	1.00387287	6.7	-0.7	17.9e	80	59.0	242.4	-5.14	331.42	0.03
2024 Mar 26	1 24 48.0487	11 42 8.920	0.86884739	7.7	-0.1	18.6e	103	38.4	240.5	-5.46	331.77	0.03
2024 Mar 31	1 34 13.1760	13 14 58.867	0.74726495	8.9	1.1	16.5e	127	20.3	237.8	-5.74	332.00	0.03
2024 Apr 5	1 32 57.8497	13 10 45.008	0.65360976	10.2	2.9	11.4e	149	7.3	232.3	-5.82	331.96	0.02
2024 Apr 10	1 23 33.6178	11 36 47.740	0.59597637	11.2	5.5	4.3e	170	0.8	210.2	-5.52	331.73	0.01
2024 Apr 15	1 11 22.9040	9 9 10.488	0.57608043	11.6	5.2	5.5w	167	1.2	83.3	-4.78	331.53	0.00
2024 Apr 20	1 2 13.9599	6 43 19.362	0.58959667	11.3	3.2	13.2w	150	6.9	67.8	-3.73	331.45	-0.01
2024 Apr 25	0 59 33.0277	5 3 30.060	0.62862598	10.6	1.9	19.3w	134	15.3	64.0	-2.59	331.45	-0.02
2024 Apr 30	1 4 0.7975	4 26 54.237	0.68526013	9.7	1.1	23.5w	121	24.4	62.5	-1.52	331.52	-0.03
2024 May 5	1 14 50.5683	4 51 24.471	0.75356387	8.9	0.7	25.7w	110	33.3	61.9	-0.60	331.69	-0.03
2024 May 10	1 30 58.2524	6 7 30.388	0.82970311	8.1	0.4	26.4w	100	41.7	62.1	0.18	332.06	-0.03
2024 May 15	1 51 35.0992	8 4 43.485	0.91127121	7.3	0.1	25.7w	90	50.1	62.8	0.82	332.75	-0.04
2024 May 20	2 16 17.0401	10 33 26.453	0.99639823	6.7	-0.1	23.9w	80	58.6	64.1	1.34	333.87	-0.03
2024 May 25	2 45 4.1005	13 24 26.124	1.08279855	6.2	-0.4	21.1w	69	67.7	66.3	1.78	335.58	-0.03
2024 May 30	3 18 15.6966	16 27 22.929	1.16665936	5.7	-0.7	17.3w	57	77.5	69.4	2.14	338.01	-0.02
2024 Jun 4	3 56 18.3376	19 28 31.792	1.24135199	5.4	-1.1	12.6w	41	87.6	74.1	2.46	341.34	0.00
2024 Jun 9	4 39 15.9238	22 8 25.461	1.29684319	5.2	-1.6	7.0w	23	96.0	82.1	2.76	345.64	0.01
2024 Jun 14	5 26 2.1486	24 3 10.317	1.32222156	5.1	-2.4	1.2w	4	99.9	131.2	3.10	350.80	0.03
2024 Jun 19	6 13 59.9074	24 53 25.582	1.31231394	5.1	-1.8	5.5e	18	97.6	255.7	3.48	356.41	0.04
2024 Jun 24	7 0 3.8308	24 34 58.887	1.27179816	5.3	-1.1	11.1e	36	90.7	266.4	3.94	1.92	0.03
2024 Jun 29	7 42 6.9636	23 18 9.080	1.21089753	5.5	-0.7	16.0e	50	82.0	273.2	4.48	6.91	0.02
2024 Jul 4	8 19 18.7986	21 18 56.018	1.13899474	5.9	-0.4	20.0e	62	73.3	278.5	5.08	11.19	0.01
2024 Jul 9	8 51 33.6578	18 52 43.119	1.06229550	6.3	-0.2	23.2e	72	65.2	282.9	5.76	14.72	0.00
2024 Jul 14	9 18 59.1182	16 12 37.371	0.98436514	6.8	0.0	25.4e	81	57.5	286.5	6.50	17.54	-0.01

Mercury, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jul 19	9 41 37.5088	13 30 3.559	0.90725729	7.4	0.2	26.7e	90	49.9	289.7	7.32	19.73	-0.02
2024 Jul 24	9 59 15.9684	10 55 59.435	0.83248264	8.0	0.4	26.9e	99	42.1	292.6	8.21	21.34	-0.02
2024 Jul 29	10 11 21.1654	8 42 21.239	0.76180718	8.8	0.7	25.7e	109	33.6	295.6	9.17	22.40	-0.03
2024 Aug 3	10 16 59.1271	7 3 28.174	0.69806526	9.6	1.2	23.0e	121	24.4	299.0	10.15	22.92	-0.03
2024 Aug 8	10 15 10.9828	6 16 20.698	0.64616102	10.3	2.0	18.3e	135	14.7	304.0	11.05	22.85	-0.04
2024 Aug 13	10 5 47.3513	6 36 30.176	0.61393573	10.9	3.4	11.7e	151	6.1	314.3	11.63	22.13	-0.04
2024 Aug 18	9 51 8.8430	8 5 12.077	0.61172083	10.9	5.2	5.0e	167	1.2	356.7	11.59	20.85	-0.03
2024 Aug 23	9 37 7.6658	10 14 44.076	0.64895987	10.3	4.0	7.8w	159	3.4	80.3	10.76	19.51	-0.03
2024 Aug 28	9 30 59.3102	12 14 57.035	0.72880071	9.2	1.8	13.9w	136	14.0	99.0	9.36	18.84	-0.01
2024 Sep 2	9 37 19.3506	13 20 3.642	0.84484859	7.9	0.3	17.5w	111	31.9	106.3	7.83	19.36	0.00
2024 Sep 7	9 56 19.0862	13 4 5.715	0.98133815	6.8	-0.6	17.9w	86	53.6	111.4	6.48	21.00	0.02
2024 Sep 12	10 24 42.3808	11 22 46.747	1.11646057	6.0	-1.0	15.7w	62	73.8	116.2	5.43	23.24	0.03
2024 Sep 17	10 57 53.0249	8 32 11.396	1.23090811	5.4	-1.2	12.0w	40	88.2	120.9	4.65	25.44	0.04
2024 Sep 22	11 32 10.3541	4 58 57.764	1.31592510	5.1	-1.4	7.7w	23	96.1	126.8	4.05	27.15	0.03
2024 Sep 27	12 5 43.1856	1 7 4.736	1.37233756	4.9	-1.6	3.5w	9	99.3	140.1	3.58	28.21	0.02
2024 Oct 2	12 38 0.5502	- 2 47 25.730	1.40477695	4.8	-1.6	1.5e	4	99.9	239.3	3.17	28.62	0.01
2024 Oct 7	13 9 8.8846	- 6 35 8.004	1.41785330	4.7	-1.2	4.6e	11	99.1	283.7	2.79	28.44	0.00
2024 Oct 12	13 39 26.6090	-10 10 31.592	1.41494778	4.7	-0.8	7.9e	18	97.6	290.1	2.43	27.71	-0.01
2024 Oct 17	14 9 13.0141	-13 30 4.544	1.39818350	4.8	-0.6	11.0e	24	95.6	291.9	2.06	26.49	-0.02
2024 Oct 22	14 38 43.7599	-16 31 5.932	1.36866661	4.9	-0.4	13.7e	30	93.1	291.9	1.69	24.83	-0.03
2024 Oct 27	15 8 7.8877	-19 11 5.696	1.32669927	5.0	-0.3	16.3e	37	90.1	291.0	1.30	22.77	-0.03
2024 Nov 1	15 37 23.9549	-21 27 21.074	1.27200001	5.3	-0.3	18.5e	44	86.2	289.4	0.89	20.37	-0.03
2024 Nov 6	16 6 14.0016	-23 16 46.439	1.20392653	5.5	-0.3	20.4e	52	81.1	287.3	0.44	17.70	-0.04
2024 Nov 11	16 33 52.3606	-24 35 51.012	1.12179906	6.0	-0.3	21.9e	61	74.1	284.9	-0.07	14.91	-0.03
2024 Nov 16	16 58 44.9080	-25 20 43.381	1.02561882	6.5	-0.3	22.5e	73	64.2	282.4	-0.67	12.25	-0.03
2024 Nov 21	17 17 53.0993	-25 27 13.697	0.91779442	7.3	-0.2	21.8e	90	50.1	280.1	-1.40	10.12	-0.02
2024 Nov 26	17 26 10.8036	-24 50 15.111	0.80710749	8.3	0.3	18.5e	112	31.0	278.2	-2.33	9.18	-0.01
2024 Dec 1	17 17 24.4271	-23 22 43.129	0.71545335	9.3	2.1	11.3e	142	10.3	275.7	-3.43	10.19	0.01
2024 Dec 6	16 52 17.7151	-21 9 22.064	0.67836352	9.8	6.0	1.4e	176	0.1	196.2	-4.44	12.99	0.03
2024 Dec 11	16 27 27.6768	-19 8 45.988	0.71738699	9.3	2.1	11.2w	142	10.4	112.0	-4.94	15.64	0.03
2024 Dec 16	16 18 46.6246	-18 29 54.737	0.81182489	8.2	0.2	18.3w	112	31.6	108.5	-5.00	16.52	0.03
2024 Dec 21	16 26 28.6026	-19 7 19.864	0.92513519	7.2	-0.3	21.4w	88	51.3	105.6	-4.90	15.74	0.03
2024 Dec 26	16 44 49.6348	-20 21 1.373	1.03437605	6.5	-0.4	22.0w	72	65.8	102.2	-4.82	13.80	0.02
2024 Dec 31	17 9 23.7452	-21 40 2.706	1.13053297	5.9	-0.4	21.2w	59	75.7	98.2	-4.77	11.11	0.00

Venus, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jan 1	16 2 26.4545	-18 42 11.406	1.18197992	14.2	-4.0	37.5w	56	77.9	103.8	-0.90	11.92	-2.07
2024 Jan 6	16 27 43.6424	-19 55 59.594	1.21304758	13.9	-4.0	36.5w	54	79.3	101.4	-0.82	9.74	-1.82
2024 Jan 11	16 53 27.8372	-20 56 38.940	1.24335949	13.5	-4.0	35.4w	52	80.6	98.8	-0.72	7.41	-1.53
2024 Jan 16	17 19 34.8322	-21 42 53.455	1.27289822	13.2	-4.0	34.4w	50	81.9	96.0	-0.61	4.96	-1.22
2024 Jan 21	17 45 59.3739	-22 13 42.513	1.30168304	12.9	-4.0	33.4w	48	83.2	93.2	-0.49	2.43	-0.88
2024 Jan 26	18 12 35.6422	-22 28 22.101	1.32972821	12.6	-3.9	32.3w	47	84.4	90.2	-0.37	359.85	-0.52
2024 Jan 31	18 39 17.2031	-22 26 25.048	1.35701907	12.4	-3.9	31.2w	45	85.5	87.2	-0.24	357.26	-0.16
2024 Feb 5	19 5 57.1767	-22 7 42.605	1.38352396	12.2	-3.9	30.1w	43	86.6	84.3	-0.12	354.71	0.21
2024 Feb 10	19 32 28.6465	-21 32 25.741	1.40920813	11.9	-3.9	29.0w	41	87.6	81.4	-0.01	352.24	0.57
2024 Feb 15	19 58 45.1458	-20 41 5.436	1.43405892	11.7	-3.9	27.9w	39	88.6	78.5	0.10	349.88	0.92
2024 Feb 20	20 24 41.5047	-19 34 29.855	1.45809916	11.5	-3.9	26.7w	38	89.6	75.9	0.20	347.66	1.25
2024 Feb 25	20 50 14.2250	-18 13 39.547	1.48134078	11.4	-3.9	25.6w	36	90.5	73.3	0.29	345.61	1.56
2024 Mar 1	21 15 21.2632	-16 39 44.828	1.50376785	11.2	-3.9	24.4w	34	91.3	71.0	0.36	343.76	1.84
2024 Mar 6	21 40 1.8717	-14 54 3.994	1.52534365	11.0	-3.8	23.2w	33	92.2	68.9	0.42	342.13	2.08
2024 Mar 11	22 4 16.4193	-12 58 1.961	1.54602154	10.9	-3.8	22.1w	31	92.9	67.0	0.46	340.71	2.29
2024 Mar 16	22 28 6.2686	-10 53 8.771	1.56577794	10.7	-3.8	20.9w	29	93.7	65.4	0.49	339.53	2.45
2024 Mar 21	22 51 34.0006	- 8 40 55.060	1.58462185	10.6	-3.8	19.7w	27	94.4	64.0	0.50	338.59	2.56
2024 Mar 26	23 14 43.2507	- 6 22 49.621	1.60254933	10.5	-3.8	18.4w	26	95.1	62.8	0.49	337.88	2.62
2024 Mar 31	23 37 38.3066	- 4 0 20.114	1.61953118	10.4	-3.8	17.2w	24	95.7	62.0	0.47	337.41	2.64
2024 Apr 5	0 0 23.8265	- 1 34 54.032	1.63551436	10.3	-3.8	16.0w	22	96.3	61.3	0.43	337.19	2.60
2024 Apr 10	0 23 4.5558	0 51 59.801	1.65043357	10.2	-3.8	14.7w	20	96.8	61.0	0.37	337.19	2.52
2024 Apr 15	0 45 45.2133	3 18 51.185	1.66425098	10.1	-3.8	13.5w	19	97.4	60.9	0.30	337.44	2.38
2024 Apr 20	1 8 30.7150	5 44 11.453	1.67695889	10.0	-3.8	12.2w	17	97.8	61.0	0.21	337.91	2.20
2024 Apr 25	1 31 26.0705	8 6 33.251	1.68854036	10.0	-3.9	10.9w	15	98.3	61.5	0.12	338.62	1.98
2024 Apr 30	1 54 36.1239	10 24 28.881	1.69895826	9.9	-3.9	9.6w	13	98.6	62.1	0.01	339.56	1.72
2024 May 5	2 18 5.2777	12 36 28.892	1.70815054	9.8	-3.9	8.3w	12	99.0	63.1	-0.10	340.73	1.43
2024 May 10	2 41 57.1138	14 41 1.001	1.71604607	9.8	-3.9	6.9w	10	99.3	64.3	-0.22	342.12	1.11
2024 May 15	3 6 14.2360	16 36 31.864	1.72260719	9.8	-3.9	5.6w	8	99.5	65.7	-0.34	343.73	0.76
2024 May 20	3 30 58.3971	18 21 30.447	1.72782545	9.7	-3.9	4.3w	6	99.7	67.2	-0.47	345.55	0.40
2024 May 25	3 56 10.3346	19 54 29.094	1.73169121	9.7	-3.9	2.9w	4	99.9	68.9	-0.59	347.56	0.03
2024 May 30	4 21 49.5339	21 14 4.599	1.73418044	9.7	-4.0	1.6w	2	100.0	70.1	-0.70	349.74	-0.34
2024 Jun 4	4 47 53.9319	22 18 59.720	1.73524371	9.7	-4.0	0.2w	0	100.0	57.2	-0.82	352.08	-0.70
2024 Jun 9	5 14 19.6292	23 8 6.058	1.73482916	9.7	-4.0	1.2e	2	100.0	260.0	-0.92	354.54	-1.05
2024 Jun 14	5 41 1.1330	23 40 28.811	1.73292207	9.7	-4.0	2.6e	4	99.9	261.2	-1.01	357.09	-1.38
2024 Jun 19	6 7 51.9499	23 55 30.213	1.72953666	9.7	-3.9	3.9e	6	99.8	263.5	-1.09	359.69	-1.68
2024 Jun 24	6 34 45.0483	23 52 50.832	1.72469435	9.8	-3.9	5.3e	8	99.6	266.1	-1.15	2.30	-1.95
2024 Jun 29	7 1 33.3366	23 32 29.770	1.71840493	9.8	-3.9	6.7e	10	99.3	268.8	-1.19	4.87	-2.18
2024 Jul 4	7 28 9.9189	22 54 44.461	1.71065048	9.8	-3.9	8.1e	12	99.0	271.5	-1.22	7.37	-2.37
2024 Jul 9	7 54 28.3436	22 0 10.941	1.70141632	9.9	-3.9	9.5e	13	98.6	274.1	-1.23	9.75	-2.51
2024 Jul 14	8 20 23.2180	20 49 42.439	1.69072300	9.9	-3.9	10.9e	15	98.2	276.6	-1.21	11.99	-2.60

Venus, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jul 19	8 45 50.7159	19 24 25.759	1.67861797	10.0	-3.9	12.2e	17	97.7	279.0	-1.18	14.05	-2.64
2024 Jul 24	9 10 48.7545	17 45 37.161	1.66516074	10.1	-3.9	13.6e	19	97.2	281.2	-1.12	15.92	-2.62
2024 Jul 29	9 35 16.9716	15 54 38.474	1.65039575	10.2	-3.9	15.0e	21	96.6	283.2	-1.03	17.58	-2.55
2024 Aug 3	9 59 16.2743	13 52 55.989	1.63433499	10.3	-3.8	16.3e	23	95.9	285.0	-0.93	19.01	-2.43
2024 Aug 8	10 22 48.5005	11 42 0.226	1.61699514	10.4	-3.8	17.7e	25	95.2	286.6	-0.80	20.23	-2.27
2024 Aug 13	10 45 56.4168	9 23 23.681	1.59842073	10.5	-3.8	19.0e	27	94.5	288.0	-0.65	21.21	-2.06
2024 Aug 18	11 8 43.6664	6 58 38.504	1.57867927	10.7	-3.8	20.3e	29	93.7	289.1	-0.49	21.96	-1.80
2024 Aug 23	11 31 14.6857	4 29 14.664	1.55785140	10.8	-3.8	21.6e	31	92.8	290.0	-0.30	22.48	-1.52
2024 Aug 28	11 53 34.5675	1 56 39.223	1.53599465	11.0	-3.8	22.9e	33	91.9	290.7	-0.10	22.77	-1.20
2024 Sep 2	12 15 48.5552	- 0 37 40.366	1.51313015	11.1	-3.8	24.2e	35	91.0	291.2	0.12	22.83	-0.86
2024 Sep 7	12 38 1.7984	- 3 12 14.637	1.48928188	11.3	-3.8	25.5e	37	90.0	291.4	0.34	22.67	-0.50
2024 Sep 12	13 0 19.3724	- 5 45 32.929	1.46449333	11.5	-3.9	26.7e	39	89.0	291.3	0.58	22.29	-0.14
2024 Sep 17	13 22 46.2673	- 8 16 4.155	1.43882855	11.7	-3.9	28.0e	41	88.0	291.1	0.82	21.67	0.23
2024 Sep 22	13 45 27.4480	-10 42 18.014	1.41236506	11.9	-3.9	29.2e	42	86.9	290.6	1.06	20.84	0.59
2024 Sep 27	14 8 27.7618	-13 2 44.541	1.38514983	12.1	-3.9	30.4e	44	85.8	289.8	1.30	19.78	0.94
2024 Oct 2	14 31 51.3253	-15 15 50.534	1.35719398	12.4	-3.9	31.5e	46	84.7	288.8	1.53	18.50	1.27
2024 Oct 7	14 55 41.1937	-17 19 59.839	1.32850930	12.7	-3.9	32.7e	48	83.5	287.5	1.76	17.00	1.58
2024 Oct 12	15 19 59.2030	-19 13 35.685	1.29912216	12.9	-3.9	33.8e	50	82.3	286.1	1.97	15.29	1.86
2024 Oct 17	15 44 45.8420	-20 55 3.582	1.26908154	13.3	-3.9	34.9e	52	81.1	284.3	2.17	13.38	2.10
2024 Oct 22	16 10 0.3675	-22 22 54.925	1.23845094	13.6	-4.0	36.0e	53	79.8	282.4	2.34	11.29	2.30
2024 Oct 27	16 35 40.6718	-23 35 48.421	1.20726026	13.9	-4.0	37.1e	55	78.4	280.3	2.50	9.04	2.45
2024 Nov 1	17 1 42.6612	-24 32 31.087	1.17550834	14.3	-4.0	38.1e	57	77.1	278.0	2.62	6.65	2.56
2024 Nov 6	17 28 0.2071	-25 12 2.678	1.14319323	14.7	-4.0	39.1e	59	75.7	275.6	2.71	4.16	2.63
2024 Nov 11	17 54 25.4377	-25 33 40.393	1.11032711	15.1	-4.1	40.0e	61	74.2	273.1	2.77	1.61	2.64
2024 Nov 16	18 20 49.3731	-25 37 2.594	1.07695069	15.6	-4.1	41.0e	63	72.7	270.5	2.80	359.05	2.60
2024 Nov 21	18 47 2.9925	-25 22 9.773	1.04311987	16.1	-4.1	41.9e	65	71.1	268.0	2.78	356.51	2.51
2024 Nov 26	19 12 57.7188	-24 49 22.736	1.00885849	16.7	-4.2	42.7e	67	69.5	265.5	2.72	354.05	2.37
2024 Dec 1	19 38 25.3638	-23 59 21.843	0.97416572	17.3	-4.2	43.5e	69	67.8	263.0	2.61	351.69	2.19
2024 Dec 6	20 3 18.4470	-22 53 6.227	0.93903917	17.9	-4.2	44.2e	71	66.1	260.7	2.46	349.47	1.97
2024 Dec 11	20 27 30.4640	-21 31 52.100	0.90349418	18.6	-4.3	44.9e	73	64.2	258.5	2.25	347.42	1.70
2024 Dec 16	20 50 56.3220	-19 57 8.803	0.86758310	19.4	-4.3	45.5e	76	62.3	256.5	2.00	345.55	1.41
2024 Dec 21	21 13 32.7977	-18 10 31.942	0.83137335	20.2	-4.4	46.1e	78	60.3	254.6	1.69	343.88	1.08
2024 Dec 26	21 35 18.0140	-16 13 39.865	0.79490689	21.2	-4.4	46.5e	81	58.2	252.9	1.34	342.42	0.74
2024 Dec 31	21 56 10.5683	-14 8 14.106	0.75820915	22.2	-4.5	46.9e	83	55.9	251.4	0.93	341.16	0.38

Mars, Equinox of J2000

Date			Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp	Ds
year	mth	d	h m s	o ' "	AU	"		o	o		o	o	o	o
2024	Jan	1	17 46 46.9290	-23 57 7.338	2.42386093	3.9	1.4	12.7w	8	99.5	88.9	-1.36	27.97	2.73
2024	Jan	6	18 3 3.0578	-24 1 59.850	2.40835235	3.9	1.4	14.1w	9	99.3	87.3	-2.98	26.18	1.56
2024	Jan	11	18 19 24.4665	-24 0 30.198	2.39222859	3.9	1.4	15.5w	10	99.2	85.7	-4.60	24.30	0.37
2024	Jan	16	18 35 49.1692	-23 52 33.778	2.37553015	3.9	1.4	16.8w	11	99.0	84.2	-6.20	22.31	-0.84
2024	Jan	21	18 52 15.1721	-23 38 9.496	2.35833982	4.0	1.4	18.2w	12	98.9	82.6	-7.79	20.24	-2.05
2024	Jan	26	19 8 40.7809	-23 17 19.175	2.34074605	4.0	1.3	19.5w	13	98.7	81.0	-9.35	18.08	-3.26
2024	Jan	31	19 25 4.4811	-22 50 6.964	2.32280512	4.0	1.3	20.7w	14	98.5	79.5	-10.89	15.85	-4.48
2024	Feb	5	19 41 24.7845	-22 16 39.532	2.30454693	4.1	1.3	22.0w	15	98.3	78.0	-12.39	13.56	-5.70
2024	Feb	10	19 57 40.1778	-21 37 6.512	2.28599112	4.1	1.3	23.2w	16	98.1	76.6	-13.84	11.22	-6.91
2024	Feb	15	20 13 49.1346	-20 51 41.003	2.26717741	4.1	1.3	24.5w	17	97.9	75.2	-15.24	8.83	-8.12
2024	Feb	20	20 29 50.4461	-20 0 38.698	2.24818561	4.2	1.3	25.7w	18	97.7	73.9	-16.58	6.40	-9.32
2024	Feb	25	20 45 43.3792	-19 4 16.368	2.22908506	4.2	1.3	26.8w	18	97.5	72.7	-17.85	3.94	-10.51
2024	Mar	1	21 1 27.4670	-18 2 51.890	2.20991174	4.2	1.3	28.0w	19	97.2	71.6	-19.05	1.46	-11.68
2024	Mar	6	21 17 2.3659	-16 56 44.700	2.19067621	4.3	1.2	29.1w	20	97.0	70.5	-20.17	358.97	-12.82
2024	Mar	11	21 32 27.7556	-15 46 16.390	2.17137907	4.3	1.2	30.2w	21	96.7	69.5	-21.19	356.47	-13.95
2024	Mar	16	21 47 43.3603	-14 31 50.871	2.15204941	4.3	1.2	31.4w	22	96.5	68.6	-22.12	353.97	-15.04
2024	Mar	21	22 2 49.2775	-13 13 52.132	2.13274770	4.4	1.2	32.4w	22	96.2	67.8	-22.95	351.49	-16.10
2024	Mar	26	22 17 45.9714	-11 52 43.235	2.11351304	4.4	1.2	33.5w	23	95.9	67.2	-23.66	349.03	-17.12
2024	Mar	31	22 32 34.0623	-10 28 47.115	2.09435232	4.5	1.2	34.6w	24	95.7	66.6	-24.27	346.60	-18.10
2024	Apr	5	22 47 14.1886	- 9 2 27.392	2.07524640	4.5	1.2	35.6w	25	95.4	66.1	-24.75	344.22	-19.03
2024	Apr	10	23 1 46.8817	- 7 34 9.329	2.05617126	4.6	1.2	36.6w	26	95.1	65.7	-25.11	341.89	-19.92
2024	Apr	15	23 16 12.6588	- 6 4 19.180	2.03713948	4.6	1.2	37.6w	26	94.8	65.4	-25.34	339.64	-20.74
2024	Apr	20	23 30 32.3190	- 4 33 21.425	2.01818282	4.6	1.1	38.7w	27	94.6	65.2	-25.45	337.47	-21.51
2024	Apr	25	23 44 46.8574	- 3 1 38.888	1.99930756	4.7	1.1	39.7w	28	94.3	65.1	-25.43	335.39	-22.21
2024	Apr	30	23 58 57.3004	- 1 29 33.860	1.98048892	4.7	1.1	40.7w	28	94.0	65.1	-25.28	333.42	-22.85
2024	May	5	0 13 4.5560	0 2 30.704	1.96167648	4.8	1.1	41.7w	29	93.7	65.2	-25.01	331.58	-23.41
2024	May	10	0 27 9.2934	1 34 10.289	1.94282599	4.8	1.1	42.7w	30	93.4	65.4	-24.62	329.86	-23.90
2024	May	15	0 41 12.1359	3 5 0.711	1.92393395	4.9	1.1	43.7w	30	93.2	65.7	-24.12	328.29	-24.32
2024	May	20	0 55 13.8954	4 34 40.315	1.90500453	4.9	1.1	44.7w	31	92.9	66.0	-23.50	326.86	-24.65
2024	May	25	1 9 15.4645	6 2 49.128	1.88601726	5.0	1.1	45.7w	32	92.6	66.5	-22.78	325.60	-24.91
2024	May	30	1 23 17.6791	7 29 7.722	1.86692056	5.0	1.1	46.7w	32	92.3	67.1	-21.96	324.50	-25.08
2024	Jun	4	1 37 21.1120	8 53 15.725	1.84764097	5.1	1.0	47.8w	33	92.0	67.7	-21.05	323.56	-25.18
2024	Jun	9	1 51 26.0003	10 14 51.838	1.82812652	5.1	1.0	48.8w	33	91.8	68.4	-20.06	322.80	-25.19
2024	Jun	14	2 5 32.5316	11 33 36.485	1.80836358	5.2	1.0	49.9w	34	91.5	69.2	-18.99	322.21	-25.12
2024	Jun	19	2 19 41.0018	12 49 12.833	1.78833876	5.2	1.0	51.0w	35	91.2	70.1	-17.86	321.79	-24.97
2024	Jun	24	2 33 51.7170	14 1 25.831	1.76801632	5.3	1.0	52.1w	35	90.9	71.1	-16.66	321.54	-24.75
2024	Jun	29	2 48 4.8350	15 10 1.041	1.74732782	5.4	1.0	53.2w	36	90.7	72.1	-15.41	321.46	-24.44
2024	Jul	4	3 2 20.0826	16 14 43.360	1.72619289	5.4	1.0	54.4w	36	90.4	73.2	-14.12	321.54	-24.07
2024	Jul	9	3 16 36.8152	17 15 18.429	1.70456662	5.5	1.0	55.6w	37	90.1	74.3	-12.79	321.78	-23.62
2024	Jul	14	3 30 54.3662	18 11 34.848	1.68243525	5.6	1.0	56.9w	37	89.9	75.5	-11.43	322.16	-23.11

Mars, Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp	Ds
year mth d	h m s	° ' "	AU	"		°	°		°	°	°	°
2024 Jul 19	3 45 12.1409	19 3 24.156	1.65978235	5.6	0.9	58.1w	38	89.6	76.8	-10.05	322.70	-22.53
2024 Jul 24	3 59 29.5495	19 50 40.001	1.63656975	5.7	0.9	59.4w	38	89.4	78.1	-8.66	323.36	-21.90
2024 Jul 29	4 13 45.7652	20 33 16.909	1.61272539	5.8	0.9	60.8w	38	89.2	79.4	-7.25	324.16	-21.21
2024 Aug 3	4 27 59.4194	21 11 10.056	1.58818205	5.9	0.9	62.2w	39	88.9	80.8	-5.84	325.08	-20.47
2024 Aug 8	4 42 8.8844	21 44 17.305	1.56291555	6.0	0.9	63.6w	39	88.7	82.1	-4.43	326.10	-19.68
2024 Aug 13	4 56 12.6184	22 12 40.031	1.53692531	6.1	0.8	65.1w	40	88.5	83.5	-3.03	327.22	-18.85
2024 Aug 18	5 10 9.2271	22 36 22.496	1.51020779	6.2	0.8	66.7w	40	88.3	84.9	-1.65	328.43	-17.97
2024 Aug 23	5 23 57.4028	22 55 30.967	1.48273519	6.3	0.8	68.3w	40	88.1	86.3	-0.29	329.72	-17.06
2024 Aug 28	5 37 35.5195	23 10 12.919	1.45444965	6.4	0.8	70.0w	41	88.0	87.7	1.05	331.07	-16.12
2024 Sep 2	5 51 1.4454	23 20 38.129	1.42531873	6.6	0.7	71.7w	41	87.8	89.1	2.35	332.48	-15.16
2024 Sep 7	6 4 13.0117	23 26 59.774	1.39535386	6.7	0.7	73.6w	41	87.7	90.4	3.62	333.93	-14.16
2024 Sep 12	6 17 8.2678	23 29 33.926	1.36458575	6.9	0.7	75.5w	41	87.6	91.7	4.85	335.42	-13.15
2024 Sep 17	6 29 45.5133	23 28 38.644	1.33304220	7.0	0.6	77.4w	41	87.5	93.0	6.04	336.93	-12.12
2024 Sep 22	6 42 3.1324	23 24 33.178	1.30072278	7.2	0.6	79.5w	41	87.5	94.2	7.17	338.45	-11.07
2024 Sep 27	6 53 58.9919	23 17 38.691	1.26761159	7.4	0.5	81.7w	41	87.5	95.4	8.25	339.97	-10.01
2024 Oct 2	7 5 30.5081	23 8 19.692	1.23373781	7.6	0.5	83.9w	41	87.5	96.5	9.27	341.49	-8.94
2024 Oct 7	7 16 35.1417	22 57 3.453	1.19917367	7.8	0.4	86.3w	41	87.6	97.5	10.23	342.98	-7.86
2024 Oct 12	7 27 10.5359	22 44 18.935	1.16401141	8.0	0.4	88.8w	41	87.7	98.5	11.11	344.44	-6.78
2024 Oct 17	7 37 14.4960	22 30 35.849	1.12834037	8.3	0.3	91.4w	41	87.8	99.4	11.93	345.85	-5.69
2024 Oct 22	7 46 44.5666	22 16 24.933	1.09222380	8.6	0.2	94.2w	40	88.1	100.2	12.67	347.21	-4.61
2024 Oct 27	7 55 37.3605	22 2 20.542	1.05573951	8.9	0.2	97.1w	40	88.3	100.9	13.33	348.50	-3.52
2024 Nov 1	8 3 48.9417	21 49 0.491	1.01902937	9.2	0.1	100.2w	39	88.7	101.6	13.91	349.71	-2.44
2024 Nov 6	8 11 15.2444	21 37 4.023	0.98228467	9.5	0.0	103.5w	38	89.1	102.1	14.40	350.82	-1.37
2024 Nov 11	8 17 52.1865	21 27 10.146	0.94572566	9.9	-0.1	106.9w	38	89.7	102.5	14.80	351.81	-0.30
2024 Nov 16	8 23 35.5602	21 19 56.576	0.90957464	10.3	-0.2	110.6w	36	90.3	102.8	15.09	352.68	0.76
2024 Nov 21	8 28 20.3073	21 16 1.563	0.87405198	10.7	-0.3	114.6w	35	91.0	102.9	15.29	353.41	1.81
2024 Nov 26	8 32 0.2103	21 16 4.974	0.83944117	11.2	-0.4	118.8w	33	91.8	102.9	15.39	353.97	2.86
2024 Dec 1	8 34 28.7999	21 20 43.199	0.80611356	11.6	-0.5	123.3w	31	92.7	102.7	15.37	354.36	3.88
2024 Dec 6	8 35 40.0766	21 30 23.501	0.77450618	12.1	-0.6	128.1w	29	93.6	102.3	15.23	354.55	4.90
2024 Dec 11	8 35 29.1541	21 45 18.581	0.74509128	12.6	-0.7	133.3w	27	94.6	101.6	14.98	354.53	5.90
2024 Dec 16	8 33 52.4430	22 5 23.787	0.71834174	13.0	-0.8	138.8w	24	95.7	100.6	14.61	354.28	6.89
2024 Dec 21	8 30 47.5706	22 30 16.871	0.69475156	13.5	-1.0	144.6w	21	96.7	99.2	14.13	353.82	7.86
2024 Dec 26	8 26 14.9101	22 59 12.355	0.67487682	13.9	-1.1	150.8w	17	97.7	97.1	13.53	353.14	8.81
2024 Dec 31	8 20 19.8215	23 30 55.567	0.65929646	14.2	-1.2	157.2w	14	98.6	93.9	12.83	352.26	9.74

Jupiter, Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp	Ds
year mth d	h m s	o ' "	AU	"		o	o		o	o	o	o
2024 Jan 1	2 13 26.7494	12 9 4.085	4.48109454	43.9	-2.5	115.5e	10	99.2	250.0	3.06	339.40	3.12
2024 Jan 6	2 13 38.3054	12 11 41.339	4.55532931	43.2	-2.4	110.5e	11	99.1	250.2	3.03	339.41	3.12
2024 Jan 11	2 14 9.8000	12 16 0.764	4.63200485	42.5	-2.4	105.5e	11	99.1	250.3	3.01	339.45	3.12
2024 Jan 16	2 15 0.9379	12 21 59.669	4.71050659	41.8	-2.3	100.7e	11	99.1	250.5	2.99	339.50	3.12
2024 Jan 21	2 16 11.1435	12 29 33.464	4.79021378	41.1	-2.3	95.9e	11	99.0	250.6	2.97	339.58	3.12
2024 Jan 26	2 17 39.6421	12 38 36.316	4.87056758	40.4	-2.3	91.2e	11	99.0	250.8	2.95	339.68	3.12
2024 Jan 31	2 19 25.6411	12 49 2.322	4.95106794	39.8	-2.2	86.6e	11	99.0	251.0	2.94	339.80	3.12
2024 Feb 5	2 21 28.3772	13 0 45.722	5.03123722	39.1	-2.2	82.1e	11	99.0	251.2	2.93	339.95	3.12
2024 Feb 10	2 23 47.0929	13 13 40.676	5.11059672	38.5	-2.2	77.6e	11	99.1	251.4	2.92	340.11	3.12
2024 Feb 15	2 26 20.9576	13 27 40.737	5.18865571	38.0	-2.1	73.2e	11	99.1	251.7	2.91	340.29	3.12
2024 Feb 20	2 29 8.9998	13 42 38.562	5.26496330	37.4	-2.1	68.9e	11	99.1	251.9	2.90	340.49	3.12
2024 Feb 25	2 32 10.2555	13 58 26.970	5.33914715	36.9	-2.1	64.6e	10	99.2	252.2	2.90	340.71	3.12
2024 Mar 1	2 35 23.8592	14 14 59.443	5.41087808	36.4	-2.0	60.4e	10	99.3	252.5	2.89	340.95	3.11
2024 Mar 6	2 38 49.0278	14 32 9.951	5.47983900	35.9	-2.0	56.3e	10	99.3	252.8	2.89	341.21	3.11
2024 Mar 11	2 42 25.0102	14 49 52.592	5.54570473	35.5	-2.0	52.2e	9	99.4	253.1	2.89	341.48	3.11
2024 Mar 16	2 46 10.9811	15 8 1.005	5.60815115	35.1	-2.0	48.2e	9	99.4	253.5	2.89	341.77	3.11
2024 Mar 21	2 50 6.0547	15 26 28.658	5.66691988	34.8	-1.9	44.2e	8	99.5	253.8	2.89	342.08	3.11
2024 Mar 26	2 54 9.4311	15 45 9.737	5.72181480	34.4	-1.9	40.3e	7	99.6	254.2	2.89	342.41	3.10
2024 Mar 31	2 58 20.4135	16 3 59.132	5.77266153	34.1	-1.9	36.4e	7	99.6	254.7	2.89	342.75	3.10
2024 Apr 5	3 2 38.3724	16 22 52.166	5.81928308	33.8	-1.9	32.5e	6	99.7	255.1	2.90	343.10	3.10
2024 Apr 10	3 7 2.6678	16 41 44.137	5.86148725	33.6	-1.9	28.7e	6	99.8	255.6	2.90	343.47	3.09
2024 Apr 15	3 11 32.5626	17 0 29.992	5.89910445	33.4	-1.9	24.9e	5	99.8	256.2	2.90	343.85	3.09
2024 Apr 20	3 16 7.3190	17 19 5.021	5.93203583	33.2	-1.9	21.2e	4	99.9	256.9	2.90	344.25	3.09
2024 Apr 25	3 20 46.2950	17 37 25.280	5.96021992	33.0	-1.9	17.5e	3	99.9	257.7	2.91	344.66	3.08
2024 Apr 30	3 25 28.9269	17 55 27.393	5.98359994	32.9	-1.9	13.8e	3	99.9	258.7	2.91	345.07	3.08
2024 May 5	3 30 14.6784	18 13 8.224	6.00210263	32.8	-1.8	10.1e	2	100.0	260.2	2.91	345.50	3.08
2024 May 10	3 35 2.9411	18 30 24.440	6.01564472	32.7	-1.8	6.4e	1	100.0	263.0	2.91	345.94	3.07
2024 May 15	3 39 53.0149	18 47 12.641	6.02418935	32.7	-1.8	2.8e	1	100.0	271.8	2.92	346.39	3.07
2024 May 20	3 44 44.2411	19 3 30.027	6.02775786	32.7	-1.8	1.1w	0	100.0	37.7	2.92	346.84	3.06
2024 May 25	3 49 36.0401	19 19 14.440	6.02638895	32.7	-1.8	4.6w	1	100.0	68.5	2.92	347.30	3.06
2024 May 30	3 54 27.8832	19 34 24.125	6.02011241	32.7	-1.8	8.2w	2	100.0	73.0	2.92	347.77	3.05
2024 Jun 4	3 59 19.2115	19 48 57.349	6.00893443	32.8	-1.8	11.8w	2	100.0	75.0	2.92	348.23	3.05
2024 Jun 9	4 4 9.3453	20 2 52.196	5.99287280	32.9	-1.8	15.4w	3	99.9	76.3	2.92	348.71	3.04
2024 Jun 14	4 8 57.5524	20 16 7.023	5.97200513	33.0	-1.8	19.0w	4	99.9	77.3	2.92	349.18	3.04
2024 Jun 19	4 13 43.1581	20 28 40.817	5.94644847	33.1	-1.9	22.7w	4	99.8	78.1	2.92	349.65	3.03
2024 Jun 24	4 18 25.5473	20 40 33.051	5.91632478	33.3	-1.9	26.3w	5	99.8	78.8	2.92	350.12	3.03
2024 Jun 29	4 23 4.1205	20 51 43.424	5.88173617	33.5	-1.9	30.0w	6	99.7	79.4	2.92	350.59	3.02
2024 Jul 4	4 27 38.1767	21 2 11.509	5.84276942	33.7	-1.9	33.7w	6	99.7	80.0	2.91	351.05	3.02
2024 Jul 9	4 32 6.8874	21 11 56.906	5.79955269	34.0	-1.9	37.4w	7	99.6	80.5	2.91	351.51	3.01
2024 Jul 14	4 36 29.4195	21 20 59.695	5.75227260	34.2	-1.9	41.1w	8	99.6	81.1	2.91	351.96	3.00

Jupiter, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jul 19	4 40 44.9969	21 29 20.471	5.70114065	34.5	-1.9	44.9w	8	99.5	81.6	2.91	352.40	3.00
2024 Jul 24	4 44 52.8865	21 37 0.154	5.64636552	34.9	-1.9	48.7w	9	99.4	82.0	2.90	352.83	2.99
2024 Jul 29	4 48 52.3165	21 43 59.673	5.58813172	35.2	-2.0	52.5w	9	99.4	82.5	2.90	353.24	2.98
2024 Aug 3	4 52 42.3566	21 50 19.826	5.52663668	35.6	-2.0	56.4w	10	99.3	82.9	2.90	353.64	2.98
2024 Aug 8	4 56 21.9952	21 56 1.666	5.46214188	36.1	-2.0	60.3w	10	99.2	83.3	2.89	354.03	2.97
2024 Aug 13	4 59 50.2590	22 1 6.692	5.39495773	36.5	-2.0	64.3w	10	99.2	83.7	2.89	354.39	2.96
2024 Aug 18	5 3 6.2367	22 5 36.707	5.32541169	37.0	-2.1	68.4w	11	99.1	84.1	2.89	354.74	2.95
2024 Aug 23	5 6 9.0507	22 9 33.587	5.25382199	37.5	-2.1	72.5w	11	99.1	84.5	2.88	355.06	2.94
2024 Aug 28	5 8 57.7248	22 12 58.973	5.18049360	38.0	-2.1	76.6w	11	99.0	84.8	2.88	355.36	2.94
2024 Sep 2	5 11 31.1425	22 15 54.434	5.10578260	38.6	-2.1	80.9w	11	99.0	85.1	2.88	355.63	2.93
2024 Sep 7	5 13 48.2106	22 18 21.780	5.03011428	39.2	-2.2	85.2w	11	99.0	85.4	2.88	355.87	2.92
2024 Sep 12	5 15 47.9451	22 20 22.983	4.95395118	39.8	-2.2	89.6w	12	99.0	85.6	2.88	356.09	2.91
2024 Sep 17	5 17 29.4814	22 21 59.972	4.87776449	40.4	-2.2	94.1w	11	99.0	85.8	2.88	356.27	2.90
2024 Sep 22	5 18 52.0152	22 23 14.331	4.80200908	41.0	-2.3	98.6w	11	99.0	86.0	2.88	356.42	2.89
2024 Sep 27	5 19 54.6647	22 24 7.169	4.72715259	41.7	-2.3	103.3w	11	99.1	86.2	2.88	356.53	2.89
2024 Oct 2	5 20 36.5893	22 24 39.475	4.65373463	42.3	-2.3	108.0w	11	99.1	86.3	2.88	356.60	2.88
2024 Oct 7	5 20 57.1796	22 24 52.208	4.58234438	43.0	-2.4	112.9w	10	99.2	86.4	2.88	356.64	2.87
2024 Oct 12	5 20 56.1172	22 24 46.131	4.51358323	43.6	-2.4	117.8w	10	99.2	86.5	2.88	356.64	2.86
2024 Oct 17	5 20 33.3729	22 24 21.629	4.44803308	44.3	-2.4	122.9w	10	99.3	86.6	2.88	356.60	2.85
2024 Oct 22	5 19 49.0977	22 23 38.496	4.38624347	44.9	-2.5	128.0w	9	99.4	86.6	2.88	356.52	2.84
2024 Oct 27	5 18 43.5833	22 22 36.186	4.32878753	45.5	-2.5	133.2w	8	99.5	86.6	2.88	356.40	2.83
2024 Nov 1	5 17 17.5111	22 21 14.280	4.27627583	46.1	-2.5	138.6w	7	99.6	86.6	2.89	356.25	2.82
2024 Nov 6	5 15 32.0705	22 19 32.545	4.22930600	46.6	-2.6	144.0w	7	99.7	86.6	2.89	356.06	2.81
2024 Nov 11	5 13 28.9525	22 17 30.940	4.18842105	47.0	-2.6	149.5w	6	99.8	86.6	2.89	355.84	2.80
2024 Nov 16	5 11 10.2409	22 15 9.555	4.15407762	47.4	-2.6	155.1w	5	99.8	86.7	2.89	355.59	2.79
2024 Nov 21	5 8 38.2287	22 12 28.697	4.12666454	47.7	-2.6	160.7w	4	99.9	86.9	2.88	355.33	2.77
2024 Nov 26	5 5 55.4902	22 9 29.489	4.10655257	48.0	-2.6	166.4w	3	99.9	87.5	2.88	355.04	2.76
2024 Dec 1	5 3 5.0273	22 6 14.221	4.09405932	48.1	-2.7	172.1w	2	100.0	89.3	2.88	354.74	2.75
2024 Dec 6	5 0 10.1900	22 2 46.273	4.08940079	48.2	-2.7	177.8w	0	100.0	101.5	2.87	354.43	2.74
2024 Dec 11	4 57 14.4987	21 59 9.891	4.09265968	48.1	-2.7	176.3e	1	100.0	253.5	2.86	354.12	2.73
2024 Dec 16	4 54 21.3716	21 55 29.824	4.10378876	48.0	-2.6	170.6e	2	100.0	259.6	2.85	353.82	2.72
2024 Dec 21	4 51 33.9893	21 51 51.349	4.12267129	47.8	-2.6	164.9e	3	99.9	260.9	2.84	353.52	2.71
2024 Dec 26	4 48 55.4258	21 48 20.535	4.14914125	47.5	-2.6	159.2e	4	99.9	261.4	2.83	353.25	2.70
2024 Dec 31	4 46 28.6407	21 45 3.930	4.18294325	47.1	-2.6	153.5e	5	99.8	261.6	2.82	352.99	2.68

Saturn, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination ° ' "	Distance AU	dia "	mag	Elong °	I °	%Ill	Limb °	De °	Pp °	Ds °
2024 Jan 1	22 21 51.2247	-11 57 28.540	10.29386993	16.2	0.9	53.2e	5	99.8	250.0	9.18	5.94	7.13
2024 Jan 6	22 23 34.9921	-11 47 14.078	10.35818163	16.1	1.0	48.6e	4	99.9	250.1	8.97	5.91	7.06
2024 Jan 11	22 25 24.6908	-11 36 25.684	10.41807507	16.0	1.0	44.0e	4	99.9	250.3	8.74	5.89	6.99
2024 Jan 16	22 27 19.7649	-11 25 6.255	10.47314572	15.9	1.0	39.4e	4	99.9	250.5	8.51	5.86	6.92
2024 Jan 21	22 29 19.6025	-11 13 19.121	10.52305394	15.8	1.0	34.8e	3	99.9	250.8	8.26	5.83	6.85
2024 Jan 26	22 31 23.6158	-11 1 7.534	10.56754407	15.8	1.0	30.3e	3	99.9	251.1	8.01	5.80	6.78
2024 Jan 31	22 33 31.2666	-10 48 34.443	10.60639369	15.7	1.0	25.8e	3	100.0	251.6	7.75	5.77	6.71
2024 Feb 5	22 35 42.0325	-10 35 42.716	10.63938660	15.7	1.0	21.3e	2	100.0	252.3	7.48	5.74	6.64
2024 Feb 10	22 37 55.3741	-10 22 35.375	10.66631383	15.6	1.0	16.8e	2	100.0	253.5	7.21	5.70	6.57
2024 Feb 15	22 40 10.7035	-10 9 15.856	10.68700017	15.6	1.0	12.4e	1	100.0	255.4	6.93	5.67	6.50
2024 Feb 20	22 42 27.4203	- 9 55 47.791	10.70135897	15.6	1.0	8.0e	1	100.0	259.5	6.65	5.63	6.43
2024 Feb 25	22 44 44.9825	- 9 42 14.476	10.70936463	15.6	1.0	3.8e	0	100.0	273.1	6.37	5.60	6.35
2024 Mar 1	22 47 2.8888	- 9 28 38.961	10.71100467	15.6	1.0	1.9w	0	100.0	8.9	6.09	5.56	6.28
2024 Mar 6	22 49 20.6423	- 9 15 4.299	10.70627023	15.6	1.0	5.6w	1	100.0	50.9	5.81	5.52	6.21
2024 Mar 11	22 51 37.7184	- 9 1 33.794	10.69516547	15.6	1.0	9.9w	1	100.0	58.3	5.53	5.48	6.14
2024 Mar 16	22 53 53.5505	- 8 48 11.136	10.67775239	15.6	1.0	14.3w	1	100.0	61.1	5.26	5.45	6.07
2024 Mar 21	22 56 7.6008	- 8 34 59.880	10.65417831	15.6	1.1	18.6w	2	100.0	62.6	4.99	5.41	6.00
2024 Mar 26	22 58 19.3918	- 8 22 3.170	10.62461833	15.7	1.1	23.0w	2	100.0	63.5	4.72	5.37	5.93
2024 Mar 31	23 0 28.4679	- 8 9 23.998	10.58924761	15.7	1.1	27.3w	3	99.9	64.2	4.46	5.34	5.86
2024 Apr 5	23 2 34.3631	- 7 57 5.449	10.54824247	15.8	1.1	31.7w	3	99.9	64.6	4.21	5.30	5.79
2024 Apr 10	23 4 36.5704	- 7 45 10.945	10.50180454	15.9	1.1	36.1w	3	99.9	65.0	3.97	5.27	5.72
2024 Apr 15	23 6 34.5655	- 7 33 44.081	10.45021156	15.9	1.2	40.4w	4	99.9	65.2	3.73	5.23	5.65
2024 Apr 20	23 8 27.8829	- 7 22 48.025	10.39379899	16.0	1.2	44.8w	4	99.9	65.5	3.51	5.20	5.57
2024 Apr 25	23 10 16.1031	- 7 12 25.581	10.33290402	16.1	1.2	49.2w	5	99.8	65.6	3.29	5.17	5.50
2024 Apr 30	23 11 58.8151	- 7 2 39.472	10.26785647	16.2	1.2	53.6w	5	99.8	65.8	3.09	5.14	5.43
2024 May 5	23 13 35.5829	- 6 53 32.602	10.19898997	16.3	1.2	58.0w	5	99.8	66.0	2.91	5.11	5.36
2024 May 10	23 15 5.9344	- 6 45 8.158	10.12668462	16.5	1.2	62.5w	5	99.8	66.1	2.73	5.08	5.29
2024 May 15	23 16 29.4273	- 6 37 29.097	10.05139467	16.6	1.2	66.9w	6	99.8	66.2	2.58	5.06	5.22
2024 May 20	23 17 45.6937	- 6 30 37.780	9.97359536	16.7	1.2	71.4w	6	99.8	66.4	2.43	5.03	5.15
2024 May 25	23 18 54.4047	- 6 24 36.238	9.89374856	16.8	1.2	75.9w	6	99.7	66.5	2.31	5.01	5.07
2024 May 30	23 19 55.2361	- 6 19 26.441	9.81230414	17.0	1.2	80.4w	6	99.7	66.6	2.20	4.99	5.00
2024 Jun 4	23 20 47.8397	- 6 15 10.539	9.72972790	17.1	1.2	85.0w	6	99.7	66.7	2.11	4.98	4.93
2024 Jun 9	23 21 31.8768	- 6 11 50.605	9.64654814	17.3	1.1	89.6w	6	99.7	66.9	2.04	4.96	4.86
2024 Jun 14	23 22 7.0975	- 6 9 28.013	9.56333756	17.4	1.1	94.2w	6	99.7	67.0	1.99	4.95	4.79
2024 Jun 19	23 22 33.3408	- 6 8 3.431	9.48065639	17.6	1.1	98.9w	6	99.7	67.2	1.96	4.95	4.71
2024 Jun 24	23 22 50.4964	- 6 7 37.139	9.39903865	17.7	1.1	103.6w	6	99.7	67.3	1.94	4.94	4.64
2024 Jun 29	23 22 58.4700	- 6 8 9.310	9.31900243	17.9	1.1	108.3w	6	99.8	67.5	1.95	4.94	4.57
2024 Jul 4	23 22 57.1806	- 6 9 40.047	9.24109643	18.0	1.0	113.1w	6	99.8	67.7	1.97	4.94	4.50
2024 Jul 9	23 22 46.6417	- 6 12 8.748	9.16591687	18.2	1.0	117.9w	5	99.8	67.9	2.02	4.94	4.43
2024 Jul 14	23 22 27.0072	- 6 15 33.766	9.09405290	18.3	1.0	122.8w	5	99.8	68.2	2.08	4.95	4.35

Saturn, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination ° ' "	Distance AU	dia "	mag	Elong °	I °	%Ill	Limb °	De °	Pp °	Ds °
2024 Jul 19	23 21 58.5376	- 6 19 52.693	9.02604890	18.5	0.9	127.7w	5	99.8	68.5	2.17	4.96	4.28
2024 Jul 24	23 21 21.5619	- 6 25 2.679	8.96240203	18.6	0.9	132.6w	4	99.9	68.8	2.26	4.97	4.21
2024 Jul 29	23 20 36.4427	- 6 31 0.732	8.90358891	18.7	0.9	137.6w	4	99.9	69.2	2.38	4.98	4.14
2024 Aug 3	23 19 43.6234	- 6 37 43.345	8.85011128	18.8	0.8	142.6w	4	99.9	69.7	2.51	5.00	4.07
2024 Aug 8	23 18 43.7073	- 6 45 5.903	8.80246179	18.9	0.8	147.7w	3	99.9	70.3	2.65	5.02	3.99
2024 Aug 13	23 17 37.4401	- 6 53 2.850	8.76106802	19.0	0.8	152.8w	3	99.9	71.1	2.81	5.04	3.92
2024 Aug 18	23 16 25.6562	- 7 1 28.126	8.72627768	19.1	0.7	157.9w	2	100.0	72.3	2.98	5.06	3.85
2024 Aug 23	23 15 9.2291	- 7 10 15.574	8.69836766	19.2	0.7	163.0w	2	100.0	74.1	3.15	5.08	3.78
2024 Aug 28	23 13 49.0535	- 7 19 19.078	8.67759185	19.2	0.6	168.1w	1	100.0	77.5	3.33	5.11	3.70
2024 Sep 2	23 12 26.1285	- 7 28 31.907	8.66419167	19.2	0.6	173.2w	1	100.0	85.7	3.51	5.13	3.63
2024 Sep 7	23 11 1.5684	- 7 37 46.643	8.65833312	19.2	0.6	177.5w	0	100.0	127.7	3.70	5.16	3.56
2024 Sep 12	23 9 36.5365	- 7 46 55.702	8.66007912	19.2	0.6	175.4e	0	100.0	218.5	3.88	5.18	3.48
2024 Sep 17	23 8 12.1820	- 7 55 51.797	8.66939500	19.2	0.6	170.5e	1	100.0	233.9	4.06	5.21	3.41
2024 Sep 22	23 6 49.5888	- 8 4 28.321	8.68618008	19.2	0.6	165.3e	2	100.0	238.8	4.24	5.23	3.34
2024 Sep 27	23 5 29.8086	- 8 12 39.035	8.71031928	19.1	0.6	160.1e	2	100.0	241.2	4.40	5.25	3.27
2024 Oct 2	23 4 13.9273	- 8 20 17.532	8.74164574	19.1	0.7	154.9e	3	100.0	242.6	4.56	5.28	3.19
2024 Oct 7	23 3 3.0099	- 8 27 17.627	8.77989428	19.0	0.7	149.7e	3	99.9	243.6	4.70	5.30	3.12
2024 Oct 12	23 1 58.0344	- 8 33 33.830	8.82470526	18.9	0.7	144.5e	3	99.9	244.3	4.83	5.32	3.05
2024 Oct 17	23 0 59.8437	- 8 39 1.662	8.87564912	18.8	0.7	139.3e	4	99.9	244.8	4.94	5.33	2.97
2024 Oct 22	23 0 9.1373	- 8 43 37.674	8.93227933	18.7	0.8	134.1e	4	99.9	245.3	5.04	5.35	2.90
2024 Oct 27	22 59 26.5572	- 8 47 18.742	8.99415117	18.5	0.8	128.9e	5	99.8	245.7	5.11	5.36	2.83
2024 Nov 1	22 58 52.6999	- 8 50 1.946	9.06076149	18.4	0.8	123.8e	5	99.8	246.0	5.17	5.37	2.75
2024 Nov 6	22 58 28.0543	- 8 51 45.019	9.13153732	18.2	0.8	118.7e	5	99.8	246.3	5.21	5.38	2.68
2024 Nov 11	22 58 12.9635	- 8 52 26.615	9.20585656	18.1	0.9	113.6e	5	99.8	246.5	5.23	5.38	2.61
2024 Nov 16	22 58 7.6103	- 8 52 6.401	9.28308863	18.0	0.9	108.6e	6	99.8	246.7	5.22	5.38	2.54
2024 Nov 21	22 58 12.0718	- 8 50 44.632	9.36264193	17.8	0.9	103.5e	6	99.8	246.9	5.20	5.38	2.46
2024 Nov 26	22 58 26.3982	- 8 48 21.540	9.44393252	17.6	0.9	98.6e	6	99.7	247.1	5.16	5.38	2.39
2024 Dec 1	22 58 50.5789	- 8 44 57.615	9.52633803	17.5	1.0	93.6e	6	99.7	247.3	5.09	5.37	2.32
2024 Dec 6	22 59 24.5005	- 8 40 33.921	9.60920903	17.3	1.0	88.7e	6	99.7	247.5	5.00	5.36	2.24
2024 Dec 11	23 0 7.9290	- 8 35 12.263	9.69189796	17.2	1.0	83.8e	6	99.7	247.6	4.90	5.35	2.17
2024 Dec 16	23 1 0.5316	- 8 28 55.022	9.77380752	17.1	1.0	79.0e	6	99.7	247.8	4.77	5.33	2.09
2024 Dec 21	23 2 1.9600	- 8 21 44.546	9.85440065	16.9	1.1	74.2e	6	99.8	247.9	4.63	5.31	2.02
2024 Dec 26	23 3 11.8726	- 8 13 42.997	9.93314335	16.8	1.1	69.4e	5	99.8	248.1	4.47	5.29	1.95
2024 Dec 31	23 4 29.8855	- 8 4 52.762	10.00948812	16.6	1.1	64.7e	5	99.8	248.2	4.29	5.27	1.87

Uranus, Equinox of J2000

Date			Right Asc.			Declination			Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp	Ds
year	mth	d	h	m	s	o	'	"	AU	"		o	o		o	o	o	o
2024	Jan	1	3	6	43.2648	17	11	8.869	18.97393863	3.6	5.7	129.3e	2	100.0	253.9	60.54	269.45	62.68
2024	Jan	6	3	6	19.0270	17	9	37.076	19.04231383	3.6	5.7	124.1e	2	100.0	253.9	60.45	269.38	62.73
2024	Jan	11	3	5	59.5455	17	8	24.704	19.11505478	3.6	5.7	119.0e	3	100.0	253.9	60.37	269.32	62.79
2024	Jan	16	3	5	45.0594	17	7	32.815	19.19154225	3.6	5.7	113.8e	3	99.9	254.0	60.31	269.28	62.84
2024	Jan	21	3	5	35.7297	17	7	2.076	19.27109963	3.6	5.7	108.7e	3	99.9	254.0	60.27	269.25	62.89
2024	Jan	26	3	5	31.6394	17	6	52.795	19.35306609	3.5	5.7	103.6e	3	99.9	254.0	60.26	269.24	62.95
2024	Jan	31	3	5	32.8356	17	7	5.142	19.43681161	3.5	5.7	98.5e	3	99.9	254.0	60.26	269.25	63.00
2024	Feb	5	3	5	39.3438	17	7	39.201	19.52170709	3.5	5.7	93.5e	3	99.9	254.1	60.29	269.28	63.05
2024	Feb	10	3	5	51.1635	17	8	34.930	19.60710124	3.5	5.7	88.4e	3	99.9	254.1	60.34	269.32	63.11
2024	Feb	15	3	6	8.2457	17	9	52.026	19.69230603	3.5	5.8	83.5e	3	99.9	254.2	60.40	269.37	63.16
2024	Feb	20	3	6	30.4655	17	11	29.802	19.77664594	3.5	5.8	78.5e	3	99.9	254.2	60.49	269.45	63.22
2024	Feb	25	3	6	57.6573	17	13	27.407	19.85951373	3.5	5.8	73.6e	3	99.9	254.3	60.60	269.54	63.27
2024	Mar	1	3	7	29.6464	17	15	43.975	19.94034611	3.4	5.8	68.7e	3	99.9	254.3	60.73	269.64	63.32
2024	Mar	6	3	8	6.2508	17	18	18.614	20.01859424	3.4	5.8	63.8e	3	99.9	254.4	60.87	269.76	63.38
2024	Mar	11	3	8	47.2705	17	21	10.331	20.09370292	3.4	5.8	59.0e	2	100.0	254.5	61.04	269.90	63.43
2024	Mar	16	3	9	32.4569	17	24	17.885	20.16511666	3.4	5.8	54.2e	2	100.0	254.6	61.22	270.05	63.48
2024	Mar	21	3	10	21.5140	17	27	39.826	20.23235003	3.4	5.8	49.4e	2	100.0	254.7	61.41	270.21	63.54
2024	Mar	26	3	11	14.1435	17	31	14.750	20.29499636	3.4	5.8	44.7e	2	100.0	254.8	61.62	270.39	63.59
2024	Mar	31	3	12	10.0569	17	35	1.326	20.35268881	3.4	5.8	40.0e	2	100.0	254.9	61.84	270.58	63.65
2024	Apr	5	3	13	8.9685	17	38	58.251	20.40507475	3.4	5.8	35.3e	2	100.0	255.0	62.08	270.79	63.70
2024	Apr	10	3	14	10.5752	17	43	4.132	20.45180190	3.4	5.8	30.6e	1	100.0	255.2	62.32	271.00	63.75
2024	Apr	15	3	15	14.5305	17	47	17.389	20.49255660	3.3	5.8	26.0e	1	100.0	255.4	62.57	271.23	63.81
2024	Apr	20	3	16	20.4754	17	51	36.444	20.52711827	3.3	5.8	21.4e	1	100.0	255.6	62.83	271.46	63.86
2024	Apr	25	3	17	28.0701	17	55	59.864	20.55532815	3.3	5.8	16.8e	1	100.0	255.9	63.10	271.71	63.91
2024	Apr	30	3	18	36.9924	18	0	26.331	20.57705427	3.3	5.8	12.2e	1	100.0	256.3	63.37	271.96	63.97
2024	May	5	3	19	46.9224	18	4	54.548	20.59216929	3.3	5.8	7.6e	0	100.0	257.1	63.64	272.22	64.02
2024	May	10	3	20	57.5149	18	9	23.111	20.60055817	3.3	5.8	3.1e	0	100.0	260.2	63.92	272.49	64.07
2024	May	15	3	22	8.3968	18	13	50.537	20.60217761	3.3	5.8	1.5w	0	100.0	65.2	64.20	272.76	64.13
2024	May	20	3	23	19.2092	18	18	15.482	20.59706717	3.3	5.8	6.0w	0	100.0	72.9	64.47	273.03	64.18
2024	May	25	3	24	29.6199	18	22	36.765	20.58530495	3.3	5.8	10.5w	1	100.0	74.1	64.75	273.31	64.23
2024	May	30	3	25	39.3138	18	26	53.302	20.56697964	3.3	5.8	15.0w	1	100.0	74.7	65.02	273.59	64.29
2024	Jun	4	3	26	47.9688	18	31	3.979	20.54217782	3.3	5.8	19.5w	1	100.0	75.0	65.28	273.87	64.34
2024	Jun	9	3	27	55.2333	18	35	7.577	20.51102412	3.3	5.8	24.0w	1	100.0	75.2	65.54	274.14	64.40
2024	Jun	14	3	29	0.7530	18	39	2.926	20.47372756	3.3	5.8	28.6w	1	100.0	75.4	65.80	274.42	64.45
2024	Jun	19	3	30	4.2037	18	42	49.038	20.43055374	3.4	5.8	33.1w	2	100.0	75.6	66.04	274.69	64.50
2024	Jun	24	3	31	5.2890	18	46	25.062	20.38178679	3.4	5.8	37.6w	2	100.0	75.7	66.28	274.95	64.56
2024	Jun	29	3	32	3.7256	18	49	50.192	20.32770544	3.4	5.8	42.1w	2	100.0	75.9	66.50	275.20	64.61
2024	Jul	4	3	32	59.2114	18	53	3.533	20.26859538	3.4	5.8	46.7w	2	100.0	76.0	66.71	275.45	64.66
2024	Jul	9	3	33	51.4291	18	56	4.153	20.20480778	3.4	5.8	51.2w	2	100.0	76.1	66.91	275.68	64.72
2024	Jul	14	3	34	40.0864	18	58	51.266	20.13676509	3.4	5.8	55.8w	2	100.0	76.2	67.10	275.90	64.77

Uranus, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jul 19	3 35 24.9301	19 1 24.253	20.06491889	3.4	5.8	60.4w	3	99.9	76.3	67.27	276.11	64.82
2024 Jul 24	3 36 5.7382	19 3 42.596	19.98972036	3.4	5.8	65.0w	3	99.9	76.4	67.43	276.30	64.88
2024 Jul 29	3 36 42.2945	19 5 45.756	19.91160522	3.4	5.8	69.6w	3	99.9	76.4	67.57	276.47	64.93
2024 Aug 3	3 37 14.3666	19 7 33.102	19.83104041	3.5	5.8	74.3w	3	99.9	76.5	67.69	276.62	64.98
2024 Aug 8	3 37 41.7399	19 9 4.088	19.74856430	3.5	5.8	79.0w	3	99.9	76.6	67.79	276.75	65.04
2024 Aug 13	3 38 4.2489	19 10 18.357	19.66475516	3.5	5.7	83.7w	3	99.9	76.6	67.88	276.86	65.09
2024 Aug 18	3 38 21.7773	19 11 15.705	19.58019323	3.5	5.7	88.4w	3	99.9	76.7	67.94	276.94	65.14
2024 Aug 23	3 38 34.2441	19 11 55.997	19.49543541	3.5	5.7	93.2w	3	99.9	76.7	67.99	277.00	65.20
2024 Aug 28	3 38 41.5705	19 12 19.028	19.41102417	3.5	5.7	97.9w	3	99.9	76.7	68.02	277.03	65.25
2024 Sep 2	3 38 43.6874	19 12 24.608	19.32755117	3.5	5.7	102.8w	3	99.9	76.8	68.03	277.04	65.30
2024 Sep 7	3 38 40.5815	19 12 12.753	19.24565128	3.6	5.7	107.6w	3	99.9	76.8	68.02	277.03	65.36
2024 Sep 12	3 38 32.3061	19 11 43.691	19.16595768	3.6	5.7	112.5w	3	99.9	76.8	67.98	276.98	65.41
2024 Sep 17	3 38 18.9723	19 10 57.803	19.08907122	3.6	5.7	117.4w	3	99.9	76.8	67.93	276.92	65.46
2024 Sep 22	3 38 0.7239	19 9 55.508	19.01554322	3.6	5.7	122.4w	2	100.0	76.8	67.86	276.83	65.52
2024 Sep 27	3 37 37.7112	19 8 37.193	18.94591876	3.6	5.7	127.4w	2	100.0	76.8	67.78	276.72	65.57
2024 Oct 2	3 37 10.1307	19 7 3.424	18.88077645	3.6	5.7	132.4w	2	100.0	76.8	67.67	276.59	65.63
2024 Oct 7	3 36 38.2547	19 5 15.046	18.82068428	3.6	5.6	137.5w	2	100.0	76.8	67.55	276.44	65.68
2024 Oct 12	3 36 2.4230	19 3 13.124	18.76616025	3.7	5.6	142.6w	2	100.0	76.8	67.41	276.27	65.73
2024 Oct 17	3 35 23.0228	19 0 58.854	18.71764839	3.7	5.6	147.7w	2	100.0	76.9	67.26	276.09	65.79
2024 Oct 22	3 34 40.4523	18 58 33.424	18.67552594	3.7	5.6	152.8w	1	100.0	76.9	67.10	275.89	65.84
2024 Oct 27	3 33 55.1219	18 55 58.089	18.64016488	3.7	5.6	158.0w	1	100.0	77.0	66.93	275.69	65.89
2024 Nov 1	3 33 7.5007	18 53 14.379	18.61192233	3.7	5.6	163.2w	1	100.0	77.1	66.75	275.48	65.95
2024 Nov 6	3 32 18.1155	18 50 24.061	18.59108935	3.7	5.6	168.4w	1	100.0	77.5	66.56	275.26	66.00
2024 Nov 11	3 31 27.5289	18 47 29.046	18.57786379	3.7	5.6	173.6w	0	100.0	78.5	66.36	275.04	66.05
2024 Nov 16	3 30 36.3057	18 44 31.242	18.57234249	3.7	5.6	178.8w	0	100.0	88.9	66.16	274.82	66.11
2024 Nov 21	3 29 44.9829	18 41 32.473	18.57456435	3.7	5.6	175.9e	0	100.0	252.3	65.97	274.60	66.16
2024 Nov 26	3 28 54.1027	18 38 34.665	18.58455282	3.7	5.6	170.6e	0	100.0	254.3	65.77	274.39	66.21
2024 Dec 1	3 28 4.2352	18 35 39.919	18.60227167	3.7	5.6	165.4e	1	100.0	254.8	65.58	274.18	66.26
2024 Dec 6	3 27 15.9592	18 32 50.401	18.62759056	3.7	5.6	160.1e	1	100.0	255.0	65.39	273.98	66.32
2024 Dec 11	3 26 29.8319	18 30 8.195	18.66027256	3.7	5.6	154.8e	1	100.0	255.2	65.21	273.80	66.37
2024 Dec 16	3 25 46.3525	18 27 35.167	18.69999875	3.7	5.6	149.6e	1	100.0	255.2	65.04	273.63	66.42
2024 Dec 21	3 25 5.9658	18 25 13.023	18.74642947	3.7	5.6	144.3e	2	100.0	255.2	64.89	273.47	66.48
2024 Dec 26	3 24 29.1043	18 23 3.488	18.79920317	3.6	5.6	139.1e	2	100.0	255.2	64.74	273.32	66.53
2024 Dec 31	3 23 56.1864	18 21 8.255	18.85789127	3.6	5.6	133.9e	2	100.0	255.3	64.62	273.20	66.58

Neptune, Equinox of J2000

Date	Right Asc.	Declination	Distance	dia	mag	Elong	I	%Ill	Limb	De	Pp	Ds
year mth d	h m s	o ' "	AU	"		o	o		o	o	o	o
2024 Jan 1	23 42 39.9653	- 3 13 26.444	30.13962110	2.4	7.9	75.0e	2	100.0	247.0	-21.61	319.16	-21.05
2024 Jan 6	23 42 57.3153	- 3 11 23.434	30.22244436	2.4	7.9	70.0e	2	100.0	247.1	-21.59	319.12	-21.04
2024 Jan 11	23 43 17.5879	- 3 9 1.941	30.30276546	2.4	7.9	65.0e	2	100.0	247.2	-21.57	319.08	-21.03
2024 Jan 16	23 43 40.6636	- 3 6 22.805	30.37995116	2.4	7.9	60.0e	2	100.0	247.3	-21.54	319.04	-21.02
2024 Jan 21	23 44 6.3844	- 3 3 27.141	30.45340835	2.4	7.9	55.1e	2	100.0	247.5	-21.51	318.99	-21.01
2024 Jan 26	23 44 34.5769	- 3 0 16.161	30.52262978	2.4	7.9	50.1e	1	100.0	247.6	-21.47	318.93	-21.00
2024 Jan 31	23 45 5.0695	- 2 56 51.036	30.58715764	2.4	7.9	45.2e	1	100.0	247.8	-21.43	318.87	-20.99
2024 Feb 5	23 45 37.6867	- 2 53 12.938	30.64654927	2.4	7.9	40.2e	1	100.0	248.1	-21.38	318.81	-20.98
2024 Feb 10	23 46 12.2388	- 2 49 23.124	30.70037020	2.4	7.9	35.3e	1	100.0	248.3	-21.34	318.74	-20.97
2024 Feb 15	23 46 48.5096	- 2 45 23.044	30.74821169	2.4	7.9	30.4e	1	100.0	248.7	-21.29	318.68	-20.96
2024 Feb 20	23 47 26.2620	- 2 41 14.298	30.78975482	2.4	8.0	25.6e	1	100.0	249.1	-21.24	318.60	-20.95
2024 Feb 25	23 48 5.2662	- 2 36 58.419	30.82476759	2.4	8.0	20.7e	1	100.0	249.8	-21.18	318.53	-20.94
2024 Mar 1	23 48 45.3017	- 2 32 36.849	30.85305475	2.4	8.0	15.9e	1	100.0	250.9	-21.13	318.46	-20.93
2024 Mar 6	23 49 26.1475	- 2 28 11.022	30.87443926	2.4	8.0	11.1e	0	100.0	252.8	-21.07	318.38	-20.92
2024 Mar 11	23 50 7.5714	- 2 23 42.448	30.88876359	2.4	8.0	6.3e	0	100.0	257.6	-21.01	318.31	-20.91
2024 Mar 16	23 50 49.3214	- 2 19 12.798	30.89592938	2.4	8.0	1.9e	0	100.0	287.3	-20.95	318.23	-20.90
2024 Mar 21	23 51 31.1474	- 2 14 43.724	30.89594358	2.4	8.0	3.6w	0	100.0	46.7	-20.89	318.15	-20.89
2024 Mar 26	23 52 12.8191	- 2 10 16.717	30.88887118	2.4	8.0	8.2w	0	100.0	58.1	-20.83	318.08	-20.88
2024 Mar 31	23 52 54.1174	- 2 5 53.175	30.87479769	2.4	8.0	13.0w	0	100.0	61.3	-20.77	318.01	-20.87
2024 Apr 5	23 53 34.8243	- 2 1 34.484	30.85382181	2.4	8.0	17.7w	1	100.0	62.7	-20.71	317.93	-20.86
2024 Apr 10	23 54 14.7111	- 1 57 22.124	30.82607164	2.4	8.0	22.4w	1	100.0	63.6	-20.65	317.86	-20.85
2024 Apr 15	23 54 53.5420	- 1 53 17.634	30.79175864	2.4	8.0	27.1w	1	100.0	64.2	-20.59	317.80	-20.84
2024 Apr 20	23 55 31.1023	- 1 49 22.394	30.75117685	2.4	7.9	31.8w	1	100.0	64.6	-20.53	317.73	-20.83
2024 Apr 25	23 56 7.2000	- 1 45 37.603	30.70464346	2.4	7.9	36.6w	1	100.0	64.9	-20.48	317.67	-20.82
2024 Apr 30	23 56 41.6539	- 1 42 4.378	30.65247981	2.4	7.9	41.3w	1	100.0	65.2	-20.43	317.61	-20.81
2024 May 5	23 57 14.2826	- 1 38 43.850	30.59501431	2.4	7.9	46.0w	1	100.0	65.4	-20.38	317.56	-20.80
2024 May 10	23 57 44.8971	- 1 35 37.220	30.53262061	2.4	7.9	50.7w	1	100.0	65.5	-20.33	317.50	-20.79
2024 May 15	23 58 13.3206	- 1 32 45.609	30.46575621	2.4	7.9	55.4w	2	100.0	65.7	-20.28	317.46	-20.78
2024 May 20	23 58 39.4071	- 1 30 9.896	30.39491728	2.4	7.9	60.1w	2	100.0	65.8	-20.24	317.41	-20.76
2024 May 25	23 59 3.0322	- 1 27 50.804	30.32059520	2.4	7.9	64.8w	2	100.0	66.0	-20.20	317.37	-20.75
2024 May 30	23 59 24.0815	- 1 25 48.988	30.24326992	2.4	7.9	69.5w	2	100.0	66.1	-20.17	317.34	-20.74
2024 Jun 4	23 59 42.4385	- 1 24 5.140	30.16343044	2.4	7.9	74.2w	2	100.0	66.2	-20.14	317.31	-20.73
2024 Jun 9	23 59 57.9918	- 1 22 39.934	30.08162450	2.4	7.9	78.9w	2	100.0	66.3	-20.11	317.29	-20.72
2024 Jun 14	0 0 10.6601	- 1 21 33.818	29.99845292	2.4	7.9	83.6w	2	100.0	66.4	-20.09	317.27	-20.71
2024 Jun 19	0 0 20.3950	- 1 20 46.998	29.91451125	2.4	7.9	88.3w	2	100.0	66.5	-20.07	317.25	-20.70
2024 Jun 24	0 0 27.1684	- 1 20 19.541	29.83036802	2.5	7.9	93.1w	2	100.0	66.6	-20.06	317.24	-20.69
2024 Jun 29	0 0 30.9600	- 1 20 11.480	29.74656819	2.5	7.9	97.8w	2	100.0	66.7	-20.05	317.24	-20.68
2024 Jul 4	0 0 31.7512	- 1 20 22.862	29.66367689	2.5	7.9	102.6w	2	100.0	66.8	-20.05	317.24	-20.67
2024 Jul 9	0 0 29.5473	- 1 20 53.571	29.58230826	2.5	7.9	107.4w	2	100.0	67.0	-20.05	317.24	-20.66
2024 Jul 14	0 0 24.3934	- 1 21 43.197	29.50307860	2.5	7.9	112.2w	2	100.0	67.1	-20.05	317.25	-20.65

Neptune, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination ° ' "	Distance AU	dia "	mag	Elong °	I °	%Ill	Limb °	De °	Pp °	Ds °
2024 Jul 19	0 0 16.3645	- 1 22 51.126	29.42656367	2.5	7.9	117.0w	2	100.0	67.2	-20.06	317.26	-20.64
2024 Jul 24	0 0 5.5529	- 1 24 16.639	29.35329115	2.5	7.8	121.8w	2	100.0	67.4	-20.07	317.28	-20.63
2024 Jul 29	23 59 52.0545	- 1 25 59.026	29.28376179	2.5	7.8	126.6w	2	100.0	67.5	-20.09	317.31	-20.62
2024 Aug 3	23 59 35.9780	- 1 27 57.507	29.21850219	2.5	7.8	131.5w	1	100.0	67.7	-20.11	317.33	-20.61
2024 Aug 8	23 59 17.4701	- 1 30 11.033	29.15804598	2.5	7.8	136.4w	1	100.0	67.9	-20.14	317.37	-20.60
2024 Aug 13	23 58 56.7130	- 1 32 38.299	29.10287845	2.5	7.8	141.2w	1	100.0	68.2	-20.16	317.40	-20.59
2024 Aug 18	23 58 33.9111	- 1 35 17.868	29.05341654	2.5	7.8	146.2w	1	100.0	68.5	-20.20	317.44	-20.58
2024 Aug 23	23 58 9.2756	- 1 38 8.285	29.01001257	2.5	7.8	151.1w	1	100.0	68.9	-20.23	317.48	-20.57
2024 Aug 28	23 57 43.0168	- 1 41 8.137	28.97299958	2.5	7.8	156.0w	1	100.0	69.5	-20.27	317.53	-20.56
2024 Sep 2	23 57 15.3687	- 1 44 15.851	28.94271846	2.5	7.8	161.0w	1	100.0	70.4	-20.31	317.58	-20.55
2024 Sep 7	23 56 46.5991	- 1 47 29.614	28.91946192	2.5	7.8	165.9w	0	100.0	71.8	-20.35	317.63	-20.54
2024 Sep 12	23 56 16.9952	- 1 50 47.486	28.90343945	2.5	7.8	170.9w	0	100.0	74.8	-20.39	317.68	-20.53
2024 Sep 17	23 55 46.8485	- 1 54 7.525	28.89477458	2.5	7.8	175.8w	0	100.0	84.8	-20.43	317.73	-20.52
2024 Sep 22	23 55 16.4395	- 1 57 27.903	28.89352727	2.5	7.8	178.3e	0	100.0	193.7	-20.48	317.79	-20.51
2024 Sep 27	23 54 46.0452	- 2 0 46.842	28.89974989	2.5	7.8	173.8e	0	100.0	234.2	-20.52	317.84	-20.50
2024 Oct 2	23 54 15.9635	- 2 4 2.404	28.91346457	2.5	7.8	168.8e	0	100.0	239.8	-20.57	317.89	-20.49
2024 Oct 7	23 53 46.5047	- 2 7 12.565	28.93460843	2.5	7.8	163.8e	1	100.0	242.0	-20.61	317.94	-20.48
2024 Oct 12	23 53 17.9739	- 2 10 15.351	28.96302454	2.5	7.8	158.7e	1	100.0	243.2	-20.65	317.99	-20.47
2024 Oct 17	23 52 50.6566	- 2 13 8.957	28.99847470	2.5	7.8	153.7e	1	100.0	243.9	-20.69	318.04	-20.46
2024 Oct 22	23 52 24.8099	- 2 15 51.796	29.04068547	2.5	7.8	148.6e	1	100.0	244.4	-20.73	318.09	-20.45
2024 Oct 27	23 52 0.6863	- 2 18 22.314	29.08938079	2.5	7.8	143.5e	1	100.0	244.8	-20.76	318.13	-20.44
2024 Nov 1	23 51 38.5426	- 2 20 38.900	29.14422471	2.5	7.8	138.4e	1	100.0	245.1	-20.80	318.17	-20.43
2024 Nov 6	23 51 18.6223	- 2 22 40.039	29.20479506	2.5	7.8	133.3e	1	100.0	245.3	-20.83	318.21	-20.42
2024 Nov 11	23 51 1.1406	- 2 24 24.422	29.27059287	2.5	7.8	128.2e	1	100.0	245.5	-20.86	318.24	-20.41
2024 Nov 16	23 50 46.2730	- 2 25 51.034	29.34107506	2.5	7.8	123.1e	2	100.0	245.7	-20.88	318.26	-20.39
2024 Nov 21	23 50 34.1644	- 2 26 59.073	29.41570809	2.5	7.9	118.0e	2	100.0	245.9	-20.90	318.29	-20.38
2024 Nov 26	23 50 24.9535	- 2 27 47.746	29.49395340	2.5	7.9	112.9e	2	100.0	246.0	-20.91	318.30	-20.37
2024 Dec 1	23 50 18.7658	- 2 28 16.331	29.57521390	2.5	7.9	107.9e	2	100.0	246.2	-20.92	318.31	-20.36
2024 Dec 6	23 50 15.6972	- 2 28 24.306	29.65883500	2.5	7.9	102.8e	2	100.0	246.3	-20.93	318.32	-20.35
2024 Dec 11	23 50 15.8025	- 2 28 11.443	29.74412783	2.5	7.9	97.7e	2	100.0	246.4	-20.93	318.32	-20.34
2024 Dec 16	23 50 19.0950	- 2 27 37.800	29.83042003	2.5	7.9	92.6e	2	100.0	246.5	-20.93	318.31	-20.33
2024 Dec 21	23 50 25.5697	- 2 26 43.535	29.91708331	2.4	7.9	87.6e	2	100.0	246.6	-20.93	318.30	-20.32
2024 Dec 26	23 50 35.2152	- 2 25 28.812	30.00348403	2.4	7.9	82.5e	2	100.0	246.7	-20.91	318.28	-20.31
2024 Dec 31	23 50 47.9984	- 2 23 53.927	30.08895728	2.4	7.9	77.5e	2	100.0	246.9	-20.90	318.25	-20.30

Pluto, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jan 1	20 7 9.0637	-23 3 26.799	35.84685520	0.2	14.5	19.5e	1	100.0	265.7	58.80	201.89	59.03
2024 Jan 6	20 7 49.2792	-23 1 45.965	35.87572249	0.2	14.5	14.6e	0	100.0	268.5	58.88	201.61	59.04
2024 Jan 11	20 8 30.2401	-23 0 4.291	35.89746322	0.2	14.5	9.8e	0	100.0	274.0	58.96	201.31	59.05
2024 Jan 16	20 9 11.6889	-22 58 22.558	35.91191568	0.2	14.5	5.3e	0	100.0	289.3	59.05	201.02	59.05
2024 Jan 21	20 9 53.3596	-22 56 41.588	35.91901958	0.2	14.5	2.8e	0	100.0	356.2	59.13	200.72	59.06
2024 Jan 26	20 10 35.0039	-22 55 2.155	35.91879855	0.2	14.5	6.0w	0	100.0	50.0	59.21	200.41	59.07
2024 Jan 31	20 11 16.3877	-22 53 24.981	35.91130349	0.2	14.5	10.6w	0	100.0	62.4	59.29	200.11	59.07
2024 Feb 5	20 11 57.2767	-22 51 50.786	35.89660430	0.2	14.5	15.4w	0	100.0	67.2	59.37	199.81	59.08
2024 Feb 10	20 12 37.4277	-22 50 20.314	35.87480712	0.2	14.5	20.3w	1	100.0	69.8	59.45	199.52	59.09
2024 Feb 15	20 13 16.5879	-22 48 54.353	35.84609201	0.2	14.5	25.1w	1	100.0	71.3	59.52	199.22	59.09
2024 Feb 20	20 13 54.5189	-22 47 33.654	35.81074163	0.2	14.5	30.0w	1	100.0	72.4	59.59	198.94	59.10
2024 Feb 25	20 14 31.0112	-22 46 18.871	35.76908096	0.2	14.5	34.9w	1	100.0	73.2	59.65	198.67	59.11
2024 Mar 1	20 15 5.8685	-22 45 10.601	35.72144250	0.2	14.5	39.8w	1	100.0	73.8	59.71	198.40	59.11
2024 Mar 6	20 15 38.8966	-22 44 9.425	35.66817508	0.2	14.5	44.6w	1	100.0	74.2	59.77	198.15	59.12
2024 Mar 11	20 16 9.8983	-22 43 15.936	35.60966730	0.2	14.5	49.5w	1	100.0	74.7	59.82	197.92	59.13
2024 Mar 16	20 16 38.6824	-22 42 30.711	35.54638954	0.2	14.5	54.4w	1	100.0	75.0	59.87	197.70	59.13
2024 Mar 21	20 17 5.0916	-22 41 54.209	35.47887644	0.2	14.5	59.2w	1	100.0	75.3	59.91	197.49	59.14
2024 Mar 26	20 17 28.9971	-22 41 26.776	35.40765893	0.2	14.5	64.1w	1	100.0	75.6	59.94	197.31	59.15
2024 Mar 31	20 17 50.2818	-22 41 8.698	35.33325879	0.2	14.5	68.9w	2	100.0	75.8	59.97	197.14	59.15
2024 Apr 5	20 18 8.8332	-22 41 0.238	35.25620568	0.2	14.5	73.8w	2	100.0	76.1	59.99	196.99	59.16
2024 Apr 10	20 18 24.5426	-22 41 1.639	35.17707017	0.2	14.5	78.7w	2	100.0	76.3	60.01	196.87	59.17
2024 Apr 15	20 18 37.3273	-22 41 13.055	35.09648750	0.2	14.5	83.5w	2	100.0	76.6	60.02	196.76	59.17
2024 Apr 20	20 18 47.1456	-22 41 34.483	35.01509705	0.2	14.5	88.3w	2	100.0	76.8	60.03	196.68	59.18
2024 Apr 25	20 18 53.9783	-22 42 5.819	34.93350153	0.2	14.5	93.2w	2	100.0	77.1	60.03	196.62	59.19
2024 Apr 30	20 18 57.8169	-22 42 46.909	34.85227972	0.2	14.5	98.0w	2	100.0	77.3	60.02	196.59	59.19
2024 May 5	20 18 58.6580	-22 43 37.574	34.77201195	0.2	14.5	102.9w	2	100.0	77.6	60.01	196.57	59.20
2024 May 10	20 18 56.5144	-22 44 37.583	34.69331579	0.2	14.5	107.7w	2	100.0	77.9	59.99	196.58	59.20
2024 May 15	20 18 51.4393	-22 45 46.559	34.61682718	0.2	14.5	112.6w	2	100.0	78.2	59.97	196.61	59.21
2024 May 20	20 18 43.5208	-22 47 3.991	34.54313254	0.2	14.5	117.4w	1	100.0	78.5	59.94	196.67	59.22
2024 May 25	20 18 32.8621	-22 48 29.310	34.47276294	0.2	14.5	122.3w	1	100.0	78.9	59.90	196.74	59.22
2024 May 30	20 18 19.5729	-22 50 1.925	34.40621499	0.2	14.4	127.1w	1	100.0	79.3	59.86	196.83	59.23
2024 Jun 4	20 18 3.7702	-22 51 41.232	34.34398721	0.2	14.4	131.9w	1	100.0	79.8	59.82	196.94	59.24
2024 Jun 9	20 17 45.5999	-22 53 26.542	34.28659428	0.2	14.4	136.8w	1	100.0	80.3	59.77	197.07	59.24
2024 Jun 14	20 17 25.2478	-22 55 17.038	34.23451012	0.2	14.4	141.6w	1	100.0	81.0	59.72	197.22	59.25
2024 Jun 19	20 17 2.9193	-22 57 11.839	34.18812901	0.2	14.4	146.5w	1	100.0	81.8	59.66	197.38	59.26
2024 Jun 24	20 16 38.8248	-22 59 10.064	34.14778133	0.2	14.4	151.3w	1	100.0	82.9	59.60	197.55	59.26
2024 Jun 29	20 16 13.1734	-23 1 10.868	34.11376311	0.2	14.4	156.1w	1	100.0	84.3	59.54	197.74	59.27
2024 Jul 4	20 15 46.1853	-23 3 13.397	34.08637317	0.2	14.4	161.0w	1	100.0	86.4	59.48	197.93	59.27
2024 Jul 9	20 15 18.1129	-23 5 16.717	34.06588453	0.2	14.4	165.7w	0	100.0	89.9	59.41	198.13	59.28
2024 Jul 14	20 14 49.2303	-23 7 19.843	34.05248631	0.2	14.4	170.4w	0	100.0	96.7	59.34	198.34	59.29

Pluto, Equinox of J2000

Date year mth d	Right Asc. h m s	Declination o ' "	Distance AU	dia "	mag	Elong o	I o	%Ill	Limb o	De o	Pp o	Ds o
2024 Jul 19	20 14 19.8127	-23 9 21.814	34.04628198	0.2	14.4	174.8w	0	100.0	115.1	59.28	198.55	59.29
2024 Jul 24	20 13 50.1251	-23 11 21.740	34.04731423	0.2	14.4	176.7e	0	100.0	180.6	59.21	198.76	59.30
2024 Jul 29	20 13 20.4234	-23 13 18.804	34.05560592	0.2	14.4	173.5e	0	100.0	227.7	59.14	198.97	59.31
2024 Aug 3	20 12 50.9772	-23 15 12.182	34.07117175	0.2	14.4	169.0e	0	100.0	240.5	59.07	199.18	59.31
2024 Aug 8	20 12 22.0744	-23 17 1.017	34.09395787	0.2	14.4	164.2e	0	100.0	245.9	59.01	199.38	59.32
2024 Aug 13	20 11 53.9992	-23 18 44.486	34.12381675	0.2	14.4	159.4e	1	100.0	248.8	58.95	199.58	59.32
2024 Aug 18	20 11 27.0174	-23 20 21.864	34.16052795	0.2	14.4	154.5e	1	100.0	250.7	58.89	199.77	59.33
2024 Aug 23	20 11 1.3700	-23 21 52.539	34.20383072	0.2	14.4	149.6e	1	100.0	252.0	58.83	199.96	59.34
2024 Aug 28	20 10 37.2863	-23 23 15.970	34.25346585	0.2	14.4	144.8e	1	100.0	253.0	58.78	200.12	59.34
2024 Sep 2	20 10 15.0052	-23 24 31.605	34.30914176	0.2	14.4	139.9e	1	100.0	253.7	58.73	200.28	59.35
2024 Sep 7	20 9 54.7600	-23 25 38.919	34.37048255	0.2	14.4	134.9e	1	100.0	254.4	58.68	200.42	59.35
2024 Sep 12	20 9 36.7588	-23 26 37.479	34.43703847	0.2	14.5	130.0e	1	100.0	254.9	58.64	200.55	59.36
2024 Sep 17	20 9 21.1769	-23 27 26.975	34.50831553	0.2	14.5	125.1e	1	100.0	255.4	58.61	200.66	59.37
2024 Sep 22	20 9 8.1582	-23 28 7.212	34.58381687	0.2	14.5	120.2e	1	100.0	255.8	58.58	200.75	59.37
2024 Sep 27	20 8 57.8399	-23 28 38.020	34.66305878	0.2	14.5	115.3e	1	100.0	256.2	58.56	200.82	59.38
2024 Oct 2	20 8 50.3567	-23 28 59.227	34.74550621	0.2	14.5	110.3e	2	100.0	256.5	58.54	200.88	59.38
2024 Oct 7	20 8 45.8176	-23 29 10.733	34.83055862	0.2	14.5	105.4e	2	100.0	256.8	58.53	200.91	59.39
2024 Oct 12	20 8 44.2961	-23 29 12.541	34.91757861	0.2	14.5	100.5e	2	100.0	257.1	58.53	200.92	59.40
2024 Oct 17	20 8 45.8275	-23 29 4.773	35.00592711	0.2	14.5	95.5e	2	100.0	257.4	58.54	200.91	59.40
2024 Oct 22	20 8 50.4235	-23 28 47.621	35.09500245	0.2	14.5	90.6e	2	100.0	257.7	58.55	200.88	59.41
2024 Oct 27	20 8 58.0946	-23 28 21.260	35.18421164	0.2	14.5	85.6e	2	100.0	258.0	58.56	200.82	59.41
2024 Nov 1	20 9 8.8356	-23 27 45.887	35.27291590	0.2	14.5	80.7e	2	100.0	258.2	58.59	200.75	59.42
2024 Nov 6	20 9 22.6081	-23 27 1.783	35.36045073	0.2	14.5	75.7e	2	100.0	258.5	58.62	200.65	59.42
2024 Nov 11	20 9 39.3374	-23 26 9.335	35.44615941	0.2	14.5	70.8e	2	100.0	258.8	58.65	200.53	59.43
2024 Nov 16	20 9 58.9188	-23 25 9.013	35.52943226	0.2	14.5	65.9e	1	100.0	259.1	58.69	200.40	59.44
2024 Nov 21	20 10 21.2400	-23 24 1.297	35.60971956	0.2	14.5	60.9e	1	100.0	259.4	58.74	200.24	59.44
2024 Nov 26	20 10 46.1888	-23 22 46.638	35.68647168	0.2	14.5	56.0e	1	100.0	259.8	58.79	200.06	59.45
2024 Dec 1	20 11 13.6305	-23 21 25.538	35.75912261	0.2	14.5	51.0e	1	100.0	260.2	58.85	199.87	59.45
2024 Dec 6	20 11 43.4001	-23 19 58.583	35.82712342	0.2	14.5	46.1e	1	100.0	260.6	58.91	199.65	59.46
2024 Dec 11	20 12 15.3044	-23 18 26.447	35.88997842	0.2	14.5	41.1e	1	100.0	261.2	58.98	199.42	59.46
2024 Dec 16	20 12 49.1383	-23 16 49.838	35.94727625	0.2	14.5	36.2e	1	100.0	261.9	59.05	199.18	59.47
2024 Dec 21	20 13 24.7047	-23 15 9.421	35.99866044	0.2	14.5	31.3e	1	100.0	262.7	59.12	198.92	59.48
2024 Dec 26	20 14 1.8033	-23 13 25.851	36.04377617	0.2	14.5	26.4e	1	100.0	263.9	59.19	198.65	59.48
2024 Dec 31	20 14 40.2137	-23 11 39.848	36.08228712	0.2	14.5	21.5e	1	100.0	265.6	59.26	198.37	59.49

Central Meridian of Mars, 2024

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	30.7	87.3	161.7	214.3	275.7	328.1	32.9	90.5	150.3	221.7	286.3	6.3
2	20.9	77.5	151.9	204.4	265.7	318.2	23.1	80.8	140.7	212.1	276.9	357.1
3	11.2	67.7	142.0	194.4	255.8	308.3	13.3	71.1	131.0	202.5	267.4	347.9
4	1.4	57.8	132.1	184.5	245.8	298.4	3.5	61.4	121.4	193.0	258.0	338.8
5	351.6	48.0	122.2	174.5	235.9	288.6	353.8	51.7	111.7	183.4	248.6	329.6
6	341.9	38.2	112.3	164.5	225.9	278.7	344.0	42.0	102.1	173.8	239.1	320.5
7	332.1	28.4	102.4	154.6	216.0	268.8	334.2	32.3	92.5	164.2	229.7	311.4
8	322.3	18.5	92.5	144.6	206.0	259.0	324.4	22.6	82.8	154.7	220.3	302.3
9	312.5	8.7	82.6	134.7	196.1	249.1	314.6	12.9	73.2	145.1	210.9	293.2
10	302.8	358.9	72.7	124.7	186.2	239.2	304.9	3.2	63.5	135.6	201.5	284.1
11	293.0	349.0	62.8	114.8	176.2	229.4	295.1	353.5	53.9	126.0	192.1	275.1
12	283.2	339.2	52.9	104.8	166.3	219.5	285.3	343.8	44.3	116.4	182.8	266.0
13	273.4	329.4	43.0	94.9	156.3	209.7	275.6	334.1	34.7	106.9	173.4	257.0
14	263.6	319.5	33.1	84.9	146.4	199.8	265.8	324.4	25.0	97.4	164.0	247.9
15	253.8	309.7	23.1	74.9	136.5	190.0	256.1	314.7	15.4	87.8	154.7	238.9
16	244.1	299.8	13.2	65.0	126.6	180.2	246.3	305.1	5.8	78.3	145.3	229.9
17	234.3	290.0	3.3	55.0	116.6	170.3	236.5	295.4	356.2	68.7	136.0	220.9
18	224.5	280.1	353.4	45.1	106.7	160.5	226.8	285.7	346.5	59.2	126.6	212.0
19	214.7	270.3	343.5	35.1	96.8	150.7	217.0	276.0	336.9	49.7	117.3	203.0
20	204.9	260.4	333.5	25.2	86.9	140.8	207.3	266.3	327.3	40.2	108.0	194.0
21	195.1	250.6	323.6	15.2	77.0	131.0	197.6	256.7	317.7	30.7	98.7	185.1
22	185.3	240.7	313.7	5.2	67.1	121.2	187.8	247.0	308.1	21.2	89.4	176.2
23	175.5	230.8	303.8	355.3	57.1	111.4	178.1	237.3	298.5	11.6	80.1	167.3
24	165.7	221.0	293.8	345.3	47.2	101.5	168.3	227.6	288.9	2.1	70.9	158.4
25	155.9	211.1	283.9	335.4	37.3	91.7	158.6	218.0	279.3	352.6	61.6	149.5
26	146.1	201.2	274.0	325.4	27.4	81.9	148.9	208.3	269.7	343.2	52.4	140.6
27	136.3	191.4	264.0	315.5	17.5	72.1	139.2	198.6	260.1	333.7	43.1	131.8
28	126.5	181.5	254.1	305.5	7.6	62.3	129.4	189.0	250.5	324.2	33.9	122.9
29	116.7	171.6	244.1	295.6	357.7	52.5	119.7	179.3	240.9	314.7	24.7	114.1
30	106.9		234.2	285.6	347.9	42.7	110.0	169.7	231.3	305.2	15.5	105.3
31	97.1		224.2		338.0		100.3	160.0		295.8		96.4

Motion of the Central Meridian

m	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8
10	2.4	17.1	31.7	46.3	60.9	75.5	90.2	104.8	119.4	134.0	148.6	163.3
20	4.9	19.5	34.1	48.7	63.4	78.0	92.6	107.2	121.8	136.5	151.1	165.7
30	7.3	21.9	36.6	51.2	65.8	80.4	95.0	109.7	124.3	138.9	153.5	168.1
40	9.7	24.4	39.0	53.6	68.2	82.8	97.5	112.1	126.7	141.3	156.0	170.6
50	12.2	26.8	41.4	56.0	70.7	85.3	99.9	114.5	129.1	143.8	158.4	173.0
60	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8	175.4

The computed central meridian of the planets Mars, Jupiter, and Saturn is the central meridian of the geometric disk of the planet - that is, there is no correction for the effect of the phase of the planet.
The output is formatted as a table on a single page, giving the longitude of the meridian at 0hrs UT. A motion table, giving the change in the longitude for 10-minute intervals over 12hrs, follows the table.
For Jupiter, two longitude tables are given. The first gives the 'System I' longitude, which is valid in the equatorial region of Jupiter. The second is the 'System II' longitude, which is valid in the mid-latitudes of Jupiter. [The longitude of the Great Red Spot in 2007 is about 119° in System II; its longitude increases by about 10 deg per year.]

Central Meridian of Jupiter, System I, 2024

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	59.5	270.3	163.1	10.0	59.2	266.7	317.6	167.9	20.4	77.5	295.1	356.3
2	217.4	68.0	320.7	167.7	216.9	64.4	115.4	325.7	178.3	235.4	93.1	154.4
3	15.2	225.7	118.4	325.3	14.5	222.0	273.1	123.5	336.1	33.4	251.2	312.4
4	173.0	23.4	276.0	123.0	172.2	19.7	70.8	281.3	134.0	191.3	49.2	110.5
5	330.8	181.1	73.7	280.6	329.8	177.4	228.5	79.1	291.9	349.3	207.2	268.5
6	128.6	338.8	231.3	78.2	127.5	335.1	26.3	236.9	89.7	147.3	5.3	66.5
7	286.4	136.5	29.0	235.9	285.1	132.8	184.0	34.7	247.6	305.2	163.3	224.6
8	84.2	294.2	186.6	33.5	82.8	290.4	341.7	192.5	45.5	103.2	321.3	22.6
9	242.0	91.9	344.3	191.1	240.4	88.1	139.5	350.3	203.4	261.2	119.4	180.7
10	39.8	249.6	141.9	348.8	38.1	245.8	297.2	148.1	1.3	59.1	277.4	338.7
11	197.6	47.3	299.6	146.4	195.7	43.5	94.9	305.9	159.1	217.1	75.5	136.7
12	355.3	205.0	97.2	304.0	353.4	201.2	252.7	103.7	317.0	15.1	233.5	294.7
13	153.1	2.7	254.9	101.7	151.0	358.9	50.4	261.5	114.9	173.1	31.5	92.8
14	310.9	160.4	52.5	259.3	308.7	156.6	208.2	59.3	272.8	331.0	189.6	250.8
15	108.7	318.0	210.2	57.0	106.3	314.3	5.9	217.1	70.7	129.0	347.6	48.8
16	266.4	115.7	7.8	214.6	264.0	112.0	163.7	15.0	228.6	287.0	145.7	206.8
17	64.2	273.4	165.5	12.2	61.7	269.7	321.4	172.8	26.5	85.0	303.7	4.8
18	222.0	71.1	323.1	169.9	219.3	67.4	119.2	330.6	184.4	243.0	101.8	162.9
19	19.7	228.8	120.7	327.5	17.0	225.1	276.9	128.4	342.3	41.0	259.8	320.9
20	177.5	26.4	278.4	125.2	174.6	22.8	74.7	286.3	140.3	199.0	57.8	118.9
21	335.2	184.1	76.0	282.8	332.3	180.5	232.4	84.1	298.2	357.0	215.9	276.9
22	133.0	341.8	233.7	80.4	130.0	338.2	30.2	241.9	96.1	155.0	13.9	74.9
23	290.7	139.4	31.3	238.1	287.6	135.9	188.0	39.8	254.0	313.0	172.0	232.9
24	88.5	297.1	188.9	35.7	85.3	293.6	345.7	197.6	51.9	111.0	330.0	30.9
25	246.2	94.8	346.6	193.4	243.0	91.3	143.5	355.4	209.9	269.0	128.1	188.9
26	43.9	252.4	144.2	351.0	40.6	249.0	301.3	153.3	7.8	67.0	286.1	346.9
27	201.7	50.1	301.9	148.6	198.3	46.8	99.0	311.1	165.7	225.0	84.2	144.9
28	359.4	207.8	99.5	306.3	356.0	204.5	256.8	109.0	323.7	23.0	242.2	302.8
29	157.1	5.4	257.1	103.9	153.7	2.2	54.6	266.8	121.6	181.1	40.3	100.8
30	314.8		54.8	261.6	311.3	159.9	212.4	64.7	279.5	339.1	198.3	258.8
31	112.5		212.4		109.0		10.2	222.5		137.1		56.8

Motion of the Central Meridian

m	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4
10	6.1	42.7	79.3	115.8	152.4	189.0	225.6	262.2	298.7	335.3	11.9	48.5
20	12.2	48.8	85.4	121.9	158.5	195.1	231.7	268.2	304.8	341.4	18.0	54.6
30	18.3	54.9	91.4	128.0	164.6	201.2	237.8	274.3	310.9	347.5	24.1	60.7
40	24.4	61.0	97.5	134.1	170.7	207.3	243.9	280.4	317.0	353.6	30.2	66.8
50	30.5	67.1	103.6	140.2	176.8	213.4	250.0	286.5	323.1	359.7	36.3	72.9
60	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4	79.0

Central Meridian of Jupiter, System II, 2024

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	115.2	89.4	120.9	91.4	271.7	242.6	64.7	38.4	14.3	202.5	183.6	15.9
2	265.4	239.5	271.0	241.4	61.7	32.7	214.8	188.6	164.6	352.8	334.0	166.3
3	55.5	29.6	61.0	31.4	211.7	182.7	4.9	338.7	314.8	143.1	124.4	316.7
4	205.7	179.6	211.0	181.4	1.7	332.8	154.9	128.9	105.0	293.5	274.8	107.1
5	355.9	329.7	1.1	331.4	151.8	122.8	305.0	279.1	255.3	83.8	65.2	257.6
6	146.1	119.8	151.1	121.4	301.8	272.9	95.1	69.2	45.5	234.1	215.6	48.0
7	296.3	269.9	301.1	271.4	91.8	62.9	245.2	219.4	195.8	24.5	6.0	198.4
8	86.4	59.9	91.1	61.5	241.8	213.0	35.3	9.6	346.0	174.8	156.4	348.8
9	236.6	210.0	241.1	211.5	31.8	3.0	185.5	159.7	136.3	325.1	306.8	139.2
10	26.7	0.1	31.2	1.5	181.9	153.1	335.6	309.9	286.5	115.5	97.2	289.6
11	176.9	150.1	181.2	151.5	331.9	303.2	125.7	100.1	76.8	265.8	247.6	80.0
12	327.1	300.2	331.2	301.5	121.9	93.2	275.8	250.3	227.0	56.2	38.0	230.4
13	117.2	90.2	121.2	91.5	271.9	243.3	65.9	40.4	17.3	206.5	188.4	20.8
14	267.4	240.3	271.2	241.5	62.0	33.3	216.0	190.6	167.6	356.9	338.9	171.2
15	57.5	30.4	61.2	31.5	212.0	183.4	6.1	340.8	317.8	147.2	129.3	321.6
16	207.6	180.4	211.2	181.5	2.0	333.5	156.2	131.0	108.1	297.6	279.7	111.9
17	357.8	330.5	1.3	331.5	152.1	123.5	306.4	281.2	258.4	87.9	70.1	262.3
18	147.9	120.5	151.3	121.5	302.1	273.6	96.5	71.4	48.7	238.3	220.5	52.7
19	298.0	270.5	301.3	271.5	92.1	63.7	246.6	221.6	198.9	28.7	10.9	203.1
20	88.1	60.6	91.3	61.6	242.1	213.8	36.7	11.8	349.2	179.0	161.3	353.5
21	238.3	210.6	241.3	211.6	32.2	3.8	186.9	162.0	139.5	329.4	311.8	143.8
22	28.4	0.7	31.3	1.6	182.2	153.9	337.0	312.2	289.8	119.8	102.2	294.2
23	178.5	150.7	181.3	151.6	332.2	304.0	127.1	102.4	80.1	270.1	252.6	84.6
24	328.6	300.8	331.3	301.6	122.3	94.1	277.3	252.6	230.4	60.5	43.0	235.0
25	118.7	90.8	121.3	91.6	272.3	244.1	67.4	42.8	20.7	210.9	193.4	25.3
26	268.8	240.8	271.4	241.6	62.4	34.2	217.5	193.0	171.0	1.3	343.8	175.7
27	58.9	30.9	61.4	31.6	212.4	184.3	7.7	343.2	321.3	151.6	134.3	326.0
28	209.0	180.9	211.4	181.6	2.4	334.4	157.8	133.4	111.6	302.0	284.7	116.4
29	359.1	330.9	1.4	331.7	152.5	124.5	308.0	283.7	261.9	92.4	75.1	266.7
30	149.2		151.4	121.7	302.5	274.6	98.1	73.9	52.2	242.8	225.5	57.1
31	299.3		301.4		92.6		248.3	224.1		33.2		207.4

Motion of the Central Meridian

m	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
	°	°	°	°	°	°	°	°	°	°	°	°
0	**0.0**	**36.3**	**72.5**	**108.8**	**145.0**	**181.3**	**217.6**	**253.8**	**290.1**	**326.4**	**2.6**	**38.9**
10	6.0	42.3	78.6	114.8	151.1	187.3	223.6	259.9	296.1	332.4	8.7	44.9
20	12.1	48.3	84.6	120.9	157.1	193.4	229.7	265.9	302.2	338.4	14.7	51.0
30	18.1	54.4	90.7	126.9	163.2	199.4	235.7	272.0	308.2	344.5	20.7	57.0
40	24.2	60.4	96.7	133.0	169.2	205.5	241.7	278.0	314.3	350.5	26.8	63.0
50	30.2	66.5	102.7	139.0	175.3	211.5	247.8	284.0	320.3	356.6	32.8	69.1
60	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9	75.1

The computed central meridian of the planets Mars, Jupiter, and Saturn is the central meridian of the geometric disk of the planet - that is, there is no correction for the effect of the phase of the planet.
The output is formatted as a table on a single page, giving the longitude of the meridian at 0hrs UT. A motion table, giving the change in the longitude for 10-minute intervals over 12hrs, follows the table.
For Jupiter, two longitude tables are given. The first gives the 'System I' longitude, which is valid in the equatorial region of Jupiter. The second is the 'System II' longitude, which is valid in the mid-latitudes of Jupiter. [The longitude of the Great Red Spot in 2007 is about 119° in System II; its longitude increases by about 10 deg per year.]

Central Meridian of Saturn, System I, 2024

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	343.5	232.3	233.5	124.1	252.0	145.7	276.4	172.5	68.5	199.1	92.2	218.9
2	107.6	356.5	357.7	248.3	16.3	270.0	40.8	296.8	192.9	323.4	216.4	343.1
3	231.8	120.7	121.9	12.6	140.6	34.4	165.2	61.2	317.3	87.8	340.7	107.3
4	355.9	244.8	246.0	136.8	264.9	158.7	289.6	185.6	81.6	212.1	104.9	231.5
5	120.1	9.0	10.2	261.1	29.2	283.1	54.0	310.0	206.0	336.4	229.2	355.7
6	244.2	133.2	134.4	25.3	153.4	47.4	178.3	74.4	330.4	100.7	353.4	119.9
7	8.4	257.3	258.6	149.6	277.7	171.7	302.7	198.8	94.7	225.0	117.7	244.1
8	132.5	21.5	22.8	273.8	42.0	296.1	67.1	323.2	219.1	349.4	241.9	8.3
9	256.7	145.7	147.0	38.1	166.3	60.4	191.5	87.6	343.5	113.7	6.1	132.4
10	20.9	269.8	271.3	162.3	290.6	184.8	315.9	212.0	107.8	238.0	130.4	256.6
11	145.0	34.0	35.5	286.6	54.9	309.1	80.2	336.4	232.2	2.3	254.6	20.8
12	269.2	158.2	159.7	50.8	179.3	73.5	204.6	100.8	356.6	126.6	18.9	145.0
13	33.3	282.4	283.9	175.1	303.6	197.9	329.0	225.2	120.9	250.9	143.1	269.2
14	157.5	46.5	48.1	299.3	67.9	322.2	93.4	349.6	245.3	15.2	267.3	33.3
15	281.6	170.7	172.3	63.6	192.2	86.6	217.8	114.0	9.6	139.5	31.5	157.5
16	45.8	294.9	296.5	187.9	316.5	210.9	342.2	238.3	134.0	263.8	155.8	281.7
17	169.9	59.1	60.7	312.1	80.8	335.3	106.6	2.7	258.4	28.1	280.0	45.9
18	294.1	183.2	184.9	76.4	205.1	99.6	231.0	127.1	22.7	152.4	44.2	170.1
19	58.3	307.4	309.2	200.7	329.4	224.0	355.4	251.5	147.1	276.6	168.4	294.2
20	182.4	71.6	73.4	324.9	93.8	348.4	119.7	15.9	271.4	40.9	292.6	58.4
21	306.6	195.8	197.6	89.2	218.1	112.7	244.1	140.3	35.8	165.2	56.9	182.6
22	70.7	320.0	321.8	213.5	342.4	237.1	8.5	264.7	160.1	289.5	181.1	306.7
23	194.9	84.1	86.0	337.7	106.7	1.5	132.9	29.1	284.4	53.8	305.3	70.9
24	319.0	208.3	210.3	102.0	231.0	125.8	257.3	153.4	48.8	178.0	69.5	195.1
25	83.2	332.5	334.5	226.3	355.4	250.2	21.7	277.8	173.1	302.3	193.7	319.2
26	207.4	96.7	98.7	350.6	119.7	14.6	146.1	42.2	297.5	66.6	317.9	83.4
27	331.5	220.9	222.9	114.9	244.0	138.9	270.5	166.6	61.8	190.9	82.1	207.6
28	95.7	345.1	347.2	239.1	8.4	263.3	34.9	291.0	186.1	315.1	206.3	331.7
29	219.8	109.3	111.4	3.4	132.7	27.7	159.3	55.4	310.5	79.4	330.5	95.9
30	344.0		235.6	127.7	257.0	152.1	283.7	179.7	74.8	203.7	94.7	220.1
31	108.2		359.9		21.4		48.1	304.1		327.9		344.2

Motion of the Central Meridian

m	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	35.2	70.4	105.5	140.7	175.9	211.1	246.3	281.4	316.6	351.8	27.0
10	5.9	41.0	76.2	111.4	146.6	181.8	216.9	252.1	287.3	322.5	357.7	32.8
20	11.7	46.9	82.1	117.3	152.4	187.6	222.8	258.0	293.2	328.3	3.5	38.7
30	17.6	52.8	87.9	123.1	158.3	193.5	228.7	263.8	299.0	334.2	9.4	44.6
40	23.5	58.6	93.8	129.0	164.2	199.3	234.5	269.7	304.9	340.1	15.2	50.4
50	29.3	64.5	99.7	134.9	170.0	205.2	240.4	275.6	310.7	345.9	21.1	56.3
60	35.2	70.4	105.5	140.7	175.9	211.1	246.3	281.4	316.6	351.8	27.0	62.2

The computed central meridian of the planets Mars, Jupiter, and Saturn is the central meridian of the geometric disk of the planet - that is, there is no correction for the effect of the phase of the planet.
The output is formatted as a table on a single page, giving the longitude of the meridian at 0hrs UT. A motion table, giving the change in the longitude for 10-minute intervals over 12hrs, follows the table.
For Jupiter, two longitude tables are given. The first gives the 'System I' longitude, which is valid in the equatorial region of Jupiter. The second is the 'System II' longitude, which is valid in the mid-latitudes of Jupiter. [The longitude of the Great Red Spot in 2007 is about 119° in System II; its longitude increases by about 10 deg per year.]

Lunar Occultation Predictions 2024

Table information

Item	Meaning
Day	The day of the event. Occult searches for events on the basis of geocentric conjunctions that occur within a 24hr - with that period starting at the UT indicated in the date selection box. Users should ensure that the period starts near the middle of their day.
Time	The predicted UTC, in hours, mins and secs.
P	The Phase of the event. Values are: • D - disappearance • d - disappearance, but star is less than 1 mag brighter than the predicted visibility limit. • R - reappearance • r - reappearance, but star is less than 1 mag brighter than the predicted visibility limit. • Gr - grazing occultation at site. At mid-occultation, or closest approach, the star is less than 4" from the limb of the moon (either above or below). • gr - grazing occultation at site, but star is less than 1 mag brighter than the predicted visibility limit. • M - miss. At closest approach, the star is more than 4" above the limb of the moon • m - miss, but star is less than 1 mag brighter than the predicted visibility limit.
Star	The star identifier. Three formats are used: • nnnn - A ZC star. When reporting occultations, the catalogue is identified with 'R'. • nnnnn, or nnnnnn - An SAO star. When reporting occultations, the catalogue is identified with 'R'. • X nnnnnn - an XZ star. When reporting occultations, the catalogue is identified with 'X'.
D	The double star code
Sp	Star's spectral type. Only basic spectral type information is provided
Mag v	The star's visual magnitude
*****	A flag to indicate a light curve is available for the star
Mag r	The star's red magnitude. For observers using CCD video cameras, the red magnitude provides a better indication of visibility.
D	The variable star code
% ill	the percent illumination of the moon. If followed by a +, values are for a waxing moon; - for a waning moon; and E for illumination during a lunar eclipse.
Elon	the elongation of the moon from the sun, in degrees. [Strictly, the quantity is calculated as the elongation of the star from the sun]

Sun Alt	the altitude of the sun. The field is blank if the sun is lower than -12 deg. (Nautical twilight)
Moon Alt	the altitude of the moon
Moon Az	the azimuth of the moon
CA	Cusp Angle - the angle of the event around the limb of the moon, measured from the nearest cusp. -'ve values indicate a bright limb event. The cusps are usually N (north) or S (south), but near full moon can be E (East) or W (west). If a lunar eclipse is in progress, CA gives is the % distance from the centre of the umbra, and is followed by a 'U'. Values up to 103% are possible. Where an event occurs more than 103% of the umbral radius, the usual Cusp Angle value is displayed.
PA	Position Angle - the angle of the event around the limb of the moon, measured from true north
VA	Vertex Angle - the angle of the event around the limb of the moon measured anticlockwise from the vertex of the lunar limb - i.e. the point on the limb highest from the horizon
AA	Axis Angle - the angle of the event around the limb of the moon, measured eastward from the moon's north pole. Essential for reappearance, as it locates the event with reference to lunar features. To use, mark a map of the moon around the circumference at 10 deg intervals, starting at the north pole. Mare Crisium is at about 300 deg. [Note - the so-called Watts Angle differs from the Axis Angle by 0.21 deg. The term Watts Angle is limited to the context of accessing the Watts Charts. In all other situations, the term Axis Angle is preferred.]

The following messages can appear

Item	Meaning
Star name	If the star is brighter than 5.0, and has a proper name, Bayer letter or Flamsteed number, this is given in a line like: R2864 = 52 Sagittarii
Double star details	If the star is a double star, the details are given in a line like: 2405 is triple: AB 6.58 10.15 2.03" 15.3, dT = -3sec : AC 6.6 14.0 24.6" 195.9, dT = +37sec The information provided for each pairing is - the magnitude of each component, - the separation; - the PA; and - the expected time difference between the 1st and 2nd components of the pairing. Pairings are separated by colons. A double asterisk (**)indicates the pairing is an occultation discovery that has not been confirmed. Where an orbit is available for the pairing, the separation and PA are computed for the date of the occultation. Where there is no orbit, the separation and PA are estimated by linear extrapolation of the values in the double star catalogue.
Close and suspected Double stars	Two additional message lines may appear for double stars. If the star is a close double, with a separation less that 2.0" and greater than 0.01", an alert line will appear like: 3157 is a close double. Observations are highly desired Where there are observations which suggest that a star might be a double star, an alert line will appear like: 3177 has been reported as non-instantaneous (OCc1608). Observations are highly desired

The OCC number in brackets gives the identification of the star in the file XZDoubles Discoveries. This message is generated for all double stars where the double star identifier is one of 'OCc', ' ', '---', 'S ' and 'GC '.

Stars in Kepler2

If the star is a target star in The Kepler2 mission, that fact is tagged, together with the EPIC identifier used in the Keppler2 mission. Most messages will state
*** A light curve is desired as...
, but for some stars the message is
*** A light curve is highly desired as...
These stars are a relatively small number of stars in the Kepler2 mission that are measured more frequently than most stars as they are considered to have a greater likelihood of having exoplanets.

Variable star details

If the star is a variable star, the details are given in a line like:
X145167 = KW Sgr, 11.0 to 13.2P, Type SRC, Period 670. days
For regular variables with a known epoch, the phase in the current cycle is also provided.

Object diameter

For planets, moons and asteroids, the prediction is for the center of the object. The prediction also includes a line like:
Duration of planetary disk occultation: predicted time +/-33.1 secs
To indicate the time difference from the start and end of the occultation of the object's disk. In this example, it will take 66 secs for the moon to cover the disk of the object.
Note: the displayed value assumes a circular object. No correction for the oblateness of Jupiter or Saturn is included.

Graze nearby

Where an 'observable' grazing occultation occurs within the graze travel distance for the site, a separate prediction line appears - like:
07 Aug 29 13 22 10 Gr 146693 G5 7.5 7.1 98- 164 49 ** GRAZE: CA 10.9N; Dist. 12km in az. 143deg. [Lat =-35.53+0.61(E.Long-149.06)]
The first part of the line is the same as for any other prediction line. The additional information provided is:

- Cusp angle at mid-graze
- the distance from the site to the closest point on the graze path (in km)
- the azimuth of the direction to the graze path
- a simple formula to give the latitude of a point on the graze path for a specified longitude. In this example, you get the following latitudes by inserting the longitude into the formula
- E. Longitude = +149.06 => latitude = -35.53
- E. Longitude = +150.06 => latitude = -34.92

For observers in US/Canada, remember that your longitude is -'ve.

Terminator distance

If a dark-limb occultation occurs less than 20" from the terminator, the distance to the terminator, and to a theoretical 3" high mountain beyond the terminator which could be sunlit, is given in a message like:
Distance of 2864 to Terminator = 12.2"; to 3km sunlit peak = 1.9"
The distance to the terminator is calculated on an assumption that the moon is perfectly smooth. The distance to a 3km sunlit peak indicates a 'worst-case' scenario of the effect of a high mountain (which could be on the near or far side of the moon).

Lunar Occultation predictions
Bill Sadowski Park
Miami
Florida
USA

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 54 36.9 R    1770 A5  5.9  5.8   56-  97     64 182  62N 321 319 300 -3.2 -1.4 +1.7-2.1 .327  175.1     12 18 40.3 - 0 47 14 397.2 631.5
   R1770 = 13 Virginis
24 Jan  4  8 40 17.2 r    1865 A2  7.3  7.2   47-  87     38 122  78S 281 331 260 -3.8 -0.4 +1.9+0.4 .329 -149.5     12 59  0.2 - 6  5 27 396.3 733.2
24 Jan  5  8 38 27.8 r    1966kK2  7.8  7.1   38-  76     27 119  25N 356  49 336 -4.8 +1.1 -0.3-2.7 .285  132.5     13 44 15.6 -11 26 12 393.5 804.6
24 Jan  5 10 40 21   M    1971SG8  5.5        37-  75     46 147  22S 223 253 204 -5.1 +1.3 +9.9+9.9 .000  -90.0     13 45 56.3 -12 25 36 391.4 683.3
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1 : AC 5.7 11.9 27.4" 162.6
      1971 is a close double. Observations are highly desired
24 Jan  7 10 46 18.3 R    2204kK0  7.7  7.1   19-  52     26 134  84S 275 320 262 -6.0 +4.1 +1.7+0.6 .377 -152.2     15 24 57.6 -22  2 37 382.6 791.1
24 Jan  7 10 52 53.6 R X 39461pK0  7.5  7.0   19-  52     27 135  63N 309 352 296 -6.0 +4.1 +0.9-0.5 .420  174.1     15 25 22.6 -21 55 45 382.4 782.4
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +10sec : AC 7.9 13.5 40" 190.5, dT = +45sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 10 43  3.8 R    2349SB1  2.9     v  11-  39     14 128  70N 294 346 286 -5.8 +5.3 +0.6+0.1 .477 -178.1     16 21 11.3 -25 35 34 378.0 874.2
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -0.05sec : AB 2.9 8.4 20.3" 273.1, dT = -40sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 26  4.3 D    2366dM1  1.1  0.1v  11-  38  25 38 176 -74S 109 113 101 -6.5 +5.7 +2.4-0.5 .351    1.9 .12 16 29 24.5 -26 25 55 374.8 638.9
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 57 45.9 R    2366dM1  1.1  0.1v  10-  38  38 35 201  76N 286 265 279 -6.8 +5.8 +2.5-0.9 .351  177.9 .12 16 29 24.5 -26 25 55 374.7 638.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 10 53  9.4 r  185324kA0  8.7  8.5    5-  27      4 124  81N 273 331 270 -5.2 +6.2 +0.6+0.7 .505 -164.9     17 22 16.8 -28  0  8 373.5 947.0
24 Jan  9 11 22 13.6 R    2505 K4  5.3  4.5    5-  27 -11  9 128  86S 259 314 257 -5.3 +6.3 +1.1+1.2 .435 -151.0     17 23 21.6 -28  8 34 372.8 899.5
   R2505 = 43 Ophiuchi
24 Jan 13 23 53  4.5 d  164823 G0  8.6  8.2    8+  34     18 241  38S 128  72 147 -0.3 +5.4 +3.1-4.9 .170  -71.8     22  1 50.2 -16 46 39 360.5 951.5
24 Jan 14  0 59 32.8 d    3232 K0  8.1  7.4    9+  34      5 250  82N  67   6  87 -0.3 +5.3 +0.2-0.1 .590   -8.8     22  4 12.2 -16  9 46 362.01047.8
24 Jan 14 23 36  5.4 d    3365kA0  8.2  8.1   16+  47 -10 35 235  77N  58   9  79 +1.4 +4.3 +1.1+0.4 .481   -6.8     22 56 49.4 -10 15 47 360.3 847.0
24 Jan 15  2  0  2.5 d    3377 K0  7.9  7.4   17+  48      6 256  86N  66   3  87 +1.3 +4.0 +0.2-0.1 .581   -8.3     23  1  7.9 - 9 33 14 363.51035.8
24 Jan 16  1  8 22   m  146936 K5  7.9  7.2   26+  62     31 249  15S 143  85 165 +2.7 +2.6 +9.9+9.9 .000  -90.0     23 51 28.9 - 3 24 14 363.5 868.4
24 Jan 16  1  8 42   Gr 146936 K5  7.9  7.2   26+  62     29 ** GRAZE: CA 14.6S; Dist. 57km in az. 337deg. [Lat = 26.16+0.38(E.Long+80.32)]
24 Jan 16  2  1 36   M    3514cG9  5.9  5.4   27+  62     20 257  12S 146  84 168 +2.7 +2.5 +9.9+9.9 .000  -90.0     23 52 55.6 - 3  9 20 364.8 935.6
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9
      3514 is a close double. Observations are highly desired
24 Jan 16  2  1 57   Gr   3514cG9  5.9  5.4   27+  62     18 ** GRAZE: CA 11.5S; Dist.106km in az. 345deg. [Lat = 26.60+0.24(E.Long+80.32)]
24 Jan 17  0 18 21.0 d  109370 K2  8.2  7.5   37+  75     54 237  69N  46 357  68 +4.0 +1.1 +1.5+1.2 .421    3.4      0 41 21.3   3 35 58 365.0 746.1
24 Jan 17 23 57 49.4 d  109947 K0  7.8  7.2   48+  88     70 221  84N  62  26  82 +5.0 -0.5 +2.2+1.0 .379  -12.8      1 31 53.2   9 59 18 368.0 692.7
24 Jan 18  2 38 11.2 d     232 K0  8.1  7.4   49+  89     39 263  82S  76  11  96 +4.6 -0.8 +1.4-0.3 .420  -17.0      1 35 33.4  10 33 42 370.5 788.6
24 Jan 19  3 10 27.9 d     363 F0  7.2  7.0   60+ 102     45 269  57N  39 329  56 +5.1 -2.3 +1.5+1.5 .368   25.6      2 27 32.1  16 38 37 374.2 741.1
24 Jan 20  3 35 22   M     486CB5  5.3     e  70+ 114     51 273   6S 161  85 174 +5.3 -3.7 +9.9+9.9 .000  -90.0      3 21 13.6  21  8 49 377.8 695.4
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  3 35 24   Gr    486CB5  5.3     e  70+ 114     50 ** GRAZE: CA  5.8S; Dist. 30km in az. 360deg. [Lat = 25.88+0.01(E.Long+80.32)]
24 Jan 23  6 49 28.6 d   78191 A0  7.7  7.7   94+ 151     46 285  74S 116  35 114 +4.4 -6.2 +1.0-1.8 .383  -13.8      6 17 59.9  28  0 24 389.5 744.0
24 Jan 24  5 35 11.9 d X 99111S    7.2  7.0s  98+ 162     74 280  61S 141  49 134 +4.2 -6.5 +1.6-3.1 .268  -34.3      7 12 49.0  27 13 30 390.9 614.9
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.5sec : BC 7.3 12.7 14.0"  68.0, dT = +15sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  5 35 11.9 D    1093SF8  6.6     s  98+ 162     74 280  61S 141  49 134 +4.2 -6.5 +1.6-3.1 .268  -34.3      7 12 49.0  27 13 30 390.9 614.9
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.5sec : AC 7.2 12.8 13.7"  74.4, dT = +20sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  9 23 34.0 d    1108cG8  7.0  6.5   98+ 163     25 289  86N 110  37 102 +3.6 -6.2 +0.2-1.4 .481    0.2      7 19 30.8  26 49 23 394.8 921.4
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.2sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 49 22.5 D    1206 G8  5.9  5.3   99+ 171     32  75  86S 139 214 128 +4.6 -6.4 +1.7-1.4 .286  -45.8      8  0 55.9  25 23 34 395.8 787.7
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 10.8"; to 3km sunlit peak = 2.5"
24 Jan 28  2 43 55.2 r   99149 A2  7.1  7.0   94- 153     24  86  89S 284 352 263 +1.4 -4.6 +0.8+0.4 .406 -170.1     10 28 42.4  13 17 20 402.6 804.7
24 Jan 28  7 20 19.2 r   99185pA3  7.9  7.7   94- 152     77 171  77S 273 281 252 +0.4 -4.3 +3.5-0.1 .247 -140.7     10 34  7.3  12 22 28 399.1 618.6
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.04sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 23 44.4 R    1625SK3  5.8  5.2   89- 142     21  91  28N 352  57 330 +0.0 -3.5 +0.6-3.2 .251  126.9     11 14  1.8   8  3 39 403.5 818.8
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.06sec : AB 5.8 11.8 23.8" 260.1, dT = +2.5sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29 10 31 33   Gr   1644 B9  4.1  4.1   88- 140     49 ** GRAZE: CA 21.5S; Dist. 94km in az.  49deg. [Lat = 26.90-1.03(E.Long+80.32)]
24 Jan 29 10 34 22   M    1644 B9  4.1  4.1   88- 140     51 246  22S 222 166 201 -1.6 -2.7 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 400.9 702.3
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6 11 44.9 R    1732cK0  6.8  6.1v  82- 130     46 116  61N 321  15 299 -1.8 -2.0 +1.2-1.5 .350  169.4     11 59 23.9   1 49 36 400.8 691.5
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.28sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 13 10.9 r    1824pG0  7.8  7.5   74- 119     46 128  43N 340  25 318 -3.3 -0.5 +0.7-2.2 .318  153.2     12 42 59.3 - 4  2 58 399.2 690.9
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -3sec
      1824 is a close double. Observations are highly desired
24 Jan 31 10 13 52.7 r  138955 K2  7.2  6.5   74- 118     58 202  62N 321 301 299 -4.0 -0.1 +1.7-2.1 .325  174.4     12 45 32.0 - 4 48 39 398.2 631.7
24 Feb  2 11 44 24.0 r    2040cK0  8.0  7.3   55-  95  -5 46 199  82N 297 279 279 -6.5 +2.9 +2.5-1.3 .319 -169.7     14 15 50.2 -16  4 53 392.1 616.8
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.28sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4  8 17 26.0 R    2270 B2  5.4  5.4e  36-  73     13 125  17N 353  47 343 -6.9 +4.9 -1.0-2.5 .271  125.3     15 53 55.9 -23 58 41 385.4 876.5
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4  8 32  5   Gr   2269cB5  5.4  5.4   35-  73     16 ** GRAZE: CA 18.4S; Dist.135km in az.  35deg. [Lat = 27.10-0.64(E.Long+80.32)]
24 Feb  4  8 32 17   M    2269cB5  5.4  5.4   35-  73     15 128  19S 209 261 199 -6.9 +4.9 +9.9+9.9 .000  -90.0     15 53 53.9 -24 31 59 385.1 855.1
24 Feb  4 11 57  7.7 R    2286kB5  5.4  5.5v  35-  72  -2 39 172  73N 297 305 286 -7.5 +5.4 +2.3-0.7 .340 -179.7     15 58 34.9 -24 49 53 381.9 629.4
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  5 10 32 43.6 r  184783 G6  7.9  7.4   25-  60     24 141  34S 217 258 212 -7.1 +6.2 +6.0+6.5 .106 -104.9     16 54 49.6 -27 44 55 377.5 759.1
24 Feb  5 10 35 41.3 r  184777pA0  8.4  8.4   25-  60     24 141  82S 265 305 260 -7.1 +6.2 +2.0+0.9 .366 -152.7     16 54 27.0 -27 34  9 377.5 754.4
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.48sec
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    184777 is a close double. Observations are highly desired
24 Feb  6 11 30 18.9 R    2586cB3  6.0  6.0   16-  47  -8 23 141  38N 317 357 317 -6.5 +7.0 +0.7-0.8 .346  145.7     17 58 39.0 -28 45 33 371.2 753.9
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.7sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb  7 10 44 46   GrX163280MG1  8.3  8.0    9-  34      6 ** GRAZE: CA 19.4S; Dist. 10km in az. 213deg. [Lat = 25.50-0.58(E.Long+80.32)]
24 Feb 11 23 42 27.0 d  146719KF8  8.1  7.8    6+  28  -7 20 253  62N  43 343  65 +1.3 +3.0 +0.4+0.7 .542   11.8     23 28 17.0 - 5 49  4 357.2 958.7
24 Feb 13  0 57 48.5 d  109178 K0  8.9  8.3   13+  42     18 263  83S  75  11  97 +3.0 +1.3 +0.6-0.3 .524  -16.5      0 23 55.0   1 32 19 360.6 955.3
24 Feb 13  1  8 46.3 D  109182 G0  7.8  7.4   13+  42     16 264  75S  82  18 104 +3.0 +1.2 +0.5-0.6 .509  -23.5      0 24 17.3   1 33 22 360.9 970.8
24 Feb 13  1 53 35.3 D      50dG5  5.8  5.3S  13+  43      6 269  63N  41 336  63 +3.0 +1.2 +0.2+0.8 .554   20.3      0 25 24.2   1 56 23 362.01036.8
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14 23 41 17.2 d     309 F0  8.2  8.0V  32+  69  -7 62 253  66N  46 343  64 +5.8 -2.0 +1.7+1.4 .389   10.7      2  6 41.6  14 35  2 366.1 702.4
       309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  1 57 36.2 d   92820 K2  8.2  7.6   33+  70     33 272  73N  52 343  71 +5.5 -2.1 +1.1+0.6 .449   13.4      2 10 15.7  15  1 23 368.8 825.3
24 Feb 15  2 16 30.3 d   92821 K0  8.1  7.3   33+  70     28 274  50N  30 321  48 +5.4 -2.2 +1.0+1.6 .379   37.0      2 10 29.4  15  9  5 369.3 851.2
24 Feb 15  3 24 45.3 D     326cM0  5.7  4.9s  33+  70     14 281  75N  55 348  73 +5.4 -2.2 +0.5+0.3 .512   15.1      2 13  3.3  15 16 48 371.1 954.6
   R326 = 19 Arietis
       326 is double: ** 6.8 6.8 0.050"
       326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
       326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 25 28.7 d   75708 K0  8.0  7.1   43+  82     53 271  55N  38 324  53 +6.2 -3.6 +1.8+1.8 .338   29.7      3  3  9.6  20 20 10 372.5 703.4
24 Feb 16  4 44 58.0 d     459SK2  6.4  5.8   45+  84     10 289  51N  35 329  50 +5.9 -3.6 +0.7+1.1 .394   42.9      3  9 20.1  20 45 40 377.3 985.3
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -284sec : AB 6.5 8.8 122" 239.0, dT = -284sec
       459 is a close double. Observations are highly desired
24 Feb 17  0 34 36.3 D     587 K0  6.2  5.5   54+  95     76 269  32N  21 298  32 +6.8 -4.8 +1.8+4.0 .227   48.1      3 57 26.4  24 27 43 376.6 621.1
24 Feb 17  0 53 23.4 D   76358kB9  7.2  7.2   54+  95     72 270  38S 131  49 141 +6.7 -4.8 +3.4-4.5 .171  -60.1      3 58 20.9  24  4 52 376.8 625.9
24 Feb 18  0 43 47.1 d   76841cK1  7.3  6.7   65+ 107     86 298  59N  54 298  60 +6.8 -5.7 +2.5+1.9 .298   21.8      4 55 34.6  27 12  9 381.6 594.5
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.24sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 36 20.8 D     746WB7  7.0  6.9   65+ 108     49 283  57N  52 330  57 +6.2 -5.8 +2.2+1.1 .301   37.3      4 59 53.7  27 19 32 383.7 705.0
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -61sec
24 Feb 18 23 20 16   M     885wG7  5.6  5.1   74+ 118  -2 63  78  14S 168 256 168 +6.9 -6.3 +9.9+9.9 .000  -90.0      5 50 58.1  27 58  4 386.6 648.8
       885 is double: AB 5.7 12.5 10.9" 233.1
24 Feb 19  4 57  6.1 D   77818 K5  6.7  5.8   75+ 120     44 285  61S 122  42 122 +5.7 -6.3 +0.8-2.1 .369  -22.1      6  0  4.9  28  7 33 388.9 751.2
24 Feb 21  2 59 58.8 D    1181cG8  7.0        90+ 142     88  72  76N  93 200  83 +5.0 -6.6 +3.0-0.1 .291   15.6      7 49 47.7  26 15 50 393.6 575.8
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.4sec
      1181 is a close double. Observations are highly desired
24 Feb 22  0 30 46.6 d    1290pF8  6.9  6.6   94+ 153     44  81  30N  55 131  40 +4.7 -6.3 +1.2+3.2 .241   47.7      8 38 45.5  23 41  9 397.8 691.8
      1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +1264sec
24 Feb 27  6 12 25.8 r    1790 M4  6.9  6.0v  93- 150     57 145  34N 349  20 327 -2.4 -0.7 +0.5-2.8 .283  147.2     12 29  9.7 - 2 25 46 400.0 653.4
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 28 10.7 r    1890 K0  7.3  6.8   88- 140     28 115  42N 341  37 320 -3.2 +0.5 +0.2-2.0 .343  147.6     13  9 46.3 - 7 39 19 400.9 788.7
24 Feb 29  8 47 56.1 R    2002 K0  6.8  6.3   80- 127     50 181  52N 330 329 311 -5.3 +2.5 +1.4-2.1 .309  161.9     13 58 29.8 -14  7 19 396.1 623.8
24 Mar  2 10 47 56.2 d    2237cK3  5.0  4.3s  62- 104     40 188 -69N  83  75  71 -7.4 +5.2 +3.3+0.1 .264   33.7 .01 15 40 16.9 -23 49  5 388.7 599.5
   R2237 = 42 Librae
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.29sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12 10 44.5 r    2237cK3  5.0  4.3s  62- 104   5 34 211  50N 324 294 312 -7.7 +5.3 +2.2-2.4 .272  146.1 .01 15 40 16.9 -23 49  5 389.0 617.7
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.17sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  6 58 47.7 D    2366dM1  1.1  0.1v  53-  93     11 127 -85N  94 148  86 -7.1 +5.8 +0.9+0.8 .431   21.5 .10 16 29 24.5 -26 25 55 387.3 869.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8  4 27.7 R    2366dM1  1.1  0.1v  53-  93     22 137  51N 318   2 310 -7.2 +6.0 +0.6-0.8 .382  158.3 .11 16 29 24.5 -26 25 55 385.8 769.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9  1 31.0 R    2373 K1  6.1  5.5   52-  93     30 147  24N 345  18 337 -7.4 +6.1 +0.0-2.3 .244  130.8     16 31 22.8 -26 32 16 384.8 697.0
24 Mar  5  9 32 35.8 R    2688 G6  7.0  6.6s  31-  68     16 134  64S 238 286 242 -7.0 +7.3 +2.0+2.0 .332 -139.7     18 32 14.0 -29 11 25 374.2 789.6
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 21 18.5 r  188343 K0  8.4  7.8   21-  54     15 131  71N 275 325 285 -6.1 +7.5 +1.1+0.7 .446  172.6     19 36 57.4 -27 30  4 368.2 802.6
24 Mar  7 10 46  2.8 R  189555 G1  7.2  6.9   12-  41     11 124  69N 270 325 284 -4.7 +7.1 +0.9+0.9 .480  169.6     20 40 22.3 -24  7  5 363.2 859.3
24 Mar  8 11 40  8.3 r    3175 G8  4.7  4.3    5-  27   0 13 119  37N 293 350 312 -3.0 +6.3 +0.7+0.1 .373  137.4     21 42 39.5 -18 51 59 358.6 880.2
   R3175 = kappa Capricorni
24 Mar 13  0 48 19.1 d   92623 K5  8.9  8.4   10+  36     18 276  85N  63 356  82 +4.0 -1.6 +0.6+0.1 .540    3.6      1 46 38.7  12 24 42 362.0 949.7
24 Mar 14 23 56 56.3 D     521kA2  6.7  6.7v  27+  63  -7 56 274  56N  40 322  53 +6.4 -4.6 +2.0+1.8 .328   32.2      3 36 58.0  23 12 40 369.7 695.5
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 16 23 47 48.9 d   77268 B8  8.2  8.0v  48+  88  -5 83 293  31S 146  37 148 +7.2 -6.4 +2.9-5.6 .155  -61.0      5 34 39.1  28  3  4 380.8 592.2
     77268 = V1371 Tau, 8.02 to 8.20, V, Type GCAS
24 Mar 18  1 16 53.6 d   78530cB9  7.8  7.8   59+ 100     76 285  51S 134  36 130 +6.7 -6.8 +2.0-2.9 .266  -33.5      6 35 40.3  28 15 51 386.7 598.7
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = -0.05sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 34  9.5 D    1022CB7  6.0     s  59+ 101     46 285  82N  87   5  83 +6.2 -6.6 +1.6-0.7 .374   19.2      6 39 33.1  28 15 47 388.7 747.6
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +1.3sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 34 10.9 d X 91013C    7.8  7.8s  59+ 101     46 285  82N  87   5  83 +6.2 -6.6 +1.6-0.7 .374   19.3      6 39 33.2  28 15 48 388.7 747.6
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -1.3sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 34 17.6 D    1026SG5  6.5  5.9   60+ 101     34 288  70N  75 359  71 +6.1 -6.5 +1.2-0.4 .380   31.4      6 41 20.9  28 11 48 390.0 841.3
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +73sec : AC 6.6 12.8 58"  61.3, dT = +147sec
24 Mar 19  1  2  1.1 D   79479 K1  7.2  6.6   68+ 112     88  33  79N  90 237  81 +6.2 -6.8 +3.0+0.0 .291   16.1      7 32 12.9  27  7 31 391.0 573.7
24 Mar 19  3 47 43.5 D    1149SK5  4.1  3.3s  69+ 112     55 281  56N  67 344  58 +5.6 -6.6 +2.9+0.5 .253   47.1 .02  7 35 55.4  26 53 45 392.6 707.4
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.16sec : AB 4.1 13.2 57"  39.0, dT = +198sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 40 29.7 r    1149SK5  4.1  3.3s  69+ 113     43 284 -30N 342 262 332 +5.4 -6.5 -0.5-3.4 .278  132.7 .02  7 35 55.4  26 53 45 393.6 783.5
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = 0.00sec : AB 4.1 13.2 57"  39.0, dT = -110sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2  0  5.3 D    1263DF0  6.9  6.8S  77+ 123     89 215  32N  49  15  36 +5.2 -6.5 +5.7+5.4 .116   67.7      8 26 39.8  24 32  3 394.7 584.5
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +49sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  2  1  1.7 d   80185SF0  7.7  7.4   77+ 123     89 221  31N  48   7  35 +5.2 -6.5 +5.9+5.8 .111   68.7      8 26 40.1  24 32  7 394.7 584.8
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.8sec : BC,A 7.5 6.9 5.6" 231.8, dT = -51sec
     80185 is a close double. Observations are highly desired
24 Mar 20  3 22 49.5 D    1270cF0  6.1  5.9v  78+ 124     71 270  76N  93  12  79 +4.9 -6.4 +2.7-0.7 .294   27.8      8 28 36.8  24  8 42 395.2 638.0
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 31 59.7 D    1479 F2  6.4  6.2   91+ 146     80 186  77N 103  97  83 +2.8 -4.9 +3.0-0.8 .280   27.7     10  5 40.9  15 45 27 399.2 613.5
24 Mar 22  5 41 16.8 d    1485 G0  7.1  6.8   92+ 146     57 258  70S 136  70 116 +2.3 -4.6 +1.2-2.3 .361   -5.2     10  7 39.3  15  9 27 400.2 702.6
24 Mar 23  3  3  0.9 D    1576 A2  5.3  5.3   96+ 157     69 132  56S 153 196 132 +1.7 -3.9 +1.4-2.6 .299  -21.3     10 49 15.4  10 32 43 400.3 622.0
   R1576 = 53 Leonis
24 Mar 27  5 24 25.9 r  158105PF5  7.5  7.2   96- 158     48 150  39N 345  13 326 -3.6 +1.9 +0.5-2.4 .295  148.1     13 42 35.7 -12  5 13 397.5 670.8
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  7  0 40.4 r  184209KK0  7.7  7.2   78- 124     31 148  80S 273 306 264 -6.3 +5.9 +2.3+0.5 .332 -155.1     16 11 51.3 -25 53  1 389.4 691.6
24 Apr  2 10 36 11   Gr   2813 K2  7.7  7.1   46-  86  -9 33 ** GRAZE: CA  1.5S; Dist.  4km in az.   4deg. [Lat = 25.64-0.06(E.Long+80.32)]
24 Apr  4  9 37 53.2 R  190165 K0  7.2  6.7   25-  60     14 123  48S 207 262 224 -4.8 +6.8 +1.5+2.8 .323 -133.4     21 15  3.2 -21 48 55 366.1 834.2
24 Apr  4 10 24 35.2 r  190177 F3  8.2  8.0   25-  60 -11 22 129  63N 276 325 293 -4.8 +6.8 +1.4+0.7 .397  155.2     21 15 52.6 -21 26 23 365.1 773.8
24 Apr  6 16 18 19.5 r    3421cM3  4.9  4.1v   7-  30  66 55 198  72N 259 243 281 -2.2 +3.6 +2.5+0.2 .371  147.4 .01 23 16 50.9 - 7 43 35 354.6 758.1
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16  3 48.6 D Venus      -3.8 -3.8    2-  16  64 64 165 -71N  42  55  64 -0.1 +2.0 +1.7+1.9 .395    1.5      0 12 29.6 - 0 16 40 353.1 676.3
   Venus contacts: Dark limb 16  3 36; Terminator 16  3 36; Bright limb 16  4  2: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17 29 25.6 R Venus      -3.8 -3.8    2-  15  72 61 212  74S 230 197 247 -0.3 +1.7 +1.7+1.5 .400  179.2      0 12 29.6 - 0 16 40 353.3 684.6
   Venus contacts: Dark limb 17 29 13; Terminator 17 29 23.0; Bright limb 17 29 38: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 14 18.7 D     472cA1  4.9  4.9    7+  31     10 289  42S 117  51 131 +4.5 -4.0 -0.3-1.8 .447  -38.8      3 14 54.1  21  2 40 367.21020.1
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.21sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 32 46.1 D   75819 F2  7.9  7.7    7+  31      6 291  62S  98  33 112 +4.5 -4.0 -0.2-1.0 .557  -19.2      3 15 46.1  21  9 55 367.71051.6
24 Apr 14  3 41 27.0 d   78233SA3  7.5        33+  70     18 294  42N  42 332  40 +6.1 -6.4 +1.5+1.3 .257   60.8      6 19 59.0  28 25 36 384.8 980.9
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.26sec : AB,C 7.5 9.6 2.9" 265.3, dT = -8sec : BA 8.7 9.3 58" 268.1, dT = -156sec
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
     78233 is a close double. Observations are highly desired
24 Apr 15  0 45 35.8 d   79180 F2  8.1  7.8   42+  81     67 281  60N  66 337  59 +6.3 -6.8 +3.2+0.9 .253   43.2      7 13  6.6  27 46 57 385.9 648.7
24 Apr 15  3 38 55.3 d   79256 K0  7.8  7.3   43+  82     29 288  68S 119  44 111 +5.9 -6.5 +0.2-1.6 .467   -7.9      7 17 59.4  27  8 31 389.3 889.4
24 Apr 15  3 49 37.1 d   79264 G2  8.0  7.7   43+  82     27 289  79N  86  12  79 +5.9 -6.5 +0.7-0.8 .437   24.4      7 18 28.9  27 15 10 389.5 907.2
24 Apr 15  4 45 44.3 d    1108cG8  7.0  6.5   43+  82     16 293  16S 171 102 163 +5.8 -6.4 -1.5-3.5 .247  -62.1      7 19 30.8  26 49 23 390.91002.3
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.06sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Apr 16  0 33 17.2 d    1229SF5  8.1  7.9   52+  92 -11 81 272  51N  63 335  51 +5.9 -6.6 +4.2+1.9 .194   52.6      8  8 20.1  25 33 10 390.4 604.5
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.46sec : AB 8.2 12.8 3.1" 302.7, dT = -8sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 17  2 43  9.8 d    1348 G5  8.1  7.6   62+ 104     62 268  85S 112  37  96 +4.6 -5.9 +1.8-1.6 .348   12.9      9  2 45.2  21 31  9 395.2 684.5
24 Apr 19  1 15 15.2 d   99185pA3  7.9  7.7   80+ 126     72 135  51S 153 194 133 +2.8 -4.3 +1.4-2.7 .293  -22.3     10 34  7.3  12 22 28 399.0 612.4
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.6sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5 10 36.2 D    1644 B9  4.1  4.1   87+ 138     51 246  44S 161 105 139 +0.6 -2.6 +0.6-2.9 .319  -28.2     11 21  8.2   6  1 46 400.7 702.4
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 18 40.9 r    1644 B9  4.1  4.1   88+ 139     36 258 -76S 281 218 259 +0.4 -2.4 +1.4-1.4 .350 -151.9     11 21  8.2   6  1 46 401.8 774.0
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 20 39.0 d    1732cK0  6.8  6.1v  92+ 148  -8 40 111  42N  68 126  46 +0.5 -1.8 +3.1+3.3 .180   61.0     11 59 23.9   1 49 36 401.1 722.1
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.27sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4  8 23   d  138955 K2  7.2  6.5   97+ 160     60 182  38N  60  59  39 -1.5 +0.1 +9.4+5.0 .080   75.9 .01 12 45 32.0 - 4 48 39 398.3 638.3
24 Apr 22  4 18 11   Gr 138955 K2  7.2  6.5   97+ 160     59 ** GRAZE: CA 23.4N; Dist. 57km in az.  51deg. [Lat = 26.43-1.12(E.Long+80.32)]
   Distance of 138955 to Terminator = 11.9"; to 3km sunlit peak = 2.9"
24 Apr 26  4 20  8.9 R    2269cB5  5.4  5.4   95- 154     27 140  70N 310 350 299 -4.9 +5.4 +1.0-0.6 .388  170.4     15 53 53.9 -24 31 59 390.4 745.8
24 May 11  1 23 54.5 D     885wG7  5.6  5.1   10+  38     18 293  51S 122  52 123 +5.2 -6.2 -0.2-1.6 .494  -23.2      5 50 58.1  27 58  4 378.4 985.6
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -8sec
24 May 11  1 33 46.8 d   77638 B8  8.2  8.1   10+  38     16 294  83S  90  21  91 +5.2 -6.1 +0.2-0.8 .540    8.4      5 51 33.0  28  5 32 378.61002.7
24 May 11  1 51  3.7 d   77639 K0  8.3  7.7   10+  38     13 295  23S 150  83 151 +5.2 -6.1 -1.0-2.6 .349  -51.6      5 51 40.2  27 50 31 379.11033.8
24 May 12  3 34 36.8 d    1056 B9  7.2  7.3   18+  51      4 298  24S 158  95 152 +5.4 -6.2 -1.2-2.4 .358  -53.1      6 55 56.2  27 17  9 386.11116.5
24 May 12 16 55 22.9 d    1149SK5  4.1  3.3s  24+  59  81 28  72  57N  64 138  55 +6.9 -6.6 +0.3+1.8 .404   26.2 .02  7 35 55.4  26 53 45 386.5 844.5
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.1sec : AB 4.1 13.2 57"  39.0, dT = +127sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 18  0 34.8 r    1149SK5  4.1  3.3s  25+  60  78 42  76 -69N 298  17 288 +6.7 -6.7 +1.7-0.3 .356  154.1 .02  7 35 55.4  26 53 45 385.5 739.8
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.08sec : AB 4.1 13.2 57"  39.0, dT = +31sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 14  3 34 45.3 d    1317 A2  8.2  8.1   36+  74     23 285  83S 111  40  96 +4.5 -5.7 +0.2-1.4 .486    7.6      8 46 28.9  22 21  8 394.1 937.9
24 May 15  2  1 22.0 d   98640 K0  8.0  7.5   46+  85     53 268  62N  81   8  63 +3.9 -5.1 +2.6-0.4 .262   46.9      9 33 38.6  18 44 12 395.1 735.1
24 May 15  2 42 49.2 d   98646 K2  8.2  7.3v  46+  85     44 272  78S 120  48 102 +3.8 -5.1 +0.9-1.8 .407    6.1      9 34 26.7  18 24 22 395.8 786.3
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 16  0 52 22.2 d   99052 G0  8.2  7.8   55+  96 -12 74 227  54S 147 105 128 +3.1 -4.3 +1.3-2.6 .320  -15.0     10 18 26.1  13 56  1 396.6 636.4
24 May 17  1 35 48.4 d  118637 F5  8.1  7.9   65+ 107     69 218  55N  79  45  57 +1.8 -3.1 +4.6+0.5 .182   56.7     11  3 43.5   8 43 48 398.4 641.0
24 May 18  1 39 29.8 d  119033PK0  8.1  7.6v  74+ 118     67 190  37S 167 158 145 +0.5 -1.8 +0.7-3.1 .282  -30.4     11 45 42.3   2 49 17 398.7 632.4
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    119033 is double: AB 6.3      11.9" 186.0, dT = +40sec
    119033 = EPIC 201650346, 8.55, range 0.04, 0Kp, Type VAR, Period 11.495508 days
24 May 18  4 55 10.8 d  119068 F5  7.8  7.5   74+ 119     35 254  77N 101  40  79 -0.2 -1.4 +1.5-1.4 .345   27.9     11 49 46.8   2 13 55 400.9 758.9
24 May 18  6  5 14.2 D    1712SF8  3.6  3.3   75+ 120     19 262  45S 159  95 137 -0.4 -1.3 +0.2-2.6 .355  -35.1     11 50 41.7   1 45 53 402.4 847.7
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -575sec : AC 3.7 9.6 406"  78.5, dT = +189sec
24 May 19  0 32 43.0 d  138796cG5  8.0  7.6   81+ 129  -7 55 139  63N  87 123  65 -0.4 -0.6 +3.5+0.9 .226   48.6     12 27 46.4 - 2 23  7 398.6 661.4
    138796 is double: ** 9.2 9.2 0.10"  90.0, dT = +0.44sec
    138796 has been reported as non-instantaneous (OCc 140). Observations are highly desired
24 May 21  3 41 52   m    2002 K0  6.8  6.3   94+ 152     50 187  25N  41  34  22 -3.3 +2.7 +9.9+9.9 .000   90.0     13 58 29.8 -14  7 19 394.1 628.7
24 May 21  3 42 25   Gr   2002 K0  6.8  6.3   94+ 152     51 ** GRAZE: CA 24.7N; Dist. 28km in az. 229deg. [Lat = 25.23-1.03(E.Long+80.32)]
24 May 22  6  9 24.5 d    2115 A6  7.2  7.1   98+ 164     36 215  63S 122  89 106 -4.6 +4.2 +2.2-1.7 .334   -4.8     14 49 27.7 -19 54 13 391.6 636.1
24 May 23  5 16 10.8 D    2237cK3  5.0  4.3s 100+ 174     40 186  68S  80  74  67 -4.8 +5.3 +3.4+0.3 .259   37.4 .01 15 40 16.9 -23 49  5 387.8 612.6
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.3sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 4.3"; to 3km sunlit peak = 0.0"
24 May 24  1 13  1.6 D    2366dM1  1.1  0.1v 100- 172      7 124 -61N 105 162  97 -4.3 +5.8 +0.5+0.4 .480    9.3 .09 16 29 24.5 -26 25 55 388.2 916.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 19  9.7 R    2366dM1  1.1  0.1v  99- 172     18 133  82S 305 353 297 -4.5 +6.0 +0.7-0.3 .426  170.5 .10 16 29 24.5 -26 25 55 386.8 810.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 9.7"; to 3km sunlit peak = 1.8"
24 May 24  3 18 33.5 r    2373 K1  6.1  5.5   99- 171     27 143  74N 328   5 320 -4.6 +6.1 +0.5-1.3 .329  147.5     16 31 22.8 -26 32 16 385.7 729.9
   Distance of 2373 to Terminator = 10.0"; to 3km sunlit peak = 2.0"
24 May 28  7  2 46.3 r    3012 A7  6.9  6.8   76- 121     28 140  82S 250 289 264 -3.7 +7.0 +2.0+1.3 .386 -176.2     20 38  4.9 -24 13 44 372.5 698.4
24 May 28  7 57 34   Gr   3018 G8  6.4  6.0   76- 121     36 ** GRAZE: CA  9.0N; Dist. 82km in az. 163deg. [Lat = 24.83+0.28(E.Long+80.32)]
24 May 28  7 58 29   M    3018 G8  6.4  6.0   76- 121     35 152   9N 339   7 354 -3.8 +6.9 +9.9+9.9 .000   90.0     20 40 11.8 -23 46 26 371.8 661.5
24 May 28  8 26 48.8 r  189555 G1  7.2  6.9   75- 121     38 159  66S 234 255 249 -3.9 +6.9 +2.2+1.4 .353 -167.4     20 40 22.3 -24  7  5 371.5 650.9
24 May 29  7  4  2.1 d    3164SB3  4.5  4.6v  65- 108     23 127 -81S  82 132 100 -2.8 +6.2 +1.5+1.1 .415  -13.6     21 37  4.8 -19 27 58 370.7 768.0
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +16sec : AB 4.5 10.1 66"  45.9, dT = +129sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 20 17.9 R    3164SB3  4.5  4.6v  65- 108     35 142  67S 229 266 247 -3.0 +6.1 +1.9+1.8 .378 -166.6     21 37  4.8 -19 27 58 369.4 697.1
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -72sec : AB 4.5 10.1 66"  45.9, dT = +175sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 54  6.0 r  164528 B8  7.5  7.5   65- 107     40 150  82N 260 289 279 -3.1 +6.1 +2.4+0.8 .357  159.7     21 37 37.7 -19 13 52 368.9 680.6
24 May 30  9  2 50.1 r  165149wG0  7.7  7.4   54-  94     38 135  62S 221 262 242 -2.1 +4.9 +1.5+2.0 .394 -164.6     22 32  9.4 -13 35 52 367.0 727.1
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +64sec
24 Jun  1  9  6 52.4 r      27DA5  8.2  8.0   31-  68     29 106  67S 223 283 245 +0.1 +1.9 +0.7+2.0 .481 -168.2      0 14 50.2 - 0 18 11 365.3 870.5
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
        27 is a close double. Observations are highly desired
24 Jun  2  9 38 45.9 r  109680 K5  8.7  7.9   20-  54 -11 29  96  69S 227 291 247 +1.2 +0.2 +0.5+1.8 .513 -172.3      1  6 43.7   6 40  0 365.0 916.9
24 Jun  4  9 24 26.4 r   93167 A5  9.1  8.8    6-  27      8  73  55S 223 288 238 +3.5 -2.9 -0.4+1.6 .586 -159.9      2 53 46.8  18 38  3 369.21117.2
24 Jun  9  2  3 11.9 D    1131 A2  7.3  7.3    7+  31      6 296  30S 152  87 143 +4.5 -6.0 -0.9-2.1 .428  -43.2      7 28  0.9  26 13 39 387.21102.3
24 Jun 10  0 17 42.7 D    1251 B9  5.9  5.9   13+  42  -2 38 281  74S 114  39 102 +4.4 -5.9 +0.7-1.6 .447    4.2      8 20 32.1  24  1 20 388.3 844.6
   R1251 = lambda Cancri
24 Jun 10  1  2 46.9 d   80129 F2  8.4  8.2   13+  43 -11 29 285  68N  77   4  64 +4.3 -5.8 +1.1-0.5 .368   40.6      8 21 57.6  24  1 26 389.3 914.6
24 Jun 10  2  2 38.2 d   80146 A2  8.0  7.9   14+  43     16 289  45S 144  76 131 +4.2 -5.7 -0.5-2.0 .466  -29.0      8 23 31.3  23 32  4 390.81010.7
24 Jun 10  2 41  0.4 d   80173 K0  8.3  7.8   14+  44      8 292  89S 101  35  87 +4.2 -5.6 -0.2-1.0 .549   13.3      8 25 21.5  23 32 58 391.81072.3
24 Jun 12  0 36  1.9 d   98897 K0  7.6  7.0   29+  66  -6 52 262  69N  87  19  68 +3.0 -4.3 +2.4-0.8 .285   42.0     10  1 20.7  15 40 14 395.0 735.0
24 Jun 12  1 16 22.6 d   98907 F8  8.5  8.3   29+  66     43 267  77S 122  53 103 +2.9 -4.2 +1.0-1.8 .405    5.9     10  2  3.1  15 21 38 395.8 782.1
24 Jun 15  3 25 59.4 d    1760pK0  7.5  7.0   58+ 100     34 249  50N  74  16  52 -1.1 -0.3 +2.3-0.3 .226   53.7     12 15  0.0 - 1 19 36 400.3 741.1
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +153sec
24 Jun 17  1 20 42.8 d    1957kG5  7.7  7.2   76+ 121     52 181  58N  79  78  59 -2.9 +2.2 +4.5+0.8 .191   54.5     13 39 17.8 -12  5 32 395.3 629.0
24 Jun 17  3 24  4.2 d  158085kK0  7.3  6.6   76+ 122     41 222  55S 145 107 125 -3.4 +2.5 +1.6-2.4 .318  -18.6     13 40 59.7 -12 46 59 395.9 645.3
24 Jun 19  2 36  4.8 D    2183 K2  5.5  4.8   91+ 144     42 176  25S 164 168 150 -4.7 +4.9 +0.9-2.6 .246  -42.2     15 16 23.0 -22 23 58 388.5 624.7
24 Jun 24  6 31 54.7 r    2965 G2  7.2  6.9   94- 151     37 163  74S 251 268 264 -3.4 +7.0 +2.4+0.9 .366  178.8     20 19 45.2 -25 13 43 369.0 655.2
24 Jun 25  7 38 38.7 r  190252 F2  7.2  7.0   87- 137     42 164  25S 192 208 210 -2.5 +6.1 +1.0+2.8 .260 -133.2     21 21  3.2 -20 49 16 366.6 675.7
24 Jun 26  6 52 18.9 r  164948kF2  7.2  7.0   78- 124     36 135  65N 277 318 297 -1.2 +5.1 +2.3+0.5 .325  142.1     22 14 37.2 -15  6  6 366.0 732.6
24 Jun 26  8 30 52.0 r    3271 F5  7.2  6.9   78- 124     48 162  49N 292 309 312 -1.5 +4.9 +4.2-1.1 .197  120.1     22 16 56.3 -14 39 25 364.9 697.2
24 Jun 28  7 45  6.7 r    3528 F0  7.5  7.3v  56-  97     37 113  74N 263 319 285 +1.0 +2.1 +1.6+1.1 .396  149.5     23 59 35.0 - 1 51  0 365.7 815.4
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jun 28 10 12  1   m  128552wK0  8.1  7.4   56-  96  -5 62 156  21N 316 338 338 +0.6 +1.7 +9.9+9.9 .000   90.0      0  2 57.1 - 0 53 38 363.9 724.0
    128552 is double: AB 8.2 13.4 25.8"  75.6
24 Jul  2  9 40 43   m   76001 K0  8.2  7.6   14-  44 -11 28  77  18N 332  44 344 +4.5 -4.2 +9.9+9.9 .000   90.0      3 34 30.3  22 45 34 372.5 960.9
24 Jul  2 17 11  6.8 D     552SB7  2.9  2.9s  12-  41  85 52 277 -29N  21 302  33 +3.4 -5.0 +2.1+3.6 .227   54.9      3 47 29.1  24  6 18 371.3 712.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.14sec : AE 2.8 15.0 78" 232.4, dT = -295sec : AB 2.8 6.3 118"
291.1, dT = -1.6sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 25  0.9 r     545SB6  4.1  4.2v  12-  41  87 49 278  66N 286 207 297 +3.3 -5.0 +1.6-1.6 .355  151.4      3 46 19.6  23 56 54 371.5 728.9
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.8sec : AB 4.2 14.4 110" 180.2, dT = +82sec : AC 4.2 12.9 147" 336.0, dT = -264sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 32 29   Gr    552SB7  2.9  2.9s  12-  41  84 47 ** GRAZE: CA  4.4N; Dist.304km in az.   8deg. [Lat = 28.37-0.13(E.Long+80.32)]
24 Jul  2 17 49 12.7 d     560SB8  3.6  3.7s  12-  41  84 44 280 -66N  58 341  70 +3.3 -5.0 +1.7+0.5 .392   20.3      3 49  9.7  24  3 12 372.0 755.1
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = +0.08sec : AC 3.6 15.0 50"  36.5, dT = +118sec :
AH 3.6 16.0 68" 221.6, dT = -167sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 17 54 28.3 R     552SB7  2.9  2.9s  12-  41  83 43 280  38N 314 237 325 +3.3 -5.0 +0.8-3.8 .243  125.0      3 47 29.1  24  6 18 372.1 764.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.04sec : AE 2.8 15.0 78" 232.4, dT = -48sec : AB 2.8 6.3 118"
291.1, dT = -447sec
       552 is a close double. Observations are highly desired
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 56  7.4 R     560SB8  3.6  3.7s  12-  41  69 30 285  70N 282 209 294 +3.2 -5.0 +0.6-1.3 .441  159.4      3 49  9.7  24  3 12 373.4 854.1
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.02sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.29sec : AC 3.6 15.0 50"  36.5, dT = +46sec :
AH 3.6 16.0 68" 221.6, dT = -76sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 10  1 10 24.9 d   99162S    8.7  8.2   16+  47 -12 25 271  44S 156  89 136 +1.9 -3.2 +0.0-2.5 .390  -31.1     10 30 25.7  11 37 51 398.7 880.4
     99162 is triple: AB 8.8 12.8 14.6"  84.4, dT = +12sec : AC 8.8 11.0 47" 202.9, dT = +82sec
24 Jul 11  1 55 17.6 d    1628 K0  7.1  6.5   24+  58     21 266   9S 193 128 171 +0.6 -1.9 -0.9-4.6 .164  -68.3     11 14 32.5   5 59 34 401.1 863.2
24 Jul 11 20  9  7   d    1712SF8  3.6  3.3   31+  68  53 56 130  -8S 211 255 189 +0.6 -1.3 +9.9+9.9 .075  -77.2 .02 11 50 41.7   1 45 53 399.0 656.9
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = +1142sec : AC 3.7 9.6 406"  78.5, dT = -3652sec
24 Jul 11 20 20 10   Gr   1712SF8  3.6  3.3   31+  68  50 60 ** GRAZE: CA-21.4S; Dist. 44km in az. 220deg. [Lat = 25.08-0.77(E.Long+80.32)]
24 Jul 11 20 29 32   r    1712SF8  3.6  3.3   31+  68  48 59 137 -35S 238 276 216 +0.5 -1.2 +9.1+8.0 .074 -102.8 .02 11 50 41.7   1 45 53 398.8 647.0
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = -3000sec : AC 3.7 9.6 406"  78.5, dT = +5112sec
24 Jul 12  2 46 42.1 D    1730wK2  6.2  5.5   32+  70     17 262  34N  58 354  36 -0.8 -0.5 +1.2+0.7 .185   65.1     11 59  3.3   0 31 50 402.5 855.9
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -39sec
24 Jul 14  2 45 10.1 d  157912kF0  7.8  7.6   51+  91     28 241  88N 110  56  89 -3.4 +2.3 +1.5-1.6 .361   11.7     13 23 56.5 -10 52 15 399.4 715.0
24 Jul 14  3 49 18.9 D    1925SB1  1.0  1.1v  52+  92     14 250  68S 134  74 114 -3.6 +2.3 +0.9-2.1 .391  -17.1     13 25 11.6 -11  9 41 400.7 795.9
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -74sec : AC 1.0 10.5 368"  60.8, dT =
+273sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  2 12 48.9 d  158363 B9  7.3  7.3   61+ 102     37 222  19S 180 141 162 -4.4 +3.6 +0.8-4.3 .174  -58.5     14  7 13.8 -16 11 26 395.8 639.9
24 Jul 15  4  8 54.6 D    2029 M1  4.9  4.1v  61+ 103     16 242  82N 101  44  82 -4.8 +3.7 +1.1-1.3 .384   12.3 .01 14 10 50.5 -16 18  7 397.6 758.5
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  0 46 13.6 d    2251KK0  7.5  7.0   79+ 125  -7 39 168  30S 159 171 148 -5.5 +5.7 +1.0-2.2 .256  -40.3     15 45 49.8 -24 43  1 387.4 629.8
24 Jul 18  1 50 19.2 D    2405SA2  6.6     s  87+ 137     37 171  67N  69  78  62 -5.9 +6.6 +3.3+1.0 .258   39.4     16 44 17.4 -27 27 22 382.2 619.7
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +6sec : AC 6.6 14.0 24.3" 195.9, dT = -57sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5  9 23.5 D    2910cG3  4.7  4.3  100+ 174     38 177  66S  41  44  52 -4.4 +7.1 +1.9+1.6 .323   29.2     19 55 50.4 -26 17 58 366.8 657.9
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Jul 24  3 43 21.1 r    3339 M0  6.7  5.8v  90- 142     18 112  45N 297 355 318 +0.2 +4.1 +1.0-0.2 .289  125.2     22 46 14.2 -11  9 59 363.0 881.0
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  8 19 42.8 R    3355KF8  6.7  6.5   89- 141     54 186  60N 281 275 302 -0.4 +3.6 +3.7-0.7 .253  127.1     22 52 46.5 -10  3 32 359.7 732.0
24 Jul 25 10 15 40.0 R    3505WG8  5.5  5.0   80- 126  -7 56 217  88S 245 212 267 +0.8 +1.7 +2.0+0.6 .410  161.7     23 47 56.5 - 2 45 42 360.5 754.2
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -367sec
24 Jul 27  8 25 10.3 r   92457cK5  8.2        58- 100     57 111  79N 259 318 279 +3.7 -1.4 +2.1+1.1 .381  149.6      1 29  5.5  10 25 56 364.4 779.7
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.21sec
     92457 is a close double. Observations are highly desired
24 Jul 27 10 22 40.2 R     222 G5  7.0  6.5   58-  99  -6 75 171  81S 239 248 259 +3.4 -1.7 +2.1+1.4 .395  168.9      1 31 42.7  10 53 22 363.8 709.4
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 28  7 56 39.9 r     347 K0  7.9  7.4   47-  87     42  91  59S 221 291 238 +4.8 -2.8 +0.5+2.1 .469 -166.6      2 21 50.3  16  9 45 368.4 861.5
24 Jul 29  7  3 21.0 R     472cA1  4.9  4.9   36-  74     21  76  77S 243 312 256 +5.6 -4.0 +0.1+1.4 .557  178.8      3 14 54.1  21  2 40 373.61008.7
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.15sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 29 14.2 r   75819 F2  7.9  7.7   36-  74     26  78  78S 244 315 258 +5.5 -4.0 +0.3+1.4 .534  176.3      3 15 46.1  21  9 55 373.1 968.0
24 Jul 31  9 36 52.6 r     786 K5  9.1  8.3   16-  48     32  72  78N 282 358 286 +6.3 -6.0 +1.1+0.5 .419  149.4      5 16 52.5  27 43  3 379.8 895.5
24 Aug  1  8 56 24.9 r     952 K2  8.0  7.2   10-  36     11  64  10S 198 265 196 +6.4 -6.2 -1.5+3.4 .258 -117.9      6 15 54.8  27 51 42 385.31032.7
24 Aug  1  9 19  7.7 r   78154 A0  8.5  8.4    9-  36     16  66  85N 283 353 281 +6.4 -6.3 +0.4+0.5 .488  156.7      6 16  3.2  28 12  6 384.8 992.1
24 Aug  1  9 59 55.8 R   78191 A0  7.7  7.7    9-  35 -11 24  69  31S 220 293 218 +6.4 -6.4 -0.4+2.4 .381 -140.5      6 17 59.9  28  0 24 384.1 920.7
24 Aug  8  0 45 49.1 D    1696 F5  6.9  6.7   11+  39 -10 17 264  89N 111  47  90 -0.1 -0.8 +0.5-1.6 .435   11.8     11 42 25.5   2 21 44 402.9 869.4
24 Aug 10  2 16 38.8 D    1886cK3  5.6  5.0   26+  61      9 255  31N  54 352  33 -3.0 +2.1 +0.5+0.8 .197   62.8     13  8 32.5 - 8 59  4 403.7 844.2
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.41sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 11  2 31 11.7 d  158207 F0  7.4  7.2   35+  72     12 247  58S 143  84 124 -4.4 +3.4 +1.0-2.4 .353  -29.8     13 52 15.4 -14 40 36 401.7 792.8
24 Aug 16  2 23 55.4 d  186672 G5  7.4  6.9   83+ 131     35 186  38N  31  25  33 -6.9 +7.5 +2.2+2.5 .196   54.6     18 20 25.4 -29  3 59 375.6 617.8
24 Aug 17  2 49 38.7 D    2831kB2  6.0  6.1s  90+ 144     37 176  87N  71  74  79 -6.2 +7.4 +2.5+0.7 .356    5.0     19 24 30.2 -27 51 57 369.5 640.1
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 19  5 53 40.7 d  164449DF0  7.2        99+ 171     44 197  80S  52  36  70 -3.8 +5.6 +1.6+0.9 .424    1.6     21 31 25.5 -19 14 15 359.1 738.8
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -3sec
    164449 is a close double. Observations are highly desired
   Distance of 164449 to Terminator = 10.7"; to 3km sunlit peak = 2.4"
24 Aug 20  3 57 51   m    3288 K0  5.8  5.3  100- 173     42 141  46N 325   1 345 -1.7 +4.5 +9.9+9.9 .000   90.0     22 24 27.1 -13 31 46 356.8 747.2
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
24 Aug 21  2 41 21.9 r    3422kF0  6.7  6.5   97- 161     24 111  56N 288 346 310 +0.4 +3.1 +1.3+0.3 .329  130.1     23 16 59.2 - 7  9 39 357.7 886.6
24 Aug 22  7 44 49   M      35 K0  6.2  5.7   91- 144     66 186  21N 316 311 338 +1.7 +0.6 +9.9+9.9 .000   90.0      0 17 47.7   1 41 19 355.4 746.7
24 Aug 22  9  2  6.4 r  109142cG5  7.6  7.1   90- 144     59 224  42S 199 160 221 +1.5 +0.4 +0.8+2.3 .388 -151.3      0 19 57.1   1 34 57 355.9 763.7
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = -0.01sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 49 22.1 r  109738 G5  7.8  7.1   82- 130     65 234  79S 236 189 257 +3.1 -1.5 +1.9+1.0 .421  174.0      1 13 41.8   8 58 29 358.2 735.2
24 Aug 24  9 45  7   M     313cK0  7.1  6.2s  72- 116     79 215  17N 323 290 341 +4.6 -3.1 +9.9+9.9 .000   90.0      2  8  3.9  15 48 16 361.4 698.3
       313 = NSV 15445, 7.12 to 7.18, Hp
24 Aug 25  6 26  3.8 r     439cF0  7.3  7.1   62- 104     39  84  64S 227 300 242 +6.3 -4.0 +0.4+1.9 .492 -170.0      2 59 10.4  19 59 23 367.3 889.4
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.15sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25 10 29  7.8 r     452 A2  7.7  7.6   61- 102  -7 84 223  49S 213 171 227 +5.7 -4.5 +1.6+2.6 .336 -153.5      3  5 30.3  20 54  9 365.8 666.4
24 Aug 26  6 52 54.9 R     587 K0  6.2  5.5   51-  91     35  77  89N 260 335 270 +7.1 -5.2 +0.8+1.1 .481  163.1      3 57 26.4  24 27 43 372.6 907.8
24 Aug 26  8 11 48.7 r   76374kG0  8.3  8.0   50-  90     52  82  79S 247 327 258 +7.0 -5.3 +1.2+1.5 .438  174.4      3 59 54.8  24 41 44 371.5 792.5
24 Aug 27  6 19 41.6 r   76841cK1  7.3  6.7   40-  78     17  67  61N 294   4 300 +7.6 -5.8 +0.6+0.1 .406  136.7      4 55 34.6  27 12  9 379.11026.6
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.17sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 20 41.8 R     746WB7  7.0  6.9   39-  77     42  75  68S 243 322 248 +7.4 -6.1 +0.7+1.6 .449 -173.9      4 59 53.7  27 19 32 377.0 826.2
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -36sec
24 Aug 28  8  5 49.7 R   77818 K5  6.7  5.8   29-  65     26  70  16S 198 272 198 +7.6 -6.4 -1.2+3.8 .249 -120.6      6  0  4.9  28  7 33 383.0 908.0
24 Aug 28  9 54 48.7 R   77883 B2  7.6  7.6   28-  64     49  75  63N 300  24 300 +7.4 -6.6 +2.4-0.7 .296  138.2      6  2 59.4  28 40 37 381.3 735.2
24 Aug 29  8  9 51.3 r   78917 M0  8.3  7.5   20-  53     16  67  62S 252 321 246 +7.5 -6.5 -0.1+1.3 .497 -166.3      6 58 11.0  27 38 13 388.3 963.8
24 Aug 29  9 26  6.3 r   78965 K0  9.0  8.4   20-  53     31  72  88S 278 354 272 +7.4 -6.6 +0.9+0.6 .433  167.6      7  0 51.9  27 48 16 387.0 831.4
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 31 10  9 31.0 r   80456kG5  9.5  8.9    6-  29     17  73  84N 300   8 284 +6.3 -5.6 +0.6-0.1 .437  160.9      8 51  9.7  22 13 35 395.6 887.4
24 Aug 31 10 17 13   m   80479kG0  9.6  9.2    6-  29 -11 18  74  13N  11  80 356 +6.3 -5.6 +9.9+9.9 .000   90.0      8 52 35.6  22 23  3 395.5 875.7
24 Sep  8  0  6 43.1 d    2055 K0  7.8  7.2   20+  53  -8 22 236  28N  50 358  32 -4.6 +4.4 +1.6+1.4 .158   63.9     14 20 27.5 -17 31 42 401.2 701.2
24 Sep  9  0  6 44.6 d  183204pK2  8.0  7.3   28+  64  -9 27 225  62N  80  37  66 -5.7 +5.5 +2.0-0.5 .292   29.5     15  8 21.6 -22  5 51 398.0 648.5
    183204 is double: AB 8.2 14.1 2.0" 151.0, dT = +2.2sec
    183204 is a close double. Observations are highly desired
24 Sep  9 19 40  4.5 d    2268MB2  4.5        36+  74  50 29 144  63S 131 167 120 -5.6 +6.1 +1.1-0.7 .361  -10.2     15 53 36.7 -25 19 38 394.8 702.0
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Sep 10  2 29 37.6 D    2298kK3  5.0  4.3   38+  76      9 236  70N  83  26  72 -7.1 +6.4 +0.8-0.7 .399   12.5     16  3 20.6 -25 51 55 395.7 785.0
24 Sep 14  0 42 41.7 d  188724cF5  7.7  7.5   78+ 124     36 163  72N  57  74  67 -6.8 +7.3 +2.4+1.3 .343   16.7     19 55 52.2 -26 33  0 370.5 643.0
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.29sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  1 41 17   m    2910cG3  4.7  4.3   78+ 124     38 179  -6N 339 340 350 -7.0 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 370.1 644.2
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Sep 14  2 54 58.6 D    2914cG8  4.8  4.4   78+ 125     36 199  54N  39  20  50 -7.2 +7.1 +1.4+1.2 .345   25.5     19 58 57.2 -26 11 45 369.9 685.3
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 17  7 38  4.4 d    3375 F2  6.8  6.6   99+ 168     34 238  75S  72  21  93 -3.1 +3.0 +1.3-0.1 .474  -21.1     23  0 19.9 - 8 52 50 355.2 874.7
   Distance of 3375 to Terminator = 19.7"; to 3km sunlit peak = 8.5"
24 Sep 21  8 21 26.2 r     397MB9  7.5  7.5   85- 135     82 217  56S 216 181 232 +5.0 -4.1 +1.5+2.2 .377 -159.4      2 41  6.6  18 48  1 358.0 699.6
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +1.2sec : AC 7.7 9.5 66" 242.2, dT = -156sec
       397 is a close double. Observations are highly desired
24 Sep 21  8 21 28.0 r X  3591MB9  7.9  7.9   85- 135     82 217  56S 216 181 232 +5.0 -4.1 +1.5+2.2 .377 -159.3      2 41  6.8  18 47 59 358.0 699.5
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -1.2sec : BC 7.5 9.5 67" 243.0, dT = -158sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  6  9 19.3 R     521kA2  6.7  6.7v  76- 122     53  84  64S 228 306 240 +6.8 -5.0 +0.8+2.0 .452 -168.8      3 36 58.0  23 12 40 363.8 813.2
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9 54 29.7 D     537SB6  3.7  3.8s  75- 120     78 267 -75S  90   9 102 +6.2 -5.5 +2.7-0.3 .346  -22.2      3 44 52.5  24  6 48 363.5 659.7
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.5sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+167sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 38 17.8 d     539SB6  4.3  4.4s  75- 120  -8 68 273 -35N  20 297  32 +6.1 -5.5 +1.9+3.8 .238   51.3      3 45 12.5  24 28  2 363.9 672.3
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.11sec : AC 4.3 14.0 53"  53.5, dT = +185sec : AB 4.3 11.0 72"
328.8, dT = +191sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 39 37.0 D     541SB8  3.9  3.9s  75- 120  -8 68 273 -71N  56 333  67 +6.1 -5.5 +2.2+1.2 .367   15.7      3 45 49.6  24 22  4 364.0 672.6
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +295sec : AB 3.8 13.7 113"  72.8, dT = +295sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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      day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 22 11  4 12   Gr    539SB6  4.3  4.4s  75- 120  -2 61 ** GRAZE: CA  1.7N; Dist.365km in az. 358deg. [Lat = 28.90+0.03(E.Long+80.32)]
   Distance of 539 to Terminator = 8.9"; to 3km sunlit peak = 0.0"
24 Sep 22 11 15 45.8 R     537SB6  3.7  3.8s  75- 120   0 59 275  67S 232 151 243 +6.0 -5.5 +2.1+1.2 .365 -157.8      3 44 52.5  24  6 48 364.5 697.5
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.22sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
11sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 22 27.2 r     536pB7  5.5  5.5   75- 120   2 58 276  76N 269 188 281 +6.0 -5.5 +2.0-0.6 .385  165.5      3 44 48.2  24 17 22 364.6 702.9
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -229sec : AC 5.4 11.5 218" 196.1, dT = -167sec
24 Sep 22 11 28 39.2 R     539SB6  4.3  4.4s  75- 120   3 57 277  39N 306 226 318 +6.0 -5.5 +1.9-3.3 .250  128.7      3 45 12.5  24 28  2 364.7 707.7
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.19sec : AC 4.3 14.0 53"  53.5, dT = +62sec : AB 4.3 11.0 72"
328.8, dT = -267sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11 56 22   D     552SB7  2.9  2.9s  75- 120  10 51 278 -10S 155  76 166 +5.9 -5.5 +9.9+9.9 .086  -78.0      3 47 29.1  24  6 18 365.2 733.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.22sec : AE 2.8 15.0 78" 232.4, dT = +196sec : AB 2.8 6.3 118"
291.1, dT = -986sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 11 57 55.9 R     541SB8  3.9  3.9s  75- 120  10 50 278  72N 273 194 284 +5.9 -5.5 +1.7-0.9 .400  164.1      3 45 49.6  24 22  4 365.3 736.9
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +266sec : AB 3.8 13.7 113"  72.8, dT = +266sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 12  4 56   Gr    552SB7  2.9  2.9s  75- 120  12 47 ** GRAZE: CA  2.3S; Dist. 40km in az. 188deg. [Lat = 25.25-0.13(E.Long+80.32)]
   Distance of 552 to Terminator = 11.9"; to 3km sunlit peak = 0.0"
24 Sep 22 12 13  5   R     552SB7  2.9  2.9s  75- 119  13 47 279  15S 180 102 191 +5.9 -5.5 +9.9+9.9 .089 -102.0      3 47 29.1  24  6 18 365.6 753.0
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.31sec : AE 2.8 15.0 78" 232.4, dT = -539sec : AB 2.8 6.3 118"
291.1, dT = +479sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 23  6 30  9.3 r X 70481p    7.3  7.2   66- 108     45  76  45N 305  25 312 +7.9 -6.0 +2.8-1.2 .240  121.3      4 38 29.6  26 56 26 370.0 826.9
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +16sec : AC 7.4 12.9 92" 203.7, dT = +77sec
   X 70481 is a close double. Observations are highly desired
24 Sep 23  6 30 14.6 R     701SF2  6.6  6.4   66- 108     45  76  46N 305  25 312 +7.9 -6.0 +2.8-1.1 .241  121.5      4 38 29.5  26 56 23 370.0 826.8
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +9sec : AB 7.36 7.21 4.47" 188.0, dT = +8sec
       701 is a close double. Observations are highly desired
24 Sep 24  7 26  3.9 r   77397 A2  8.1  8.0V  54-  95     45  74  89N 269 350 270 +8.4 -6.6 +1.4+0.8 .419  166.0      5 41 38.6  28 27 24 376.1 787.4
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 24 10 47 36.9 r   77551cB9  8.3  8.2   54-  94  -6 86  27  76S 254  46 255 +7.8 -6.8 +2.7+0.9 .326 -168.1      5 47 14.3  28 37 26 375.1 606.1
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -1.3sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 15 29.5 R    1022CB7  6.0     s  44-  83     18  67  74N 291   1 287 +8.6 -6.6 +0.6+0.2 .454  151.9      6 39 33.1  28 15 47 384.0 959.2
   R1022 = 54 Aurigae
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.41sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  6  9.1 R    1026SG5  6.5  5.9   44-  83     28  70  79S 264 339 260 +8.6 -6.6 +0.6+1.0 .468  178.7      6 41 20.9  28 11 48 383.2 870.7
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +54sec : AC 6.6 12.8 58"  61.4, dT = +113sec
24 Sep 25  8 11  6.0 r   78673 G5  8.3  7.7   44-  83     42  74  67N 299  19 294 +8.5 -6.7 +1.8-0.4 .341  145.7      6 43 38.2  28 24  6 382.2 765.6
24 Sep 26  9 22 42.3 r   79642 K5  8.6  7.9   33-  70     45  77  63N 310  29 300 +8.1 -6.5 +2.0-1.1 .311  145.2      7 43 29.1  26 35 43 387.3 711.0
24 Sep 27  9 18 50.1 r   80288pK5  8.6  8.2v  24-  59     33  78  67S 264 338 250 +7.6 -5.9 +0.9+1.2 .388 -163.3      8 36 55.8  23 14 49 392.7 770.7
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = +0.8sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9  8 37.6 R   98567 A3  7.5  7.4   16-  47     19  77  48S 250 319 233 +6.8 -5.1 +0.2+1.9 .359 -144.2      9 26 34.5  19  3 36 397.6 852.5
24 Sep 28 10  1 16.4 r    1400cF5  8.3        16-  47     30  82  25N 357  68 340 +6.7 -5.1 +1.9-5.9 .146  111.3      9 29  0.7  19 17 19 396.6 771.0
      1400 is double: AB 8.42 9.96 1.09" 223.7, dT = +5sec
      1400 is a close double. Observations are highly desired
24 Sep 29 11  5 51   M    1504 M1  5.4  4.6    9-  35  -2 33  90   1S 206 275 187 +5.5 -4.0 +9.9+9.9 .000  -90.0     10 16 40.7  13 43 42 399.2 748.5
   R1504 = 37 Leonis
   Distance of 1504 to Terminator = 16.1"; to 3km sunlit peak = 0.0"
24 Oct  7  0 42 42.1 d    2251KK0  7.5  7.0   15+  46      6 239  39N  57 358  45 -5.9 +6.2 +0.2+0.2 .314   40.7     15 45 49.8 -24 43  1 399.7 804.2
24 Oct  8 23 40 31.5 d  185508 K5  8.4  7.5   32+  68 -10 29 209  88S  97  67  95 -7.2 +7.4 +2.4-0.8 .327  -10.2     17 33 54.3 -29 13 24 389.8 628.0
24 Oct  9 23 29 55.1 D    2688 G6  7.0  6.6s  41+  80  -8 34 193  71N  69  55  72 -7.5 +7.6 +2.5+0.4 .319   11.0     18 32 14.0 -29 11 25 384.4 605.5
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2 21 33.0 d  164449DF0  7.2        74+ 119     43 198  66N  45  28  63 -6.5 +5.6 +1.5+1.1 .401    7.6     21 31 25.5 -19 14 15 365.7 717.3
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -4sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1 11  0.3 D    3288 K0  5.8  5.3   83+ 132     48 156  24N 360  22  20 -5.0 +4.4 +0.2+3.3 .251   52.1     22 24 27.1 -13 31 46 360.4 715.4
   R3288 = 50 Aquarii
24 Oct 14  4 31 42.8 D    3303kF2  6.4  6.2   84+ 133     40 224  58S  97  57 117 -5.5 +3.9 +2.6-1.1 .311  -47.7     22 30  1.5 -12 54 54 360.4 807.1
24 Oct 14 23 33 16   M    3421cM3  4.9  4.1v  91+ 145 -10 29 116   7S 147 202 168 -3.1 +3.0 +9.9+9.9 .000  -90.0     23 16 50.9 - 7 43 35 358.0 845.7
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 3.2"; to 3km sunlit peak = 0.0"
24 Oct 14 23 45 30.5 d    3422kF0  6.7  6.5   91+ 145     32 117  54N  27  81  49 -3.1 +3.0 +0.9+2.3 .423   28.5     23 16 59.2 - 7  9 39 357.7 834.4
24 Oct 15  3  3 58.0 d  146658 K0  7.3  6.8   92+ 147     58 178  37N  11  12  32 -3.6 +2.6 +0.5+2.6 .351   35.8     23 21 15.4 - 6 11 33 355.2 745.6
24 Oct 16  4 56 47.9 D      35 K0  6.2  5.7   97+ 162     63 213  47N  23 354  44 -1.8 +0.5 +0.9+2.1 .409   24.2      0 17 47.7   1 41 19 352.2 765.2
24 Oct 19  3 36  9.9 r     452 A2  7.7  7.6   96- 156     49  87  66N 271 346 286 +4.9 -4.3 +1.7+0.7 .416  146.0      3  5 30.3  20 54  9 356.7 866.8
24 Oct 19  6  6 35.5 r   75768 K0  7.6  7.1   95- 155     81 116  50S 207 268 222 +4.6 -4.7 +1.1+2.7 .358 -149.1      3 10 14.5  21 16 19 355.6 719.4
24 Oct 21  3 17 51.8 r     773wF8  7.0  6.7   81- 129     21  68  85S 257 328 261 +7.8 -6.1 +0.1+1.1 .564  175.8      5 10  3.9  27 33 23 369.41012.9
       773 is double: AB 7.0 9.3 315" 353.1, dT = +64sec
24 Oct 21 10 16 20.5 r   77138 A*  7.6  7.4   79- 126     69 284  53N 300 207 303 +6.9 -6.6 +2.1-2.1 .317  148.9      5 23  1.4  28 28  8 367.5 659.6
24 Oct 21 11 28 44   M     810SB7  1.7  1.7   79- 126   0 54 284 -11N   4 279   7 +6.7 -6.6 +9.9+9.9 .000   90.0      5 26 17.5  28 36 27 368.6 727.1
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Oct 21 11 29 32   Gr    810SB7  1.7  1.7   79- 126   1 52 ** GRAZE: CA-10.9N; Dist.107km in az. 202deg. [Lat = 24.57-0.37(E.Long+80.32)]
24 Oct 22  6 28 30.5 r   78233SA3  7.5        71- 114     48  75  64S 244 327 242 +8.4 -6.7 +1.1+1.8 .398 -162.5      6 19 59.0  28 25 36 374.0 755.9
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.28sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -132sec
     78233 is a close double. Observations are highly desired
24 Oct 22  8 17 47.7 r   78294 A0  7.6  7.6   70- 114     71  76  89N 271   6 269 +8.1 -6.8 +2.5+0.4 .352  176.2      6 23  0.3  28 37 17 373.1 638.8
24 Oct 23 10 32 11.3 r   79394cA2  8.0  7.9   59- 101     87  47  47N 321  94 313 +8.0 -6.6 +2.2-2.9 .268  145.0      7 27 16.8  27 17 55 379.6 601.6
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.23sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10 49 16.8 r   79402 B8  7.3  6.9   59- 100  -9 87 315  39N 329 195 320 +7.9 -6.6 +1.9-3.5 .247  138.7      7 27 48.9  27 17 33 379.7 605.6
24 Oct 26  8 45 29.1 r   98892dK0  7.7  7.1   30-  66     30  86  72N 310  19 291 +6.8 -4.3 +1.1-0.7 .382  163.2     10  0 31.6  15 51 51 397.1 768.5
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +23sec
24 Oct 26  9 27  1.7 R   98897 K0  7.6  7.0   30-  66     39  90  86S 288 358 269 +6.7 -4.3 +1.5+0.1 .368 -172.1     10  1 20.7  15 40 14 396.3 714.8
24 Oct 27 10  9 22.1 r   99296kA3  8.0  7.9v  21-  55     37  96  39N 345  50 324 +5.5 -3.0 +0.9-2.8 .274  137.0     10 47 46.5  10 26 37 399.5 726.2
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Oct 29 10 26 49.3 r  138642 K0  9.5  9.0    8-  33     19 101  71S 275 337 253 +2.8 -0.3 +0.8+0.8 .374 -150.4     12 12  1.9 - 1  5 53 404.0 843.3
24 Nov  5 23 44 38.7 d  186563 K2  7.8  6.9   18+  50     19 223  18N  21 337  23 -6.7 +7.4 -0.3+2.2 .224   55.0     18 16 20.4 -28 55 54 389.3 737.4
24 Nov  6  0 19 55.5 d  186607 B8  8.6  8.6   18+  50     14 228  58S 125  74 126 -6.8 +7.3 +2.2-2.4 .274  -49.1     18 17 56.3 -29 15 26 389.8 790.3
24 Nov  6  0 59 44.7 d  186642 B8  8.3  8.3v  18+  50      7 233  78N  81  25  83 -6.9 +7.2 +0.7-0.6 .449   -5.5     18 19 24.3 -28 59 59 390.4 854.2
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  8 23 27 24   m  190052 F8  7.9  7.6   47+  86     43 183  17S 147 143 163 -6.4 +6.0 +9.9+9.9 .000  -90.0     21  8 36.9 -21 40 59 373.9 660.3
24 Nov  8 23 31  4.3 D    3089SA0  5.3  5.3   47+  86     43 185  46N  29  24  45 -6.4 +6.0 +1.3+1.9 .324   27.5     21  8 33.6 -21 11 37 373.9 662.2
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +29sec : AF 5.3 13.0 9.7"  14.0, dT = +29sec : AG 5.3 20.0 13.1"  62.0, dT = +34sec : AC 5.3
15.0 35" 114.8, dT = +8sec
      3089 is a close double. Observations are highly desired
24 Nov 11  2 24 53.6 D Saturn      0.9  0.9   70+ 113     50 215  16N 352 321  13 -5.2 +3.0 -0.7+3.6 .244   55.2     22 58 12.9 - 8 52 27 363.5 754.9
   Saturn ring contacts offset by ±20.5 secs, at  2 24 33 and  2 25 14
   Saturn limb contacts offset by ±33.7 secs, at  2 24 20 and  2 25 27  Both contacts are against the bright limb of Saturn
24 Nov 11  2 49 10   GrSaturn      0.9  0.9   70+ 114     42 ** GRAZE: CA-17.7N; Dist.317km in az. 321deg. [Lat = 29.29+0.74(E.Long+80.32)]
24 Nov 11  3  5 43.1 D    3375 F2  6.8  6.6   70+ 114     44 226  80S  76  35  97 -5.3 +2.9 +2.0+0.0 .393  -28.0     23  0 19.9 - 8 52 50 363.8 785.0
24 Nov 11  3  7  6.0 R Saturn      0.9  0.9   70+ 114     44 227 -53N 284 242 305 -5.3 +2.9 +3.1-1.7 .255  124.8     22 58 12.9 - 8 52 27 363.8 788.0
   Saturn ring contacts offset by ±79.5 secs, at  3  5 46 and  3  8 25
   Saturn limb contacts offset by ±35.4 secs, at  3  6 31 and  3  7 41  Both contacts are against the bright limb of Saturn
24 Nov 11 23 55 55.6 D    3505WG8  5.5  5.0   79+ 126     52 133  62N  37  78  59 -3.4 +1.7 +1.2+2.0 .428   11.5     23 47 56.5 - 2 45 42 359.8 761.6
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -196sec
24 Nov 12  2  1  5.2 d Neptune     7.8  7.8   80+ 127     62 188  57S  98  91 120 -3.7 +1.4 +3.7-0.6 .257  -52.7     23 50 57.8 - 2 24 44 358.9 737.1
   Neptune limb contacts offset by ±4.9 secs, at  2  1  0.4 and  2  1 10.1  Both contacts are against the bright limb of Neptune
24 Nov 14  2 17 29.8 D     241 G5  6.8  6.4   95+ 155     69 126  27N  10  58  29 -0.2 -2.1 +0.3+3.1 .345   39.5      1 37 40.9  12  4 42 354.3 769.1
24 Nov 15  5 33 31.5 d     397MB9  7.5  7.5   99+ 170     73 251  74S 107  42 123 +1.4 -4.1 +3.1-1.6 .282  -47.2      2 41  6.6  18 48  1 354.5 713.3
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +12sec : AC 7.7 9.5 66" 242.2, dT = -166sec
       397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 13.2"; to 3km sunlit peak = 4.0"
24 Nov 16  6 52 35.0 d     537SB6  3.7  3.8s 100- 173     70 271 -51S  76 355  88 +3.2 -5.4 +2.3+0.2 .399   -5.7      3 44 52.5  24  6 48 357.0 694.7
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.37sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+94sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  7 41 25.6 d     541SB8  3.9  3.9s 100- 173     59 276 -89N  38 317  50 +3.1 -5.5 +2.0+2.0 .336   36.4      3 45 49.6  24 22  4 357.6 724.1
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +277sec : AB 3.8 13.7 113"  72.8, dT = +277sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  8  1 32.1 d     545SB6  4.1  4.2v 100- 173     55 276  19S 149  69 160 +3.0 -5.5 +1.4-8.1 .126  -72.8      3 46 19.6  23 56 54 357.9 742.5
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +1.9sec : AB 4.2 14.4 110" 180.2, dT = +743sec : AC 4.2 12.9 147" 336.0, dT = -1158sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 0.7"; to 3km sunlit peak = 0.0"
24 Nov 16  8 12 56.2 R     537SB6  3.7  3.8s 100- 173     52 277  60N 251 172 263 +3.0 -5.5 +1.8+0.1 .433 -174.5      3 44 52.5  24  6 48 358.1 755.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.31sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+66sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 5.2"; to 3km sunlit peak = 0.0"
24 Nov 16  8 13 52   Gr    545SB6  4.1  4.2v 100- 173     50 ** GRAZE: CA 36.1S; Dist. 81km in az. 186deg. [Lat = 24.88-0.09(E.Long+80.32)]
   Distance of 545 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Nov 16  8 24 13.5 D     552SB7  2.9  2.9s 100- 173     50 278 -15S 115  37 127 +3.0 -5.5 +1.5-2.1 .346  -38.1      3 47 29.1  24  6 18 358.3 764.8
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = 0.00sec : AE 2.8 15.0 78" 232.4, dT = -103sec : AB 2.8 6.3 118"
291.1, dT = -339sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 25 34.3 R     545SB6  4.1  4.2v 100- 173     49 278  54S 184 106 196 +3.0 -5.5 +2.5+7.5 .131 -107.2      3 46 19.6  23 56 54 358.3 767.6
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = -0.7sec : AB 4.2 14.4 110" 180.2, dT = -842sec : AC 4.2 12.9 147" 336.0, dT = +993sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 4.6"; to 3km sunlit peak = 0.0"
24 Nov 16  8 41 36.3 r     541SB8  3.9  3.9s 100- 173     46 280  16N 295 217 307 +3.0 -5.5 +1.2-2.0 .363  143.4      3 45 49.6  24 22  4 358.6 787.1
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +231sec : AB 3.8 13.7 113"  72.8, dT = +232sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 0.6"; to 3km sunlit peak = 0.0"
24 Nov 16  9 20 22.5 r     549SA0  6.3  6.3  100- 173     37 282  86N 227 151 238 +2.9 -5.5 +1.5+1.0 .400 -146.3      3 47 21.0  24  6 59 359.4 838.5
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -11sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = -37sec : BC 6.3 8.2 86" 345.0, dT =
+103sec
   Distance of 549 to Terminator = 7.7"; to 3km sunlit peak = 0.6"
24 Nov 16  9 22 24.4 R     552SB7  2.9  2.9s 100- 173     37 282  89S 223 147 234 +2.9 -5.5 +1.5+1.2 .381 -142.1      3 47 29.1  24  6 18 359.5 841.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.08sec : AE 2.8 15.0 78" 232.4, dT = -203sec : AB 2.8 6.3 118"
291.1, dT = -112sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  9 41  3   Gr    560SB8  3.6  3.7s 100- 173     32 ** GRAZE: CA 37.4S; Dist. 49km in az.  17deg. [Lat = 26.07-0.28(E.Long+80.32)]
   Distance of 560 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 16  9 41 19   M     560SB8  3.6  3.7s 100- 173     33 283  38S 171  97 183 +2.9 -5.5 +9.9+9.9 .000  -90.0      3 49  9.7  24  3 12 359.9 867.9
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7 : Aa,Ab 3.8 6.8 0.22" 336.1 : AC 3.6 15.0 50"  36.4 : AH 3.6 16.0 68" 221.7
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Nov 16 10  5 51.1 R     561SB7  5.1  5.1V 100- 172     28 285  80S 215 142 226 +2.9 -5.5 +1.4+1.5 .350 -132.4      3 49 11.2  24  8 12 360.4 907.5
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.5sec : AF 5.0 14.5 4.7" 221.0, dT = -13sec : AE 5.1 14.8 96"  76.8, dT = +204sec : AD 5.1
14.7 144"  65.9, dT = +351sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 8.0"; to 3km sunlit peak = 0.8"
24 Nov 17 11 10 38.8 r   76841cK1  7.3  6.7   97- 159  -7 28 289  69S 231 156 236 +4.4 -6.2 +1.3+0.7 .388 -138.3      4 55 34.6  27 12  9 364.6 918.7
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.18sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 20  9 57 57.6 R    1206 G8  5.9  5.3   76- 121     82 271  71N 298 211 287 +7.2 -6.1 +2.2-1.5 .345  176.9      8  0 55.9  25 23 34 378.2 633.7
   R1206 = omega Cancri
24 Nov 20 10 35 10.5 R    1211SA1  6.3  6.3   75- 121     74 272  62S 251 167 240 +7.1 -6.0 +3.4+0.8 .252 -134.7      8  1 43.8  25  5 22 378.6 659.0
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +128sec : AC 6.3 11.6 106" 295.0, dT = -303sec
24 Nov 21  8 59 45.9 r   80499 K0  8.2  7.6   66- 109     73  99  78N 297  10 281 +7.4 -5.4 +2.5-1.0 .330 -179.7      8 54 32.2  21 49 13 384.1 615.3
24 Nov 23  7 37 34.1 r   99157pF2  7.4        47-  86     31  91  71S 273 340 253 +6.3 -3.3 +1.2+0.9 .360 -155.3     10 29 25.6  12 11 13 396.1 760.2
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.25sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 40 58.2 R  119114 F2  7.2  7.0   28-  64     10  94  84S 288 352 266 +3.9 -0.7 +0.3+0.3 .447 -167.2     11 55 23.9   1  5 45 403.4 897.0
24 Nov 25  9 17 39.1 R  119138 K0  7.4  6.9   28-  64     31 105  48N 335  36 314 +3.6 -0.5 +0.6-1.9 .345  151.2     11 58 13.0   0 52  9 401.4 766.1
24 Nov 25 10 21 26.3 R    1730wK2  6.2  5.5   28-  63     44 117  79N 304 358 282 +3.4 -0.4 +1.5-0.7 .358 -173.1     11 59  3.3   0 31 50 400.3 700.9
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +26sec
24 Nov 26 10 56  5.1 R  138921KG5  8.1  7.7   20-  52 -12 39 122  56N 326  17 305 +2.0 +1.1 +0.9-1.5 .359  165.5     12 41 59.6 - 5 13 15 401.3 721.8
24 Nov 27 10 35 48.6 R  157912kF0  7.8  7.6   13-  42     25 117  63S 263 318 243 +0.7 +2.4 +1.7+1.5 .290 -134.6     13 23 56.5 -10 52 15 402.2 806.6
24 Nov 27 10 53 25.9 D    1925SB1  1.0  1.1v  13-  42     28 120 -12S 187 240 167 +0.7 +2.4 -0.9-3.9 .214  -58.0     13 25 11.6 -11  9 41 401.9 786.5
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -648sec : AC 1.0 10.5 368"  60.8, dT = -
1025sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 11 16 32   Gr   1925SB1  1.0  1.1v  13-  41  -6 35 ** GRAZE: CA 21.3S; Dist.268km in az. 216deg. [Lat = 22.64-0.64(E.Long+80.32)]
24 Nov 27 11 34 50.2 R    1925SB1  1.0  1.1v  12-  41  -3 35 127  54S 253 300 233 +0.6 +2.5 +3.2+2.4 .201 -122.0     13 25 11.6 -11  9 41 401.1 737.9
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +582sec : AC 1.0 10.5 368"  60.8, dT =
+1786sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11  5 41.8 d    2029 M1  4.9  4.1v   7-  31 -10 19 120 -53S 141 196 123 -0.6 +3.7 +0.3-0.9 .416  -15.2 .01 14 10 50.5 -16 18  7 401.4 839.9
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 16 49.2 r    2029 M1  4.9  4.1v   7-  30   5 32 132  80N 294 339 276 -0.8 +3.8 +1.4-0.2 .372 -164.9 .01 14 10 50.5 -16 18  7 400.0 746.7
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
```

Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Dec  3 23 28  1.7 D    2765 A3  7.9  7.8    7+  32     12 231  50N  53   0  59 -5.9 +7.0 +0.3+0.3 .433   16.9      19  0  0.2 -28  3  3 386.2 848.3
24 Dec  4 21 54 46.1 d    2910cG3  4.7  4.3   13+  43   6 34 205  63S 111  86 122 -5.6 +6.7 +3.4-1.6 .249  -47.7      19 55 50.4 -26 17 58 380.8 682.8
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 22 48 55.8 r    2910cG3  4.7  4.3   14+  43  -5 27 217 -20S 194 157 205 -5.8 +6.6 -0.2+2.1 .269 -132.0      19 55 50.4 -26 17 58 381.3 744.1
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 23  9 59   m  188749 G1  8.1  7.8   14+  43  -9 25 221  22S 152 111 163 -5.8 +6.6 +9.9+9.9 .000  -90.0      19 57 15.5 -26 13  3 381.6 770.8
24 Dec  4 23 10  7   Gr 188749 G1  8.1  7.8   14+  43  -9 23 ** GRAZE: CA 21.7S; Dist. 46km in az. 320deg. [Lat = 26.15+0.75(E.Long+80.32)]
24 Dec  5  0 42 52.8 d  188809 F5  8.7  8.4   14+  44     10 235  75S  99  43 110 -6.0 +6.4 +1.1-1.2 .398  -35.4      20  0 36.8 -25 42 10 382.9 907.1
24 Dec  5 23 36 36.1 d  189831 K0  8.5  7.9   22+  56     32 219  89N  76  38  91 -5.7 +5.8 +1.7-0.2 .391  -19.8      20 54 50.6 -22  6  6 377.5 761.1
24 Dec  5 23 54 11.5 d  189843 K2  8.3  7.7   22+  56     29 222  72S  96  55 111 -5.7 +5.7 +2.2-1.0 .330  -39.4      20 55 18.7 -22  7 25 377.7 782.1
24 Dec  6  1 10 38   gr   3062 K2  7.5  6.8   22+  56     16 235  19S 148  95 163 -5.8 +5.6 +9.9+9.9 .000  -90.0      20 56 52.7 -22  0 21 378.8 887.2
24 Dec  6  1 10 39   Gr   3062 K2  7.5  6.8   22+  56     15 ** GRAZE: CA 18.8S; Dist.  3km in az. 327deg. [Lat = 25.64+0.59(E.Long+80.32)]
24 Dec  6 22 47 14.8 d  164653DB9  7.7  7.7v  31+  68  -4 46 195  77N  59  46  78 -5.0 +4.8 +2.0+0.8 .379   -8.3      21 47 36.4 -17 17 41 373.1 692.7
    164653 is double: AB 7.7 11.4 4.5" 207.2, dT = -10sec
    164653 is a close double. Observations are highly desired
    164653 = AP Cap, 7.6 to 7.65, V, Type ACV, Period 2.6733 days, Phase  23%
24 Dec  7  0 41 41.3 D    3197 K3  6.4  5.6   32+  69     34 226  87N  69  26  87 -5.4 +4.5 +1.5+0.1 .419  -16.7      21 50 13.0 -16 50 42 373.9 792.7
24 Dec  7 23 31 12   m  165228 K3  7.9  7.1   42+  81     52 195  21S 137 124 158 -4.5 +3.4 +9.9+9.9 .000  -90.0      22 40 20.7 -11 36 19 369.3 708.8
24 Dec  8 23 32 25   m  146747 K0  8.0  7.5   54+  94     60 176  21S 136 139 157 -3.6 +1.8 +9.9+9.9 .000  -90.0      23 30 57.4 - 5  3 39 365.9 711.3
24 Dec  9  1 29 59.8 D    3472PF5  6.9  6.7   54+  95     51 225  44S 113  73 134 -4.0 +1.5 +4.5-3.0 .177  -65.4      23 33 28.6 - 4 24  5 366.2 755.1
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.5sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 47 18.9 d  146789kF2  7.2  7.0   55+  95     37 243  81S  75  21  97 -4.1 +1.3 +1.5-0.2 .420  -24.4      23 35 14.7 - 3 51 14 367.2 820.7
24 Dec 10  1 27  9.8 d      47 F0  7.7  7.5   66+ 108     63 214  62N  38   8  60 -2.9 -0.1 +1.4+1.7 .409    8.4       0 23 38.5   2 44 35 362.9 727.2
24 Dec 10 23 44 22.9 d  109738 G5  7.8  7.1   76+ 121     63 123  83N  62 112  82 -1.3 -1.5 +1.8+1.5 .423  -13.6       1 13 41.8   8 58 29 361.0 762.5
24 Dec 11  2  6 59.5 d     186pF2  7.3        76+ 122     70 219  25N   4 328  25 -1.7 -1.9 +0.3+3.5 .289   45.3       1 15 46.7   9 47  5 360.5 718.0
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.22sec
       186 is a close double. Observations are highly desired
24 Dec 12 23 43  9.3 d     452 A2  7.7  7.6   93+ 148     45  85  63N  52 127  67 +1.7 -4.3 +0.7+1.8 .499    5.1       3  5 30.3  20 54  9 361.0 877.5
24 Dec 13  2 42 11.4 d   75768 K0  7.6  7.1   93+ 149     84 128  39S 131 181 146 +1.4 -4.8 +6.1-5.5 .121  -72.5       3 10 14.5  21 16 19 359.2 701.9
24 Dec 13  2 53 31.9 d   75764SF0  7.6        93+ 149     86 147  33N  24  56  39 +1.3 -4.8 +1.2+3.0 .326   35.3       3 10  6.6  21 44 49 359.2 696.8
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +0.7sec : AB,C 7.6 13.5 48"  44.0, dT = +139sec : AB,D 7.6 15.8 55" 159.0, dT = -118sec
     75764 is a close double. Observations are highly desired
24 Dec 13  3 30 47.5 d     461cK0  7.2  6.7   93+ 150     83 242  15N   6 307  20 +1.2 -4.8 +0.6+4.7 .223   55.6       3 10 39.9  21 53 34 359.2 686.3
   Distance of 461 to Terminator = 10.3"; to 3km sunlit peak = 1.5"
24 Dec 15  4 55 57.4 d     797cB9  6.4  6.3e 100+ 175     87  42  54N 116 253 120 +4.2 -6.4 +2.8-1.5 .303  -34.9       5 20 59.3  27 57 26 363.5 650.6
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  24%
   Distance of 797 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Dec 16  8 48 12.4 r     996cA2  6.9  6.8   99- 167     55 283  60N 283 197 279 +4.8 -6.4 +1.5-1.2 .419 -177.8       6 30 22.0  28 12 44 369.2 751.1
       996 is double:  7.6 7.6
   Distance of 996 to Terminator = 18.9"; to 3km sunlit peak = 7.9"
24 Dec 16 10  0 47.6 r   78480cK5  7.5  6.7   99- 166     40 286  63S 227 148 223 +4.6 -6.3 +2.6+1.5 .242 -120.7       6 33  2.1  27 49 31 370.6 853.4
     78480 is double: ** 8.3 8.3 0.10"  63.0, dT = +0.4sec
     78480 has been reported as non-instantaneous (OCc 720). Observations are highly desired
24 Dec 16 11  3  8.6 R    1008 A0  5.3  5.3s  98- 166     27 290  39N 306 232 302 +4.6 -6.2 +0.0-1.7 .498  160.2       6 35 12.1  28  1 20 372.0 955.8
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Occultation prediction for Bill Sadowski Park, Miami, Florida, USA
E. Longitude - 80 19 13.9, Latitude 25 36 30.9, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 11.6"; to 3km sunlit peak = 2.9"
24 Dec 18  2 19 44.6 r    1251 B9  5.9  5.9   90- 144     15  70  56N 312  21 299 +7.1 -5.6 +0.8-0.6 .418  144.8      8 20 32.1  24  1 20 381.4 946.9
   R1251 = lambda Cancri
24 Dec 18  4 21  8.4 r   80165 F2  7.5  7.3   90- 143     41  80  33N 335  51 322 +6.9 -5.6 +2.0-2.9 .243  126.3      8 24 55.2  23 56 43 379.4 753.5
24 Dec 19  5 57 46.2 r   98510kG5  7.2  6.8   83- 131     50  90  37S 232 305 215 +6.7 -4.7 +2.2+4.7 .175 -118.3      9 20 37.9  19  5 26 384.4 688.4
24 Dec 22  9 23 10.7 R    1696 F5  6.9  6.7   55-  95     57 131  87N 296 339 274 +3.7 -0.5 +2.2-0.7 .324 -162.0     11 42 25.5   2 21 44 396.7 655.0
24 Dec 24  7 33 39.0 r  139140 K0  7.9  7.3   36-  74     14 107  74S 276 337 255 +1.4 +2.0 +0.7+0.7 .392 -151.1     13  4 47.0 - 8 34 16 403.0 874.6
24 Dec 24 10  1  1.2 R    1886cK3  5.6  5.0   36-  73     42 132  41N 340  23 320 +1.0 +2.3 +0.5-2.1 .320  152.5     13  8 32.5 - 8 59  4 400.2 700.7
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.1sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 24 11 23  3.6 R    1887 K0  6.3  5.8   35-  73  -9 52 157  71S 273 293 252 +0.7 +2.5 +3.4+0.3 .244 -137.4     13  9 14.2 - 9 32 17 399.4 643.1
24 Dec 25 10 23  4.1 R  158207 F0  7.4  7.2   27-  62     35 133  48S 247 291 228 -0.3 +3.6 +4.0+3.1 .167 -116.5     13 52 15.4 -14 40 36 400.0 727.7
24 Dec 25 11 33 28.1 r    1992cF0  7.5     S  27-  62  -7 45 150  57N 321 349 302 -0.6 +3.7 +1.3-1.4 .338  170.9     13 53 51.7 -14 39 51 399.1 662.0
      1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.8sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
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Lunar Occultation predictions
Fox Observatory
Broward
Florida
USA

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 53 29.2 R    1770 A5  5.9  5.8   56-  97     63 181  61N 322 321 301 -3.2 -1.4 +1.6-2.1 .327  173.9     12 18 40.3 - 0 47 14 397.2 632.7
   R1770 = 13 Virginis
24 Jan  4  8 40 19.3 r    1865 A2  7.3  7.2   47-  87     38 122  80S 282 332 261 -3.8 -0.3 +1.8+0.3 .335 -151.4     12 59  0.2 - 6  5 27 396.4 734.2
24 Jan  5  8 37  0.3 r    1966kK2  7.8  7.1   38-  76     26 119  23N 358  51 339 -4.8 +1.1 -0.4-2.9 .272  130.0     13 44 15.6 -11 26 12 393.6 807.4
24 Jan  5 10 39 36   M    1971SG8  5.5        37-  75     46 147  22S 223 252 203 -5.1 +1.3 +9.9+9.9 .000  -90.0     13 45 56.3 -12 25 36 391.4 685.1
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1 : AC 5.7 11.9 27.4" 162.6
      1971 is a close double. Observations are highly desired
24 Jan  7 10 46 29.4 R    2204kK0  7.7  7.1   19-  52     26 135  85S 277 321 264 -6.0 +4.1 +1.6+0.6 .383 -153.8     15 24 57.6 -22  2 37 382.6 791.8
24 Jan  7 10 52 35.1 R X 39461pK0  7.5  7.0   19-  52     27 136  61N 310 353 298 -6.0 +4.1 +0.9-0.6 .419  172.6     15 25 22.6 -21 55 45 382.5 783.9
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +11sec : AC 7.9 13.5 40" 190.5, dT = +47sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 10 43  3.8 R    2349SB1  2.9     v  11-  39     14 128  69N 296 347 287 -5.9 +5.3 +0.6+0.1 .477 -179.6     16 21 11.3 -25 35 34 378.0 875.0
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -0.03sec : AB 2.9 8.4 20.3" 273.1, dT = -39sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 25 46.3 D    2366dM1  1.1  0.1v  11-  38  25 37 176 -75S 108 113 100 -6.4 +5.7 +2.4-0.5 .352    2.9 .12 16 29 24.5 -26 25 55 374.8 640.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 57 10.9 R    2366dM1  1.1  0.1v  10-  38  37 34 201  75N 287 267 280 -6.8 +5.8 +2.5-0.9 .351  176.8 .12 16 29 24.5 -26 25 55 374.7 639.5
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 10 53 31.2 r  185324kA0  8.7  8.5    5-  27      4 124  79N 274 332 272 -5.2 +6.2 +0.6+0.7 .508 -166.5     17 22 16.8 -28  0  8 373.5 947.0
24 Jan  9 11 22 47.3 R    2505 K4  5.3  4.5    5-  27 -11  9 128  87S 261 315 258 -5.3 +6.3 +1.1+1.1 .442 -152.7     17 23 21.6 -28  8 34 372.8 899.4
   R2505 = 43 Ophiuchi
24 Jan 13 23 50 46.0 d  164823 G0  8.6  8.2    8+  34     18 240  43S 123  68 142 -0.3 +5.4 +2.5-3.7 .213  -66.9     22  1 50.2 -16 46 39 360.5 948.4
24 Jan 14  0 59 28.6 d    3232 K0  8.1  7.4    9+  34      5 249  80N  66   4  85 -0.3 +5.3 +0.2-0.1 .592   -7.0     22  4 12.2 -16  9 46 362.01047.5
24 Jan 14 23 36 17.3 d    3365kA0  8.2  8.1   16+  47 -10 35 235  76N  56   8  78 +1.4 +4.3 +1.1+0.5 .483   -5.1     22 56 49.4 -10 15 47 360.3 847.9
24 Jan 15  2  0  1.0 d    3377 K0  7.9  7.4   17+  48      6 256  84N  64   2  86 +1.3 +4.0 +0.2+0.0 .584   -6.4     23  1  7.9 - 9 33 14 363.51035.7
24 Jan 16  1  8 39   gr 146936 K5  7.9  7.2   26+  62     30 249  15S 143  86 165 +2.7 +2.6 +9.9+9.9 .000  -90.0     23 51 28.9 - 3 24 14 363.5 869.4
24 Jan 16  1  8 39   Gr 146936 K5  7.9  7.2   26+  62     29 ** GRAZE: CA 14.6S; Dist.  2km in az. 337deg. [Lat = 26.15+0.38(E.Long+80.36)]
24 Jan 16  2  1 46   M    3514cG9  5.9  5.4   27+  62     19 256  12S 146  85 168 +2.7 +2.5 +9.9+9.9 .000  -90.0     23 52 55.6 - 3  9 20 364.8 936.2
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9
      3514 is a close double. Observations are highly desired
24 Jan 16  2  1 56   Gr   3514cG9  5.9  5.4   27+  62     18 ** GRAZE: CA 11.5S; Dist. 49km in az. 345deg. [Lat = 26.59+0.24(E.Long+80.36)]
24 Jan 17  0 18 55.3 d  109370 K2  8.2  7.5   37+  75     54 237  67N  45 356  66 +4.0 +1.1 +1.4+1.3 .421    5.2      0 41 21.3   3 35 58 365.0 747.6
24 Jan 17 23 58 16.7 d  109947 K0  7.8  7.2   48+  88     70 220  82N  61  25  81 +5.0 -0.5 +2.1+1.0 .382  -11.0      1 31 53.2   9 59 18 368.0 694.2
24 Jan 18  2 38  1.8 d     232 K0  8.1  7.4   49+  89     39 263  84S  74   9  94 +4.6 -0.8 +1.4-0.2 .424  -15.0      1 35 33.4  10 33 42 370.5 789.3
24 Jan 19  3 11 12.4 d     363 F0  7.2  7.0   60+ 102     44 268  55N  37 327  54 +5.1 -2.3 +1.5+1.6 .362   27.8      2 27 32.1  16 38 37 374.2 743.0
24 Jan 20  3 27 44   D     486CB5  5.3     e  70+ 114     53 271  16S 150  76 164 +5.3 -3.7 +9.9+9.9 .065  -80.0      3 21 13.6  21  8 49 377.7 689.3
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6, dT = +7sec
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  3 35 18   Gr    486CB5  5.3     e  70+ 114     50 ** GRAZE: CA  5.8S; Dist. 28km in az. 180deg. [Lat = 25.88+0.01(E.Long+80.36)]
24 Jan 23  6 48 31.0 d   78191 A0  7.7  7.7   94+ 151     47 284  76S 115  34 112 +4.4 -6.2 +1.0-1.8 .385  -12.3      6 17 59.9  28  0 24 389.5 743.4
24 Jan 24  5 33 32.5 d X 99111S    7.2  7.0s  98+ 162     74 278  63S 139  49 132 +4.2 -6.5 +1.7-3.0 .274  -32.4      7 12 49.0  27 13 30 390.9 615.1
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.5sec : BC 7.3 12.7 14.0"  68.0, dT = +16sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  5 33 32.5 D    1093SF8  6.6     s  98+ 162     74 278  63S 139  49 132 +4.2 -6.5 +1.7-3.0 .274  -32.4      7 12 49.0  27 13 30 390.9 615.1
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.5sec : AC 7.2 12.8 13.7"  74.4, dT = +21sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  9 22 48.0 d    1108cG8  7.0  6.5   98+ 163     25 289  85N 109  36 101 +3.6 -6.2 +0.2-1.4 .480    1.3      7 19 30.8  26 49 23 394.7 920.1
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.2sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 48 36.8 D    1206 G8  5.9  5.3   99+ 171     32  75  89S 137 211 126 +4.6 -6.4 +1.7-1.2 .300  -43.3      8  0 55.9  25 23 34 395.8 790.0
   R1206 = omega Cancri
24 Jan 28  2 44  4.0 r   99149 A2  7.1  7.0   94- 153     24  86  89N 286 353 265 +1.4 -4.6 +0.8+0.3 .409 -172.0     10 28 42.4  13 17 20 402.6 805.4
24 Jan 28  7 20  7.2 r   99185pA3  7.9  7.7   94- 152     76 171  79S 275 283 254 +0.4 -4.3 +3.4-0.2 .254 -142.5     10 34  7.3  12 22 28 399.1 619.9
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.06sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 22  7.9 R    1625SK3  5.8  5.2   89- 142     21  91  25N 355  60 333 +0.0 -3.5 +0.6-3.6 .232  123.5     11 14  1.8   8  3 39 403.5 822.3
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.04sec : AB 5.8 11.8 23.8" 260.1, dT = +9sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29 10 31 24   Gr   1644 B9  4.1  4.1   88- 140     50 ** GRAZE: CA 21.5S; Dist. 59km in az.  49deg. [Lat = 26.94-1.03(E.Long+80.36)]
24 Jan 29 10 33 11   M    1644 B9  4.1  4.1   88- 140     51 246  22S 222 167 201 -1.6 -2.7 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 400.8 702.1
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6 10 55.6 R    1732cK0  6.8  6.1v  82- 130     45 117  59N 323  16 301 -1.8 -2.0 +1.2-1.5 .348  167.6     11 59 23.9   1 49 36 400.8 693.4
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.28sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 11 57.6 r    1824pG0  7.8  7.5   74- 119     46 128  41N 342  27 320 -3.3 -0.5 +0.6-2.3 .314  151.4     12 42 59.3 - 4  2 58 399.3 693.1
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -3sec
      1824 is a close double. Observations are highly desired
24 Jan 31 10 12 42.5 r  138955 K2  7.2  6.5   74- 118     57 201  61N 322 303 300 -4.0 -0.1 +1.6-2.1 .325  173.4     12 45 32.0 - 4 48 39 398.2 632.8
24 Feb  2 11 43 36.6 r    2040cK0  8.0  7.3   55-  95  -5 46 199  81N 298 280 280 -6.5 +2.9 +2.4-1.3 .321 -170.7     14 15 50.2 -16  4 53 392.1 618.3
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.28sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4  8 16  5.0 R    2270 B2  5.4  5.4e  36-  73     13 125  15N 356  50 345 -6.9 +4.9 -1.1-2.8 .253  122.5     15 53 55.9 -23 58 41 385.5 879.3
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4  8 32  3   Gr    2269cB5  5.4  5.4   35-  73     16 ** GRAZE: CA 18.4S; Dist. 90km in az.  35deg. [Lat = 27.13-0.64(E.Long+80.36)]
24 Feb  4  8 32 11   M    2269cB5  5.4  5.4   35-  73     15 128  19S 209 261 198 -6.9 +5.0 +9.9+9.9 .000  -90.0     15 53 53.9 -24 31 59 385.1 856.1
24 Feb  4 11 56 39.3 R    2286kB5  5.4  5.5v  35-  72  -2 39 172  72N 298 306 287 -7.5 +5.4 +2.3-0.7 .341  179.2     15 58 34.9 -24 49 53 382.0 631.3
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  5 10 35 19.7 r  184783 G6  7.9  7.4   25-  60     24 141  38S 222 261 216 -7.1 +6.2 +4.9+4.9 .136 -109.3     16 54 49.6 -27 44 55 377.5 756.7
24 Feb  5 10 36  5.7 r  184777pA0  8.4  8.4   25-  60     24 141  83S 266 306 261 -7.1 +6.2 +1.9+0.9 .371 -154.2     16 54 27.0 -27 34  9 377.5 755.1
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.47sec
    184777 is a close double. Observations are highly desired
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Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb  6 11 29 52.0 R    2586cB3  6.0  6.0   16-  47  -8 22 141  36N 318 359 319 -6.5 +7.0 +0.7-0.8 .340  144.1     17 58 39.0 -28 45 33 371.2 756.0
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.7sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb  7 10 52 47.4 r X163280MG1  8.3  8.0    9-  34      6 126  33S 198 254 205 -5.4 +7.2 +4.2+6.9 .120 -103.8     19  2 32.1 -28 38 41 367.3 896.0
   X163280 is triple: AB 9.0 9.3 2.2"  52.6, dT = +15sec : AC 9.0 8.9 241" 265.0, dT = -796sec
   X163280 is a close double. Observations are highly desired
24 Feb 11 23 42 50.2 d  146719KF8  8.1  7.8    6+  28  -8 20 253  60N  41 342  63 +1.3 +3.1 +0.4+0.8 .538   13.8     23 28 17.0 - 5 49  4 357.3 959.6
24 Feb 13  0 57 40.1 d  109178 K0  8.9  8.3   13+  42     18 263  85S  73  10  95 +3.0 +1.3 +0.6-0.3 .529  -14.5      0 23 55.0   1 32 19 360.6 955.4
24 Feb 13  1  8 28.7 D  109182 G0  7.8  7.4   13+  42     16 264  77S  80  17 102 +3.0 +1.3 +0.5-0.5 .516  -21.4      0 24 17.3   1 33 22 360.9 970.6
24 Feb 13  1 53 59.6 D      50dG5  5.8  5.3S  13+  43      6 269  61N  39 335  61 +3.0 +1.2 +0.2+0.8 .546   22.3      0 25 24.2   1 56 23 362.01037.4
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14 23 41 58.8 d     309 F0  8.2  8.0V  32+  69  -7 62 252  64N  44 342  62 +5.8 -2.0 +1.7+1.5 .387   12.7      2  6 41.6  14 35  2 366.1 704.1
       309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  1 57 54.4 d   92820 K2  8.2  7.6   33+  70     33 272  71N  50 342  69 +5.5 -2.1 +1.1+0.7 .446   15.3      2 10 15.7  15  1 23 368.8 826.5
24 Feb 15  2 17 20.2 d   92821 K0  8.1  7.3   33+  70     28 274  48N  27 319  46 +5.4 -2.2 +1.0+1.8 .368   39.5      2 10 29.4  15  9  5 369.3 853.0
24 Feb 15  3 24 54.2 D     326cM0  5.7  4.9s  33+  70     14 281  73N  53 347  71 +5.4 -2.2 +0.5+0.4 .507   17.0      2 13  3.3  15 16 48 371.0 955.0
   R326 = 19 Arietis
       326 is double: ** 6.8 6.8 0.050"
       326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
       326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 26 21.2 d   75708 K0  8.0  7.1   43+  82     52 270  52N  36 322  51 +6.2 -3.6 +1.8+1.9 .331   32.0      3  3  9.6  20 20 10 372.5 705.5
24 Feb 16  4 45 34.0 d     459SK2  6.4  5.8   45+  84     10 289  49N  33 327  47 +5.9 -3.6 +0.7+1.3 .379   45.3      3  9 20.1  20 45 40 377.3 986.2
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -290sec : AB 6.5 8.8 122" 239.0, dT = -290sec
       459 is a close double. Observations are highly desired
24 Feb 17  0 36 40.3 D     587 K0  6.2  5.5   54+  95     76 268  29N  18 297  29 +6.8 -4.8 +1.7+4.3 .214   51.1      3 57 26.4  24 27 43 376.7 623.2
24 Feb 17  0 51  4.9 D   76358kB9  7.2  7.2   54+  95     73 268  42S 127  47 137 +6.7 -4.8 +3.3-3.8 .189  -56.6      3 58 20.9  24  4 52 376.8 626.8
24 Feb 18  0 44 41.3 d   76841cK1  7.3  6.7   65+ 107     86 290  57N  52 304  58 +6.8 -5.7 +2.5+2.0 .294   23.9      4 55 34.6  27 12  9 381.6 596.2
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.24sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 36 51.4 D     746WB7  7.0  6.9   65+ 108     49 283  54N  50 329  55 +6.2 -5.7 +2.3+1.2 .293   39.5      4 59 53.7  27 19 32 383.7 706.8
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -64sec
24 Feb 18 23 20 54   M     885wG7  5.6  5.1   74+ 118  -2 63  79  14S 168 255 168 +6.9 -6.3 +9.9+9.9 .000  -90.0      5 50 58.1  27 58  4 386.6 649.7
       885 is double: AB 5.7 12.5 10.9" 233.1
24 Feb 19  4 56  0.4 D   77818 K5  6.7  5.8   75+ 120     44 285  62S 121  41 120 +5.7 -6.3 +0.8-2.0 .373  -20.5      6  0  4.9  28  7 33 388.8 750.3
24 Feb 21  2 59 48.1 D    1181cG8  7.0        90+ 142     88  84  74N  91 186  81 +5.0 -6.6 +3.0+0.0 .289   17.3      7 49 47.7  26 15 50 393.6 577.4
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.44sec
      1181 is a close double. Observations are highly desired
24 Feb 22  0 32 32.4 d    1290pF8  6.9  6.6   94+ 153     44  81  28N  52 128  38 +4.7 -6.3 +1.2+3.6 .227   50.7      8 38 45.5  23 41  9 397.8 691.1
      1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +1214sec
24 Feb 27  6 10 55.6 r    1790 M4  6.9  6.0v  93- 150     56 145  32N 350  21 328 -2.3 -0.7 +0.5-2.9 .278  145.5     12 29  9.7 - 2 25 46 400.1 655.3
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 27  9.5 r    1890 K0  7.3  6.8   88- 140     28 115  40N 343  38 322 -3.2 +0.5 +0.2-2.0 .335  145.6     13  9 46.3 - 7 39 19 401.0 790.9
24 Feb 29  8 46 47.2 R    2002 K0  6.8  6.3   80- 127     50 180  51N 331 331 312 -5.3 +2.5 +1.4-2.1 .307  160.7     13 58 29.8 -14  7 19 396.2 625.5
24 Mar  2 10 47 52.8 d    2237cK3  5.0  4.3s  62- 104     40 188 -68N  82  74  70 -7.4 +5.2 +3.3+0.2 .262   34.9 .01 15 40 16.9 -23 49  5 388.7 601.2
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Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.3sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12  9 24.8 r    2237cK3  5.0  4.3s  62- 104   5 34 210  49N 325 295 313 -7.7 +5.3 +2.2-2.4 .268  145.0 .01 15 40 16.9 -23 49  5 389.0 618.5
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.17sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  6 59 11.4 D    2366dM1  1.1  0.1v  53-  93     11 127 -83N  92 146  84 -7.1 +5.8 +1.0+0.8 .426   23.0 .10 16 29 24.5 -26 25 55 387.3 869.9
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8  4  3.6 R    2366dM1  1.1  0.1v  53-  93     22 137  50N 319   3 312 -7.2 +6.0 +0.5-0.8 .379  156.8 .12 16 29 24.5 -26 25 55 385.9 770.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9  0 20.7 R    2373 K1  6.1  5.5   52-  93     29 147  22N 347  20 339 -7.4 +6.1 -0.1-2.4 .235  128.8     16 31 22.8 -26 32 16 384.9 699.8
24 Mar  5  9 33 28.8 R    2688 G6  7.0  6.6s  31-  68     16 135  66S 240 287 243 -7.0 +7.4 +2.0+1.9 .340 -141.4     18 32 14.0 -29 11 25 374.3 789.5
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 21 36.8 r  188343 K0  8.4  7.8   21-  54     15 131  69N 277 326 286 -6.1 +7.5 +1.1+0.6 .445  171.3     19 36 57.4 -27 30  4 368.2 803.5
24 Mar  7 10 46 27.9 R  189555 G1  7.2  6.9   12-  41     11 124  67N 271 326 286 -4.8 +7.1 +0.9+0.8 .478  168.3     20 40 22.3 -24  7  5 363.2 859.8
24 Mar  8 11 40 11.0 r    3175 G8  4.7  4.3    5-  27   0 13 119  36N 295 351 313 -3.0 +6.3 +0.7+0.1 .363  135.8     21 42 39.5 -18 51 59 358.6 881.3
   R3175 = kappa Capricorni
24 Mar 13  0 48 21.8 d   92623 K5  8.9  8.4   10+  36     18 275  83N  61 354  80 +4.0 -1.6 +0.6+0.1 .539    5.4      1 46 38.7  12 24 42 362.0 950.1
24 Mar 14 23 57 48.8 D     521kA2  6.7  6.7v  27+  63  -7 56 274  53N  38 320  50 +6.4 -4.6 +2.0+1.9 .320   34.6      3 36 58.0  23 12 40 369.7 697.7
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 18  1 15 20.8 d   78530cB9  7.8  7.8   59+ 100     76 283  53S 132  36 128 +6.7 -6.7 +2.1-2.7 .272  -31.6      6 35 40.3  28 15 51 386.7 599.4
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = -0.02sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 33 43.9 D    1022CB7  6.0     s  59+ 101     47 285  81N  85   4  81 +6.2 -6.6 +1.6-0.7 .371   20.7      6 39 33.1  28 15 47 388.7 747.7
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +1.4sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 33 45.5 d X 91013C    7.8  7.8s  59+ 101     47 285  81N  85   4  81 +6.2 -6.6 +1.6-0.7 .371   20.7      6 39 33.2  28 15 48 388.7 747.7
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -1.4sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 34  3.8 D    1026SG5  6.5  5.9   60+ 101     34 288  69N  74 358  69 +6.1 -6.5 +1.3-0.3 .373   32.9      6 41 20.9  28 11 48 390.0 841.1
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +75sec : AC 6.6 12.8 58"  61.3, dT = +151sec
24 Mar 19  1  1 56.7 D   79479 K1  7.2  6.6   68+ 112     88  45  77N  88 223  79 +6.2 -6.8 +3.0+0.1 .289   17.9      7 32 12.9  27  7 31 391.0 575.4
24 Mar 19  3 47 52.8 D    1149SK5  4.1  3.3s  69+ 112     55 280  54N  65 343  56 +5.6 -6.6 +2.9+0.6 .244   49.1 .03  7 35 55.4  26 53 45 392.6 708.4
   R1149 = upsilon Geminorum
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.16sec : AB 4.1 13.2 57"  39.0, dT = +209sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 38 47.0 r    1149SK5  4.1  3.3s  69+ 113     44 283 -28N 343 265 334 +5.5 -6.5 -0.5-3.6 .267  130.8 .02  7 35 55.4  26 53 45 393.6 781.2
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = -0.01sec : AB 4.1 13.2 57"  39.0, dT = -120sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2  3 18   D    1263DF0  6.9  6.8S  77+ 123     88 222  27N  44   3  31 +5.2 -6.5 +6.7+7.5 .091   72.6      8 26 39.8  24 32  3 394.7 587.2
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +61sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  2  4 21   d   80185SF0  7.7  7.4   77+ 123     88 227  26N  43 357  30 +5.2 -6.5 +7.1+8.2 .085   73.9      8 26 40.1  24 32  7 394.7 587.6
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.9sec : BC,A 7.5 6.9 5.6" 231.8, dT = -65sec
     80185 is a close double. Observations are highly desired
24 Mar 20  3 22 21.5 D    1270cF0  6.1  5.9v  78+ 124     71 269  74N  91  12  78 +4.9 -6.3 +2.8-0.6 .291   29.3      8 28 36.8  24  8 42 395.2 638.7
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 31 29.8 D    1479 F2  6.4  6.2   91+ 146     80 185  75N 101  97  82 +2.8 -4.9 +3.0-0.7 .277   29.1     10  5 40.9  15 45 27 399.2 614.7
24 Mar 22  5 40  4.4 d    1485 G0  7.1  6.8   92+ 146     58 257  71S 135  70 115 +2.3 -4.6 +1.2-2.2 .361   -4.3     10  7 39.3  15  9 27 400.1 702.3
24 Mar 23  3  1 38.6 D    1576 A2  5.3  5.3   96+ 157     68 132  58S 151 194 130 +1.7 -3.9 +1.4-2.5 .302  -19.9     10 49 15.4  10 32 43 400.3 623.7
   R1576 = 53 Leonis
24 Mar 27  5 23 10.3 r  158105PF5  7.5  7.2   96- 158     47 150  38N 347  14 327 -3.6 +1.9 +0.4-2.4 .291  146.6     13 42 35.7 -12  5 13 397.6 673.0
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  7  0 50.3 r  184209KK0  7.7  7.2   78- 124     30 148  82S 275 307 266 -6.3 +5.9 +2.2+0.5 .336 -156.5     16 11 51.3 -25 53  1 389.4 692.8
24 Apr  2 10 36  7   Gr   2813 K2  7.7  7.1   46-  86  -9 33 ** GRAZE: CA  1.5S; Dist. 54km in az. 184deg. [Lat = 25.65-0.07(E.Long+80.36)]
24 Apr  2 10 44 53   r    2813 K2  7.7  7.1   46-  86  -7 33 162  12S 184 203 192 -6.9 +7.6 +2.8+9.1 .067 -101.1 .01 19 16 48.8 -28 40  2 374.1 632.6
24 Apr  4  9 39 13.9 R  190165 K0  7.2  6.7   25-  60     14 123  50S 209 263 226 -4.8 +6.8 +1.5+2.7 .333 -135.1     21 15  3.2 -21 48 55 366.1 833.5
24 Apr  4 10 24 51.2 r  190177 F3  8.2  8.0   25-  60 -11 22 129  62N 277 325 294 -4.8 +6.8 +1.4+0.6 .393  153.9     21 15 52.6 -21 26 23 365.1 774.9
24 Apr  6 16 18 19.1 r    3421cM3  4.9  4.1v   7-  30  65 55 198  71N 261 245 283 -2.2 +3.6 +2.6+0.2 .366  145.9 .01 23 16 50.9 - 7 43 35 354.6 759.3
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16  4 45.1 D Venus      -3.8 -3.8    2-  16  63 63 166 -70N  41  53  63 -0.1 +2.0 +1.6+1.9 .395    2.7      0 12 29.6 - 0 16 40 353.2 677.5
   Venus contacts: Dark limb 16  4 32; Terminator 16  4 33; Bright limb 16  4 58: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17 30  6.7 R Venus      -3.8 -3.8    2-  15  71 60 212  75S 231 198 248 -0.3 +1.7 +1.7+1.4 .400  177.9      0 12 29.6 - 0 16 40 353.3 686.1
   Venus contacts: Dark limb 17 29 54; Terminator 17 30  4.4; Bright limb 17 30 20: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 13 21.8 D     472cA1  4.9  4.9    7+  31     10 289  44S 115  49 129 +4.5 -4.0 -0.3-1.7 .459  -36.7      3 14 54.1  21  2 40 367.11018.4
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.21sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 32 15.1 D   75819 F2  7.9  7.7    7+  31      6 291  63S  96  32 110 +4.5 -4.0 -0.2-1.0 .562  -17.5      3 15 46.1  21  9 55 367.61050.4
24 Apr 14  3 42  6.5 d   78233SA3  7.5        33+  70     18 293  39N  39 330  37 +6.1 -6.4 +1.7+1.5 .235   63.4      6 19 59.0  28 25 36 384.8 981.8
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.26sec : AB,C 7.5 9.6 2.9" 265.3, dT = -9sec : BA 8.7 9.3 58" 268.1, dT = -162sec
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
     78233 is a close double. Observations are highly desired
24 Apr 15  0 45 58.3 d   79180 F2  8.1  7.8   42+  81     67 280  58N  64 336  57 +6.3 -6.8 +3.3+1.0 .244   45.3      7 13  6.6  27 46 57 385.9 650.3
24 Apr 15  3 38  1.7 d   79256 K0  7.8  7.3   43+  82     30 288  69S 117  43 110 +5.9 -6.5 +0.3-1.6 .467   -6.8      7 17 59.4  27  8 31 389.2 888.0
24 Apr 15  3 49  9.9 d   79264 G2  8.0  7.7   43+  82     28 289  78N  85  12  77 +5.9 -6.5 +0.7-0.8 .432   25.7      7 18 28.9  27 15 10 389.5 906.5
24 Apr 15  4 43 55.5 d    1108cG8  7.0  6.5   43+  82     16 292  18S 169 100 161 +5.8 -6.4 -1.4-3.3 .266  -59.7      7 19 30.8  26 49 23 390.9 998.9
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.07sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Apr 16  0 34  9.8 d    1229SF5  8.1  7.9   52+  92 -11 81 269  48N  60 336  49 +5.9 -6.6 +4.3+2.3 .182   55.3      8  8 20.1  25 33 10 390.4 606.5
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.48sec : AB 8.2 12.8 3.1" 302.7, dT = -8sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 17  2 42 18.0 d    1348 G5  8.1  7.6   62+ 104     62 267  87S 111  37  95 +4.6 -5.9 +1.9-1.6 .346   14.0      9  2 45.2  21 31  9 395.2 684.5
24 Apr 19  1 13 49.5 d   99185pA3  7.9  7.7   79+ 126     72 136  52S 152 192 131 +2.8 -4.2 +1.5-2.6 .296  -21.0     10 34  7.3  12 22 28 399.0 613.9
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.6sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5  9  5.6 D    1644 B9  4.1  4.1   87+ 138     51 245  45S 160 105 138 +0.7 -2.5 +0.6-2.9 .321  -27.2     11 21  8.2   6  1 46 400.7 702.0
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 17 55.2 r    1644 B9  4.1  4.1   88+ 139     36 258 -77S 282 220 260 +0.4 -2.4 +1.4-1.4 .353 -152.9     11 21  8.2   6  1 46 401.8 773.6
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 22 29.2 d    1732cK0  6.8  6.1v  92+ 148  -8 40 112  39N  64 121  42 +0.5 -1.8 +3.4+4.0 .159   64.6     11 59 23.9   1 49 36 401.1 721.5
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.27sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4 11 22   d  138955 K2  7.2  6.5   97+ 160     59 183  33N  55  53  34 -1.6 +0.1 +9.9+9.9 .052   80.9 .02 12 45 32.0 - 4 48 39 398.3 639.3
   Distance of 138955 to Terminator = 17.4"; to 3km sunlit peak = 6.5"
24 Apr 22  4 18  2   Gr 138955 K2  7.2  6.5   97+ 160     59 ** GRAZE: CA 23.4N; Dist. 24km in az.  51deg. [Lat = 26.48-1.12(E.Long+80.36)]
   Distance of 138955 to Terminator = 11.9"; to 3km sunlit peak = 2.9"
24 Apr 26  4 19 49.2 R    2269cB5  5.4  5.4   95- 154     27 140  69N 311 351 301 -4.9 +5.4 +0.9-0.6 .387  169.0     15 53 53.9 -24 31 59 390.4 747.4
24 May 11  1 23  3.9 D     885wG7  5.6  5.1   10+  38     19 293  52S 121  51 121 +5.2 -6.2 -0.2-1.6 .498  -21.8      5 50 58.1  27 58  4 378.3 983.9
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -8sec
24 May 11  1 33 20.6 d   77638 B8  8.2  8.1   10+  38     17 294  84S  89  20  90 +5.2 -6.1 +0.2-0.8 .538    9.7      5 51 33.0  28  5 32 378.61001.7
24 May 11  1 49 49.2 d   77639 K0  8.3  7.7   10+  38     13 295  25S 148  81 149 +5.2 -6.1 -0.9-2.5 .364  -49.6      5 51 40.2  27 50 31 379.01031.1
24 May 12  3 33 28.6 d    1056 B9  7.2  7.3   18+  51      4 298  26S 156  93 150 +5.4 -6.2 -1.1-2.3 .373  -51.2      6 55 56.2  27 17  9 386.01113.7
24 May 12 16 56 21.3 d    1149SK5  4.1  3.3s  24+  59  81 28  72  55N  62 135  53 +6.9 -6.6 +0.2+1.9 .397   28.2 .02  7 35 55.4  26 53 45 386.5 843.8
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.1sec : AB 4.1 13.2 57"  39.0, dT = +132sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 18  0 18.9 r    1149SK5  4.1  3.3s  25+  60  77 42  76 -67N 300  18 290 +6.7 -6.6 +1.8-0.4 .351  152.1 .02  7 35 55.4  26 53 45 385.5 741.5
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.07sec : AB 4.1 13.2 57"  39.0, dT = +26sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 14  3 34  2.3 d    1317 A2  8.2  8.1   36+  74     24 284  84S 110  40  95 +4.5 -5.7 +0.3-1.4 .485    8.6      8 46 28.9  22 21  8 394.0 936.6
24 May 15  2  1  4.7 d   98640 K0  8.0  7.5   46+  85     53 267  61N  79   8  61 +3.9 -5.1 +2.7-0.3 .255   48.3      9 33 38.6  18 44 12 395.1 735.4
24 May 15  2 41 49.4 d   98646 K2  8.2  7.3v  46+  85     44 271  79S 119  48 101 +3.8 -5.0 +1.0-1.8 .406    7.1      9 34 26.7  18 24 22 395.8 785.5
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 16  0 50 58.7 d   99052 G0  8.2  7.8   55+  96 -11 74 224  55S 146 106 126 +3.1 -4.3 +1.4-2.6 .321  -13.9     10 18 26.1  13 56  1 396.6 636.8
24 May 17  1 35 57.1 d  118637 F5  8.1  7.9   65+ 107     69 217  53N  77  44  55 +1.8 -3.1 +4.8+0.7 .173   58.6     11  3 43.5   8 43 48 398.4 642.2
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Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 May 18  1 37 54.3 d  119033PK0  8.1  7.6v  74+ 118     66 189  38S 166 158 144 +0.6 -1.8 +0.7-3.0 .286  -29.3     11 45 42.3   2 49 17 398.8 633.4
    119033 is double: AB 6.3      11.9" 186.0, dT = +39sec
    119033 = EPIC 201650346, 8.55, range 0.04, 0Kp, Type VAR, Period 11.495508 days
24 May 18  4 54 24.3 d  119068 F5  7.8  7.5   74+ 119     35 253  76N 100  40  78 -0.2 -1.4 +1.5-1.4 .341   29.0     11 49 46.8   2 13 55 400.9 758.7
24 May 18  6  3 50.2 D    1712SF8  3.6  3.3   75+ 120     20 262  46S 158  95 136 -0.4 -1.3 +0.3-2.6 .360  -33.9     11 50 41.7   1 45 53 402.4 846.0
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -583sec : AC 3.7 9.6 406"  78.5, dT = +210sec
24 May 19  0 33  5.1 d  138796cG5  8.0  7.6   81+ 129  -7 54 140  61N  85 120  63 -0.4 -0.6 +3.7+1.1 .218   50.5     12 27 46.4 - 2 23  7 398.6 662.4
    138796 is double: ** 9.2 9.2 0.10"  90.0, dT = +0.46sec
    138796 has been reported as non-instantaneous (OCc 140). Observations are highly desired
24 May 21  3 41  3   m    2002 K0  6.8  6.3   94+ 152     50 186  25N  41  35  22 -3.3 +2.7 +9.9+9.9 .000   90.0     13 58 29.8 -14  7 19 394.1 630.3
24 May 22  6  8 26.9 d    2115 A6  7.2  7.1   98+ 164     36 215  64S 121  88 105 -4.6 +4.2 +2.2-1.6 .335   -3.8     14 49 27.7 -19 54 13 391.6 637.0
24 May 23  5 16 13.0 D    2237cK3  5.0  4.3s 100+ 174     40 185  69S  78  73  66 -4.8 +5.4 +3.4+0.4 .255   38.6 .01 15 40 16.9 -23 49  5 387.9 614.2
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.3sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 4.4"; to 3km sunlit peak = 0.0"
24 May 24  1 13 13.3 D    2366dM1  1.1  0.1v 100- 172      6 124 -60N 104 160  95 -4.3 +5.9 +0.5+0.5 .478   10.8 .09 16 29 24.5 -26 25 55 388.2 916.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 18 58.0 R    2366dM1  1.1  0.1v  99- 172     18 133  84S 306 354 299 -4.5 +6.0 +0.6-0.3 .425  169.1 .10 16 29 24.5 -26 25 55 386.8 812.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 9.8"; to 3km sunlit peak = 1.9"
24 May 24  3 17 49.7 r    2373 K1  6.1  5.5   99- 171     27 143  72N 329   6 322 -4.6 +6.1 +0.5-1.3 .324  145.9     16 31 22.8 -26 32 16 385.8 732.1
   Distance of 2373 to Terminator = 9.8"; to 3km sunlit peak = 1.9"
24 May 28  7  3 20.9 r    3012 A7  6.9  6.8   76- 121     28 140  83S 251 290 265 -3.7 +7.0 +2.0+1.3 .387 -177.4     20 38  4.9 -24 13 44 372.6 699.6
24 May 28  7 57 27   Gr   3018 G8  6.4  6.0   76- 121     36 ** GRAZE: CA  8.9N; Dist.139km in az. 163deg. [Lat = 24.82+0.28(E.Long+80.36)]
24 May 28  7 58 59   M    3018 G8  6.4  6.0   76- 121     35 152   9N 339   7 354 -3.8 +6.9 +9.9+9.9 .000   90.0     20 40 11.8 -23 46 26 371.8 663.0
24 May 28  8 27 28.3 r  189555 G1  7.2  6.9   75- 121     37 160  68S 236 256 250 -3.9 +6.9 +2.2+1.4 .355 -168.5     20 40 22.3 -24  7  5 371.6 652.5
24 May 29  7  4 31.5 d    3164SB3  4.5  4.6v  65- 108     22 127 -82S  81 130  99 -2.8 +6.2 +1.5+1.1 .417  -12.5     21 37  4.8 -19 27 58 370.7 768.8
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +13sec : AB 4.5 10.1 66"  45.9, dT = +130sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 21  8.3 R    3164SB3  4.5  4.6v  65- 108     35 142  68S 230 266 249 -3.0 +6.1 +1.9+1.7 .381 -167.7     21 37  4.8 -19 27 58 369.4 698.2
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -69sec : AB 4.5 10.1 66"  45.9, dT = +173sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 54 25.8 r  164528 B8  7.5  7.5   65- 107     39 150  81N 262 290 280 -3.1 +6.1 +2.4+0.8 .355  158.6     21 37 37.7 -19 13 52 369.0 682.1
24 May 29 11 37 25.4 r    3175 G8  4.7  4.3   64- 107  13 43 200   4S 166 147 184 -3.6 +5.8 -1.9+4.7 .159 -113.4     21 42 39.5 -18 51 59 368.4 717.0
   R3175 = kappa Capricorni
   Distance of 3175 to Terminator = 18.3"; to 3km sunlit peak = 0.0"
24 May 30  9  3 48.6 r  165149wG0  7.7  7.4   54-  94     38 136  64S 222 262 243 -2.1 +4.9 +1.5+2.0 .396 -165.6     22 32  9.4 -13 35 52 367.1 727.9
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +65sec
24 Jun  1  9  7 52.7 r      27DA5  8.2  8.0   31-  68     29 106  68S 224 284 246 +0.1 +1.9 +0.7+2.0 .483 -169.3      0 14 50.2 - 0 18 11 365.3 870.3
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
        27 is a close double. Observations are highly desired
24 Jun  2  9 39 43.2 r  109680 K5  8.7  7.9   20-  54 -11 29  97  70S 228 292 248 +1.2 +0.2 +0.5+1.8 .514 -173.4      1  6 43.7   6 40  0 365.0 916.5
24 Jun  4  9 25 17.9 r   93167 A5  9.1  8.8    6-  27      9  73  56S 224 289 239 +3.5 -2.9 -0.4+1.6 .590 -161.1      2 53 46.8  18 38  3 369.11115.8
24 Jun  9  2  2 10.7 D    1131 A2  7.3  7.3    7+  31      6 296  31S 150  86 142 +4.5 -6.0 -0.9-2.0 .437  -41.7      7 28  0.9  26 13 39 387.21099.8
24 Jun 10  0 16 53.9 d    1251 B9  5.9  5.9   13+  42  -2 38 281  75S 113  38 100 +4.4 -5.9 +0.7-1.5 .446    5.3      8 20 32.1  24  1 20 388.2 843.6
   R1251 = lambda Cancri
24 Jun 10  1  2 29.2 d   80129 F2  8.4  8.2   13+  43 -11 29 284  67N  75   3  62 +4.3 -5.8 +1.1-0.5 .360   42.0      8 21 57.6  24  1 26 389.3 914.1
24 Jun 10  2  1 37.1 d   80146 A2  8.0  7.9   14+  43     16 289  46S 143  75 130 +4.2 -5.7 -0.4-1.9 .471  -27.8      8 23 31.3  23 32  4 390.81008.7
24 Jun 10  2 40 28.6 d   80173 K0  8.3  7.8   14+  44      8 292  90S  99  34  86 +4.2 -5.6 -0.2-1.0 .546   14.4      8 25 21.5  23 32 58 391.71070.8
24 Jun 12  0 35 31.7 d   98897 K0  7.6  7.0   29+  66  -5 52 262  67N  86  19  67 +3.0 -4.3 +2.5-0.7 .279   43.3     10  1 20.7  15 40 14 395.0 735.2
24 Jun 12  1 15 21.3 d   98907 F8  8.5  8.3   29+  66     44 267  78S 121  53 102 +2.9 -4.2 +1.0-1.8 .404    6.8     10  2  3.1  15 21 38 395.7 781.4
24 Jun 15  3 25 42.8 d    1760pK0  7.5  7.0   58+ 100     34 249  49N  72  15  50 -1.1 -0.3 +2.3-0.2 .218   55.3     12 15  0.0 - 1 19 36 400.3 741.6
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +160sec
24 Jun 17  1 20 56.7 d    1957kG5  7.7  7.2   76+ 121     52 181  57N  77  76  57 -2.9 +2.2 +4.6+0.9 .183   56.1     13 39 17.8 -12  5 32 395.3 630.3
24 Jun 17  3 22 50.3 d  158085kK0  7.3  6.6   76+ 122     41 221  56S 144 106 124 -3.4 +2.5 +1.6-2.3 .321  -17.6     13 40 59.7 -12 46 59 395.9 645.9
24 Jun 19  2 34 45.6 D    2183 K2  5.5  4.8   91+ 144     41 176  27S 163 167 149 -4.7 +4.9 +1.0-2.5 .252  -40.9     15 16 23.0 -22 23 58 388.5 626.9
24 Jun 24  6 32 16.5 r    2965 G2  7.2  6.9   94- 151     37 163  75S 252 268 265 -3.5 +7.0 +2.4+0.9 .367  177.7     20 19 45.2 -25 13 43 369.1 656.9
24 Jun 25  7 40  1.6 r  190252 F2  7.2  7.0   87- 137     42 165  27S 194 209 211 -2.5 +6.1 +1.1+2.7 .268 -134.8     21 21  3.2 -20 49 16 366.6 677.3
24 Jun 26  6 52 30.3 r  164948kF2  7.2  7.0   78- 124     36 135  64N 278 319 298 -1.2 +5.1 +2.3+0.5 .320  140.8     22 14 37.2 -15  6  6 366.0 734.0
24 Jun 26  8 30  2.9 r    3271 F5  7.2  6.9   78- 124     48 162  47N 295 311 315 -1.5 +4.9 +4.4-1.3 .185  117.9     22 16 56.3 -14 39 25 365.0 698.8
24 Jun 28  7 45 36.5 r    3528 F0  7.5  7.3v  56-  97     37 114  72N 264 320 286 +1.0 +2.1 +1.6+1.1 .391  148.3     23 59 35.0 - 1 51  0 365.7 816.1
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jul  2  9 41 28   m   76001 K0  8.2  7.6   14-  44 -11 29  77  18N 332  43 344 +4.5 -4.2 +9.9+9.9 .000   90.0      3 34 30.3  22 45 34 372.5 960.2
24 Jul  2 17 12 59.5 D     552SB7  2.9  2.9s  12-  41  85 52 277 -26N  18 300  29 +3.4 -5.0 +2.2+4.1 .208   58.4      3 47 29.1  24  6 18 371.3 715.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.15sec : AE 2.8 15.0 78" 232.4, dT = -310sec : AB 2.8 6.3 118"
291.1, dT = +32sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 24  3.5 r     545SB6  4.1  4.2v  12-  41  86 49 277  64N 288 210 299 +3.3 -5.0 +1.6-1.7 .347  149.2      3 46 19.6  23 56 54 371.5 729.1
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.9sec : AB 4.2 14.4 110" 180.2, dT = +95sec : AC 4.2 12.9 147" 336.0, dT = -282sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 32 26   Gr    552SB7  2.9  2.9s  12-  41  84 47 ** GRAZE: CA  4.4N; Dist.247km in az.   8deg. [Lat = 28.38-0.13(E.Long+80.36)]
24 Jul  2 17 49 27.4 d     560SB8  3.6  3.7s  12-  41  83 44 279 -64N  56 340  68 +3.3 -5.0 +1.7+0.6 .388   22.3      3 49  9.7  24  3 12 372.0 756.5
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = +0.1sec : AC 3.6 15.0 50"  36.5, dT = +121sec : AH
3.6 16.0 68" 221.6, dT = -171sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 17 52 21.5 R     552SB7  2.9  2.9s  12-  41  83 43 280  35N 317 241 329 +3.3 -5.0 +0.8-4.3 .221  121.5      3 47 29.1  24  6 18 372.0 762.5
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.05sec : AE 2.8 15.0 78" 232.4, dT = -32sec : AB 2.8 6.3 118"
291.1, dT = -479sec
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 55 23.2 R     560SB8  3.6  3.7s  12-  41  69 30 284  68N 284 211 295 +3.2 -5.0 +0.6-1.4 .435  157.4      3 49  9.7  24  3 12 373.4 853.4
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.02sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.31sec : AC 3.6 15.0 50"  36.5, dT = +43sec :
AH 3.6 16.0 68" 221.6, dT = -72sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 10  1  9  9.0 d   99162S    8.7  8.2   16+  47 -11 25 271  45S 155  88 134 +1.9 -3.1 +0.0-2.4 .394  -29.9     10 30 25.7  11 37 51 398.7 878.7
     99162 is triple: AB 8.8 12.8 14.6"  84.4, dT = +12sec : AC 8.8 11.0 47" 202.9, dT = +80sec
24 Jul 11  1 52 53.8 d    1628 K0  7.1  6.5   24+  58     22 266  12S 190 126 169 +0.6 -1.9 -0.8-4.3 .182  -65.7     11 14 32.5   5 59 34 401.0 860.2
24 Jul 11 20  4 21.0 d    1712SF8  3.6  3.3   31+  68  54 54 129  -3S 206 250 184 +0.6 -1.3 -3.1-8.3 .105  -72.1 .01 11 50 41.7   1 45 53 399.0 660.9
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = +522sec : AC 3.7 9.6 406"  78.5, dT = -2342sec
24 Jul 11 20 20  2   Gr   1712SF8  3.6  3.3   31+  68  50 59 ** GRAZE: CA-21.4S; Dist. 86km in az. 221deg. [Lat = 25.11-0.77(E.Long+80.36)]
24 Jul 11 20 32 29.9 r    1712SF8  3.6  3.3   31+  68  48 59 138 -40S 243 279 221 +0.5 -1.2 +7.0+5.1 .103 -107.9 .01 11 50 41.7   1 45 53 398.8 647.0
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = -2376sec : AC 3.7 9.6 406"  78.5, dT = +3801sec
24 Jul 12  2 47  5.0 D    1730wK2  6.2  5.5   33+  70     16 262  32N  55 352  33 -0.8 -0.5 +1.3+1.0 .168   67.5     11 59  3.3   0 31 50 402.5 856.7
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -46sec
24 Jul 14  2 44 17.0 d  157912kF0  7.8  7.6   51+  91     27 241  87N 109  56  88 -3.4 +2.3 +1.5-1.6 .360   12.7     13 23 56.5 -10 52 15 399.4 714.9
24 Jul 14  3 48 12.3 D    1925SB1  1.0  1.1v  52+  92     15 249  69S 133  74 113 -3.6 +2.3 +0.9-2.1 .393  -15.9     13 25 11.6 -11  9 41 400.7 794.7
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -66sec : AC 1.0 10.5 368"  60.8, dT =
+289sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  2 10 40.5 d  158363 B9  7.3  7.3   61+ 102     37 221  21S 179 140 160 -4.4 +3.6 +0.8-4.0 .183  -56.6     14  7 13.8 -16 11 26 395.9 639.8
24 Jul 15  4  8 13.4 D    2029 M1  4.9  4.1v  61+ 103     16 242  80N  99  43  81 -4.8 +3.7 +1.1-1.3 .382   13.6 .01 14 10 50.5 -16 18  7 397.6 758.2
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  0 45  5.1 d    2251KK0  7.5  7.0   79+ 125  -7 38 168  32S 158 170 146 -5.5 +5.7 +1.0-2.1 .262  -38.9     15 45 49.8 -24 43  1 387.4 632.2
24 Jul 18  1 50 47.1 D    2405SA2  6.6     s  87+ 137     36 172  66N  68  76  61 -5.9 +6.6 +3.3+1.1 .254   40.7     16 44 17.4 -27 27 22 382.2 621.3
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +7sec : AC 6.6 14.0 24.3" 195.9, dT = -59sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5 10  5.0 D    2910cG3  4.7  4.3  100+ 174     38 177  67S  40  43  50 -4.5 +7.1 +1.9+1.6 .319   30.5     19 55 50.4 -26 17 58 366.8 659.7
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Jul 24  3 43 11.6 r    3339 M0  6.7  5.8v  90- 142     18 112  43N 299 357 320 +0.1 +4.1 +1.0-0.2 .275  123.3     22 46 14.2 -11  9 59 363.0 882.2
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  8 19  7.9 R    3355KF8  6.7  6.5   89- 141     54 186  58N 283 277 304 -0.4 +3.6 +3.9-0.9 .242  125.1     22 52 46.5 -10  3 32 359.8 733.1
24 Jul 25 10 15 56.0 R    3505WG8  5.5  5.0   80- 126  -7 55 217  89S 247 214 269 +0.8 +1.7 +2.0+0.5 .407  160.2     23 47 56.5 - 2 45 42 360.5 755.5
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -376sec
24 Jul 27  8 25 38.1 r   92457cK5  8.2        58- 100     57 112  78N 261 319 281 +3.7 -1.4 +2.1+1.0 .376  148.3      1 29  5.5  10 25 56 364.5 780.5
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.2sec
     92457 is a close double. Observations are highly desired
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 27 10 23 20.3 R     222 G5  7.0  6.5   58-  99  -5 75 172  82S 241 248 261 +3.4 -1.7 +2.1+1.3 .393  167.5      1 31 42.7  10 53 22 363.9 710.7
24 Jul 28  7 57 43.6 r     347 K0  7.9  7.4   47-  87     42  91  61S 222 291 239 +4.8 -2.8 +0.5+2.0 .471 -167.7      2 21 50.3  16  9 45 368.4 861.0
24 Jul 29  7  4  4.5 R     472cA1  4.9  4.9   36-  74     21  76  78S 244 313 258 +5.6 -4.0 +0.1+1.4 .556  177.7      3 14 54.1  21  2 40 373.51007.9
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.15sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 29 58.5 r   75819 F2  7.9  7.7   36-  74     27  78  79S 245 316 259 +5.5 -4.0 +0.3+1.4 .533  175.1      3 15 46.1  21  9 55 373.0 967.3
24 Jul 31  9 37  4.4 r     786 K5  9.1  8.3   16-  48     32  72  76N 284 359 287 +6.3 -6.0 +1.1+0.4 .412  147.8      5 16 52.5  27 43  3 379.8 895.9
24 Aug  1  8 58  8.6 r     952 K2  8.0  7.2   10-  36     12  65  13S 201 268 199 +6.4 -6.2 -1.4+3.2 .282 -120.7      6 15 54.8  27 51 42 385.21029.7
24 Aug  1  9 19 18.9 r   78154 A0  8.5  8.4    9-  36     16  66  84N 285 354 283 +6.4 -6.3 +0.4+0.4 .483  155.2      6 16  3.2  28 12  6 384.8 992.0
24 Aug  1 10  1 11.0 R   78191 A0  7.7  7.7    9-  35 -10 25  69  33S 222 295 220 +6.4 -6.3 -0.4+2.3 .391 -142.4      6 17 59.9  28  0 24 384.0 919.1
24 Aug  8  0 44 58.9 D    1696 F5  6.9  6.7   11+  39 -10 17 264  88N 110  47  89 -0.1 -0.8 +0.5-1.5 .433   12.8     11 42 25.5   2 21 44 402.9 868.4
24 Aug 10  2 17  3.8 D    1886cK3  5.6  5.0   26+  61      9 255  28N  51 350  31 -3.0 +2.1 +0.5+1.1 .180   65.3     13  8 32.5 - 8 59  4 403.7 845.2
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.43sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 11  2 29 53.4 d  158207 F0  7.4  7.2   35+  72     12 247  60S 142  83 123 -4.4 +3.4 +1.0-2.4 .357  -28.4     13 52 15.4 -14 40 36 401.7 791.4
24 Aug 16  2 25  7.5 d  186672 G5  7.4  6.9   83+ 131     35 186  36N  29  23  31 -6.9 +7.5 +2.1+2.6 .188   56.5     18 20 25.4 -29  3 59 375.6 619.9
24 Aug 17  2 49 53.9 D    2831kB2  6.0  6.1s  90+ 144     36 176  86N  70  73  77 -6.2 +7.4 +2.5+0.7 .356    6.1     19 24 30.2 -27 51 57 369.5 641.9
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 19  5 54  6.0 d  164449DF0  7.2        99+ 171     43 197  81S  51  35  68 -3.8 +5.6 +1.6+0.9 .425    3.0     21 31 25.5 -19 14 15 359.1 740.4
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -3sec
    164449 is a close double. Observations are highly desired
   Distance of 164449 to Terminator = 10.8"; to 3km sunlit peak = 2.5"
24 Aug 20  3 58 33   m    3288 K0  5.8  5.3  100- 173     42 142  46N 325   0 345 -1.7 +4.5 +9.9+9.9 .000   90.0     22 24 27.1 -13 31 46 356.9 748.4
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
24 Aug 21  2 41 26.3 r    3422kF0  6.7  6.5   97- 161     23 111  54N 290 347 311 +0.4 +3.1 +1.3+0.2 .318  128.4     23 16 59.2 - 7  9 39 357.7 887.6
24 Aug 22  7 45 29   M      35 K0  6.2  5.7   91- 144     66 186  21N 316 311 338 +1.7 +0.6 +9.9+9.9 .000   90.0      0 17 47.7   1 41 19 355.4 748.0
24 Aug 22  9  3 13.7 r  109142cG5  7.6  7.1   90- 144     58 224  44S 201 162 222 +1.5 +0.4 +0.8+2.2 .395 -152.9      0 19 57.1   1 34 57 355.9 765.5
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = -0.01sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 49 48.3 r  109738 G5  7.8  7.1   82- 130     64 233  81S 238 192 259 +3.1 -1.4 +1.9+1.0 .420  172.4      1 13 41.8   8 58 29 358.2 736.7
24 Aug 25  6 27  1.2 r     439cF0  7.3  7.1   62- 104     40  85  65S 228 301 243 +6.3 -4.0 +0.5+1.9 .493 -171.2      2 59 10.4  19 59 23 367.3 888.8
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.15sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25 10 30 20.8 r     452 A2  7.7  7.6   61- 102  -7 83 222  51S 215 175 229 +5.7 -4.5 +1.6+2.4 .342 -155.3      3  5 30.3  20 54  9 365.8 667.8
24 Aug 26  6 53 27.5 R     587 K0  6.2  5.5   51-  91     35  77  87N 261 335 272 +7.1 -5.1 +0.8+1.1 .477  161.8      3 57 26.4  24 27 43 372.6 907.7
24 Aug 26  8 12 31.0 r   76374kG0  8.3  8.0   50-  90     52  82  80S 249 328 259 +6.9 -5.3 +1.2+1.5 .437  173.0      3 59 54.8  24 41 44 371.5 792.7
24 Aug 27  6 19 44.1 r   76841cK1  7.3  6.7   40-  78     17  67  59N 296   5 302 +7.6 -5.8 +0.7+0.1 .395  135.0      4 55 34.6  27 12  9 379.01026.7
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.17sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 21 29.6 R     746WB7  7.0  6.9   39-  77     42  76  69S 245 323 250 +7.4 -6.1 +0.7+1.6 .450 -175.3      4 59 53.7  27 19 32 377.0 825.9
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -35sec
24 Aug 28  8  7 42.4 R   77818 K5  6.7  5.8   29-  65     27  70  18S 201 274 200 +7.6 -6.4 -1.0+3.5 .268 -123.4      6  0  4.9  28  7 33 382.9 905.2
24 Aug 28  9 54 19.5 R   77883 B2  7.6  7.6   28-  64     49  75  60N 303  25 302 +7.4 -6.6 +2.4-0.8 .287  136.0      6  2 59.4  28 40 37 381.3 737.2
24 Aug 28 10 11  6.4 r     917 K2  8.1  7.4S  28-  64 -11 53  77   8S 191 274 190 +7.4 -6.6 -1.1+7.0 .141 -111.3      6  4 16.2  28 18  3 381.1 714.9
       917 = NSV 2811, 8.4,
24 Aug 29  8 10 33.7 r   78917 M0  8.3  7.5   20-  53     16  67  63S 253 322 247 +7.5 -6.5 -0.1+1.3 .500 -167.8      6 58 11.0  27 38 13 388.3 963.0
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 29  9 26 22.8 r   78965 K0  9.0  8.4   20-  53     32  72  90S 280 355 274 +7.4 -6.6 +1.0+0.6 .430  166.0      7  0 51.9  27 48 16 386.9 831.9
24 Aug 31 10  9 24.7 r   80456kG5  9.5  8.9    6-  29     17  73  82N 301  10 286 +6.3 -5.6 +0.7-0.2 .432  159.0      8 51  9.7  22 13 35 395.6 888.3
24 Sep  8  0  7 26.2 d    2055 K0  7.8  7.2   20+  53  -8 22 236  26N  47 356  30 -4.6 +4.4 +1.6+1.8 .144   66.4     14 20 27.5 -17 31 42 401.3 703.1
24 Sep  9  0  6 23.3 d  183204pK2  8.0  7.3   28+  64  -8 27 224  61N  79  36  64 -5.7 +5.5 +2.0-0.5 .289   30.8     15  8 21.6 -22  5 51 398.1 649.5
    183204 is double: AB 8.2 14.1 2.0" 151.0, dT = +2.1sec
    183204 is a close double. Observations are highly desired
24 Sep  9 19 39 45.5 d    2268MB2  4.5        36+  74  50 29 144  64S 130 165 118 -5.6 +6.1 +1.1-0.6 .363   -9.0     15 53 36.7 -25 19 38 394.9 703.7
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Sep 10  2 29 15.8 D    2298kK3  5.0  4.3   38+  76      8 236  69N  81  26  71 -7.1 +6.4 +0.8-0.7 .397   14.0     16  3 20.6 -25 51 55 395.8 784.9
24 Sep 14  0 43 18.2 d  188724cF5  7.7  7.5   78+ 124     35 163  71N  56  72  66 -6.8 +7.3 +2.3+1.3 .342   17.8     19 55 52.2 -26 33  0 370.5 644.7
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.29sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  1 41 28   m    2910cG3  4.7  4.3   78+ 124     38 179  -6N 339 340 350 -7.0 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 370.1 645.9
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Sep 14  2 55 35.6 D    2914cG8  4.8  4.4   78+ 125     35 199  53N  38  19  48 -7.2 +7.1 +1.3+1.3 .341   27.0     19 58 57.2 -26 11 45 370.0 687.1
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 17  7 38  0.3 d    3375 F2  6.8  6.6   99+ 168     34 238  76S  70  20  91 -3.1 +3.0 +1.3+0.0 .479  -19.3     23  0 19.9 - 8 52 50 355.2 875.3
24 Sep 21  8 22 30.0 r     397MB9  7.5  7.5   85- 135     81 216  58S 218 184 234 +5.0 -4.1 +1.6+2.1 .382 -161.1      2 41  6.6  18 48  1 358.0 700.9
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +1.5sec : AC 7.7 9.5 66" 242.2, dT = -156sec
       397 is a close double. Observations are highly desired
24 Sep 21  8 22 31.6 r X  3591MB9  7.9  7.9   85- 135     81 216  58S 217 183 234 +5.0 -4.1 +1.6+2.1 .382 -160.9      2 41  6.8  18 47 59 358.0 700.9
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -1.5sec : BC 7.5 9.5 67" 243.0, dT = -159sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  6 10 19.9 R     521kA2  6.7  6.7v  76- 122     53  85  65S 230 307 242 +6.8 -5.0 +0.9+1.9 .454 -170.1      3 36 58.0  23 12 40 363.7 813.1
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9 54 17.0 D     537SB6  3.7  3.8s  75- 120     78 265 -77S  88   9 100 +6.2 -5.4 +2.6-0.2 .352  -20.2      3 44 52.5  24  6 48 363.5 661.3
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.49sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+156sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 40 10.5 D     541SB8  3.9  3.9s  75- 120  -8 68 271 -69N  54 333  65 +6.1 -5.5 +2.2+1.3 .364   17.7      3 45 49.6  24 22  4 364.0 674.5
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +294sec : AB 3.8 13.7 113"  72.8, dT = +294sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 10 40 18.0 d     539SB6  4.3  4.4s  75- 120  -8 68 272 -32N  17 296  29 +6.1 -5.5 +1.8+4.2 .222   54.6      3 45 12.5  24 28  2 364.0 674.9
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.11sec : AC 4.3 14.0 53"  53.5, dT = +191sec : AB 4.3 11.0 72"
328.8, dT = +219sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11  4  8   Gr    539SB6  4.3  4.4s  75- 120  -2 61 ** GRAZE: CA  1.7N; Dist.307km in az. 358deg. [Lat = 28.90+0.03(E.Long+80.36)]
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Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 539 to Terminator = 9.0"; to 3km sunlit peak = 0.0"
24 Sep 22 11 16 15.3 R     537SB6  3.7  3.8s  75- 120   1 59 274  69S 234 154 245 +6.0 -5.5 +2.0+1.1 .371 -159.9      3 44 52.5  24  6 48 364.5 699.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.24sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
1.1sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 21 59.3 r     536pB7  5.5  5.5   75- 120   2 58 275  74N 271 191 283 +6.0 -5.5 +2.0-0.7 .382  163.5      3 44 48.2  24 17 22 364.6 704.0
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -231sec : AC 5.4 11.5 218" 196.1, dT = -150sec
24 Sep 22 11 26 41.2 R     539SB6  4.3  4.4s  75- 120   3 57 276  35N 310 230 321 +6.0 -5.5 +1.9-3.7 .231  125.4      3 45 12.5  24 28  2 364.7 707.5
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.19sec : AC 4.3 14.0 53"  53.5, dT = +55sec : AB 4.3 11.0 72"
328.8, dT = -295sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11 51  6.0 D     552SB7  2.9  2.9s  75- 120   8 52 277 -17S 148  70 159 +5.9 -5.5 +1.2-7.6 .132  -71.2      3 47 29.1  24  6 18 365.1 729.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.12sec : AE 2.8 15.0 78" 232.4, dT = +55sec : AB 2.8 6.3 118"
291.1, dT = -712sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 11 57 22.1 R     541SB8  3.9  3.9s  75- 120  10 50 278  70N 275 197 286 +5.9 -5.5 +1.6-1.0 .396  162.0      3 45 49.6  24 22  4 365.2 737.5
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +265sec : AB 3.8 13.7 113"  72.8, dT = +265sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 12  4 51   Gr    552SB7  2.9  2.9s  75- 120  12 48 ** GRAZE: CA  2.3S; Dist. 97km in az. 188deg. [Lat = 25.25-0.13(E.Long+80.36)]
   Distance of 552 to Terminator = 11.8"; to 3km sunlit peak = 0.0"
24 Sep 22 12 17 29.8 R     552SB7  2.9  2.9s  75- 119  14 46 279  22S 187 110 198 +5.9 -5.5 +2.6+6.8 .138 -108.8      3 47 29.1  24  6 18 365.6 759.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.21sec : AE 2.8 15.0 78" 232.4, dT = -398sec : AB 2.8 6.3 118"
291.1, dT = +208sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 12 58 33   Gr    561SB7  5.1  5.1V  74- 119  23 37 ** GRAZE: CA  5.0S; Dist.185km in az.  15deg. [Lat = 27.86-0.24(E.Long+80.36)]
24 Sep 23  6 29 21.9 r X 70481p    7.3  7.2   66- 108     45  77  43N 308  28 315 +7.9 -6.0 +3.0-1.4 .221  118.5      4 38 29.6  26 56 26 370.0 829.1
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +18sec : AC 7.4 12.9 92" 203.7, dT = +104sec
   X 70481 is a close double. Observations are highly desired
24 Sep 23  6 29 26.1 R     701SF2  6.6  6.4   66- 108     45  77  43N 308  27 315 +7.9 -6.0 +3.0-1.4 .222  118.7      4 38 29.5  26 56 23 370.0 829.0
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +10sec : AB 7.36 7.21 4.47" 188.0, dT = +10sec
       701 is a close double. Observations are highly desired
24 Sep 24  7 26 26.2 r   77397 A2  8.1  8.0V  55-  95     45  75  87N 271 351 272 +8.4 -6.6 +1.4+0.8 .416  164.4      5 41 38.6  28 27 24 376.1 788.0
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 24 10 47 58.0 r   77551cB9  8.3  8.2   54-  94  -6 87  31  78S 256  44 257 +7.8 -6.8 +2.7+0.8 .329 -170.1      5 47 14.3  28 37 26 375.1 607.9
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -1.3sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 15 35.4 R    1022CB7  6.0     s  44-  83     18  67  72N 293   2 288 +8.6 -6.6 +0.6+0.2 .447  150.2      6 39 33.1  28 15 47 384.0 959.5
   R1022 = 54 Aurigae
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.36sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  6 39.2 R    1026SG5  6.5  5.9   44-  83     29  71  81S 266 340 262 +8.6 -6.6 +0.6+1.0 .468  177.2      6 41 20.9  28 11 48 383.1 870.6
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +53sec : AC 6.6 12.8 58"  61.4, dT = +112sec
24 Sep 25  8 10 48.4 r   78673 G5  8.3  7.7   44-  83     42  74  65N 301  20 296 +8.5 -6.7 +1.9-0.5 .333  143.7      6 43 38.2  28 24  6 382.2 767.3
24 Sep 27  9 19 25.1 r   80288pK5  8.6  8.2v  24-  59     33  78  69S 266 339 252 +7.6 -5.9 +0.9+1.1 .391 -165.2      8 36 55.8  23 14 49 392.7 771.0
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = +0.5sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9  9 33.9 R   98567 A3  7.5  7.4   16-  47     19  78  50S 252 321 235 +6.8 -5.1 +0.3+1.8 .368 -146.5      9 26 34.5  19  3 36 397.6 851.7
24 Sep 28  9 57 34.2 r    1400cF5  8.3        16-  47     29  82  19N   3  74 346 +6.7 -5.1 +2.3-8.5 .105  105.0      9 29  0.7  19 17 19 396.7 777.7
      1400 is double: AB 8.42 9.96 1.09" 223.7, dT = +8sec
      1400 is a close double. Observations are highly desired
24 Sep 29 11  5 28   Gr   1504 M1  5.4  4.6    9-  35  -3 34 ** GRAZE: CA  1.0S; Dist.147km in az.   3deg. [Lat = 27.45-0.04(E.Long+80.36)]
24 Sep 29 11  5 41   M    1504 M1  5.4  4.6    9-  35  -3 33  90   1S 206 274 187 +5.5 -4.0 +9.9+9.9 .000  -90.0     10 16 40.7  13 43 42 399.2 749.9
   R1504 = 37 Leonis
   Distance of 1504 to Terminator = 15.8"; to 3km sunlit peak = 0.0"
24 Oct  7  0 42 49.9 d    2251KK0  7.5  7.0   15+  46      6 239  37N  55 357  43 -5.9 +6.2 +0.2+0.3 .306   42.6     15 45 49.8 -24 43  1 399.7 804.9
24 Oct  8 23 40  3.8 d  185508 K5  8.4  7.5   32+  68 -10 28 209  89S  96  66  93 -7.2 +7.4 +2.4-0.8 .329   -8.9     17 33 54.3 -29 13 24 389.9 629.0
24 Oct  9 23 30  4.4 D    2688 G6  7.0  6.6s  41+  80  -8 34 193  70N  68  54  71 -7.5 +7.6 +2.4+0.4 .318   12.3     18 32 14.0 -29 11 25 384.5 607.2
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2 22  6.0 d  164449DF0  7.2        74+ 119     43 198  65N  44  27  62 -6.5 +5.6 +1.4+1.1 .400    9.0     21 31 25.5 -19 14 15 365.8 718.9
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -4sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1 12 43.8 D    3288 K0  5.8  5.3   83+ 132     48 157  23N 358  19  18 -5.0 +4.4 +0.1+3.4 .241   53.9     22 24 27.1 -13 31 46 360.4 716.6
   R3288 = 50 Aquarii
24 Oct 14  4 31  6.4 D    3303kF2  6.4  6.2   84+ 133     40 223  60S  95  56 115 -5.5 +4.0 +2.5-1.0 .324  -45.4     22 30  1.5 -12 54 54 360.4 807.3
24 Oct 14 23 34  5   M    3421cM3  4.9  4.1v  91+ 145 -10 29 116   7S 147 201 168 -3.1 +3.0 +9.9+9.9 .000  -90.0     23 16 50.9 - 7 43 35 358.0 846.0
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 3.2"; to 3km sunlit peak = 0.0"
24 Oct 14 23 46 41.7 d    3422kF0  6.7  6.5   91+ 145     32 118  53N  26  79  47 -3.2 +3.0 +0.8+2.3 .418   29.6     23 16 59.2 - 7  9 39 357.7 834.4
24 Oct 15  3  5 15.3 d  146658 K0  7.3  6.8   92+ 147     58 179  35N   9  10  31 -3.6 +2.6 +0.4+2.6 .344   37.5     23 21 15.4 - 6 11 33 355.2 747.1
24 Oct 16  4 57 52.7 D      35 K0  6.2  5.7   97+ 162     62 212  46N  21 352  43 -1.8 +0.5 +0.9+2.2 .404   25.9      0 17 47.7   1 41 19 352.2 766.8
24 Oct 19  3 36 28.7 r     452 A2  7.7  7.6   96- 156     49  87  65N 273 347 287 +4.9 -4.3 +1.7+0.7 .408  144.5      3  5 30.3  20 54  9 356.7 867.4
24 Oct 19  6  7 55.7 r   75768 K0  7.6  7.1   95- 155     81 120  52S 209 266 223 +4.6 -4.7 +1.2+2.7 .365 -150.9      3 10 14.5  21 16 19 355.6 720.2
24 Oct 21  3 18 25.8 r     773wF8  7.0  6.7   81- 129     21  69  86S 258 329 262 +7.8 -6.1 +0.2+1.1 .563  174.5      5 10  3.9  27 33 23 369.41012.3
       773 is double: AB 7.0 9.3 315" 353.1, dT = +51sec
24 Oct 21 10 15  8.4 r   77138 A*  7.6  7.4   79- 126     70 282  50N 303 211 306 +6.9 -6.6 +2.1-2.3 .309  146.6      5 23  1.4  28 28  8 367.4 660.4
24 Oct 21 11 28 16   M     810SB7  1.7  1.7   79- 126   0 54 284 -11N   4 279   7 +6.7 -6.6 +9.9+9.9 .000   90.0      5 26 17.5  28 36 27 368.6 727.7
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Oct 21 11 29 27   Gr    810SB7  1.7  1.7   79- 126   1 52 ** GRAZE: CA-10.9N; Dist.159km in az. 202deg. [Lat = 24.58-0.37(E.Long+80.36)]
24 Oct 22  6 29 21.8 r   78233SA3  7.5        71- 114     48  76  66S 246 328 244 +8.4 -6.7 +1.1+1.7 .401 -164.3      6 19 59.0  28 25 36 374.0 756.1
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.28sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -133sec
     78233 is a close double. Observations are highly desired
24 Oct 22  8 17 49.2 r   78294 A0  7.6  7.6   70- 114     71  77  87N 273   6 271 +8.1 -6.8 +2.5+0.3 .352  174.3      6 23  0.3  28 37 17 373.1 640.6
24 Oct 23 10 30 33.0 r   79394cA2  8.0  7.9   59- 101     87  61  44N 323  82 315 +8.0 -6.6 +2.1-3.1 .260  142.5      7 27 16.8  27 17 55 379.6 603.1
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.23sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10 47 20.5 r   79402 B8  7.3  6.9   59- 100  -9 88 314  37N 331 198 323 +7.9 -6.6 +1.8-3.7 .237  136.1      7 27 48.9  27 17 33 379.7 606.7
24 Oct 26  8 45  3.3 r   98892dK0  7.7  7.1   30-  66     30  86  70N 312  21 293 +6.8 -4.3 +1.1-0.8 .378  161.1     10  0 31.6  15 51 51 397.1 770.2
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +23sec
24 Oct 26  9 26 58.7 R   98897 K0  7.6  7.0   30-  66     39  91  88S 290 359 271 +6.7 -4.3 +1.5+0.0 .371 -174.0     10  1 20.7  15 40 14 396.3 716.2
24 Oct 27  8  7 52   r   99272 K2  7.5  6.8   22-  55     10  83   9S 213 278 192 +5.7 -3.1 +9.9+9.9 .073  -99.1 .01 10 44 26.0  10 22 29 402.0 898.3
24 Oct 27 10  7 47.6 r   99296kA3  8.0  7.9v  21-  55     36  96  37N 347  52 326 +5.5 -3.0 +0.9-3.0 .263  134.2     10 47 46.5  10 26 37 399.5 729.3
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Oct 29 10 27 13.0 r  138642 K0  9.5  9.0    8-  33     19 101  73S 277 339 255 +2.8 -0.3 +0.8+0.7 .382 -152.5     12 12  1.9 - 1  5 53 404.0 843.5
24 Nov  5 23 45 48.7 d  186563 K2  7.8  6.9   18+  50     19 223  16N  19 334  20 -6.7 +7.4 -0.5+2.4 .210   57.5     18 16 20.4 -28 55 54 389.4 740.0
24 Nov  6  0 18 44.5 d  186607 B8  8.6  8.6   18+  50     14 227  61S 122  73 124 -6.8 +7.3 +2.2-2.3 .285  -46.8     18 17 56.3 -29 15 26 389.8 788.8
24 Nov  6  0 59 26.4 d  186642 B8  8.3  8.3v  18+  50      7 233  76N  79  24  81 -6.9 +7.2 +0.6-0.6 .450   -3.9     18 19 24.3 -28 59 59 390.5 853.9
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  8 23 27 54   m  190052 F8  7.9  7.6   47+  86     42 183  17S 147 143 163 -6.4 +6.0 +9.9+9.9 .000  -90.0     21  8 36.9 -21 40 59 373.9 662.0
24 Nov  8 23 31 58.3 D    3089SA0  5.3  5.3   47+  86     43 185  44N  28  23  44 -6.4 +6.0 +1.3+1.9 .321   28.9     21  8 33.6 -21 11 37 373.9 664.0
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +29sec : AF 5.3 13.0 9.7"  14.0, dT = +29sec : AG 5.3 20.0 13.1"  62.0, dT = +34sec : AC 5.3
15.0 35" 114.8, dT = +5sec
      3089 is a close double. Observations are highly desired
24 Nov 11  2 26 52.6 D Saturn      0.9  0.9   70+ 113     49 215  13N 350 318  11 -5.2 +3.0 -0.9+3.9 .227   58.0     22 58 12.9 - 8 52 27 363.5 757.3
   Saturn ring contacts offset by ±25.8 secs, at  2 26 27 and  2 27 18
   Saturn limb contacts offset by ±36.2 secs, at  2 26 16 and  2 27 29  Both contacts are against the bright limb of Saturn
24 Nov 11  2 49  6   GrSaturn      0.9  0.9   70+ 114     42 ** GRAZE: CA-17.7N; Dist.269km in az. 321deg. [Lat = 29.26+0.74(E.Long+80.36)]
24 Nov 11  3  5 38.0 D    3375 F2  6.8  6.6   70+ 114     44 226  82S  75  34  96 -5.3 +2.9 +1.9+0.0 .400  -26.1     23  0 19.9 - 8 52 50 363.8 785.8
24 Nov 11  3  6  0.2 R Saturn      0.9  0.9   70+ 114     43 226 -50N 287 245 308 -5.3 +2.9 +3.3-2.0 .237  122.1     22 58 12.9 - 8 52 27 363.9 788.0
   Saturn ring contacts offset by ±84.9 secs, at  3  4 35 and  3  7 25
   Saturn limb contacts offset by ±38.1 secs, at  3  5 22 and  3  6 38  Both contacts are against the bright limb of Saturn
24 Nov 11 23 56 56.0 D    3505WG8  5.5  5.0   79+ 126     51 134  60N  36  76  58 -3.4 +1.7 +1.2+2.1 .426   12.6     23 47 56.5 - 2 45 42 359.9 762.4
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -189sec
24 Nov 12  2  0 46.8 d Neptune     7.8  7.8   80+ 127     62 187  59S  96  90 118 -3.7 +1.4 +3.5-0.5 .270  -50.5     23 50 57.8 - 2 24 44 358.9 738.4
   Neptune limb contacts offset by ±4.6 secs, at  2  0 42.2 and  2  0 51.4  Both contacts are against the bright limb of Neptune
24 Nov 12  2 20 16   m  146935 K0  7.9  7.1   80+ 127     61 197  20S 136 121 158 -3.8 +1.3 +9.9+9.9 .000  -90.0     23 51  9.9 - 2 31 14 358.9 741.0
24 Nov 14  2 19  6.2 D     241 G5  6.8  6.4   95+ 155     69 128  26N   8  54  28 -0.2 -2.1 +0.2+3.1 .336   41.3      1 37 40.9  12  4 42 354.3 769.4
   Distance of 241 to Terminator = 18.4"; to 3km sunlit peak = 7.0"
24 Nov 15  5 32 35.4 d     397MB9  7.5  7.5   99+ 170     73 249  76S 104  41 121 +1.4 -4.1 +3.0-1.3 .296  -44.6      2 41  6.6  18 48  1 354.5 714.8
      397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +11sec : AC 7.7 9.5 66" 242.2, dT = -165sec
      397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 13.5"; to 3km sunlit peak = 4.2"
24 Nov 16  6 52 35.0 d     537SB6  3.7  3.8s 100- 173     70 270 -53S  74 354  86 +3.2 -5.4 +2.2+0.3 .401   -3.8      3 44 52.5  24  6 48 357.0 696.4
   R537 = Electra = 17 Tauri
      537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.36sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+86sec
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Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  7 42 25.0 d     541SB8  3.9  3.9s 100- 173     59 275 -86N  36 316  47 +3.1 -5.5 +2.0+2.1 .326   38.9      3 45 49.6  24 22  4 357.6 726.3
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +277sec : AB 3.8 13.7 113"  72.8, dT = +277sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  7 57 51.7 d     545SB6  4.1  4.2v 100- 173     56 275  13S 143  64 155 +3.0 -5.5 +1.6-6.1 .163  -67.5      3 46 19.6  23 56 54 357.9 740.3
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +1.6sec : AB 4.2 14.4 110" 180.2, dT = +538sec : AC 4.2 12.9 147" 336.0, dT = -880sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 0.3"; to 3km sunlit peak = 0.0"
24 Nov 16  8 12 51.6 R     537SB6  3.7  3.8s 100- 173     52 277  58N 253 175 265 +3.0 -5.5 +1.7+0.0 .435 -176.4      3 44 52.5  24  6 48 358.1 756.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.32sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+73sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 5.0"; to 3km sunlit peak = 0.0"
24 Nov 16  8 13 47   Gr    545SB6  4.1  4.2v 100- 173     50 ** GRAZE: CA 36.1S; Dist.138km in az. 186deg. [Lat = 24.88-0.09(E.Long+80.36)]
   Distance of 545 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Nov 16  8 23  8.3 D     552SB7  2.9  2.9s 100- 173     50 277 -18S 113  35 125 +3.0 -5.5 +1.5-2.0 .357  -35.9      3 47 29.1  24  6 18 358.3 764.8
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.01sec : AE 2.8 15.0 78" 232.4, dT = -108sec : AB 2.8 6.3 118"
291.1, dT = -330sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 28 36.0 R     545SB6  4.1  4.2v 100- 173     49 278  59S 190 113 202 +3.0 -5.5 +2.3+5.5 .170 -112.5      3 46 19.6  23 56 54 358.4 772.5
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = -0.34sec : AB 4.2 14.4 110" 180.2, dT = -638sec : AC 4.2 12.9 147" 336.0, dT = +718sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 5.2"; to 3km sunlit peak = 0.0"
24 Nov 16  8 40 26.7 r     541SB8  3.9  3.9s 100- 173     46 279  14N 297 220 309 +3.0 -5.5 +1.2-2.2 .351  140.9      3 45 49.6  24 22  4 358.6 786.8
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +230sec : AB 3.8 13.7 113"  72.8, dT = +230sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 0.4"; to 3km sunlit peak = 0.0"
24 Nov 16  9 20 47.9 r     549SA0  6.3  6.3  100- 173     37 282  84N 229 154 240 +2.9 -5.5 +1.4+0.8 .411 -148.5      3 47 21.0  24  6 59 359.4 840.0
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -12sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = -43sec : BC 6.3 8.2 86" 345.0, dT =
+93sec
   Distance of 549 to Terminator = 7.6"; to 3km sunlit peak = 0.6"
24 Nov 16  9 22 56.4 R     552SB7  2.9  2.9s 100- 173     37 282  88N 225 150 236 +2.9 -5.5 +1.5+1.0 .393 -144.3      3 47 29.1  24  6 18 359.5 843.0
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.08sec : AE 2.8 15.0 78" 232.4, dT = -198sec : AB 2.8 6.3 118"
291.1, dT = -120sec
       552 is a close double. Observations are highly desired
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Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 7.7"; to 3km sunlit peak = 0.7"
24 Nov 16  9 40 58   Gr    560SB8  3.6  3.7s 100- 173     33 283  37S 171  97 183 +2.9 -5.5 +9.9+9.9 .000  -90.0      3 49  9.7  24  3 12 359.8 868.0
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7 : Aa,Ab 3.8 6.8 0.22" 336.1 : AC 3.6 15.0 50"  36.4 : AH 3.6 16.0 68" 221.7
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Nov 16  9 41  0   Gr    560SB8  3.6  3.7s 100- 173     32 ** GRAZE: CA 37.4S; Dist.  5km in az. 197deg. [Lat = 26.08-0.28(E.Long+80.36)]
   Distance of 560 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
24 Nov 16 10  6 32.1 R     561SB7  5.1  5.1V 100- 172     28 285  82S 217 145 228 +2.9 -5.4 +1.3+1.3 .367 -135.0      3 49 11.2  24  8 12 360.4 909.1
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.5sec : AF 5.0 14.5 4.7" 221.0, dT = -13sec : AE 5.1 14.8 96"  76.8, dT = +202sec : AD 5.1
14.7 144"  65.9, dT = +343sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 8.1"; to 3km sunlit peak = 0.9"
24 Nov 17 11 10 54.7 r   76841cK1  7.3  6.7   97- 159  -7 28 288  71S 233 159 238 +4.5 -6.1 +1.3+0.5 .401 -140.5      4 55 34.6  27 12  9 364.6 919.4
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.18sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 18 10 39 43   M   77818 K5  6.7  5.8   91- 146     48 284  17S 190 109 190 +5.8 -6.5 +9.9+9.9 .000  -90.0      6  0  4.9  28  7 33 368.0 783.0
   Distance of 77818 to Terminator = 18.6"; to 3km sunlit peak = 6.4"
24 Nov 20  9 57  3.8 R    1206 G8  5.9  5.3   76- 121     83 267  69N 300 216 288 +7.2 -6.1 +2.2-1.6 .345  175.2      8  0 55.9  25 23 34 378.2 634.7
   R1206 = omega Cancri
24 Nov 20 10 35 24.8 R    1211SA1  6.3  6.3   75- 121     74 270  64S 254 171 242 +7.1 -6.0 +3.3+0.6 .262 -136.8      8  1 43.8  25  5 22 378.6 660.5
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +119sec : AC 6.3 11.6 106" 295.0, dT = -301sec
24 Nov 21  8 59  6.4 r   80499 K0  8.2  7.6   66- 109     72 100  76N 298  11 283 +7.4 -5.4 +2.4-1.0 .331  178.4      8 54 32.2  21 49 13 384.1 617.2
24 Nov 23  7 38  0.3 r   99157pF2  7.4        47-  86     31  91  73S 275 342 255 +6.3 -3.3 +1.2+0.8 .366 -157.3     10 29 25.6  12 11 13 396.1 760.9
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.25sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 41  3.8 R  119114 F2  7.2  7.0   28-  64     10  94  86S 290 353 268 +3.9 -0.6 +0.3+0.2 .450 -169.1     11 55 23.9   1  5 45 403.4 897.4
24 Nov 25  9 16 38.6 R  119138 K0  7.4  6.9   28-  64     30 106  46N 337  37 316 +3.6 -0.5 +0.6-2.0 .338  149.0     11 58 13.0   0 52  9 401.4 768.4
24 Nov 25 10 21  0.8 R    1730wK2  6.2  5.5   28-  63     43 117  78N 306 359 284 +3.4 -0.4 +1.5-0.8 .360 -174.8     11 59  3.3   0 31 50 400.3 702.5
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +27sec
24 Nov 26 10 55 15.6 R  138921KG5  8.1  7.7   20-  52 -12 39 122  55N 328  18 306 +2.0 +1.1 +0.8-1.5 .357  163.8     12 41 59.6 - 5 13 15 401.3 723.7
24 Nov 27 10 36 31.6 R  157912kF0  7.8  7.6   13-  42     24 117  65S 265 320 245 +0.7 +2.4 +1.6+1.4 .302 -136.8     13 23 56.5 -10 52 15 402.2 806.5
24 Nov 27 10 51 32.0 D    1925SB1  1.0  1.1v  13-  42     27 120 -15S 184 237 164 +0.7 +2.4 -0.7-3.5 .230  -55.3     13 25 11.6 -11  9 41 401.9 789.7
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -586sec : AC 1.0 10.5 368"  60.8, dT = -
885sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 11 16 28   Gr   1925SB1  1.0  1.1v  13-  41  -6 35 ** GRAZE: CA 21.2S; Dist.313km in az. 216deg. [Lat = 22.67-0.64(E.Long+80.36)]
24 Nov 27 11 35 54.2 R    1925SB1  1.0  1.1v  12-  41  -4 35 128  57S 256 302 236 +0.6 +2.5 +3.0+2.1 .216 -124.7     13 25 11.6 -11  9 41 401.1 737.8
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +520sec : AC 1.0 10.5 368"  60.8, dT =
+1645sec
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11  5 16.5 d    2029 M1  4.9  4.1v   7-  31 -10 18 120 -55S 140 194 121 -0.6 +3.7 +0.3-0.8 .420  -13.6 .01 14 10 50.5 -16 18  7 401.4 841.3
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 16 41.9 r    2029 M1  4.9  4.1v   7-  30   5 32 132  79N 296 340 278 -0.8 +3.8 +1.4-0.2 .375 -166.5 .01 14 10 50.5 -16 18  7 400.0 747.9
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  3 23 28 11.1 D    2765 A3  7.9  7.8    7+  32     11 231  48N  51 359  57 -5.9 +7.0 +0.3+0.3 .430   18.6     19  0  0.2 -28  3  3 386.2 848.9
24 Dec  4 21 53 48.0 d    2910cG3  4.7  4.3   13+  43   6 33 205  65S 109  84 120 -5.6 +6.7 +3.2-1.4 .258  -45.7     19 55 50.4 -26 17 58 380.9 683.2
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 22 49 57.9 r    2910cG3  4.7  4.3   14+  43  -5 27 217 -22S 197 159 207 -5.8 +6.6 -0.1+2.0 .280 -134.0     19 55 50.4 -26 17 58 381.4 746.3
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 23 10  4   Gr 188749 G1  8.1  7.8   14+  43  -9 23 ** GRAZE: CA 21.7S; Dist.  1km in az. 140deg. [Lat = 26.12+0.75(E.Long+80.36)]
24 Dec  4 23 10  4   gr 188749 G1  8.1  7.8   14+  43  -9 24 221  22S 152 111 163 -5.8 +6.6 +9.9+9.9 .000  -90.0     19 57 15.5 -26 13  3 381.6 771.6
24 Dec  5  0 42 11.8 d  188809 F5  8.7  8.4   14+  44     10 235  77S  97  42 108 -6.0 +6.4 +1.1-1.2 .408  -33.3     20  0 36.8 -25 42 10 382.9 906.2
24 Dec  5 23 36 28.6 d  189831 K0  8.5  7.9   22+  56     31 218  87N  74  37  89 -5.7 +5.8 +1.7-0.1 .395  -18.2     20 54 50.6 -22  6  6 377.5 761.7
24 Dec  5 23 53 35.0 d  189843 K2  8.3  7.7   22+  56     29 222  73S  94  53 109 -5.7 +5.7 +2.1-1.0 .339  -37.5     20 55 18.7 -22  7 25 377.7 782.1
24 Dec  6  1  2 45.3 d    3062 K2  7.5  6.8   22+  56     18 234  32S 134  83 150 -5.8 +5.6 +5.1-7.2 .109  -76.8     20 56 52.7 -22  0 21 378.7 876.2
24 Dec  6  1 10 37   Gr   3062 K2  7.5  6.8   22+  56     15 ** GRAZE: CA 18.8S; Dist. 47km in az. 147deg. [Lat = 25.62+0.59(E.Long+80.36)]
24 Dec  6 22 47 36.3 d  164653DB9  7.7  7.7v  31+  68  -4 46 194  76N  58  45  76 -5.1 +4.8 +1.9+0.9 .381   -6.9     21 47 36.4 -17 17 41 373.1 694.2
    164653 is double: AB 7.7 11.4 4.5" 207.2, dT = -10sec
    164653 is a close double. Observations are highly desired
    164653 = AP Cap, 7.6 to 7.65, V, Type ACV, Period 2.6733 days, Phase  23%
24 Dec  7  0 41 42.1 D    3197 K3  6.4  5.6   32+  69     33 225  85N  67  25  85 -5.4 +4.5 +1.4+0.1 .423  -15.1     21 50 13.0 -16 50 42 373.9 793.5
24 Dec  7 23 31 53   m  165228 K3  7.9  7.1   42+  81     51 195  21S 137 124 158 -4.5 +3.4 +9.9+9.9 .000  -90.0     22 40 20.7 -11 36 19 369.4 710.4
24 Dec  8 23 33 14   m  146747 K0  8.0  7.5   54+  94     59 176  21S 136 139 158 -3.6 +1.8 +9.9+9.9 .000  -90.0     23 30 57.4 - 5  3 39 365.9 712.6
24 Dec  9  1 28 24.0 D    3472PF5  6.9  6.7   54+  95     50 224  47S 109  70 131 -4.0 +1.5 +4.0-2.4 .200  -61.9     23 33 28.6 - 4 24  5 366.2 755.0
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.47sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 47  7.7 d  146789kF2  7.2  7.0   55+  95     37 243  83S  73  20  95 -4.1 +1.3 +1.4-0.1 .426  -22.4     23 35 14.7 - 3 51 14 367.2 821.4
24 Dec 10  1 28  0.5 d      47 F0  7.7  7.5   66+ 108     63 214  60N  37   7  59 -2.9 -0.1 +1.4+1.7 .408   10.0      0 23 38.5   2 44 35 362.9 728.7
24 Dec 10 23 45  4.8 d  109738 G5  7.8  7.1   76+ 121     63 124  82N  60 109  81 -1.3 -1.5 +1.7+1.5 .426  -12.3      1 13 41.8   8 58 29 361.0 763.3
24 Dec 11  2  8 49.5 d     186pF2  7.3        76+ 122     70 220  23N   2 326  22 -1.7 -1.9 +0.2+3.7 .276   47.8      1 15 46.7   9 47  5 360.6 719.6
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.21sec
       186 is a close double. Observations are highly desired
24 Dec 12 23 44  3.1 d     452 A2  7.7  7.6   93+ 148     45  86  62N  51 125  66 +1.7 -4.3 +0.7+1.8 .498    6.4      3  5 30.3  20 54  9 361.0 877.2
24 Dec 13  2 39 45.7 d   75768 K0  7.6  7.1   93+ 149     83 128  44S 126 176 141 +1.4 -4.7 +5.1-3.8 .154  -67.7      3 10 14.5  21 16 19 359.2 704.8
24 Dec 13  2 55  1.9 d   75764SF0  7.6        93+ 149     85 154  31N  22  47  36 +1.3 -4.8 +1.1+3.1 .317   37.6      3 10  6.6  21 44 49 359.2 697.8
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +0.6sec : AB,C 7.6 13.5 48"  44.0, dT = +141sec : AB,D 7.6 15.8 55" 159.0, dT = -126sec
     75764 is a close double. Observations are highly desired
24 Dec 16  8 47 31.2 r     996cA2  6.9  6.8   99- 167     55 283  58N 284 200 281 +4.8 -6.4 +1.5-1.2 .420 -179.4      6 30 22.0  28 12 44 369.2 751.3
       996 is double:  7.6 7.6
   Distance of 996 to Terminator = 18.3"; to 3km sunlit peak = 7.5"
24 Dec 16 10  1 23.7 r   78480cK5  7.5  6.7   99- 166     40 286  66S 229 151 226 +4.6 -6.3 +2.4+1.2 .262 -123.4      6 33  2.1  27 49 31 370.6 854.9
     78480 is double: ** 8.3 8.3 0.10"  63.0, dT = +0.37sec
     78480 has been reported as non-instantaneous (OCc 720). Observations are highly desired
24 Dec 16 11  2 15.2 R    1008 A0  5.3  5.3s  98- 166     27 290  38N 307 234 304 +4.6 -6.2 +0.0-1.8 .493  158.8      6 35 12.1  28  1 20 371.9 954.3
```

Occultation prediction for Fox Observatory Broward
E. Longitude - 80 21 35.6, Latitude 26 7 45.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 10.9"; to 3km sunlit peak = 2.5"
24 Dec 18  2 19 23.6 r    1251 B9  5.9  5.9   90- 144     15  71  53N 314  22 301 +7.1 -5.5 +0.8-0.7 .408  142.7      8 20 32.1  24  1 20 381.4 948.1
   R1251 = lambda Cancri
24 Dec 18  4 19 25.4 r   80165 F2  7.5  7.3   90- 143     41  80  29N 339  54 325 +6.9 -5.6 +2.1-3.3 .224  122.9      8 24 55.2  23 56 43 379.4 757.2
24 Dec 19  5 59 52.3 r   98510kG5  7.2  6.8   83- 131     50  91  41S 236 307 219 +6.6 -4.7 +2.2+4.0 .195 -121.9      9 20 37.9  19  5 26 384.4 687.9
24 Dec 22  9 22 43.7 R    1696 F5  6.9  6.7   55-  95     57 132  86N 297 340 276 +3.7 -0.5 +2.2-0.8 .327 -163.6     11 42 25.5   2 21 44 396.8 656.5
24 Dec 24  7 33 58.0 r  139140 K0  7.9  7.3   36-  74     14 107  76S 278 339 257 +1.4 +2.0 +0.7+0.7 .399 -153.1     13  4 47.0 - 8 34 16 403.0 874.7
24 Dec 24  9 59 50.6 R    1886cK3  5.6  5.0   36-  73     42 132  40N 342  25 321 +1.0 +2.3 +0.5-2.2 .316  150.8     13  8 32.5 - 8 59  4 400.3 702.9
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.1sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 24 11 22 57.8 R    1887 K0  6.3  5.8   35-  73 -10 52 158  73S 274 294 253 +0.7 +2.5 +3.3+0.2 .251 -139.0     13  9 14.2 - 9 32 17 399.4 644.4
24 Dec 25 10 24 21.1 R  158207 F0  7.4  7.2   27-  62     35 133  51S 250 293 231 -0.3 +3.6 +3.7+2.7 .184 -119.5     13 52 15.4 -14 40 36 400.1 727.3
24 Dec 25 11 32 40.4 r    1992cF0  7.5     S  27-  62  -8 44 150  56N 323 350 304 -0.6 +3.7 +1.3-1.5 .337  169.6     13 53 51.7 -14 39 51 399.2 663.9
      1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.8sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
```

Lunar Occultation predictions
Marathon Key Airport
Florida
USA

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 55  8.7 R    1770 A5  5.9  5.8   56-  97     64 181  66N 318 317 296 -3.2 -1.4 +1.8-2.0 .327  179.1     12 18 40.3 - 0 47 14 397.1 629.4
   R1770 = 13 Virginis
24 Jan  4  8 38 22.1 r    1865 A2  7.3  7.2   47-  87     38 121  73S 276 328 255 -3.8 -0.4 +2.0+0.6 .313 -144.9     12 59  0.2 - 6  5 27 396.4 736.6
24 Jan  5  8 40 47.7 r    1966kK2  7.8  7.1   38-  76     27 119  31N 350  44 331 -4.8 +1.0 -0.1-2.4 .314  138.3     13 44 15.6 -11 26 12 393.5 804.1
24 Jan  7 10 44 25.7 R    2204kK0  7.7  7.1   19-  52     26 133  79S 271 316 258 -6.0 +4.1 +1.8+0.8 .362 -147.6     15 24 57.6 -22  2 37 382.6 796.1
24 Jan  7 10 52 39.4 R X 39461pK0  7.5  7.0   19-  52     27 135  67N 305 350 292 -6.0 +4.1 +1.0-0.4 .423  178.1     15 25 22.6 -21 55 45 382.4 785.2
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +9sec : AC 7.9 13.5 40" 190.5, dT = +39sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 10 42 27.1 R    2349SB1  2.9     v  11-  39     14 127  74N 290 343 282 -5.8 +5.2 +0.7+0.2 .477 -174.1     16 21 11.3 -25 35 34 378.0 878.8
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -0.11sec : AB 2.9 8.4 20.3" 273.1, dT = -41sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 24 52.9 D    2366dM1  1.1  0.1v  11-  38  25 39 174 -71S 112 118 104 -6.4 +5.7 +2.4-0.6 .351   -0.6 .12 16 29 24.5 -26 25 55 374.7 637.9
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 56 42.8 R    2366dM1  1.1  0.1v  10-  38  38 36 200  79N 284 264 277 -6.8 +5.8 +2.5-0.8 .349 -179.7 .13 16 29 24.5 -26 25 55 374.6 633.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 10 52  0.4 r  185324kA0  8.7  8.5    5-  27      4 123  85N 269 328 266 -5.2 +6.2 +0.6+0.8 .497 -160.7     17 22 16.8 -28  0  8 373.5 953.5
24 Jan  9 11 17 14.1 r  185348KG8  9.4  9.0    5-  27 -12  9 126  62N 292 348 289 -5.3 +6.2 +0.5+0.2 .503  176.7     17 23 17.7 -27 58  1 372.9 911.5
24 Jan  9 11 20 16.5 R    2505 K4  5.3  4.5    5-  27 -11  9 127  81S 255 311 252 -5.3 +6.2 +1.2+1.3 .418 -146.4     17 23 21.6 -28  8 34 372.8 906.9
   R2505 = 43 Ophiuchi
24 Jan 13 23 55 29.8 d  164823 G0  8.6  8.2    8+  34     18 241  32S 134  78 153 -0.3 +5.4 +4.6-7.8 .111  -78.2     22  1 50.2 -16 46 39 360.5 950.2
24 Jan 14  0  2  0   Gr 164823 G0  8.6  8.2    8+  34     16 ** GRAZE: CA 19.9S; Dist. 38km in az. 152deg. [Lat = 24.34+0.49(E.Long+81.05)]
24 Jan 14  0  8 24.6 r  164823 G0  8.6  8.2    9+  34     16 243   8S 158 100 177 -0.3 +5.4 -3.5+8.4 .113 -101.8     22  1 50.2 -16 46 39 360.8 969.0
24 Jan 14  0 59 31.0 d    3232 K0  8.1  7.4    9+  34      6 249  84N  70   7  89 -0.3 +5.3 +0.2-0.1 .583  -11.2     22  4 12.2 -16  9 46 361.91042.9
24 Jan 14 23 34 52.7 d    3365kA0  8.2  8.1   16+  47  -9 36 235  79N  59  10  81 +1.4 +4.3 +1.2+0.4 .476   -8.5     22 56 49.4 -10 15 47 360.2 840.9
24 Jan 15  1 59 57.7 d    3377 K0  7.9  7.4   17+  48      7 256  89N  69   5  90 +1.3 +3.9 +0.2-0.1 .574  -11.0     23  1  7.9 - 9 33 14 363.41030.8
24 Jan 16  1  7  2   m  146936 K5  7.9  7.2   26+  62     32 249  15S 143  84 165 +2.7 +2.6 +9.9+9.9 .000  -90.0     23 51 28.9 - 3 24 14 363.4 861.9
24 Jan 16  2  0 43   M    3514cG9  5.9  5.4   27+  62     21 256  12S 146  83 168 +2.7 +2.5 +9.9+9.9 .000  -90.0     23 52 55.6 - 3  9 20 364.6 929.3
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9
      3514 is a close double. Observations are highly desired
24 Jan 16  2  1 23   Gr   3514cG9  5.9  5.4   27+  62     19 ** GRAZE: CA 11.7S; Dist.181km in az. 345deg. [Lat = 26.41+0.25(E.Long+81.05)]
24 Jan 17  0 16 10.9 d  109370 K2  8.2  7.5   37+  75     56 237  70N  48 358  69 +4.0 +1.1 +1.5+1.2 .419    1.7      0 41 21.3   3 35 58 364.9 741.0
24 Jan 17 23 55 20.3 d  109947 K0  7.8  7.2   48+  88     72 219  85N  63  28  83 +5.0 -0.5 +2.2+1.0 .375  -14.2      1 31 53.2   9 59 18 367.9 690.0
24 Jan 18  2 37 27.9 d     232 K0  8.1  7.4   49+  89     40 263  79S  79  12  99 +4.6 -0.8 +1.5-0.4 .409  -20.1      1 35 33.4  10 33 42 370.4 782.5
24 Jan 18 23 37 43.3 d   92903cF5  8.2  7.9   59+ 100  -9 80 152   9N 350  16   8 +5.7 -2.0 -1.0+5.5 .181   61.1      2 22  0.5  15 59 30 371.8 676.0
     92903 is double: ** 8.9 8.9 0.050"
     92903 has been reported as non-instantaneous (OCc1183). Observations are highly desired
24 Jan 19  3  8  7.2 d     363 F0  7.2  7.0   60+ 102     46 269  60N  42 331  59 +5.1 -2.4 +1.5+1.4 .375   22.0      2 27 32.1  16 38 37 374.1 733.3
24 Jan 20  3 33 34   M     486CB5  5.3     e  70+ 114     52 273   6S 160  84 174 +5.3 -3.8 +9.9+9.9 .000  -90.0      3 21 13.6  21  8 49 377.7 688.4
   R486 = Tau Arietis
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       486 is double: AB 5.34 8.09 0.94" 212.6
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  3 33 46   Gr    486CB5  5.3     e  70+ 114     51 ** GRAZE: CA  6.2S; Dist.126km in az. 359deg. [Lat = 25.86+0.02(E.Long+81.05)]
24 Jan 23  6 50 22.4 d   78191 A0  7.7  7.7   94+ 151     46 286  70S 120  37 118 +4.4 -6.2 +0.9-1.9 .373  -17.7      6 17 59.9  28  0 24 389.5 739.4
24 Jan 24  5 37  5.0 D    1093SF8  6.6     s  98+ 162     74 283  56S 146  51 139 +4.2 -6.5 +1.5-3.5 .250  -39.1      7 12 49.0  27 13 30 390.9 611.4
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.6sec : AC 7.2 12.8 13.7"  74.4, dT = +17sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  5 37  5.0 d X 99111S    7.2  7.0s  98+ 162     74 283  56S 146  51 139 +4.2 -6.5 +1.5-3.5 .250  -39.1      7 12 49.0  27 13 30 390.9 611.4
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.6sec : BC 7.3 12.7 14.0"  68.0, dT = +11sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  9 24 40.0 d    1108cG8  7.0  6.5   98+ 163     25 289  90N 113  40 105 +3.6 -6.2 +0.2-1.4 .479   -3.1      7 19 30.8  26 49 23 394.8 917.9
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.19sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 49 32.9 D    1206 G8  5.9  5.3   99+ 171     31  74  83S 143 218 131 +4.6 -6.5 +1.8-1.7 .270  -49.0      8  0 55.9  25 23 34 395.9 791.0
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 10.7"; to 3km sunlit peak = 2.4"
24 Jan 28  2 43  0.7 r   99149 A2  7.1  7.0   94- 153     23  85  86S 281 349 260 +1.4 -4.6 +0.8+0.5 .404 -167.2     10 28 42.4  13 17 20 402.7 809.5
24 Jan 28  7 17 30.6 r   99185pA3  7.9  7.7   94- 152     77 165  72S 268 282 247 +0.4 -4.3 +3.8+0.3 .226 -135.3     10 34  7.3  12 22 28 399.1 615.2
     99185 is double: AB 7.7      0.20" 180.0, dT = -0.04sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 25 52.5 R    1625SK3  5.8  5.2   89- 142     21  91  33N 346  53 325 +0.0 -3.5 +0.6-2.7 .281  132.1     11 14  1.8   8  3 39 403.5 818.9
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.08sec : AB 5.8 11.8 23.8" 260.1, dT = -6sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29  9 54 40.5 r    1645cF8  6.7  6.4   88- 140     60 237   6N  15 325 353 -1.4 -2.8 -1.4-4.9 .170  119.5     11 21 26.8   6 38  6 400.3 668.0
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
   Distance of 1645 to Terminator = 3.2"; to 3km sunlit peak = 0.0"
24 Jan 29 10 29  0   Gr   1644 B9  4.1  4.1   88- 140     50 ** GRAZE: CA 21.6S; Dist.214km in az.  49deg. [Lat = 27.67-1.05(E.Long+81.05)]
24 Jan 29 10 35 28   M    1644 B9  4.1  4.1   88- 140     51 247  22S 223 165 201 -1.6 -2.7 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 400.8 699.0
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6 12  2.4 R    1732cK0  6.8  6.1v  82- 130     46 115  65N 317  13 295 -1.8 -2.0 +1.3-1.3 .354  173.4     11 59 23.9   1 49 36 400.8 691.9
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.28sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 14 33.4 r    1824pG0  7.8  7.5   74- 119     47 127  47N 335  22 314 -3.3 -0.6 +0.8-2.1 .330  157.7     12 42 59.3 - 4  2 58 399.2 690.5
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -3sec
      1824 is a close double. Observations are highly desired
24 Jan 31 10 14 26.7 r  138955 K2  7.2  6.5   74- 118     59 201  66N 317 298 296 -4.0 -0.1 +1.8-2.0 .326  178.1     12 45 32.0 - 4 48 39 398.2 629.2
24 Feb  2 11 43 41.1 r    2040cK0  8.0  7.3   55-  95  -6 47 198  86N 294 277 276 -6.5 +2.8 +2.6-1.2 .314 -166.2     14 15 50.2 -16  4 53 392.0 614.2
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.29sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4  8 20  1.9 R    2270 B2  5.4  5.4e  36-  73     14 125  24N 347  42 336 -6.9 +4.9 -0.7-2.1 .313  131.8     15 53 55.9 -23 58 41 385.4 876.3
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4  8 31 58   M    2269cB5  5.4  5.4   35-  73     15 127  19S 209 262 199 -6.9 +4.9 +9.9+9.9 .000  -90.0     15 53 53.9 -24 31 59 385.1 859.3
24 Feb  4 11 55 59.8 R    2286kB5  5.4  5.5v  35-  72  -3 40 171  77N 293 303 283 -7.5 +5.4 +2.4-0.6 .339 -176.2     15 58 34.9 -24 49 53 381.9 629.1
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D     v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb  5 10 22 17   m  184783 G6  7.9  7.4   25-  60     22 138  19S 203 246 197 -7.0 +6.2 +9.9+9.9 .000  -90.0      16 54 49.6 -27 44 55 377.7 776.1
24 Feb  5 10 33 20.4 r  184777pA0  8.4  8.4   25-  60     24 140  77S 261 302 256 -7.0 +6.2 +2.1+1.1 .353 -148.3      16 54 27.0 -27 34  9 377.5 759.8
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.5sec
    184777 is a close double. Observations are highly desired
24 Feb  6 11 30 21.4 R    2586cB3  6.0  6.0   16-  47  -8 23 140  42N 313 355 313 -6.5 +7.0 +0.8-0.7 .363  149.9      17 58 39.0 -28 45 33 371.1 755.8
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.7sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb 11 23 41 28.4 d  146719KF8  8.1  7.8    6+  28  -6 21 253  64N  46 345  67 +1.3 +3.0 +0.5+0.7 .543    9.3      23 28 17.0 - 5 49  4 357.1 952.4
24 Feb 13  0 57 41.0 d  109178 K0  8.9  8.3   13+  42     19 263  80S  78  13 100 +3.0 +1.2 +0.7-0.4 .512  -19.6       0 23 55.0   1 32 19 360.5 949.9
24 Feb 13  1  8 57.5 D  109182 G0  7.8  7.4   13+  42     17 264  72S  85  21 107 +3.0 +1.2 +0.6-0.7 .493  -26.8       0 24 17.3   1 33 22 360.8 965.9
24 Feb 13  1 52 49.1 D      50dG5  5.8  5.3S  13+  43      7 269  67N  44 339  66 +3.0 +1.2 +0.2+0.7 .562   16.8       0 25 24.2   1 56 23 361.91030.6
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14 23 38 43.8 d     309 F0  8.2  8.0V  32+  69  -5 64 253  68N  48 344  66 +5.8 -2.0 +1.8+1.4 .389    8.3       2  6 41.6  14 35  2 366.0 697.5
       309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  1 56 17.2 d   92820 K2  8.2  7.6   33+  70     33 272  76N  56 345  74 +5.5 -2.2 +1.1+0.5 .451    9.8       2 10 15.7  15  1 23 368.7 817.9
24 Feb 15  2 14 23.1 d   92821 K0  8.1  7.3   33+  70     29 274  54N  34 324  52 +5.4 -2.2 +1.0+1.5 .396   32.7       2 10 29.4  15  9  5 369.2 842.4
24 Feb 15  3 24 10.5 D     326cM0  5.7  4.9s  33+  70     14 281  79N  59 351  77 +5.4 -2.2 +0.5+0.2 .517   11.3       2 13  3.3  15 16 48 371.0 948.0
   R326 = 19 Arietis
       326 is double: ** 6.8 6.8 0.050"
       326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
       326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 22 40.3 d   75708 K0  8.0  7.1   43+  82     54 271  58N  42 326  56 +6.2 -3.6 +1.8+1.6 .347   25.8       3  3  9.6  20 20 10 372.4 695.8
24 Feb 16  4 43 35.1 d     459SK2  6.4  5.8   45+  84     10 288  56N  40 333  55 +5.9 -3.6 +0.6+0.9 .421   37.9       3  9 20.1  20 45 40 377.2 977.3
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -275sec : AB 6.5 8.8 122" 239.0, dT = -275sec
       459 is a close double. Observations are highly desired
24 Feb 17  0 29 55.0 D     587 K0  6.2  5.5   54+  95     78 273  36N  25 298  35 +6.8 -4.8 +1.9+3.6 .244   43.8       3 57 26.4  24 27 43 376.6 617.1
24 Feb 17  0 55 19.4 D   76358kB9  7.2  7.2   54+  95     72 273  32S 137  52 147 +6.7 -4.8 +3.7-6.0 .138  -66.2       3 58 20.9  24  4 52 376.8 622.8
24 Feb 18  0 40 20.4 d   76841cK1  7.3  6.7   65+ 107     87 323  62N  57 275  63 +6.8 -5.7 +2.5+1.7 .304   18.4       4 55 34.6  27 12  9 381.6 592.2
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.25sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 33 51.5 D     746WB7  7.0  6.9   65+ 108     50 284  61N  57 333  62 +6.2 -5.8 +2.2+0.9 .315   32.5       4 59 53.7  27 19 32 383.7 695.8
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -56sec
24 Feb 19  4 58 24.5 D   77818 K5  6.7  5.8   75+ 120     44 286  56S 126  45 126 +5.7 -6.3 +0.7-2.2 .355  -26.2       6  0  4.9  28  7 33 388.9 747.2
24 Feb 21  2 57 56.2 D    1181cG8  7.0        90+ 142     86  64  80N  97 212  87 +5.0 -6.6 +3.0-0.3 .294   11.3       7 49 47.7  26 15 50 393.6 572.1
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.3sec
      1181 is a close double. Observations are highly desired
24 Feb 22  0 27 19.2 d    1290pF8  6.9  6.6   94+ 153     42  80  34N  59 136  44 +4.7 -6.3 +1.2+2.8 .263   43.3       8 38 45.5  23 41  9 398.0 698.3
      1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +1306sec
24 Feb 27  6 14 26.9 r    1790 M4  6.9  6.0v  93- 150     57 144  38N 344  16 322 -2.4 -0.7 +0.7-2.6 .296  151.9      12 29  9.7 - 2 25 46 400.0 651.8
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 29 42.3 r    1890 K0  7.3  6.8   88- 140     28 115  46N 337  33 316 -3.2 +0.5 +0.3-1.8 .359  152.2      13  9 46.3 - 7 39 19 400.9 789.3
24 Feb 29  8 48 37.2 R    2002 K0  6.8  6.3   80- 127     51 180  55N 326 327 308 -5.3 +2.5 +1.6-2.0 .314  165.7      13 58 29.8 -14  7 19 396.1 622.2
24 Mar  2 10 45 31.2 d    2237cK3  5.0  4.3s  62- 104     41 187 -72N  86  80  74 -7.4 +5.2 +3.3+0.0 .272   30.9 .01 15 40 16.9 -23 49  5 388.6 597.6
   R2237 = 42 Librae
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.29sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12 11  9.2 r    2237cK3  5.0  4.3s  62- 104   5 35 211  53N 321 291 309 -7.7 +5.3 +2.2-2.3 .279  148.9     15 40 16.9 -23 49  5 388.9 613.5
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.18sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  6 57 33.6 D    2366dM1  1.1  0.1v  53-  93     11 126 -89N  98 153  90 -7.1 +5.8 +0.8+0.6 .445   17.3 .10 16 29 24.5 -26 25 55 387.3 875.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8  4 39.1 R    2366dM1  1.1  0.1v  53-  93     22 136  55N 314 359 306 -7.2 +6.0 +0.6-0.6 .393  162.5 .11 16 29 24.5 -26 25 55 385.8 771.5
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9  3 12.5 R    2373 K1  6.1  5.5   52-  93     30 147  29N 339  13 332 -7.4 +6.1 +0.3-2.0 .269  136.2     16 31 22.8 -26 32 16 384.8 696.3
24 Mar  5  9 29 13.9 R    2688 G6  7.0  6.6s  31-  68     16 133  59S 233 283 237 -7.0 +7.3 +2.1+2.2 .309 -134.8     18 32 14.0 -29 11 25 374.3 797.5
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 19 52.6 r  188343 K0  8.4  7.8   21-  54     15 130  74N 272 324 282 -6.1 +7.5 +1.1+0.7 .451  175.9     19 36 57.4 -27 30  4 368.2 807.4
24 Mar  7 10 44 38.4 R  189555 G1  7.2  6.9   12-  41     11 123  71N 267 324 282 -4.7 +7.1 +0.9+0.9 .487  172.7     20 40 22.3 -24  7  5 363.2 864.6
24 Mar  8 11 39 27.8 r    3175 G8  4.7  4.3    5-  27  -1 13 118  41N 290 348 308 -3.0 +6.3 +0.7+0.2 .393  140.7     21 42 39.5 -18 51 59 358.7 884.1
   R3175 = kappa Capricorni
24 Mar 13  0 47 51.5 d   92623 K5  8.9  8.4   10+  36     19 276  89N  66 358  85 +4.0 -1.6 +0.6+0.0 .538    0.0      1 46 38.7  12 24 42 361.9 943.4
24 Mar 14 23 53 58.3 D     521kA2  6.7  6.7v  27+  63  -6 57 275  59N  44 324  56 +6.4 -4.6 +2.0+1.6 .338   28.1      3 36 58.0  23 12 40 369.6 687.9
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 16 23 51 17.2 d   77268 B8  8.2  8.0v  48+  88  -5 82 298  24S 154  39 156 +7.2 -6.4 +3.0-7.8 .118  -68.4      5 34 39.1  28  3  4 380.8 589.3
     77268 = V1371 Tau, 8.02 to 8.20, V, Type GCAS
24 Mar 18  1 18  9.8 d   78530cB9  7.8  7.8   59+ 100     76 288  46S 138  37 135 +6.7 -6.8 +2.0-3.2 .249  -38.3      6 35 40.3  28 15 51 386.7 594.8
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = -0.12sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 33 42.3 D    1022CB7  6.0     s  59+ 101     47 286  86N  91   8  87 +6.2 -6.6 +1.6-0.9 .379   15.3      6 39 33.1  28 15 47 388.7 741.0
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +1.2sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 33 43.4 d X 91013C    7.8  7.8s  59+ 101     47 286  86N  91   8  87 +6.2 -6.6 +1.6-0.9 .379   15.3      6 39 33.2  28 15 48 388.7 741.0
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -1.2sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 33 46.8 D    1026SG5  6.5  5.9   60+ 101     34 288  74N  79   1  75 +6.1 -6.5 +1.2-0.5 .392   27.3      6 41 20.9  28 11 48 389.9 834.6
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +68sec : AC 6.6 12.8 58"  61.3, dT = +139sec
24 Mar 19  0 59 50.4 D   79479 K1  7.2  6.6   68+ 112     87  41  83N  94 232  85 +6.2 -6.8 +3.0-0.2 .294   11.9      7 32 12.9  27  7 31 391.0 569.8
24 Mar 19  3 45 26.5 D    1149SK5  4.1  3.3s  69+ 112     56 282  61N  73 348  63 +5.6 -6.6 +2.7+0.1 .274   41.8 .02  7 35 55.4  26 53 45 392.5 698.7
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.15sec : AB 4.1 13.2 57"  39.0, dT = +173sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 43 34.8 r    1149SK5  4.1  3.3s  69+ 113     43 285 -35N 336 256 327 +5.4 -6.5 -0.3-3.1 .305  138.0 .02  7 35 55.4  26 53 45 393.6 782.6
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.01sec : AB 4.1 13.2 57"  39.0, dT = -86sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  1 52 41.2 D    1263DF0  6.9  6.8S  77+ 123     88  94  41N  58 143  44 +5.3 -6.5 +4.7+3.3 .158   58.4      8 26 39.8  24 32  3 394.7 578.4
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +35sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  1 53 17.9 d   80185SF0  7.7  7.4   77+ 123     88  94  40N  57 142  44 +5.3 -6.5 +4.7+3.4 .155   59.1      8 26 40.1  24 32  7 394.7 578.6
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.6sec : BC,A 7.5 6.9 5.6" 231.8, dT = -36sec
     80185 is a close double. Observations are highly desired
24 Mar 20  3 21 31.1 D    1270cF0  6.1  5.9v  78+ 124     72 273  80N  97  13  84 +4.9 -6.4 +2.7-0.9 .302   23.5      8 28 36.8  24  8 42 395.2 631.9
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 30 34.3 D    1479 F2  6.4  6.2   91+ 146     81 180  81N 107 107  88 +2.8 -4.9 +2.9-1.0 .289   23.3     10  5 40.9  15 45 27 399.1 609.7
24 Mar 22  5 42 28.4 d    1485 G0  7.1  6.8   92+ 146     58 259  67S 139  72 120 +2.3 -4.6 +1.1-2.4 .356   -8.5     10  7 39.3  15  9 27 400.1 699.3
24 Mar 23  3  4 26.3 D    1576 A2  5.3  5.3   96+ 157     69 129  52S 157 203 136 +1.7 -3.9 +1.3-2.8 .288  -25.6     10 49 15.4  10 32 43 400.2 620.0
   R1576 = 53 Leonis
24 Mar 27  5 26  3.2 r  158105PF5  7.5  7.2   96- 158     48 149  44N 341   9 322 -3.6 +1.9 +0.7-2.2 .309  152.8     13 42 35.7 -12  5 13 397.5 669.8
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  6 58 30.9 r  184209KK0  7.7  7.2   78- 124     31 147  76S 269 303 260 -6.3 +5.8 +2.4+0.7 .321 -150.8     16 11 51.3 -25 53  1 389.4 695.6
24 Apr  1  8 18  7.6 r  186391cA2  7.8  7.7   58-  99     24 143  82N 278 317 280 -6.9 +7.3 +1.7+0.5 .382 -177.2     18 10 18.2 -29 12 47 380.6 705.7
    186391 is double: AB 8.3 8.8 0.38"  94.9, dT = +1sec
    186391 is a close double. Observations are highly desired
24 Apr  4  9 34 17.1 R  190165 K0  7.2  6.7   25-  60     13 122  44S 204 260 220 -4.8 +6.7 +1.5+3.0 .300 -129.2     21 15  3.2 -21 48 55 366.2 842.3
24 Apr  4 10 22 56.0 r  190177 F3  8.2  8.0   25-  60 -12 22 128  65N 274 324 291 -4.8 +6.7 +1.4+0.7 .406  157.7     21 15 52.6 -21 26 23 365.1 777.3
24 Apr  6 16 16 14.5 r    3421cM3  4.9  4.1v   7-  30  65 57 196  73N 259 244 281 -2.2 +3.6 +2.6+0.3 .371  147.8 .01 23 16 50.9 - 7 43 35 354.5 754.0
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16  0 53.5 D Venus      -3.8 -3.8    2-  16  63 64 162 -72N  42  59  64 -0.1 +2.0 +1.7+1.9 .394    1.2      0 12 29.6 - 0 16 40 353.1 675.2
   Venus contacts: Dark limb 16  0 41; Terminator 16  0 41; Bright limb 16  1  6: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17 26 48.4 R Venus      -3.8 -3.8    2-  15  73 62 210  73S 229 197 246 -0.3 +1.7 +1.7+1.6 .397  179.5      0 12 29.6 - 0 16 40 353.2 680.9
   Venus contacts: Dark limb 17 26 35; Terminator 17 26 45.6; Bright limb 17 27  1: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 16 15.1 D     472cA1  4.9  4.9    7+  31     10 289  37S 122  55 136 +4.5 -4.0 -0.4-2.0 .413  -43.8      3 14 54.1  21  2 40 367.21018.1
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.22sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 33 51.5 D   75819 F2  7.9  7.7    7+  31      6 291  57S 102  36 116 +4.5 -4.0 -0.2-1.1 .540  -23.2      3 15 46.1  21  9 55 367.71048.2
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr 14  3 39 35.8 d   78233SA3  7.5        33+  70     19 293  48N  48 337  46 +6.1 -6.4 +1.3+0.8 .303   54.4      6 19 59.0  28 25 36 384.7 972.2
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.27sec : AB,C 7.5 9.6 2.9" 265.3, dT = -8sec : BA 8.7 9.3 58" 268.1, dT = -147sec
     78233 is a close double. Observations are highly desired
24 Apr 15  0 42 40.4 d   79180 F2  8.1  7.8   42+  81     68 284  65N  71 339  64 +6.3 -6.8 +3.1+0.5 .270   37.9      7 13  6.6  27 46 57 385.9 640.5
24 Apr 15  3 40 12.2 d   79256 K0  7.8  7.3   43+  82     30 288  65S 122  47 115 +5.9 -6.5 +0.2-1.7 .460  -11.3      7 17 59.4  27  8 31 389.3 886.1
24 Apr 15  3 49 50.6 d   79264 G2  8.0  7.7   43+  82     28 289  83N  90  15  82 +5.9 -6.5 +0.7-0.9 .446   20.9      7 18 28.9  27 15 10 389.5 902.1
24 Apr 15  4 50 31.5 d    1108cG8  7.0  6.5   43+  82     15 293   8S 179 109 171 +5.8 -6.4 -2.2-4.5 .183  -69.9      7 19 30.8  26 49 23 391.01005.7
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.01sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Apr 16  0 28 55.3 d    1229SF5  8.1  7.9   52+  92 -10 82 279  57N  69 334  57 +5.9 -6.6 +3.9+1.3 .218   46.2      8  8 20.1  25 33 10 390.3 597.5
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.43sec : AB 8.2 12.8 3.1" 302.7, dT = -9sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 17  2 43 20.6 d    1348 G5  8.1  7.6   62+ 104     63 269  82S 116  39 100 +4.6 -5.9 +1.8-1.7 .350    9.2      9  2 45.2  21 31  9 395.2 679.7
24 Apr 19  1 16 47.9 d   99185pA3  7.9  7.7   80+ 126     73 133  46S 158 201 137 +2.8 -4.3 +1.3-2.9 .282  -26.7     10 34  7.3  12 22 28 399.0 610.1
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.7sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5 12 49.7 D    1644 B9  4.1  4.1   87+ 138     51 247  41S 165 107 143 +0.6 -2.6 +0.4-3.0 .307  -31.6     11 21  8.2   6  1 46 400.6 700.1
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 18 43.7 r    1644 B9  4.1  4.1   88+ 139     37 258 -73S 278 214 256 +0.4 -2.4 +1.5-1.3 .336 -148.4     11 21  8.2   6  1 46 401.8 769.3
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 16 16.7 d    1732cK0  6.8  6.1v  92+ 148  -7 39 109  50N  75 135  53 +0.5 -1.9 +2.5+2.3 .223   53.3     11 59 23.9   1 49 36 401.2 727.9
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.27sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4  0 21.0 d  138955 K2  7.2  6.5   97+ 160     60 176  49N  71  75  50 -1.5 +0.0 +6.0+2.0 .139   65.1     12 45 32.0 - 4 48 39 398.2 637.6
24 Apr 26  4 19 52.4 R    2269cB5  5.4  5.4   95- 154     27 139  74N 306 348 295 -4.9 +5.4 +1.0-0.5 .393  174.4     15 53 53.9 -24 31 59 390.4 748.4
24 May 10  1 20 40   M   76764cG8  7.9  7.2    5+  25      7 297  17N   1 295   7 +4.6 -5.5 +9.9+9.9 .000   90.0      4 48 20.4  26 57 59 374.21072.8
     76764 is double: ** 8.6 8.6 0.10" 160.0
     76764 has been reported as non-instantaneous (OCc 736). Observations are highly desired
24 May 11  1 25 32.0 D     885wG7  5.6  5.1   10+  38     18 293  47S 126  55 127 +5.2 -6.2 -0.3-1.7 .477  -27.1      5 50 58.1  27 58  4 378.4 983.2
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -7sec
24 May 11  1 34 24.4 d   77638 B8  8.2  8.1   10+  38     17 294  79S  94  24  95 +5.2 -6.2 +0.1-0.9 .542    4.9      5 51 33.0  28  5 32 378.6 998.5
24 May 11  1 54 26.5 d   77639 K0  8.3  7.7   10+  38     12 295  17S 156  88 157 +5.2 -6.1 -1.3-3.0 .301  -57.6      5 51 40.2  27 50 31 379.11034.7
24 May 12 16 53 36.9 d    1149SK5  4.1  3.3s  24+  59  81 27  71  59N  66 140  56 +6.9 -6.6 +0.3+1.7 .415   24.0 .02  7 35 55.4  26 53 45 386.7 851.6
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.1sec : AB 4.1 13.2 57"  39.0, dT = +122sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 17 59 34.4 r    1149SK5  4.1  3.3s  25+  60  79 41  75 -71N 295  15 286 +6.8 -6.7 +1.7-0.2 .364  156.2 .02  7 35 55.4  26 53 45 385.6 743.7
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.08sec : AB 4.1 13.2 57"  39.0, dT = +37sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 14  3 35 53.6 d    1317 A2  8.2  8.1   36+  74     24 285  80S 114  42  99 +4.5 -5.7 +0.2-1.4 .487    4.7      8 46 28.9  22 21  8 394.0 934.7
24 May 15  1 59 58.4 d   98640 K0  8.0  7.5   46+  85     54 268  67N  85  12  68 +3.9 -5.2 +2.5-0.6 .281   42.2      9 33 38.6  18 44 12 395.0 728.4
24 May 15  2 43 45.6 d   98646 K2  8.2  7.3v  46+  85     44 272  75S 123  50 105 +3.8 -5.1 +0.9-1.9 .407    3.1      9 34 26.7  18 24 22 395.8 782.4
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 16  0 53 55.2 d   99052 G0  8.2  7.8   55+  96 -12 75 228  50S 151 107 132 +3.1 -4.4 +1.2-2.8 .312  -18.8     10 18 26.1  13 56  1 396.6 633.5
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 May 17  0 26 13   m    1603 A0  7.2  7.2   64+ 107  -6 74 161  21N  45  62  23 +2.1 -3.3 +9.9+9.9 .000   90.0      11  2 32.9   9 10 23 398.2 618.7
24 May 17  1 32 24.6 d  118637 F5  8.1  7.9   65+ 107     71 215  61N  85  53  63 +1.8 -3.1 +4.1+0.0 .209   50.7      11  3 43.5   8 43 48 398.3 636.1
24 May 18  1 41 48.4 d  119033PK0  8.1  7.6v  74+ 118     68 190  33S 172 162 150 +0.5 -1.8 +0.5-3.3 .268  -34.6      11 45 42.3   2 49 17 398.7 630.2
    119033 is double: AB 6.3      11.9" 186.0, dT = +43sec
    119033 = EPIC 201650346, 8.55, range 0.04, 0Kp, Type VAR, Period 11.495508 days
24 May 18  4 55 19.8 d  119068 F5  7.8  7.5   74+ 119     36 254  80N 103  43  82 -0.2 -1.4 +1.5-1.4 .351   25.3      11 49 46.8   2 13 55 400.8 754.3
24 May 18  6  7 27.5 D    1712SF8  3.6  3.3   75+ 120     20 263  42S 162  97 140 -0.4 -1.3 +0.2-2.7 .342  -37.8      11 50 41.7   1 45 53 402.4 845.8
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -558sec : AC 3.7 9.6 406"  78.5, dT = +139sec
24 May 21  3 27 36   d    2002 K0  6.8  6.3   94+ 152     51 180  42N  59  58  40 -3.2 +2.6 +7.8+4.0 .097   72.9      13 58 29.8 -14  7 19 394.0 630.5
24 May 22  6  9 18.2 d    2115 A6  7.2  7.1   98+ 164     37 215  61S 125  91 109 -4.6 +4.2 +2.2-1.7 .330   -6.9      14 49 27.7 -19 54 13 391.5 631.9
24 May 23  5 13 31.4 D    2237cK3  5.0  4.3s 100+ 174     41 184  65S  83  79  71 -4.8 +5.3 +3.3+0.2 .268   34.3 .01 15 40 16.9 -23 49  5 387.7 611.1
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.29sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 4.1"; to 3km sunlit peak = 0.0"
24 May 24  1 12 24.5 D    2366dM1  1.1  0.1v 100- 172      6 123 -65N 109 167 101 -4.3 +5.8 +0.4+0.2 .488    5.3 .09 16 29 24.5 -26 25 55 388.2 922.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 18 49.8 R    2366dM1  1.1  0.1v  99- 172     18 132  79S 301 350 293 -4.4 +6.0 +0.7-0.2 .432  174.5 .10 16 29 24.5 -26 25 55 386.8 814.3
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 9.5"; to 3km sunlit peak = 1.7"
24 May 24  3 19 11.0 r    2373 K1  6.1  5.5   99- 171     27 142  78N 324   2 316 -4.6 +6.1 +0.7-1.1 .345  151.9      16 31 22.8 -26 32 16 385.7 731.0
   Distance of 2373 to Terminator = 10.3"; to 3km sunlit peak = 2.2"
24 May 28  7  0 13.7 r    3012 A7  6.9  6.8   76- 121     28 139  80S 248 289 262 -3.7 +7.0 +2.0+1.3 .386 -173.8      20 38  4.9 -24 13 44 372.6 701.2
24 May 28  7 55 23   Gr   3018 G8  6.4  6.0   76- 121     36 ** GRAZE: CA  8.6N; Dist.  8km in az. 165deg. [Lat = 24.65+0.25(E.Long+81.05)]
24 May 28  7 55 28   Gr   3018 G8  6.4  6.0   76- 121     35 150   9N 340   9 354 -3.8 +6.9 +9.9+9.9 .000   90.0      20 40 11.8 -23 46 26 371.8 661.7
24 May 28  8 23 54.1 r  189555 G1  7.2  6.9   75- 121     38 158  65S 233 256 248 -3.9 +6.9 +2.2+1.5 .350 -165.8      20 40 22.3 -24  7  5 371.5 649.7
24 May 29  7  1 59.1 d    3164SB3  4.5  4.6v  65- 108     22 126 -79S  84 135 102 -2.8 +6.2 +1.4+1.0 .414  -15.3      21 37  4.8 -19 27 58 370.8 771.9
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +21sec : AB 4.5 10.1 66"  45.9, dT = +126sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 17 22.1 R    3164SB3  4.5  4.6v  65- 108     35 140  66S 228 266 246 -3.0 +6.1 +1.9+1.8 .376 -164.9      21 37  4.8 -19 27 58 369.4 698.5
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -75sec : AB 4.5 10.1 66"  45.9, dT = +176sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 51 34.4 r  164528 B8  7.5  7.5   65- 107     40 148  83N 259 290 278 -3.1 +6.1 +2.4+0.9 .359  161.0      21 37 37.7 -19 13 52 368.9 680.2
24 May 30  8 59 56.4 r  165149wG0  7.7  7.4   54-  94     38 133  62S 220 263 241 -2.1 +4.9 +1.5+2.1 .392 -163.3      22 32  9.4 -13 35 52 367.1 728.8
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +63sec
24 Jun  1  9  4 36.3 r      27DA5  8.2  8.0   31-  68     28 104  66S 222 283 244 +0.1 +1.9 +0.7+2.0 .481 -167.0       0 14 50.2 - 0 18 11 365.4 875.7
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
        27 is a close double. Observations are highly desired
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D   v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jun  2  9 36 47.4 r  109680 K5  8.7  7.9   20-  54      28  95  68S 226 292 247 +1.2 +0.2 +0.5+1.9 .515 -171.3      1  6 43.7   6 40  0 365.1 922.7
24 Jun  4  9 23 16.4 r   93167 A5  9.1  8.8    6-  27       7  73  54S 221 288 237 +3.5 -3.0 -0.4+1.6 .584 -158.6      2 53 46.8  18 38  3 369.31124.3
24 Jun  9  2  5 45.5 D    1131 A2  7.3  7.3    7+  31       6 296  26S 156  90 147 +4.5 -6.0 -1.0-2.2 .398  -47.3      7 28  0.9  26 13 39 387.31102.4
24 Jun 10  0 18 37.9 D    1251 B9  5.9  5.9   13+  42  -2 38 282  71S 118  41 105 +4.4 -5.9 +0.6-1.6 .446    0.9      8 20 32.1  24  1 20 388.3 840.5
   R1251 = lambda Cancri
24 Jun 10  1  2 30.1 d   80129 F2  8.4  8.2   13+  43 -11 29 285  72N  81   7  68 +4.3 -5.8 +1.0-0.6 .386   36.7      8 21 57.6  24  1 26 389.3 908.9
24 Jun 10  2  4 46.2 d   80146 A2  8.0  7.9   14+  43      16 289  42S 147  78 135 +4.2 -5.7 -0.5-2.0 .450  -32.3      8 23 31.3  23 32  4 390.81009.6
24 Jun 10  2 42  3.3 d   80173 K0  8.3  7.8   14+  44       8 292  86S 103  37  90 +4.2 -5.6 -0.2-1.1 .553   10.6      8 25 21.5  23 32 58 391.81069.7
24 Jun 12  0 35  2.0 d   98897 K0  7.6  7.0   29+  66  -5 53 263  73N  92  22  73 +3.0 -4.3 +2.3-0.9 .300   37.9     10  1 20.7  15 40 14 394.9 729.1
24 Jun 12  1 17 21.6 d   98907 F8  8.5  8.3   29+  66      44 268  74S 125  55 106 +2.9 -4.3 +0.9-1.9 .405    2.9     10  2  3.1  15 21 38 395.7 778.4
24 Jun 12  3 15 31.6 d   98936 K0  8.0  7.2   30+  67      18 279  38N  58 349  38 +2.6 -4.0 +1.4+0.7 .208   64.8     10  5  3.5  15  8  4 398.5 945.5
24 Jun 13  2 53 20   m   99302kA0  7.4  7.3   39+  77      30 268  15N  37 329  16 +1.6 -3.0 +9.9+9.9 .000   90.0     10 49  3.3  10  9 28 399.6 833.3
24 Jun 15  3 24 40.9 d    1760pK0  7.5  7.0   58+ 100      35 249  55N  78  20  56 -1.1 -0.3 +2.2-0.5 .243   50.0     12 15  0.0 - 1 19 36 400.2 734.9
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +138sec
24 Jun 17  1 17  4.7 d    1957kG5  7.7  7.2   76+ 121      53 178  64N  84  86  65 -2.9 +2.2 +4.1+0.4 .215   49.1     13 39 17.8 -12  5 32 395.2 628.5
24 Jun 17  3 25  1.5 d  158085kK0  7.3  6.6   76+ 122      42 222  52S 148 109 128 -3.4 +2.4 +1.6-2.5 .312  -21.2     13 40 59.7 -12 46 59 395.8 641.9
24 Jun 19  2 37 51.5 D    2183 K2  5.5  4.8   91+ 144      43 176  21S 169 173 155 -4.7 +4.9 +0.7-2.9 .228  -46.5 .01 15 16 23.0 -22 23 58 388.4 622.7
24 Jun 24  6 29 22.9 r    2965 G2  7.2  6.9   94- 151      38 161  73S 249 268 262 -3.4 +6.9 +2.4+1.0 .365 -179.6     20 19 45.2 -25 13 43 369.0 653.4
24 Jun 25  7 35 22.0 r  190252 F2  7.2  7.0   87- 137      43 162  24S 191 209 209 -2.5 +6.1 +1.0+2.9 .253 -131.8     21 21  3.2 -20 49 16 366.5 673.3
24 Jun 26  6 50 13.1 r  164948kF2  7.2  7.0   78- 124      36 133  66N 275 319 295 -1.2 +5.1 +2.2+0.6 .333  143.7     22 14 37.2 -15  6  6 366.0 734.0
24 Jun 26  8 28 40.6 r    3271 F5  7.2  6.9   78- 124      49 160  50N 291 310 311 -1.4 +4.9 +4.1-1.0 .203  121.1     22 16 56.3 -14 39 25 364.9 695.0
24 Jun 28  7 42 57.4 r    3528 F0  7.5  7.3v  56-  97      36 112  74N 262 320 284 +1.0 +2.1 +1.6+1.1 .402  150.6     23 59 35.0 - 1 51  0 365.7 819.2
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jun 28 10  9 18   m  128552wK0  8.1  7.4   56-  96  -7 62 152  21N 316 341 338 +0.6 +1.7 +9.9+9.9 .000   90.0      0  2 57.1 - 0 53 38 363.9 723.4
    128552 is double: AB 8.2 13.4 25.8"  75.6
24 Jul  2  9 39 11   m   76001 K0  8.2  7.6   14-  44      27  76  18N 332  45 344 +4.5 -4.2 +9.9+9.9 .000   90.0      3 34 30.3  22 45 34 372.6 967.7
24 Jul  2  9 49 31.1 r   75998 F8  9.1  8.8   14-  44 -11 29  77  81N 269 343 282 +4.5 -4.2 +0.8+0.9 .464  152.0      3 34 20.3  22 31 37 372.4 949.9
24 Jul  2 17  6 42.5 D     552SB7  2.9  2.9s  12-  41  84 54 278 -35N  27 306  38 +3.4 -5.0 +2.1+3.0 .256   48.9      3 47 29.1  24  6 18 371.2 702.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.12sec : AE 2.8 15.0 78" 232.4, dT = -276sec : AB 2.8 6.3 118"
291.1, dT = -45sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 25  7.2 r     545SB6  4.1  4.2v  12-  41  87 50 279  70N 282 202 293 +3.3 -5.0 +1.6-1.3 .364  155.2      3 46 19.6  23 56 54 371.5 723.4
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.8sec : AB 4.2 14.4 110" 180.2, dT = +60sec : AC 4.2 12.9 147" 336.0, dT = -236sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 47 32.4 d     560SB8  3.6  3.7s  12-  41  85 45 280 -70N  62 343  74 +3.3 -5.0 +1.7+0.4 .398   16.3      3 49  9.7  24  3 12 371.9 747.1
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = +0.04sec : AC 3.6 15.0 50"  36.5, dT = +113sec :
AH 3.6 16.0 68" 221.6, dT = -161sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 17 56 55.1 R     552SB7  2.9  2.9s  12-  41  83 43 281  44N 308 230 319 +3.3 -5.0 +1.0-3.1 .276  130.9      3 47 29.1  24  6 18 372.1 761.5
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.02sec : AE 2.8 15.0 78" 232.4, dT = -71sec : AB 2.8 6.3 118"
291.1, dT = -407sec
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 56 42.7 R     560SB8  3.6  3.7s  12-  41  70 30 285  74N 278 204 290 +3.2 -5.0 +0.7-1.2 .449  163.4      3 49  9.7  24  3 12 373.4 849.0
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.26sec : AC 3.6 15.0 50"  36.5, dT = +52sec :
AH 3.6 16.0 68" 221.6, dT = -84sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 10  1 12 41.4 d   99162S    8.7  8.2   16+  47     25 272  41S 159  91 139 +1.8 -3.2 -0.1-2.5 .377  -34.0     10 30 25.7  11 37 51 398.7 878.8
     99162 is triple: AB 8.8 12.8 14.6"  84.4, dT = +10sec : AC 8.8 11.0 47" 202.9, dT = +90sec
24 Jul 11 20 17 51   Gr   1712SF8  3.6  3.3   31+  68  51 58 ** GRAZE: CA-21.0S; Dist. 77km in az.  39deg. [Lat = 25.62-0.74(E.Long+81.05)]
24 Jul 11 20 19 21   m    1712SF8  3.6  3.3   31+  68  51 57 131 -21S 224 268 202 +0.6 -1.3 +9.9+9.9 .000  -90.0     11 50 41.7   1 45 53 398.8 651.0
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3 : AC 3.7 9.6 406"  78.5
24 Jul 12  2 45 19.9 D    1730wK2  6.2  5.5   32+  69     18 262  39N  62 358  41 -0.8 -0.5 +1.2+0.3 .213   60.6     11 59  3.3   0 31 50 402.4 848.9
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -28sec
24 Jul 14  2 45 28.1 d  157912kF0  7.8  7.6   51+  91     28 241  90S 112  58  92 -3.4 +2.3 +1.5-1.6 .361    9.7     13 23 56.5 -10 52 15 399.3 710.2
24 Jul 14  3 50 31.9 D    1925SB1  1.0  1.1v  52+  92     15 250  66S 136  75 116 -3.6 +2.3 +0.9-2.2 .386  -19.0     13 25 11.6 -11  9 41 400.6 792.2
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -89sec : AC 1.0 10.5 368"  60.8, dT =
+245sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  2 16 24.3 d  158363 B9  7.3  7.3   61+ 102     37 223  14S 185 145 167 -4.5 +3.5 +0.5-4.9 .148  -63.5     14  7 13.8 -16 11 26 395.8 637.9
24 Jul 15  4  9 13.7 D    2029 M1  4.9  4.1v  61+ 103     17 242  83N 102  45  84 -4.8 +3.7 +1.2-1.3 .384   10.6 .01 14 10 50.5 -16 18  7 397.5 753.2
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  0 47 35.3 d    2251KK0  7.5  7.0   79+ 125  -8 40 167  26S 164 176 152 -5.5 +5.7 +0.8-2.5 .239  -44.5     15 45 49.8 -24 43  1 387.3 628.3
24 Jul 18  1 47  7.6 D    2405SA2  6.6     s  87+ 137     37 170  71N  73  83  66 -5.9 +6.6 +3.3+0.9 .270   36.3     16 44 17.4 -27 27 22 382.1 620.2
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +6sec : AC 6.6 14.0 24.3" 195.9, dT = -49sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5  6 36.3 D    2910cG3  4.7  4.3  100+ 174     39 175  65S  42  47  53 -4.4 +7.1 +2.0+1.6 .324   28.3     19 55 50.4 -26 17 58 366.7 654.0
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 4.7"; to 3km sunlit peak = 0.0"
24 Jul 23 10 31 56   m    3225SG8  7.2  6.6   95- 153  -4 28 234  24N 323 273 342 -2.3 +4.7 +9.9+9.9 .000   90.0     22  1 32.9 -15 36 43 362.3 874.0
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0 : AC 7.2 11.5 109" 291.0 : AD 7.2 9.9 181" 312.9
      3225 is a close double. Observations are highly desired
   Distance of 3225 to Terminator = 18.2"; to 3km sunlit peak = 6.7"
24 Jul 24  3 42 40.7 r    3339 M0  6.7  5.8v  90- 142     17 111  48N 294 354 315 +0.2 +4.1 +1.0+0.0 .312  128.3     22 46 14.2 -11  9 59 363.0 884.6
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  8 17 36.9 R    3355KF8  6.7  6.5   89- 141     55 184  61N 280 276 301 -0.4 +3.6 +3.7-0.7 .255  127.6     22 52 46.5 -10  3 32 359.7 728.3
24 Jul 25 10 13 41.7 R    3505WG8  5.5  5.0   80- 126  -8 57 216  87S 244 212 266 +0.8 +1.7 +2.0+0.7 .408  162.2     23 47 56.5 - 2 45 42 360.4 749.7
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -364sec
24 Jul 27  8 22 43.8 r   92457cK5  8.2        58- 100     56 109  79N 259 320 279 +3.7 -1.4 +2.0+1.1 .384  150.0      1 29  5.5  10 25 56 364.5 782.9
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.21sec
     92457 is a close double. Observations are highly desired
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 27 10 19 57.0 R     222 G5  7.0  6.5   58-  99  -7 76 165  80S 239 253 259 +3.4 -1.7 +2.0+1.4 .395  169.3      1 31 42.7  10 53 22 363.8 708.9
24 Jul 28  7 54 30.1 r     347 K0  7.9  7.4   47-  87     41  89  59S 220 291 238 +4.8 -2.8 +0.5+2.1 .471 -166.0      2 21 50.3  16  9 45 368.5 867.2
24 Jul 29  7  2  3.3 R     472cA1  4.9  4.9   36-  74     20  75  76S 242 312 256 +5.6 -4.0 +0.0+1.4 .560  179.7      3 14 54.1  21  2 40 373.71015.6
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.15sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 27 46.5 r   75819 F2  7.9  7.7   36-  74     25  77  78S 243 315 257 +5.6 -4.0 +0.2+1.4 .538  177.1      3 15 46.1  21  9 55 373.2 974.7
24 Jul 31  9 35 41.3 r     786 K5  9.1  8.3   16-  48     30  71  79N 281 357 285 +6.3 -6.0 +1.0+0.5 .426  150.6      5 16 52.5  27 43  3 379.9 901.8
24 Aug  1  8 54 23.3 r     952 K2  8.0  7.2   10-  36     10  64   7S 196 263 194 +6.5 -6.2 -1.7+3.7 .237 -115.2      6 15 54.8  27 51 42 385.41041.8
24 Aug  1  9 18 26.0 r   78154 A0  8.5  8.4    9-  36     15  66  87N 282 352 280 +6.4 -6.3 +0.3+0.5 .496  158.0      6 16  3.2  28 12  6 384.9 998.6
24 Aug  1  9 58  9.2 R   78191 A0  7.7  7.7    9-  35     23  69  30S 219 292 216 +6.4 -6.4 -0.5+2.4 .375 -138.9      6 17 59.9  28  0 24 384.2 928.6
24 Aug  8  0 46 46.9 D    1696 F5  6.9  6.7   11+  39 -10 17 264  89S 114  49  92 -0.1 -0.8 +0.5-1.6 .437    9.7     11 42 25.5   2 21 44 402.8 865.8
24 Aug 10  2 15 38.5 D    1886cK3  5.6  5.0   26+  61     10 255  35N  58 355  37 -3.0 +2.1 +0.6+0.6 .219   59.1     13  8 32.5 - 8 59  4 403.6 837.2
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.39sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 11  2 32 34.0 d  158207 F0  7.4  7.2   35+  72     12 247  56S 145  85 126 -4.4 +3.4 +1.0-2.5 .344  -31.8     13 52 15.4 -14 40 36 401.6 789.3
24 Aug 16  2 20  8.0 d  186672 G5  7.4  6.9   83+ 131     36 184  40N  33  29  35 -6.8 +7.5 +2.4+2.4 .205   52.4     18 20 25.4 -29  3 59 375.5 613.4
24 Aug 17  2 47 12.8 D    2831kB2  6.0  6.1s  90+ 144     37 175  88N  72  77  80 -6.1 +7.4 +2.5+0.7 .354    4.0     19 24 30.2 -27 51 57 369.4 636.6
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 19  5 51 38.9 d  164449DF0  7.2        99+ 171     45 196  79S  53  37  70 -3.8 +5.6 +1.7+0.9 .421    1.1     21 31 25.5 -19 14 15 359.0 733.3
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -3sec
    164449 is a close double. Observations are highly desired
   Distance of 164449 to Terminator = 10.7"; to 3km sunlit peak = 2.4"
24 Aug 20  3 55  0   m    3288 K0  5.8  5.3  100- 173     42 139  45N 325   3 346 -1.6 +4.5 +9.9+9.9 .000   90.0     22 24 27.1 -13 31 46 356.9 747.8
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 3.3"; to 3km sunlit peak = 0.0"
24 Aug 21  2 40  9.6 r    3422kF0  6.7  6.5   97- 161     23 110  58N 286 346 308 +0.4 +3.1 +1.2+0.3 .346  132.3     23 16 59.2 - 7  9 39 357.7 890.5
24 Aug 22  7 42 24   M      35 K0  6.2  5.7   91- 144     67 182  22N 316 314 338 +1.7 +0.6 +9.9+9.9 .000   90.0      0 17 47.7   1 41 19 355.3 744.5
24 Aug 22  8 59 31.3 r  109142cG5  7.6  7.1   90- 144     60 223  41S 198 160 220 +1.5 +0.4 +0.8+2.3 .383 -150.5      0 19 57.1   1 34 57 355.8 759.2
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = -0.01sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 47  5.4 r  109738 G5  7.8  7.1   82- 130     66 233  78S 235 188 256 +3.2 -1.5 +1.9+1.1 .419  174.9      1 13 41.8   8 58 29 358.1 731.4
24 Aug 24  9 42 41   M     313cK0  7.1  6.2s  72- 116     80 211  17N 322 293 341 +4.7 -3.1 +9.9+9.9 .000   90.0      2  8  3.9  15 48 16 361.3 696.6
       313 = NSV 15445, 7.12 to 7.18, Hp
24 Aug 25  6 24  5.5 r     439cF0  7.3  7.1   62- 104     38  83  64S 227 301 242 +6.3 -4.0 +0.4+1.9 .494 -169.4      2 59 10.4  19 59 23 367.4 895.6
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.15sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25 10 25 40.9 r     452 A2  7.7  7.6   61- 102  -9 86 217  47S 211 175 225 +5.7 -4.5 +1.5+2.7 .332 -152.2      3  5 30.3  20 54  9 365.8 665.3
24 Aug 26  6 51 23.0 R     587 K0  6.2  5.5   51-  91     33  76  89N 259 335 270 +7.1 -5.2 +0.7+1.1 .486  163.8      3 57 26.4  24 27 43 372.7 914.3
24 Aug 26  8  9 38.2 r   76374kG0  8.3  8.0   50-  90     50  80  78S 247 327 257 +7.0 -5.3 +1.2+1.5 .441  175.1      3 59 54.8  24 41 44 371.5 798.0
24 Aug 27  6 19  7.9 r   76841cK1  7.3  6.7   40-  78     15  67  62N 293   3 298 +7.6 -5.8 +0.6+0.1 .417  138.0      4 55 34.6  27 12  9 379.21032.9
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.17sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 18 45.3 R     746WB7  7.0  6.9   39-  77     40  74  67S 242 322 247 +7.5 -6.1 +0.7+1.6 .452 -173.0      4 59 53.7  27 19 32 377.1 832.7
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -36sec
24 Aug 27 11  7 57.8 r     756 F0  6.6  6.5   38-  76   0 77  73  66S 242 342 246 +7.0 -6.4 +2.2+1.7 .339 -167.8      5  4 38.0  27 41 46 375.6 632.3
24 Aug 28  8  3 18.4 R   77818 K5  6.7  5.8   29-  65     25  69  13S 196 270 195 +7.7 -6.4 -1.4+4.0 .233 -118.2      6  0  4.9  28  7 33 383.1 917.0
24 Aug 28  9 53 40.0 R   77883 B2  7.6  7.6   28-  64     48  74  65N 298  23 297 +7.5 -6.6 +2.3-0.6 .307  140.1      6  2 59.4  28 40 37 381.4 739.1
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 29  8  8 47.1 r   78917 M0  8.3  7.5   20-  53     15  66  60S 250 320 244 +7.5 -6.5 -0.2+1.3 .498 -164.9      6 58 11.0  27 38 13 388.5 971.0
24 Aug 29  9 24 52.7 r   78965 K0  9.0  8.4   20-  53     30  71  86S 277 353 270 +7.4 -6.6 +0.9+0.6 .438  169.1      7  0 51.9  27 48 16 387.1 837.4
24 Aug 31 10  9  7.8 r   80456kG5  9.5  8.9    6-  29     16  73  87N 297   7 282 +6.3 -5.6 +0.6-0.1 .445  163.0      8 51  9.7  22 13 35 395.7 892.6
24 Aug 31 10 16 32   m   80479kG0  9.6  9.2    6-  29 -12 17  73  13N  10  80 355 +6.3 -5.7 +9.9+9.9 .000   90.0      8 52 35.6  22 23  3 395.6 881.3
24 Sep  8  0  4 19.0 d    2055 K0  7.8  7.2   20+  53  -7 24 235  32N  54   2  36 -4.6 +4.4 +1.7+1.1 .177   60.2     14 20 27.5 -17 31 42 401.1 693.0
24 Sep  9  0  5 43.3 d  183204pK2  8.0  7.3   28+  64  -8 28 224  64N  82  39  68 -5.7 +5.5 +2.1-0.6 .295   27.7     15  8 21.6 -22  5 51 397.9 642.3
    183204 is double: AB 8.2 14.1 2.0" 151.0, dT = +2.5sec
    183204 is a close double. Observations are highly desired
24 Sep  9 19 39 58.9 d    2268MB2  4.5        36+  74  51 29 143  59S 135 172 123 -5.6 +6.1 +1.0-0.8 .357  -13.9     15 53 36.7 -25 19 38 394.8 704.0
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Sep 10  2 29 42.1 D    2298kK3  5.0  4.3   38+  76     10 236  72N  84  28  74 -7.1 +6.4 +0.8-0.7 .398   11.1     16  3 20.6 -25 51 55 395.6 778.9
24 Sep 14  0 39 48.0 d  188724cF5  7.7  7.5   78+ 124     36 161  73N  58  77  69 -6.7 +7.3 +2.4+1.3 .344   15.6     19 55 52.2 -26 33  0 370.5 641.7
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.28sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  1 38 38   m    2910cG3  4.7  4.3   78+ 124     39 177  -6N 339 342 350 -6.9 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 370.0 640.0
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Sep 14  2 52 51.9 D    2914cG8  4.8  4.4   78+ 125     37 198  55N  40  22  51 -7.2 +7.1 +1.4+1.3 .344   24.8     19 58 57.2 -26 11 45 369.9 678.8
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 17  7 37 10.0 d    3375 F2  6.8  6.6   99+ 168     35 238  73S  74  22  95 -3.1 +2.9 +1.4-0.1 .464  -23.0     23  0 19.9 - 8 52 50 355.1 868.9
   Distance of 3375 to Terminator = 19.4"; to 3km sunlit peak = 8.3"
24 Sep 21  8 18 20.7 r     397MB9  7.5  7.5   85- 135     83 211  55S 214 184 231 +5.1 -4.1 +1.5+2.3 .374 -158.3      2 41  6.6  18 48  1 357.9 698.3
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +1sec : AC 7.7 9.5 66" 242.2, dT = -155sec
       397 is a close double. Observations are highly desired
24 Sep 21  8 18 21.3 r X  3591MB9  7.9  7.9   85- 135     83 211  55S 214 184 230 +5.1 -4.1 +1.5+2.3 .373 -158.2      2 41  6.8  18 47 59 357.9 698.3
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -1sec : BC 7.5 9.5 67" 243.0, dT = -158sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  6  7  0.1 R     521kA2  6.7  6.7v  76- 122     51  83  63S 228 307 240 +6.9 -5.0 +0.8+2.0 .454 -168.1      3 36 58.0  23 12 40 363.8 818.6
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9 52 47.7 D     537SB6  3.7  3.8s  75- 120     79 271 -72S  92   7 104 +6.3 -5.5 +2.8-0.4 .337  -25.2      3 44 52.5  24  6 48 363.4 656.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.5sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+182sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 33 42.9 d     539SB6  4.3  4.4s  75- 120 -10 70 275 -39N  24 299  36 +6.1 -5.5 +1.9+3.4 .261   46.3      3 45 12.5  24 28  2 363.9 666.1
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.12sec : AC 4.3 14.0 53"  53.5, dT = +177sec : AB 4.3 11.0 72"
328.8, dT = +158sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 37  0.9 D     541SB8  3.9  3.9s  75- 120  -9 69 274 -74N  58 334  70 +6.1 -5.5 +2.2+1.1 .369   12.3      3 45 49.6  24 22  4 363.9 667.2
   R541 = Maia = 20 Tauri
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +297sec : AB 3.8 13.7 113"  72.8, dT = +298sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11 13  4.8 R     537SB6  3.7  3.8s  75- 120  -1 60 276  63S 228 146 240 +6.0 -5.5 +2.1+1.4 .353 -154.8      3 44 52.5  24  6 48 364.4 690.5
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.2sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
28sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 21 26.5 r     536pB7  5.5  5.5   75- 120   1 59 277  79N 266 183 277 +6.0 -5.5 +2.1-0.4 .386  168.6      3 44 48.2  24 17 22 364.6 697.0
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -229sec : AC 5.4 11.5 218" 196.1, dT = -197sec
24 Sep 22 11 29 54.2 R     539SB6  4.3  4.4s  75- 120   3 57 278  44N 301 219 313 +6.0 -5.5 +1.9-2.7 .274  133.6      3 45 12.5  24 28  2 364.7 703.7
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.18sec : AC 4.3 14.0 53"  53.5, dT = +73sec : AB 4.3 11.0 72"
328.8, dT = -234sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11 57 24.7 R     541SB8  3.9  3.9s  75- 120   9 51 279  76N 269 189 281 +5.9 -5.6 +1.7-0.7 .403  167.5      3 45 49.6  24 22  4 365.2 730.7
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +269sec : AB 3.8 13.7 113"  72.8, dT = +270sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 12  3 28   Gr    552SB7  2.9  2.9s  75- 120  11 48 ** GRAZE: CA  2.1S; Dist. 67km in az.   7deg. [Lat = 25.33-0.12(E.Long+81.05)]
   Distance of 552 to Terminator = 10.7"; to 3km sunlit peak = 0.0"
24 Sep 22 12  3 37   M     552SB7  2.9  2.9s  75- 120  11 50 279   2S 167  87 179 +5.9 -5.6 +9.9+9.9 .000  -90.0      3 47 29.1  24  6 18 365.3 735.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1 : AE 2.8 15.0 78" 232.4 : AB 2.8 6.3 118" 291.1
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 2.0"; to 3km sunlit peak = 0.0"
24 Sep 23  6 29  3.9 r X 70481p    7.3  7.2   66- 108     44  75  47N 304  25 311 +7.9 -6.0 +2.7-1.0 .252  123.0      4 38 29.6  26 56 26 370.1 831.6
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +14sec : AC 7.4 12.9 92" 203.7, dT = +62sec
   X 70481 is a close double. Observations are highly desired
24 Sep 23  6 29  7.9 R     701SF2  6.6  6.4   66- 108     44  75  47N 303  24 310 +7.9 -6.0 +2.7-1.0 .254  123.2      4 38 29.5  26 56 23 370.1 831.5
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +9sec : AB 7.36 7.21 4.47" 188.0, dT = +8sec
       701 is a close double. Observations are highly desired
24 Sep 24  7 24 22.0 r   77397 A2  8.1  8.0V  54-  95     44  73  90S 268 350 269 +8.4 -6.6 +1.3+0.9 .424  167.2      5 41 38.6  28 27 24 376.2 793.0
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 24 10 44 43.8 r   77551cB9  8.3  8.2   54-  94  -7 85  35  73S 251  34 252 +7.8 -6.8 +2.7+1.1 .322 -165.6      5 47 14.3  28 37 26 375.1 603.9
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -1.5sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 14 53.1 R    1022CB7  6.0     s  44-  83     17  66  75N 290   0 285 +8.6 -6.6 +0.5+0.2 .463  153.3      6 39 33.1  28 15 47 384.1 965.5
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.45sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  4 49.2 R    1026SG5  6.5  5.9   44-  83     27  70  78S 263 338 259 +8.6 -6.7 +0.5+1.1 .472 -180.0      6 41 20.9  28 11 48 383.3 877.3
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +54sec : AC 6.6 12.8 58"  61.4, dT = +114sec
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 25  8 10  3.5 r   78673 G5  8.3  7.7   44-  83     41  73  69N 297  17 292 +8.5 -6.7 +1.8-0.3 .351  147.6      6 43 38.2  28 24  6 382.3 770.1
24 Sep 26  9 22  7.3 r   79642 K5  8.6  7.9   33-  70     44  76  65N 307  27 297 +8.1 -6.5 +2.0-0.9 .322  147.8      7 43 29.1  26 35 43 387.3 713.9
24 Sep 27  9 17  6.6 r   80288pK5  8.6  8.2v  24-  59     31  77  64S 262 336 248 +7.6 -5.9 +0.9+1.3 .385 -161.0      8 36 55.8  23 14 49 392.8 776.5
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = +1.1sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9  6 50.1 R   98567 A3  7.5  7.4   16-  47     18  77  45S 247 316 230 +6.8 -5.1 +0.1+2.0 .348 -141.3      9 26 34.5  19  3 36 397.8 859.7
24 Sep 28 10  4 14.6 r    1400cF5  8.3        16-  47     30  81  32N 350  62 333 +6.7 -5.1 +1.7-4.3 .188  118.1      9 29  0.7  19 17 19 396.6 769.3
      1400 is double: AB 8.42 9.96 1.09" 223.7, dT = +3sec
      1400 is a close double. Observations are highly desired
24 Sep 29 11  4 57   M    1504 M1  5.4  4.6    9-  35  -3 32  89   1S 206 276 186 +5.5 -4.0 +9.9+9.9 .000  -90.0     10 16 40.7  13 43 42 399.3 751.9
   R1504 = 37 Leonis
   Distance of 1504 to Terminator = 11.6"; to 3km sunlit peak = 0.0"
24 Oct  7  0 42 19.0 d    2251KK0  7.5  7.0   15+  46      7 239  41N  59 360  47 -5.9 +6.2 +0.3+0.2 .320   38.9     15 45 49.8 -24 43  1 399.6 797.5
24 Oct  9 23 27 46.4 D    2688 G6  7.0  6.6s  41+  80  -7 35 192  72N  70  57  73 -7.5 +7.6 +2.5+0.4 .317   10.1     18 32 14.0 -29 11 25 384.3 600.0
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2 19 27.4 d  164449DF0  7.2        74+ 119     45 197  67N  46  29  63 -6.5 +5.6 +1.5+1.2 .398    7.0     21 31 25.5 -19 14 15 365.7 711.6
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -4sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1  7 54.7 D    3288 K0  5.8  5.3   83+ 132     48 154  25N   1  25  21 -5.0 +4.4 +0.3+3.3 .254   51.5     22 24 27.1 -13 31 46 360.4 713.9
   R3288 = 50 Aquarii
24 Oct 14  4 30 46.8 D    3303kF2  6.4  6.2   84+ 133     41 224  57S  99  59 119 -5.5 +3.9 +2.8-1.2 .299  -49.3     22 30  1.5 -12 54 54 360.3 801.7
24 Oct 14 23 31 10   M    3421cM3  4.9  4.1v  91+ 145  -8 29 114   7S 147 203 168 -3.1 +3.0 +9.9+9.9 .000  -90.0     23 16 50.9 - 7 43 35 358.1 849.8
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 2.9"; to 3km sunlit peak = 0.0"
24 Oct 14 23 42 50.8 d    3422kF0  6.7  6.5   91+ 145 -11 31 116  55N  28  84  50 -3.1 +3.0 +0.9+2.3 .428   27.6     23 16 59.2 - 7  9 39 357.8 838.7
24 Oct 15  3  1 19.4 d  146658 K0  7.3  6.8   92+ 147     59 176  37N  11  15  33 -3.5 +2.6 +0.5+2.6 .352   35.4     23 21 15.4 - 6 11 33 355.1 742.8
24 Oct 16  4 54 15.3 D      35 K0  6.2  5.7   97+ 162     64 211  48N  24 356  45 -1.8 +0.5 +1.0+2.1 .410   23.0      0 17 47.7   1 41 19 352.1 761.5
24 Oct 19  6  3 21.2 r   75768 K0  7.6  7.1   95- 155     80 107  49S 206 275 220 +4.6 -4.7 +1.0+2.8 .355 -148.0      3 10 14.5  21 16 19 355.6 720.6
24 Oct 19  6 12 20.5 r   75764SF0  7.6        95- 155     83 110  25N 312  19 327 +4.6 -4.7 +6.7-6.0 .113  105.7      3 10  6.6  21 44 49 355.6 715.1
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +6sec : AB,C 7.6 13.5 48"  44.0, dT = +13sec : AB,D 7.6 15.8 55" 159.0, dT = +433sec
     75764 is a close double. Observations are highly desired
   Distance of 75764 to Terminator = 17.7"; to 3km sunlit peak = 6.5"
24 Oct 21  3 16 49.3 r     773wF8  7.0  6.7   81- 129     20  68  84S 256 327 260 +7.8 -6.1 +0.1+1.1 .568  176.8      5 10  3.9  27 33 23 369.51019.9
       773 is double: AB 7.0 9.3 315" 353.1, dT = +73sec
24 Oct 21 10 16 31.0 r   77138 A*  7.6  7.4   79- 126     70 286  57N 296 200 299 +6.9 -6.6 +2.2-1.8 .327  152.9      5 23  1.4  28 28  8 367.4 654.9
24 Oct 21 11 24  9   D     810SB7  1.7  1.7   79- 126  -1 56 285 -17N  10 282  13 +6.7 -6.6 +9.9+9.9 .045   83.6 .03  5 26 17.5  28 36 27 368.5 715.5
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Oct 21 11 28 12   Gr    810SB7  1.7  1.7   79- 126   0 53 ** GRAZE: CA-10.7N; Dist. 10km in az.  21deg. [Lat = 24.83-0.35(E.Long+81.05)]
24 Oct 21 11 32 31   R     810SB7  1.7  1.7   79- 125   1 54 285  -4N 358 271   1 +6.7 -6.6 +9.9+9.9 .045   96.4 .03  5 26 17.5  28 36 27 368.6 726.0
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Oct 22  6 26  9.9 r   78233SA3  7.5        71- 114     47  74  62S 242 326 240 +8.4 -6.7 +1.0+1.8 .397 -161.0      6 19 59.0  28 25 36 374.1 761.7
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.27sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -131sec
     78233 is a close double. Observations are highly desired
24 Oct 22  7 18 33   m   78282 K0  7.8  7.1   70- 114     57  74   7N 354  82 351 +8.3 -6.8 +9.9+9.9 .000   90.0      6 22 28.1  28 54 43 373.6 694.2
24 Oct 22  8 15 38.1 r   78294 A0  7.6  7.6   70- 114     70  74  88S 269   5 266 +8.1 -6.8 +2.4+0.5 .353  178.4      6 23  0.3  28 37 17 373.2 639.7
24 Oct 23 10 32 56.1 r   79394cA2  8.0  7.9   59- 101     86  42  51N 317  94 308 +8.0 -6.6 +2.3-2.6 .279  149.3      7 27 16.8  27 17 55 379.6 598.3
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.25sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10 50 54.0 r   79402 B8  7.3  6.9   59- 100  -9 87 331  44N 324 174 315 +7.9 -6.6 +2.0-3.1 .263  143.6      7 27 48.9  27 17 33 379.7 602.3
24 Oct 26  8 45 15.5 r   98892dK0  7.7  7.1   30-  66     29  85  75N 307  17 288 +6.8 -4.3 +1.1-0.6 .389  166.1     10  0 31.6  15 51 51 397.1 771.5
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +23sec
24 Oct 26  9 25 48.7 R   98897 K0  7.6  7.0   30-  66     38  89  83S 285 355 265 +6.7 -4.3 +1.5+0.2 .367 -169.0     10  1 20.7  15 40 14 396.4 718.0
24 Oct 27 10 11  2.1 r   99296kA3  8.0  7.9v  21-  55     37  95  44N 340  47 319 +5.5 -3.0 +1.0-2.5 .294  141.7     10 47 46.5  10 26 37 399.5 726.0
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Oct 29 10 25 22.9 r  138642 K0  9.5  9.0    8-  33     18 100  66S 270 334 248 +2.8 -0.3 +0.8+1.0 .361 -146.4     12 12  1.9 - 1  5 53 404.1 848.6
24 Nov  5 23 42 59.4 d  186563 K2  7.8  6.9   18+  50     21 222  20N  23 339  25 -6.7 +7.4 -0.2+2.1 .232   53.2     18 16 20.4 -28 55 54 389.2 729.1
24 Nov  6  0 20 23.4 d  186607 B8  8.6  8.6   18+  50     15 228  57S 126  76 128 -6.8 +7.3 +2.4-2.5 .262  -50.9     18 17 56.3 -29 15 26 389.7 785.0
24 Nov  6  0 59 46.9 d  186642 B8  8.3  8.3v  18+  50      8 233  79N  82  26  84 -6.9 +7.2 +0.7-0.6 .445   -6.8     18 19 24.3 -28 59 59 390.3 848.3
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  8 23 25  2   m  190052 F8  7.9  7.6   47+  86 -11 44 182  17S 147 145 163 -6.4 +6.0 +9.9+9.9 .000  -90.0     21  8 36.9 -21 40 59 373.8 655.6
24 Nov  8 23 28 26.1 D    3089SA0  5.3  5.3   47+  86 -11 44 183  46N  29  27  45 -6.4 +6.0 +1.4+1.9 .323   27.0     21  8 33.6 -21 11 37 373.8 657.2
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +29sec : AF 5.3 13.0 9.7"  14.0, dT = +29sec : AG 5.3 20.0 13.1"  62.0, dT = +34sec : AC 5.3
15.0 35" 114.8, dT = +9sec
      3089 is a close double. Observations are highly desired
24 Nov 10  0 26 20   m    3232 K0  8.1  7.4   58+ 100     49 186  19S 140 135 159 -5.9 +4.7 +9.9+9.9 .000  -90.0     22  4 12.2 -16  9 46 368.4 691.5
24 Nov 11  2 22 11.0 D Saturn      0.9  0.9   70+ 113     51 213  17N 353 323  14 -5.2 +3.0 -0.6+3.6 .251   53.8     22 58 12.9 - 8 52 27 363.4 749.2
   Saturn ring contacts offset by ±18.5 secs, at  2 21 52 and  2 22 30
   Saturn limb contacts offset by ±32.7 secs, at  2 21 38 and  2 22 44  Both contacts are against the bright limb of Saturn
24 Nov 11  2 47 54   GrSaturn      0.9  0.9   70+ 114     43 ** GRAZE: CA-17.9N; Dist.343km in az. 320deg. [Lat = 28.74+0.75(E.Long+81.05)]
24 Nov 11  3  4 17.2 D    3375 F2  6.8  6.6   70+ 114     45 225  79S  77  36  98 -5.3 +2.9 +2.0-0.1 .385  -29.3     23  0 19.9 - 8 52 50 363.7 779.5
24 Nov 11  3  6 15.9 R Saturn      0.9  0.9   70+ 114     45 226 -54N 282 240 303 -5.3 +2.9 +3.1-1.5 .263  126.3     22 58 12.9 - 8 52 27 363.7 783.0
   Saturn ring contacts offset by ±77.5 secs, at  3  4 58 and  3  7 33
   Saturn limb contacts offset by ±34.4 secs, at  3  5 41 and  3  6 50  Both contacts are against the bright limb of Saturn
24 Nov 11  6 23 40.1 d    3388SF2  5.5        71+ 115      7 259  53N  29 325  51 -5.5 +2.4 +0.0+1.2 .506   28.2     23  5  9.8 - 7 41 38 366.91022.8
   R3388 = 83 Aquarii
      3388 is triple: AB 6.20 6.34 0.15" 214.8, dT = -0.29sec : AB,C 5.5 7.2 257" 149.2, dT = -253sec
      3388 is a close double. Observations are highly desired
24 Nov 11 23 53 12.5 D    3505WG8  5.5  5.0   79+ 126     51 131  62N  37  81  59 -3.4 +1.7 +1.2+2.1 .429   11.3     23 47 56.5 - 2 45 42 359.9 762.9
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -198sec
24 Nov 12  1 58 55.9 d Neptune     7.8  7.8   80+ 127     63 185  57S  99  94 121 -3.7 +1.4 +3.8-0.7 .251  -53.5     23 50 57.8 - 2 24 44 358.9 734.4
   Neptune limb contacts offset by ±5.0 secs, at  1 58 50.9 and  1 59  0.9  Both contacts are against the bright limb of Neptune
24 Nov 14  2 14 37.3 D     241 G5  6.8  6.4   95+ 155     69 122  28N  10  62  30 -0.1 -2.1 +0.3+3.0 .350   38.8      1 37 40.9  12  4 42 354.3 770.9
24 Nov 15  5 32 34.6 d     397MB9  7.5  7.5   99+ 170     74 253  71S 110  43 126 +1.4 -4.1 +3.3-1.8 .263  -50.5      2 41  6.6  18 48  1 354.5 710.1
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +13sec : AC 7.7 9.5 66" 242.2, dT = -169sec
       397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 12.8"; to 3km sunlit peak = 3.7"
24 Nov 16  6 50 46.9 d     537SB6  3.7  3.8s 100- 173     71 273 -48S  79 355  91 +3.2 -5.4 +2.3+0.1 .394   -8.9      3 44 52.5  24  6 48 356.9 690.0
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
      day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.39sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+107sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  7 38 20.4 d     541SB8  3.9  3.9s 100- 173     60 277 -87S  42 319  54 +3.1 -5.5 +2.0+1.8 .350   32.1      3 45 49.6  24 22  4 357.5 716.7
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +278sec : AB 3.8 13.7 113"  72.8, dT = +278sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  8 11 27.7 R     537SB6  3.7  3.8s 100- 173     53 278  63N 248 167 259 +3.0 -5.5 +1.8+0.3 .426 -171.3      3 44 52.5  24  6 48 358.1 748.1
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.3sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+54sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 5.5"; to 3km sunlit peak = 0.0"
24 Nov 16  8 12 22   Gr    545SB6  4.1  4.2v 100- 173     51 ** GRAZE: CA 35.8S; Dist. 23km in az.   5deg. [Lat = 24.93-0.08(E.Long+81.05)]
   Distance of 545 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Nov 16  8 12 23   M     545SB6  4.1  4.2v 100- 173     53 278  36S 166  86 178 +3.0 -5.5 +9.9+9.9 .000  -90.0      3 46 19.6  23 56 54 358.1 747.7
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0 : AB 4.2 14.4 110" 180.2 : AC 4.2 12.9 147" 336.0
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 2.4"; to 3km sunlit peak = 0.0"
24 Nov 16  8 25 13.0 D     552SB7  2.9  2.9s 100- 173     50 279 -11S 120  40 132 +3.0 -5.5 +1.5-2.4 .321  -42.8      3 47 29.1  24  6 18 358.3 760.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = 0.00sec : AE 2.8 15.0 78" 232.4, dT = -93sec : AB 2.8 6.3 118"
291.1, dT = -362sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 42 19.0 r     541SB8  3.9  3.9s 100- 173     46 280  21N 291 211 302 +3.0 -5.5 +1.3-1.7 .380  147.6      3 45 49.6  24 22  4 358.6 782.2
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +235sec : AB 3.8 13.7 113"  72.8, dT = +236sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 0.9"; to 3km sunlit peak = 0.0"
24 Nov 16  9 18 14.4 R     549SA0  6.3  6.3  100- 173     38 282  89S 222 145 233 +2.9 -5.5 +1.6+1.3 .374 -141.9      3 47 21.0  24  6 59 359.3 829.4
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -10sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = -24sec : BC 6.3 8.2 86" 345.0, dT =
+126sec
24 Nov 16  9 20  4.1 R     552SB7  2.9  2.9s 100- 173     38 282  85S 218 141 229 +2.9 -5.5 +1.7+1.6 .351 -137.4      3 47 29.1  24  6 18 359.4 831.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.09sec : AE 2.8 15.0 78" 232.4, dT = -216sec : AB 2.8 6.3 118"
291.1, dT = -95sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 7.7"; to 3km sunlit peak = 0.6"
24 Nov 16  9 40  8   Gr    560SB8  3.6  3.7s 100- 173     33 ** GRAZE: CA 37.3S; Dist.164km in az.  17deg. [Lat = 26.27-0.28(E.Long+81.05)]
   Distance of 560 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 16  9 41  0   M     560SB8  3.6  3.7s 100- 173     34 284  38S 171  96 183 +2.9 -5.5 +9.9+9.9 .000  -90.0      3 49  9.7  24  3 12 359.8 861.3
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7 : Aa,Ab 3.8 6.8 0.22" 336.1 : AC 3.6 15.0 50"  36.4 : AH 3.6 16.0 68" 221.7
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Nov 16 10  3 12.6 R     561SB7  5.1  5.1V 100- 172     29 285  74S 209 134 220 +2.9 -5.5 +1.6+2.1 .306 -126.6      3 49 11.2  24  8 12 360.3 897.0
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.6sec : AF 5.0 14.5 4.7" 221.0, dT = -15sec : AE 5.1 14.8 96"  76.8, dT = +210sec : AD 5.1
14.7 144"  65.9, dT = +374sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 7.7"; to 3km sunlit peak = 0.6"
24 Nov 17 11  8 55.0 r   76841cK1  7.3  6.7   97- 159  -8 29 289  64S 225 150 231 +4.4 -6.2 +1.5+1.0 .351 -133.0      4 55 34.6  27 12  9 364.6 909.6
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.19sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 20  9 57 32.7 R    1206 G8  5.9  5.3   76- 121     83 278  75N 294 200 283 +7.2 -6.1 +2.4-1.3 .343 -179.2      8  0 55.9  25 23 34 378.2 629.2
   R1206 = omega Cancri
24 Nov 20 10 31 36.0 R    1211SA1  6.3  6.3   75- 121     75 275  56S 245 157 234 +7.1 -6.0 +3.8+1.4 .222 -128.8      8  1 43.8  25  5 22 378.5 651.3
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +159sec : AC 6.3 11.6 106" 295.0, dT = -308sec
24 Nov 21  8 58 40.0 r   80499 K0  8.2  7.6   66- 109     72  95  82N 293  10 277 +7.4 -5.4 +2.5-0.8 .329 -176.1      8 54 32.2  21 49 13 384.1 613.6
24 Nov 23  7 35 51.7 r   99157pF2  7.4        47-  86     30  90  67S 269 338 249 +6.4 -3.3 +1.2+1.0 .351 -151.8     10 29 25.6  12 11 13 396.2 764.9
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.25sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 40 26.4 r  119114 F2  7.2  7.0   28-  64      9  93  80S 284 349 262 +3.9 -0.7 +0.3+0.4 .443 -163.9     11 55 23.9   1  5 45 403.5 901.9
24 Nov 25  9 18 45.4 R  119138 K0  7.4  6.9   28-  64     31 105  52N 331  33 309 +3.6 -0.5 +0.7-1.7 .358  155.4     11 58 13.0   0 52  9 401.4 767.0
24 Nov 25 10 20 54.1 R    1730wK2  6.2  5.5   28-  63     44 115  84N 300 356 278 +3.5 -0.4 +1.6-0.6 .355 -169.2     11 59  3.3   0 31 50 400.3 702.3
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +24sec
24 Nov 26 10 56 38.3 R  138921KG5  8.1  7.7   20-  52 -12 39 121  60N 322  14 301 +2.0 +1.0 +1.0-1.4 .365  169.7     12 41 59.6 - 5 13 15 401.3 722.6
24 Nov 27 10 33  0.0 R  157912kF0  7.8  7.6   13-  42     24 116  57S 257 314 237 +0.8 +2.3 +1.9+1.9 .261 -128.8     13 23 56.5 -10 52 15 402.3 813.2
24 Nov 27 10 58 19.0 D    1925SB1  1.0  1.1v  13-  42 -12 28 120  -4S 196 250 176 +0.7 +2.4 -1.7-5.3 .161  -66.4     13 25 11.6 -11  9 41 401.8 782.9
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -913sec : AC 1.0 10.5 368"  60.8, dT = -
1622sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 11 15 15   Gr   1925SB1  1.0  1.1v  13-  41  -7 34 ** GRAZE: CA 21.0S; Dist.149km in az. 215deg. [Lat = 23.10-0.63(E.Long+81.05)]
24 Nov 27 11 29 38.4 R    1925SB1  1.0  1.1v  12-  41  -5 35 125  45S 245 294 224 +0.6 +2.5 +4.0+3.8 .153 -113.6     13 25 11.6 -11  9 41 401.2 745.5
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +852sec : AC 1.0 10.5 368"  60.8, dT =
+2393sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11  6 23.8 d    2029 M1  4.9  4.1v   7-  31 -10 19 119 -49S 146 202 127 -0.6 +3.7 +0.2-1.1 .408  -19.4 .01 14 10 50.5 -16 18  7 401.4 842.2
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 15 47.0 r    2029 M1  4.9  4.1v   7-  30   5 32 131  84N 290 336 272 -0.8 +3.8 +1.5+0.0 .365 -160.7 .01 14 10 50.5 -16 18  7 400.0 750.0
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Dec  3 23 27 31.0 D    2765 A3  7.9  7.8    7+  32 -12 13 231  51N  54   1  60 -5.9 +7.0 +0.4+0.3 .433   15.5      19  0  0.2 -28  3  3 386.1 841.6
24 Dec  4 21 53 40.7 d    2910cG3  4.7  4.3   13+  43   8 35 204  62S 112  87 123 -5.6 +6.7 +3.5-1.6 .241  -48.8      19 55 50.4 -26 17 58 380.7 676.6
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 22 47  9.5 r    2910cG3  4.7  4.3   14+  43  -3 29 217 -19S 193 156 204 -5.8 +6.6 -0.2+2.3 .261 -131.0      19 55 50.4 -26 17 58 381.2 736.4
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  5  0 43  9.5 d  188809 F5  8.7  8.4   14+  44     11 235  73S 101  45 111 -6.0 +6.4 +1.2-1.3 .387  -37.2      20  0 36.8 -25 42 10 382.8 902.1
24 Dec  5 23 35 28.6 d  189831 K0  8.5  7.9   22+  56     33 218  89N  77  39  92 -5.6 +5.8 +1.8-0.2 .385  -20.8      20 54 50.6 -22  6  6 377.4 754.6
24 Dec  5 23 53 28.8 d  189843 K2  8.3  7.7   22+  56     30 222  70S  97  56 112 -5.7 +5.7 +2.3-1.1 .321  -40.8      20 55 18.7 -22  7 25 377.6 776.0
24 Dec  6  1  9 56   m    3062 K2  7.5  6.8   22+  56     18 235  19S 148  94 163 -5.8 +5.6 +9.9+9.9 .000  -90.0      20 56 52.7 -22  0 21 378.7 880.8
24 Dec  6  1 10  4   Gr   3062 K2  7.5  6.8   22+  56     16 ** GRAZE: CA 19.0S; Dist. 44km in az. 326deg. [Lat = 25.20+0.60(E.Long+81.05)]
24 Dec  7  0 40 31.9 D    3197 K3  6.4  5.6   32+  69     35 225  88N  70  27  88 -5.4 +4.5 +1.5+0.1 .413  -18.0      21 50 13.0 -16 50 42 373.8 786.5
24 Dec  7 23 28 42   m  165228 K3  7.9  7.1   42+  81 -12 53 193  21S 137 125 158 -4.5 +3.4 +9.9+9.9 .000  -90.0      22 40 20.7 -11 36 19 369.3 704.3
24 Dec  8 23 29 41   m  146747 K0  8.0  7.5   54+  94     60 173  21S 136 142 157 -3.6 +1.8 +9.9+9.9 .000  -90.0      23 30 57.4 - 5  3 39 365.8 708.8
24 Dec  9  1 29 30.2 D    3472PF5  6.9  6.7   54+  95     52 225  42S 115  75 137 -4.0 +1.5 +5.0-3.5 .158  -68.1      23 33 28.6 - 4 24  5 366.1 750.8
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.6sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 46 21.9 d  146789kF2  7.2  7.0   55+  95     38 243  80S  77  22  99 -4.1 +1.3 +1.6-0.2 .410  -26.5      23 35 14.7 - 3 51 14 367.0 815.1
24 Dec 10  1 24 37.8 d      47 F0  7.7  7.5   66+ 108     65 212  62N  39  10  61 -2.9 -0.1 +1.5+1.7 .408    7.2       0 23 38.5   2 44 35 362.8 723.6
24 Dec 10 23 41 46.6 d  109738 G5  7.8  7.1   76+ 121     62 120  83N  62 115  83 -1.3 -1.5 +1.8+1.5 .424  -14.0       1 13 41.8   8 58 29 361.1 764.5
24 Dec 11  2  3 39.9 d     186pF2  7.3        76+ 122     72 217  27N   5 332  26 -1.6 -1.9 +0.4+3.4 .297   43.5       1 15 46.7   9 47  5 360.5 715.2
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.23sec
       186 is a close double. Observations are highly desired
24 Dec 12 23 41  7.7 d     452 A2  7.7  7.6   93+ 148     44  84  64N  53 129  68 +1.8 -4.4 +0.7+1.7 .503    4.5       3  5 30.3  20 54  9 361.1 883.2
24 Dec 13  2 42 39   d   75768 K0  7.6  7.1   93+ 149     84 119  34S 137 195 151 +1.4 -4.8 +8.2-8.9 .083  -78.0       3 10 14.5  21 16 19 359.2 700.3
24 Dec 13  2 50  3.4 d   75764SF0  7.6        93+ 149     85 125  35N  26  79  40 +1.4 -4.8 +1.2+2.9 .335   33.2       3 10  6.6  21 44 49 359.2 697.1
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +0.7sec : AB,C 7.6 13.5 48"  44.0, dT = +137sec : AB,D 7.6 15.8 55" 159.0, dT = -111sec
     75764 is a close double. Observations are highly desired
24 Dec 13  2 51 23   Gr  75768 K0  7.6  7.1   93+ 149     86 ** GRAZE: CA 21.8S; Dist. 39km in az. 148deg. [Lat = 24.31+0.57(E.Long+81.05)]
24 Dec 13  3 26 22.6 d     461cK0  7.2  6.7   93+ 150     85 241  18N   9 310  23 +1.3 -4.9 +0.7+4.3 .242   52.0       3 10 39.9  21 53 34 359.2 684.9
   Distance of 461 to Terminator = 14.7"; to 3km sunlit peak = 4.2"
24 Dec 15  4 55 17.6 d     797cB9  6.4  6.3e 100+ 175     85  42  58N 120 256 123 +4.2 -6.4 +2.9-1.7 .287  -38.6       5 20 59.3  27 57 26 363.5 648.4
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  24%
   Distance of 797 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Dec 16  8 47 59.8 r     996cA2  6.9  6.8   99- 167     55 285  63N 279 192 275 +4.8 -6.4 +1.7-1.0 .414 -173.8       6 30 22.0  28 12 44 369.2 745.0
       996 is double:  7.6 7.6
24 Dec 16  9 56 48.6 r   78480cK5  7.5  6.7   99- 166     41 286  55S 218 138 215 +4.6 -6.3 +3.5+3.0 .176 -112.1       6 33  2.1  27 49 31 370.5 840.9
     78480 is double: ** 8.3 8.3 0.10"  63.0, dT = +0.5sec
     78480 has been reported as non-instantaneous (OCc 720). Observations are highly desired
   Distance of 78480 to Terminator = 18.0"; to 3km sunlit peak = 7.3"
24 Dec 16 11  4 36.2 R    1008 A0  5.3  5.3s  98- 166     27 290  43N 302 227 298 +4.6 -6.2 +0.1-1.6 .508  164.1       6 35 12.1  28  1 20 372.0 952.7
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 13.4"; to 3km sunlit peak = 4.1"
24 Dec 18  2 19 41.5 r    1251 B9  5.9  5.9   90- 144     14  70  58N 310  19 297 +7.1 -5.6 +0.7-0.5 .431  147.0       8 20 32.1  24  1 20 381.5 951.8
   R1251 = lambda Cancri
```

Occultation prediction for Marathon Key Airport
E. Longitude - 81 3 4.0, Latitude 24 43 29.2, Alt. 1m; Telescope dia 15cm; dMag 0.0

y	m	day d	Time h	m	s	P	Star No	Sp D	Mag v	Mag r	V	% ill	Elon	Sun Alt	Moon Alt	Az	CA o	PA o	VA o	AA o	Libration L	B	A m/o	B m/o	RV "/s	Cct o	durn sec	R.A. (J2000) h	m	s	Dec o	m	s	Mdist Mm	SV m/s
24	Dec	18	4	22	5.4	r	80165	F2	7.5	7.3		90-	143	40	79	37N	331	48	318	+6.9	-5.6	+2.0	-2.4	.266	130.4		8	24	55.2	23	56	43	379.5	754.4
24	Dec	19	5	51	12.4	r	98510	kG5	7.2	6.8		83-	131	48	88	29S	224	298	207	+6.7	-4.7	+2.2	+6.7	.132	-110.8		9	20	37.9	19	5	26	384.5	695.7
24	Dec	22	9	22	6.6	R	1696	F5	6.9	6.7		55-	95	57	129	88S	292	337	270	+3.7	-0.6	+2.4	-0.5	.315	-157.7		11	42	25.5	2	21	44	396.7	655.0
24	Dec	24	10	2	22.0	R	1886c	K3	5.6	5.0		36-	73	42	131	46N	336	20	315	+1.0	+2.3	+0.7	-1.9	.332	157.1		13	8	32.5	- 8	59	4	400.2	700.5

1886 is double: ** 6.5 6.5 0.10" 90.0, dT = +0.12sec
1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired

24	Dec	24	11	20	0.3	R	1887	K0	6.3	5.8		35-	73	-10	53	155	65S	267	290	246	+0.7	+2.4	+3.8	+0.6	.221	-131.7		13	9	14.2	- 9	32	17	399.4	644.3
24	Dec	25	10	15	44.3	R	158207	F0	7.4	7.2		27-	62		34	130	37S	236	282	217	-0.3	+3.5	+6.2	+6.3	.101	-105.5		13	52	15.4	-14	40	36	400.2	737.9
24	Dec	25	11	33	41.2	r	1992c	F0	7.5		S	27-	62	-8	45	149	61N	317	346	298	-0.6	+3.7	+1.4	-1.3	.341	174.9		13	53	51.7	-14	39	51	399.1	662.2

1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.8sec
1992 is a close double. Observations are highly desired
1992 = NSV 19984, 7.4, , Type VAR:

Lunar Occultation predictions
Coleman Science Works Theater
Tampa
Florida
USA

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 46 18.0 R    1770 A5  5.9  5.8   56-  97     61 173  61N 322 328 300 -3.1 -1.4 +1.6-2.0 .329  173.9     12 18 40.3 - 0 47 14 397.3 638.4
   R1770 = 13 Virginis
24 Jan  4  8 37 15.9 r    1865 A2  7.3  7.2   47-  87     35 121  83S 285 335 264 -3.8 -0.3 +1.6+0.3 .353 -155.0     12 59  0.2 - 6  5 27 396.7 749.4
24 Jan  5  8 32 13.4 r    1966kK2  7.8  7.1   38-  76     23 118  18N   3  56 344 -4.7 +1.1 -0.7-3.3 .243  124.2     13 44 15.6 -11 26 12 393.9 826.7
24 Jan  5 10 34  4   M    1971SG8  5.5        37-  75     42 144  22S 222 254 203 -5.1 +1.3 +9.9+9.9 .000  -90.0     13 45 56.3 -12 25 36 391.7 700.3
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1 : AC 5.7 11.9 27.4" 162.6
      1971 is a close double. Observations are highly desired
24 Jan  7 10 44 29.2 R    2204kK0  7.7  7.1   19-  52     23 133  87S 278 322 265 -6.0 +4.1 +1.4+0.6 .397 -155.8     15 24 57.6 -22  2 37 382.9 808.6
24 Jan  7 10 49 56.6 R X 39461pK0  7.5  7.0   19-  52     24 134  60N 312 355 299 -6.0 +4.1 +0.7-0.5 .426  170.8     15 25 22.6 -21 55 45 382.8 801.5
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +11sec : AC 7.9 13.5 40" 190.5, dT = +48sec
   X 39461 is a close double. Observations are highly desired
24 Jan  7 11 36 29   m  183474kK0  8.1  7.5   19-  51 -10 30 144  22S 213 248 200 -6.1 +4.2 +9.9+9.9 .000  -90.0     15 26 44.6 -22 30 20 382.0 746.8
24 Jan  8 10 42  4.8 R    2349SB1  2.9     v  11-  39     11 127  67N 297 349 289 -5.8 +5.3 +0.5+0.1 .486  178.0     16 21 11.3 -25 35 34 378.3 891.6
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = 0.00sec : AB 2.9 8.4 20.3" 273.1, dT = -38sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 20  7.2 D    2366dM1  1.1  0.1v  11-  38  21 35 172 -76S 107 115  99 -6.4 +5.7 +2.3-0.3 .358    4.8 .12 16 29 24.5 -26 25 55 375.0 653.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 50 21.8 R    2366dM1  1.1  0.1v  10-  38  34 34 196  72N 290 274 283 -6.7 +5.8 +2.4-0.9 .351  174.8 .12 16 29 24.5 -26 25 55 374.8 641.5
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 11 22 54.9 R    2505 K4  5.3  4.5    5-  27      7 127  90S 263 316 260 -5.3 +6.3 +0.9+1.1 .458 -155.1     17 23 21.6 -28  8 34 373.1 914.9
   R2505 = 43 Ophiuchi
24 Jan 13 23 41 58.0 d  164823 G0  8.6  8.2    8+  34 -11 20 237  61S 105  54 124 -0.3 +5.5 +1.7-1.7 .345  -49.4     22  1 50.2 -16 46 39 360.3 926.5
24 Jan 14  0 59 13.9 d    3232 K0  8.1  7.4    9+  34      6 248  71N  57 358  76 -0.3 +5.3 +0.1+0.1 .589    1.8     22  4 12.2 -16  9 46 361.91034.9
24 Jan 14 23 35 24.2 d    3365kA0  8.2  8.1   16+  47  -9 35 232  66N  47   2  68 +1.4 +4.3 +0.9+0.7 .480    4.4     22 56 49.4 -10 15 47 360.3 841.6
24 Jan 15  1 59 48.4 d    3377 K0  7.9  7.4   17+  49      8 255  76N  56 356  77 +1.3 +4.0 +0.2+0.2 .581    1.8     23  1  7.9 - 9 33 14 363.31023.6
24 Jan 16  0 48 53.0 d  146936 K5  7.9  7.2   26+  61     35 243  48S 110  58 132 +2.8 +2.7 +2.4-2.5 .254  -57.8     23 51 28.9 - 3 24 14 363.0 841.1
24 Jan 16  1 45 39.5 D    3514cG9  5.9  5.4   26+  62     24 252  41S 117  59 139 +2.7 +2.6 +1.8-3.3 .242  -61.9     23 52 55.6 - 3  9 20 364.2 905.7
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9, dT = +0.29sec
      3514 is a close double. Observations are highly desired
24 Jan 17  0 18 58.4 d  109370 K2  8.2  7.5   37+  75     54 232  58N  35 350  56 +4.0 +1.2 +1.2+1.6 .408   14.8      0 41 21.3   3 35 58 365.0 747.7
24 Jan 17 23 56 33.6 d  109947 K0  7.8  7.2   48+  88     70 211  72N  51  24  71 +5.0 -0.4 +1.8+1.4 .391   -1.4      1 31 53.2   9 59 18 368.0 698.9
24 Jan 18  2 35  8.6 d     232 K0  8.1  7.4   49+  89     41 260  87N  66   4  86 +4.6 -0.7 +1.4+0.1 .432   -7.2      1 35 33.4  10 33 42 370.3 781.6
24 Jan 19  3 11 46.2 d     363 F0  7.2  7.0   60+ 102     46 265  46N  28 321  45 +5.1 -2.3 +1.4+2.1 .328   36.4      2 27 32.1  16 38 37 374.1 740.0
24 Jan 19 20 37 28   m     465 K2  4.4  3.8s  69+ 112  26 33  83  17S 149 218 163 +6.5 -2.9 +9.9+9.9 .000  -90.0      3 11 37.8  19 43 36 378.2 907.0
   R465 = Botein = delta Arietis
       465 = NSV 1066, 4.33 to 4.37, V
24 Jan 19 20 45  0   Gr    465 K2  4.4  3.8s  69+ 112  21 36 ** GRAZE: CA 16.3S; Dist.346km in az. 317deg. [Lat = 32.34+0.83(E.Long+82.41)]
24 Jan 20  3  8 39.7 d X 65442C    8.1  7.9e  70+ 114     59 265  38S 128  57 142 +5.4 -3.7 +2.6-4.4 .185  -59.9      3 21 13.6  21  8 49 377.3 672.8
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Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   X 65442 is double: BA 8.1 5.3 0.9"  32.6, dT = -0.5sec
   X 65442 is a close double. Observations are highly desired
   X 65442 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  3  8 40.5 D     486CB5  5.3     e  70+ 114     59 265  38S 128  57 142 +5.4 -3.7 +2.6-4.4 .185  -59.8      3 21 13.6  21  8 49 377.3 672.8
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6, dT = +0.49sec
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 23  6 42 52.5 d   78191 A0  7.7  7.7   94+ 151     50 281  78S 112  33 110 +4.5 -6.2 +1.2-1.7 .380  -10.1      6 17 59.9  28  0 24 389.2 728.0
24 Jan 24  5 24 20.2 D    1093SF8  6.6     s  98+ 162     78 270  68S 135  52 128 +4.3 -6.5 +1.9-2.7 .281  -29.2      7 12 49.0  27 13 30 390.7 609.5
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.5sec : AC 7.2 12.8 13.7"  74.4, dT = +24sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  5 24 20.2 d X 99111S    7.2  7.0s  98+ 162     78 270  68S 135  52 128 +4.3 -6.5 +1.9-2.7 .281  -29.2      7 12 49.0  27 13 30 390.7 609.5
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.5sec : BC 7.3 12.7 14.0"  68.0, dT = +19sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  9 19 34.7 d    1108cG8  7.0  6.5   98+ 163     28 287  84N 107  36 100 +3.6 -6.2 +0.3-1.4 .471    2.6      7 19 30.8  26 49 23 394.4 901.6
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.2sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 44 11.6 D    1206 G8  5.9  5.3   99+ 171     30  75  81N 126 197 114 +4.6 -6.4 +1.3-0.4 .358  -32.3      8  0 55.9  25 23 34 396.0 813.7
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 10.5"; to 3km sunlit peak = 2.3"
24 Jan 27  8 18 41   m   98792wK2  7.8  7.0   98- 162     68 244  31S 219 163 200 +1.3 -5.0 +9.9+9.9 .000  -90.0      9 49 52.8  16 50 18 398.2 664.4
     98792 is double: AB 7.9 11.1 25.3" 320.7
   Distance of 98792 to Terminator = 12.6"; to 3km sunlit peak = 3.4"
24 Jan 28  2 42 54.6 r   99149 A2  7.1  7.0   94- 153     22  86  81N 293 358 273 +1.4 -4.6 +0.7+0.1 .421  180.0     10 28 42.4  13 17 20 402.8 822.2
24 Jan 28  7 12 57.7 r   99185pA3  7.9  7.7   94- 152     73 159  80S 276 294 255 +0.5 -4.2 +3.2-0.2 .262 -144.5     10 34  7.3  12 22 28 399.2 622.8
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.08sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 11 30.0 r    1625SK3  5.8  5.2   89- 142     17  90   8N  11  75 350 +0.0 -3.5 +0.6-7.7 .118  105.8 .01 11 14  1.8   8  3 39 403.9 852.6
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = -0.17sec : AB 5.8 11.8 23.8" 260.1, dT = +74sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
   Distance of 1625 to Terminator = 5.7"; to 3km sunlit peak = 0.0"
24 Jan 29 10 24  9   Gr   1644 B9  4.1  4.1   88- 140     52 ** GRAZE: CA 21.7S; Dist. 75km in az.  51deg. [Lat = 29.12-1.08(E.Long+82.41)]
24 Jan 29 10 26 31   M    1644 B9  4.1  4.1   88- 140     53 240  22S 223 172 201 -1.5 -2.7 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 400.7 693.7
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6  5 41.9 R    1732cK0  6.8  6.1v  82- 130     42 116  56N 326  19 304 -1.8 -2.0 +1.0-1.5 .349  163.4     11 59 23.9   1 49 36 401.1 709.3
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.27sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7  6 28.3 r    1824pG0  7.8  7.5   74- 119     42 126  39N 344  29 322 -3.3 -0.5 +0.5-2.3 .311  148.3     12 42 59.3 - 4  2 58 399.6 708.7
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -3sec
      1824 is a close double. Observations are highly desired
24 Jan 31 10  5 20.7 r  138955 K2  7.2  6.5   74- 118     56 193  62N 321 309 300 -4.0 -0.1 +1.6-2.0 .328  174.2     12 45 32.0 - 4 48 39 398.3 636.2
24 Feb  2 11 36 14.1 r    2040cK0  8.0  7.3   55-  95  -9 45 193  81N 298 286 280 -6.4 +2.9 +2.4-1.2 .323 -170.2     14 15 50.2 -16  4 53 392.2 624.2
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.27sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
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Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb  4  8 13  2.0 R    2270 B2  5.4  5.4e  36-  73      9 124  10N   1  54 350 -6.8 +4.9 -1.5-3.3 .221  117.4     15 53 55.9 -23 58 41 385.8 898.7
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4  8 30 42   Gr   2269cB5  5.4  5.4   35-  73     13 ** GRAZE: CA 17.9S; Dist. 31km in az.  35deg. [Lat = 28.40-0.61(E.Long+82.41)]
24 Feb  4  8 30 43   M    2269cB5  5.4  5.4   35-  73     12 127  18S 209 260 198 -6.9 +5.0 +9.9+9.9 .000  -90.0     15 53 53.9 -24 31 59 385.5 873.0
24 Feb  4 11 50 55.5 R    2286kB5  5.4  5.5v  35-  72  -6 36 168  72N 298 310 288 -7.4 +5.4 +2.1-0.6 .348  178.9     15 58 34.9 -24 49 53 382.2 645.5
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  5 10 34  3.6 r  184777pA0  8.4  8.4   25-  60     21 140  84S 268 308 262 -7.0 +6.2 +1.7+0.9 .384 -155.6     16 54 27.0 -27 34  9 377.8 773.0
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.45sec
    184777 is a close double. Observations are highly desired
24 Feb  5 10 34 52.9 r  184783 G6  7.9  7.4   25-  60     21 140  41S 225 265 219 -7.0 +6.2 +4.1+4.2 .162 -112.5     16 54 49.6 -27 44 55 377.8 772.5
24 Feb  6 11 27  1.9 R    2586cB3  6.0  6.0   16-  47 -11 19 139  35N 320   1 321 -6.5 +7.0 +0.5-0.8 .340  142.2     17 58 39.0 -28 45 33 371.5 775.3
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.6sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb 11 23 43 52.2 d  146719KF8  8.1  7.8    6+  28  -6 21 251  51N  32 335  54 +1.3 +3.1 +0.3+1.1 .507   22.8     23 28 17.0 - 5 49  4 357.2 952.0
24 Feb 13  0 56  7.7 d  109178 K0  8.9  8.3   13+  42     20 261  87N  65   4  86 +3.0 +1.3 +0.6+0.0 .536   -6.8      0 23 55.0   1 32 19 360.4 943.8
24 Feb 13  1  6 32.6 D  109182 G0  7.8  7.4   13+  42     18 262  86S  72  11  94 +3.0 +1.3 +0.6-0.3 .532  -13.6      0 24 17.3   1 33 22 360.6 957.8
24 Feb 13  1 55 27.7 D      50dG5  5.8  5.3S  13+  43      8 268  53N  31 329  53 +3.1 +1.2 +0.2+1.1 .507   30.0      0 25 24.2   1 56 23 361.91027.7
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14  0 16 11.1 d  109759 K5  9.0  8.1   22+  56     42 255  45S 112  53 133 +4.6 -0.3 +2.2-2.7 .254  -56.1      1 15  7.2   8  2 35 362.5 801.6
24 Feb 14 23 41 59.9 d     309 F0  8.2  8.0V  32+  69  -6 63 246  55N  34 337  53 +5.8 -1.9 +1.5+1.9 .369   21.9      2  6 41.6  14 35  2 366.1 706.2
       309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  1 57 13.9 d   92820 K2  8.2  7.6   33+  70     35 270  63N  43 337  61 +5.5 -2.1 +1.1+1.0 .424   22.3      2 10 15.7  15  1 23 368.6 818.7
24 Feb 15  2 19  5.5 d   92821 K0  8.1  7.3   33+  70     30 272  38N  18 312  36 +5.4 -2.1 +1.1+2.4 .314   48.4      2 10 29.4  15  9  5 369.2 847.4
24 Feb 15  3 24 41.1 D     326cM0  5.7  4.9s  33+  70     16 279  67N  47 343  65 +5.4 -2.2 +0.6+0.5 .484   22.5      2 13  3.3  15 16 48 370.8 942.8
   R326 = 19 Arietis
       326 is double: ** 6.8 6.8 0.050"
       326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
       326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 26 57.1 d   75708 K0  8.0  7.1   43+  82     54 267  43N  27 316  41 +6.2 -3.5 +1.7+2.5 .295   40.9      3  3  9.6  20 20 10 372.4 704.5
24 Feb 16  4 46 32.3 d     459SK2  6.4  5.8   45+  84     12 287  43N  27 322  41 +5.9 -3.6 +0.9+1.6 .334   51.2      3  9 20.1  20 45 40 377.0 974.4
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -310sec : AB 6.5 8.8 122" 239.0, dT = -310sec
       459 is a close double. Observations are highly desired
24 Feb 17  0 38 59.3 D   76358kB9  7.2  7.2   54+  95     77 256  55S 114  43 124 +6.8 -4.7 +3.1-2.1 .244  -44.8      3 58 20.9  24  4 52 376.6 628.7
24 Feb 17  0 44 24.2 D     587 K0  6.2  5.5   54+  95     76 260  13N   2 288  12 +6.8 -4.7 +0.9+7.7 .130   67.9 .01  3 57 26.4  24 27 43 376.7 629.8
24 Feb 18  0 44 17.1 d   76841cK1  7.3  6.7   65+ 107     88 249  48N  43 335  48 +6.8 -5.7 +2.2+2.6 .274   32.9      4 55 34.6  27 12  9 381.6 604.0
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.23sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 34 50.3 D     746WB7  7.0  6.9   65+ 108     52 280  48N  44 325  49 +6.2 -5.7 +2.4+1.7 .266   45.0      4 59 53.7  27 19 32 383.5 698.9
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -73sec
24 Feb 18 23 11 15   d     885wG7  5.6  5.1   74+ 118   2 60  82  24S 157 239 158 +7.0 -6.2 +9.9+9.9 .061  -80.2 .02  5 50 58.1  27 58  4 386.7 674.5
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = +43sec
24 Feb 18 23 18 42   Gr    885wG7  5.6  5.1   74+ 118   0 63 ** GRAZE: CA 14.5S; Dist. 27km in az. 154deg. [Lat = 27.79+0.42(E.Long+82.41)]
24 Feb 18 23 26 22   R     885wG7  5.6  5.1   74+ 118  -2 63  83   4S 178 261 178 +6.9 -6.3 +9.9+9.9 .060  -99.8 .02  5 50 58.1  27 58  4 386.6 657.8
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -103sec
   Distance of 885 to Terminator = 8.4"; to 3km sunlit peak = 0.0"
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb 19  4 50 16.4 D   77818 K5  6.7  5.8   75+ 120     48 282  65S 118  39 117 +5.7 -6.3 +1.0-2.0 .370  -18.1      6  0  4.9  28  7 33 388.5 734.1
24 Feb 21  2 53 58.2 D    1181cG8  7.0        90+ 142     84 106  69N  86 158  76 +5.0 -6.6 +3.0+0.4 .285   21.2      7 49 47.7  26 15 50 393.6 582.6
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.6sec
      1181 is a close double. Observations are highly desired
24 Feb 27  6  4 33.7 r    1790 M4  6.9  6.0v  93- 150     53 141  32N 351  24 329 -2.3 -0.7 +0.4-2.8 .277  143.8     12 29  9.7 - 2 25 46 400.3 667.2
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 22 52.3 r    1890 K0  7.3  6.8   88- 140     24 114  35N 347  42 327 -3.2 +0.5 +0.0-2.2 .320  140.4     13  9 46.3 - 7 39 19 401.3 809.1
24 Feb 29  8 40 11.6 R    2002 K0  6.8  6.3   80- 127     48 175  51N 330 335 312 -5.3 +2.5 +1.3-1.9 .313  161.2     13 58 29.8 -14  7 19 396.3 635.8
24 Mar  2 10 41 32.1 d    2237cK3  5.0  4.3s  62- 104     38 184 -66N  81  77  69 -7.4 +5.2 +3.3+0.3 .259   36.8 .01 15 40 16.9 -23 49  5 388.9 610.3
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.3sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12  0 29.5 r    2237cK3  5.0  4.3s  62- 104   1 34 205  46N 328 304 317 -7.7 +5.3 +2.1-2.4 .261  142.9 .01 15 40 16.9 -23 49  5 389.0 616.6
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.16sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  6 59  1.5 D    2366dM1  1.1  0.1v  53-  93      8 126 -81N  90 143  82 -7.1 +5.8 +0.9+1.0 .428   24.7 .10 16 29 24.5 -26 25 55 387.6 885.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8  1 41.6 R    2366dM1  1.1  0.1v  53-  93     19 135  48N 320   5 313 -7.2 +6.0 +0.4-0.7 .382  155.1 .11 16 29 24.5 -26 25 55 386.2 789.2
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8 56 14.8 R    2373 K1  6.1  5.5   52-  93     26 145  21N 348  22 340 -7.3 +6.1 -0.3-2.3 .233  127.3     16 31 22.8 -26 32 16 385.2 718.9
24 Mar  5  9 33 13.9 R    2688 G6  7.0  6.6s  31-  68     13 134  68S 242 289 246 -7.0 +7.4 +1.8+1.8 .357 -143.6     18 32 14.0 -29 11 25 374.6 806.0
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 20 45.2 r  188343 K0  8.4  7.8   21-  54     12 130  67N 279 328 289 -6.1 +7.5 +1.0+0.7 .451  169.2     19 36 57.4 -27 30  4 368.5 821.0
24 Mar  7 10 46 23.2 R  189555 G1  7.2  6.9   12-  41      8 123  65N 274 328 288 -4.8 +7.1 +0.7+0.8 .482  165.8     20 40 22.3 -24  7  5 363.5 876.0
24 Mar  8 11 38 59.4 R    3175 G8  4.7  4.3    5-  27  -2 10 118  31N 299 355 318 -3.0 +6.3 +0.5+0.0 .342  131.5     21 42 39.5 -18 51 59 358.9 898.6
   R3175 = kappa Capricorni
24 Mar 13  0 47 32.5 d   92623 K5  8.9  8.4   10+  36     20 274  77N  54 350  74 +4.0 -1.6 +0.6+0.3 .524   11.5      1 46 38.7  12 24 42 361.7 938.5
24 Mar 14 23 58  3.3 D     521kA2  6.7  6.7v  27+  63  -5 58 270  44N  29 315  41 +6.4 -4.5 +1.9+2.6 .283   43.2      3 36 58.0  23 12 40 369.6 696.9
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 15  4 15 40.8 d   76156pA0  6.9  6.9   29+  65      4 294  21S 145  83 156 +6.1 -4.5 -1.3-3.4 .275  -61.9      3 45 48.8  23  8 50 375.71064.2
     76156 is triple: AB 6.9 10.1 3.2" 339.0, dT = -11sec : AC 6.9 16.5 16.6" 153.4, dT = +59sec
     76156 is a close double. Observations are highly desired
24 Mar 18  1  6  9.7 d   78530cB9  7.8  7.8   59+ 100     80 275  59S 126  36 122 +6.7 -6.7 +2.3-2.3 .283  -27.3      6 35 40.3  28 15 51 386.5 596.6
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = +0.04sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 29  0.3 D    1022CB7  6.0     s  59+ 101     50 282  78N  83   4  79 +6.3 -6.6 +1.8-0.6 .359   22.5      6 39 33.1  28 15 47 388.4 733.0
   R1022 = 54 Aurigae
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +1.5sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 29  1.4 d X 91013C    7.8  7.8s  59+ 101     50 282  78N  83   4  79 +6.3 -6.6 +1.8-0.6 .359   22.6      6 39 33.2  28 15 48 388.4 733.1
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -1.5sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 30 38.8 D    1026SG5  6.5  5.9   60+ 101     37 286  67N  72 357  67 +6.1 -6.5 +1.4-0.3 .359   34.6      6 41 20.9  28 11 48 389.7 824.4
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +80sec : AC 6.6 12.8 58"  61.3, dT = +158sec
24 Mar 18  6 36 17.0 d    1035cK3  6.7  6.0   60+ 102     12 295  54S 132  67 127 +6.0 -6.3 -0.6-1.7 .483  -27.1      6 45 35.1  27 40 24 392.71032.6
      1035 is double: ** 7.6 7.6 0.12"  90.0, dT = +0.19sec
      1035 has been reported as non-instantaneous (OCc 233). Observations are highly desired
24 Mar 19  0 56 24.4 D   79479 K1  7.2  6.6   68+ 112     86 100  72N  83 160  74 +6.3 -6.8 +3.0+0.6 .284   22.1      7 32 12.9  27  7 31 391.0 580.4
24 Mar 19  3 42 59.8 D    1149SK5  4.1  3.3s  69+ 112     58 277  51N  63 343  54 +5.7 -6.6 +3.1+0.8 .231   50.9 .03  7 35 55.4  26 53 45 392.4 696.0
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.17sec : AB 4.1 13.2 57"  39.0, dT = +225sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 32 44.9 r    1149SK5  4.1  3.3s  69+ 113     47 280 -27N 345 268 336 +5.5 -6.5 -0.5-3.8 .251  128.9 .03  7 35 55.4  26 53 45 393.3 763.3
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = -0.01sec : AB 4.1 13.2 57"  39.0, dT = -133sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2 10 11   M    1263DF0  6.9  6.8S  77+ 123     86 198   9N  26   9  13 +5.2 -6.4 +9.9+9.9 .000   90.0      8 26 39.8  24 32  3 394.7 593.1
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  2 10 19   m   80185SF0  7.7  7.4   77+ 123     86 198   9N  26   9  13 +5.2 -6.4 +9.9+9.9 .000   90.0      8 26 40.1  24 32  7 394.7 593.2
     80185 is triple: BC 8.5 8.5 0.14" 281.1 : BC,A 7.5 6.9 5.6" 231.8
     80185 is a close double. Observations are highly desired
24 Mar 20  2 10 23   Gr   1263DF0  6.9  6.8S  77+ 123     86 ** GRAZE: CA  9.4N; Dist. 15km in az. 208deg. [Lat = 27.90-0.47(E.Long+82.41)]
24 Mar 20  2 10 37   Gr  80185SF0  7.7  7.4   77+ 123     86 ** GRAZE: CA  9.4N; Dist. 25km in az. 208deg. [Lat = 27.80-0.47(E.Long+82.41)]
24 Mar 20  3 15 33.3 D    1270cF0  6.1  5.9v  78+ 124     74 260  72N  89  17  76 +5.0 -6.3 +2.9-0.4 .285   30.2      8 28 36.8  24  8 42 395.1 631.2
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 24  9.8 D    1479 F2  6.4  6.2   91+ 146     77 167  74N 100 112  81 +2.9 -4.9 +3.0-0.5 .277   29.3     10  5 40.9  15 45 27 399.2 615.6
24 Mar 22  5 33 13.7 d    1485 G0  7.1  6.8   92+ 146     60 250  71S 135  76 116 +2.4 -4.6 +1.3-2.3 .355   -4.6     10  7 39.3  15  9 27 400.0 691.8
24 Mar 23  2 54  3.8 D    1576 A2  5.3  5.3   96+ 157     64 128  60S 149 194 128 +1.8 -3.9 +1.5-2.3 .308  -19.2     10 49 15.4  10 32 43 400.5 632.6
   R1576 = 53 Leonis
24 Mar 27  5 17 50.4 r  158105PF5  7.5  7.2   96- 158     44 147  38N 347  17 328 -3.5 +1.9 +0.4-2.3 .294  145.7     13 42 35.7 -12  5 13 397.8 687.4
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Apr  2 10 50  9.9 r    2813 K2  7.7  7.1   46-  86  -7 31 161  25S 196 215 204 -6.9 +7.7 +2.6+4.2 .140 -113.4     19 16 48.8 -28 40  2 374.3 640.6
24 Apr  4  9 41 16.2 R  190165 K0  7.2  6.7   25-  60     12 122  54S 213 267 230 -4.8 +6.8 +1.3+2.5 .360 -139.0     21 15  3.2 -21 48 55 366.4 846.2
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D     v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr  4 10 23 18.9 r  190177 F3  8.2  8.0   25-  60     19 128  58N 281 329 298 -4.8 +6.8 +1.3+0.6 .388  150.4     21 15 52.6 -21 26 23 365.4 791.5
24 Apr  4 10 33 11.9 r  190197 F5  8.0  7.7   25-  60 -10 20 130  24S 183 230 200 -4.9 +6.8 +1.8+4.6 .166 -112.1     21 17 15.6 -21 44 29 365.2 781.0
24 Apr  6 16 12 29.3 r    3421cM3  4.9  4.1v   7-  30  62 54 191  59N 273 263 295 -2.2 +3.7 +3.1-0.3 .308  134.3 .02 23 16 50.9 - 7 43 35 354.7 759.4
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16  5 42.9 D Venus      -3.8 -3.8    2-  16  61 61 163 -61N  31  47  54 -0.1 +2.0 +1.3+2.2 .390   12.2      0 12 29.6 - 0 16 40 353.3 683.4
   Venus contacts: Dark limb 16  5 30; Terminator 16  5 30; Bright limb 16  5 56: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17 28 49.1 R Venus      -3.8 -3.8    2-  15  69 59 206  85S 238 214 258 -0.3 +1.8 +2.0+1.1 .393  168.4      0 12 29.6 - 0 16 40 353.4 687.9
   Venus contacts: Dark limb 17 28 36; Terminator 17 28 48.4; Bright limb 17 29  2: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 10 37.5 D     472cA1  4.9  4.9    7+  31     13 287  49S 110  45 124 +4.5 -4.0 -0.1-1.6 .476  -32.1      3 14 54.1  21  2 40 366.8 999.9
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.2sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 30 38.5 D   75819 F2  7.9  7.7    7+  31      9 289  67S  92  29 106 +4.5 -4.0 +0.0-0.9 .563  -13.8      3 15 46.1  21  9 55 367.31033.2
24 Apr 14  3 10 19.7 d   78206 K0  8.0  7.4   33+  70     27 289  33S 147  76 145 +6.2 -6.4 -0.5-2.7 .353  -44.1      6 18 47.3  28  3 20 383.8 913.5
24 Apr 14  3 41 32.3 d   78233SA3  7.5        33+  70     21 292  35N  35 327  33 +6.2 -6.4 +2.1+2.0 .201   67.2      6 19 59.0  28 25 36 384.5 966.6
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.26sec : AB,C 7.5 9.6 2.9" 265.3, dT = -9sec : BA 8.7 9.3 58" 268.1, dT = -175sec
     78233 is a close double. Observations are highly desired
24 Apr 14  4 42  7.1 d   78291 K0  7.7  7.0   33+  70      9 297  64S 116  53 114 +6.2 -6.3 -0.5-1.4 .552  -14.7      6 22 47.9  27 59 12 386.11068.0
24 Apr 15  0 41 31.3 d   79180 F2  8.1  7.8   42+  81 -11 70 275  53N  60 336  52 +6.4 -6.7 +3.4+1.5 .227   48.7      7 13  6.6  27 46 57 385.8 643.9
24 Apr 15  3 34 17.8 d   79256 K0  7.8  7.3   43+  82     33 286  71S 116  43 109 +5.9 -6.5 +0.4-1.6 .459   -5.6      7 17 59.4  27  8 31 388.9 869.7
24 Apr 15  3 46  1.1 d   79264 G2  8.0  7.7   43+  82     31 287  77N  84  12  76 +5.9 -6.5 +0.9-0.8 .420   26.9      7 18 28.9  27 15 10 389.2 888.7
24 Apr 15  4 40 22.9 d    1108cG8  7.0  6.5   43+  82     19 291  21S 166  99 159 +5.8 -6.4 -1.2-3.2 .281  -57.1      7 19 30.8  26 49 23 390.5 978.6
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.08sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Apr 16  0 30 17.3 d    1229SF5  8.1  7.9   52+  92  -8 83 252  43N  55 347  43 +6.0 -6.6 +4.5+3.2 .162   59.7      8  8 20.1  25 33 10 390.3 605.6
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.5sec : AB 8.2 12.8 3.1" 302.7, dT = -7sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 17  2 35 25.2 d    1348 G5  8.1  7.6   62+ 104     65 261  87S 111  41  95 +4.7 -5.9 +2.0-1.5 .341   14.1      9  2 45.2  21 31  9 395.1 673.4
24 Apr 19  1  5 53.6 d   99185pA3  7.9  7.7   79+ 126     68 131  54S 150 193 129 +2.9 -4.2 +1.5-2.4 .301  -20.3     10 34  7.3  12 22 28 399.2 621.2
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.6sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5  2 21.7 D    1644 B9  4.1  4.1   87+ 138     53 239  45S 161 111 139 +0.7 -2.6 +0.6-2.9 .317  -27.5     11 21  8.2   6  1 46 400.5 693.6
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 12  9.5 r    1644 B9  4.1  4.1   88+ 139     39 254 -77S 282 224 260 +0.5 -2.4 +1.5-1.5 .347 -152.6     11 21  8.2   6  1 46 401.6 760.6
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 25  5.4 d    1732cK0  6.8  6.1v  92+ 148  -7 38 112  29N  54 109  32 +0.5 -1.8 +4.5+7.4 .102   74.2 .02 11 59 23.9   1 49 36 401.3 731.0
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.26sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4  1 49   d  138955 K2  7.2  6.5   97+ 160     57 175  36N  59  63  37 -1.5 +0.1 +9.8+5.9 .074   77.2 .01 12 45 32.0 - 4 48 39 398.4 646.5
24 Apr 22  4 10 43   Gr 138955 K2  7.2  6.5   97+ 160     58 ** GRAZE: CA 23.1N; Dist. 47km in az.  51deg. [Lat = 28.72-1.08(E.Long+82.41)]
   Distance of 138955 to Terminator = 11.6"; to 3km sunlit peak = 2.7"
24 Apr 26  4 16 59.7 R    2269cB5  5.4  5.4   95- 154     24 138  68N 312 353 302 -4.9 +5.4 +0.8-0.5 .394  167.6     15 53 53.9 -24 31 59 390.7 765.5
24 May 11  1 20 14.4 D     885wG7  5.6  5.1   10+  38     22 291  54S 118  50 119 +5.2 -6.1 -0.1-1.6 .495  -19.8      5 50 58.1  27 58  4 378.0 965.0
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -9sec
24 May 11  1 31 19.2 D   77638 B8  8.2  8.1   10+  38     20 292  86S  87  19  88 +5.2 -6.1 +0.3-0.8 .525   11.6      5 51 33.0  28  5 32 378.2 983.8
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 May 11  1 46 50.8 d   77639 K0  8.3  7.7   10+  38     16 293  28S 145  79 146 +5.2 -6.1 -0.8-2.5 .377  -46.7      5 51 40.2  27 50 31 378.71010.9
24 May 12  3 31 19.2 d    1056 B9  7.2  7.3   18+  51      7 297  28S 153  91 148 +5.4 -6.2 -1.0-2.3 .388  -48.4      6 55 56.2  27 17  9 385.71094.3
24 May 12 17  0 19.8 d    1149SK5  4.1  3.3s  24+  59  79 28  73  45N  51 122  42 +6.9 -6.5 +0.0+2.5 .354   39.0 .02  7 35 55.4  26 53 45 386.5 853.3
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.11sec : AB 4.1 13.2 57"  39.0, dT = +157sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 17 55 27.4 r    1149SK5  4.1  3.3s  25+  60  78 40  77 -56N 310  25 301 +6.8 -6.6 +1.8-0.9 .319  141.2 .02  7 35 55.4  26 53 45 385.7 764.8
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.06sec : AB 4.1 13.2 57"  39.0, dT = -4sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 14  3 30 41.7 d    1317 A2  8.2  8.1   36+  74     27 282  85S 109  40  94 +4.6 -5.7 +0.4-1.4 .474    9.7      8 46 28.9  22 21  8 393.7 918.7
24 May 15  1 54 43.3 d   98640 K0  8.0  7.5   46+  85     56 262  61N  79  12  61 +4.0 -5.1 +2.8-0.3 .251   48.2      9 33 38.6  18 44 12 394.8 722.2
24 May 15  2 36 17.2 d   98646 K2  8.2  7.3v  46+  85     47 267  80S 119  50 101 +3.8 -5.0 +1.1-1.8 .398    7.3      9 34 26.7  18 24 22 395.6 770.4
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 16  0 43 15.0 d   99052 G0  8.2  7.8   55+  96  -7 74 209  55S 146 120 126 +3.2 -4.3 +1.4-2.5 .319  -14.4     10 18 26.1  13 56  1 396.6 633.7
24 May 17  1 27 43.7 d  118637 F5  8.1  7.9   65+ 107     69 204  54N  78  56  56 +1.9 -3.1 +4.6+0.7 .179   57.3     11  3 43.5   8 43 48 398.4 640.0
24 May 18  1 30 41.9 d  119033PK0  8.1  7.6v  74+ 118     65 179  38S 166 167 145 +0.6 -1.8 +0.7-3.0 .284  -30.3     11 45 42.3   2 49 17 398.8 636.7
    119033 is double: AB 6.3      11.9" 186.0, dT = +39sec
    119033 = EPIC 201650346, 8.55, range 0.04, 0Kp, Type VAR, Period 11.495508 days
24 May 18  4 48 30.3 d  119068 F5  7.8  7.5   74+ 119     37 250  75N  99  43  77 -0.1 -1.4 +1.7-1.4 .332   30.3     11 49 46.8   2 13 55 400.7 746.5
24 May 18  5 58 14.0 D    1712SF8  3.6  3.3   75+ 120     22 260  48S 155  95 134 -0.3 -1.3 +0.3-2.6 .365  -30.8     11 50 41.7   1 45 53 402.1 829.0
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -603sec : AC 3.7 9.6 406"  78.5, dT = +250sec
24 May 18  6 54 27.9 r    1712SF8  3.6  3.3   75+ 120     10 267 -66S 270 208 248 -0.4 -1.2 +0.4-1.1 .399 -149.1     11 50 41.7   1 45 53 403.4 910.2
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -812sec : AC 3.7 9.6 406"  78.5, dT = +996sec
24 May 21  3 34  4   m    2002 K0  6.8  6.3   94+ 152     48 181  25N  41  40  22 -3.2 +2.7 +9.9+9.9 .000   90.0     13 58 29.8 -14  7 19 394.2 639.2
24 May 21  3 34 54   Gr   2002 K0  6.8  6.3   94+ 152     49 ** GRAZE: CA 24.8N; Dist. 47km in az. 230deg. [Lat = 27.39-1.04(E.Long+82.41)]
24 May 22  6  0 55.5 d    2115 A6  7.2  7.1   98+ 164     36 210  66S 120  91 104 -4.5 +4.2 +2.2-1.5 .335   -0.9     14 49 27.7 -19 54 13 391.6 635.6
24 May 23  5 10 10.9 D    2237cK3  5.0  4.3s 100+ 174     38 181  70S  77  76  65 -4.8 +5.4 +3.4+0.5 .252   40.4 .01 15 40 16.9 -23 49  5 388.0 624.2
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.3sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 4.4"; to 3km sunlit peak = 0.0"
24 May 24  1 13 13.8 d    2366dM1  1.1  0.1v 100- 172 -12  4 123 -57N 101 157  93 -4.3 +5.9 +0.5+0.6 .482   12.7 .09 16 29 24.5 -26 25 55 388.5 931.5
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 17 16.5 R    2366dM1  1.1  0.1v  99- 172     15 132  85S 308 355 300 -4.4 +6.0 +0.5-0.3 .431  167.1 .10 16 29 24.5 -26 25 55 387.1 829.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 9.8"; to 3km sunlit peak = 1.9"
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 May 24  3 14 34.8 r    2373 K1  6.1  5.5   99- 171     23 141  71N 331   9 323 -4.6 +6.1 +0.3-1.2 .326  144.5     16 31 22.8 -26 32 16 386.1 750.9
   Distance of 2373 to Terminator = 9.7"; to 3km sunlit peak = 1.8"
24 May 28  7  1 48.6 r    3012 A7  6.9  6.8   76- 121     25 139  86S 255 294 269 -3.7 +7.0 +1.8+1.2 .395  179.6     20 38  4.9 -24 13 44 372.9 714.5
24 May 28  7 55 49   M    3018 G8  6.4  6.0   76- 121     32 150   8N 340   9 355 -3.8 +7.0 +9.9+9.9 .000   90.0     20 40 11.8 -23 46 26 372.1 675.3
24 May 28  8 25 24.0 r  189555 G1  7.2  6.9   75- 121     35 158  73S 241 263 256 -3.9 +6.9 +2.2+1.3 .364 -173.0     20 40 22.3 -24  7  5 371.8 661.9
24 May 29  7  3 56.4 d    3164SB3  4.5  4.6v  65- 108     20 126 -86S  77 126  95 -2.8 +6.2 +1.3+1.3 .431   -8.1     21 37  4.8 -19 27 58 371.0 783.9
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +3sec : AB 4.5 10.1 66"  45.9, dT = +132sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 20 37.1 R    3164SB3  4.5  4.6v  65- 108     32 141  73S 236 272 254 -3.0 +6.1 +1.8+1.6 .392 -172.1     21 37  4.8 -19 27 58 369.7 709.8
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -54sec : AB 4.5 10.1 66"  45.9, dT = +166sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 50 58.9 r  164528 B8  7.5  7.5   65- 107     36 148  74N 268 298 286 -3.1 +6.1 +2.4+0.7 .346  153.2     21 37 37.7 -19 13 52 369.2 693.1
24 May 29 11 45 34.8 r    3175 G8  4.7  4.3   64- 106  14 41 200  21S 183 164 201 -3.6 +5.8 -0.1+2.7 .259 -129.9     21 42 39.5 -18 51 59 368.6 722.1
   R3175 = kappa Capricorni
24 May 30  9  4 16.0 r  165149wG0  7.7  7.4   54-  94     36 135  69S 228 268 249 -2.1 +4.9 +1.6+1.8 .409 -170.9     22 32  9.4 -13 35 52 367.3 738.5
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +71sec
24 Jun  1  9 10  1.1 r      27DA5  8.2  8.0   31-  67     27 106  74S 229 288 251 +0.0 +1.9 +0.7+1.9 .495 -174.4      0 14 50.2 - 0 18 11 365.5 880.9
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
        27 is a close double. Observations are highly desired
24 Jun  2  9 42  3.6 r  109680 K5  8.7  7.9   20-  54 -11 27  97  76S 234 296 254 +1.2 +0.2 +0.5+1.7 .523 -178.9      1  6 43.7   6 40  0 365.2 926.7
24 Jun  4  9 29  1.7 r   93167 A5  9.1  8.8    6-  27      8  73  62S 230 293 245 +3.4 -2.9 -0.3+1.5 .610 -166.7      2 53 46.8  18 38  3 369.21122.0
24 Jun  9  1 59 59.1 D    1131 A2  7.3  7.3    7+  31      9 295  33S 148  85 140 +4.5 -6.0 -0.8-2.0 .445  -39.4      7 28  0.9  26 13 39 386.81080.8
24 Jun 10  1 58 39.2 D   80146 A2  8.0  7.9   14+  43     19 287  47S 142  75 129 +4.3 -5.7 -0.4-2.0 .469  -26.2      8 23 31.3  23 32  4 390.4 990.0
24 Jun 10  2 38 43.9 d   80173 K0  8.3  7.8   14+  44     11 291  89N  98  34  85 +4.3 -5.6 -0.1-1.1 .533   16.2      8 25 21.5  23 32 58 391.41053.2
24 Jun 12  1  9 39.2 d   98907 F8  8.5  8.3   29+  66  -9 47 263  78S 121  56 102 +2.9 -4.2 +1.1-1.9 .397    7.0     10  2  3.1  15 21 38 395.5 767.1
24 Jun 15  3 20 15.4 d    1760pK0  7.5  7.0   58+ 100     36 245  47N  71  17  49 -1.0 -0.3 +2.6-0.2 .203   57.5     12 15  0.0 - 1 19 36 400.1 730.8
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +173sec
24 Jun 17  1 13 34.7 d    1957kG5  7.7  7.2   76+ 121 -10 50 175  58N  78  82  58 -2.9 +2.2 +4.4+1.0 .191   55.1     13 39 17.8 -12  5 32 395.4 640.0
24 Jun 17  3 15 12.7 d  158085kK0  7.3  6.6   76+ 122     42 216  57S 143 111 124 -3.3 +2.5 +1.6-2.2 .322  -16.2     13 40 59.7 -12 46 59 395.8 643.6
24 Jun 19  2 28 29.4 D    2183 K2  5.5  4.8   91+ 144     39 172  27S 163 171 149 -4.6 +4.9 +0.8-2.3 .259  -40.2     15 16 23.0 -22 23 58 388.7 640.1
24 Jun 24  6 28 54.1 r    2965 G2  7.2  6.9   94- 151     34 161  81S 257 276 270 -3.4 +7.0 +2.4+0.8 .369  173.4     20 19 45.2 -25 13 43 369.3 666.1
24 Jun 25  7 42 11.2 r  190252 F2  7.2  7.0   87- 137     40 163  36S 203 218 220 -2.5 +6.1 +1.4+2.2 .307 -142.9     21 21  3.2 -20 49 16 366.8 683.7
24 Jun 26  6 48 41.7 r  164948kF2  7.2  7.0   78- 124     33 133  56N 285 327 305 -1.2 +5.1 +2.2+0.3 .295  134.4     22 14 37.2 -15  6  6 366.3 748.5
24 Jun 26  8  8 17   Gr   3271 F5  7.2  6.9   78- 124     43 ** GRAZE: CA 17.1N; Dist.  3km in az. 136deg. [Lat = 28.02+0.84(E.Long+82.41)]
24 Jun 26  8  8 20   gr   3271 F5  7.2  6.9   78- 124     43 153  17N 324 349 344 -1.4 +5.0 +9.9+9.9 .000   90.0     22 16 56.3 -14 39 25 365.3 708.9
24 Jun 28  7 44 16.4 r    3528 F0  7.5  7.3v  56-  97     34 113  65N 272 326 294 +1.0 +2.1 +1.6+0.9 .367  141.7     23 59 35.0 - 1 51  0 365.9 830.1
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jul  2 17 16 56.0 r     545SB6  4.1  4.2v  12-  41  83 53 274  56N 296 221 307 +3.4 -4.9 +1.7-2.3 .307  140.3      3 46 19.6  23 56 54 371.3 718.1
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +1sec : AB 4.2 14.4 110" 180.2, dT = +153sec : AC 4.2 12.9 147" 336.0, dT = -365sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 19 10.7 D     552SB7  2.9  2.9s  12-  41  84 53 274 -10N   2 287  13 +3.4 -4.9 +2.5+9.0 .107   74.4      3 47 29.1  24  6 18 371.3 719.1
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.26sec : AE 2.8 15.0 78" 232.4, dT = -462sec : AB 2.8 6.3 118"
291.1, dT = +363sec
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 29 26   Gr    552SB7  2.9  2.9s  12-  41  84 49 ** GRAZE: CA  5.1N; Dist. 62km in az.   7deg. [Lat = 28.61-0.11(E.Long+82.41)]
24 Jul  2 17 39 44.2 R     552SB7  2.9  2.9s  12-  41  84 48 276  20N 332 257 343 +3.3 -4.9 +0.5-9.2 .111  105.6      3 47 29.1  24  6 18 371.6 741.5
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.16sec : AE 2.8 15.0 78" 232.4, dT = +116sec : AB 2.8 6.3 118"
291.1, dT = -806sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 47 26.0 d     560SB8  3.6  3.7s  12-  41  84 47 276 -58N  50 336  61 +3.3 -4.9 +1.8+0.9 .367   28.0      3 49  9.7  24  3 12 371.8 748.7
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = +0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = +0.17sec : AC 3.6 15.0 50"  36.5, dT = +132sec :
AH 3.6 16.0 68" 221.6, dT = -185sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 18 51  2.1 R     560SB8  3.6  3.7s  12-  41  72 33 282  63N 289 218 301 +3.2 -4.9 +0.6-1.7 .407  151.8      3 49  9.7  24  3 12 373.1 836.9
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.02sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.37sec : AC 3.6 15.0 50"  36.5, dT = +36sec :
AH 3.6 16.0 68" 221.6, dT = -64sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 11  1 46 28.3 D    1628 K0  7.1  6.5   24+  58     25 263  15S 187 125 166 +0.7 -1.9 -0.6-3.9 .205  -61.7     11 14 32.5   5 59 34 400.7 841.6
24 Jul 11 19 54 52.3 D    1712SF8  3.6  3.3   31+  68  58 50 126   3S 200 246 178 +0.7 -1.3 -1.8-6.8 .130  -68.1 .01 11 50 41.7   1 45 53 399.3 676.4
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = +180sec : AC 3.7 9.6 406"  78.5, dT = -1643sec
24 Jul 11 20 13 45   Gr   1712SF8  3.6  3.3   31+  68  54 56 ** GRAZE: CA-20.4S; Dist.128km in az. 218deg. [Lat = 26.58-0.70(E.Long+82.41)]
24 Jul 11 20 28 29.9 r    1712SF8  3.6  3.3   31+  68  50 56 136 -43S 246 284 224 +0.6 -1.2 +5.6+4.0 .127 -111.9 .01 11 50 41.7   1 45 53 399.0 657.2
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = -2022sec : AC 3.7 9.6 406"  78.5, dT = +3123sec
24 Jul 12  2 46 41.0 D    1730wK2  6.2  5.5   33+  70     18 261  24N  48 347  26 -0.8 -0.4 +2.0+2.4 .109   75.5 .01 11 59  3.3   0 31 50 402.4 846.3
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -86sec
24 Jul 12  2 53 31   Gr   1730wK2  6.2  5.5   33+  70     15 ** GRAZE: CA  9.3N; Dist.110km in az.  19deg. [Lat = 29.11-0.31(E.Long+82.41)]
24 Jul 14  2 38  1.9 d  157912kF0  7.8  7.6   51+  91     29 237  85N 107  57  86 -3.4 +2.3 +1.6-1.5 .350   15.9     13 23 56.5 -10 52 15 399.3 704.0
24 Jul 14  3 42 19.3 D    1925SB1  1.0  1.1v  52+  92     17 247  73S 129  73 109 -3.6 +2.4 +1.0-2.1 .393  -11.2     13 25 11.6 -11  9 41 400.5 778.2
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -41sec : AC 1.0 10.5 368"  60.8, dT =
+347sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 14  4 50 21.2 r    1925SB1  1.0  1.1v  52+  92      2 256 -81S 282 222 262 -3.7 +2.4 +0.4-1.4 .442 -168.6     13 25 11.6 -11  9 41 401.9 879.8
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +122sec : AC 1.0 10.5 368"  60.8, dT =
+622sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  2  1 31.6 d  158363 B9  7.3  7.3   61+ 102     37 216  23S 176 143 158 -4.4 +3.6 +0.8-3.6 .198  -53.3     14  7 13.8 -16 11 26 395.8 635.7
24 Jul 15  4  3 21.7 D    2029 M1  4.9  4.1v  61+ 103     18 240  76N  95  42  77 -4.8 +3.7 +1.2-1.2 .366   18.8 .01 14 10 50.5 -16 18  7 397.4 744.5
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 18  1 46 17.8 D    2405SA2  6.6     s  87+ 137     34 168  64N  66  77  59 -5.8 +6.6 +3.3+1.3 .249   43.2     16 44 17.4 -27 27 22 382.4 634.6
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +7sec : AC 6.6 14.0 24.3" 195.9, dT = -63sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5  9 35.2 D    2910cG3  4.7  4.3  100+ 174     36 175  74S  32  38  43 -4.4 +7.1 +1.8+1.8 .292   38.5     19 55 50.4 -26 17 58 367.0 665.1
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 5.3"; to 3km sunlit peak = 0.0"
24 Jul 24  3 40 15.1 r    3339 M0  6.7  5.8v  90- 142     15 111  35N 307   4 328 +0.1 +4.2 +0.9-0.8 .220  115.6 .01 22 46 14.2 -11  9 59 363.3 900.8
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  7 44 20.6 d    3355KF8  6.7  6.5   89- 141     52 168   7N 334 345 356 -0.3 +3.7 -3.5+6.6 .111   74.7     22 52 46.5 -10  3 32 359.9 731.5
   Distance of 3355 to Terminator = 4.2"; to 3km sunlit peak = 0.0"
24 Jul 24  8  5 19.7 R    3355KF8  6.7  6.5   89- 141     52 177  38N 303 306 324 -0.4 +3.7 +7.0-4.0 .111  105.4     22 52 46.5 -10  3 32 359.9 733.5
24 Jul 24  8 45 21.7 r  165373 K0  7.7  7.1   89- 140     51 192  23S 184 173 205 -0.5 +3.6 +0.1+2.7 .305 -135.6     22 54 30.0 -10 17 59 360.0 744.2
24 Jul 25 10 12 11.4 R    3505WG8  5.5  5.0   80- 126  -8 55 211  80N 257 230 279 +0.8 +1.8 +2.3+0.2 .373  149.7     23 47 56.5 - 2 45 42 360.5 754.7
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -453sec
24 Jul 27  8 22 57.9 r   92457cK5  8.2        58- 100     54 112  68N 271 327 291 +3.7 -1.3 +2.3+0.8 .339  138.9      1 29  5.5  10 25 56 364.6 794.6
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.12sec
     92457 is a close double. Observations are highly desired
24 Jul 27 10 20 55.6 R     222 G5  7.0  6.5   58-  99  -7 73 164  88N 251 265 271 +3.4 -1.6 +2.3+1.0 .378  157.9      1 31 42.7  10 53 22 363.9 719.2
24 Jul 28  8  0 18.7 r     347 K0  7.9  7.4   47-  87     41  92  68S 230 296 247 +4.8 -2.8 +0.6+1.9 .485 -174.9      2 21 50.3  16  9 45 368.5 871.2
24 Jul 29  7  6 26.3 R     472cA1  4.9  4.9   36-  74     20  76  85S 251 317 264 +5.5 -3.9 +0.1+1.3 .555  171.4      3 14 54.1  21  2 40 373.61017.5
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.16sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 31 57.8 r   75819 F2  7.9  7.7   36-  74     26  78  87S 253 321 266 +5.5 -4.0 +0.3+1.3 .529  168.5      3 15 46.1  21  9 55 373.1 978.0
24 Jul 31  9 35 16.2 r     786 K5  9.1  8.3   16-  48     30  72  66N 295   7 298 +6.3 -6.0 +1.2+0.1 .367  137.6      5 16 52.5  27 43  3 379.9 914.5
24 Aug  1  9  5 36.3 r     952 K2  8.0  7.2    9-  36     13  65  26S 214 279 212 +6.4 -6.2 -0.9+2.4 .382 -133.8      6 15 54.8  27 51 42 385.11030.5
24 Aug  1  9 19  6.2 r   78154 A0  8.5  8.4    9-  36     16  66  74N 294   0 292 +6.4 -6.2 +0.5+0.2 .448  146.1      6 16  3.2  28 12  6 384.91007.0
24 Aug  1 10  5 45.9 R   78191 A0  7.7  7.7    9-  35 -10 25  70  44S 233 303 230 +6.4 -6.3 -0.2+2.0 .441 -152.3      6 17 59.9  28  0 24 384.0 926.7
24 Aug  8  0 40 45.4 d    1696 F5  6.9  6.7   11+  39  -6 20 262  85N 108  47  86 +0.0 -0.8 +0.7-1.6 .420   15.7     11 42 25.5   2 21 44 402.6 852.4
24 Aug 10  2 20 20   D    1886cK3  5.6  5.0   26+  62      9 254  15N  38 338  17 -3.0 +2.1 +0.5+4.6 .081   79.1 .02 13  8 32.5 - 8 59  4 403.7 839.8
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.8sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 10  2 26  4   Gr   1886cK3  5.6  5.0   26+  62      7 ** GRAZE: CA  3.4N; Dist. 59km in az. 357deg. [Lat = 28.58+0.05(E.Long+82.41)]
24 Aug 11  2 23 19.6 d  158207 F0  7.4  7.2   35+  72     14 245  65S 137  81 118 -4.3 +3.4 +1.0-2.3 .367  -22.5     13 52 15.4 -14 40 36 401.4 773.2
24 Aug 16  2 27  0.8 d  186672 G5  7.4  6.9   83+ 131     33 184  26N  19  14  21 -6.8 +7.5 +1.9+3.9 .133   67.2     18 20 25.4 -29  3 59 375.8 625.5
24 Aug 17  2 46 23.5 D    2831kB2  6.0  6.1s  90+ 144     34 173  80N  64  71  72 -6.1 +7.4 +2.4+0.9 .353   12.4     19 24 30.2 -27 51 57 369.7 648.1
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 19  5 53  3.1 d  164449DF0  7.2        99+ 171     42 194  89S  42  29  60 -3.8 +5.7 +1.4+1.2 .415   12.1     21 31 25.5 -19 14 15 359.2 739.7
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -4sec
    164449 is a close double. Observations are highly desired
24 Aug 20  7 57 14.1 r    3303kF2  6.4  6.2  100- 172     41 218  43S 225 191 246 -2.2 +4.0 +1.1+0.9 .466 -175.2     22 30  1.5 -12 54 54 356.7 808.9
   Distance of 3303 to Terminator = 4.2"; to 3km sunlit peak = 0.0"
24 Aug 21  2  3 33.1 r    3421cM3  4.9  4.1v  97- 161     13 106  17S 182 241 203 +0.4 +3.2 +0.5+3.3 .277 -120.5 .02 23 16 50.9 - 7 43 35 358.8 951.6
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Aug 21  2 38 52.8 r    3422kF0  6.7  6.5   97- 161     20 110  46N 298 355 320 +0.4 +3.1 +1.3-0.1 .266  120.7     23 16 59.2 - 7  9 39 358.0 904.8
24 Aug 22  9  4 54.1 r  109142cG5  7.6  7.1   90- 144     58 219  54S 211 177 233 +1.5 +0.5 +1.1+1.7 .426 -163.2      0 19 57.1   1 34 57 355.9 767.6
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = +0.01sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 47 12.5 r  109738 G5  7.8  7.1   82- 130     65 225  89N 248 208 268 +3.2 -1.4 +2.1+0.6 .405  162.4      1 13 41.8   8 58 29 358.2 739.0
24 Aug 25  6 29 26.4 r     439cF0  7.3  7.1   62- 104     38  86  73S 236 306 251 +6.3 -3.9 +0.6+1.7 .505 -178.5      2 59 10.4  19 59 23 367.4 899.5
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.17sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25  8 17 59.9 r   75708 K0  8.0  7.1   61- 103     62  99  16S 179 248 194 +6.1 -4.2 -0.8+4.3 .234 -122.9      3  3  9.6  20 20 10 366.1 765.7
24 Aug 25 10 31  1.1 r     452 A2  7.7  7.6   61- 102  -8 83 201  61S 225 205 239 +5.7 -4.5 +1.8+2.0 .368 -165.4      3  5 30.3  20 54  9 365.8 675.7
24 Aug 26  6 53 44.9 R     587 K0  6.2  5.5   51-  91     33  78  79N 270 341 280 +7.1 -5.1 +0.9+1.0 .457  153.7      3 57 26.4  24 27 43 372.7 921.9
24 Aug 26  8 12 26.0 r   76374kG0  8.3  8.0   50-  90     50  84  89S 258 333 268 +7.0 -5.3 +1.3+1.2 .432  164.4      3 59 54.8  24 41 44 371.6 807.4
24 Aug 27  6 17 54.9 r   76841cK1  7.3  6.7   40-  78     15  67  47N 308  14 313 +7.5 -5.8 +0.9-0.4 .315  123.7      4 55 34.6  27 12  9 379.21043.6
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.18sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 22 48.7 R     746WB7  7.0  6.9   39-  77     41  77  78S 254 329 259 +7.4 -6.1 +0.8+1.4 .458  176.2      4 59 53.7  27 19 32 377.1 839.6
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -30sec
24 Aug 27 11  9 36.6 r     756 F0  6.6  6.5   38-  76   0 76  87  79S 255 340 259 +7.0 -6.3 +2.3+1.1 .354  179.4      5  4 38.0  27 41 46 375.6 645.6
24 Aug 28  8 15  4.9 R   77818 K5  6.7  5.8   29-  65     27  71  32S 214 286 214 +7.6 -6.4 -0.5+2.7 .355 -136.5      6  0  4.9  28  7 33 382.9 908.2
24 Aug 28  9 46 27.0 R   77883 B2  7.6  7.6   28-  65     46  77  46N 317  36 317 +7.5 -6.6 +2.9-2.0 .214  121.1      6  2 59.4  28 40 37 381.5 764.4
24 Aug 28 10 21 28.3 r     917 K2  8.1  7.4S  28-  64 -11 54  79  26S 209 289 208 +7.4 -6.6 +0.3+4.0 .245 -129.2      6  4 16.2  28 18  3 381.1 717.1
       917 = NSV 2811, 8.4,
24 Aug 29  8 12 56.7 r   78917 M0  8.3  7.5   20-  53     16  67  72S 262 328 256 +7.5 -6.4 +0.0+1.1 .516 -176.2      6 58 11.0  27 38 13 388.4 973.8
24 Aug 29  9 25  8.4 r   78965 K0  9.0  8.4   20-  53     30  72  81N 289   2 283 +7.4 -6.5 +1.0+0.3 .416  156.6      7  0 51.9  27 48 16 387.1 850.2
24 Aug 31 10  7 26.3 r   80456kG5  9.5  8.9    6-  29     16  73  73N 311  17 296 +6.3 -5.6 +0.7-0.5 .406  149.2      8 51  9.7  22 13 35 395.8 907.4
24 Sep  9 19 36 29.2 d    2268MB2  4.5        36+  74  51 26 142  65S 129 166 118 -5.6 +6.1 +1.0-0.5 .372   -8.7     15 53 36.7 -25 19 38 395.2 721.9
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Sep 10  0 29 18   M    2287SB1  2.9  3.0v  38+  76 -11 27 215   0S 193 159 183 -6.7 +6.5 +9.9+9.9 .000  -90.0     15 58 51.1 -26  6 51 394.2 630.4
   R2287 = pi Scorpii
      2287 is triple: Aa,Ab 5.1 13.4 2.0" 244.0 : AB 2.9 11.9 50" 128.2
      2287 is a close double. Observations are highly desired
      2287 = pi Sco, 2.88 to 2.91, V, Type ELL, Period 1.570103 days, Phase  54%
24 Sep 10  2 26 29.5 D    2298kK3  5.0  4.3   38+  76      9 234  61N  74  21  64 -7.1 +6.5 +0.8-0.5 .373   22.0     16  3 20.6 -25 51 55 395.7 770.9
24 Sep 14  0 41 20.2 d  188724cF5  7.7  7.5   78+ 124     33 161  65N  50  69  61 -6.7 +7.3 +2.2+1.5 .333   23.8     19 55 52.2 -26 33  0 370.8 654.3
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.3sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  2 55 51.1 D    2914cG8  4.8  4.4   78+ 125     34 196  44N  28  12  39 -7.2 +7.1 +1.1+1.6 .307   36.7     19 58 57.2 -26 11 45 370.1 686.7
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 17  7 35 48.9 d    3375 F2  6.8  6.6   99+ 168     35 235  86S  60  13  82 -3.1 +3.0 +1.1+0.3 .496   -9.7     23  0 19.9 - 8 52 50 355.2 867.4
24 Sep 21  8 22 47.5 r     397MB9  7.5  7.5   85- 134     80 200  68S 227 209 244 +5.0 -4.0 +1.7+1.7 .403 -170.9      2 41  6.6  18 48  1 358.0 708.6
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +2.8sec : AC 7.7 9.5 66" 242.2, dT = -157sec
       397 is a close double. Observations are highly desired
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
      day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 21  8 22 50.6 r X  3591MB9  7.9  7.9   85- 134     80 200  68S 227 209 243 +5.0 -4.0 +1.7+1.7 .403 -170.8      2 41  6.8  18 47 59 358.0 708.5
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -2.8sec : BC 7.5 9.5 67" 243.0, dT = -161sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  6 11 58.9 R     521kA2  6.7  6.7v  76- 122     52  87  74S 238 312 251 +6.8 -5.0 +1.0+1.7 .467 -178.5      3 36 58.0  23 12 40 363.8 825.3
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9 49 12.3 D     537SB6  3.7  3.8s  75- 120     80 250 -86S  79  13  91 +6.3 -5.4 +2.5+0.3 .370  -11.9      3 44 52.5  24  6 48 363.4 667.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.42sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+112sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 38 42.2 D     541SB8  3.9  3.9s  75- 120 -10 70 265 -60N  45 330  57 +6.1 -5.5 +2.1+1.7 .346   25.6      3 45 49.6  24 22  4 363.9 676.6
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +290sec : AB 3.8 13.7 113"  72.8, dT = +290sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 10 47 56.9 d     539SB6  4.3  4.4s  75- 120  -8 68 267 -14N 359 283  11 +6.1 -5.5 +1.3+8.7 .119   72.0      3 45 12.5  24 28  2 364.0 681.2
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.05sec : AC 4.3 14.0 53"  53.5, dT = +261sec : AB 4.3 11.0 72"
328.8, dT = +524sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11  0 27   Gr    539SB6  4.3  4.4s  75- 120  -5 64 ** GRAZE: CA  2.5N; Dist. 81km in az. 356deg. [Lat = 28.78+0.07(E.Long+82.41)]
   Distance of 539 to Terminator = 12.4"; to 3km sunlit peak = 0.0"
24 Sep 22 11 12 29.8 R     539SB6  4.3  4.4s  75- 120  -2 62 270  20N 325 249 337 +6.0 -5.5 +2.4-8.1 .121  107.9      3 45 12.5  24 28  2 364.3 695.9
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.25sec : AC 4.3 14.0 53"  53.5, dT = -14sec : AB 4.3 11.0 72"
328.8, dT = -595sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11 13 46.6 R     537SB6  3.7  3.8s  75- 120  -2 62 270  76S 241 166 253 +6.0 -5.5 +2.0+0.7 .386 -168.1      3 44 52.5  24  6 48 364.4 697.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.29sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+32sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 13 55   m     545SB6  4.1  4.2v  75- 120  -2 62 269  -2S 163  88 175 +6.0 -5.5 +9.9+9.9 .000  -90.0      3 46 19.6  23 56 54 364.4 696.4
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0 : AB 4.2 14.4 110" 180.2 : AC 4.2 12.9 147" 336.0
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Sep 22 11 14 11   Gr    545SB6  4.1  4.2v  75- 120  -2 60 ** GRAZE: CA -1.7S; Dist.237km in az. 358deg. [Lat = 30.19+0.03(E.Long+82.41)]
   Distance of 545 to Terminator = 0.7"; to 3km sunlit peak = 0.0"
24 Sep 22 11 16  3.0 R     536pB7  5.5  5.5   75- 120  -1 61 270  66N 279 202 290 +6.0 -5.5 +2.1-1.1 .358  154.9      3 44 48.2  24 17 22 364.4 698.9
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -240sec : AC 5.4 11.5 218" 196.1, dT = -81sec
24 Sep 22 11 25 55   Gr    542pB8  5.8  5.8   75- 120   1 58 ** GRAZE: CA  0.7N; Dist.158km in az. 181deg. [Lat = 26.63-0.01(E.Long+82.41)]
   Distance of 542 to Terminator = 5.7"; to 3km sunlit peak = 0.0"
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 22 11 37 45.8 D     552SB7  2.9  2.9s  75- 120   3 57 272 -33S 132  57 144 +6.0 -5.5 +1.8-4.1 .217  -57.4      3 47 29.1  24  6 18 364.7 713.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.04sec : AE 2.8 15.0 78" 232.4, dT = -62sec : AB 2.8 6.3 118"
291.1, dT = -504sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 11 51 40.5 R     541SB8  3.9  3.9s  75- 120   7 54 274  63N 282 206 293 +6.0 -5.5 +1.7-1.4 .371  154.2      3 45 49.6  24 22  4 365.0 728.4
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +267sec : AB 3.8 13.7 113"  72.8, dT = +268sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 12  0 42   Gr    552SB7  2.9  2.9s  75- 120   9 50 ** GRAZE: CA  1.5S; Dist.286km in az. 186deg. [Lat = 25.47-0.10(E.Long+82.41)]
   Distance of 552 to Terminator = 8.7"; to 3km sunlit peak = 0.0"
24 Sep 22 12 21 50.5 R     552SB7  2.9  2.9s  75- 119  13 47 276  35S 201 126 212 +5.9 -5.5 +2.1+3.4 .231 -122.7      3 47 29.1  24  6 18 365.6 759.7
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.13sec : AE 2.8 15.0 78" 232.4, dT = -288sec : AB 2.8 6.3 118"
291.1, dT = +5sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 12 55 30   Gr    561SB7  5.1  5.1V  74- 119  20 39 ** GRAZE: CA  4.4S; Dist. 29km in az.  14deg. [Lat = 28.32-0.22(E.Long+82.41)]
24 Sep 23  6 13  7   GrX 70481p    7.3  7.2   66- 108     42 ** GRAZE: CA 13.6N; Dist. 57km in az. 140deg. [Lat = 27.39+0.73(E.Long+82.41)]
24 Sep 23  6 13  9   Gr    701SF2  6.6  6.4   66- 108     42 ** GRAZE: CA 13.6N; Dist. 53km in az. 140deg. [Lat = 27.43+0.73(E.Long+82.41)]
24 Sep 23  6 14  2   M     701SF2  6.6  6.4   66- 108     40  77  14N 337  52 344 +7.9 -5.9 +9.9+9.9 .000   90.0      4 38 29.5  26 56 23 370.4 867.9
       701 is triple:  6.6 9.2 3.1" 169.4 : AB 7.36 7.21 4.47" 188.0
       701 is a close double. Observations are highly desired
24 Sep 23  6 14  5   m X 70481p    7.3  7.2   66- 108     40  77  14N 337  52 344 +7.9 -5.9 +9.9+9.9 .000   90.0      4 38 29.6  26 56 26 370.4 867.8
   X 70481 is triple:  7.3 9.2 5.8" 174.9 : AC 7.4 12.9 92" 203.7
   X 70481 is a close double. Observations are highly desired
24 Sep 24  7 24 47.9 r   77397 A2  8.1  8.0V  55-  95     43  76  78N 281 358 282 +8.4 -6.5 +1.5+0.5 .400  154.9      5 41 38.6  28 27 24 376.3 806.4
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 24 10 43 38.3 r   77551cB9  8.3  8.2   54-  94  -9 86  79  85S 264   2 265 +7.8 -6.7 +2.6+0.4 .339 -178.7      5 47 14.3  28 37 26 375.1 617.1
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -0.9sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 14 20.6 R    1022CB7  6.0     s  44-  83     17  67  62N 303  10 299 +8.6 -6.5 +0.7-0.1 .403  140.2      6 39 33.1  28 15 47 384.1 976.8
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.05sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  7  2.5 R    1026SG5  6.5  5.9   44-  83     28  71  90S 275 346 270 +8.6 -6.6 +0.7+0.8 .467  168.5      6 41 20.9  28 11 48 383.2 885.9
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +46sec : AC 6.6 12.8 58"  61.4, dT = +103sec
24 Sep 27  9 19 23.0 r   80288pK5  8.6  8.2v  24-  59     31  79  77S 275 345 261 +7.6 -5.9 +0.9+0.8 .411 -174.1      8 36 55.8  23 14 49 392.8 787.2
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = -0.49sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9 11 58.1 R   98567 A3  7.5  7.4   16-  47     18  78  60S 262 328 245 +6.8 -5.0 +0.3+1.4 .409 -156.2      9 26 34.5  19  3 36 397.7 863.4
24 Sep 29 10 52 43.3 d    1504 M1  5.4  4.6    9-  36  -7 28  89 -15S 190 255 170 +5.5 -3.9 +1.1-8.9 .104  -75.1 .04 10 16 40.7  13 43 42 399.7 782.4
   R1504 = 37 Leonis
24 Sep 29 11  2 39   Gr   1504 M1  5.4  4.6    9-  35  -5 32 ** GRAZE: CA  0.3S; Dist. 61km in az. 181deg. [Lat = 27.50-0.02(E.Long+82.41)]
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 29 11 12 45.4 R    1504 M1  5.4  4.6    9-  35  -3 33  91  16S 221 287 201 +5.5 -3.9 +1.5+9.1 .100 -104.9 .04 10 16 40.7  13 43 42 399.3 755.1
   R1504 = 37 Leonis
24 Oct  7  0 43 44.8 d    2251KK0  7.5  7.0   15+  46      6 238  27N  44 349  32 -5.9 +6.2 -0.1+0.9 .244   53.6     15 45 49.8 -24 43  1 399.7 795.9
24 Oct  9 23 26  7.4 d    2688 G6  7.0  6.6s  41+  80  -5 32 190  64N  62  52  65 -7.4 +7.6 +2.4+0.6 .308   19.3     18 32 14.0 -29 11 25 384.6 608.0
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2 21 49.6 d  164449DF0  7.2        74+ 119     42 195  56N  35  21  53 -6.5 +5.6 +1.2+1.4 .384   18.4     21 31 25.5 -19 14 15 365.9 718.3
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -5sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1 21 32.4 D    3288 K0  5.8  5.3   83+ 132     46 158   7N 342   2   2 -5.0 +4.5 -1.5+5.1 .142   69.9     22 24 27.1 -13 31 46 360.5 722.2
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 8.5"; to 3km sunlit peak = 0.0"
24 Oct 14  4 25 11.4 D    3303kF2  6.4  6.2   84+ 133     40 219  73S  83  48 103 -5.5 +4.0 +2.1-0.4 .383  -33.1     22 30  1.5 -12 54 54 360.4 798.3
24 Oct 14 23 35 24   M    3421cM3  4.9  4.1v  91+ 145  -8 27 116   6S 147 200 169 -3.1 +3.1 +9.9+9.9 .000  -90.0     23 16 50.9 - 7 43 35 358.2 857.7
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 2.7"; to 3km sunlit peak = 0.0"
24 Oct 14 23 36 42   Gr   3421cM3  4.9  4.1v  91+ 145  -9 28 ** GRAZE: CA  6.3S; Dist. 78km in az. 334deg. [Lat = 28.84+0.44(E.Long+82.41)]
   Distance of 3421 to Terminator = 5.8"; to 3km sunlit peak = 0.0"
24 Oct 14 23 49 44.9 d    3422kF0  6.7  6.5   91+ 145 -12 30 118  46N  19  71  41 -3.2 +3.0 +0.7+2.5 .390   36.6     23 16 59.2 - 7  9 39 357.9 844.0
24 Oct 15  3 10 26.8 d  146658 K0  7.3  6.8   92+ 147     56 178  23N 357 359  19 -3.6 +2.6 -0.2+3.2 .280   50.1     23 21 15.4 - 6 11 33 355.3 751.9
24 Oct 16  5  1  6.1 D      35 K0  6.2  5.7   97+ 162     61 208  34N  10 345  32 -1.8 +0.5 +0.5+2.6 .358   37.4      0 17 47.7   1 41 19 352.3 770.5
   Distance of 35 to Terminator = 16.0"; to 3km sunlit peak = 5.7"
24 Oct 16  6  0  7.7 d  109142cG5  7.6  7.1   98+ 162     53 230  39S 117  74 139 -1.9 +0.3 +4.3-3.7 .175  -67.9      0 19 57.1   1 34 57 352.7 795.2
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = +0.23sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
   Distance of 109142 to Terminator = 18.6"; to 3km sunlit peak = 7.5"
24 Oct 19  6  9 53.5 r   75768 K0  7.6  7.1   95- 155     79 125  62S 220 271 234 +4.6 -4.6 +1.4+2.2 .400 -161.1      3 10 14.5  21 16 19 355.6 729.5
24 Oct 21  3 19 59.6 r     773wF8  7.0  6.7   81- 129     20  69  86N 266 334 270 +7.8 -6.1 +0.2+1.0 .557  166.9      5 10  3.9  27 33 23 369.41024.0
       773 is double: AB 7.0 9.3 315" 353.1, dT = -27sec
24 Oct 21  8 23 32.7 R     797cB9  6.4  6.3e  80- 126     84  88  17S 189 278 193 +7.3 -6.5 +0.8+8.5 .122 -109.5      5 20 59.3  27 57 26 366.6 648.9
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  69%
24 Oct 21 10  6  0.2 r   77138 A*  7.6  7.4   79- 126     74 276  43N 310 222 313 +7.0 -6.6 +2.1-2.9 .272  137.6      5 23  1.4  28 28  8 367.3 656.5
24 Oct 21 11 23 40   M     810SB7  1.7  1.7   79- 126  -3 58 280 -10N   3 281   6 +6.7 -6.6 +9.9+9.9 .000   90.0      5 26 17.5  28 36 27 368.3 718.2
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Oct 21 11 25 42   Gr    810SB7  1.7  1.7   79- 126  -2 55 ** GRAZE: CA-10.2N; Dist.288km in az. 201deg. [Lat = 25.28-0.33(E.Long+82.41)]
24 Oct 22  6 30  5.4 r   78233SA3  7.5        71- 114     47  77  75S 255 334 253 +8.4 -6.7 +1.2+1.4 .422 -173.5      6 19 59.0  28 25 36 374.1 771.0
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.3sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -133sec
     78233 is a close double. Observations are highly desired
24 Oct 22  8 13  7.3 r   78294 A0  7.6  7.6   70- 114     69  82  79N 282   8 279 +8.1 -6.8 +2.4+0.0 .350  165.1      6 23  0.3  28 37 17 373.2 656.5
24 Oct 23 10 19 42.4 r   79394cA2  8.0  7.9   59- 101     83  94  37N 331  53 322 +8.0 -6.6 +2.1-3.7 .228  133.7      7 27 16.8  27 17 55 379.6 608.7
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.21sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10 35 37.7 r   79402 B8  7.3  6.9   59- 101     87 101  29N 339  56 330 +8.0 -6.6 +1.7-4.7 .199  127.0      7 27 48.9  27 17 33 379.6 609.4
24 Oct 24  7 28 29.2 r   80089 G5  7.2  6.7   50-  90     35  79  11S 205 276 192 +8.4 -6.1 -1.0+8.5 .114 -106.0      8 19  9.2  24 10 29 387.3 779.1
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Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct 26  8 41  4.0 r   98892dK0  7.7  7.1   30-  66     27  86  62N 320  26 301 +6.8 -4.2 +1.0-1.1 .363  152.3     10  0 31.6  15 51 51 397.3 791.2
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +21sec
24 Oct 26  9 24  2.5 R   98897 K0  7.6  7.0   30-  66     36  91  85N 297   3 277 +6.7 -4.2 +1.3-0.2 .382  178.5     10  1 20.7  15 40 14 396.5 734.1
24 Oct 26  9 54 22.6 r   98907 F8  8.5  8.3   30-  66     43  95  41S 243 309 224 +6.6 -4.2 +2.0+3.4 .212 -125.5     10  2  3.1  15 21 38 396.1 700.3
24 Oct 27  8 19  9.4 r   99272 K2  7.5  6.8   22-  55     11  84  32S 236 299 215 +5.7 -3.1 +0.0+3.5 .239 -121.4     10 44 26.0  10 22 29 401.9 894.4
24 Oct 27  9 59 40.2 r   99296kA3  8.0  7.9v  21-  55     33  96  27N 357  60 336 +5.5 -3.0 +0.7-3.9 .215  123.6     10 47 46.5  10 26 37 399.9 752.9
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Oct 27 11 18 39.6 r   99302kA0  7.4  7.3   21-  54  -5 49 108  49N 335  33 314 +5.2 -2.9 +1.2-2.3 .305  151.0     10 49  3.3  10  9 28 398.6 674.9
24 Oct 29 10 27  1.6 r  138642 K0  9.5  9.0    8-  33     16 100  79S 283 343 261 +2.8 -0.2 +0.6+0.6 .409 -159.1     12 12  1.9 - 1  5 53 404.3 857.4
24 Nov  6  0 11  2.4 d  186607 B8  8.6  8.6   18+  50     15 225  72S 111  66 113 -6.8 +7.4 +1.9-1.7 .333  -35.0     18 17 56.3 -29 15 26 389.7 767.7
24 Nov  6  0 57 17.9 d  186642 B8  8.3  8.3v  18+  50      8 231  67N  70  18  72 -6.9 +7.3 +0.6-0.4 .441    5.3     18 19 24.3 -28 59 59 390.4 838.9
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  8 23 11 32.4 d  190052 F8  7.9  7.6   47+  86  -7 40 176  35S 128 132 144 -6.3 +6.0 +5.6-3.1 .125  -69.9     21  8 36.9 -21 40 59 374.2 659.4
24 Nov  8 23 33 37.4 D    3089SA0  5.3  5.3   47+  86     41 183  35N  18  16  34 -6.4 +6.0 +0.9+2.2 .286   38.9     21  8 33.6 -21 11 37 374.0 667.0
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +34sec : AF 5.3 13.0 9.7"  14.0, dT = +34sec : AG 5.3 20.0 13.1"  62.0, dT = +33sec : AC 5.3
15.0 35" 114.8, dT = -14sec
      3089 is a close double. Observations are highly desired
24 Nov  9  1 58 19.9 d  190125 K0  7.9  7.3   48+  87     29 221  49S 114  76 130 -6.8 +5.7 +3.3-2.5 .223  -59.0     21 12 36.7 -21  0 43 374.6 786.0
24 Nov  9  3 57 26   M    3106 K0  5.2  4.6   48+  88     10 241  15S 148  93 165 -7.0 +5.4 +9.9+9.9 .000  -90.0     21 15 37.9 -20 39  6 376.3 947.0
   R3106 = phi Capricorni
24 Nov 10  0 16 53.6 d    3232 K0  8.1  7.4   58+  99     46 180  34S 125 125 144 -5.9 +4.8 +6.9-3.9 .109  -73.6     22  4 12.2 -16  9 46 368.7 695.2
24 Nov 11  2 45 23   GrSaturn      0.9  0.9   70+ 114     45 ** GRAZE: CA-18.3N; Dist. 31km in az. 138deg. [Lat = 27.68+0.78(E.Long+82.41)]
24 Nov 11  2 45 41   M Saturn      0.9  0.9   70+ 114     46 217 -18N 318 286 339 -5.2 +3.0 +9.9+9.9 .000   90.0     22 58 12.9 - 8 52 27 363.7 769.4
24 Nov 11  3  2 22.1 D    3375 F2  6.8  6.6   70+ 114     44 221  88N  64  28  85 -5.3 +2.9 +1.7+0.4 .425  -15.9     23  0 19.9 - 8 52 50 363.8 780.5
24 Nov 11  6 28 42.7 d    3388SF2  5.5        71+ 115      6 258  37N  14 313  35 -5.5 +2.4 -0.2+1.9 .412   44.2     23  5  9.8 - 7 41 38 367.01023.3
   R3388 = 83 Aquarii
      3388 is triple: AB 6.20 6.34 0.15" 214.8, dT = -0.33sec : AB,C 5.5 7.2 257" 149.2, dT = -447sec
      3388 is a close double. Observations are highly desired
24 Nov 11 23 58 46.7 D    3505WG8  5.5  5.0   80+ 126     49 134  53N  28  68  50 -3.4 +1.7 +1.0+2.2 .412   21.0     23 47 56.5 - 2 45 42 360.0 770.9
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -140sec
24 Nov 12  1 54 24.7 d Neptune     7.8  7.8   80+ 127     60 180  72S  84  84 105 -3.7 +1.5 +2.8+0.3 .339  -37.4     23 50 57.8 - 2 24 44 359.0 742.2
   Neptune limb contacts offset by ±3.7 secs, at  1 54 21.0 and  1 54 28.4  Both contacts are against the bright limb of Neptune
24 Nov 12  2 19 58   m  146935 K0  7.9  7.1   80+ 127     59 192  20S 136 125 158 -3.8 +1.4 +9.9+9.9 .000  -90.0     23 51  9.9 - 2 31 14 359.0 744.2
24 Nov 12  2 20 32   Gr 146935 K0  7.9  7.1   80+ 127     58 ** GRAZE: CA 19.4S; Dist. 29km in az. 314deg. [Lat = 28.43+0.92(E.Long+82.41)]
24 Nov 14  2 25 59.4 d     241 G5  6.8  6.4   95+ 155     68 131  12N 354  37  14 -0.2 -2.1 -0.6+3.9 .257   55.2      1 37 40.9  12  4 42 354.3 775.0
   Distance of 241 to Terminator = 4.4"; to 3km sunlit peak = 0.0"
24 Nov 15  5 25 22.1 d     397MB9  7.5  7.5   99+ 170     75 236  88S  92  42 109 +1.4 -4.1 +2.6-0.4 .349  -33.4      2 41  6.6  18 48  1 354.4 719.2
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +9sec : AC 7.7 9.5 66" 242.2, dT = -163sec
       397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 14.3"; to 3km sunlit peak = 4.7"
24 Nov 16  6 49  1.1 d     537SB6  3.7  3.8s 100- 173     72 262 -62S  66 353  78 +3.2 -5.4 +2.2+0.7 .403    3.6      3 44 52.5  24  6 48 356.9 698.6
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.31sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+53sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 16  7 43  9.5 d     541SB8  3.9  3.9s 100- 173     61 271 -76N  26 310  38 +3.1 -5.4 +1.9+2.9 .280   48.2      3 45 49.6  24 22  4 357.5 726.6
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +277sec : AB 3.8 13.7 113"  72.8, dT = +277sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  7 45 41.7 d     545SB6  4.1  4.2v 100- 173     60 270  -1S 129  53 140 +3.1 -5.4 +2.0-3.5 .244  -54.6      3 46 19.6  23 56 54 357.5 728.6
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +1.2sec : AB 4.2 14.4 110" 180.2, dT = +281sec : AC 4.2 12.9 147" 336.0, dT = -537sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Nov 16  8  8 59.0 R     537SB6  3.7  3.8s 100- 173     55 273  51N 259 184 271 +3.1 -5.4 +1.8-0.3 .431  176.3      3 44 52.5  24  6 48 357.9 749.9
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.36sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+97sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 4.2"; to 3km sunlit peak = 0.0"
24 Nov 16  8  9 31   Gr    545SB6  4.1  4.2v 100- 173     53 ** GRAZE: CA 35.3S; Dist.336km in az. 184deg. [Lat = 25.02-0.06(E.Long+82.41)]
   Distance of 545 to Terminator = 2.7"; to 3km sunlit peak = 0.0"
24 Nov 16  8 16 37.1 D     552SB7  2.9  2.9s 100- 173     54 274 -25S 105  30 117 +3.0 -5.4 +1.6-1.5 .379  -29.3      3 47 29.1  24  6 18 358.0 754.7
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.02sec : AE 2.8 15.0 78" 232.4, dT = -124sec : AB 2.8 6.3 118"
291.1, dT = -309sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 32  9.0 R     545SB6  4.1  4.2v 100- 173     50 275  71S 203 128 214 +3.0 -5.4 +2.0+3.1 .258 -125.5      3 46 19.6  23 56 54 358.3 772.4
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.03sec : AB 4.2 14.4 110" 180.2, dT = -394sec : AC 4.2 12.9 147" 336.0, dT = +392sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 6.4"; to 3km sunlit peak = 0.0"
24 Nov 16  8 33  3.9 r     541SB8  3.9  3.9s 100- 173     50 276   6N 306 230 317 +3.0 -5.4 +1.3-2.9 .296  131.7      3 45 49.6  24 22  4 358.3 773.6
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +231sec : AB 3.8 13.7 113"  72.8, dT = +232sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 0.1"; to 3km sunlit peak = 0.0"
24 Nov 16  9 19  8.6 r     549SA0  6.3  6.3  100- 173     40 279  79N 235 162 246 +2.9 -5.4 +1.4+0.5 .431 -154.9      3 47 21.0  24  6 59 359.2 830.1
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -13sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = -58sec : BC 6.3 8.2 86" 345.0, dT =
+70sec
   Distance of 549 to Terminator = 7.4"; to 3km sunlit peak = 0.5"
24 Nov 16  9 21 37.1 R     552SB7  2.9  2.9s 100- 173     39 280  83N 231 158 242 +2.9 -5.4 +1.4+0.7 .418 -150.9      3 47 29.1  24  6 18 359.2 833.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.07sec : AE 2.8 15.0 78" 232.4, dT = -187sec : AB 2.8 6.3 118"
291.1, dT = -139sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 7.6"; to 3km sunlit peak = 0.6"
24 Nov 16  9 23 11.7 d     560SB8  3.6  3.7s 100- 173     39 279  13S 146  73 158 +2.9 -5.4 +0.1-5.4 .193  -66.2      3 49  9.7  24  3 12 359.3 833.6
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7, dT = +0.08sec : Aa,Ab 3.8 6.8 0.22" 336.1, dT = -1.1sec : AC 3.6 15.0 50"  36.4, dT = -87sec : AH
3.6 16.0 68" 221.7, dT = +89sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 0.4"; to 3km sunlit peak = 0.0"
24 Nov 16  9 38 22   Gr    560SB8  3.6  3.7s 100- 173     35 ** GRAZE: CA 37.0S; Dist.152km in az. 196deg. [Lat = 26.62-0.26(E.Long+82.41)]
   Distance of 560 to Terminator = 3.3"; to 3km sunlit peak = 0.0"
24 Nov 16  9 51 22.0 R     560SB8  3.6  3.7s 100- 172     33 282  61S 195 124 206 +2.9 -5.4 +2.2+3.9 .203 -113.8      3 49  9.7  24  3 12 359.9 875.0
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7, dT = -0.06sec : Aa,Ab 3.8 6.8 0.22" 336.1, dT = +0.8sec : AC 3.6 15.0 50"  36.4, dT = +229sec :
AH 3.6 16.0 68" 221.7, dT = -302sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 6.2"; to 3km sunlit peak = 0.0"
24 Nov 16 10  5 57.6 R     561SB7  5.1  5.1V 100- 172     30 283  88S 223 152 234 +2.9 -5.4 +1.3+0.9 .401 -141.3      3 49 11.2  24  8 12 360.2 897.9
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.49sec : AF 5.0 14.5 4.7" 221.0, dT = -12sec : AE 5.1 14.8 96"  76.8, dT = +200sec : AD
5.1 14.7 144"  65.9, dT = +330sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 8.3"; to 3km sunlit peak = 1.0"
24 Nov 17 11  9 11.5 r   76841cK1  7.3  6.7   97- 159 -10 31 287  75S 236 164 242 +4.5 -6.1 +1.2+0.3 .418 -144.7      4 55 34.6  27 12  9 364.3 905.1
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.18sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 18 10 34 17   M   77818 K5  6.7  5.8   91- 146     52 281  17S 190 110 189 +5.8 -6.5 +9.9+9.9 .000  -90.0      6  0  4.9  28  7 33 367.7 768.8
   Distance of 77818 to Terminator = 17.4"; to 3km sunlit peak = 5.6"
24 Nov 20  9 49 28.3 R    1206 G8  5.9  5.3   76- 121     85 237  66N 303 248 292 +7.3 -6.0 +2.1-1.7 .341  170.7      8  0 55.9  25 23 34 378.2 633.1
   R1206 = omega Cancri
24 Nov 20 10 29 51.6 R    1211SA1  6.3  6.3   75- 121     77 260  67S 257 182 245 +7.1 -6.0 +3.1+0.4 .277 -140.8      8  1 43.8  25  5 22 378.5 655.7
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +106sec : AC 6.3 11.6 106" 295.0, dT = -299sec
24 Nov 21  8 52 15.9 r   80499 K0  8.2  7.6   66- 109     69 102  72N 303  12 288 +7.4 -5.4 +2.2-1.1 .334  172.3      8 54 32.2  21 49 13 384.2 628.0
24 Nov 23  7 36 58.6 r   99157pF2  7.4        47-  86     29  91  80S 282 347 262 +6.4 -3.3 +1.1+0.5 .390 -165.0     10 29 25.6  12 11 13 396.3 776.7
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.23sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 40 43.1 r  119114 F2  7.2  7.0   28-  64      8  93  87N 296 358 274 +3.9 -0.6 +0.2+0.0 .465 -176.3     11 55 23.9   1  5 45 403.7 911.5
24 Nov 25  9 11 38.3 R  119138 K0  7.4  6.9   28-  64     27 105  41N 343  42 321 +3.7 -0.5 +0.4-2.2 .320  142.4     11 58 13.0   0 52  9 401.7 787.6
24 Nov 25 10 16 42.2 R    1730wK2  6.2  5.5   28-  63     40 116  75N 309   1 287 +3.5 -0.4 +1.3-0.8 .369 -178.9     11 59  3.3   0 31 50 400.6 718.0
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +28sec
24 Nov 26 10 50 46.6 R  138921KG5  8.1  7.7   20-  52     36 121  52N 330  20 309 +2.0 +1.1 +0.7-1.5 .358  160.3     12 41 59.6 - 5 13 15 401.6 740.1
24 Nov 26 11 37 52.9 r  138924 F2  7.7  7.5   19-  52  -5 44 131  72N 311 353 289 +1.9 +1.2 +1.4-0.9 .359 -177.6     12 42 35.9 - 5 28  6 400.9 697.7
24 Nov 27 10 35 54.6 R  157912kF0  7.8  7.6   13-  42     22 116  70S 269 323 249 +0.8 +2.4 +1.4+1.2 .330 -141.7     13 23 56.5 -10 52 15 402.5 820.4
24 Nov 27 10 46 32.9 D    1925SB1  1.0  1.1v  13-  42     24 118 -20S 180 232 159 +0.7 +2.4 -0.5-3.0 .258  -51.5     13 25 11.6 -11  9 41 402.3 809.0
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -498sec : AC 1.0 10.5 368"  60.8, dT = -
690sec
      1925 is a close double. Observations are highly desired
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 11 13  2   Gr   1925SB1  1.0  1.1v  13-  41  -9 32 ** GRAZE: CA 20.5S; Dist.381km in az. 214deg. [Lat = 23.91-0.60(E.Long+82.41)]
24 Nov 27 11 34  2.2 R    1925SB1  1.0  1.1v  12-  41  -6 32 127  60S 259 305 239 +0.6 +2.5 +2.6+1.9 .240 -128.5     13 25 11.6 -11  9 41 401.4 752.2
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +443sec : AC 1.0 10.5 368"  60.8, dT =
+1453sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11  3 16.2 d    2029 M1  4.9  4.1v   7-  31     16 119 -58S 137 191 119 -0.6 +3.7 +0.3-0.6 .431  -11.4 .01 14 10 50.5 -16 18  7 401.7 857.6
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 13 46.4 r    2029 M1  4.9  4.1v   7-  30   2 28 131  77N 297 342 279 -0.7 +3.9 +1.2-0.1 .386 -168.7 .01 14 10 50.5 -16 18  7 400.3 764.3
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  3 23 28 32.9 D    2765 A3  7.9  7.8    7+  32     11 230  38N  41 352  47 -5.9 +7.0 +0.1+0.6 .393   28.7     19  0  0.2 -28  3  3 386.2 838.9
24 Dec  4 21 45 45.3 d    2910cG3  4.7  4.3   13+  43   9 33 200  76S  99  79 109 -5.6 +6.8 +2.8-0.8 .301  -34.3     19 55 50.4 -26 17 58 380.9 673.7
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 22 52 36.4 r    2910cG3  4.7  4.3   14+  43  -5 26 216 -34S 208 173 219 -5.8 +6.7 +0.4+1.3 .331 -145.3     19 55 50.4 -26 17 58 381.5 743.6
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  5  0 38 12.2 d  188809 F5  8.7  8.4   14+  44     11 233  88S  86  34  97 -6.0 +6.5 +0.9-0.8 .442  -22.7     20  0 36.8 -25 42 10 382.8 888.6
24 Dec  5 23 33 17.6 d  189831 K0  8.5  7.9   22+  56     31 215  78N  65  31  80 -5.6 +5.8 +1.5+0.2 .407   -8.4     20 54 50.6 -22  6  6 377.5 752.8
24 Dec  5 23 48  4.1 d  189843 K2  8.3  7.7   22+  56     29 218  84S  83  46  98 -5.7 +5.8 +1.8-0.5 .377  -26.3     20 55 18.7 -22  7 25 377.7 769.4
24 Dec  6  0 49 42.9 D    3062 K2  7.5  6.8   22+  56     20 230  55S 111  64 127 -5.8 +5.7 +2.3-2.2 .271  -54.1     20 56 52.7 -22  0 21 378.5 847.8
24 Dec  7  0 39 30.3 D    3197 K3  6.4  5.6   32+  69     33 222  75N  57  19  76 -5.3 +4.6 +1.2+0.4 .431   -5.3     21 50 13.0 -16 50 42 373.9 785.5
24 Dec  7 23 24  5   d  165228 K3  7.9  7.1   42+  81 -11 50 188  30S 128 120 149 -4.5 +3.4 +9.9+9.9 .068  -80.2 .02 22 40 20.7 -11 36 19 369.5 708.9
24 Dec  7 23 30 43   Gr 165228 K3  7.9  7.1   42+  81     49 ** GRAZE: CA 20.6S; Dist. 28km in az. 132deg. [Lat = 27.68+0.99(E.Long+82.41)]
24 Dec  7 23 38  7   r  165228 K3  7.9  7.1   42+  81     50 194  11S 148 135 168 -4.5 +3.4 +9.9+9.9 .068  -99.8 .02 22 40 20.7 -11 36 19 369.5 714.5
24 Dec  8 23 14 13.6 d  146747 K0  8.0  7.5   54+  94  -9 56 164  48S 108 122 130 -3.6 +1.9 +4.5-1.1 .191  -61.8     23 30 57.4 - 5  3 39 366.1 718.1
24 Dec  9  1 18 51.9 D    3472PF5  6.9  6.7   54+  95     52 217  64S  93  61 115 -3.9 +1.6 +2.9-0.8 .294  -45.8     23 33 28.6 - 4 24  5 366.2 748.5
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.34sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 44 25.7 d  146789kF2  7.2  7.0   55+  95     38 240  87N  63  14  85 -4.1 +1.4 +1.3+0.2 .446  -12.9     23 35 14.7 - 3 51 14 367.1 813.9
24 Dec 10  1 29  5.1 d      47 F0  7.7  7.5   66+ 108     62 209  50N  27   2  49 -2.9 -0.1 +1.1+2.1 .391   20.1      0 23 38.5   2 44 35 362.9 732.0
24 Dec 10 23 45  2.0 d  109738 G5  7.8  7.1   76+ 121     60 124  73N  52 100  72 -1.3 -1.5 +1.4+1.8 .441   -3.2      1 13 41.8   8 58 29 361.2 773.7
24 Dec 11  5 58 42.2 d     201kG5  7.5  7.1   78+ 123     25 269  55S 104  40 125 -2.1 -2.2 +0.8-1.8 .381  -41.3      1 22 43.4  10 22 10 363.6 894.8
24 Dec 12 23 46 35.5 d     452 A2  7.7  7.6   93+ 148     44  87  54N  43 114  58 +1.7 -4.3 +0.4+2.0 .489   15.1      3  5 30.3  20 54  9 361.1 887.9
24 Dec 13  2 27 32.9 d   75768 K0  7.6  7.1   93+ 149     78 120  62S 108 163 123 +1.4 -4.7 +3.3-0.9 .268  -49.7      3 10 14.5  21 16 19 359.3 722.1
24 Dec 13  3  0 13.3 d   75764SF0  7.6        93+ 150     83 155  18N   9  32  23 +1.3 -4.7 +0.5+4.1 .255   51.0      3 10  6.6  21 44 49 359.2 705.1
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +0.01sec : AB,C 7.6 13.5 48"  44.0, dT = +155sec : AB,D 7.6 15.8 55" 159.0, dT = -186sec
     75764 is a close double. Observations are highly desired
   Distance of 75764 to Terminator = 15.1"; to 3km sunlit peak = 4.4"
24 Dec 16  8 41 54.5 r     996cA2  6.9  6.8   99- 167     59 279  55N 287 205 284 +4.8 -6.4 +1.5-1.4 .413  177.0      6 30 22.0  28 12 44 368.9 739.2
      996 is double:  7.6 7.6
   Distance of 996 to Terminator = 17.2"; to 3km sunlit peak = 6.7"
24 Dec 16  9 58 43.9 r   78480cK5  7.5  6.7   99- 166     43 283  69S 233 156 229 +4.7 -6.3 +2.2+0.9 .282 -127.0      6 33  2.1  27 49 31 370.3 841.0
     78480 is double: ** 8.3 8.3 0.10"  63.0, dT = +0.35sec
     78480 has been reported as non-instantaneous (OCc 720). Observations are highly desired
24 Dec 16 10 58 44.4 R    1008 A0  5.3  5.3s  98- 166     30 288  36N 309 236 305 +4.6 -6.2 +0.0-1.9 .478  157.1      6 35 12.1  28  1 20 371.6 935.7
```

Occultation prediction for Tampa Coleman Science Works Thea
E. Longitude - 82 24 25.4, Latitude 28 3 13.1, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 10.1"; to 3km sunlit peak = 2.0"
24 Dec 18  2 15 54.2 r    1251 B9  5.9  5.9   90- 144     14  70  41N 326  31 314 +7.1 -5.5 +1.0-1.2 .341  130.6      8 20 32.1  24  1 20 381.6 969.9
   R1251 = lambda Cancri
24 Dec 19  6  1 51.8 r   98510kG5  7.2  6.8   83- 131     49  93  51S 246 315 229 +6.7 -4.6 +1.9+2.6 .256 -133.0      9 20 37.9  19  5 26 384.5 699.2
24 Dec 22  9 17  4.4 R    1696 F5  6.9  6.7   55-  95     53 129  84N 299 342 277 +3.7 -0.5 +2.0-0.7 .337 -166.2     11 42 25.5   2 21 44 397.0 668.6
24 Dec 24  9 54 53.8 R    1886cK3  5.6  5.0   36-  73     38 130  38N 344  27 323 +1.1 +2.3 +0.3-2.1 .315  148.2     13  8 32.5 - 8 59  4 400.5 719.0
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.09sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 24 11 16 52.7 R    1887 K0  6.3  5.8   35-  73     49 153  72S 274 298 253 +0.8 +2.5 +3.1+0.3 .257 -139.4     13  9 14.2 - 9 32 17 399.7 656.9
24 Dec 25 10 22 16.2 R  158207 F0  7.4  7.2   27-  62     32 132  54S 253 295 234 -0.3 +3.6 +3.2+2.4 .206 -122.7     13 52 15.4 -14 40 36 400.3 742.1
24 Dec 25 11 27 34.4 R    1992cF0  7.5     S  27-  62 -11 41 147  56N 323 352 304 -0.5 +3.7 +1.1-1.3 .344  168.8     13 53 51.7 -14 39 51 399.5 679.0
      1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.8sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
```

Lunar Occultation predictions
Capitolio Nacional
Havana City
Cuba

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 32 12   M    1772cA2  3.9  3.9s  56-  97     65 163 -24N  47  62  25 -3.1 -1.5 +9.9+9.9 .000   90.0     12 19 54.3 - 0 40  1 397.1 628.6
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  3 10 37  2   Gr   1772cA2  3.9  3.9s  56-  97     70 ** GRAZE: CA-24.3N; Dist.202km in az. 229deg. [Lat = 20.34-1.07(E.Long+82.36)]
24 Jan  3 10 55 30.7 R    1770 A5  5.9  5.8   56-  97     66 178  72N 311 313 289 -3.2 -1.5 +2.1-1.8 .323 -173.7     12 18 40.3 - 0 47 14 397.1 626.0
   R1770 = 13 Virginis
24 Jan  4  8 34 14.8 r    1865 A2  7.3  7.2   47-  87     37 118  64S 267 322 246 -3.8 -0.4 +2.3+1.2 .277 -135.8     12 59  0.2 - 6  5 27 396.5 744.1
24 Jan  5  8 44 15.0 r    1966kK2  7.8  7.1   38-  76     27 118  40N 341  37 322 -4.8 +1.0 +0.1-1.9 .355  147.4     13 44 15.6 -11 26 12 393.4 804.6
24 Jan  7 10 40 24.3 R    2204kK0  7.7  7.1   19-  52     26 131  70S 262 310 249 -6.0 +4.0 +2.0+1.2 .326 -138.5     15 24 57.6 -22  2 37 382.7 806.7
24 Jan  7 10 51 48.5 R X 39461pK0  7.5  7.0   19-  52     27 133  74N 298 345 285 -6.0 +4.1 +1.1-0.3 .425 -174.6     15 25 22.6 -21 55 45 382.4 790.9
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +6sec : AC 7.9 13.5 40" 190.5, dT = +28sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 10 41  4.2 R    2349SB1  2.9     v  11-  39     14 126  81N 283 338 275 -5.8 +5.2 +0.8+0.4 .471 -166.8     16 21 11.3 -25 35 34 378.0 888.0
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -0.23sec : AB 2.9 8.4 20.3" 273.1, dT = -42sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 22 54.1 D    2366dM1  1.1  0.1v  11-  38  25 40 172 -66S 117 125 109 -6.4 +5.7 +2.3-0.8 .349   -5.3 .13 16 29 24.5 -26 25 55 374.6 636.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 54 27.7 R    2366dM1  1.1  0.1v  10-  38  38 38 199  83N 280 261 273 -6.7 +5.8 +2.6-0.7 .344 -175.1 .13 16 29 24.5 -26 25 55 374.4 626.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 10 49 41.8 r  185324kA0  8.7  8.5    5-  27      4 123  87S 261 323 258 -5.2 +6.1 +0.7+1.0 .475 -153.0     17 22 16.8 -28  0  8 373.6 966.0
24 Jan  9 11 16  6.9 R    2505 K4  5.3  4.5    5-  27      8 125  72S 246 304 243 -5.2 +6.2 +1.4+1.7 .375 -137.4     17 23 21.6 -28  8 34 372.9 921.4
   R2505 = 43 Ophiuchi
24 Jan  9 11 16 11.6 r  185348KG8  9.4  9.0    5-  27      8 125  69N 284 343 282 -5.2 +6.2 +0.5+0.3 .508 -176.1     17 23 17.7 -27 58  1 372.9 920.9
24 Jan 14  0  0 47   m  164823 G0  8.6  8.2    8+  34     19 241  20S 146  88 165 -0.3 +5.4 +9.9+9.9 .000  -90.0     22  1 50.2 -16 46 39 360.4 948.4
24 Jan 14  0  1  1   Gr 164823 G0  8.6  8.2    8+  34     18 ** GRAZE: CA 20.3S; Dist. 53km in az. 331deg. [Lat = 23.68+0.51(E.Long+82.36)]
24 Jan 14  0 59 26.3 d    3232 K0  8.1  7.4    9+  34      8 249  88N  74  10  93 -0.3 +5.3 +0.3-0.2 .568  -15.4     22  4 12.2 -16  9 46 361.71034.0
24 Jan 14 23 32 36.4 d    3365kA0  8.2  8.1   16+  47  -7 39 234  81N  62  12  83 +1.4 +4.3 +1.3+0.4 .466  -11.3     22 56 49.4 -10 15 47 360.0 830.0
24 Jan 15  1 59 48.9 d    3377 K0  7.9  7.4   17+  48      9 256  87S  73   8  95 +1.3 +3.9 +0.3-0.2 .558  -15.9     23  1  7.9 - 9 33 14 363.21021.9
24 Jan 16  1  4 26   m  146936 K5  7.9  7.2   26+  62     34 249  16S 142  83 164 +2.7 +2.6 +9.9+9.9 .000  -90.0     23 51 28.9 - 3 24 14 363.2 850.1
24 Jan 16  1 58 58   M    3514cG9  5.9  5.4   27+  62     23 256  12S 145  82 167 +2.7 +2.5 +9.9+9.9 .000  -90.0     23 52 55.6 - 3  9 20 364.4 917.8
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9
      3514 is a close double. Observations are highly desired
24 Jan 17  0 12 12.4 d  109370 K2  8.2  7.5   37+  75     58 236  73N  50 360  71 +4.1 +1.1 +1.6+1.2 .414   -1.4      0 41 21.3   3 35 58 364.7 732.1
24 Jan 17 23 50 43.9 d  109947 K0  7.8  7.2   48+  88 -10 75 215  87N  65  33  85 +5.1 -0.5 +2.4+1.0 .368  -16.7      1 31 53.2   9 59 18 367.8 685.6
24 Jan 18  2 36  5.6 d     232 K0  8.1  7.4   49+  89     41 264  74S  84  16 104 +4.6 -0.8 +1.6-0.5 .387  -25.7      1 35 33.4  10 33 42 370.2 772.0
24 Jan 19  3  4  1.0 d     363 F0  7.2  7.0   60+ 102     48 270  66N  48 334  65 +5.1 -2.4 +1.6+1.2 .382   15.8      2 27 32.1  16 38 37 373.9 720.0
24 Jan 19 23 39  1   m     472cA1  4.9  4.9   70+ 113  -8 73  93 -21N 325  46 339 +6.1 -3.4 +9.9+9.9 .000   90.0      3 14 54.1  21  2 40 376.0 680.2
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jan 20  3 30  2   M     486CB5  5.3     e  70+ 114     54 275   7S 160  80 173 +5.3 -3.8 +9.9+9.9 .000  -90.0      3 21 13.6  21  8 49 377.6 676.0
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 21  7  4 51   m     647WB9  5.4  5.4s  81+ 128     20 290   4N 357 284   6 +4.9 -4.9 +9.9+9.9 .000   90.0      4 22 34.9  25 37 46 385.1 901.7
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9
       647 = NSV 15957, 5.34 to 5.39, Hp
   Distance of 647 to Terminator = 3.6"; to 3km sunlit peak = 0.0"
24 Jan 23  6 52 29.9 d   78191 A0  7.7  7.7   94+ 151     47 287  63S 128  43 126 +4.4 -6.3 +0.8-2.2 .351  -25.2      6 17 59.9  28  0 24 389.5 731.9
24 Jan 24  5 41 29.2 D    1093SF8  6.6     s  98+ 162     74 288  47S 156  55 149 +4.2 -6.6 +1.1-4.4 .210  -48.8      7 12 49.0  27 13 30 390.9 606.3
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.8sec : AC 7.2 12.8 13.7"  74.4, dT = +9sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  5 41 29.2 d X 99111S    7.2  7.0s  98+ 162     74 288  47S 156  55 149 +4.2 -6.6 +1.1-4.4 .210  -48.8      7 12 49.0  27 13 30 390.9 606.3
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.8sec : BC 7.3 12.7 14.0"  68.0, dT = +2sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  9 26 51.8 d    1108cG8  7.0  6.5   98+ 163     25 290  84S 119  44 112 +3.6 -6.2 +0.1-1.6 .470   -9.0      7 19 30.8  26 49 23 394.8 911.9
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.18sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 50 16.6 D    1206 G8  5.9  5.3   99+ 171     30  73  77S 149 226 137 +4.6 -6.5 +2.0-2.4 .235  -55.4      8  0 55.9  25 23 34 396.0 796.4
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 10.3"; to 3km sunlit peak = 2.2"
24 Jan 28  2 41  3.8 r   99149 A2  7.1  7.0   94- 153     21  84  80S 275 345 255 +1.4 -4.6 +0.7+0.7 .399 -162.0     10 28 42.4  13 17 20 402.9 818.7
24 Jan 28  7 10 35.6 r   99185pA3  7.9  7.7   94- 152     78 149  60S 256 285 236 +0.4 -4.3 +4.8+1.5 .177 -124.1     10 34  7.3  12 22 28 399.1 609.6
     99185 is double: AB 7.7      0.20" 180.0, dT = -0.27sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 28 58.0 R    1625SK3  5.8  5.2   89- 142     20  90  41N 338  46 316 +0.0 -3.5 +0.7-2.1 .322  140.2     11 14  1.8   8  3 39 403.5 820.5
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.12sec : AB 5.8 11.8 23.8" 260.1, dT = -15sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29 10  2 47.7 R    1645cF8  6.7  6.4   88- 140     60 240  16N   4 311 342 -1.5 -2.8 -0.5-4.0 .223  130.5     11 21 26.8   6 38  6 400.2 666.9
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Jan 29 10 37 27   M    1644 B9  4.1  4.1   88- 140     53 248  22S 223 164 201 -1.6 -2.8 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 400.7 693.2
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6 12  4.7 R    1732cK0  6.8  6.1v  82- 130     45 113  72N 310   8 288 -1.8 -2.1 +1.5-1.1 .357 -179.5     11 59 23.9   1 49 36 400.8 693.3
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.28sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 16 21.7 r    1824pG0  7.8  7.5   74- 119     47 125  55N 328  17 306 -3.3 -0.6 +1.0-1.8 .345  165.5     12 42 59.3 - 4  2 58 399.2 690.3
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -2.7sec
      1824 is a close double. Observations are highly desired
24 Jan 31 10 14 58.7 r  138955 K2  7.2  6.5   74- 118     60 200  72N 311 292 290 -4.0 -0.2 +2.1-1.9 .323 -175.1     12 45 32.0 - 4 48 39 398.0 625.0
24 Feb  2 11 41 48.0 r    2040cK0  8.0  7.3   55-  95  -7 49 196  89S 288 272 270 -6.5 +2.8 +2.8-1.0 .301 -159.6     14 15 50.2 -16  4 53 391.9 610.1
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.32sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4  8 23 26.1 R    2270 B2  5.4  5.4e  36-  73     14 124  34N 337  33 326 -6.8 +4.9 -0.4-1.5 .370  141.9     15 53 55.9 -23 58 41 385.3 877.8
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4 11 53 39.1 R    2286kB5  5.4  5.5v  35-  72  -4 41 168  82N 288 300 277 -7.4 +5.3 +2.5-0.4 .334 -169.7     15 58 34.9 -24 49 53 381.8 629.3
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  5 10 20 58   m  184783 G6  7.9  7.4   25-  60     22 136  19S 203 249 198 -7.0 +6.1 +9.9+9.9 .000  -90.0     16 54 49.6 -27 44 55 377.7 782.9
24 Feb  5 10 28 29.7 r  184777pA0  8.4  8.4   25-  60     24 138  69S 252 297 247 -7.0 +6.1 +2.3+1.5 .321 -139.6     16 54 27.0 -27 34  9 377.5 771.0
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.6sec
    184777 is a close double. Observations are highly desired
24 Feb  6 11 30  4.7 R    2586cB3  6.0  6.0   16-  47  -9 23 139  49N 306 350 306 -6.5 +6.9 +1.0-0.5 .389  157.1     17 58 39.0 -28 45 33 371.1 760.1
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.7sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb 11 23 39 46.0 d  146719KF8  8.1  7.8    6+  28  -5 23 253  68N  50 348  71 +1.3 +3.0 +0.6+0.6 .542    4.8     23 28 17.0 - 5 49  4 356.9 941.0
24 Feb 13  0 57 28.9 d  109178 K0  8.9  8.3   13+  42     21 263  75S  83  17 105 +3.0 +1.2 +0.7-0.5 .486  -25.3      0 23 55.0   1 32 19 360.3 940.4
24 Feb 13  1  9 23.6 D  109182 G0  7.8  7.4   13+  42     18 264  66S  91  25 113 +3.0 +1.2 +0.7-0.9 .459  -33.0      0 24 17.3   1 33 22 360.7 957.2
24 Feb 13  1 51 35.7 D      50dG5  5.8  5.3S  13+  43      9 269  73N  50 343  72 +3.0 +1.1 +0.2+0.5 .571   10.6      0 25 24.2   1 56 23 361.81019.5
   R50 = 44 Piscium
       50 is double: AB 5.8 9.0 1.0"
       50 is a close double. Observations are highly desired
       50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14  1 20 54.3 d  109763cG5  8.1  7.6   22+  56     29 268  17N 355 286  16 +4.5 -0.5 +0.5+4.9 .205   65.3      1 15 37.1   8 46  5 363.9 865.0
24 Feb 15  1 54  4.1 d   92820 K2  8.2  7.6   33+  70     35 273  82N  61 349  80 +5.5 -2.2 +1.2+0.4 .449    3.6      2 10 15.7  15  1 23 368.6 805.0
24 Feb 15  2 10 53.8 d   92821 K0  8.1  7.3   33+  70     31 274  61N  41 329  59 +5.5 -2.2 +1.1+1.2 .418   25.4      2 10 29.4  15  9  5 369.0 827.3
24 Feb 15  3 23 20.6 D     326cM0  5.7  4.9s  33+  70     15 281  86N  66 356  84 +5.4 -2.2 +0.5+0.0 .519    4.5      2 13  3.3  15 16 48 370.9 936.4
   R326 = 19 Arietis
      326 is double: ** 6.8 6.8 0.050"
      326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
      326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 17 49.6 d   75708 K0  8.0  7.1   43+  82     56 273  64N  47 328  62 +6.3 -3.6 +1.9+1.4 .357   19.3      3  3  9.6  20 20 10 372.3 683.0
24 Feb 16  4 41 34.2 d     459SK2  6.4  5.8   45+  84     11 288  64N  48 339  63 +5.9 -3.7 +0.6+0.6 .458   29.6      3  9 20.1  20 45 40 377.1 963.5
      459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -262sec : AB 6.5 8.8 122" 239.0, dT = -262sec
      459 is a close double. Observations are highly desired
24 Feb 17  0 22  4.3 D     587 K0  6.2  5.5   54+  95     81 282  42N  30 293  41 +6.8 -4.8 +1.9+3.1 .267   37.1      3 57 26.4  24 27 43 376.5 611.5
24 Feb 17  1 10 30   Gr  76358kB9  7.2  7.2   54+  95     68 ** GRAZE: CA  7.7S; Dist.  3km in az. 172deg. [Lat = 23.11+0.13(E.Long+82.36)]
24 Feb 17  1 10 31   gr  76358kB9  7.2  7.2   54+  95     70 278   8S 161  72 172 +6.7 -4.8 +9.9+9.9 .000  -90.0      3 58 20.9  24  4 52 377.0 621.7
24 Feb 18  0 34 20.9 d   76841cK1  7.3  6.7   65+ 107     86   7  67N  62 235  67 +6.9 -5.8 +2.6+1.5 .311   12.7      4 55 34.6  27 12  9 381.6 589.3
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.25sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 29 52.3 D     746WB7  7.0  6.9   65+ 108     52 286  69N  64 338  70 +6.2 -5.8 +2.2+0.5 .333   24.3      4 59 53.7  27 19 32 383.5 680.4
      746 is double: AB 7.0 8.7 20.4" 206.0, dT = -48sec
24 Feb 19  5  1 30.1 D   77818 K5  6.7  5.8   75+ 120     44 288  48S 135  51 134 +5.7 -6.3 +0.5-2.6 .325  -34.2      6  0  4.9  28  7 33 388.9 741.1
24 Feb 21  2 54 50.2 D    1181cG8  7.0        90+ 142     84  58  87N 104 224  94 +5.0 -6.7 +2.9-0.7 .296    4.0      7 49 47.7  26 15 50 393.6 566.2
     1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.14sec
     1181 is a close double. Observations are highly desired
24 Feb 22  0 21 52.9 d    1290pF8  6.9  6.6   94+ 153     39  78  41N  65 144  51 +4.7 -6.4 +1.1+2.2 .296   36.3      8 38 45.5  23 41  9 398.2 709.8
     1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +1360sec
24 Feb 27  6 17 17.9 r    1790 M4  6.9  6.0v  93- 150     58 141  46N 336  11 314 -2.4 -0.7 +1.0-2.3 .315  160.1     12 29  9.7 - 2 25 46 399.9 649.6
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 31 40.5 r    1890 K0  7.3  6.8   88- 140     28 113  54N 329  27 308 -3.2 +0.4 +0.5-1.5 .383  160.0     13  9 46.3 - 7 39 19 400.9 791.4
24 Feb 29  8 49 25.8 R    2002 K0  6.8  6.3   80- 127     53 178  62N 320 322 301 -5.3 +2.4 +1.8-1.8 .320  172.7     13 58 29.8 -14  7 19 395.9 619.7
24 Mar  2 10 41 23.2 d    2237cK3  5.0  4.3s  62- 104     43 184 -78N  92  88  80 -7.4 +5.2 +3.2-0.2 .284   25.8     15 40 16.9 -23 49  5 388.5 595.0
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.27sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12 11 38.0 r    2237cK3  5.0  4.3s  62- 103   4 37 210  57N 317 287 305 -7.7 +5.3 +2.3-2.1 .289  154.0     15 40 16.9 -23 49  5 388.7 606.3
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.19sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  6 55 58.0 D    2366dM1  1.1  0.1v  53-  93     10 125 -84S 105 163  97 -7.0 +5.8 +0.6+0.3 .465    9.9 .09 16 29 24.5 -26 25 55 387.3 886.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8  4 33.8 R    2366dM1  1.1  0.1v  53-  93     23 135  62N 306 354 299 -7.2 +5.9 +0.8-0.5 .409  169.9 .11 16 29 24.5 -26 25 55 385.8 776.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9  5 29.3 R    2373 K1  6.1  5.5   52-  93     31 146  38N 331   6 323 -7.4 +6.1 +0.6-1.6 .306  145.0     16 31 22.8 -26 32 16 384.7 696.5
24 Mar  5  9 22 12.3 R    2688 G6  7.0  6.6s  31-  68     15 131  49S 223 276 227 -6.9 +7.3 +2.5+3.0 .253 -124.4     18 32 14.0 -29 11 25 374.4 814.3
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 17  9.8 r  188343 K0  8.4  7.8   21-  54     15 129  79N 267 320 276 -6.1 +7.4 +1.2+0.8 .457 -177.9     19 36 57.4 -27 30  4 368.2 816.9
24 Mar  7 10 42  0.6 R  189555 G1  7.2  6.9   12-  41     10 122  77N 262 321 276 -4.7 +7.1 +0.9+1.0 .496  178.4     20 40 22.3 -24  7  5 363.3 874.8
24 Mar  8 11 38  3.7 R    3175 G8  4.7  4.3    5-  27  -2 12 117  46N 284 345 303 -3.0 +6.3 +0.7+0.4 .428  146.6     21 42 39.5 -18 51 59 358.7 891.7
   R3175 = kappa Capricorni
24 Mar 13  0 47 11.8 d   92623 K5  8.9  8.4   10+  36     20 276  85S  72   2  92 +4.0 -1.6 +0.6-0.2 .528   -6.4      1 46 38.7  12 24 42 361.8 932.4
24 Mar 14 23 48 56.6 D     521kA2  6.7  6.7v  27+  63  -3 59 277  65N  50 326  62 +6.5 -4.6 +2.1+1.4 .351   21.2      3 36 58.0  23 12 40 369.5 675.1
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 17  0  6 38   Gr  77268 B8  8.2  8.0v  48+  88  -7 78 ** GRAZE: CA  1.3S; Dist. 49km in az.   2deg. [Lat = 23.58-0.03(E.Long+82.36)]
24 Mar 18  1 21 33.3 d   78530cB9  7.8  7.8   59+ 100     76 295  37S 148  40 144 +6.7 -6.8 +1.8-4.2 .212  -47.6      6 35 40.3  28 15 51 386.7 588.8
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = -0.28sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 33 13.1 D    1022CB7  6.0     s  59+ 101     48 287  87S  98  12  94 +6.2 -6.7 +1.5-1.1 .383    8.2      6 39 33.1  28 15 47 388.6 729.7
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +0.9sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 33 14.1 d X 91013C    7.8  7.8s  59+ 101     48 287  87S  98  12  94 +6.2 -6.7 +1.5-1.1 .383    8.3      6 39 33.2  28 15 48 388.6 729.7
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -0.9sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 18  4 33 15.9 D    1026SG5  6.5  5.9   60+ 101     35 289  82N  87   6  83 +6.1 -6.6 +1.1-0.7 .409   20.2      6 41 20.9  28 11 48 389.9 823.1
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +60sec : AC 6.6 12.8 58"  61.3, dT = +127sec
24 Mar 19  0 56 24.7 D   79479 K1  7.2  6.6   68+ 112     84  45  90N 101 234  92 +6.3 -6.9 +3.0-0.5 .296    4.5      7 32 12.9  27  7 31 391.0 563.8
24 Mar 19  3 42  8.4 D    1149SK5  4.1  3.3s  69+ 112     57 284  70N  81 353  72 +5.6 -6.7 +2.5-0.3 .301   33.1 .02  7 35 55.4  26 53 45 392.4 684.5
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.13sec : AB 4.1 13.2 57"  39.0, dT = +139sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 48 26.7 r    1149SK5  4.1  3.3s  69+ 113     42 286 -44N 328 245 319 +5.4 -6.6 +0.0-2.7 .341  146.6 .02  7 35 55.4  26 53 45 393.7 779.7
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.02sec : AB 4.1 13.2 57"  39.0, dT = -54sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  1 43 12.3 D    1263DF0  6.9  6.8S  77+ 123     85  73  52N  69 174  56 +5.3 -6.5 +3.9+1.8 .207   45.9      8 26 39.8  24 32  3 394.7 570.3
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +26sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  1 43 38.8 d   80185SF0  7.7  7.4   77+ 123     85  72  52N  69 174  56 +5.3 -6.5 +4.0+1.9 .205   46.4      8 26 40.1  24 32  7 394.7 570.4
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.6sec : BC,A 7.5 6.9 5.6" 231.8, dT = -26sec
     80185 is a close double. Observations are highly desired
24 Mar 20  3 19 41.5 D    1270cF0  6.1  5.9v  78+ 124     73 277  88N 105  15  91 +4.9 -6.4 +2.5-1.2 .312   15.9      8 28 36.8  24  8 42 395.1 621.8
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 28 44.7 D    1479 F2  6.4  6.2   91+ 146     82 167  89N 115 127  95 +2.8 -5.0 +2.7-1.3 .300   15.7     10  5 40.9  15 45 27 399.1 603.6
24 Mar 22  5 44 59.5 d    1485 G0  7.1  6.8   92+ 146     59 261  60S 146  76 126 +2.3 -4.7 +0.9-2.5 .346  -14.6     10  7 39.3  15  9 27 400.1 693.7
24 Mar 23  3  7 48.8 D    1576 A2  5.3  5.3   96+ 157     70 125  44S 166 216 145 +1.7 -3.9 +1.0-3.3 .264  -33.8     10 49 15.4  10 32 43 400.2 616.5
   R1576 = 53 Leonis
24 Mar 27  5 28 22.6 r  158105PF5  7.5  7.2   96- 158     49 147  52N 333   4 314 -3.6 +1.9 +1.0-2.0 .328  160.7     13 42 35.7 -12  5 13 397.4 668.8
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.13sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  6 53 52.5 r  184209KK0  7.7  7.2   78- 124     31 144  68S 261 298 252 -6.3 +5.8 +2.6+1.1 .295 -142.4     16 11 51.3 -25 53  1 389.4 704.3
24 Apr  1  8 14 59.0 r  186391cA2  7.8  7.7   58-  99     24 141  88N 272 314 274 -6.8 +7.3 +1.8+0.6 .381 -170.7     18 10 18.2 -29 12 47 380.6 713.2
    186391 is double: AB 8.3 8.8 0.38"  94.9, dT = +1sec
    186391 is a close double. Observations are highly desired
24 Apr  4  9 26 56.2 r  190165 K0  7.2  6.7   25-  60     11 120  36S 195 255 212 -4.7 +6.7 +1.7+3.7 .242 -120.1     21 15  3.2 -21 48 55 366.4 859.2
24 Apr  4 10 19 53.7 r  190177 F3  8.2  8.0   25-  60     22 126  70N 269 322 286 -4.8 +6.7 +1.4+0.8 .422  162.5     21 15 52.6 -21 26 23 365.2 784.2
24 Apr  5 11  9 30.0 r    3265PK0  6.6  6.1   15-  46  -3 24 121  82S 237 292 257 -3.4 +5.7 +1.3+1.6 .463 -172.8     22 14 38.2 -15 49  7 360.6 816.4
      3265 is double: AB 4.3 11.9 22.0"  65.0, dT = +47sec
24 Apr  6 16 12 21.0 r    3421cM3  4.9  4.1v   7-  30  65 59 193  74N 258 246 280 -2.1 +3.6 +2.6+0.4 .370  148.4 .01 23 16 50.9 - 7 43 35 354.4 747.1
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 15 55 33.2 D Venus      -3.8 -3.8    2-  16  62 65 155 -72N  43  66  64 +0.0 +2.0 +1.7+2.0 .393    0.9      0 12 29.6 - 0 16 40 353.1 673.7
   Venus contacts: Dark limb 15 55 20; Terminator 15 55 21; Bright limb 15 55 46: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr  7 17 22  0.0 R Venus      -3.8 -3.8    2-  15  74 64 207  72S 228 199 245 -0.2 +1.7 +1.7+1.7 .394  180.0      0 12 29.6 - 0 16 40 353.1 674.6
   Venus contacts: Dark limb 17 21 47; Terminator 17 21 57.0; Bright limb 17 22 13: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 20 39.5 D     472cA1  4.9  4.9    7+  31      9 289  27S 133  64 147 +4.5 -4.0 -0.6-2.7 .334  -54.2      3 14 54.1  21  2 40 367.31016.0
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.24sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 36  8.7 D   75819 F2  7.9  7.7    7+  31      6 290  50S 110  42 124 +4.5 -4.0 -0.3-1.4 .502  -30.9      3 15 46.1  21  9 55 367.71042.8
24 Apr 14  3 37 16.2 d   78233SA3  7.5        33+  70     20 293  58N  58 345  56 +6.1 -6.4 +1.0+0.3 .364   44.9      6 19 59.0  28 25 36 384.6 958.2
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.27sec : AB,C 7.5 9.6 2.9" 265.3, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -138sec
     78233 is a close double. Observations are highly desired
24 Apr 15  0 38 14.0 d   79180 F2  8.1  7.8   42+  81 -12 69 288  74N  80 342  73 +6.4 -6.8 +2.9+0.1 .293   29.0      7 13  6.6  27 46 57 385.8 627.1
24 Apr 15  3 42 51.6 d   79256 K0  7.8  7.3   43+  82     30 289  58S 129  51 121 +5.9 -6.5 +0.1-1.9 .444  -17.6      7 17 59.4  27  8 31 389.3 880.5
24 Apr 15  3 50 27.2 d   79264 G2  8.0  7.7   43+  82     28 290  90N  96  19  89 +5.9 -6.5 +0.6-1.0 .458   14.5      7 18 28.9  27 15 10 389.4 893.3
24 Apr 16  0 22 34.4 d    1229SF5  8.1  7.9   52+  92  -8 84 298  66N  79 324  67 +6.0 -6.7 +3.6+0.6 .250   36.2      8  8 20.1  25 33 10 390.3 586.7
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.39sec : AB 8.2 12.8 3.1" 302.7, dT = -9sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 16  1 48  4   m   79987SK5  7.5  6.7   52+  93     66 281  16N  29 299  17 +5.6 -6.5 +9.9+9.9 .000   90.0      8  9 42.4  25 33 33 391.1 655.0
     79987 is triple: **Aa,Ab 8.9 8.9 0.10"  90.0 : AB 7.6 10.7 28.9"  98.1
     79987 has been reported as non-instantaneous (OCc  78). Observations are highly desired
24 Apr 17  2 44  0.1 d    1348 G5  8.1  7.6   62+ 104     64 272  75S 123  42 107 +4.6 -5.9 +1.6-1.9 .350    2.7      9  2 45.2  21 31  9 395.2 671.6
24 Apr 19  1 20 21.9 d   99185pA3  7.9  7.7   80+ 126     73 128  38S 166 215 146 +2.8 -4.3 +1.0-3.5 .257  -34.9     10 34  7.3  12 22 28 399.0 606.3
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.8sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5 17 16.4 D    1644 B9  4.1  4.1   87+ 138     52 249  34S 172 112 150 +0.6 -2.6 +0.2-3.3 .281  -38.3     11 21  8.2   6  1 46 400.6 696.7
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 18 23.4 r    1644 B9  4.1  4.1   87+ 139     39 259 -66S 272 206 250 +0.4 -2.4 +1.8-1.0 .307 -141.8     11 21  8.2   6  1 46 401.6 760.4
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 10 38.8 d    1732cK0  6.8  6.1v  92+ 148  -5 37 106  60N  86 148  64 +0.6 -1.9 +2.0+1.3 .280   42.3     11 59 23.9   1 49 36 401.4 736.8
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.26sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  3 52  1.6 d  138955 K2  7.2  6.5   97+ 160     62 169  62N  85  95  63 -1.5 +0.0 +4.4+0.6 .201   52.4     12 45 32.0 - 4 48 39 398.2 636.7
24 Apr 26  4 19  1.8 R    2269cB5  5.4  5.4   95- 154     27 137  81N 299 343 288 -4.9 +5.4 +1.2-0.3 .398 -178.3     15 53 53.9 -24 31 59 390.3 753.9
24 Apr 30  7 59  7.8 r  188724cF5  7.7  7.5   62- 104     25 137  36N 314 358 325 -5.3 +7.4 +1.2-1.2 .244  129.0     19 55 52.2 -26 33  0 375.3 705.7
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.01sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 May 10  1 21 55   M   76764cG8  7.9  7.2    5+  25      7 296  17N   1 293   7 +4.5 -5.6 +9.9+9.9 .000   90.0      4 48 20.4  26 57 59 374.21065.9
     76764 is double: ** 8.6 8.6 0.10" 160.0
     76764 has been reported as non-instantaneous (OCc 736). Observations are highly desired
24 May 10  1 22 21   Gr  76764cG8  7.9  7.2    5+  25      5 ** GRAZE: CA 17.3N; Dist. 61km in az. 210deg. [Lat = 22.50-0.52(E.Long+82.36)]
24 May 11  1 28 59.6 D     885wG7  5.6  5.1   10+  38     18 293  39S 134  61 134 +5.1 -6.2 -0.4-2.0 .440  -34.5      5 50 58.1  27 58  4 378.4 979.5
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -4sec
24 May 11  1 35 46.7 d   77638 B8  8.2  8.1   10+  38     17 294  72S 101  28 101 +5.1 -6.2 +0.1-1.0 .540   -1.4      5 51 33.0  28  5 32 378.6 991.2
24 May 11  2 28 50.3 d   77674 K5  8.3  7.6   11+  38      6 298  43N  36 329  36 +5.2 -6.1 +1.1+1.5 .272   62.5      5 53 19.0  28 16 31 379.91086.3
24 May 12 16 50 44.0 d    1149SK5  4.1  3.3s  24+  59  80 25  70  63N  69 145  60 +6.9 -6.6 +0.2+1.5 .432   20.4 .01  7 35 55.4  26 53 45 386.9 864.4
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.09sec : AB 4.1 13.2 57"  39.0, dT = +114sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 17 57 39.3 r    1149SK5  4.1  3.3s  25+  60  81 39  73 -75N 291  12 282 +6.8 -6.7 +1.6-0.1 .377  159.9 .02  7 35 55.4  26 53 45 385.7 751.6
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.08sec : AB 4.1 13.2 57"  39.0, dT = +46sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 14  3 37 58.7 d    1317 A2  8.2  8.1   36+  74     24 285  75S 119  46 105 +4.5 -5.7 +0.2-1.5 .486   -0.5      8 46 28.9  22 21  8 394.0 929.1
24 May 15  1 58  1.3 d   98640 K0  8.0  7.5   46+  85     55 270  75N  94  17  76 +3.9 -5.2 +2.3-0.9 .308   34.6      9 33 38.6  18 44 12 394.9 717.4
24 May 15  2 45 43.4 d   98646 K2  8.2  7.3v  46+  85     45 273  69S 129  54 111 +3.8 -5.1 +0.8-2.0 .404   -2.5      9 34 26.7  18 24 22 395.8 775.9
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 16  0 57 12.9 d   99052 G0  8.2  7.8   55+  96     76 231  42S 159 111 139 +3.1 -4.4 +0.9-3.1 .294  -26.0     10 18 26.1  13 56  1 396.6 628.9
24 May 17  0 26 34   m    1603 A0  7.2  7.2   64+ 107  -6 75 155  21N  45  68  24 +2.1 -3.3 +9.9+9.9 .000   90.0     11  2 32.9   9 10 23 398.1 614.6
24 May 17  1 27 49.3 d  118637 F5  8.1  7.9   65+ 107     73 211  71N  95  66  73 +1.8 -3.2 +3.6-0.5 .245   41.3     11  3 43.5   8 43 48 398.2 628.5
24 May 18  4 55 46.3 d  119068 F5  7.8  7.5   74+ 119     37 254  85N 109  46  87 -0.2 -1.4 +1.5-1.5 .360   20.5     11 49 46.8   2 13 55 400.7 746.4
24 May 18  6 11 41.0 D    1712SF8  3.6  3.3   75+ 120     20 263  37S 167 101 145 -0.4 -1.3 +0.1-3.0 .315  -43.2     11 50 41.7   1 45 53 402.3 842.9
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -520sec : AC 3.7 9.6 406"  78.5, dT = +28sec
24 May 18  6 58 32.8 r    1712SF8  3.6  3.3   75+ 120      9 268 -54S 258 191 236 -0.5 -1.2 +0.4-0.5 .340 -136.7     11 50 41.7   1 45 53 403.5 914.6
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -871sec : AC 3.7 9.6 406"  78.5, dT = +1193sec
24 May 21  3 16  9.2 d    2002 K0  6.8  6.3   94+ 152     53 174  58N  74  80  55 -3.1 +2.6 +4.9+1.4 .175   58.2     13 58 29.8 -14  7 19 393.9 632.5
24 May 22  6  9 12.1 d    2115 A6  7.2  7.1   98+ 164     39 214  56S 129  96 113 -4.6 +4.2 +2.2-1.8 .323  -10.8     14 49 27.7 -19 54 13 391.3 624.7
24 May 23  5  9  5.0 D    2237cK3  5.0  4.3s 100+ 174     43 181  58S  90  88  77 -4.8 +5.3 +3.2+0.0 .284   28.8     15 40 16.9 -23 49  5 387.6 609.3
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.27sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 3.6"; to 3km sunlit peak = 0.0"
24 May 24  1 11 53.6 D    2366dM1  1.1  0.1v 100- 172      6 122 -73N 116 177 108 -4.3 +5.8 +0.2+0.0 .494   -1.9 .09 16 29 24.5 -26 25 55 388.3 931.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 17 57.7 R    2366dM1  1.1  0.1v  99- 172     18 131  72S 294 345 286 -4.4 +5.9 +0.8+0.0 .438 -178.2 .10 16 29 24.5 -26 25 55 386.8 821.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 8.9"; to 3km sunlit peak = 1.4"
24 May 24  3 19 44.5 R    2373 K1  6.1  5.5   99- 171     28 141  85N 316 357 309 -4.6 +6.1 +0.8-0.9 .368  159.6     16 31 22.8 -26 32 16 385.6 734.1
   Distance of 2373 to Terminator = 10.7"; to 3km sunlit peak = 2.4"
24 May 28  6 55 29.1 r    3012 A7  6.9  6.8   76- 121     28 136  76S 244 288 259 -3.6 +6.9 +1.9+1.5 .384 -169.3     20 38  4.9 -24 13 44 372.6 707.2
24 May 28  7 51 33   Gr   3018 G8  6.4  6.0   76- 121     35 ** GRAZE: CA  7.9N; Dist.136km in az. 348deg. [Lat = 24.39+0.20(E.Long+82.36)]
24 May 28  8  3 42.2 R    3018 G8  6.4  6.0   75- 121     37 150  26N 322 352 337 -3.8 +6.9 +3.7-4.3 .107  107.1     20 40 11.8 -23 46 26 371.6 655.4
24 May 28  8 18 26.1 r  189555 G1  7.2  6.9   75- 121     38 154  63S 231 257 245 -3.9 +6.9 +2.2+1.6 .343 -162.6     20 40 22.3 -24  7  5 371.5 648.5
24 May 29  6 58 43.9 d    3164SB3  4.5  4.6v  65- 108     22 124 -75S  88 142 106 -2.8 +6.1 +1.3+0.9 .411  -18.6     21 37  4.8 -19 27 58 370.8 779.4
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +31sec : AB 4.5 10.1 66"  45.9, dT = +120sec
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 11 55.0 R    3164SB3  4.5  4.6v  65- 108     35 137  63S 225 267 244 -3.0 +6.1 +1.8+2.0 .372 -161.6     21 37  4.8 -19 27 58 369.4 702.1
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -83sec : AB 4.5 10.1 66"  45.9, dT = +178sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 47  0.1 r  164528 B8  7.5  7.5   65- 107     40 145  85N 257 292 276 -3.0 +6.1 +2.3+1.0 .365  163.6     21 37 37.7 -19 13 52 368.9 680.3
24 May 30  8 54 38.7 r  165149wG0  7.7  7.4   54-  94     37 130  60S 218 265 239 -2.1 +4.9 +1.5+2.1 .389 -160.8     22 32  9.4 -13 35 52 367.1 732.9
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +60sec
24 Jun  1  9  0 34.8 r      27DA5  8.2  8.0   31-  68     27 102  64S 220 284 242 +0.1 +1.9 +0.6+2.0 .481 -164.6      0 14 50.2 - 0 18 11 365.6 885.7
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
        27 is a close double. Observations are highly desired
24 Jun  2  9 33 16.8 r  109680 K5  8.7  7.9   20-  54     26  94  67S 224 292 245 +1.2 +0.1 +0.4+1.9 .518 -169.2      1  6 43.7   6 40  0 365.3 933.5
24 Jun  4  9 21 14.3 r   93167 A5  9.1  8.8    6-  27      5  72  51S 219 286 234 +3.5 -3.0 -0.5+1.6 .580 -156.0      2 53 46.8  18 38  3 369.51137.1
24 Jun  9  2 10 56.9 D    1131 A2  7.3  7.3    7+  31      5 296  17S 164  98 156 +4.5 -6.0 -1.2-2.6 .330  -55.8      7 28  0.9  26 13 39 387.41103.7
24 Jun 10  0 20 34.4 D    1251 B9  5.9  5.9   13+  42  -2 39 283  64S 124  45 111 +4.3 -5.9 +0.6-1.8 .441   -5.0      8 20 32.1  24  1 20 388.2 833.7
   R1251 = lambda Cancri
24 Jun 10  1  2 18.2 d   80129 F2  8.4  8.2   13+  43 -11 30 285  79N  88  12  75 +4.3 -5.8 +0.9-0.8 .412   30.0      8 21 57.6  24  1 26 389.2 899.1
24 Jun 10  2  8 58.4 d   80146 A2  8.0  7.9   14+  43     15 289  35S 154  83 141 +4.2 -5.7 -0.6-2.2 .415  -38.6      8 23 31.3  23 32  4 390.91008.0
24 Jun 10  2 44  2.2 d   80173 K0  8.3  7.8   14+  44      8 292  81S 108  40  95 +4.2 -5.6 -0.2-1.1 .558    5.8      8 25 21.5  23 32 58 391.81065.2
24 Jun 12  0 33 48.9 d   98897 K0  7.6  7.0   29+  66  -5 55 264  81N  99  27  80 +3.0 -4.4 +2.1-1.2 .322   30.9     10  1 20.7  15 40 14 394.8 719.3
24 Jun 12  1 19 17.8 d   98907 F8  8.5  8.3   29+  66     45 269  68S 131  58 112 +2.9 -4.3 +0.9-2.0 .402   -2.5     10  2  3.1  15 21 38 395.7 772.1
24 Jun 12  3 13 30.8 d   98936 K0  8.0  7.2   30+  66     19 279  48N  67 357  48 +2.6 -4.0 +1.1+0.0 .272   55.8     10  5  3.5  15  8  4 398.3 933.7
24 Jun 13  1 49 53   m   99296kA3  8.0  7.9v  39+  77     46 261  19N  41 333  20 +1.7 -3.1 +9.9+9.9 .000   90.0     10 47 46.5  10 26 37 398.1 746.1
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase   7%
24 Jun 13  2 55 19   m   99302kA0  7.4  7.3   39+  77     31 268  15N  37 328  16 +1.5 -3.0 +9.9+9.9 .000   90.0     10 49  3.3  10  9 28 399.5 827.3
24 Jun 15  3 22 50.3 d    1760pK0  7.5  7.0   58+ 100     37 249  62N  85  26  63 -1.1 -0.4 +2.2-0.7 .270   43.7     12 15  0.0 - 1 19 36 400.0 724.5
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +117sec
24 Jun 17  1 11 49.5 d    1957kG5  7.7  7.2   76+ 121 -12 55 174  73N  93  99  74 -2.9 +2.2 +3.6-0.1 .249   40.5     13 39 17.8 -12  5 32 395.1 628.2
24 Jun 17  3 27  8.7 d  158085kK0  7.3  6.6   76+ 122     44 222  47S 153 114 133 -3.4 +2.4 +1.5-2.7 .297  -26.2     13 40 59.7 -12 46 59 395.6 636.3
24 Jun 19  2 42 34.6 D    2183 K2  5.5  4.8   91+ 144     44 176  11S 178 183 164 -4.7 +4.9 +0.0-3.7 .186  -55.6 .01 15 16 23.0 -22 23 58 388.3 618.7
   Distance of 2183 to Terminator = 9.1"; to 3km sunlit peak = 0.6"
24 Jun 24  6 24 41.0 r    2965 G2  7.2  6.9   94- 151     39 158  71S 247 269 260 -3.4 +6.9 +2.4+1.1 .363 -176.4     20 19 45.2 -25 13 43 368.9 651.2
24 Jun 25  7 29  7.5 r  190252 F2  7.2  7.0   87- 137     43 158  22S 189 210 206 -2.4 +6.1 +1.0+3.3 .237 -128.9     21 21  3.2 -20 49 16 366.5 669.9
24 Jun 26  6 46 25.3 r  164948kF2  7.2  7.0   78- 124     36 130  69N 273 319 293 -1.1 +5.1 +2.1+0.6 .347  146.8     22 14 37.2 -15  6  6 366.0 737.4
24 Jun 26  8 24 47.8 r    3271 F5  7.2  6.9   78- 124     49 156  52N 290 312 310 -1.4 +4.9 +4.0-0.8 .213  123.1     22 16 56.3 -14 39 25 364.9 691.8
24 Jun 28  7 39 11.0 r    3528 F0  7.5  7.3v  56-  97     35 109  76N 261 321 283 +1.0 +2.0 +1.5+1.1 .414  152.7     23 59 35.0 - 1 51  0 365.9 826.4
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jun 28 10  4 19   m  128552wK0  8.1  7.4   56-  96  -9 62 146  21N 316 347 338 +0.7 +1.7 +9.9+9.9 .000   90.0      0  2 57.1 - 0 53 38 363.9 722.9
    128552 is double: AB 8.2 13.4 25.8"  75.6
24 Jun 29 10 28 46.6 r     120pG5  7.9  7.4   44-  83  -5 64 127  64N 273 321 294 +1.7 +0.0 +3.1+0.3 .289  133.7      0 53 58.2   5 48 33 364.6 739.0
       120 is double: ** 7.9      0.10"  51.0, dT = +0.25sec
       120 has been reported as non-instantaneous (OCc1778). Observations are highly desired
24 Jul  2  9 36 31   m   76001 K0  8.2  7.6   14-  44     25  75  18N 332  46 344 +4.6 -4.2 +9.9+9.9 .000   90.0      3 34 30.3  22 45 34 372.8 980.1
24 Jul  2  9 47 10.6 r   75998 F8  9.1  8.8   14-  44     27  76  82N 268 343 280 +4.5 -4.2 +0.7+0.9 .477  153.7      3 34 20.3  22 31 37 372.6 961.5
24 Jul  2 16 59 47.3 D     552SB7  2.9  2.9s  12-  41  82 57 279 -43N  35 311  47 +3.4 -5.0 +2.1+2.3 .293   39.7      3 47 29.1  24  6 18 371.0 686.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6           : AB     1.6 0.031" 207.1, dT = -0.1sec : AE 2.8 15.0 78" 232.4, dT = -255sec : AB 2.8 6.3 118"
291.1, dT = -97sec
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 24 40.1 r     545SB6  4.1  4.2v  12-  41  87 51 280  77N 275 192 286 +3.4 -5.0 +1.8-1.0 .375  161.5      3 46 19.6  23 56 54 371.4 713.1
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.8sec : AB 4.2 14.4 110" 180.2, dT = +24sec : AC 4.2 12.9 147" 336.0, dT = -190sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 44 51.5 d     560SB8  3.6  3.7s  12-  41  87 47 281 -77N  69 347  80 +3.3 -5.0 +1.7+0.2 .401    9.3      3 49  9.7  24  3 12 371.8 733.4
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.02sec : AC 3.6 15.0 50"  36.5, dT = +105sec :
AH 3.6 16.0 68" 221.6, dT = -152sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 17 59 51.2 R     552SB7  2.9  2.9s  12-  41  84 43 282  53N 299 218 310 +3.3 -5.0 +1.1-2.3 .321  140.1      3 47 29.1  24  6 18 372.1 754.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = 0.00sec : AE 2.8 15.0 78" 232.4, dT = -98sec : AB 2.8 6.3 118"
291.1, dT = -363sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 57 17.2 R     560SB8  3.6  3.7s  12-  41  71 30 285  81N 271 195 283 +3.2 -5.0 +0.8-0.8 .457  170.4      3 49  9.7  24  3 12 373.3 839.0
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.2sec : AC 3.6 15.0 50"  36.5, dT = +63sec : AH
3.6 16.0 68" 221.6, dT = -97sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 10  1 17  0.6 d   99162S    8.7  8.2   16+  47     25 272  35S 165  95 145 +1.8 -3.2 -0.2-2.7 .348  -39.9     10 30 25.7  11 37 51 398.7 876.4
     99162 is triple: AB 8.8 12.8 14.6"  84.4, dT = +7sec : AC 8.8 11.0 47" 202.9, dT = +106sec
24 Jul 11 20 13 54   Gr   1712SF8  3.6  3.3   31+  68  54 56 ** GRAZE: CA-20.4S; Dist.301km in az.  37deg. [Lat = 26.55-0.70(E.Long+82.36)]
24 Jul 11 20 19 30   m    1712SF8  3.6  3.3   31+  68  52 57 127 -21S 224 271 202 +0.6 -1.3 +9.9+9.9 .000  -90.0     11 50 41.7   1 45 53 398.8 650.3
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3 : AC 3.7 9.6 406"  78.5
24 Jul 12  2 43 44.6 D    1730wK2  6.2  5.5   32+  69     19 262  47N  70   4  48 -0.8 -0.5 +1.2-0.1 .255   53.6     11 59  3.3   0 31 50 402.2 837.3
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -16sec
24 Jul 14  2 46  9.0 d  157912kF0  7.8  7.6   51+  91     30 241  86S 116  61  96 -3.4 +2.2 +1.6-1.7 .361    5.9     13 23 56.5 -10 52 15 399.2 701.9
24 Jul 14  3 52 51.3 D    1925SB1  1.0  1.1v  52+  92     16 250  62S 140  78 119 -3.6 +2.3 +0.9-2.3 .373  -22.6     13 25 11.6 -11  9 41 400.5 785.8
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -119sec : AC 1.0 10.5 368"  60.8, dT =
+189sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  4  9 48.3 D    2029 M1  4.9  4.1v  61+ 103     19 242  87N 106  48  88 -4.8 +3.6 +1.2-1.4 .383    7.5 .01 14 10 50.5 -16 18  7 397.3 743.9
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  0 51 26.5 d    2251KK0  7.5  7.0   79+ 125  -8 41 167  17S 173 186 161 -5.5 +5.7 +0.2-3.3 .199  -53.3     15 45 49.8 -24 43  1 387.2 625.0
24 Jul 18  1 41 38.1 D    2405SA2  6.6     s  87+ 137     38 166  77N  79  93  72 -5.8 +6.6 +3.1+0.7 .289   30.7     16 44 17.4 -27 27 22 382.1 621.9
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +5sec : AC 6.6 14.0 24.3" 195.9, dT = -38sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5  1 21.0 D    2910cG3  4.7  4.3  100+ 174     40 172  62S  45  53  55 -4.4 +7.1 +2.2+1.6 .326   26.5     19 55 50.4 -26 17 58 366.6 648.0
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 4.5"; to 3km sunlit peak = 0.0"
24 Jul 23 10 30 17   m    3225SG8  7.2  6.6   95- 153  -6 31 234  24N 323 272 342 -2.2 +4.6 +9.9+9.9 .000   90.0     22  1 32.9 -15 36 43 362.1 862.9
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0 : AC 7.2 11.5 109" 291.0 : AD 7.2 9.9 181" 312.9
      3225 is a close double. Observations are highly desired
   Distance of 3225 to Terminator = 18.8"; to 3km sunlit peak = 7.2"
24 Jul 24  3 41 19.5 r    3339 M0  6.7  5.8v  90- 142     17 110  53N 289 351 310 +0.2 +4.1 +0.9+0.2 .350  133.8     22 46 14.2 -11  9 59 363.1 891.7
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  8 13 41.2 R    3355KF8  6.7  6.5   89- 141     57 180  62N 279 279 300 -0.4 +3.6 +3.7-0.5 .258  128.5     22 52 46.5 -10  3 32 359.6 722.2
24 Jul 25 10  9 50.3 R    3505WG8  5.5  5.0   80- 126 -11 60 214  85S 243 212 265 +0.9 +1.7 +2.0+0.8 .406  163.1     23 47 56.5 - 2 45 42 360.2 742.0
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -360sec
24 Jul 27  8 18 23.6 r   92457cK5  8.2        58- 100     55 105  80N 258 323 278 +3.8 -1.4 +1.9+1.1 .390  150.8      1 29  5.5  10 25 56 364.6 789.2
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.21sec
     92457 is a close double. Observations are highly desired
24 Jul 27 10 15  0.9 R     222 G5  7.0  6.5   58-  99 -10 77 152  79S 238 263 258 +3.5 -1.7 +2.0+1.5 .396  170.0      1 31 42.7  10 53 22 363.8 708.8
24 Jul 28  7 50 40.7 r     347 K0  7.9  7.4   47-  87     39  87  58S 219 292 237 +4.8 -2.8 +0.4+2.0 .474 -164.7      2 21 50.3  16  9 45 368.7 877.8
24 Jul 29  6 59 47.6 R     472cA1  4.9  4.9   36-  74     18  74  74S 240 312 254 +5.6 -4.0 +0.0+1.4 .567 -178.5      3 14 54.1  21  2 40 373.91027.9
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.14sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 25 15.7 r   75819 F2  7.9  7.7   36-  74     23  76  76S 242 315 256 +5.6 -4.1 +0.2+1.4 .545  178.7      3 15 46.1  21  9 55 373.4 986.9
24 Jul 31  9 33 38.9 r     786 K5  9.1  8.3   16-  48     28  70  81N 279 356 283 +6.3 -6.0 +0.9+0.5 .440  152.6      5 16 52.5  27 43  3 380.1 913.3
24 Aug  1  8 50 33.1 r     952 K2  8.0  7.2   10-  36      8  63   1S 190 258 188 +6.5 -6.2 -2.3+4.5 .188 -109.4      6 15 54.8  27 51 42 385.71058.9
24 Aug  1  9 17 18.7 r   78154 A0  8.5  8.4    9-  36     13  65  89N 280 350 278 +6.5 -6.3 +0.2+0.5 .509  160.3      6 16  3.2  28 12  6 385.11010.3
24 Aug  1  9 55  0.9 R   78191 A0  7.7  7.7    9-  35     21  67  27S 216 290 213 +6.4 -6.4 -0.6+2.5 .363 -135.8      6 17 59.9  28  0 24 384.4 943.2
24 Aug  1 10 18 32.8 r   78206 K0  8.0  7.4    9-  35 -10 26  69  31S 220 297 218 +6.4 -6.4 -0.4+2.4 .375 -140.8      6 18 47.3  28  3 20 384.0 901.3
24 Aug  8  0 48 40.8 D    1696 F5  6.9  6.7   11+  39 -10 18 264  85S 118  51  96 -0.1 -0.8 +0.5-1.6 .438    5.8     11 42 25.5   2 21 44 402.8 859.6
24 Aug 10  2 14 15.1 D    1886cK3  5.6  5.0   26+  61     12 255  41N  64   0  43 -3.0 +2.1 +0.7+0.2 .253   53.2     13  8 32.5 - 8 59  4 403.4 825.3
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.36sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 11  2 35 22.3 d  158207 F0  7.4  7.2   35+  73     13 247  52S 149  88 130 -4.4 +3.4 +1.1-2.7 .327  -35.6     13 52 15.4 -14 40 36 401.5 783.3
24 Aug 16  2 13 12.2 d  186672 G5  7.4  6.9   83+ 131     38 180  45N  38  38  40 -6.8 +7.5 +2.6+2.2 .221   48.5     18 20 25.4 -29  3 59 375.4 606.7
24 Aug 17  2 42 46.4 D    2831kB2  6.0  6.1s  90+ 144     39 172  89S  75  83  82 -6.1 +7.4 +2.6+0.6 .352    2.1     19 24 30.2 -27 51 57 369.3 631.4
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 19  5 47 49.5 d  164449DF0  7.2        99+ 171     47 193  78S  53  41  71 -3.8 +5.6 +1.8+1.0 .416    0.1     21 31 25.5 -19 14 15 358.8 723.6
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -3sec
    164449 is a close double. Observations are highly desired
   Distance of 164449 to Terminator = 10.6"; to 3km sunlit peak = 2.4"
24 Aug 20  3 47 13   Gr   3288 K0  5.8  5.3  100- 173     43 ** GRAZE: CA 44.7N; Dist.156km in az. 147deg. [Lat = 21.45+0.61(E.Long+82.36)]
   Distance of 3288 to Terminator = 3.6"; to 3km sunlit peak = 0.0"
24 Aug 20  3 49 52   m    3288 K0  5.8  5.3  100- 173     42 136  45N 326   7 346 -1.6 +4.5 +9.9+9.9 .000   90.0     22 24 27.1 -13 31 46 356.9 749.8
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 3.3"; to 3km sunlit peak = 0.0"
24 Aug 21  2 37 57.8 r    3422kF0  6.7  6.5   97- 161     22 108  62N 282 344 304 +0.4 +3.1 +1.1+0.4 .375  136.5     23 16 59.2 - 7  9 39 357.8 897.9
24 Aug 22  7 37 56   M      35 K0  6.2  5.7   91- 144     69 176  22N 315 319 337 +1.8 +0.6 +9.9+9.9 .000   90.0      0 17 47.7   1 41 19 355.3 741.3
24 Aug 22  8 54 45.0 r  109142cG5  7.6  7.1   90- 144     63 221  39S 196 159 218 +1.6 +0.4 +0.7+2.5 .374 -149.2      0 19 57.1   1 34 57 355.6 751.7
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = -0.02sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 42 46.3 r  109738 G5  7.8  7.1   82- 130     69 232  76S 233 186 253 +3.2 -1.5 +1.9+1.3 .417  176.4      1 13 41.8   8 58 29 358.0 725.0
24 Aug 24  9 38 12   M     313cK0  7.1  6.2s  72- 116     82 202  18N 322 300 340 +4.7 -3.1 +9.9+9.9 .000   90.0      2  8  3.9  15 48 16 361.3 694.5
       313 = NSV 15445, 7.12 to 7.18, Hp
24 Aug 25  6 20 38.9 r     439cF0  7.3  7.1   62- 104     36  81  62S 225 301 240 +6.3 -4.0 +0.3+1.9 .498 -168.1      2 59 10.4  19 59 23 367.6 907.0
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.14sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25 10 19 24.5 r     452 A2  7.7  7.6   61- 102     88 178  44S 208 209 222 +5.8 -4.6 +1.4+2.9 .324 -150.0      3  5 30.3  20 54  9 365.8 664.5
24 Aug 26  6 48 42.5 R     587 K0  6.2  5.5   51-  91     31  74  89S 258 335 268 +7.1 -5.2 +0.6+1.1 .495  165.3      3 57 26.4  24 27 43 372.9 926.1
24 Aug 26  8  5 46.2 r   76374kG0  8.3  8.0   50-  90     48  78  76S 245 328 255 +7.0 -5.3 +1.1+1.5 .448  176.4      3 59 54.8  24 41 44 371.7 808.4
24 Aug 27  6 18 10.6 r   76841cK1  7.3  6.7   40-  78     14  66  64N 291   1 296 +7.6 -5.9 +0.5+0.2 .437  140.4      4 55 34.6  27 12  9 379.41044.2
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.16sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 15 19.8 R     746WB7  7.0  6.9   39-  77     38  72  65S 240 321 245 +7.5 -6.1 +0.6+1.6 .456 -171.3      4 59 53.7  27 19 32 377.3 844.7
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -37sec
24 Aug 27 11  2 20.7 R     756 F0  6.6  6.5   38-  76  -3 74  69  62S 238 341 243 +7.0 -6.4 +2.1+1.9 .337 -164.9      5  4 38.0  27 41 46 375.7 635.4
24 Aug 28  7 58 36.0 R   77818 K5  6.7  5.8   29-  65     22  68   8S 191 266 190 +7.7 -6.5 -1.9+4.6 .199 -113.3 .01  6  0  4.9  28  7 33 383.4 933.9
24 Aug 28  9 51 30.2 R   77883 B2  7.6  7.6   28-  64     46  72  68N 295  20 294 +7.5 -6.6 +2.1-0.4 .324  143.3      6  2 59.4  28 40 37 381.5 746.9
24 Aug 28 10 30  9.7 r   77908 B9  8.8  8.8   28-  64 -10 55  72  87N 276   6 275 +7.4 -6.7 +2.1+0.4 .359  163.0      6  4  0.5  28 38 47 381.1 693.7
24 Aug 29  8  6 57.2 r   78917 M0  8.3  7.5   20-  53     12  65  58S 248 318 242 +7.5 -6.5 -0.3+1.3 .498 -162.4      6 58 11.0  27 38 13 388.7 984.0
24 Aug 29  9 22 45.7 r   78965 K0  9.0  8.4   20-  53     28  70  83S 274 351 267 +7.4 -6.6 +0.8+0.7 .447  171.8      7  0 51.9  27 48 16 387.3 848.5
24 Aug 31 10  8 27.3 r   80456kG5  9.5  8.9    6-  29     14  72  89S 293   4 278 +6.3 -5.7 +0.5+0.0 .457  166.7      8 51  9.7  22 13 35 395.9 902.2
24 Aug 31 10 15 23   m   80479kG0  9.6  9.2    6-  29     16  72  14N  10  81 355 +6.3 -5.7 +9.9+9.9 .000   90.0      8 52 35.6  22 23  3 395.8 891.6
24 Sep  9 19 40 19.2 d    2268MB2  4.5        36+  74  53 30 141  52S 142 181 131 -5.6 +6.1 +0.8-1.1 .345  -20.8     15 53 36.7 -25 19 38 394.7 707.2
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -4sec
      2268 is a close double. Observations are highly desired
24 Sep 10  2 29 40.0 D    2298kK3  5.0  4.3   38+  76     11 235  74N  87  29  76 -7.1 +6.4 +1.0-0.7 .396    8.6     16  3 20.6 -25 51 55 395.4 767.9
24 Sep 12  3 57 48.9 d  186041 K0  7.1  6.5   59+ 100     13 230  50S 129  75 129 -8.2 +7.3 +2.3-2.6 .270  -51.3     17 59 14.9 -29 23 24 384.4 806.8
24 Sep 14  0 34 31.3 d  188724cF5  7.7  7.5   78+ 124     37 158  76N  61  84  72 -6.7 +7.2 +2.5+1.3 .347   13.5     19 55 52.2 -26 33  0 370.4 640.3
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.28sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  1 33 41   m    2910cG3  4.7  4.3   78+ 124     41 174  -5N 340 345 350 -6.9 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 369.9 633.2
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Sep 14  2 48 52.6 D    2914cG8  4.8  4.4   78+ 125     39 196  57N  41  25  52 -7.1 +7.1 +1.6+1.3 .341   23.5     19 58 57.2 -26 11 45 369.7 667.4
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 17  7 35 29.4 d    3375 F2  6.8  6.6   99+ 168     37 238  70S  76  24  98 -3.0 +2.9 +1.5-0.1 .447  -26.2     23  0 19.9 - 8 52 50 354.9 858.6
   Distance of 3375 to Terminator = 18.8"; to 3km sunlit peak = 7.8"
24 Sep 21  8 12 41.1 r     397MB9  7.5  7.5   85- 135     86 192  52S 212 200 228 +5.1 -4.1 +1.4+2.5 .368 -156.5      2 41  6.6  18 48  1 357.9 697.0
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +0.6sec : AC 7.7 9.5 66" 242.2, dT = -154sec
       397 is a close double. Observations are highly desired
24 Sep 21  8 12 42.1 r X  3591MB9  7.9  7.9   85- 135     86 192  52S 212 200 228 +5.1 -4.1 +1.4+2.5 .368 -156.3      2 41  6.8  18 47 59 357.9 697.0
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -0.6sec : BC 7.5 9.5 67" 243.0, dT = -156sec
   X  3591 is a close double. Observations are highly desired
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 22  6  2 55.9 R     521kA2  6.7  6.7v  76- 122     49  80  62S 226 307 238 +6.9 -5.0 +0.7+2.0 .457 -166.9      3 36 58.0  23 12 40 364.0 828.9
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9 49 58.3 D     537SB6  3.7  3.8s  75- 120     80 279 -67S  97   2 109 +6.3 -5.5 +2.9-0.6 .318  -30.7      3 44 52.5  24  6 48 363.4 651.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.6sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+212sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 26 17.7 d     539SB6  4.3  4.4s  75- 120     72 279 -46N  31 300  43 +6.2 -5.5 +2.0+2.8 .291   38.6      3 45 12.5  24 28  2 363.7 656.5
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.13sec : AC 4.3 14.0 53"  53.5, dT = +168sec : AB 4.3 11.0 72"
328.8, dT = +117sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 32 25.7 D     541SB8  3.9  3.9s  75- 120 -11 71 279 -79N  64 333  75 +6.2 -5.5 +2.4+0.9 .371    6.4      3 45 49.6  24 22  4 363.8 658.3
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +302sec : AB 3.8 13.7 113"  72.8, dT = +302sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11  7 39.4 R     537SB6  3.7  3.8s  75- 120  -3 63 279  57S 222 136 234 +6.1 -5.6 +2.1+1.9 .330 -149.3      3 44 52.5  24  6 48 364.3 678.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.15sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
62sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 19  4.8 R     536pB7  5.5  5.5   75- 120  -1 60 279  85N 260 174 271 +6.0 -5.6 +2.2-0.1 .386  173.8      3 44 48.2  24 17 22 364.5 686.4
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -229sec : AC 5.4 11.5 218" 196.1, dT = -250sec
24 Sep 22 11 31  2.0 R     539SB6  4.3  4.4s  75- 120   2 58 280  52N 293 208 305 +6.0 -5.6 +2.1-2.0 .307  141.3      3 45 12.5  24 28  2 364.7 695.6
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.18sec : AC 4.3 14.0 53"  53.5, dT = +87sec : AB 4.3 11.0 72"
328.8, dT = -192sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11 55 57.0 R     541SB8  3.9  3.9s  75- 120   8 52 281  82N 263 180 275 +5.9 -5.6 +1.9-0.4 .403  173.3      3 45 49.6  24 22  4 365.1 719.3
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +276sec : AB 3.8 13.7 113"  72.8, dT = +277sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 12  0 47   Gr    552SB7  2.9  2.9s  75- 120   9 50 ** GRAZE: CA  1.5S; Dist.257km in az.   6deg. [Lat = 25.46-0.10(E.Long+82.36)]
   Distance of 552 to Terminator = 8.8"; to 3km sunlit peak = 0.0"
24 Sep 22 12  1  9   M     552SB7  2.9  2.9s  75- 120   9 51 281   2S 167  84 178 +5.9 -5.6 +9.9+9.9 .000  -90.0      3 47 29.1  24  6 18 365.2 723.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1 : AE 2.8 15.0 78" 232.4 : AB 2.8 6.3 118" 291.1
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 1.2"; to 3km sunlit peak = 0.0"
24 Sep 23  6 27  6.5 r X 70481p    7.3  7.2   66- 108     42  74  50N 301  23 308 +7.9 -6.0 +2.4-0.8 .274  125.8      4 38 29.6  26 56 26 370.3 840.6
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +12sec : AC 7.4 12.9 92" 203.7, dT = +40sec
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   X 70481 is a close double. Observations are highly desired
24 Sep 23  6 27  9.1 R     701SF2  6.6  6.4   66- 108     42  74  50N 300  23 307 +7.9 -6.0 +2.4-0.7 .275  126.0      4 38 29.5  26 56 23 370.3 840.5
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +7sec : AB 7.36 7.21 4.47" 188.0, dT = +6sec
       701 is a close double. Observations are highly desired
24 Sep 24  7 21 19.1 r   77397 A2  8.1  8.0V  54-  95     41  72  87S 265 349 267 +8.4 -6.6 +1.2+0.9 .433  169.3      5 41 38.6  28 27 24 376.4 803.6
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 24 10 39 10.3 r   77551cB9  8.3  8.2   54-  94 -10 82  43  67S 246  21 246 +7.8 -6.8 +2.7+1.5 .313 -161.1      5 47 14.3  28 37 26 375.1 601.2
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -1.7sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 13 49.6 R    1022CB7  6.0     s  44-  83     15  65  78N 287 358 283 +8.7 -6.6 +0.4+0.3 .478  155.8      6 39 33.1  28 15 47 384.3 976.8
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.5sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  2 29.8 R    1026SG5  6.5  5.9   44-  83     25  68  75S 260 336 256 +8.6 -6.7 +0.4+1.1 .478 -177.6      6 41 20.9  28 11 48 383.5 889.4
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +55sec : AC 6.6 12.8 58"  61.4, dT = +114sec
24 Sep 25  8  8  8.3 r   78673 G5  8.3  7.7   44-  83     39  71  72N 293  15 288 +8.5 -6.8 +1.6-0.1 .367  150.8      6 43 38.2  28 24  6 382.4 778.8
24 Sep 26  9 20 48.5 r   79642 K5  8.6  7.9   33-  70     42  74  70N 302  24 292 +8.1 -6.6 +1.9-0.7 .339  152.2      7 43 29.1  26 35 43 387.5 719.8
24 Sep 26 10  7 21   m    1173WB8  7.9  7.9   33-  70     52  76   5N   7  93 357 +8.0 -6.6 +9.9+9.9 .000   90.0      7 45 53.0  26 43 32 386.9 660.9
24 Sep 27  9 13 54.2 r   80288pK5  8.6  8.2v  24-  59     29  75  59S 257 333 243 +7.6 -6.0 +0.7+1.4 .380 -156.8      8 36 55.8  23 14 49 393.0 787.6
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = +1.7sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9  3 24.0 R   98567 A3  7.5  7.4   16-  47     15  76  39S 241 311 224 +6.8 -5.1 +0.0+2.3 .325 -135.9      9 26 34.5  19  3 36 398.0 873.4
24 Sep 28 10  7 52.7 r    1400cF5  8.3        16-  47     29  80  41N 341  55 323 +6.7 -5.1 +1.5-3.0 .242  127.3      9 29  0.7  19 17 19 396.7 769.3
      1400 is double: AB 8.42 9.96 1.09" 223.7, dT = +2.1sec
      1400 is a close double. Observations are highly desired
24 Oct  7  0 41 34.8 D    2251KK0  7.5  7.0   15+  46      9 238  44N  62   2  50 -6.0 +6.2 +0.4+0.1 .329   35.6     15 45 49.8 -24 43  1 399.4 785.4
24 Oct  9 23 23 44.5 d    2688 G6  7.0  6.6s  41+  80  -4 37 190  75N  73  62  76 -7.4 +7.6 +2.7+0.4 .314    8.2     18 32 14.0 -29 11 25 384.2 590.6
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2 15 31.8 d  164449DF0  7.2        74+ 119     47 194  68N  47  33  64 -6.5 +5.6 +1.6+1.2 .394    6.1     21 31 25.5 -19 14 15 365.5 701.6
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -4sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1  2  8.4 D    3288 K0  5.8  5.3   83+ 132     49 149  27N   2  31  22 -4.9 +4.4 +0.4+3.3 .259   50.5     22 24 27.1 -13 31 46 360.4 712.3
   R3288 = 50 Aquarii
24 Oct 14  4 28 57.6 D    3303kF2  6.4  6.2   84+ 133     44 223  55S 101  61 121 -5.5 +3.9 +3.1-1.3 .278  -52.1     22 30  1.5 -12 54 54 360.1 792.0
24 Oct 14 23 27 30   M    3421cM3  4.9  4.1v  91+ 145  -6 27 112   6S 147 206 169 -3.1 +3.0 +9.9+9.9 .000  -90.0     23 16 50.9 - 7 43 35 358.2 857.6
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 2.5"; to 3km sunlit peak = 0.0"
24 Oct 14 23 38  9.6 d    3422kF0  6.7  6.5   91+ 145  -9 30 113  57N  30  89  52 -3.1 +3.0 +0.9+2.2 .439   25.9     23 16 59.2 - 7  9 39 358.0 847.1
24 Oct 15  2 56 25.9 d  146658 K0  7.3  6.8   92+ 147     61 170  38N  12  21  33 -3.5 +2.6 +0.6+2.6 .353   34.6     23 21 15.4 - 6 11 33 355.1 738.5
24 Oct 15  8 21 19.7 d    3461 K3  6.3  5.7   93+ 149     12 260  50N  25 320  47 -4.0 +1.7 +0.1+1.4 .493   32.0     23 29 32.1 - 4 31 58 358.51009.9
24 Oct 16  4 49 35.0 D      35 K0  6.2  5.7   97+ 162     67 207  49N  25   0  47 -1.7 +0.4 +1.0+2.1 .413   21.2      0 17 47.7   1 41 19 352.0 755.5
24 Oct 19  5 57 31.9 r   75768 K0  7.6  7.1   95- 155     78  95  46S 203 283 218 +4.6 -4.7 +0.9+2.9 .349 -146.2      3 10 14.5  21 16 19 355.6 723.8
24 Oct 19  6 12 14.9 r   75764SF0  7.6        95- 155     82  96  31N 306  26 320 +4.6 -4.7 +5.3-3.7 .156  112.1      3 10  6.6  21 44 49 355.6 714.1
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +5sec : AB,C 7.6 13.5 48"  44.0, dT = +46sec : AB,D 7.6 15.8 55" 159.0, dT = +291sec
     75764 is a close double. Observations are highly desired
24 Oct 21  3 14 59.8 r     773wF8  7.0  6.7   81- 129     18  67  82S 254 326 258 +7.9 -6.1 +0.0+1.1 .576  178.7      5 10  3.9  27 33 23 369.71032.4
       773 is double: AB 7.0 9.3 315" 353.1, dT = +89sec
24 Oct 21 10 16  5.7 r   77138 A*  7.6  7.4   79- 126     70 291  64N 289 188 292 +6.9 -6.7 +2.3-1.4 .340  159.5      5 23  1.4  28 28  8 367.4 646.3
24 Oct 21 11  7 27.7 D     810SB7  1.7  1.7   79- 126  -6 60 288 -39N  32 299  35 +6.8 -6.6 +3.3+3.8 .191   60.2      5 26 17.5  28 36 27 368.1 687.0
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +36sec : AD 1.9 18.5 9.8"  70.0, dT = +41sec : AE 1.9      10.9"  80.0, dT = +38sec : AF 1.9
15.8 11.6" 296.0, dT = -7sec
       810 is a close double. Observations are highly desired
24 Oct 21 11 25 47   Gr    810SB7  1.7  1.7   79- 126  -2 55 ** GRAZE: CA-10.3N; Dist.222km in az.  20deg. [Lat = 25.27-0.34(E.Long+82.36)]
24 Oct 21 11 46 38.6 R     810SB7  1.7  1.7   79- 125   3 51 288  18N 335 247 338 +6.7 -6.6 +0.1-4.9 .203  119.7      5 26 17.5  28 36 27 368.8 733.6
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -38sec : AD 1.9 18.5 9.8"  70.0, dT = +4sec : AE 1.9      10.9"  80.0, dT = +14sec : AF 1.9 15.8
11.6" 296.0, dT = -44sec
       810 is a close double. Observations are highly desired
24 Oct 22  6 22  0.1 r   78233SA3  7.5        71- 114     44  72  59S 239 324 237 +8.5 -6.7 +0.8+1.9 .395 -158.2      6 19 59.0  28 25 36 374.2 772.6
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.25sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -128sec
     78233 is a close double. Observations are highly desired
24 Oct 22  7 15  7   m   78282 K0  7.8  7.1   70- 114     55  72   7N 353  84 350 +8.3 -6.8 +9.9+9.9 .000   90.0      6 22 28.1  28 54 43 373.7 700.7
24 Oct 22  8 11 29.7 r   78294 A0  7.6  7.6   70- 114     67  71  84S 264   3 261 +8.2 -6.8 +2.4+0.8 .355 -177.8      6 23  0.3  28 37 17 373.3 642.3
24 Oct 23 10 33 26.9 r   79394cA2  8.0  7.9   59- 101     84  39  59N 309  89 301 +8.0 -6.6 +2.5-2.1 .295  156.6      7 27 16.8  27 17 55 379.6 592.7
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.26sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10 52 32.0 r   79402 B8  7.3  6.9   59- 100  -9 86 351  52N 316 145 307 +7.9 -6.6 +2.3-2.5 .285  151.6      7 27 48.9  27 17 33 379.7 596.3
24 Oct 26  8 44 39.8 r   98892dK0  7.7  7.1   30-  66     27  84  81N 301  13 282 +6.8 -4.3 +1.0-0.4 .399  171.3     10  0 31.6  15 51 51 397.3 777.7
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +24sec
24 Oct 26  9 23 22.8 R   98897 K0  7.6  7.0   30-  66     36  87  77S 279 351 259 +6.7 -4.3 +1.4+0.5 .361 -163.4     10  1 20.7  15 40 14 396.5 724.7
24 Oct 27 10 13 13.8 r   99296kA3  8.0  7.9v  21-  55     36  94  52N 332  41 311 +5.5 -3.0 +1.1-2.0 .322  149.3     10 47 46.5  10 26 37 399.6 726.7
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Oct 29 10 22 22.3 r  138642 K0  9.5  9.0    8-  33     16  98  58S 262 328 240 +2.8 -0.3 +0.8+1.4 .329 -138.7     12 12  1.9 - 1  5 53 404.3 859.3
24 Nov  5 23 39 52.1 d  186563 K2  7.8  6.9   18+  50     23 221  23N  26 342  28 -6.7 +7.3 +0.1+2.0 .243   50.1     18 16 20.4 -28 55 54 388.9 714.1
24 Nov  6  0 21 23.4 d  186607 B8  8.6  8.6   18+  50     16 227  54S 130  79 131 -6.8 +7.3 +2.7-2.8 .240  -54.3     18 17 56.3 -29 15 26 389.5 775.7
24 Nov  6  0 59 42.7 d  186642 B8  8.3  8.3v  18+  50     10 232  81N  84  28  86 -6.9 +7.2 +0.8-0.6 .437   -9.3     18 19 24.3 -28 59 59 390.1 837.6
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  6  1 32 57.9 d  186672 G5  7.4  6.9   18+  51      4 236  68S 115  54 117 -6.9 +7.2 +1.2-1.7 .364  -39.6     18 20 25.4 -29  3 59 390.7 894.8
24 Nov  8 23 20 39   m  190052 F8  7.9  7.6   47+  86  -8 45 179  16S 147 148 163 -6.4 +6.0 +9.9+9.9 .000  -90.0     21  8 36.9 -21 40 59 373.7 647.6
24 Nov  8 23 23 29.1 D    3089SA0  5.3  5.3   47+  86  -9 46 180  47N  31  31  47 -6.4 +6.0 +1.5+2.0 .321   26.1     21  8 33.6 -21 11 37 373.7 648.9
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +29sec : AF 5.3 13.0 9.7"  14.0, dT = +29sec : AG 5.3 20.0 13.1"  62.0, dT = +35sec : AC 5.3
15.0 35" 114.8, dT = +11sec
      3089 is a close double. Observations are highly desired
24 Nov  9  2 14 47   m  190125 K0  7.9  7.3   48+  87     30 226  19S 144  99 161 -6.9 +5.6 +9.9+9.9 .000  -90.0     21 12 36.7 -21  0 43 374.5 798.0
24 Nov 10  0 21 50   m    3232 K0  8.1  7.4   58+ 100     51 182  19S 140 138 159 -5.8 +4.7 +9.9+9.9 .000  -90.0     22  4 12.2 -16  9 46 368.3 683.7
24 Nov 11  2 17 20.9 D Saturn      0.9  0.9   70+ 113     54 211  19N 355 327  16 -5.1 +3.0 -0.5+3.5 .261   51.6     22 58 12.9 - 8 52 27 363.2 739.5
   Saturn ring contacts offset by ±15.6 secs, at  2 17  5 and  2 17 37
   Saturn limb contacts offset by ±31.4 secs, at  2 16 50 and  2 17 52  Both contacts are against the bright limb of Saturn
24 Nov 11  3  1 37.4 D    3375 F2  6.8  6.6   70+ 114     48 224  77S  79  38 100 -5.2 +2.9 +2.2-0.1 .371  -31.7     23  0 19.9 - 8 52 50 363.5 769.7
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 11  3  4 26.9 R Saturn      0.9  0.9   70+ 114     47 226 -57N 279 237 300 -5.3 +2.8 +3.1-1.3 .274  128.6     22 58 12.9 - 8 52 27 363.6 773.8
   Saturn ring contacts offset by ±74.8 secs, at  3  3 12 and  3  5 42
   Saturn limb contacts offset by ±33.1 secs, at  3  3 54 and  3  5  0  Both contacts are against the bright limb of Saturn
24 Nov 11  6 21 55.5 d    3388SF2  5.5        71+ 115      8 258  58N  35 329  56 -5.5 +2.4 +0.0+1.0 .525   22.6     23  5  9.8 - 7 41 38 366.71011.4
   R3388 = 83 Aquarii
      3388 is triple: AB 6.20 6.34 0.15" 214.8, dT = -0.28sec : AB,C 5.5 7.2 257" 149.2, dT = -205sec
      3388 is a close double. Observations are highly desired
24 Nov 11 23 48 19.5 D    3505WG8  5.5  5.0   79+ 126     50 126  63N  38  86  60 -3.4 +1.7 +1.2+2.1 .431   10.8     23 47 56.5 - 2 45 42 359.9 765.9
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -202sec
24 Nov 12  1 54 57.9 d Neptune     7.8  7.8   80+ 127     65 180  56S 100 100 122 -3.7 +1.4 +4.0-0.7 .241  -54.9     23 50 57.8 - 2 24 44 358.8 729.9
   Neptune limb contacts offset by ±5.2 secs, at  1 54 53 and  1 55  3  Both contacts are against the bright limb of Neptune
24 Nov 13  6 44 16.9 d  109485kK2  7.5  6.8   90+ 143     31 264  47N  26 319  47 -2.6 -1.1 +0.7+1.7 .427   32.0      0 49 39.9   6 24 26 358.0 874.8
24 Nov 14  2  9 29.6 D     241 G5  6.8  6.4   95+ 155     67 115  29N  11  70  31 -0.1 -2.1 +0.3+3.0 .357   37.6      1 37 40.9  12  4 42 354.4 774.8
24 Nov 15  5 31 29.0 d     397MB9  7.5  7.5   99+ 170     76 256  65S 115  45 132 +1.4 -4.1 +3.7-2.5 .225  -56.8      2 41  6.6  18 48  1 354.4 704.7
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +15sec : AC 7.7 9.5 66" 242.2, dT = -175sec
       397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 11.8"; to 3km sunlit peak = 3.1"
24 Nov 16  6 47 34.2 d     537SB6  3.7  3.8s 100- 173     73 278 -43S  84 354  96 +3.2 -5.5 +2.5-0.1 .382  -14.5      3 44 52.5  24  6 48 356.9 682.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.43sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+130sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  7 33  5.1 d     541SB8  3.9  3.9s 100- 173     63 279 -81S  48 321  60 +3.1 -5.5 +2.1+1.5 .368   25.0      3 45 49.6  24 22  4 357.4 704.3
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +280sec : AB 3.8 13.7 113"  72.8, dT = +280sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  8  8 17.0 R     537SB6  3.7  3.8s 100- 173     54 280  69N 241 157 253 +3.0 -5.5 +1.9+0.6 .410 -165.6      3 44 52.5  24  6 48 357.9 735.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.27sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+30sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 6.1"; to 3km sunlit peak = 0.0"
24 Nov 16  8  9 37   Gr    545SB6  4.1  4.2v 100- 173     53 ** GRAZE: CA 35.3S; Dist.208km in az.   4deg. [Lat = 25.01-0.06(E.Long+82.36)]
   Distance of 545 to Terminator = 2.7"; to 3km sunlit peak = 0.0"
24 Nov 16  8  9 41   M     545SB6  4.1  4.2v 100- 173     54 280  36S 166  82 177 +3.0 -5.5 +9.9+9.9 .000  -90.0      3 46 19.6  23 56 54 358.0 735.5
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0 : AB 4.2 14.4 110" 180.2 : AC 4.2 12.9 147" 336.0
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 2.4"; to 3km sunlit peak = 0.0"
24 Nov 16  8 27 53.8 D     552SB7  2.9  2.9s 100- 173     50 281  -1S 129  47 141 +3.0 -5.5 +1.4-3.3 .266  -52.2      3 47 29.1  24  6 18 358.3 753.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.02sec : AE 2.8 15.0 78" 232.4, dT = -67sec : AB 2.8 6.3 118"
291.1, dT = -421sec
       552 is a close double. Observations are highly desired
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 42 58.7 R     541SB8  3.9  3.9s 100- 173     47 282  28N 283 201 295 +3.0 -5.5 +1.4-1.3 .402  154.8      3 45 49.6  24 22  4 358.6 772.8
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +243sec : AB 3.8 13.7 113"  72.8, dT = +243sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 1.6"; to 3km sunlit peak = 0.0"
24 Nov 16  8 52 29   Gr    552SB7  2.9  2.9s 100- 173     43 ** GRAZE: CA 37.5S; Dist.379km in az. 191deg. [Lat = 19.66-0.18(E.Long+82.36)]
   Distance of 552 to Terminator = 3.2"; to 3km sunlit peak = 0.0"
24 Nov 16  9 13 27.9 r     549SA0  6.3  6.3  100- 173     40 283  81S 213 133 224 +2.9 -5.5 +1.8+2.0 .319 -133.2      3 47 21.0  24  6 59 359.2 811.8
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -7sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = +9sec : BC 6.3 8.2 86" 345.0, dT =
+181sec
   Distance of 549 to Terminator = 7.5"; to 3km sunlit peak = 0.6"
24 Nov 16  9 14 38.2 R     552SB7  2.9  2.9s 100- 173     40 283  75S 208 128 219 +2.9 -5.5 +1.9+2.5 .287 -127.9      3 47 29.1  24  6 18 359.2 813.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.11sec : AE 2.8 15.0 78" 232.4, dT = -248sec : AB 2.8 6.3 118"
291.1, dT = -47sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 7.2"; to 3km sunlit peak = 0.4"
24 Nov 16  9 38 26   Gr    560SB8  3.6  3.7s 100- 173     34 ** GRAZE: CA 37.0S; Dist.371km in az.  16deg. [Lat = 26.61-0.26(E.Long+82.36)]
   Distance of 560 to Terminator = 3.3"; to 3km sunlit peak = 0.0"
24 Nov 16  9 43 15   Gr    561SB7  5.1  5.1V 100- 172     32 ** GRAZE: CA 37.9S; Dist.142km in az. 197deg. [Lat = 21.80-0.28(E.Long+82.36)]
   Distance of 561 to Terminator = 3.5"; to 3km sunlit peak = 0.0"
24 Nov 16  9 56  4.4 R     561SB7  5.1  5.1V 100- 172     31 285  61S 195 118 206 +2.9 -5.5 +2.3+4.3 .196 -113.0      3 49 11.2  24  8 12 360.1 874.3
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.8sec : AF 5.0 14.5 4.7" 221.0, dT = -22sec : AE 5.1 14.8 96"  76.8, dT = +231sec : AD 5.1
14.7 144"  65.9, dT = +460sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 6.3"; to 3km sunlit peak = 0.0"
24 Nov 17 11  4 14.0 r   76841cK1  7.3  6.7   97- 159 -10 30 289  52S 214 135 219 +4.5 -6.2 +2.1+2.2 .263 -121.4      4 55 34.6  27 12  9 364.4 890.5
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.21sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 20  9 56 10.6 R    1206 G8  5.9  5.3   76- 121     84 294  82N 287 175 276 +7.2 -6.1 +2.6-1.0 .335 -172.1      8  0 55.9  25 23 34 378.2 621.1
   R1206 = omega Cancri
24 Nov 20 10  4 27   Gr   1211SA1  6.3  6.3   75- 121     80 ** GRAZE: CA 16.5S; Dist.175km in az. 210deg. [Lat = 21.32-0.52(E.Long+82.36)]
24 Nov 20 10 22 14.0 R    1211SA1  6.3  6.3   75- 121     79 283  43S 232 134 220 +7.1 -6.1 +5.1+3.7 .149 -115.5      8  1 43.8  25  5 22 378.4 636.1
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +273sec : AC 6.3 11.6 106" 295.0, dT = -318sec
24 Nov 21  8 56 12.4 r   80499 K0  8.2  7.6   66- 109     70  90  89N 286   8 271 +7.4 -5.4 +2.6-0.4 .323 -169.7      8 54 32.2  21 49 13 384.2 611.2
24 Nov 23  7 32 26.0 r   99157pF2  7.4        47-  86     28  88  60S 262 332 242 +6.4 -3.3 +1.1+1.4 .332 -145.4     10 29 25.6  12 11 13 396.4 774.4
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.26sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 39 18.2 r  119114 F2  7.2  7.0   28-  64      8  92  74S 278 345 256 +3.9 -0.7 +0.3+0.6 .431 -157.9     11 55 23.9   1  5 45 403.7 911.3
24 Nov 25  9 20 12.4 R  119138 K0  7.4  6.9   28-  64     30 103  60N 324  28 302 +3.7 -0.6 +0.8-1.4 .377  162.6     11 58 13.0   0 52  9 401.4 769.3
24 Nov 25 10 19 26.0 R   1730wK2  6.2  5.5   28-  63     43 112  89S 293 351 271 +3.5 -0.5 +1.7-0.3 .346 -162.0     11 59  3.3   0 31 50 400.3 705.6
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +20sec
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Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 26 10 57 15.0 R  138921KG5  8.1  7.7   20-  52     39 119  68N 315   9 293 +2.0 +1.0 +1.1-1.1 .372  176.9     12 41 59.6 - 5 13 15 401.3 724.6
24 Nov 27 10 26 15.9 R  157912kF0  7.8  7.6   13-  42     22 113  44S 244 303 223 +0.8 +2.3 +2.4+3.5 .186 -116.0     13 23 56.5 -10 52 15 402.5 828.0
24 Nov 27 11 13  6   Gr   1925SB1  1.0  1.1v  13-  41  -9 32 ** GRAZE: CA 20.5S; Dist. 70km in az.  33deg. [Lat = 23.88-0.60(E.Long+82.36)]
24 Nov 27 11 13 46   M    1925SB1  1.0  1.1v  13-  41  -9 31 120  21S 220 274 200 +0.7 +2.4 +9.9+9.9 .000  -90.0     13 25 11.6 -11  9 41 401.5 768.1
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0 : AC 1.0 10.5 368"  60.8
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11  8 18.0 d    2029 M1  4.9  4.1v   7-  31 -10 19 118 -41S 153 211 135 -0.6 +3.6 +0.0-1.5 .386  -27.2 .01 14 10 50.5 -16 18  7 401.4 845.8
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 13 32.4 r    2029 M1  4.9  4.1v   7-  30   4 32 128  88S 282 331 264 -0.7 +3.8 +1.7+0.3 .347 -152.9 .02 14 10 50.5 -16 18  7 400.0 756.9
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  3 23 26 27.9 d    2765 A3  7.9  7.8    7+  31 -10 15 230  53N  56   3  62 -5.9 +7.0 +0.5+0.3 .432   13.1     19  0  0.2 -28  3  3 385.8 829.6
24 Dec  4 21 51 29.7 d    2910cG3  4.7  4.3   13+  43  10 37 203  60S 114  90 125 -5.6 +6.7 +3.7-1.7 .228  -50.8     19 55 50.4 -26 17 58 380.6 665.8
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 22 43 42.6 r    2910cG3  4.7  4.3   14+  43  -1 31 215 -17S 191 155 202 -5.8 +6.6 -0.3+2.6 .246 -128.9     19 55 50.4 -26 17 58 381.0 722.3
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  5  0 43 34.6 d  188809 F5  8.7  8.4   14+  44     13 235  70S 104  47 114 -6.0 +6.4 +1.4-1.4 .366  -40.6     20  0 36.8 -25 42 10 382.6 893.1
24 Dec  5 23 33 15.3 d  189831 K0  8.5  7.9   22+  56 -11 35 217  89S  78  41  93 -5.6 +5.8 +2.0-0.1 .375  -22.6     20 54 50.6 -22  6  6 377.2 742.9
24 Dec  5 23 52  1.2 d  189843 K2  8.3  7.7   22+  56     33 221  68S  99  58 114 -5.7 +5.7 +2.5-1.1 .305  -43.1     20 55 18.7 -22  7 25 377.4 764.9
24 Dec  6  1  8 29   m    3062 K2  7.5  6.8   22+  56     20 234  20S 147  93 162 -5.8 +5.5 +9.9+9.9 .000  -90.0     20 56 52.7 -22  0 21 378.5 869.2
24 Dec  6  1 27 52.9 d  189879 F3  8.7  8.5   22+  57     16 237  74N  60   4  76 -5.9 +5.5 +0.5+0.2 .488   -2.5     20 57 46.6 -21 33 24 378.8 896.9
24 Dec  7  0 38 15.2 D    3197 K3  6.4  5.6   32+  69     37 224  89N  71  29  90 -5.3 +4.5 +1.7+0.1 .402  -20.1     21 50 13.0 -16 50 42 373.6 775.3
24 Dec  7 23 24  6   m  165228 K3  7.9  7.1   42+  81  -9 55 189  21S 137 128 158 -4.5 +3.4 +9.9+9.9 .000  -90.0     22 40 20.7 -11 36 19 369.1 696.6
24 Dec  8 23 24 42   m  146747 K0  8.0  7.5   54+  94  -9 61 167  21S 136 147 157 -3.6 +1.8 +9.9+9.9 .000  -90.0     23 30 57.4 - 5  3 39 365.8 705.1
24 Dec  9  1 28 52.0 D    3472PF5  6.9  6.7   54+  95     54 224  37S 120  80 142 -3.9 +1.5 +6.5-5.1 .120  -73.4     23 33 28.6 - 4 24  5 366.0 743.5
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.7sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  1 51 24.1 r    3472PF5  6.9  6.7   54+  95     50 231   3S 154 108 176 -4.0 +1.4 -3.2+7.6 .122 -106.6     23 33 28.6 - 4 24  5 366.2 759.6
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = -0.36sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 44 32.6 d  146789kF2  7.2  7.0   55+  95     40 243  76S  80  25 102 -4.1 +1.3 +1.8-0.3 .391  -30.3     23 35 14.7 - 3 51 14 366.9 805.0
24 Dec 10  1 19 56.4 d      47 F0  7.7  7.5   66+ 108     67 209  64N  40  14  62 -2.8 -0.1 +1.5+1.7 .406    5.4      0 23 38.5   2 44 35 362.7 717.8
24 Dec 10 23 37  7.0 d  109738 G5  7.8  7.1   76+ 121 -12 61 114  84N  62 121  83 -1.2 -1.5 +1.7+1.5 .425  -14.6      1 13 41.8   8 58 29 361.1 768.9
24 Dec 11  1 57 47.6 d     186pF2  7.3        76+ 122     75 212  29N   8 338  28 -1.6 -1.9 +0.5+3.3 .309   40.5      1 15 46.7   9 47  5 360.4 711.0
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.24sec
       186 is a close double. Observations are highly desired
24 Dec 13  2 44  3.5 d   75764SF0  7.6        93+ 149     83  99  38N  29 107  43 +1.4 -4.8 +1.2+2.7 .348   29.7      3 10  6.6  21 44 49 359.2 698.5
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +0.8sec : AB,C 7.6 13.5 48"  44.0, dT = +134sec : AB,D 7.6 15.8 55" 159.0, dT = -101sec
     75764 is a close double. Observations are highly desired
24 Dec 13  2 46 36   m   75768 K0  7.6  7.1   93+ 149     84 104  22S 148 222 163 +1.4 -4.8 +9.9+9.9 .000  -90.0      3 10 14.5  21 16 19 359.2 697.0
24 Dec 13  2 47 14   Gr  75768 K0  7.6  7.1   93+ 149     85 ** GRAZE: CA 22.3S; Dist. 36km in az. 327deg. [Lat = 23.52+0.60(E.Long+82.36)]
24 Dec 13  3 18 54.0 d     461cK0  7.2  6.7   93+ 150     88 237  23N  13 317  28 +1.3 -4.9 +0.9+3.8 .270   46.5      3 10 39.9  21 53 34 359.2 683.5
24 Dec 15  4 54 25.7 d     797cB9  6.4  6.3e 100+ 175     83  41  64N 126 263 130 +4.2 -6.5 +3.1-2.3 .255  -45.7      5 20 59.3  27 57 26 363.5 645.0
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  24%
```

Occultation prediction for Capitolio Nacional Habana
E. Longitude - 82 21 34.2, Latitude 23 8 6.6, Alt. 3m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 797 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
24 Dec 16  8 47  1.7 r     996cA2  6.9  6.8   99- 167     56 287  71N 271 181 268 +4.8 -6.5 +1.9-0.7 .398 -166.6      6 30 22.0  28 12 44 369.1 733.5
       996 is double:  7.6 7.6
24 Dec 16 11  6 48.9 R    1008 A0  5.3  5.3s  98- 166     27 291  49N 295 218 292 +4.6 -6.2 +0.2-1.4 .518  170.9      6 35 12.1  28  1 20 372.0 946.4
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 16.7"; to 3km sunlit peak = 6.3"
24 Dec 18  2 19 33.9 r    1251 B9  5.9  5.9   90- 144     13  69  62N 306  16 293 +7.1 -5.6 +0.6-0.4 .453  150.8      8 20 32.1  24  1 20 381.7 961.0
   R1251 = lambda Cancri
24 Dec 18  4 23  0.4 r   80165 F2  7.5  7.3   90- 143     39  77  44N 324  43 311 +6.9 -5.7 +1.9-1.9 .301  136.9      8 24 55.2  23 56 43 379.6 757.3
24 Dec 19  5 33 31   Gr  98510kG5  7.2  6.8   83- 131     44 ** GRAZE: CA  6.4S; Dist. 57km in az. 360deg. [Lat = 23.65+0.00(E.Long+82.36)]
   Distance of 98510 to Terminator = 16.2"; to 3km sunlit peak = 3.0"
24 Dec 22  9 19 27.8 R    1696 F5  6.9  6.7   55-  95     57 125  80S 284 333 262 +3.7 -0.6 +2.6-0.2 .294 -149.7     11 42 25.5   2 21 44 396.8 655.8
24 Dec 24 10  4 12.2 R    1886cK3  5.6  5.0   36-  73     43 129  53N 328  15 307 +1.0 +2.2 +0.9-1.7 .349  164.9     13  8 32.5 - 8 59  4 400.1 700.9
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.15sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 24 11 12 19.9 R    1887 K0  6.3  5.8   35-  73     53 149  53S 255 284 234 +0.8 +2.4 +5.0+2.0 .165 -119.5     13  9 14.2 - 9 32 17 399.4 648.5
24 Dec 25 10  4 58   m  158207 F0  7.4  7.2   27-  62     32 126  21S 220 270 201 -0.2 +3.5 +9.9+9.9 .000  -90.0     13 52 15.4 -14 40 36 400.3 754.6
24 Dec 25 11 33 36.9 R    1992cF0  7.5     S  27-  62  -8 46 147  68N 310 342 291 -0.6 +3.7 +1.6-1.1 .343 -177.8     13 53 51.7 -14 39 51 399.1 663.4
      1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.8sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
```

Lunar Occultation predictions
Teide Observatory
Canary Islands
Spain

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  2  0 43 42.7 r    1646 K0  7.6  7.0   69- 112     45 110  25N 358  54 336 -0.7 -3.4 +0.4-3.8 .224  129.0      11 21 39.6   7 13 23 400.3 690.6
24 Jan  2  0 54 23.0 r  118803 G0  8.1  7.8   69- 112     47 112  81N 301 356 279 -0.8 -3.4 +1.7-0.6 .349 -173.5      11 21  2.5   7  3 52 400.2 681.5
24 Jan  2  3  5  4.2 R    1648 G5  6.9  6.5   68- 112     67 161  81N 301 318 279 -1.3 -3.2 +2.3-1.3 .317 -166.9      11 23 15.2   6 35  9 398.9 630.1
24 Jan  3  1 18 13.9 r    1740 A*  7.7  7.6   60- 101     41 115  56N 327  19 305 -2.1 -2.1 +1.0-1.5 .352  162.3      12  4 12.9   1 27 43 399.5 715.1
24 Jan  3  4 58 27.5 R    1746KF2  7.0  6.8   59- 100 -11 60 202  44N 339 319 317 -3.0 -1.7 +1.0-2.7 .306  156.4      12  8  0.6   0 37 17 397.9 643.2
24 Jan  4  0  6 23.4 r    1830WA3  7.3  7.1   51-  91     15 103  40N 343  43 322 -3.2 -0.9 +0.1-1.9 .346  140.4      12 45 17.4 - 3 53 17 399.8 869.9
      1830 is double: AB 7.3 8.1 16.0" 348.0, dT = -46sec
24 Jan  4  2 25 46.4 r    1837 K2  7.4  6.6   50-  90     42 128  73S 275 320 254 -3.5 -0.7 +2.3+0.6 .298 -143.6      12 47 34.1 - 4 40 53 396.9 712.4
24 Jan  5  2 39  8.0 r  157984kK2  8.1  7.5   40-  79     33 127  84N 297 343 278 -4.6 +0.8 +1.3-0.2 .387 -167.4      13 31 48.5 -10 15 31 394.0 758.7
24 Jan  5  2 49  4.6 R    1945kK0  5.2  4.7   40-  79     35 128  19N   2  47 343 -4.6 +0.8 -0.5-3.3 .241  128.0      13 32 58.1 -10  9 54 393.8 749.0
   R1945 = 76 Virginis
24 Jan  7  3  9 33.2 r  183209kK1  8.0  7.4   22-  55     16 125  68S 262 313 248 -5.9 +3.6 +1.4+1.4 .353 -139.3      15  8 47.5 -20 41 40 385.5 869.5
24 Jan  7  3 28 42.0 R  183232cF6  7.2  7.0   21-  55     19 128  46N 327  15 313 -5.9 +3.7 +0.2-1.0 .412  156.0      15  9 48.7 -20 31 14 385.1 842.8
    183232 is double: ** 7.5 8.8 0.060" 328.0, dT = -0.15sec
    183232 has been reported as non-instantaneous (OCc1709). Observations are highly desired
24 Jan  8  3 27 42.6 R    2299kK2  6.2  5.5   13-  43      7 123  76S 262 317 253 -5.9 +4.9 +1.0+1.3 .416 -145.7      16  3 54.7 -24 43 35 380.5 928.7
24 Jan  8  4 49 13.1 r  184117 K1  8.4  7.8   13-  43     21 136  85N 281 324 272 -6.0 +5.1 +1.3+0.5 .422 -163.3      16  6 25.7 -24 56 11 378.8 810.1
24 Jan 13 11 41 15.9 d    3164SB3  4.5  4.6v   6+  28  39 38 155  51N  42  65  60 -0.2 +6.5 +1.7+1.7 .392   18.7      21 37  4.8 -19 27 58 358.3 718.7
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.6, dT = -86sec : AB 4.5 10.1 66"  45.9, dT = +168sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 Jan 13 15  9  7.4 d    3175 G8  4.7  4.3    6+  29  13 35 215  76S  93  61 112 -0.7 +6.1 +2.3-0.8 .360  -39.0      21 42 39.5 -18 51 59 358.7 806.3
   R3175 = kappa Capricorni
24 Jan 13 17 18 57.2 d  164632DG5  8.5         7+  30     14 240  40N  28 335  47 -0.8 +5.8 +0.0+1.1 .483   29.0      21 45 51.2 -17 59 16 360.7 965.6
    164632 is double: AB 8.57 11.76 1.64"  67.5, dT = +2.6sec
    164632 is a close double. Observations are highly desired
24 Jan 13 17 25 49.0 d X 50839 G0  8.8  8.6    7+  30     13 241  87S  81  27 100 -0.8 +5.7 +0.7-0.6 .511  -23.6      21 46 40.5 -18  9 17 360.9 975.3
24 Jan 13 17 34 28.9 D  164637 K2  7.5  6.8    7+  30     12 242  45N  33 338  52 -0.8 +5.7 +0.0+0.9 .513   24.5      21 46 27.4 -17 55 25 361.1 987.7
24 Jan 13 18 12 10   m    3191cA5  7.4  7.3    7+  31      4 247  19S 149  91 168 -0.8 +5.6 +9.9+9.9 .000  -90.0      21 47 44.9 -18 12 47 361.91044.6
      3191 is double: AB 7.6 9.3 0.18" 105.8
      3191 is a close double. Observations are highly desired
24 Jan 14 16 35 28.1 d    3327 K2  6.8  6.1   14+  43  -4 35 228  76N  58  16  79 +1.0 +4.8 +1.2+0.4 .476   -6.7      22 41 25.6 -12 13 48 359.7 835.6
24 Jan 14 19 10 14.6 d    3338 K0  8.3  7.8   14+  45      7 253  80S  81  22 102 +0.9 +4.4 +0.4-0.6 .537  -23.5      22 46  7.3 -11 32 19 362.81030.7
24 Jan 17 14 34 25.6 d     180SA7  5.2  5.1S  44+  83  19 57 123  25N   3  51  24 +5.3 +0.5 +0.0+3.3 .300   45.5       1 13 43.9   7 34 31 367.1 761.7
   R180 = zeta Piscium A
       180 is triple: Aa,Ab 5.6 6.4 0.20"       : AB 5.2 6.3 22.8"  62.9, dT = +38sec
       180 is a close double. Observations are highly desired
       180 = NSV 15259, 5.31,
24 Jan 17 18 25 14.6 d     193cK0  7.9  7.4   45+  84     56 240  81S  77  27  97 +4.6 -0.1 +2.1+0.0 .371  -24.7       1 19 28.3   8 23 47 367.8 729.4
       193 is double: ** 8.7 8.7 0.10" 133.0, dT = +0.15sec
       193 has been reported as non-instantaneous (OCc 712). Observations are highly desired
24 Jan 17 21  5 25.0 d     205 F0  7.4  7.3   46+  85     23 268  60N  38 335  58 +4.3 -0.3 +0.7+1.0 .447   24.7       1 23  6.8   9 11 15 371.0 885.2
24 Jan 20 18 30 22.3 d   76358kB9  7.2  7.2   77+ 122     83 124  48N  39  92  49 +5.9 -4.4 +1.6+2.6 .317   24.8       3 58 20.9  24  4 52 378.9 642.2
24 Jan 20 22 34 39.9 D     598SG0  5.5  5.0S  78+ 124     42 278  27S 144  71 154 +5.1 -4.6 +0.4-5.3 .181  -63.4       4  4 21.7  24  6 22 381.6 750.1
   R598 = 36 Tauri
       598 is triple: Aa,Ab 5.5 5.5 0.021"  88.2, dT = +0.07sec : AB 5.5 12.2 25.7" 258.0, dT = -57sec
       598 is a close double. Observations are highly desired
       598 = NSV 15883, 5.47,
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan 20 22 53 34   Gr    598SG0  5.5  5.0S  78+ 124     37 ** GRAZE: CA -0.4S; Dist.190km in az. 196deg. [Lat = 26.69-0.26(E.Long-16.31)]
   Distance of 598 to Terminator = 2.2"; to 3km sunlit peak = 0.0"
24 Jan 21 17 14 48.9 d     732pK3  7.5  6.8   85+ 134 -11 56  83  21N  19  97  24 +6.2 -5.2 +0.0+3.9 .257   49.0      4 52 58.2  26 46 39 383.5 729.0
       732 is double: ** 7.9 10.2 0.040"  69.0, dT = +0.1sec
       732 has been reported as non-instantaneous (OCc 778). Observations are highly desired
24 Jan 22 16 57 38.2 D     885wG7  5.6  5.1   91+ 146  -7 41  76  67N  72 148  73 +6.0 -5.9 +0.9+1.5 .424    3.0      5 50 58.1  27 58  4 388.0 798.6
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -24sec
24 Jan 22 17  9 55   d   77621 M3  7.5  6.6s  91+ 146 -10 44  78  34S 152 228 152 +6.0 -5.9 +5.5-6.4 .097  -76.5 .02  5 50 48.2  27 41  9 387.8 778.7
     77621 = NSV 16688, 7.47, range 0.02, 6V, Type VAR, Period 4.88496 days
24 Jan 22 17 18 26   Gr  77621 M3  7.5  6.6s  91+ 146 -12 47 ** GRAZE: CA 20.5S; Dist. 50km in az. 148deg. [Lat = 27.94+0.56(E.Long-16.31)]
24 Jan 22 22 49 18.9 D   77818 K5  6.7  5.8   92+ 147     64 277  84N  91   9  90 +4.8 -6.1 +2.2-0.7 .345    5.2      6  0  4.9  28  7 33 387.3 651.4
24 Jan 28 21 35 58.4 r    1603 A0  7.2  7.2   91- 145     32  97  88S 286 349 265 +0.2 -3.7 +1.2+0.3 .374 -165.8     11  2 32.9   9 10 23 402.3 753.5
24 Jan 29  4 10 28.3 r  118702 K5  7.5  6.6s  90- 143     48 248  16N   4 308 342 -1.2 -3.0 -0.5-3.8 .227  127.6     11 10 30.8   7 53 30 401.0 723.8
    118702 = NSV 18681, 7.56 to 7.62, Hp
24 Jan 30 23 14 38.0 r    1790 M4  6.9  6.0v  77- 122     31 112  68S 270 325 249 -2.7 -1.1 +1.6+1.1 .314 -142.5     12 29  9.7 - 2 25 46 401.2 769.4
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Jan 31  4 53 28.2 r  138861kK5  7.9  7.2   76- 121 -11 47 227  46N 337 297 315 -4.0 -0.3 +1.0-2.7 .312  154.5     12 35 27.6 - 3 32 46 399.4 669.8
24 Feb  3  4 43 11.1 r X 38558 K0  8.2  7.7   48-  87     42 176  59N 318 321 302 -6.9 +3.8 +1.7-1.4 .329  168.0     14 50 54.8 -19 28 47 389.0 634.6
24 Feb  4  1 31 51.2 R    2227SK0  5.8  5.2   38-  77     11 124  87N 286 338 274 -6.8 +4.6 +0.7+0.4 .457 -165.9     15 37 48.0 -23  8 30 387.3 884.7
      2227 is triple: **     5.5 0.010" 102.0, dT = +0.02sec : ** 3.4 8.9 0.010" 102.0, dT = +0.02sec
24 Feb  4  1 46 54.7 r  183654 K4  7.2  6.3   38-  76     14 126  43N 329  19 317 -6.8 +4.6 +0.0-1.0 .402  151.1     15 38 44.6 -23  2 58 386.9 862.8
24 Feb  4  2 10 53.4 R    2235kB9  6.3  6.3   38-  76     18 130  47N 325  12 313 -6.8 +4.7 +0.2-0.9 .402  155.5     15 39 21.4 -23  9  1 386.4 828.7
24 Feb  5  4 16 15.1 r    2389kB9  8.4  8.4   28-  63     25 146  81S 266 300 259 -7.2 +6.0 +2.1+0.9 .352 -151.9     16 38 36.3 -26 59 22 379.0 734.5
24 Feb  6  3 14  5.6 r  185562kA0  8.0  7.9   19-  51      6 127  53N 305 358 303 -6.6 +6.7 +0.2-0.1 .467  161.2     17 37 44.6 -28 26 14 375.0 898.0
24 Feb  6  3 38 39.5 r    2536KF5  7.7  7.4   19-  51     10 130  27N 330  20 329 -6.6 +6.7 -0.2-1.1 .338  135.5     17 39  0.7 -28 24 45 374.5 859.9
24 Feb  6  4 30 44.7 R    2540 B3  7.2  7.1e  18-  51     18 139  53S 230 271 229 -6.7 +6.8 +2.8+2.7 .245 -124.5     17 40 23.9 -28 55 24 373.4 784.7
      2540 = V2382 Oph, 7.26 to 7.29, Hp, Type E+BE, Period 0.9215 days, Phase  35%
24 Feb 11 17 39 21.7 D  146589kM*  7.4  6.5s   4+  24     11 255  81N  64   5  86 +0.8 +3.5 +0.3-0.1 .584   -6.9     23 14 49.7 - 7 42 10 357.71021.0
    146589 = NSV 26046, 7.37, range 0.02, 3V, Type VAR, Period 13.38688 days
24 Feb 13 17 28 27.7 D     136wM2  6.1  5.3v  19+  52 -10 41 253  45N  22 324  43 +4.2 +0.2 +0.8+2.0 .389   33.2      0 59 49.7   6 29  0 361.2 813.5
       136 is double: AB 6.3 13.4 29.7" 313.3, dT = +28sec
       136 = WW Psc, 5.97 to 6.11, V, Type LB
24 Feb 13 19 23  0.8 D     148DA0  7.1        20+  53     17 269  76S  82  19 103 +4.1 +0.0 +0.5-0.7 .507  -19.9      1  3 47.1   6 45 53 363.9 951.0
       148 is double: AB 7.14 10.44 1.72" 242.8, dT = -3sec
       148 is a close double. Observations are highly desired
24 Feb 13 20  0 56.9 d     152 F8  7.9  7.7   20+  53      9 273  77N  54 352  75 +4.1 +0.0 +0.3+0.2 .561    9.5      1  4 50.4   7  2 45 364.91006.6
24 Feb 14 17 59 31   D     279 F6  7.1  6.8   29+  66     48 257  20S 139  77 158 +5.4 -1.6 +9.9+9.9 .076  -79.8      1 53 29.9  12 40 57 365.7 759.4
24 Feb 14 18  6 52   Gr    279 F6  7.1  6.8   29+  66     45 ** GRAZE: CA  9.7S; Dist. 29km in az. 167deg. [Lat = 28.21+0.21(E.Long-16.31)]
24 Feb 15 17 57 38.1 d     408cA5  8.3  8.1   40+  79     62 257  18N   0 295  16 +6.2 -3.1 +0.8+5.5 .181   61.8      2 46 20.3  18 50 17 370.3 688.0
       408 is double: ** 9.2 9.2 0.10"  85.0, dT = +0.05sec
       408 has been reported as non-instantaneous (OCc 873). Observations are highly desired
24 Feb 15 18  3  7.2 d   93106 K5  7.9  7.1   40+  79     61 257  56S 106  41 122 +6.2 -3.1 +2.6-1.9 .277  -43.8      2 47 33.2  18 30 37 370.3 690.5
24 Feb 15 19  6 58.0 d   93126 G5  7.9  7.4   40+  79     47 268  65S  98  29 113 +6.0 -3.2 +1.7-1.3 .353  -30.6      2 49 11.9  18 43 47 371.5 739.3
24 Feb 15 20 16 43.2 D     421wF8  6.6  6.3   41+  79     32 276  53N  35 327  51 +5.9 -3.2 +1.2+1.4 .367   36.1      2 50 42.6  19  9 38 373.0 822.2
       421 is double: AB 6.6 13.0 17.2"  15.0, dT = +44sec
24 Feb 16 20 36 15.4 d   76175pA0  8.2  8.0   52+  92     41 278  56N  43 331  55 +6.3 -4.5 +1.7+1.2 .340   35.2      3 46 34.2  23 37 26 377.8 761.6
     76175 is double: ** 8.7 10.7 0.050"
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Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     76175 has been reported as non-instantaneous (OCc 297). Observations are highly desired
24 Feb 16 21  4 24.3 d   76202wK0  7.8  7.1   52+  92     35 280  71N  58 347  70 +6.2 -4.5 +1.3+0.3 .405   21.5      3 47 37.0  23 36 33 378.4 800.1
     76202 is double: AB 7.9 13.0 49" 210.0, dT = -105sec
24 Feb 16 21  7  7.1 d   76198KA3  7.8  7.7v  52+  92     35 281  51N  39 328  50 +6.2 -4.5 +1.5+1.3 .331   40.9      3 47 26.8  23 40 42 378.5 804.2
     76198 = V0650 Tau, 7.76, range 0.03, V, Type DSCTC, Period 0.03065278 days
24 Feb 16 21 12 11.8 D   76189pF8  7.0  6.7   52+  92     33 281  33N  20 310  32 +6.2 -4.5 +2.0+3.1 .223   59.8      3 47 17.1  23 43 36 378.6 812.1
     76189 is multiple: AE 7.0 12.7 8.1"  42.0, dT = +34sec : AB 7.0 12.6 66" 226.6, dT = -266sec : AD 7.0 13.4 131" 243.9, dT = -426sec : AC 7.0
12.4 147" 252.9, dT = -403sec
     76189 is a close double. Observations are highly desired
24 Feb 16 21 23 20.9 D     556pB8  5.4  5.5S  52+  92     31 282  61S 106  36 118 +6.2 -4.5 +0.6-1.7 .406  -25.7      3 48 20.8  23 25 17 378.8 828.2
       556 is triple: Aa,Ab 5.7 7.7 0.10"       : AB 5.4 14.1 177" 298.3, dT = -426sec
       556 is a close double. Observations are highly desired
       556 = NSV 1321, 5.44, , Type EA, Period 2.2663 days, Phase  41%
24 Feb 16 22 10  6.6 D     564pB8  6.2  6.2S  52+  93     21 286  64N  52 345  63 +6.1 -4.5 +0.9+0.4 .423   30.4      3 49 43.5  23 42 43 380.0 902.5
       564 is triple: AB 6.2 11.6 97" 104.1, dT = +140sec : AC 6.2 13.3 117" 202.3, dT = -240sec
       564 = NSV 15798, 6.17, , Type VAR:
24 Feb 16 22 18 24   m     559pF0  6.5  6.3   52+  93     20 287   5N 353 286   4 +6.1 -4.5 +9.9+9.9 .000   90.0      3 48 56.9  23 51 26 380.2 917.9
   R559 = 26 Tauri
       559 is quadruple: Aa,Ab 6.4 9.3            : AB 6.5 14.5 79" 242.4 : AC 6.5 15.0 87" 331.9
24 Feb 16 22 45  9   Gr    567pA0  6.8        53+  93     13 ** GRAZE: CA  5.2N; Dist.  5km in az. 205deg. [Lat = 28.43-0.40(E.Long-16.31)]
24 Feb 16 22 45 10   gr    567pA0  6.8        53+  93     14 290   5N 353 288   4 +6.1 -4.5 +9.9+9.9 .000   90.0      3 49 58.1  23 50 55 380.9 963.0
       567 is triple: AB 6.81 10.15 3.31" 235.1 : AC 6.8 10.5 10.1" 234.9
       567 is a close double. Observations are highly desired
24 Feb 19  1 21 38.1 d     885wG7  5.6  5.1   74+ 118      7 298  68N  69   7  69 +5.6 -5.9 +0.1-0.3 .487   28.9      5 50 58.1  27 58  4 391.81058.3
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -21sec
24 Feb 19 17 26 37   m   78496 K0  7.5  6.9   80+ 127  -9 62  83  12S 175 257 171 +6.5 -6.5 +9.9+9.9 .000  -90.0      6 33 41.4  27 58 49 389.7 644.6
24 Feb 19 18  3 34.0 d   78530cB9  7.8  7.8   80+ 127     70  85  83N  90 175  87 +6.3 -6.6 +2.5+0.5 .324   -2.8      6 35 40.3  28 15 51 389.4 613.6
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = +0.36sec
     78530 is a close double. Observations are highly desired
24 Feb 19 18 18 37   D    1008 A0  5.3  5.3s  80+ 127     73  87  23S 165 249 161 +6.3 -6.6 +9.9+9.9 .079  -75.8      6 35 12.1  28  1 20 389.4 603.2
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 Feb 19 18 31 31   Gr   1008 A0  5.3  5.3s  80+ 127     78 ** GRAZE: CA  7.8S; Dist. 57km in az. 173deg. [Lat = 27.96+0.11(E.Long-16.31)]
24 Feb 19 20 49  8.7 D    1022CB7  6.0     s  81+ 128     74 274  69N  76 351  72 +5.7 -6.6 +2.8+0.3 .294   24.5      6 39 33.1  28 15 47 389.7 610.6
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +2sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  98%
24 Feb 19 20 49 10.8 d X 91013C    7.8  7.8s  81+ 128     74 274  69N  76 351  72 +5.7 -6.6 +2.8+0.3 .294   24.6      6 39 33.2  28 15 48 389.7 610.6
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -2sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  98%
24 Feb 19 22  2 30.1 D    1026SG5  6.5  5.9   81+ 128     59 278  62N  70 349  66 +5.4 -6.5 +2.5+0.2 .295   34.6      6 41 20.9  28 11 48 390.6 678.8
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +98sec : AC 6.6 12.8 58"  61.3, dT = +193sec
24 Feb 20  0 30 42.0 d    1035cK3  6.7  6.0   82+ 129     28 288  60S 129  58 124 +5.1 -6.3 -0.1-2.0 .434  -22.4      6 45 35.1  27 40 24 393.4 895.0
      1035 is double: ** 7.6 7.6 0.12"  90.0, dT = +0.22sec
      1035 has been reported as non-instantaneous (OCc 233). Observations are highly desired
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Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb 20 18 34 44.4 d   79479 K1  7.2  6.6   88+ 139     65  86  34N  49 129  40 +5.6 -6.7 +2.1+3.7 .214   48.4      7 32 12.9  27  7 31 393.1 615.4
24 Feb 20 21 13 28.7 D    1149SK5  4.1  3.3s  88+ 140     80 264  45N  60 341  51 +5.0 -6.6 +3.7+2.0 .204   49.8 .03  7 35 55.4  26 53 45 393.0 603.1
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.19sec : AB 4.1 13.2 57"  39.0, dT = +259sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Feb 20 22 11 24.7 r    1149SK5  4.1  3.3s  88+ 140     68 272 -33N 343 262 333 +4.8 -6.5 +0.3-4.4 .218  130.0 .03  7 35 55.4  26 53 45 393.5 649.0
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = -0.01sec : AB 4.1 13.2 57"  39.0, dT = -144sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Feb 21  2 18  5.6 D    1169 K5  5.3  4.5s  89+ 141     16 291  56S 140  74 130 +4.2 -6.1 -0.5-2.0 .453  -28.7      7 44  6.9  25 47  3 398.1 998.3
   R1169 = 76 Geminorum
      1169 = NSV 3703, 5.28 to 5.32, V
24 Feb 21 20 39 14.9 D    1270cF0  6.1  5.9v  94+ 151     80 113  67N  90 153  76 +4.3 -6.4 +3.0+0.3 .282   23.4      8 28 36.8  24  8 42 395.6 589.5
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Feb 23 20 33 19.3 d    1479 F2  6.4  6.2  100+ 172     56 105  67N 116 179  97 +2.4 -5.0 +2.1-0.5 .331    4.9     10  5 40.9  15 45 27 400.0 643.9
   Distance of 1479 to Terminator = 7.2"; to 3km sunlit peak = 0.4"
24 Feb 28 23 11 35.2 r  158105PF5  7.5  7.2   83- 131     32 128  82N 300 345 280 -4.3 +1.7 +1.2-0.3 .386 -169.6     13 42 35.7 -12  5 13 398.8 758.2
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.13sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar  8 10 12 52.9 d    3164SB3  4.5  4.6v   6-  28  55 41 194 -73S  79  66  97 -4.1 +6.2 +2.3+0.1 .395  -24.6     21 37  4.8 -19 27 58 356.1 749.7
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +9sec : AB 4.5 10.1 66"  45.9, dT = +140sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 Mar  8 11 20 36.5 R    3164SB3  4.5  4.6v   6-  28  57 35 213  57S 209 178 227 -4.3 +6.1 +0.7+1.3 .423 -155.1     21 37  4.8 -19 27 58 356.5 805.2
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -105sec : AB 4.5 10.1 66"  45.9, dT = +150sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 Mar 11 18  1 54   M      81 K4  6.4  5.7    3+  19      4 271   6S 152  90 174 +1.9 +0.7 +9.9+9.9 .000  -90.0      0 37 30.5   3  8  7 358.51066.2
24 Mar 12 18 34 31.3 d   92488     9.0  8.2    8+  33     12 276  34N  11 308  31 +3.6 -1.1 +0.6+2.4 .331   54.6      1 31 52.0  10 47 45 361.41002.6
24 Mar 12 18 50 58   M     222 G5  7.0  6.5    8+  33      8 278  -1N 337 274 357 +3.6 -1.1 +9.9+9.9 .000   90.0      1 31 42.7  10 53 22 361.91029.2
24 Mar 12 19 13 39.7 d X  2178 F8  8.0  7.7    8+  33      4 281  58N  35 333  55 +3.6 -1.1 +0.3+0.9 .509   32.6      1 33 43.4  10 54 15 362.51063.0
24 Mar 13 18 42 40.7 D     363 F0  7.2  7.0   16+  46     24 277  38S 122  56 139 +5.0 -2.8 +0.4-2.8 .317  -51.7      2 27 32.1  16 38 37 365.2 905.8
24 Mar 14 12 48 25.7 d     472cA1  4.9  4.9   23+  58  50 64  99  79N  62 130  76 +7.0 -3.7 +1.5+1.6 .424   -5.2      3 14 54.1  21  2 40 366.5 756.5
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.19sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Mar 14 18 59 50.5 D     493 A0  6.9  6.9   25+  60     34 279  90N  74   4  87 +6.0 -4.2 +1.1-0.3 .461    2.8      3 24 34.5  22  2 25 370.2 829.3
24 Mar 14 20  2 58.1 d   75929 K7  8.0  7.1   25+  60     20 285  46S 118  51 131 +6.0 -4.2 +0.0-2.1 .401  -38.8      3 26 39.3  21 57  1 371.8 926.6
24 Mar 15 17 53 12.8 d   76559 B9  7.8  7.7   35+  72 -12 61 273  59N  48 331  57 +6.8 -5.3 +2.2+1.4 .320   30.6      4 20 30.4  25 49 39 374.1 673.7
24 Mar 15 18 58  6.8 D     647WB9  5.4  5.4s  35+  73     47 278  60S 109  34 118 +6.6 -5.3 +1.3-1.8 .364  -26.4      4 22 34.9  25 37 46 375.3 740.2
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = +5sec
       647 = NSV 15957, 5.34 to 5.39, Hp
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Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 15 18 58 12.4 d X  5643SF8  8.5  8.2s  35+  73     47 278  61S 108  33 117 +6.6 -5.3 +1.3-1.7 .368  -25.3      4 22 35.5  25 38  3 375.3 740.3
   X  5643 is multiple: BE 6.9 15.0 10.6" 264.0, dT = -26sec : BD 6.9 13.3 11.0" 227.0, dT = -14sec : BC 6.9 12.5 11.7" 245.0, dT = -23sec : BA 8.5
5.4 19.4" 204.9, dT = -6sec
   X  5643 = NSV 15958, 8.41, range 0.07, V
24 Mar 15 20 17 11.4 d     655PF5  7.9  7.6   35+  73     30 285  75S  95  24 103 +6.5 -5.3 +0.7-1.1 .461   -8.3      4 25 10.8  25 44 57 377.0 852.6
       655 is double: AB 7.9 15.4 43" 271.0, dT = -93sec
24 Mar 16 18 29 50.5 D     797cB9  6.4  6.3e  45+  85     65 276  85N  81 358  84 +7.0 -6.2 +2.3-0.2 .347    8.1      5 20 59.3  27 57 26 380.1 645.8
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  75%
24 Mar 17 18 34 33.4 d   78233SA3  7.5        56+  97     76 274  72S 110  24 108 +6.8 -6.6 +2.4-1.5 .316  -13.6      6 19 59.0  28 25 36 385.2 607.4
     78233 is quadruple: AB 8.16 8.35 0.14" 283.8, dT = -0.44sec : AB,C 7.5 9.6 2.9" 265.3, dT = -8sec : BA 8.7 9.3 58" 268.1, dT = -169sec
     78233 is a close double. Observations are highly desired
24 Mar 17 20 58  6   m   78294 A0  7.6  7.6   57+  98     46 283  10N  14 296  11 +6.4 -6.5 +9.9+9.9 .000   90.0      6 23  0.3  28 37 17 387.4 758.4
24 Mar 18 19 48 49.4 d   79264 G2  8.0  7.7   66+ 109     72 271  44S 146  64 138 +6.1 -6.7 +1.3-3.3 .265  -36.7      7 18 28.9  27 15 10 390.4 626.8
24 Mar 19 17 19 14.5 d   79987SK5  7.5  6.7   75+ 120  -4 64  89  30N  45 122  33 +6.0 -6.6 +2.4+5.0 .166   58.7      8  9 42.4  25 33 33 394.2 610.6
     79987 is triple: **Aa,Ab 8.9 8.9 0.10"  90.0, dT = +0.43sec : AB 7.6 10.7 28.9"  98.1, dT = +105sec
     79987 has been reported as non-instantaneous (OCc  78). Observations are highly desired
24 Mar 19 17 50 18.0 D    1233SG8  5.7  5.3S  75+ 120 -11 71  94  33N  49 125  37 +5.9 -6.6 +3.1+4.6 .166   57.8      8 10 27.2  25 30 26 393.9 593.9
   R1233 = psi Cancri
      1233 is quadruple: **Aa,Ab 6.6 6.6 0.10" 270.0, dT = -0.45sec : AC 5.8 11.8 82" 220.7, dT = -493sec : AB 5.8 13.1 90" 319.0, dT = +1.9sec
      1233 has been reported as non-instantaneous (OCc  73). Observations are highly desired
      1233 = NSV 17752, 5.73, , Type VAR:
24 Mar 20  0  3  8.9 d   80089 G5  7.2  6.7   76+ 122     28 284  58S 138  68 125 +4.6 -6.1 -0.1-2.1 .436  -21.2      8 19  9.2  24 10 29 397.8 901.8
24 Mar 20  0 46 30.5 D    1251 B9  5.9  5.9   76+ 122     19 288  58S 138  71 125 +4.6 -6.0 -0.3-1.9 .463  -22.6      8 20 32.1  24  1 20 398.8 970.4
   R1251 = lambda Cancri
24 Mar 23 20 44  4.6 D    1645cF8  6.7  6.4   98+ 165     60 133  69N 101 141  79 +0.8 -2.9 +2.7+0.0 .283   31.7     11 21 26.8   6 38  6 400.7 647.4
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Mar 24  0 34 58.9 d    1656 K2  7.4  6.6   98+ 166     49 243  67N  98  46  76 -0.1 -2.4 +2.2-1.3 .300   34.7     11 25 11.2   5 44 22 401.4 710.2
24 Mar 27  2 48  2.9 r  158011dF2  7.1  6.9   97- 160     35 229  58N 328 285 308 -4.2 +2.0 +1.4-2.5 .323  156.8     13 34 17.8 -11 32 15 398.8 680.3
    158011 is double: AB 7.2 12.9 3.6" 245.6, dT = -1.5sec
    158011 is a close double. Observations are highly desired
24 Mar 29 22 21  4.7 R    2269cB5  5.4  5.4   80- 127     12 127  82N 293 344 282 -5.8 +5.3 +0.6+0.2 .448 -174.1     15 53 53.9 -24 31 59 392.7 858.1
24 Mar 30  0 36  1.1 R    2286kB5  5.4  5.5v  80- 127     31 152   6N   9  36 358 -6.2 +5.6 -2.2-5.0 .128  110.6     15 58 34.9 -24 49 53 390.4 685.7
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  45%
   Distance of 2286 to Terminator = 9.1"; to 3km sunlit peak = 0.0"
24 Apr  5  3 10  0.0 R    3214 A0  6.8  6.7   18-  50      7 114  56S 212 269 231 -3.8 +6.1 +0.9+2.4 .405 -141.5     21 56 46.0 -17 53 49 363.7 913.3
24 Apr 10 18 34 55.3 d X 64067     9.3  8.5    5+  27     10 287  62S  96  33 111 +4.1 -3.6 +0.0-1.1 .546  -19.5      2 59  3.2  19 43 40 365.81027.3
24 Apr 10 18 39 14.8 D   93217 K0  8.3  7.7    5+  27      9 288  24S 134  71 149 +4.1 -3.6 -0.7-3.1 .312  -57.7      2 58 54.5  19 34 34 365.91035.4
24 Apr 10 18 47 41.6 D     439cF0  7.3  7.1    5+  27      7 289  63N  41 339  56 +4.1 -3.6 +0.4+0.7 .480   35.7      2 59 10.4  19 59 23 366.11048.8
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.13sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Apr 11 14 10 41.2 D     560SB8  3.6  3.7s  11+  38  40 79 251  44N  27 321  38 +5.8 -4.8 +1.6+3.1 .286   40.6      3 49  9.7  24  3 12 365.0 667.7
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 137.1, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.5, dT = +0.49sec : AC 3.6 15.0 50"  36.5, dT = +172sec :
AH 3.6 16.0 68" 221.6, dT = -231sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Apr 11 15 13 34.0 r     560SB8  3.6  3.7s  11+  39  26 65 267 -51N 292 218 303 +5.6 -4.9 +2.3-2.0 .294  139.4      3 49  9.7  24  3 12 365.7 687.5
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 137.1, dT = +0.03sec : Aa,Ab 3.8 6.8 0.22" 336.5, dT = -0.5sec : AC 3.6 15.0 50"  36.5, dT = +41sec : AH
3.6 16.0 68" 221.6, dT = -77sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Apr 11 18  9 41.8 d X  5126     8.7        12+  40 -12 28 284  56N  40 330  51 +5.3 -4.9 +1.3+1.1 .365   42.3      3 56 27.3  24 25 41 369.2 884.1
24 Apr 11 18 37  6.1 D     587 K0  6.2  5.5   12+  40     23 287  55N  39 331  49 +5.3 -4.9 +1.1+1.0 .370   44.4      3 57 26.4  24 27 43 369.8 928.1
24 Apr 11 18 58 37.6 D   76358kB9  7.2  7.2   12+  40     18 288  28S 136  70 147 +5.2 -4.9 -0.5-2.9 .325  -52.7      3 58 20.9  24  4 52 370.4 964.2
24 Apr 12 18 30 16.7 d   76857cF5  8.9  8.6   20+  53     37 284  53N  43 329  49 +6.0 -5.8 +1.8+1.2 .307   47.4      4 57 40.8  27 22 33 374.5 823.4
     76857 is double: ** 9.7 9.7 0.050"  55.0, dT = +0.16sec
     76857 has been reported as non-instantaneous (OCc1118). Observations are highly desired
24 Apr 12 19 26 58.5 d X  6391WA0  8.7  8.5   20+  53     26 289  65N  56 346  61 +6.0 -5.8 +1.0+0.2 .407   35.7      4 59 53.1  27 19 14 375.8 913.7
   X  6391 is double: BA 8.7 7.0 20.4"  26.0, dT = +43sec
24 Apr 12 19 27 43.0 D     746WB7  7.0  6.9   20+  53     25 289  64N  55 345  60 +6.0 -5.8 +1.1+0.3 .400   37.1      4 59 53.7  27 19 32 375.8 915.0
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -45sec
24 Apr 13 18  0 33.3 d   77768 A0  8.6  8.5   29+  65 -10 56 280  51S 126  46 126 +6.5 -6.5 +1.2-2.4 .338  -28.4      5 57 41.1  28 17 27 379.1 706.5
24 Apr 13 19 28 50.9 D   77818 K5  6.7  5.8   30+  66     37 285  29S 149  75 148 +6.3 -6.4 -0.3-3.3 .296  -48.8      6  0  4.9  28  7 33 380.9 829.2
24 Apr 13 21 10  8.5 d     917 K2  8.1  7.4S  30+  67     17 293  69N  68   1  67 +6.2 -6.3 +0.5-0.3 .451   32.7      6  4 16.2  28 18  3 383.3 996.3
       917 = NSV 2811, 8.4,
24 Apr 15 18 35 41.5 d   79784SK2  7.8  7.1s  50+  89     72 268  54N  65 346  54 +6.0 -6.6 +3.6+1.2 .219   50.0      7 54 28.4  26 10  2 389.5 642.3
     79784 is triple: Aa,Ab 10.0 10.0 0.40" 156.0, dT = -0.03sec : AB 8.7 10.4 16.9" 343.0, dT = +11sec
     79784 is a close double. Observations are highly desired
     79784 = NSV 17648, 7.83, range 0.02, 3V, Type VAR, Period 55.92841 days
24 Apr 15 22 26 34.9 D    1206 G8  5.9  5.3   51+  91     23 288  74N  86  18  75 +5.4 -6.2 +0.5-0.9 .439   28.2      8  0 55.9  25 23 34 393.8 952.1
   R1206 = omega Cancri
24 Apr 15 22 58 37.9 D    1211SA1  6.3  6.3   51+  91     16 290  57S 134  69 123 +5.4 -6.1 -0.4-1.8 .488  -21.4      8  1 43.8  25  5 22 394.61003.5
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.3, dT = -27sec : AC 6.3 11.6 106" 295.0, dT = -204sec
24 Apr 22  1 48 11.0 d    1814SK5  6.7  5.8S  96+ 158     20 253  67N  89  31  67 -2.1 +0.2 +1.1-1.1 .345   33.7     12 38 43.3 - 4 22 25 401.7 806.7
      1814 is triple: AB 6.8 10.0 57" 110.5, dT = +154sec : AC 6.8 10.2 165" 359.1, dT = +1.5sec
      1814 = NSV 19445, 6.66, , Type VAR:
24 Apr 23  1 19 10.1 d    1917pG5  7.2  6.7   99+ 169     30 237  90S 105  57  85 -3.2 +1.6 +1.7-1.5 .350   18.4     13 21 12.2 - 9 59 57 398.8 714.2
      1917 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.28sec
      1917 has been reported as non-instantaneous (OCc 141). Observations are highly desired
24 Apr 25 22 34 30.6 R    2237cK3  5.0  4.3s  96- 157     32 152  88S 290 318 279 -4.9 +5.3 +1.9-0.1 .359 -168.7     15 40 16.9 -23 49  5 390.7 693.2
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.2sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Apr 28  2 56 45.3 r    2540 B3  7.2  7.1e  83- 132     32 192  49N 318 306 317 -6.3 +7.2 +2.8-2.0 .231  134.4     17 40 23.9 -28 55 24 383.1 613.6
      2540 = V2382 Oph, 7.26 to 7.29, Hp, Type E+BE, Period 0.9215 days, Phase  20%
24 Apr 30  2 13 55.5 r  188429 K4  7.7  6.9   65- 107     28 153  45S 217 244 227 -5.6 +7.5 +2.4+2.3 .261 -136.1     19 40 48.8 -27 41 44 376.0 660.0
24 May  1  1 17 23.9 r    3012 A7  6.9  6.8   54-  95     16 129  57N 288 337 303 -4.8 +7.1 +1.1+0.4 .372  149.8     20 38  4.9 -24 13 44 373.5 780.1
24 May  1  2 38 21.4 r  189555 G1  7.2  6.9   54-  94     28 144  63N 282 317 296 -5.0 +7.1 +2.0+0.4 .336  150.7     20 40 22.3 -24  7  5 372.1 695.0
24 May  2  2 29 40.9 R    3164SB3  4.5  4.6v  43-  81     22 128  61N 279 326 297 -4.1 +6.4 +1.5+0.7 .371  149.1     21 37  4.8 -19 27 58 368.9 772.9
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +65sec : AB 4.5 10.1 66"  45.9, dT = +108sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 May  2  3 12 42.4 r  164544 F7  7.3  7.0   42-  81     28 136  48S 208 248 226 -4.2 +6.3 +1.5+2.4 .328 -143.2     21 38 50.6 -19 37 31 368.2 731.8
24 May  2  6 16 20.2 r    3175 G8  4.7  4.3   41-  80  26 43 187  89S 248 242 267 -4.7 +6.1 +2.2+0.6 .383  165.4     21 42 39.5 -18 51 59 366.4 702.7
   R3175 = kappa Capricorni
24 May  3  2 50  7.2 r  165149wG0  7.7  7.4   31-  68     20 119  58N 279 331 299 -3.0 +5.2 +1.2+0.8 .381  144.2     22 32  9.4 -13 35 52 365.7 834.5
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +109sec
24 May 10 18 22 29.4 d   77248 K5  9.3  8.6    8+  34 -10 23 290  85S  85  16  87 +5.1 -6.0 +0.5-0.8 .511   11.4      5 33 21.6  27 54 19 376.2 951.5
24 May 10 18 54 40.0 d   77267cK2  8.3  7.6    9+  34     17 293  90N  80  14  82 +5.1 -6.0 +0.3-0.6 .528   16.3      5 34 38.4  27 53 45 377.01006.3
     77267 is double: ** 8.9 8.9 0.10" 311.0, dT = -0.12sec
     77267 has been reported as non-instantaneous (OCc 711). Observations are highly desired
24 May 10 19  6 12.1 d   77268 B8  8.2  8.0v   9+  34     15 294  46N  37 331  39 +5.1 -6.0 +1.3+1.3 .281   59.9      5 34 39.1  28  3  4 377.31026.9
     77268 = V1371 Tau, 8.02 to 8.20, V, Type GCAS
24 May 10 19 29 38.0 D     840cK0  6.3  5.5    9+  34     10 296  46S 125  62 127 +5.1 -5.9 -0.6-1.7 .507  -29.3      5 35 55.5  27 39 44 377.91066.4
       840 is double: ** 7.3 7.3 0.050"
       840 has been reported as non-instantaneous (OCc1267). Observations are highly desired
24 May 10 19 44  2.4 d   77314 B8  8.2  8.1    9+  35      7 298  74N  65   3  67 +5.1 -5.9 +0.2-0.2 .509   31.2      5 36 39.8  27 54 42 378.21090.6
24 May 11 18  8 15.6 d   78496 K0  7.5  6.9   15+  46  -7 38 285  51S 128  53 124 +5.5 -6.4 +0.3-2.1 .420  -23.1      6 33 41.4  27 58 49 380.4 841.5
24 May 11 18 45 22.2 D    1008 A0  5.3  5.3s  16+  47     30 288  79S 100  28  96 +5.4 -6.4 +0.5-1.2 .485    5.0      6 35 12.1  28  1 20 381.2 900.5
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 May 11 19 21 10   m   78530cB9  7.8  7.8   16+  47     23 291  16N  15 306  11 +5.4 -6.3 +9.9+9.9 .000   90.0      6 35 40.3  28 15 51 382.1 961.5
     78530 is double: AB 8.6 8.9 0.19"  39.6
     78530 is a close double. Observations are highly desired
24 May 11 19 42 45.5 d   78553 G5  9.0  8.7   16+  47     19 292  84N  83  16  79 +5.4 -6.3 +0.3-0.7 .500   21.3      6 37 21.4  27 58 34 382.6 996.0
24 May 11 20 21 10.0 D   78580SA2  7.3  7.2   16+  47     11 296  77S 102  39  98 +5.4 -6.2 -0.2-1.1 .570    1.2      6 38 53.6  27 48 16 383.51060.2
     78580 is triple: AC 7.3 13.8 26.7" 237.2, dT = -33sec : AB 7.3 10.5 28.6" 130.5, dT = +44sec
24 May 12 18 31 56.2 d   79490 G5  8.7  8.2   24+  59 -12 44 280  47S 139  64 130 +5.4 -6.4 +0.3-2.4 .385  -26.0      7 32 57.9  26 29 46 385.4 800.6
24 May 12 18 43 26.0 d   79497 K7  8.8  8.0   24+  59     42 281  46S 140  66 131 +5.4 -6.4 +0.2-2.4 .388  -27.5      7 33 17.1  26 27 36 385.7 817.4
24 May 12 19 39  1.2 d   79530 K0  8.2  7.6   24+  59     31 286  59N  66 354  57 +5.3 -6.3 +1.4-0.1 .330   46.6      7 35 21.1  26 36  8 386.9 903.3
24 May 15 17 36 37.6 d    1479 F2  6.4  6.2   52+  93   0 77 191  38N  58  48  39 +3.6 -4.7 +7.2+4.7 .102   71.8     10  5 40.9  15 45 27 395.8 624.6
24 May 15 17 48 45   Gr   1479 F2  6.4  6.2   52+  93  -3 75 ** GRAZE: CA 19.4N; Dist. 88km in az.  43deg. [Lat = 29.57-0.83(E.Long-16.31)]
24 May 15 18  4 33.7 r    1479 F2  6.4  6.2   52+  93  -6 74 217   2N  23 349   3 +3.5 -4.6 -3.5-8.1 .103  108.1     10  5 40.9  15 45 27 395.9 637.4
24 May 15 19 21 25.1 D    1485 G0  7.1  6.8   53+  93     61 249  88N 109  50  89 +3.2 -4.5 +2.0-1.5 .334   21.7     10  7 39.3  15  9 27 396.7 691.6
24 May 16 16 26 57.4 d    1576 A2  5.3  5.3   62+ 103  14 61 123  76S 127 176 106 +2.8 -3.7 +2.0-1.2 .329    2.2     10 49 15.4  10 32 43 398.3 636.5
   R1576 = 53 Leonis
24 May 19 18 26 35.2 d    1863 K0  7.8  7.2   87+ 137 -10 48 143  34S 168 200 147 -1.3 +0.5 +0.4-2.5 .295  -33.7     12 58 35.9 - 6 56 54 397.8 683.0
24 May 26  0 32  8.7 r  186672 G5  7.4  6.9   93- 150     32 173  68N 299 307 302 -5.1 +7.4 +2.5-0.7 .296  150.6     18 20 25.4 -29  3 59 378.7 624.3
24 May 27  2 12 54.6 R    2831kB2  6.0  6.1s  86- 137     34 183  78N 280 277 288 -4.9 +7.4 +2.8-0.4 .317  154.5     19 24 30.2 -27 51 57 375.3 639.6
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 May 29  1 23 27.6 r  190252 F2  7.2  7.0   68- 111     30 140  82N 262 299 279 -3.2 +6.4 +2.0+1.0 .381  164.5     21 21  3.2 -20 49 16 370.5 711.1
24 May 30  0 10 51.9 r    3265PK0  6.6  6.1   58-  99     12 115  24S 184 239 204 -2.2 +5.4 +1.1+3.9 .216 -116.6     22 14 38.2 -15 49  7 370.4 866.1
      3265 is double: AB 4.3 11.9 22.0"  65.0, dT = +49sec
24 May 31  7 23  8.5 r    3421cM3  4.9  4.1v  44-  83  43 46 220  30S 187 152 209 -2.1 +3.3 +0.1+2.5 .329 -139.0 .01 23 16 50.9 - 7 43 35 365.0 771.2
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Jun  3  2 12  4.1 r     253 F0  8.4  8.2   14-  45     10  83  72S 232 295 251 +2.0 -0.9 -0.1+1.6 .596 -172.4      1 42 50.0  11  5  9 367.31070.8
24 Jun  8 18 59 12.8 D    1088 A4  5.8  5.7S   6+  28     12 294  48S 130  66 123 +4.5 -6.1 -0.5-1.6 .523  -23.1      7 11 23.1  26 51 24 385.21062.7
   R1088 = 47 Geminorum
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1088 = NSV 17371, 5.77, , Type DSCT:
24 Jun  8 19 25 43.4 d   79165 A2  9.2  9.1    6+  28      7 297  57N  56 354  49 +4.6 -6.0 +0.4+0.1 .371   51.1      7 12 33.2  27  5 45 385.81106.1
24 Jun  9 18 54 27.1 d    1226cK0  9.0  8.5   12+  40     23 287  80N  87  19  75 +4.4 -5.8 +0.5-0.9 .454   27.8      8  8  6.1  24 42 55 388.7 967.0
      1226 is double: ** 9.9 9.9 0.10"  90.0, dT = +0.22sec
      1226 has been reported as non-instantaneous (OCc 159). Observations are highly desired
24 Jun 10 20 34 50.6 d   80604 K0  8.4  7.8   19+  52     11 288  50S 144  80 128 +3.8 -5.1 -0.5-1.9 .482  -27.2      9  3 35.3  20 33 16 394.71037.2
24 Jun 11 19  5 35.6 d   98792wK2  7.8  7.0   27+  63     38 270  36N  54 347  35 +3.1 -4.4 +3.8+1.7 .134   71.9      9 49 52.8  16 50 18 395.4 825.4
     98792 is double: AB 7.9 11.1 25.3" 320.7, dT = -10sec
24 Jun 11 19  6 22.4 d   98799dG0  8.9        27+  63     38 269  78S 120  53 101 +3.1 -4.4 +0.7-1.8 .428    5.5      9 49 57.9  16 33 36 395.4 825.4
     98799 is double: AB 9.01 10.63 0.98" 327.2, dT = -2sec
     98799 is a close double. Observations are highly desired
24 Jun 11 19 57 56.5 d    1450 K0  8.0  7.3   27+  63     26 275  72S 126  60 108 +3.0 -4.3 +0.3-1.8 .466   -3.2      9 51 13.7  16 19 12 396.6 896.8
24 Jun 12 19 20 18.6 D   99198WK2  7.3  6.6   36+  74     42 260  61N  82  20  61 +2.1 -3.4 +2.1-0.8 .274   47.0     10 36  6.7  11 36 52 397.9 775.8
     99198 is double: AB 7.4 9.7 60" 330.4, dT = -80sec
24 Jun 14 19 55 47   m  119176kK2  8.0  7.2   56+  96     44 239  18N  41 352  19 -0.5 -0.8 +9.9+9.9 .000   90.0     12  2 21.3   0 33 49 399.6 701.6
24 Jun 14 19 57 27.3 d    1737WA2  7.8  7.6   56+  96     44 239  43S 160 111 138 -0.5 -0.8 +0.7-2.8 .315  -29.4     12  1 57.0   0  6  8 399.6 702.0
      1737 is double: AB 7.8 8.5 73" 175.7, dT = +222sec
24 Jun 19 18 28 57.3 D    2269cB5  5.4  5.4   94+ 152  -7 26 143  56N  60  96  49 -4.6 +5.5 +3.5+2.8 .202   59.4     15 53 53.9 -24 31 59 387.0 744.5
24 Jun 23 21 24 35.3 R    2914cG8  4.8  4.4   95- 155     17 134  62N 298 343 310 -3.3 +7.1 +1.1+0.0 .348  144.5     19 58 57.2 -26 11 45 372.0 771.3
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Jun 25  3 26  3   D    3089SA0  5.3  5.3   88- 140  -7 35 208  14N 335 308 351 -3.2 +6.1 +9.9+9.9 .062   81.6     21  8 33.6 -21 11 37 367.5 750.6
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +122sec : AF 5.3 13.0 9.7"  14.0, dT = +122sec : AG 5.3 20.0 13.1"  62.0, dT = +9sec : AC 5.3
15.0 35" 114.8, dT = -436sec
      3089 is a close double. Observations are highly desired
   Distance of 3089 to Terminator = 18.5"; to 3km sunlit peak = 5.7"
24 Jun 25  3 31 37   Gr   3089SA0  5.3  5.3   88- 140  -6 33 ** GRAZE: CA 22.5N; Dist. 22km in az. 317deg. [Lat = 28.75+0.83(E.Long-16.31)]
24 Jun 25  3 36 55   R    3089SA0  5.3  5.3   88- 140  -5 34 211  31N 318 289 334 -3.2 +6.1 +9.9+9.9 .062   98.4     21  8 33.6 -21 11 37 367.6 761.4
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = -86sec : AF 5.3 13.0 9.7"  14.0, dT = -86sec : AG 5.3 20.0 13.1"  62.0, dT = +52sec : AC 5.3
15.0 35" 114.8, dT = +515sec
      3089 is a close double. Observations are highly desired
24 Jun 27  1  9 11.4 r  165373 K0  7.7  7.1   71- 114     39 134  44N 295 335 316 -0.5 +4.1 +3.1-0.4 .210  119.7     22 54 30.0 -10 17 59 365.3 751.8
24 Jun 29  1 55  4.5 R      81 K4  6.4  5.7   48-  87     39 111  78S 235 291 257 +1.7 +0.8 +1.1+1.8 .468  176.4      0 37 30.5   3  8  7 366.0 833.1
24 Jun 29  2 17 17.6 r  109348kG2  7.3  7.0s  48-  87     43 114   7S 164 217 186 +1.6 +0.8 -1.2+4.5 .182 -113.4      0 39 13.3   3  8  2 365.7 812.0
    109348 = NSV 242, 7.30 to 7.35, V
24 Jun 29  3 38 10.5 r  109355pG5  7.7  7.1   47-  87  -5 58 136  83S 240 278 262 +1.4 +0.6 +1.8+1.5 .414  167.0      0 39 46.9   3 39 10 364.7 751.3
    109355 is double: ** 9.1 9.1 0.10"  90.0, dT = +0.21sec
    109355 has been reported as non-instantaneous (OCc1143). Observations are highly desired
24 Jul  1  2 11  1   Gr    347 K0  7.9  7.4   26-  61     29 ** GRAZE: CA 14.9N; Dist. 40km in az. 319deg. [Lat = 28.95+0.75(E.Long-16.31)]
24 Jul  1  2 15 20   r     347 K0  7.9  7.4   26-  61     28  86  25N 317  24 335 +3.5 -2.4 +4.8-4.3 .089   99.6      2 21 50.3  16  9 45 369.7 954.7
24 Jul  1  2 32  1.0 r   92903cF5  8.2  7.9   26-  61     32  88  84N 259 325 276 +3.5 -2.4 +0.8+1.3 .481  157.8      2 22  0.5  15 59 30 369.4 930.0
     92903 is double: ** 8.9 8.9 0.050"
     92903 has been reported as non-instantaneous (OCc1183). Observations are highly desired
24 Jul  2  1 16 23   M     472cA1  4.9  4.9   17-  48      7  70  13N 334  37 348 +4.3 -3.6 +9.9+9.9 .000   90.0      3 14 54.1  21  2 40 373.91124.7
   R472 = zeta Arietis
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       472 is double: ** 5.8 5.8 0.10"  96.0
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul  2  1 25 50.2 r   75815 K0  8.3  7.7   17-  48      9  71  32S 199 262 213 +4.3 -3.6 -0.7+2.2 .433 -135.1      3 15 28.3  20 33 31 373.71109.0
24 Jul  2  1 46 24.0 r   75820 A0  8.1  8.0   17-  48     13  73  54S 221 286 235 +4.3 -3.7 -0.4+1.7 .552 -158.0      3 15 53.3  20 42  8 373.31076.7
24 Jul  2  3 40 50   m     486CB5  5.3     e  16-  47  -5 37  84 -18S 150 220 163 +4.3 -3.9 +9.9+9.9 .000  -90.0      3 21 13.6  21  8 49 371.1 903.9
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.3
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  62%
24 Jul  4  3  3 58.2 r   77070cG5  8.9  8.3    4-  22 -12  9  64  47S 233 296 237 +5.5 -5.6 -0.5+1.5 .558 -158.7      5 16 25.3  27  6 29 379.51102.4
     77070 is double: ** 9.4 9.4 0.10"  50.0, dT = +0.18sec
     77070 has been reported as non-instantaneous (OCc 705). Observations are highly desired
24 Jul 10 19 13  3.4 D  118636 K0  7.3  6.7s  21+  55     23 266  71S 131  69 110 +1.0 -2.2 +0.4-2.0 .442   -6.1     11  3 41.3   7 34 55 400.4 864.2
    118636 = NSV 18595, 7.38 to 7.43, Hp
24 Jul 10 20  6 31.8 D    1609SF2  4.6  4.5   22+  56     12 272  65S 137  75 116 +0.9 -2.1 +0.0-2.0 .466  -15.1     11  5  1.0   7 20 10 401.7 939.8
   R1609 = chi Leonis
      1609 is quadruple: AB 4.7 11.0 5.1" 271.1, dT = -8sec : AC 4.7 10.6 252" 310.7, dT = -537sec : AD 4.7 11.7 287" 298.0, dT = -582sec
      1609 is a close double. Observations are highly desired
24 Jul 12 21  2 51.8 d    1795cK3  6.9  6.1   39+  78     11 259  84S 119  59  97 -1.9 +0.6 +0.5-1.8 .441    0.8     12 30 50.3 - 4  3 39 403.0 861.9
24 Jul 13 17 25 28.1 d    1886cK3  5.6  5.0   48+  88    5 51 199  42S 160 143 139 -2.4 +1.6 +1.1-2.6 .291  -27.1     13  8 32.5 - 8 59  4 398.2 631.3
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.12sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Jul 14 18 46  8.5 d    1992cF0  7.5     S  58+  99 -11 42 209  22S 178 152 159 -3.9 +3.1 +0.5-3.5 .203  -51.6     13 53 51.7 -14 39 51 396.4 628.4
      1992 is double: AB 7.85 8.92 0.28" 323.4, dT = -1.1sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
24 Jul 15 19 55 19   m    2099 K0  6.9  6.2   68+ 111     35 213  12N  28 358  12 -5.1 +4.5 +9.9+9.9 .000   90.0     14 42 45.1 -19 18 42 393.2 631.1
24 Jul 16 19  1 59.1 D  183548 M4  6.8  6.0v  76+ 122     38 184  26S 165 161 152 -5.5 +5.5 +1.1-2.7 .221  -47.5     15 32 15.1 -23 52 49 388.7 615.4
    183548 = GG Lib, 6.868, range 0.23, 6w, Type SR:, Period 35.65 days, Phase  72%
24 Jul 18 19 51  7.1 d    2519 M0  7.3  6.4v  92+ 146     32 168  33S 141 153 139 -5.8 +7.1 +1.8-1.4 .264  -40.5     17 28 27.6 -29  3 31 378.6 636.7
      2519 = V2372 Oph, 7.31 to 7.4, Hp, Type LB
24 Jul 19 20 25 40.0 d    2688 G6  7.0  6.6s  97+ 159     30 162  51S 111 129 114 -5.4 +7.4 +2.2-0.2 .338  -20.5     18 32 14.0 -29 11 25 373.5 654.2
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Jul 21 23 29 37.5 r    3018 G8  6.4  6.0   99- 171     38 178  51S 252 254 266 -3.6 +6.6 +2.3+0.5 .385  170.8     20 40 11.8 -23 46 26 364.2 688.5
   Distance of 3018 to Terminator = 6.9"; to 3km sunlit peak = 0.2"
24 Jul 25 22 13 31.3 r  109126 G5  7.2  6.5   74- 118     17  99  72S 230 290 252 +2.5 +1.3 +0.4+1.8 .537 -172.2      0 18  3.6   0 37  0 364.6 957.7
24 Jul 26  1 45 48.2 r  109182 G0  7.8  7.4   73- 117     58 142  19S 177 210 198 +2.2 +0.8 -0.2+3.4 .273 -129.3      0 24 17.3   1 33 22 361.4 754.6
24 Jul 26  3  1 33.7 R      50dG5  5.8  5.3S  72- 117     64 178  43S 200 201 222 +2.0 +0.6 +0.8+2.4 .376 -153.7      0 25 24.2   1 56 23 361.2 734.8
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Jul 27  2 24 29.7 r  109763cG5  8.1  7.6   61- 103     62 130  78N 260 303 280 +3.3 -0.9 +2.3+1.0 .366  148.4      1 15 37.1   8 46  5 363.5 757.5
24 Jul 28  1 14 44.9 r     309 F0  8.2  8.0V  50-  90     41  95  81S 241 306 260 +4.5 -2.3 +0.9+1.7 .483  172.5      2  6 41.6  14 35  2 367.6 868.9
       309 = HD 12899, 8.20, , Type DSCTC
24 Jul 28  3 16 29.6 r   92820 K2  8.2  7.6   50-  90     66 119  41S 201 254 219 +4.3 -2.6 +0.6+2.8 .363 -150.0      2 10 15.7  15  1 23 366.2 744.2
24 Jul 28  3 38 14.7 r   92821 K0  8.1  7.3   50-  89  -8 70 128  55S 216 261 234 +4.2 -2.7 +1.2+2.3 .396 -164.8      2 10 29.4  15  9  5 366.1 728.6
24 Jul 29  0  5  3   m     439cF0  7.3  7.1   40-  78     17  76  13N 331  37 346 +5.4 -3.5 +9.9+9.9 .000   90.0      2 59 10.4  19 59 23 373.01039.6
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       439 is double: ** 8.2 9.8 0.11" 275.8
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Jul 29  2 28 57.1 r   75708 K0  8.0  7.1   39-  77     48  90  83N 262 331 276 +5.2 -3.9 +1.4+1.2 .419  155.2      3  3  9.6  20 20 10 370.4 830.4
24 Jul 29  3 41 22   m     452 A2  7.7  7.6   38-  76  -8 64 100  19N 326  34 341 +5.1 -4.1 +9.9+9.9 .000   90.0      3  5 30.3  20 54  9 369.6 748.6
24 Jul 30  1 27 26.9 R   76358kB9  7.2  7.2   28-  64     25  75  64S 235 303 245 +5.9 -4.8 +0.0+1.7 .530 -170.0      3 58 20.9  24  4 52 375.8 981.3
24 Jul 31  2 25 48   Gr    746WB7  7.0  6.9   19-  51     27 ** GRAZE: CA 17.1N; Dist. 17km in az. 141deg. [Lat = 28.28+0.70(E.Long-16.31)]
24 Jul 31  2 26  1   M     746WB7  7.0  6.9   19-  51     26  72  17N 341  51 346 +6.3 -5.7 +9.9+9.9 .000   90.0      4 59 53.7  27 19 32 379.3 954.7
       746 is double: AB 7.0 8.7 20.4" 206.0
24 Aug  1  2  1 45.5 r   77777 B9  8.6  8.4   11-  39     11  64  59N 307  11 307 +6.4 -6.1 +0.6-0.2 .378  131.6      5 58  7.4  28 11 13 384.41061.5
24 Aug  1  2 56 11.0 R   77818 K5  6.7  5.8   11-  39     21  69  83S 269 337 268 +6.4 -6.2 +0.3+0.9 .511  169.1      6  0  4.9  28  7 33 383.4 968.2
24 Aug  2  2 28 19.4 r   78917 M0  8.3  7.5    6-  27      5  61  60N 316  16 310 +6.3 -6.2 +0.5-0.5 .373  130.5      6 58 11.0  27 38 13 388.51082.3
24 Aug  2  2 48 10.7 r   78934 F0  9.6  9.4    5-  27      8  63  33S 228 290 222 +6.3 -6.2 -0.7+1.9 .440 -142.2      6 58 58.7  27 17 47 388.21048.2
24 Aug  2  3  1 15.7 r X 96338     9.8  9.4v   5-  27     11  64  45N 330  34 324 +6.3 -6.3 +1.4-1.8 .234  115.4      6 59 48.4  27 41 59 387.91026.0
   X 96338 = V0417 Gem, 9.80 to 9.92, V, Type EW, Period 0.328532 days, Phase  38%
24 Aug  2  3 22 22.0 r X 10224 F8  9.3  9.0    5-  27 -12 15  67  66S 262 327 256 +6.3 -6.3 +0.0+1.1 .525 -175.8      7  0  4.8  27 27 10 387.6 988.8
24 Aug  2  3 24 39.6 r   78962SG0  9.1         5-  27 -11 15  67  14S 209 275 203 +6.3 -6.3 -1.1+3.2 .289 -123.5      7  0 45.1  27 16  4 387.5 985.3
     78962 is triple: AB 9.80 9.89 0.25"  23.7, dT = +0.9sec : AB,C 9.1 13.9 31"   1.2, dT = +96sec
     78962 is a close double. Observations are highly desired
24 Aug  2  3 53  5.2 r   78976wA0  8.2  8.1    5-  27  -6 21  69  44S 240 308 234 +6.3 -6.3 -0.1+1.8 .448 -154.0      7  1 24.5  27 22 49 387.0 935.6
     78976 is double: AB 8.1 12.0 30" 248.0, dT = -66sec
24 Aug  7  9 16 32.8 D    1644 B9  4.1  4.1    8+  33  63 30 100  80N 100 161  79 +2.1 -2.2 +1.2+0.6 .367   22.5     11 21  8.2   6  1 46 400.7 772.7
   R1644 = Shang Tseang = sigma Leo
24 Aug  7 10 28 14.9 r    1644 B9  4.1  4.1    8+  34  76 45 112 -50N 330  25 309 +1.9 -2.1 +1.1-1.8 .333  157.6     11 21  8.2   6  1 46 399.5 698.1
   R1644 = Shang Tseang = sigma Leo
24 Aug 13 17 16 50.4 d    2298kK3  5.0  4.3   61+ 102   3 36 177  85S 105 108  94 -6.3 +6.3 +2.6-0.4 .319    9.6     16  3 20.6 -25 51 55 389.2 610.2
24 Aug 13 18 52 27.4 r    2298kK3  5.0  4.3   61+ 103     32 202 -73N 297 275 287 -6.7 +6.4 +2.5-1.3 .318  170.1     16  3 20.6 -25 51 55 389.2 609.4
24 Aug 13 20 55  3.1 D    2312 M2  5.4  4.5s  62+ 104     17 226  48S 142  97 132 -7.1 +6.4 +2.1-2.7 .269  -44.5 .02 16  8  7.6 -26 19 36 390.3 714.3
      2312 = NSV 20513, 5.35, range 0.00, 8V, Type VAR, Period 7.61267 days
24 Aug 14 18 17 25.7 d  184914 K2  7.5  6.9   71+ 115 -10 33 179  48S 135 136 129 -6.8 +7.1 +2.2-1.3 .278  -31.7     17  1  3.3 -28 33 11 383.8 608.5
24 Aug 14 18 22 48.5 d    2444kA0  7.6  7.6   71+ 115 -11 33 180  10S 173 173 168 -6.8 +7.1 +1.0-5.0 .108  -70.6     17  0 28.9 -28 38  4 383.7 607.3
24 Aug 14 20 25 59.1 D    2453 K1  6.6  6.2   71+ 115     26 209  66S 117  87 112 -7.3 +7.1 +2.4-1.5 .318  -24.4     17  4 27.8 -28 34 58 383.9 650.2
24 Aug 15 18 30 28.6 d  186109 A0  7.6  7.6   80+ 127     31 168  23S 152 164 152 -6.7 +7.5 +1.8-2.3 .185  -57.4     18  1 26.7 -29 35 17 377.9 630.2
24 Aug 15 20 48 40.1 d  186256 A2  7.3  7.3   81+ 128     29 201  81N  76  54  77 -7.2 +7.5 +2.2-0.1 .354    7.5     18  5 40.2 -29 16 39 377.6 653.1
24 Aug 15 20 48 53.0 D    2609SG0  4.7  4.3V  81+ 128     28 201  20S 155 133 156 -7.2 +7.5 +4.4-5.1 .113  -71.5 .01 18  5  1.2 -29 34 48 377.6 653.7
   R2609 = W Sagittarii
      2609 is multiple: Aa,Ab 4.7      0.29" 259.6, dT = -0.6sec : AD 4.7 16.1 6.3" 341.0, dT = -55sec : AE 4.7 16.4 19.0"  46.0, dT = -55sec : AB
4.8 13.5 34" 231.7, dT = +69sec
      2609 is a close double. Observations are highly desired
      2609 = W Sgr, 4.28 to 5.10, V, Type DCEP, Period 7.594984 days, Phase  93%
24 Aug 15 21  2 52   Gr   2609SG0  4.7  4.3V  81+ 128     27 ** GRAZE: CA  2.4S; Dist.124km in az. 150deg. [Lat = 27.19+0.51(E.Long-16.31)]
   Distance of 2609 to Terminator = 6.7"; to 3km sunlit peak = 0.0"
24 Aug 16 20 22 21.2 D    2788 K3  6.1  5.2   88+ 140     33 180  50S 116 115 122 -6.4 +7.5 +2.9-0.9 .282  -38.0     19  7 30.8 -28 38 12 371.3 644.4
24 Aug 18 23 34 36.6 D    3106 K0  5.2  4.6   99+ 168     38 202  80N  41  20  57 -4.3 +5.9 +1.2+1.0 .418   14.9     21 15 37.9 -20 39  6 360.5 755.5
   R3106 = phi Capricorni
24 Aug 19  1  8 13.3 d    3116 K0  6.6  6.1   99+ 168     27 224  76S  64  23  81 -4.5 +5.7 +1.1+0.1 .480   -8.4     21 18 26.1 -20 20  8 361.2 850.6
   Distance of 3116 to Terminator = 18.0"; to 3km sunlit peak = 7.3"
24 Aug 21  1 43  7.7 r    3404PG0  7.3  7.0   98- 162     47 216  63S 227 196 249 -0.8 +2.8 +1.3+1.0 .462 -179.2     23 10 24.7 - 7 48 43 355.5 796.0
      3404 is double: AB 5.9 10.7 42" 256.0, dT = -79sec
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 21  4  5 33   M Saturn      0.7  0.7   97- 161  -6 24 247 -19S 142  89 165 -1.0 +2.5 +9.9+9.9 .000  -90.0     23 15 39.0 - 7  6 51 357.6 938.5
24 Aug 21  4  5 54   GrSaturn      0.7  0.7   97- 161  -5 22 ** GRAZE: CA-20.1S; Dist.108km in az. 337deg. [Lat = 29.53+0.37(E.Long-16.31)]
24 Aug 21 21 51 25.3 r    3528 F0  7.5  7.3v  93- 150     37 117  28S 187 239 209 +1.6 +1.7 +0.3+2.8 .340 -134.2     23 59 35.0 - 1 51  0 356.8 843.7
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Aug 22  2 13 24.0 R       4 G9  6.3  5.7   92- 148     56 216  50S 208 177 230 +1.1 +1.0 +1.0+1.8 .422 -160.3      0  5  3.8 - 0 30 11 355.6 772.8
24 Aug 23  2 34 19.0 R     132kG5  6.7  6.2   85- 134     66 210  78S 235 209 256 +2.8 -0.8 +1.8+1.1 .426  173.6      0 58 19.5   6 50 40 357.2 743.5
24 Aug 23  5 50 31.3 r     146cK0  4.3  3.8   84- 132  17 30 263  67N 270 208 291 +2.4 -1.2 +1.1-1.0 .431  149.2      1  2 56.6   7 53 24 360.2 876.8
   R146 = epsilon Piscium
24 Aug 24  4  0 20.8 r     285 G5  7.5  6.9   75- 119  -7 66 237  37S 196 147 215 +4.1 -2.7 +1.0+2.9 .322 -141.5      1 54 47.2  13 45 25 360.8 719.1
24 Aug 25  2 26 56.7 r X 63427D    8.2  7.8S  64- 106     73 119  77N 265 320 281 +5.7 -4.0 +2.5+0.6 .353  149.8      2 47 27.2  19 22 21 364.5 723.0
   X 63427 is double: BA 8.3 7.5 3.6" 126.4, dT = +8sec
   X 63427 is a close double. Observations are highly desired
   X 63427 = NSV 15579, 6.89, , Type VAR:
24 Aug 25  2 27  2.7 R     411SG0  7.0     S  64- 106     73 119  77N 265 319 281 +5.7 -4.0 +2.5+0.6 .354  150.0      2 47 27.4  19 22 19 364.5 722.9
       411 is triple: AB 7.52 8.25 3.58" 306.4, dT = -8sec : AC 7.5 13.0 96"  25.3, dT = +138sec
       411 is a close double. Observations are highly desired
       411 = NSV 15579, 6.89, , Type VAR:
24 Aug 26  1 32 52.7 r   76103SA9  7.9  7.8S  53-  94     52  87  85S 252 326 264 +6.8 -5.0 +1.3+1.4 .438  168.2      3 43 41.5  23 38 57 370.1 802.9
     76103 is triple: Aa,Ab 7.9 8.9      251.5, dT = +0.27sec : AB 8.0 9.6 197" 175.1, dT = -100sec
     76103 is a close double. Observations are highly desired
     76103 = NSV 15745, 7.92, , Type VAR:
24 Aug 26  1 51 51.5 D     545SB6  4.1  4.2v  53-  94     56  88 -70N  57 131  69 +6.7 -5.0 +1.1+1.8 .434    3.5      3 46 19.6  23 56 54 369.9 780.8
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.41sec : AB 4.2 14.4 110" 180.2, dT = -139sec : AC 4.2 12.9 147" 336.0, dT = +53sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Aug 26  1 53 29   Gr    537SB6  3.7  3.8s  53-  93     58 ** GRAZE: CA 17.5N; Dist.370km in az. 138deg. [Lat = 23.98+0.79(E.Long-16.31)]
24 Aug 26  2 35 40.3 D     552SB7  2.9  2.9s  53-  93     65  93 -69N  56 130  67 +6.6 -5.1 +1.4+1.9 .407    5.0      3 47 29.1  24  6 18 369.5 731.6
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.07sec : AE 2.8 15.0 78" 232.4, dT = -192sec : AB 2.8 6.3 118"
291.1, dT = -165sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Aug 26  2 37 54.8 r   76145pA3  8.1  8.0   53-  93     66  94  61N 286   0 298 +6.6 -5.1 +2.9-0.3 .285  134.5      3 45 26.1  24  2  7 369.5 728.5
     76145 is triple: AB 8.1 13.6 123" 356.9, dT = -142sec : AC 8.1 15.0 139" 136.9, dT = +419sec
24 Aug 26  2 55 51   gr    546pA0  7.3  7.3   53-  93     70  96  16N 331  45 343 +6.6 -5.2 +9.9+9.9 .000   90.0      3 46 27.3  24 15 18 369.4 711.8
       546 is triple: Aa,Ab 7.3      0.20" 157.6 : AB 7.3 14.8 119"  34.8
       546 is a close double. Observations are highly desired
24 Aug 26  2 55 51   Gr    546pA0  7.3  7.3   53-  93     71 ** GRAZE: CA 16.1N; Dist.  0km in az. 143deg. [Lat = 28.47+0.65(E.Long-16.31)]
24 Aug 26  2 56 12.4 r   76158pA0  7.9  7.8s  53-  93     70  97  73N 274 347 286 +6.6 -5.2 +2.6+0.3 .333  147.0      3 45 51.6  24  2 20 369.4 711.1
     76158 is double: AB 7.9 14.5 164" 321.1, dT = -335sec
     76158 = NSV 15764, 7.9 to 8.0, pg, Type VAR:
24 Aug 26  3  2  7.9 r   76167SK2  7.6  7.0S  53-  93     71  98  41N 306  19 317 +6.5 -5.2 +4.6-2.7 .169  115.3      3 46 13.7  24 11 48 369.4 706.1
     76167 is triple: CD 7.7 12.9 18.3"   4.6, dT = -56sec : C,AB 7.7 8.1 39" 128.3, dT = +231sec
     76167 = NSV 15768, 7.7,
24 Aug 26  3  5 44.6 r   76169pA3  8.1  7.9   53-  93     72  99  46N 301  14 313 +6.5 -5.2 +4.1-2.0 .197  120.1      3 46 16.0  24 11 24 369.4 702.9
     76169 is triple: AB 8.1 9.4 1.1" 178.4, dT = +2.9sec : AB,C 8.1 7.7 39" 308.3, dT = -197sec
     76169 has been reported as non-instantaneous (S   437). Observations are highly desired
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Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 26  3 10 17.7 R     545SB6  4.1  4.2v  53-  93     73 101  77S 245 316 256 +6.5 -5.2 +1.9+1.5 .390  176.9      3 46 19.6  23 56 54 369.3 699.0
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.5sec : AB 4.2 14.4 110" 180.2, dT = -123sec : AC 4.2 12.9 147" 336.0, dT = +10sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Aug 26  3 12 41.3 R     550pA1  7.0  7.0   53-  93     73 101  18S 185 256 197 +6.5 -5.2 -0.2+4.8 .214 -123.4      3 47 21.0  23 48 12 369.3 697.2
       550 is double: AB 7.1 14.0 29.8" 276.8, dT = +4sec
24 Aug 26  3 34 56.6 d     561SB7  5.1  5.1V  53-  93     78 107 -77S  91 158 102 +6.4 -5.3 +2.7+0.3 .335  -28.2      3 49 11.2  24  8 12 369.3 680.9
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.48sec : AF 5.0 14.5 4.7" 221.0, dT = -9sec : AE 5.1 14.8 96"  76.8, dT = +279sec : AD 5.1
14.7 144"  65.9, dT = +389sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  47%
24 Aug 26  3 36 11.6 R     551SB9  7.3  7.3   53-  93     78 109  45S 212 278 224 +6.4 -5.3 +1.3+2.8 .328 -149.8      3 47 24.4  23 54 53 369.3 679.9
       551 is triple: AB 7.3 9.4 5.8" 262.8, dT = -11sec : AC 7.3 13.9 55" 178.2, dT = -139sec
       551 is a close double. Observations are highly desired
24 Aug 26  3 36 49.5 D     560SB8  3.6  3.7s  53-  93     78 108 -57S 110 177 122 +6.4 -5.3 +3.4-1.0 .257  -47.4      3 49  9.7  24  3 12 369.3 679.6
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.004" 250.6, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.2, dT = -0.6sec : AC 3.6 15.0 50"  36.5, dT = +55sec : AH
3.6 16.0 68" 221.7, dT = -98sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Aug 26  3 54 20.5 r   76191PA7  8.2  8.1v  52-  93  -8 82 120  89N 258 315 269 +6.4 -5.3 +2.4+0.8 .361  165.1      3 47 19.3  24  8 21 369.3 669.1
     76191 is quadruple: CD 8.2 8.7 55" 225.1, dT = -127sec : CB 8.2 6.3 86" 165.0, dT = +13sec : CA 8.2 2.8 182" 133.1, dT = +289sec
     76191 = V0647 Tau, 8.25 to 8.3, V, Type ACV, Period 1.8526 days, Phase  37%
24 Aug 26  3 54 25.7 R     549SA0  6.3  6.3   52-  93  -8 82 120  86S 253 310 264 +6.4 -5.3 +2.3+1.0 .368  170.2      3 47 21.0  24  6 59 369.3 669.1
   R549 = 24 Tauri
       549 is multiple: AB              109.9, dT = -22sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = -126sec : BC 6.3 8.2 86" 345.0, dT =
+8sec
24 Aug 26  3 58 31.3 R     552SB7  2.9  2.9s  52-  93  -8 83 124  80S 248 301 259 +6.4 -5.3 +2.2+1.2 .371  175.5      3 47 29.1  24  6 18 369.3 666.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6           : AB     1.6 0.031" 207.1, dT = -0.06sec : AE 2.8 15.0 78" 232.4, dT = -203sec : AB 2.8 6.3 118"
291.1, dT = -231sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Aug 26  4  0 19.5 R     553pA0  6.8  6.8e  52-  93  -7 83 125  61N 287 339 298 +6.4 -5.3 +3.2-0.9 .272  137.0      3 47 29.5  24 17 18 369.3 666.0
       553 is double: AB 6.8 15.5 95"  16.8, dT = +1.7sec
       553 = V1229 Tau, 6.83 to 6.94, V, Type EA, Period 2.46113408 days, Phase  30%
24 Aug 26  4 37 27.9 R     560SB8  3.6  3.7s  52-  93   1 85 213  31S 198 166 209 +6.2 -5.4 +1.2+4.0 .245 -132.3      3 49  9.7  24  3 12 369.4 652.5
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.004" 250.6, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.2, dT = +0.7sec : AC 3.6 15.0 50"  36.5, dT = +193sec :
AH 3.6 16.0 68" 221.7, dT = -256sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Aug 26  4 53 28.2 r     561SB7  5.1  5.1V  52-  93   4 83 238  51S 218 163 229 +6.2 -5.4 +1.9+2.4 .318 -151.4      3 49 11.2  24  8 12 369.5 650.0
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.6sec : AF 5.0 14.5 4.7" 221.0, dT = -15sec : AE 5.1 14.8 96"  76.8, dT = +236sec : AD 5.1
14.7 144"  65.9, dT = +400sec
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Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  47%
24 Aug 27  4 19  0.9 r   76764cG8  7.9  7.2   41-  80  -3 76  92  29S 203 284 209 +6.9 -6.1 +1.0+4.1 .241 -131.8      4 48 20.4  26 57 59 374.3 655.5
     76764 is double: ** 8.6 8.6 0.10" 160.0, dT = -0.3sec
     76764 has been reported as non-instantaneous (OCc 736). Observations are highly desired
24 Aug 28  2 28 44.9 r   77495cA0  8.1  8.1   31-  68     41  76  58S 239 314 240 +7.5 -6.4 +0.6+1.9 .422 -163.0      5 44 59.0  28 11 40 380.6 814.6
     77495 is double: AB 8.0 8.0 0.20"  43.4, dT = +0.46sec
     77495 is a close double. Observations are highly desired
24 Aug 28  2 37 17.1 r   77498 A5  8.4  8.3   31-  68     43  76  68S 249 325 250 +7.5 -6.4 +0.8+1.6 .432 -173.4      5 45  9.6  28 15 10 380.5 801.7
24 Aug 28  3 37 51.5 r   77551cB9  8.3  8.2   31-  68     55  80  48N 313  34 314 +7.4 -6.5 +3.1-2.0 .218  124.0      5 47 14.3  28 37 26 379.7 718.7
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = +1.6sec
     77551 is a close double. Observations are highly desired
24 Aug 29  0 49 47   Gr   1026SG5  6.5  5.9   23-  57     11 ** GRAZE: CA 13.6N; Dist.113km in az. 326deg. [Lat = 29.70+0.58(E.Long-16.31)]
24 Aug 29  0 57 24.7 R    1026SG5  6.5  5.9   23-  57     11  64  33N 335  39 331 +7.6 -6.4 +2.0-2.8 .175  108.7      6 41 20.9  28 11 48 387.61027.3
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = -51sec : AC 6.6 12.8 58"  61.4, dT = -20sec
24 Aug 31  3 29 36.6 r   80288pK5  8.6  8.2v   8-  32     18  73  78N 304  10 290 +6.5 -5.8 +0.7-0.2 .422  154.7      8 36 55.8  23 14 49 394.6 894.1
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = -4sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep  1  3 26 10.7 r   98567 A3  7.5  7.4    3-  21      6  72  80S 289 351 271 +5.7 -5.0 +0.1+0.4 .499  175.5      9 26 34.5  19  3 36 398.9 968.4
24 Sep  6 18 35  3   M    1925SB1  1.0  1.1v  11+  40      3 255   0N  24 324   4 -3.0 +2.8 +9.9+9.9 .000   90.0     13 25 11.6 -11  9 41 405.3 869.5
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0 : AC 1.0 10.5 368"  60.8
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  38%
24 Sep  8 19 20  1.6 D    2134SK4  5.9  5.2v  26+  62      6 242  59S 140  83 124 -5.7 +5.3 +1.2-2.5 .335  -35.3     14 57 28.0 -21 24 56 400.9 798.3
      2134 is multiple: AB 5.9 8.2 26.3" 307.7, dT = -77sec : AE 5.9 13.1 155" 349.1, dT = -404sec : AC 5.9 14.0 228" 353.8, dT = -563sec : AG 5.9
18.0 258" 316.0, dT = -769sec
      2134 = KX Lib, 5.72, range 0.04, V, Type BY
24 Sep  9 19 29 27.4 d  183802pA0  7.2        35+  73     11 233  63S 131  80 119 -6.8 +6.2 +1.6-2.2 .330  -32.6     15 48  3.3 -25 12 56 396.7 753.6
    183802 is double: AB 7.60 8.49 0.10"  94.1, dT = +0.24sec
    183802 is a close double. Observations are highly desired
24 Sep 10 19  3 23.7 D    2397 K1  6.5  5.9   45+  84     21 219  82N  90  51  83 -7.4 +7.0 +1.8-0.9 .355    3.4     16 41 37.6 -27 48 35 391.1 674.0
24 Sep 11 19 44 59   m    2538 K1  6.7  6.2   55+  96     21 216   7S 174 138 172 -7.9 +7.4 +9.9+9.9 .000  -90.0     17 39 20.4 -29 31 51 385.5 689.6
24 Sep 12 17 54 18.9 d  187053 F5  7.7  7.5   65+ 108     32 177  30S 144 146 148 -7.5 +7.6 +3.0-2.5 .170  -59.5     18 37 17.2 -29 28 27 378.9 614.6
24 Sep 14 18 24 37.4 d  189555 G1  7.2  6.9   85+ 134     33 154  46S 114 138 128 -6.0 +6.8 +2.6-0.3 .272  -45.2     20 40 22.3 -24  7  5 366.4 685.1
24 Sep 14 18 33 17.1 D    3018 G8  6.4  6.0   85+ 134     34 156  56N  36  59  50 -6.1 +6.8 +1.9+2.0 .327   31.6     20 40 11.8 -23 46 26 366.2 682.1
24 Sep 15 19 18 21.6 d  164567cK5  7.3  6.5   92+ 148     37 151  50S 104 131 122 -4.7 +5.7 +2.7+0.1 .295  -44.3     21 40 34.8 -18 53 44 360.4 720.2
    164567 is double:  7.1 7.6
24 Sep 15 23 21 52.3 d  164637 K2  7.5  6.8   93+ 149     33 221  42S 112  75 130 -5.3 +5.2 +3.2-2.3 .244  -59.0     21 46 27.4 -17 55 25 360.1 826.3
24 Sep 18 20  4 51.4 R      50dG5  5.8  5.3S  99- 169     35 109  76S 236 293 258 +1.2 +0.7 +0.9+1.7 .518  176.7      0 25 24.2   1 56 23 353.7 890.2
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
   Distance of 50 to Terminator = 15.7"; to 3km sunlit peak = 5.7"
24 Sep 20  0  5  6.3 r     209dA0  7.2  7.2   95- 153     72 165  88S 244 258 264 +2.9 -1.7 +2.0+1.1 .426  164.5      1 25 58.2  10 24 25 353.2 756.8
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Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       209 is double: AB 7.2 14.2 4.4" 127.3, dT = +5sec
       209 is a close double. Observations are highly desired
24 Sep 21  0  6  2.7 R     348cA2  6.8  6.7   88- 139     70 121  87S 246 298 263 +4.8 -3.4 +1.8+1.3 .429  167.0      2 22 33.2  16 52 13 356.8 761.9
       348 is double: ** 7.0 9.0
24 Sep 21 20 28  3.3 R     472cA1  4.9  4.9   80- 127     14  73  33S 195 260 209 +6.6 -4.2 -0.7+2.4 .411 -131.9      3 14 54.1  21  2 40 365.11089.5
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.04sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Sep 22  4 20 41.7 R     501pK0  6.2        78- 124  -6 62 266  38S 202 129 214 +5.7 -5.2 +1.8+3.2 .264 -131.4      3 28 26.6  22 48 14 362.8 703.8
   R501 = 66 Arietis
       501 is quadruple: Aa,Ab 6.0 7.4 0.18"  27.7, dT = +0.7sec : AB 6.2 10.4 0.65"  57.6, dT = +2sec : AC 6.2 12.5 144" 229.3, dT = -481sec
       501 is a close double. Observations are highly desired
24 Sep 22 23 24 51.2 r   76559 B9  7.8  7.7   69- 112     41  79  88S 257 331 266 +7.7 -5.6 +0.9+1.3 .479  168.2      4 20 30.4  25 49 39 368.7 875.5
24 Sep 23 23  1  7.7 R     797cB9  6.4  6.3e  58-  99     24  70  75N 281 351 284 +8.4 -6.2 +0.6+0.6 .470  152.3      5 20 59.3  27 57 26 376.0 967.8
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  44%
24 Sep 25  2 24 18   m   78431 B5  7.5  7.6   46-  86     54  79   9N 354  75 351 +8.3 -6.7 +9.9+9.9 .000   90.0      6 29 39.5  28 46 50 380.0 707.5
24 Sep 25  4 11 58.1 r   78461cA0  8.3  8.2   46-  85  -8 77  86  52S 236 322 232 +8.0 -6.8 +2.4+2.4 .273 -144.7      6 31 42.7  28 22 56 379.3 615.7
     78461 is double: AB 8.6 9.3 0.70"  74.1, dT = +2.4sec
     78461 is a close double. Observations are highly desired
24 Sep 26  1 52 14   Gr  79394cA2  8.0  7.9   36-  74     37 ** GRAZE: CA  9.7N; Dist. 13km in az. 336deg. [Lat = 28.61+0.40(E.Long-16.31)]
24 Sep 26  1 56 24   r   79394cA2  8.0  7.9   36-  74     36  76  17N 354  67 345 +8.3 -6.5 +9.9+9.9 .050   96.9      7 27 16.8  27 17 55 386.5 790.5
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.22sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Sep 26  2  9 13   Gr  79402 B8  7.3  6.9   36-  74     40 ** GRAZE: CA  9.2N; Dist. 54km in az. 337deg. [Lat = 29.00+0.36(E.Long-16.31)]
24 Sep 26  2 17 56   r   79402 B8  7.3  6.9   36-  74     41  77  23N 347  62 339 +8.3 -6.6 +4.3-7.9 .099  104.2      7 27 48.9  27 17 33 386.2 758.5
24 Sep 26  3 49 39.9 r   79431 K2  8.2  7.3   35-  73     60  85  62S 253 332 244 +8.0 -6.6 +2.0+1.7 .318 -156.4      7 29 32.0  26 55 43 385.1 648.3
24 Sep 26  6 48 36.5 d    1149SK5  4.1  3.3s  35-  72  26 81 262 -52N  63 345  54 +7.3 -6.5 +3.6+1.7 .222   48.0 .03  7 35 55.4  26 53 45 385.0 618.3
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.18sec : AB 4.1 13.2 57"  39.0, dT = +234sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Sep 26  7 47 17.4 R    1149SK5  4.1  3.3s  35-  72  38 68 272  29N 342 261 333 +7.1 -6.5 +0.4-4.2 .236  131.7 .03  7 35 55.4  26 53 45 385.5 664.0
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = -0.01sec : AB 4.1 13.2 57"  39.0, dT = -130sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Sep 27  0 55 56.2 r   80089 G5  7.2  6.7   27-  63     12  69  45S 241 305 228 +7.9 -6.0 -0.4+1.9 .408 -145.0      8 19  9.2  24 10 29 393.3 949.8
24 Sep 27  3 56 24.7 r   80171WK0  8.7  8.0   26-  61 -12 50  85  35N 342  56 329 +7.6 -6.1 +2.3-4.1 .188  121.6      8 25 18.2  24 21  0 390.4 679.2
     80171 is double: AB 8.7 10.4 29.1" 216.3, dT = +89sec
24 Sep 27  4  2 43.8 R   80165 F2  7.5  7.3   26-  61 -10 51  86  37S 233 307 220 +7.5 -6.1 +1.6+3.6 .224 -129.2      8 24 55.2  23 56 43 390.3 672.6
24 Sep 28  1 49 45.0 r   80684kG   8.7  8.4   18-  51     12  73  78S 279 342 262 +7.1 -5.3 +0.2+0.7 .478 -175.8      9 11 45.2  20 25 39 397.4 923.4
24 Sep 29  2 22 52.0 r   98892dK0  7.7  7.1   11-  39      7  76  61N 323  26 304 +6.0 -4.3 +0.5-1.0 .394  144.8     10  0 31.6  15 51 51 401.0 938.2
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +19sec
24 Sep 29  3  0 19.4 R   98897 K0  7.6  7.0   11-  39     15  80  89S 294 358 275 +6.0 -4.3 +0.5+0.2 .451  175.8     10  1 20.7  15 40 14 400.2 877.1
24 Sep 29  3 19 16.0 r   98907 F8  8.5  8.3   11-  39     19  83  25S 230 294 211 +6.0 -4.3 +0.1+4.2 .212 -119.0     10  2  3.1  15 21 38 399.8 848.0
24 Sep 30  3 45 58.3 R   99296kA3  8.0  7.9v   6-  28     14  85  44N 343  46 322 +4.7 -3.1 +0.6-2.2 .301  132.0     10 47 46.5  10 26 37 402.7 879.2
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  80%
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct  6 18 12 39.9 d  183548 M4  6.8  6.0v  13+  43      3 240  54N  73  16  60 -5.6 +6.0 +0.4-0.5 .379   26.1     15 32 15.1 -23 52 49 400.8 819.2
    183548 = GG Lib, 6.868, range 0.23, 6w, Type SR:, Period 35.65 days, Phase   2%
24 Oct  7 18 14 43.6 D    2354kA0  7.5  7.4s  21+  54     10 232  77S 116  65 107 -6.6 +6.8 +1.4-1.8 .364  -23.3     16 24 30.4 -27  9  4 396.9 763.0
      2354 = NSV 20613, 7.46 to 7.49, V, Type VAR:
24 Oct  9 19 39 13.1 d  186672 G5  7.4  6.9   39+  78     12 227  47N  46 359  48 -7.9 +7.4 +0.3+0.4 .366   29.6     18 20 25.4 -29  3 59 387.4 791.6
24 Oct 11 20 23 52.9 d    2965 G2  7.2  6.9   61+ 102     25 218  44S 122  85 135 -7.7 +6.7 +3.6-2.9 .203  -61.6     20 19 45.2 -25 13 43 374.6 776.2
24 Oct 12 19 43 16.6 D    3106 K0  5.2  4.6   71+ 115     39 198  41N  22   5  38 -6.8 +6.0 +0.7+1.8 .336   33.5     21 15 37.9 -20 39  6 367.7 717.4
   R3106 = phi Capricorni
24 Oct 12 21 18 28.3 D    3116 K0  6.6  6.1   72+ 116     29 221  69N  49  11  66 -7.0 +5.7 +0.9+0.6 .450    5.9     21 18 26.1 -20 20  8 368.2 808.0
24 Oct 14 22 38 11.9 d    3404PG0  7.3  7.0   90+ 144     43 225  62S  92  53 113 -4.3 +2.7 +2.3-0.9 .343  -43.1     23 10 24.7 - 7 48 43 357.0 814.7
      3404 is double: AB 5.9 10.7 42" 256.0, dT = -117sec
24 Oct 15 23 32 35   m       4 G9  6.3  5.7   96+ 158     47 233  15S 140  95 161 -2.5 +0.8 +9.9+9.9 .000  -90.0      0  5  3.8 - 0 30 11 353.6 813.6
   Distance of 4 to Terminator = 5.2"; to 3km sunlit peak = 0.0"
24 Oct 15 23 32 58   Gr      4 G9  6.3  5.7   96+ 158     46 ** GRAZE: CA 15.2S; Dist. 41km in az. 327deg. [Lat = 28.92+0.56(E.Long-16.31)]
   Distance of 4 to Terminator = 7.2"; to 3km sunlit peak = 0.2"
24 Oct 16 22 25 39.4 d     132kG5  6.7  6.2  100+ 172     68 190  86N  68  59  89 -0.2 -0.8 +2.1+0.8 .421  -19.8      0 58 19.5   6 50 40 351.3 762.6
   Distance of 132 to Terminator = 8.9"; to 3km sunlit peak = 1.3"
24 Oct 17  1 44 22.9 D     146cK0  4.3  3.8  100+ 173     37 258  57N  43 343  64 -0.5 -1.3 +1.0+0.9 .489   13.9      1  2 56.6   7 53 24 353.4 863.1
   R146 = epsilon Piscium
   Distance of 146 to Terminator = 4.5"; to 3km sunlit peak = 0.0"
24 Oct 19  0 41 53.0 r   75633 K0  7.0  6.3   96- 158     77 234  50N 285 236 300 +3.9 -4.4 +3.0-1.2 .294  135.1      2 54 49.8  20 22 23 354.8 713.4
24 Oct 19  2 43 52.1 R     435wF5  5.8  5.6S  96- 157     53 268  67N 268 198 283 +3.6 -4.6 +1.7-0.7 .416  160.1      2 58  5.2  20 40  7 356.3 764.4
   R435 = 47 Arietis
       435 is double: AB 5.8 14.7 14.6" 113.0, dT = +32sec
       435 = NSV 15614, 5.8, , Type VAR:
24 Oct 19 19 39 55.4 r   76189pF8  7.0  6.7   92- 146     22  74  82N 261 328 272 +6.1 -4.9 +0.2+1.1 .574  164.1      3 47 17.1  23 43 36 362.01048.6
     76189 is multiple: AE 7.0 12.7 8.1"  42.0, dT = +11sec : AB 7.0 12.6 66" 226.6, dT = -96sec : AD 7.0 13.4 131" 243.9, dT = -218sec : AC 7.0 12.4
147" 252.9, dT = -254sec
     76189 is a close double. Observations are highly desired
24 Oct 19 19 41 55.4 r     550pA1  7.0  7.0   92- 146     22  74  67N 275 342 286 +6.1 -4.9 +0.5+0.8 .515  149.8      3 47 21.0  23 48 12 362.01045.5
       550 is double: AB 7.1 14.0 29.8" 276.8, dT = -58sec
24 Oct 19 19 46  0.8 d     560SB8  3.6  3.7s  92- 146     23  74 -40N  22  90  34 +6.1 -4.9 -0.6+2.3 .440   42.1      3 49  9.7  24  3 12 361.91041.4
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.012" 169.6, dT = -0.02sec : Aa,Ab 3.8 6.8 0.22" 336.1, dT = +0.34sec : AC 3.6 15.0 50"  36.5, dT = +110sec :
AH 3.6 16.0 68" 221.7, dT = -147sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Oct 19 20 14 37   Gr    561SB7  5.1  5.1V  91- 146     31 ** GRAZE: CA  8.3N; Dist.168km in az. 319deg. [Lat = 30.50+0.78(E.Long-16.31)]
   Distance of 561 to Terminator = 8.1"; to 3km sunlit peak = 0.2"
24 Oct 19 20 22 23.3 R     559pF0  6.5  6.3   91- 146     31  77  88S 250 320 261 +6.1 -5.0 +0.4+1.4 .557  173.7      3 48 56.9  23 51 26 361.3 981.6
   R559 = 26 Tauri
       559 is quadruple: Aa,Ab 6.4 9.3            : AB 6.5 14.5 79" 242.5, dT = -140sec : AC 6.5 15.0 87" 331.9, dT = -21sec
24 Oct 19 20 22 35.5 R     561SB7  5.1  5.1V  91- 146     31  77  31N 312  22 323 +6.1 -5.0 +2.4-1.3 .208  111.8      3 49 11.2  24  8 12 361.3 981.9
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.22sec : AF 5.0 14.5 4.7" 221.0, dT = +0.2sec : AE 5.1 14.8 96"  76.8, dT = +267sec : AD
5.1 14.7 144"  65.9, dT = +285sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct 19 20 25 28.7 R     564pB8  6.2  6.2S  91- 146     31  78  41S 203 273 214 +6.1 -5.0 -0.4+2.5 .424 -139.5      3 49 43.5  23 42 43 361.3 977.1
       564 is triple: AB 6.2 11.6 97" 104.1, dT = +35sec : AC 6.2 13.3 117" 202.3, dT = -276sec
       564 = NSV 15798, 6.17, , Type VAR:
24 Oct 19 20 29  8.7 R     560SB8  3.6  3.7s  91- 146     32  78  57N 285 356 297 +6.1 -5.0 +1.1+0.5 .412  138.0      3 49  9.7  24  3 12 361.2 971.4
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.012" 169.6, dT = +0.01sec : Aa,Ab 3.8 6.8 0.22" 336.1, dT = -0.33sec : AC 3.6 15.0 50"  36.5, dT = +44sec :
AH 3.6 16.0 68" 221.7, dT = -74sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Oct 19 20 43 22.4 r     567pA0  6.8        91- 146     35  79  64S 226 297 237 +6.1 -5.1 +0.2+1.9 .519 -163.1      3 49 58.1  23 50 55 361.0 949.3
       567 is triple: AB 6.81 10.15 3.31" 235.1, dT = -6sec : AC 6.8 10.5 10.1" 234.9, dT = -19sec
       567 is a close double. Observations are highly desired
24 Oct 19 21 10  9.6 r     570kA2  7.0  6.9   91- 145     41  81  65S 227 300 238 +6.1 -5.1 +0.4+1.9 .502 -164.7      3 50 52.4  23 57 41 360.6 909.3
24 Oct 20 22  0 29.3 r   76841cK1  7.3  6.7   83- 132     39  77  80S 250 325 256 +7.5 -6.1 +0.7+1.4 .499  179.5      4 55 34.6  27 12  9 366.3 885.8
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.16sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Oct 20 23 51 39.7 r     746WB7  7.0  6.9   83- 131     62  84  29S 200 280 205 +7.3 -6.3 +0.2+4.0 .257 -128.2      4 59 53.7  27 19 32 365.1 736.6
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -79sec
24 Oct 21  3  1 36.4 R     756 F0  6.6  6.5   82- 130     77 271  60S 231 147 235 +6.7 -6.4 +2.4+1.8 .313 -147.5      5  4 38.0  27 41 46 365.4 657.2
24 Oct 21 22  9 39.5 r   77818 K5  6.7  5.8   74- 118     29  72  17S 194 265 194 +8.4 -6.5 -1.4+4.3 .223 -116.0      6  0  4.9  28  7 33 373.5 923.7
24 Oct 21 23 56 46.7 r   77883 B2  7.6  7.6   73- 118     51  78  60N 298  18 297 +8.2 -6.6 +2.2-0.5 .329  141.3      6  2 59.4  28 40 37 372.0 759.5
24 Oct 22  3 57 44.1 r   78042 K7  7.9  7.0v  72- 116     78 275  85N 274 186 273 +7.5 -6.7 +2.4-0.5 .355 -178.5      6  9 32.6  28 39 57 371.8 641.2
     78042 = V0450 Aur, 7.94 to 8.1, Hp, Type SRB:
24 Oct 23 23 34 13.9 R    1206 G8  5.9  5.3   53-  93     22  72  89S 281 349 270 +8.7 -6.2 +0.5+0.6 .472  173.4      8  0 55.9  25 23 34 386.8 891.1
   R1206 = omega Cancri
24 Oct 24  1 50 50.8 r   79936 K5  8.1  7.2s  52-  92     50  83  19N 353  69 342 +8.4 -6.2 +3.1-8.3 .107  106.7 .01  8  6  7.3  25 29 38 384.8 692.0
     79936 = NSV 17734, 8.07 to 8.14, V, Type L, Period 16.8 days, Phase   8%
24 Oct 24  4 44 16.8 r   79980 G8  7.3  6.8   51-  92  -4 86 150  47S 240 268 228 +7.8 -6.2 +3.9+2.7 .192 -125.9      8  9 24.9  24 49 34 384.0 610.6
24 Oct 25  0 59 25.0 R    1334kG5  7.0  6.6   42-  81     27  79  56N 321  29 306 +8.1 -5.5 +1.2-1.2 .337  142.1      8 57  5.1  21 51 38 391.8 811.8
24 Oct 25  4 19 32.9 r    1348 G5  8.1  7.6   41-  80 -10 70 105  16N   2  68 346 +7.4 -5.4 +0.6-6.9 .139  115.4      9  2 45.2  21 31  9 389.4 615.0
24 Oct 26  3 49 38.3 R   98792wK2  7.8  7.0   32-  69     52  99  89S 290 355 272 +6.8 -4.5 +2.0-0.1 .341 -171.6      9 49 52.8  16 50 18 394.4 660.4
     98792 is double: AB 7.9 11.1 25.3" 320.7, dT = -64sec
24 Oct 27  4 21  1.7 R   99198WK2  7.3  6.6   23-  57 -10 48 105  84N 300   0 279 +5.6 -3.3 +1.7-0.5 .352 -176.1     10 36  6.7  11 36 52 398.0 680.6
     99198 is double: AB 7.4 9.7 60" 330.4, dT = -147sec
24 Oct 28  4 18  9.1 D    1644 B9  4.1  4.1   16-  46 -11 35 104 -54N  79 138  57 +4.4 -2.0 +1.8+2.0 .263   46.3     11 21  8.2   6  1 46 401.1 740.2
   R1644 = Shang Tseang = sigma Leo
24 Oct 28  5 12 11.8 R    1644 B9  4.1  4.1   15-  46   1 47 114  30N 355  49 333 +4.3 -1.9 +0.5-3.4 .245  133.7     11 21  8.2   6  1 46 400.2 688.8
   R1644 = Shang Tseang = sigma Leo
24 Oct 29  2 47 25.4 R    1730wK2  6.2  5.5   10-  36      5  93  35S 239 301 217 +3.3 -0.7 +0.3+3.5 .233 -119.6     11 59  3.3   0 31 50 405.3 930.1
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -29sec
24 Oct 29  4 17 22.2 r  119173 K5  8.8  8.1    9-  36 -11 25 104  46N 338  37 316 +3.1 -0.6 +0.4-1.8 .345  146.9     12  1 46.4   0 31 56 403.3 804.8
24 Oct 30  3 39 57.3 R  138921KG5  8.1  7.7    5-  25      6  99  65S 267 328 246 +1.8 +0.8 +0.4+1.2 .388 -144.9     12 41 59.6 - 5 13 15 405.5 931.3
24 Oct 30  3 47 38   M  138924 F2  7.7  7.5    5-  25      7 100  11S 213 273 191 +1.8 +0.8 +9.9+9.9 .000  -90.0     12 42 35.9 - 5 28  6 405.4 921.6
24 Nov  3 16 43 39.8 d    2312 M2  5.4  4.5s   4+  24  -8  5 237  62S 140  85 130 -5.2 +6.5 +1.6-2.7 .293  -45.8 .01 16  8  7.6 -26 19 36 398.5 811.9
      2312 = NSV 20513, 5.35, range 0.00, 8V, Type VAR, Period 7.61267 days
24 Nov  4 17 11 45.9 d  184978 B9  7.7  7.7    9+  35      8 232  47N  61   9  55 -6.1 +7.1 +0.5-0.1 .375   25.9     17  3 59.1 -28 15 23 395.1 797.6
24 Nov  4 17 39 39.1 d    2453 K1  6.6  6.2    9+  36      3 235  43S 150  94 145 -6.1 +7.0 +2.5-4.1 .193  -64.0     17  4 27.8 -28 34 58 395.6 843.3
24 Nov  5 17 10 33.5 d  186099 F5  8.1  7.9   16+  47     16 223  71S 115  71 115 -6.6 +7.4 +2.0-1.8 .319  -35.7     18  1 12.3 -29 20 33 390.7 744.6
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov  5 17 30 43   d  186100 K0  7.7  7.1   16+  47     13 226  28S 157 110 157 -6.6 +7.3 +6.4-8.9 .080  -78.7     18  1 12.8 -29 26 39 391.0 775.0
24 Nov  5 17 38 26   Gr 186100 K0  7.7  7.1   16+  47     11 ** GRAZE: CA 17.0S; Dist. 36km in az. 144deg. [Lat = 28.07+0.65(E.Long-16.31)]
24 Nov  5 18 17 11.8 d  186156 B8  7.8  7.8e  16+  47      5 233  33S 152  98 152 -6.7 +7.3 +4.1-6.2 .124  -73.9     18  2 47.5 -29 21 59 391.7 847.4
    186156 = V5562 Sgr, 7.77 to 7.99, V, Type EA/KE, Period 3.03868 days, Phase  31%
24 Nov  6 16 48 15.3 d  187535 F8  8.7  8.4   24+  59 -10 26 209  88N  85  56  91 -6.8 +7.4 +2.1-0.5 .353  -13.6     18 59  7.4 -28 35 34 385.7 680.3
24 Nov  6 17 36 25.6 d  187554 F5  8.5  8.3   24+  59     21 218  41S 136  98 142 -6.9 +7.3 +4.0-4.0 .161  -65.8     19  0  4.1 -28 42  6 386.2 737.9
24 Nov  7 16  6 48.7 D    2910cG3  4.7  4.3   33+  70  -1 35 187  48N  39  32  49 -6.7 +7.1 +1.7+1.4 .303   28.2     19 55 50.4 -26 17 58 380.7 635.7
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Nov  7 16 58  8.1 d  188749 G1  8.1  7.8   33+  71 -12 33 200  61N  52  32  62 -6.8 +7.0 +1.6+0.7 .354   12.6     19 57 15.5 -26 13  3 380.8 669.6
24 Nov  7 17 25 16.1 r    2910cG3  4.7  4.3   34+  71     30 207 -79N 271 245 282 -6.9 +6.9 +2.4-0.7 .333  152.3     19 55 50.4 -26 17 58 380.9 695.2
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Nov  7 17 55 54.0 D    2914cG8  4.8  4.4   34+  71     27 213  85S  85  53  96 -7.0 +6.9 +2.0-0.6 .364  -22.3     19 58 57.2 -26 11 45 381.1 727.0
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Nov  7 19  5 22.8 r    2914cG8  4.8  4.4   34+  71     17 226 -50S 220 175 231 -7.2 +6.7 +0.3+0.7 .408 -157.5     19 58 57.2 -26 11 45 381.9 818.3
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Nov  8 19 12 14.9 d    3062 K2  7.5  6.8   45+  84     28 220  53N  37 359  52 -6.9 +6.0 +0.6+0.9 .405   19.2     20 56 52.7 -22  0 21 376.1 783.3
24 Nov  9 19 54 17.1 d    3204 K0  7.9  7.3   56+  97     33 222  57S 103  65 121 -6.4 +4.8 +2.7-1.6 .280  -50.7     21 52 41.6 -17  4  0 370.7 794.2
24 Nov 10 16 31  4.0 d  165228 K3  7.9  7.1   66+ 109  -7 43 144  39N  16  48  37 -4.9 +3.9 +0.9+2.6 .327   36.8     22 40 20.7 -11 36 19 365.8 724.7
24 Nov 12 16 41 38.2 D      50dG5  5.8  5.3S  86+ 136  -9 38 111  68S  88 144 110 -2.2 +0.6 +1.6+1.0 .397  -36.3      0 25 24.2   1 56 23 358.8 857.2
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Nov 12 18 42 12.4 d      58 G4  7.2  6.7   86+ 137     59 143  34N  11  43  32 -2.4 +0.3 +0.4+2.7 .356   36.5      0 27 20.3   2 48 51 356.9 768.0
24 Nov 13 21 32 26.8 d     209dA0  7.2  7.2   94+ 152     69 212  69S  92  63 112 -1.0 -1.9 +2.9-0.4 .327  -41.1      1 25 58.2  10 24 25 354.4 744.6
       209 is double: AB 7.2 14.2 4.4" 127.3, dT = +11sec
       209 is a close double. Observations are highly desired
24 Nov 14 21 16 55.7 D     348cA2  6.8  6.7   98+ 166     77 153  90N  81 106  99 +1.1 -3.5 +2.4+0.6 .384  -27.4      2 22 33.2  16 52 13 354.0 743.3
       348 is double: ** 7.0 9.0
24 Nov 16 20  7 50.6 R     647WB9  5.4  5.4s  98- 166     44  81  53S 207 282 216 +5.1 -5.6 +0.0+2.7 .390 -141.0      4 22 34.9  25 37 46 360.4 876.8
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = +50sec
       647 = NSV 15957, 5.34 to 5.39, Hp
   Distance of 647 to Terminator = 18.8"; to 3km sunlit peak = 7.8"
24 Nov 18 19 47 10.0 r     996cA2  6.9  6.8   88- 139     16  66  44N 314  20 311 +7.6 -6.3 +0.9-0.6 .357  128.9      6 30 22.0  28 12 44 373.21028.6
       996 is double:  7.6 7.6
24 Nov 18 21 14 35.5 r   78496 K0  7.5  6.9   88- 139     33  73  59S 237 310 233 +7.6 -6.4 +0.2+2.0 .438 -153.9      6 33 41.4  27 58 49 371.8 879.7
24 Nov 18 21 57 41.4 R    1008 A0  5.3  5.3s  87- 138     42  77  60S 238 314 234 +7.5 -6.5 +0.6+2.1 .405 -153.8      6 35 12.1  28  1 20 371.2 812.6
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 Nov 18 22 15 37.2 r   78530cB9  7.8  7.8   87- 138     46  77  70N 289   6 285 +7.5 -6.5 +1.6+0.1 .399  155.9      6 35 40.3  28 15 51 371.0 786.7
     78530 is double: AB 8.6 8.9 0.19"  39.7, dT = +0.17sec
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     78530 is a close double. Observations are highly desired
24 Nov 19  0 27  0.1 R    1022CB7  6.0     s  87- 138     74  86  79N 280   5 275 +7.1 -6.6 +2.4+0.0 .361  172.1      6 39 33.1  28 15 47 370.0 653.1
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.9sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  31%
24 Nov 19  0 27  1.2 r X 91013C    7.8  7.8s  87- 138     74  86  79N 280   5 276 +7.1 -6.6 +2.4+0.0 .360  172.1      6 39 33.2  28 15 48 370.0 653.1
   X 91013 is double: BA 7.8 6.2 0.8" 214.3, dT = -0.9sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  31%
24 Nov 19  1 34 14.4 R    1026SG5  6.5  5.9   87- 137     88  93  87N 272 357 267 +6.9 -6.6 +2.6+0.0 .353 -174.7      6 41 20.9  28 11 48 370.0 635.4
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +64sec : AC 6.6 12.8 58"  61.4, dT = +141sec
24 Nov 20  3 42 19.8 r   79672DK5  7.6         78- 124     77 263  82S 269 193 259 +7.1 -6.2 +2.6-0.3 .329 -155.9      7 45 32.1  25 59 19 376.8 657.9
     79672 is double: AB 7.58 11.58 2.70" 228.3, dT = -6sec
     79672 is a close double. Observations are highly desired
24 Nov 23  0 46 38.7 R    1504 M1  5.4  4.6   50-  90     29  90  88N 293 358 273 +6.7 -3.6 +1.0+0.1 .407 -178.0     10 16 40.7  13 43 42 395.2 780.9
   R1504 = 37 Leonis
24 Nov 24  4 52 51   M  118658 F5  7.3  7.1   39-  77  -7 65 146  20S 223 253 202 +4.8 -2.0 +9.9+9.9 .000  -90.0     11  6  9.4   7  8 23 396.5 637.3
24 Nov 25  5 16 37   M    1712SF8  3.6  3.3   30-  66  -3 58 144 -21N  45  76  23 +3.5 -0.6 +9.9+9.9 .000   90.0     11 50 41.7   1 45 53 399.0 649.4
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3 : AC 3.7 9.6 406"  78.4
24 Nov 25  5 20 20   Gr   1712SF8  3.6  3.3   30-  66  -1 63 ** GRAZE: CA-21.9N; Dist.218km in az. 224deg. [Lat = 25.73-0.86(E.Long-16.31)]
24 Nov 26  2  6 53.7 r  138790kK2  8.5  7.9   22-  56     13 101  86S 289 349 267 +2.7 +0.5 +0.5+0.3 .435 -165.4     12 27 10.3 - 3 17 15 403.8 879.3
24 Nov 26  5  6  9.7 R    1795cK3  6.9  6.1   21-  55  -5 47 134  77S 280 319 258 +2.2 +0.8 +2.5+0.3 .292 -145.9     12 30 50.3 - 4  3 39 400.6 685.0
24 Nov 29  4 12 46.3 R    2099 K0  6.9  6.2    4-  23      5 115  66N 303   1 287 -1.4 +4.5 +0.1-0.1 .478  178.7     14 42 45.1 -19 18 42 401.4 931.8
24 Dec  4 17  9  4.1 d    2878 K2  8.5  7.7   12+  40     16 227  21N  18 332  27 -5.9 +6.7 -0.4+1.7 .301   47.3     19 42 23.5 -26 26 38 383.3 823.7
24 Dec  5 17 29 36.5 d  189543 A2  8.8  8.7   20+  53     24 224  43N  32 350  46 -5.8 +6.0 +0.4+1.0 .391   26.5     20 40  2.0 -23  1 57 379.1 802.0
24 Dec  5 18 17 27.1 d  189586 F3  8.1  7.8   20+  53     16 232  63S 105  56 119 -5.9 +5.9 +1.7-1.7 .327  -46.0     20 41 52.6 -23  8 11 379.8 867.2
24 Dec  5 18 27  3.2 d  189594 K2  8.6  7.9   20+  53     15 233  85S  84  34  98 -5.9 +5.9 +1.0-0.7 .435  -24.4     20 42 11.6 -23  0  5 379.9 880.7
24 Dec  6 18 23 48.4 d    3161 F2  7.9  7.7   29+  65     27 228  70S  93  50 111 -5.5 +4.9 +1.9-1.1 .347  -39.8     21 36 22.2 -18 23 32 375.4 820.8
24 Dec  7 16 29 12.0 d  165053 K2  7.8  7.1   39+  77  -7 49 186   6N 346 340   6 -4.6 +3.9 -1.4+4.3 .175   63.4     22 24 44.1 -12 57 28 370.5 702.4
24 Dec  8 19 32 12.4 D    3432cK0  6.2  5.6   51+  92     41 232  86S  71  27  93 -4.3 +1.9 +1.6+0.0 .413  -21.9     23 20 40.9 - 5 54 29 367.7 794.4
24 Dec  9 18 18 38.9 d      16cK2  7.5        62+ 104     62 196  44N  20   6  42 -3.1 +0.5 +0.9+2.3 .371   26.2      0  8 52.2   0 41 33 363.7 728.9
        16 is double: AB 7.67 9.31 0.30"  93.2, dT = +0.23sec
        16 is a close double. Observations are highly desired
24 Dec  9 21 28 21.3 D      24 K0  6.8  6.1   63+ 105     32 252  77S  79  22 101 -3.5 +0.0 +1.2-0.5 .435  -24.9      0 13 47.6   1 23  1 365.6 850.8
24 Dec  9 22 13 54   m      26 F5  7.0  6.8   64+ 106     23 259  10S 147  87 169 -3.6 +0.0 +9.9+9.9 .000  -90.0      0 14 36.6   1 17 49 366.4 907.2
24 Dec 10 16 21 27.7 D     132kG5  6.7  6.2   73+ 117  -5 52 118  85N  62 114  84 -1.5 -0.9 +1.5+1.6 .442  -13.2      0 58 19.5   6 50 40 362.2 797.9
24 Dec 10 18  3 19.5 d  109593kF5  8.1  7.9   73+ 118     68 158  81N  59  79  80 -1.8 -1.1 +1.9+1.4 .412  -11.7      1  0 30.4   7 21 14 361.2 737.8
24 Dec 10 19  8 17   m  109609kG0  7.8  7.3   74+ 118     68 201  20S 138 120 159 -2.0 -1.3 +9.9+9.9 .000  -90.0      1  1 39.6   7 18 19 361.1 727.3
24 Dec 10 19  9 13   Gr 109609kG0  7.8  7.3   74+ 118     66 ** GRAZE: CA 19.6S; Dist. 50km in az. 319deg. [Lat = 29.06+0.75(E.Long-16.31)]
24 Dec 10 19 45 30.7 d     142pG5  7.6  7.0   74+ 118     64 221  45N  23 347  44 -2.1 -1.4 +1.0+2.3 .373   26.6      1  2  6.8   7 56 26 361.2 731.7
   R142 = 70 Piscium
       142 is double: ** 8.6 8.6 0.050"
       142 has been reported as non-instantaneous (OCc1154). Observations are highly desired
24 Dec 10 19 59 26   m  109626kA0  7.8  7.8S  74+ 118     62 227  18S 140 100 161 -2.1 -1.4 +9.9+9.9 .000  -90.0      1  2 49.4   7 30  3 361.3 735.9
    109626 = NSV 15228, 7.83, , Type ACV, Period 3.7931 days, Phase  41%
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Dec 10 19 59 29.2 D     146cK0  4.3  3.8   74+ 118     62 227  81N  59  19  80 -2.1 -1.4 +1.9+0.9 .414   -9.3      1  2 56.6   7 53 24 361.3 735.4
   R146 = epsilon Piscium
24 Dec 10 21 15 46.3 r     146cK0  4.3  3.8   74+ 119     48 249 -67S 225 169 246 -2.3 -1.6 +1.3+1.1 .437 -170.6      1  2 56.6   7 53 24 362.2 778.5
   R146 = epsilon Piscium
24 Dec 10 21 43 40.8 d  109661kG5  7.9  7.3   74+ 119     43 254  84N  63   4  84 -2.3 -1.6 +1.4+0.3 .452   -6.5      1  5 24.1   8 19 55 362.5 800.0
24 Dec 10 22 25 20.7 d     162kF0  6.9  6.8s  74+ 119     34 261  64S  94  33 115 -2.4 -1.7 +1.3-1.2 .389  -35.6      1  6 37.6   8 21 36 363.2 843.5
       162 = NSV 15244, 6.93, range 0.01, 2V, Type GDOR, Period 0.74488 days, Phase  53%
24 Dec 11 18 29 51.3 d     285 G5  7.5  6.9   83+ 131     70 134  48S 113 154 132 -0.4 -2.8 +4.4-1.5 .196  -62.8      1 54 47.2  13 45 25 359.7 747.9
24 Dec 11 20 38 42.4 d   92724 F5  8.0  7.7   84+ 132     69 233  66S  96  49 115 -0.7 -3.1 +2.8-0.8 .310  -41.3      1 57 46.2  14 23 20 359.7 718.8
24 Dec 11 23 17 10.7 D     297cK0  6.5  5.9   84+ 133     37 268  86S  76  10  95 -1.1 -3.3 +1.2-0.4 .464  -11.1      2  1 50.4  15  4  2 361.7 829.2
       297 is double: ** 7.6 7.6 0.10"  37.0, dT = +0.17sec
       297 has been reported as non-instantaneous (OCc 729). Observations are highly desired
24 Dec 12 16 30  0.8 d     411SG0  7.0     S  91+ 144  -7 38  87  23N  10  79  26 +1.3 -3.9 -0.5+2.9 .356   47.6      2 47 27.4  19 22 19 361.4 925.2
       411 is triple: AB 7.52 8.25 3.58" 306.4, dT = +5sec : AC 7.5 13.0 96"  25.2, dT = +260sec
       411 is a close double. Observations are highly desired
       411 = NSV 15579, 6.89, , Type VAR:
24 Dec 12 20 45 43.5 d   75633 K0  7.0  6.3   91+ 146     81 215  53N  41   9  57 +0.8 -4.5 +1.7+2.0 .382   18.3      2 54 49.8  20 22 23 359.1 701.3
24 Dec 12 22 43 13.8 D     435wF5  5.8  5.6S  92+ 147     58 264  70N  59 350  75 +0.5 -4.6 +1.8+0.7 .415    7.7      2 58  5.2  20 40  7 360.0 732.1
   R435 = 47 Arietis
       435 is double: AB 5.8 14.7 14.6" 113.0, dT = +21sec
       435 = NSV 15614, 5.8, , Type VAR:
24 Dec 13 16 16  2   Gr    545SB6  4.1  4.2v  96+ 158  -3 25 ** GRAZE: CA-22.4N; Dist.223km in az. 141deg. [Lat = 25.88+0.72(E.Long-16.31)]
24 Dec 13 16 19 33   m     545SB6  4.1  4.2v  96+ 158  -5 25  75 -22N 334  43 346 +2.9 -4.9 +9.9+9.9 .000   90.0      3 46 19.6  23 56 54 363.41018.7
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0 : AB 4.2 14.4 110" 180.2 : AC 4.2 12.9 147" 336.0
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Dec 13 16 43 46.0 d     559pF0  6.5  6.3   96+ 158 -10 30  77  77N  73 143  85 +2.9 -5.0 +0.4+1.3 .550   -9.6      3 48 56.9  23 51 26 363.0 982.2
   R559 = 26 Tauri
       559 is quadruple: Aa,Ab 6.4 9.3            : AB 6.5 14.5 79" 242.5, dT = -141sec : AC 6.5 15.0 87" 331.9, dT = -32sec
24 Dec 13 16 46 15   Gr    552SB7  2.9  2.9s  96+ 158  -8 31 ** GRAZE: CA-23.9N; Dist.390km in az. 139deg. [Lat = 23.85+0.75(E.Long-16.31)]
24 Dec 13 16 52 44   M     552SB7  2.9  2.9s  96+ 158 -11 32  78 -24N 333  44 345 +2.9 -5.0 +9.9+9.9 .000   90.0      3 47 29.1  24  6 18 362.8 966.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1 : AE 2.8 15.0 78" 232.4 : AB 2.8 6.3 118" 291.1
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Dec 13 16 59 59.6 D     560SB8  3.6  3.7s  96+ 158     34  78  44N  41 112  52 +2.9 -5.0 +0.0+2.0 .502   22.7      3 49  9.7  24  3 12 362.7 957.2
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.016" 153.5, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.0, dT = +0.19sec : AC 3.6 15.0 50"  36.4, dT = +99sec :
AH 3.6 16.0 68" 221.7, dT = -136sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Dec 13 17  9 33.4 D     561SB7  5.1  5.1V  96+ 158     36  79  26N  23  95  35 +2.9 -5.1 -0.3+2.5 .410   40.0      3 49 11.2  24  8 12 362.5 942.4
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.41sec : AF 5.0 14.5 4.7" 221.0, dT = -11sec : AE 5.1 14.8 96"  76.8, dT = +139sec : AD
5.1 14.7 144"  65.9, dT = +257sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 561 to Terminator = 14.2"; to 3km sunlit peak = 4.3"
24 Dec 13 17 11 21.1 d     567pA0  6.8        96+ 158     36  80  78S  99 170 111 +2.9 -5.1 +1.1+0.7 .434  -35.7      3 49 58.1  23 50 55 362.5 939.8
       567 is triple: AB 6.81 10.15 3.31" 235.1, dT = -5sec : AC 6.8 10.5 10.1" 234.9, dT = -17sec
       567 is a close double. Observations are highly desired
24 Dec 13 17 13  9.7 D     564pB8  6.2  6.2S  96+ 158     36  80  44S 133 204 144 +2.9 -5.1 +3.0-1.8 .185  -69.6      3 49 43.5  23 42 43 362.4 936.4
       564 is triple: AB 6.2 11.6 97" 104.1, dT = +456sec : AC 6.2 13.3 117" 202.3, dT = +222sec
       564 = NSV 15798, 6.17, , Type VAR:
24 Dec 13 17 21 32   Gr    564pB8  6.2  6.2S  96+ 158     39 ** GRAZE: CA 24.5S; Dist.126km in az. 139deg. [Lat = 26.96+0.77(E.Long-16.31)]
   Distance of 564 to Terminator = 15.5"; to 3km sunlit peak = 5.2"
24 Dec 13 17 37 51.5 d     570kA2  7.0  6.9   96+ 158     41  82  80S  97 170 109 +2.9 -5.1 +1.4+0.7 .422  -34.7      3 50 52.4  23 57 41 362.0 900.6
24 Dec 13 17 58 46.2 r     560SB8  3.6  3.7s  96+ 158     46  84 -87S 265 338 276 +2.8 -5.2 +1.3+1.0 .457  157.4      3 49  9.7  24  3 12 361.6 868.8
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.016" 153.5, dT = +0.01sec : Aa,Ab 3.8 6.8 0.22" 336.0, dT = -0.15sec : AC 3.6 15.0 50"  36.4, dT = +72sec :
AH 3.6 16.0 68" 221.7, dT = -109sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Dec 14 20 23 25.3 d     746WB7  7.0  6.9  100+ 172     64  85  78N 107 188 113 +4.1 -6.1 +2.4-0.2 .343  -35.1      4 59 53.7  27 19 32 363.0 738.6
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -9sec
   Distance of 746 to Terminator = 8.9"; to 3km sunlit peak = 1.3"
24 Dec 14 23  8 33.1 d     756 F0  6.6  6.5  100+ 173     80 269  47N  82 358  87 +3.7 -6.3 +2.4+0.1 .378    0.2      5  4 38.0  27 41 46 362.8 665.3
   Distance of 756 to Terminator = 4.3"; to 3km sunlit peak = 0.0"
24 Dec 15 19  6 28.2 r   77818 K5  6.7  5.8  100- 172     36  74  73N 251 324 250 +5.6 -6.3 +0.5+1.5 .492 -171.7      6  0  4.9  28  7 33 368.3 888.0
   Distance of 77818 to Terminator = 8.1"; to 3km sunlit peak = 0.9"
24 Dec 17  0  8 52.0 r X 99111S    7.2  7.0s  96- 158     86 107  87N 269 340 261 +5.8 -6.3 +2.6+0.2 .344 -165.7      7 12 49.0  27 13 30 371.1 639.9
   X 99111 is triple: BA 7.3 7.2 0.7" 117.7, dT = +1.8sec : BC 7.3 12.7 14.0"  67.7, dT = +38sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Dec 17  0  8 52.0 R    1093SF8  6.6     s  96- 158     86 107  87N 269 340 261 +5.8 -6.3 +2.6+0.2 .344 -165.7      7 12 49.0  27 13 30 371.1 639.9
      1093 is triple: AB 7.24 7.27 0.71" 297.7, dT = -1.8sec : AC 7.2 12.8 13.7"  74.2, dT = +38sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Dec 17  2 22 19   M    1105cG7  6.5        96- 158     65 273  24S 201 121 193 +5.4 -6.2 +9.9+9.9 .000  -90.0      7 17  3.4  26 41 22 372.1 715.2
      1105 is double: AB 7.00 7.70 0.20" 236.4
      1105 is a close double. Observations are highly desired
   Distance of 1105 to Terminator = 13.1"; to 3km sunlit peak = 3.5"
24 Dec 17  4  4 40.8 r    1108cG8  7.0  6.5   96- 157     43 281  64N 293 218 285 +5.2 -6.0 +0.8-1.5 .467  179.1      7 19 30.8  26 49 23 373.9 846.2
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.2sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Dec 17 21 55 54.4 r   79980 G8  7.3  6.8   92- 146     45  82  45N 321  35 309 +6.8 -5.8 +1.9-1.6 .308  139.1      8  9 24.9  24 49 34 377.6 745.6
24 Dec 18 23 40 20.6 r    1357pG0  7.7  7.3   85- 134     55  95  85N 288 358 272 +6.7 -4.9 +2.0-0.1 .364 -175.5      9  6 42.9  20 30 35 382.7 677.9
      1357 is double: AB 7.7 16.4 82" 229.0, dT = -115sec
24 Dec 20  0 28 11   r    1464 G5  7.5  7.0   76- 122     53 103  27S 226 289 207 +6.2 -3.7 +4.2+9.0 .095 -105.4      9 58 11.7  15 13 17 388.1 677.1
   R1464 = 26 Leonis
24 Dec 20  4 29 28.9 r   98914 A1  8.0  7.9   75- 121     65 240  72S 271 219 252 +5.3 -3.3 +2.8-0.7 .283 -140.4     10  2 29.6  14 33 25 388.2 692.1
24 Dec 20 23  2 12.1 r    1562 K5  7.1  6.2s  68- 111     23  91  88S 289 353 268 +5.7 -2.6 +0.8+0.3 .425 -172.0     10 42 16.7  10 21 20 394.8 822.3
      1562 = NSV 18478, 7.18 to 7.24, Hp
24 Dec 20 23 47 53.4 r   99272 K2  7.5  6.8   68- 111     33  96  18N   3  66 343 +5.6 -2.5 +0.6-5.1 .179  116.6     10 44 26.0  10 22 29 394.0 763.5
24 Dec 22  5 18 30.4 r  118917 K0  7.3  6.7   57-  98  -6 62 210  70N 313 287 291 +3.4 -0.6 +1.7-2.0 .340 -177.7     11 33 19.7   3 21 45 396.0 653.8
```

Occultation prediction for Teide Observatory Canary Islands
E. Longitude 16 18 39.8, Latitude 28 28 31.6, Alt. 3000m; Telescope dia 15cm; dMag 0.0

y	m	day d	Time h	m	s	P	Star No	Sp D	Mag v	Mag r	V	% ill	Elon	Sun Alt	Moon Alt	Az	CA o	PA o	VA o	AA o	Libration L	B	A m/o	B m/o	RV "/s	Cct o	durn sec	R.A. (J2000) h	m	s	Dec o	m	s	Mdist Mm	SV m/s
24	Dec	27	4	52	2.4	R	2183	K2	5.5	4.8		13-	43	-12	24	135	22N	348	30	334	-2.4	+5.6	-0.3	-2.1	.279	134.7		15	16	23.0	-22	23	58	397.1	762.7

Lunar Occultation predictions
San Vicente, Antioquia
Colombia

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 49  0.2 D    1772cA2  3.9  3.9s  57-  98  -6 82 211 -67N  90  59  68 -3.3 -1.7 +4.7+0.0 .204   49.4     12 19 54.3 - 0 40  1 396.6 603.4
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = +0.14sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  3 11 51 48.6 R    1772cA2  3.9  3.9s  56-  97   8 69 251  16N   7 297 345 -3.6 -1.5 -0.5-4.5 .208  130.2     12 19 54.3 - 0 40  1 396.8 619.7
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = -0.6sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  5  8 18 39.5 r  158111kA0  8.1  8.0e  38-  76     35 109  76S 277 351 258 -4.8 +0.7 +1.6-0.1 .347 -147.1     13 42 57.7 -11 18  8 392.8 786.3
    158111 = ASAS J134258-1118.1, 7.752, range 0.08, 1Ic, Type EC|ESD, Period 3.89092 days, Phase  46%
24 Jan  5  9 14 50.8 r    1966kK2  7.8  7.1   38-  76     48 115  77N 304  11 284 -5.0 +0.9 +1.5-1.2 .373 -170.9     13 44 15.6 -11 26 12 391.5 717.4
24 Jan  7 11  4 24.1 r X 39461pK0  7.5  7.0   19-  52  -3 46 131  71S 263 317 250 -6.1 +3.9 +2.9+0.6 .286 -137.3     15 25 22.6 -21 55 45 380.7 719.5
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = -11sec : AC 7.9 13.5 40" 190.5, dT = -41sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 10  1 27.7 r  184324 G6  9.0  8.3   12-  40     21 120  44N 321  33 312 -5.8 +4.9 +0.0-1.4 .448  156.2     16 20 21.6 -25  6 54 377.4 896.2
24 Jan  8 10  3 56.2 D    2349SB1  2.9     v  12-  40     21 121  -6S 179 251 171 -5.8 +4.9 -1.7-3.9 .230  -62.0     16 21 11.3 -25 35 34 377.4 894.7
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = +1.6sec : AB 2.9 8.4 20.3" 273.1, dT = -6sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 10 21 19   Gr   2349SB1  2.9     v  11-  40     28 ** GRAZE: CA 22.8S; Dist.208km in az. 216deg. [Lat =  4.01-0.71(E.Long+75.33)]
24 Jan  8 10 29 50.0 r  184332 A0  8.8  8.6v  11-  39 -11 27 123  88N 276 344 268 -5.8 +5.0 +1.2+0.0 .432 -158.6     16 20 49.3 -25 23 39 376.7 848.2
    184332 = V0961 Sco, 10.17 to 10.25, U, Type ACV, Period 2.0025 days, Phase  84%
24 Jan  8 10 35 40.6 R    2349SB1  2.9     v  11-  39 -10 28 124  51S 236 303 228 -5.8 +5.0 +3.2+2.6 .216 -118.0     16 21 11.3 -25 35 34 376.6 839.4
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = +0.02sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -1.7sec : AB 2.9 8.4 20.3" 273.1, dT = -75sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 15 11  0.4 D    2366dM1  1.1  0.1v  11-  38  50 55 200 -25S 158 136 150 -6.7 +5.5 +2.3-4.0 .204  -51.1 .21 16 29 24.5 -26 25 55 373.3 589.5
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 16  8  9.8 R    2366dM1  1.1  0.1v  10-  38  58 48 217  47S 230 188 223 -6.9 +5.6 +2.7+2.4 .213 -128.8 .21 16 29 24.5 -26 25 55 373.5 615.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9  9 40 11.3 r  185274kA2  8.7  8.6    6-  27      4 119  47S 222 303 219 -5.2 +5.8 +1.9+3.2 .231 -113.9     17 20  7.5 -27 46 23 373.81036.8
24 Jan  9  9 48  4.3 R X 42243pF7  7.9  7.6    6-  27      6 118  12N 343  63 340 -5.2 +5.8 -1.2-2.5 .325  125.2     17 20 54.7 -27 20 40 373.61021.9
   X 42243 is double: AB 8.4 9.6 5.4"  91.1, dT = +5sec
   X 42243 is a close double. Observations are highly desired
24 Jan  9 10  0 56.7 R  185295 G8  7.4  6.8    5-  27      8 119  29N 326  44 323 -5.2 +5.8 -0.6-1.5 .440  143.0     17 21  5.6 -27 25  5 373.2 997.4
24 Jan  9 10  5 35.8 r  185286pK5  9.5  8.6    5-  27      9 119  83N 272 350 269 -5.2 +5.9 +0.4+0.2 .522 -162.9     17 20 44.8 -27 38 36 373.1 988.4
    185286 is double: ** 9.5 9.5 0.10"  90.0, dT = +0.19sec
    185286 has been reported as non-instantaneous (OCc 184). Observations are highly desired
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o   sec  h  m   s    o  m  s   Mm   m/s
24 Jan  9 10 26 23   M  185324kA0  8.7  8.5    5-  27     13 121  25S 199 275 197 -5.2 +5.9 +9.9+9.9 .000  -90.0      17 22 16.8 -28  0  8 372.6 952.0
24 Jan 14  0 20 56.9 d  164831 F8  9.0  8.8    9+  34     15 251  66S  99  20 118 -0.3 +5.0 +0.8-0.6 .431  -42.0      22  2 28.4 -16 11 10 360.81015.8
24 Jan 16  1 24 46.1 d  146935 K0  7.9  7.1   26+  62     27 264  45N  22 300  44 +2.7 +2.2 +0.3+2.2 .428   32.6      23 51  9.9 - 2 31 14 363.9 897.2
24 Jan 16  1 31  5.4 d  146939 K2  8.6  7.8   26+  62     25 264  65N  42 320  64 +2.7 +2.2 +0.6+1.4 .501   12.7      23 51 40.0 - 2 32 27 364.1 905.9
24 Jan 16 23 21 22.4 d  109355pG5  7.7  7.1   36+  74  -5 69 264  72N  49 327  71 +4.2 +0.9 +1.9+1.7 .395   -3.1       0 39 46.9   3 39 10 364.0 698.3
    109355 is double: ** 9.1 9.1 0.10"  90.0, dT = +0.19sec
    109355 has been reported as non-instantaneous (OCc1143). Observations are highly desired
24 Jan 17  0 41  9   m  109370 K2  8.2  7.5   37+  75     50 268  17S 141  56 162 +4.0 +0.7 +9.9+9.9 .000  -90.0       0 41 21.3   3 35 58 365.3 751.7
24 Jan 17  1 20 52.7 d      90SF8  7.6        37+  75     40 270  78N  55 330  77 +3.9 +0.6 +1.3+1.2 .445   -1.9       0 42 23.2   4 10  0 366.2 790.6
        90 is triple: AB 7.86 9.71 2.13" 212.5, dT = -4sec : AC 7.9 13.4 47" 275.5, dT = -81sec
        90 is a close double. Observations are highly desired
24 Jan 18  2  3 15.0 d X  2178 F8  8.0  7.7   49+  88     42 279  54N  33 301  53 +4.6 -1.0 +1.3+2.2 .377   25.0       1 33 43.4  10 54 15 370.1 746.2
24 Jan 19  3 17 46.5 d     363 F0  7.2  7.0   60+ 102     35 286  47S 115  21 132 +5.0 -2.7 +1.6-1.8 .273  -48.4       2 27 32.1  16 38 37 375.0 746.7
24 Jan 19 22 40 37.2 d     472cA1  4.9  4.9   69+ 113   5 61  56  62N  48 165  62 +6.3 -3.6 +1.5+1.9 .374    5.4       3 14 54.1  21  2 40 376.4 686.1
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.18sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jan 19 23 18 56.9 d   75819 F2  7.9  7.7   69+ 113  -4 68  44  67N  53 185  67 +6.2 -3.7 +2.0+1.7 .356    0.6       3 15 46.1  21  9 55 376.2 649.0
24 Jan 20  0  9 50.6 r     472cA1  4.9  4.9   70+ 113     75  11 -74S 240  48 254 +6.0 -3.8 +2.6+1.5 .335  175.4       3 14 54.1  21  2 40 376.1 613.8
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.24sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jan 20  5 30 33.0 d     493 A0  6.9  6.9   71+ 115     16 291  65N  52 322  65 +5.0 -4.0 +1.0+1.2 .413   27.8       3 24 34.5  22  2 25 381.3 864.3
24 Jan 21  6 44 56.7 D     647WB9  5.4  5.4s  80+ 127     12 295  73N  67 338  75 +4.9 -5.1 +0.7+0.6 .452   21.7       4 22 34.9  25 37 46 385.9 910.2
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = +32sec
       647 = NSV 15957, 5.34 to 5.39, Hp
24 Jan 22  0 15 36.5 d     773wF8  7.0  6.7   87+ 137     56  48  77N  77 200  81 +6.1 -5.9 +2.4+0.8 .337   -8.4       5 10  3.9  27 33 23 384.6 636.4
       773 is double: AB 7.0 9.3 315" 353.1, dT = +95sec
24 Jan 29  3 52 55.9 R    1625SK3  5.8  5.2   89- 142     32  85  80S 279   7 257 -0.2 -3.8 +1.5-0.2 .344 -156.8      11 14  1.8   8  3 39 402.3 729.8
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.29sec : AB 5.8 11.8 23.8" 260.1, dT = -66sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29 10 59 35.3 R    1645cF8  6.7  6.4   88- 140  -5 43 273  45N 336 248 314 -1.9 -2.9 +0.6-2.6 .342  155.9      11 21 26.8   6 38  6 401.4 729.8
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Jan 30  6 38 38.5 R    1732cK0  6.8  6.1v  82- 130     63  99  69S 271 350 249 -2.0 -2.2 +3.7+0.2 .230 -134.9      11 59 23.9   1 49 36 399.7 631.0
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.34sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 55 13.5 r    1824pG0  7.8  7.5   74- 119     70 120  84N 299 358 277 -3.6 -0.7 +2.6-1.4 .305 -160.3      12 42 59.3 - 4  2 58 397.8 624.0
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -1.8sec
      1824 is a close double. Observations are highly desired
24 Jan 31 11  0  7.5 r  138955 K2  7.2  6.5   74- 118  -5 60 249  86S 289 221 268 -4.4 -0.3 +2.7-1.2 .294 -155.0      12 45 32.0 - 4 48 39 398.0 626.1
24 Feb  4  8 43 55.8 R    2270 B2  5.4  5.4e  35-  73     33 124  72N 299   3 288 -6.9 +4.7 +1.0-0.8 .424 -177.2      15 53 55.9 -23 58 41 383.3 788.8
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4 11  7 44.6 d    2286kB5  5.4  5.5v  35-  72  -3 56 157 -26S 164 190 154 -7.4 +5.1 +0.7-3.4 .240  -43.9      15 58 34.9 -24 49 53 380.9 614.6
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  5  8  9 59.7 r    2420dA3  7.5  7.4   26-  61     14 120  61N 303  18 297 -6.8 +5.6 +0.1-0.8 .502  170.1      16 50 10.7 -26 44 33 379.2 936.8
      2420 is double: AB 7.3 15.4 6.6" 229.0, dT = -4sec
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2420 is a close double. Observations are highly desired
24 Feb  5  8 58  2.8 R  184724 F0  7.5  7.4   26-  61     24 123  54N 310  19 304 -6.9 +5.8 +0.3-1.1 .448  164.4     16 51 51.8 -26 52 26 377.9 851.9
24 Feb  5  9 10 18.7 r  184732SF0  8.3  8.1   26-  61     26 124  56N 307  15 302 -6.9 +5.8 +0.5-1.0 .441  166.6     16 52 13.3 -26 55 11 377.6 831.0
    184732 is quadruple: AC 7.4 17.9 3.1"  51.0, dT = +1.6sec : AB 7.4 17.9 3.2" 273.0, dT = -6sec : AD 7.4 16.9 4.7"  39.0, dT = +0.27sec
    184732 is a close double. Observations are highly desired
24 Feb  5  9 18 27.8 r  184734 M0  8.2  7.3   25-  61     28 125  74N 290 356 284 -6.9 +5.8 +1.0-0.5 .445 -175.5     16 52 17.9 -27  0 58 377.4 817.3
24 Feb  6  8 51 32   m X 43016SK0  7.9  7.3   17-  48     10 121  19S 195 273 195 -6.3 +6.4 +9.9+9.9 .000  -90.0     17 53 48.2 -28 41 19 373.2 964.1
   X 43016 is triple:  5.4 10.6 0.10"       : AB 9.4 12.2 7.4"   0.9
   X 43016 is a close double. Observations are highly desired
24 Feb  6 17  2 27   m    2617cK0  4.6  4.1   15-  45  68 35 229   5N 349 291 350 -7.6 +6.8 +9.9+9.9 .000   90.0     18  8  5.0 -28 27 26 368.5 736.2
      2617 is double: AB 5.1 5.9 0.26"  12.0
      2617 is a close double. Observations are highly desired
24 Feb  7 10  1  8.1 R    2765 A3  7.9  7.8    9-  35     12 120  63N 282 359 289 -5.2 +6.9 +0.4-0.2 .523  173.7     19  0  0.2 -28  3  3 366.9 935.6
24 Feb 11 16  3 21.9 d    3421cM3  4.9  4.1v   5+  25  63 45 107  37N  21  94  42 +2.2 +3.9 +1.0+2.6 .383   33.1 .01 23 16 50.9 - 7 43 35 354.3 784.9
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Feb 12  0  2 16   Gr 146719KF8  8.1  7.8    6+  28     15 262  14S 147  65 169 +1.3 +2.7 +9.9+9.9 .000  -90.0     23 28 17.0 - 5 49  4 357.81009.3
24 Feb 12  0  2 16   Gr 146719KF8  8.1  7.8    6+  28     14 ** GRAZE: CA 13.7S; Dist.  1km in az. 346deg. [Lat =  6.32+0.25(E.Long+75.33)]
24 Feb 12  0  8 22.8 D  146724 K2  7.0  6.2    6+  28     13 263  74N  54 332  76 +1.3 +2.6 +0.3+0.9 .585    3.0     23 28 46.7 - 5 23 22 358.01016.8
24 Feb 13  0 36  7.4 d  109166 A2  9.0  8.9   13+  42     20 270  83N  60 336  82 +3.1 +1.0 +0.6+0.8 .538   -2.0      0 22 40.7   1 49 25 360.4 940.6
24 Feb 14  0 58 13.1 d  109763cG5  8.1  7.6   22+  56     27 277  88S  69 342  90 +4.5 -0.8 +1.0+0.6 .479   -9.1      1 15 37.1   8 46  5 364.0 856.7
24 Feb 15  0 12 11   m     309 F0  8.2  8.0V  32+  69     50 285  10S 149  51 167 +5.7 -2.4 +9.9+9.9 .000  -90.0      2  6 41.6  14 35  2 367.0 704.5
       309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  0 12 26   Gr    309 F0  8.2  8.0V  32+  69     48 ** GRAZE: CA 10.5S; Dist. 21km in az. 345deg. [Lat =  6.51+0.27(E.Long+75.33)]
24 Feb 15  2 14 28.5 d   92821 K0  8.1  7.3   33+  70     21 284  58S 102  13 120 +5.4 -2.5 +0.7-0.8 .399  -33.6      2 10 29.4  15  9  5 370.0 860.5
24 Feb 16  1 31 48.7 d   75708 K0  8.0  7.1   43+  82     42 292  51S 112  12 127 +6.2 -3.9 +1.9-1.6 .283  -42.8      3  3  9.6  20 20 10 373.3 699.1
24 Feb 17  0 21 44.2 D     587 K0  6.2  5.5   54+  95     66 320  71S  98 322 109 +6.8 -5.1 +3.4-0.6 .278  -29.3      3 57 26.4  24 27 43 377.0 582.7
24 Feb 18  1  6 23.5 d   76841cK1  7.3  6.7   65+ 107     65 328  42S 133 349 139 +6.7 -6.1 +3.5-3.7 .177  -54.0      4 55 34.6  27 12  9 382.3 557.8
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.29sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 49 41.2 d     746WB7  7.0  6.9   65+ 108     34 299  61S 115  13 120 +6.1 -6.0 +1.0-1.3 .360  -22.5      4 59 53.7  27 19 32 385.0 727.6
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -1.4sec
24 Feb 21  3 48  5.6 d    1181cG8  7.0        90+ 142     66 327  45S 153  10 142 +4.6 -6.9 +1.4-3.4 .238  -37.2      7 49 47.7  26 15 50 394.2 571.9
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = +1.1sec
      1181 is a close double. Observations are highly desired
24 Feb 22  0 31 55.6 d    1290pF8  6.9  6.6   94+ 153     43  64  73S 132 236 118 +4.6 -6.6 +2.4-1.9 .287  -29.0      8 38 45.5  23 41  9 397.9 634.2
      1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +2194sec
24 Feb 25  5 31 45.1 r    1603 A0  7.2  7.2   99- 172     85  53  76N 287  53 265 +0.1 -3.7 +3.5-1.0 .264 -149.2     11  2 32.9   9 10 23 399.9 595.9
   Distance of 1603 to Terminator = 9.1"; to 3km sunlit peak = 1.4"
24 Feb 27  7  6  6.3 R    1790 M4  6.9  6.0v  93- 150     81 181  69N 313 312 291 -2.7 -0.8 +2.2-2.1 .311 -173.3     12 29  9.7 - 2 25 46 399.0 606.0
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 57 36.6 r    1890 K0  7.3  6.8   88- 140     47 108  88S 290   2 269 -3.4 +0.3 +1.9-0.8 .337 -156.6     13  9 46.3 - 7 39 19 399.3 711.4
24 Feb 29  9 35 25.6 R    2002 K0  6.8  6.3   80- 127     63 220  85N 297 256 278 -5.7 +2.3 +2.9-1.5 .296 -166.0     13 58 29.8 -14  7 19 395.2 585.5
24 Mar  1  9 37 56.3 r    2107 A3  8.1  8.0   72- 116     64 195  53N 325 310 310 -6.6 +3.7 +2.0-2.6 .286  161.8     14 46  3.2 -18 58 45 391.7 572.8
24 Mar  2 12 52  9.1 r    2237cK3  5.0  4.3s  62- 103  24 38 233  78S 272 212 260 -8.1 +5.1 +2.2-0.3 .329 -167.5     15 40 16.9 -23 49  5 388.4 635.3
   R2237 = 42 Librae
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.24sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  7  9  0.0 D    2366dM1  1.1  0.1v  53-  93     28 125 -47S 143 209 135 -7.1 +5.6 +0.2-1.6 .391  -24.9 .11 16 29 24.5 -26 25 55 385.4 806.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8 19 17.3 R    2366dM1  1.1  0.1v  53-  93     42 134  85S 273 326 266 -7.3 +5.8 +2.3+0.0 .340 -155.4 .13 16 29 24.5 -26 25 55 383.9 696.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9 38 56.6 R    2373 K1  6.1  5.5   52-  92     53 154  71N 298 327 291 -7.6 +5.9 +2.4-1.1 .326  177.7     16 31 22.8 -26 32 16 382.8 605.2
24 Mar  4  5 59 59.9 r    2505 K4  5.3  4.5   43-  82      2 119  61S 243 325 241 -7.1 +6.2 +0.8+1.2 .390 -135.3     17 23 21.6 -28  8 34 382.71018.7
   R2505 = 43 Ophiuchi
24 Mar  4  7 12 18.3 r  185400 F5  7.2  7.0   42-  81     17 122  41S 223 296 221 -7.1 +6.4 +3.0+3.5 .195 -114.0     17 26 15.7 -28 25  0 380.8 885.1
24 Mar  4  8 10 17.4 r  185420 B8  8.1  8.0   42-  81     29 127  89N 273 337 271 -7.2 +6.5 +1.4+0.1 .408 -163.6     17 27 45.7 -28 21 32 379.4 782.9
24 Mar  5  8 42 11.4 r    2681cA1  7.8        31-  68     23 125  90N 265 333 268 -6.8 +7.0 +1.3+0.4 .433 -164.3     18 30 31.0 -28 47 43 373.7 816.0
      2681 is double: AB 8.47 8.71 0.14" 223.1, dT = -0.25sec
      2681 is a close double. Observations are highly desired
24 Mar  6  8 58 28.4 r  188292 K1  8.3  7.7   21-  55     15 120  44N 303  18 312 -5.9 +7.1 +0.1-1.0 .421  148.0     19 34 24.9 -27  9  9 368.6 886.2
24 Mar  6 10  6  8.3 r  188343 K0  8.4  7.8   21-  55     28 126  57S 223 288 232 -6.0 +7.2 +2.3+2.4 .300 -133.8     19 36 57.4 -27 30  4 366.9 770.1
24 Mar  7  9 18 54.9 R    3012 A7  6.9  6.8   12-  41      7 115  47S 206 286 221 -4.6 +6.8 +1.5+3.0 .300 -123.6     20 38  4.9 -24 13 44 364.0 958.2
24 Mar  7  9 56 28.3 r  189524 K2  8.9  8.1   12-  41     15 117  81S 239 315 254 -4.6 +6.8 +1.1+1.2 .468 -158.0     20 39  0.3 -24  4 40 362.9 888.6
24 Mar  7 10 26 16.2 R  189555 G1  7.2  6.9   12-  41 -12 21 119  58S 217 289 231 -4.6 +6.9 +1.7+2.4 .346 -136.5     20 40 22.3 -24  7  5 362.2 837.6
24 Mar  7 10 32  0.6 R    3018 G8  6.4  6.0   12-  41 -11 22 119  43N 296   8 311 -4.6 +6.9 +0.7-0.8 .380  143.7     20 40 11.8 -23 46 26 362.0 828.1
24 Mar  8 10 28 49.9 d    3175 G8  4.7  4.3    5-  27 -11 10 110 -67S  84 164 103 -2.8 +6.1 +0.5+0.4 .535  -10.8     21 42 39.5 -18 51 59 359.2 948.7
   R3175 = kappa Capricorni
24 Mar  8 10 35 45.2 R  164567cK5  7.3  6.5    5-  27  -9 12 111  65N 266 345 284 -2.8 +6.1 +0.6+0.4 .523  167.4     21 40 34.8 -18 53 44 358.9 932.2
    164567 is double:  7.1 7.6
24 Mar  8 11 32 14.6 r    3175 G8  4.7  4.3    5-  27   5 24 114  89S 239 313 258 -2.9 +6.1 +1.2+1.2 .476 -169.4     21 42 39.5 -18 51 59 357.5 839.6
   R3175 = kappa Capricorni
24 Mar 14  0 23 24.7 D     395cF5  8.1  7.9   18+  50     28 288  90N  69 337  86 +5.3 -3.5 +1.2+0.6 .458    1.0      2 40 33.1  18 35 59 366.1 813.9
       395 is double: ** 8.6 8.6 0.050"
       395 has been reported as non-instantaneous (OCc1192). Observations are highly desired
24 Mar 14  0 53 50.0 D     397MB9  7.5  7.5   18+  50     21 288  56N  36 306  53 +5.3 -3.5 +1.2+1.9 .392   36.1      2 41  6.6  18 48  1 366.9 862.9
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +1.3sec : AC 7.7 9.5 66" 242.1, dT = -151sec
       397 is a close double. Observations are highly desired
24 Mar 14  0 53 50.7 D X  3591MB9  7.9  7.9   18+  50     21 288  57N  36 306  53 +5.3 -3.5 +1.2+1.9 .393   35.9      2 41  6.8  18 47 59 366.9 862.9
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -1.3sec : BC 7.5 9.5 67" 243.0, dT = -153sec
   X  3591 is a close double. Observations are highly desired
24 Mar 15  0  4 26.8 D     521kA2  6.7  6.7v  27+  63     44 297  52S 113   8 125 +6.3 -4.9 +1.9-1.5 .301  -38.3      3 36 58.0  23 12 40 370.6 690.4
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 16  1 52 42.6 D     701SF2  6.6  6.4   38+  76     32 298  66N  57 317  64 +6.6 -5.9 +1.9+1.2 .348   32.2      4 38 29.5  26 56 23 378.3 754.7
       701 is triple:  6.6 9.2 3.1" 169.4, dT = -3sec : AB 7.36 7.21 4.46" 188.1, dT = -8sec
       701 is a close double. Observations are highly desired
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 16  1 52 46.4 d X 70481p    7.3  7.2   38+  76     32 298  66N  56 316  64 +6.6 -5.9 +1.9+1.2 .347   32.4      4 38 29.6  26 56 26 378.3 754.9
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = -8sec : AC 7.4 12.9 92" 203.7, dT = -222sec
   X 70481 is a close double. Observations are highly desired
24 Mar 18  4  3 33.4 d X 91013C    7.8  7.8s  59+ 101     28 299  49S 136  38 132 +6.0 -6.8 +0.1-1.9 .378  -28.1      6 39 33.2  28 15 48 390.4 811.7
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = +0.44sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4  3 33.6 D    1022CB7  6.0     s  59+ 101     28 299  49S 136  38 132 +6.0 -6.8 +0.1-1.9 .378  -28.1      6 39 33.1  28 15 47 390.4 811.7
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = -0.44sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 53 16.7 D    1026SG5  6.5  5.9   60+ 101     17 298  63S 122  30 118 +5.9 -6.7 +0.0-1.2 .459  -14.9      6 41 20.9  28 11 48 391.7 902.6
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +18sec : AC 6.6 12.8 58"  61.3, dT = +60sec
24 Mar 18 20 59 40.3 D    1122cG9  3.8  3.3   67+ 110  32 33  61  17N  27 129  19 +7.1 -7.1 -0.4+4.6 .181   61.0 .02  7 25 43.6  27 47 53 393.1 710.7
   R1122 = iota Geminorum
24 Mar 18 21 19 57   Gr   1122cG9  3.8  3.3   67+ 110  27 40 ** GRAZE: CA-11.6N; Dist.217km in az. 338deg. [Lat =  8.42+0.39(E.Long+75.33)]
24 Mar 18 21 39 49.8 r    1122cG9  3.8  3.3   68+ 111  22 42  58 -40N 331  79 322 +6.9 -7.1 +3.7-4.5 .166  119.2 .02  7 25 43.6  27 47 53 392.5 647.7
   R1122 = iota Geminorum
24 Mar 19  0 59 57.7 d   79464dF8  8.1  8.0S  68+ 111     68 352  30N  42 231  33 +6.1 -7.1 +6.1+6.2 .109   67.5      7 31 25.4  27 37 21 391.4 538.9
     79464 is double: AB 9.9 13.9 2.8" 261.6, dT = -19sec
     79464 is a close double. Observations are highly desired
     79464 = NSV 3620, 7.92 to 8.48, V, Type ACYG:, Period 27.3 days, Phase  76%
24 Mar 19  1 48 43.2 d   79479 K1  7.2  6.6   68+ 112     64 326  40S 151   9 142 +5.9 -7.0 +1.5-3.5 .234  -38.6      7 32 12.9  27  7 31 391.7 569.4
24 Mar 19  4  8 47.9 D    1149SK5  4.1  3.3s  69+ 112     39 300  75S 116  12 107 +5.4 -6.8 +1.0-1.2 .391   -0.3 .02  7 35 55.4  26 53 45 393.9 746.8
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.07sec : AB 4.1 13.2 57"  39.0, dT = +31sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  5 20 25.1 r    1149SK5  4.1  3.3s  69+ 113     23 297 -77N 295 200 285 +5.2 -6.7 +0.4-1.0 .455 -180.0 .01  7 35 55.4  26 53 45 395.6 872.6
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.06sec : AB 4.1 13.2 57"  39.0, dT = +31sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2 10 46.6 D    1263DF0  6.9  6.8S  77+ 123     70 337  81S 116 322 103 +5.0 -6.7 +2.8-1.4 .293    4.7      8 26 39.8  24 32  3 395.1 564.0
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +8sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  2 10 55.4 d   80185SF0  7.7  7.4   77+ 123     70 337  81S 116 321 102 +5.0 -6.7 +2.8-1.4 .293    5.1      8 26 40.1  24 32  7 395.1 564.1
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.46sec : BC,A 7.5 6.9 5.6" 231.8, dT = -8sec
     80185 is a close double. Observations are highly desired
24 Mar 20  4  1  7.5 D    1270cF0  6.1  5.9v  78+ 124     51 301  61S 136  25 123 +4.6 -6.5 +1.1-2.0 .344  -12.8      8 28 36.8  24  8 42 396.3 677.3
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 20  4 45 31.4 d   80209 K0  7.1  6.5   78+ 124     42 297  31N  48 304  35 +4.4 -6.4 +6.7+5.4 .101   74.7      8 29 40.1  24 20 41 397.2 740.9
24 Mar 20  5 56 17.7 D    1274cF0  5.7  5.5s  78+ 124     26 294  33N  50 315  37 +4.2 -6.3 +3.7+3.3 .148   70.4      8 31 30.5  24  4 52 398.7 854.8
   R1274 = upsilon 1 Cancri
      1274 = NSV 17909, 5.691, range 0.01, 4w, Type PULS, Period 0.109096 days, Phase  60%
24 Mar 20  6  6 12   Gr   1274cF0  5.7  5.5s  78+ 124     23 ** GRAZE: CA 12.8N; Dist.114km in az.  35deg. [Lat =  7.57-0.70(E.Long+75.33)]
24 Mar 20 23 12 17.1 d    1373dA2  6.5  6.5   84+ 133  -1 42  67  79N 102 203  85 +4.8 -6.3 +2.1-0.3 .325    7.8      9 13 37.3  21 17  0 399.1 634.8
   R1373 = 90 H1. Cancri
      1373 is double: AB 6.4 13.8 6.9" 260.0, dT = -20sec
      1373 is a close double. Observations are highly desired
24 Mar 21  5  3  3   m   80764cK2  7.8  7.0v  85+ 135     49 294  16N  39 294  22 +3.4 -5.8 +9.9+9.9 .000   90.0      9 19 39.5  20 32 47 399.1 709.3
     80764 is double: ** 7.8 10.7 0.042"  73.0
     80764 has been reported as non-instantaneous (OCc1108). Observations are highly desired
     80764 = HIP 45747, 7.77, range 0.01, 2V, Type VAR, Period 6.12595 days
24 Mar 21  5  3 42   Gr  80764cK2  7.8  7.0v  85+ 135     47 ** GRAZE: CA 16.4N; Dist. 31km in az. 223deg. [Lat =  5.93-0.92(E.Long+75.33)]
24 Mar 22  4 17  4.6 D    1479 F2  6.4  6.2   91+ 146     71 300  65S 141  25 122 +2.4 -5.1 +1.6-2.4 .318   -7.2     10  5 40.9  15 45 27 399.5 621.2
24 Mar 22  6 34 18.8 d    1485 G0  7.1  6.8   92+ 146     39 284  33S 173  79 154 +1.9 -4.7 -0.4-3.3 .287  -43.8     10  7 39.3  15  9 27 401.6 772.9
24 Mar 27  6 12 18.8 r  158105PF5  7.5  7.2   96- 158     71 171  74N 310 320 291 -3.9 +1.8 +2.3-1.9 .313 -173.9     13 42 35.7 -12  5 13 396.1 605.3
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.16sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  6 44 55   m  184209KK0  7.7  7.2   78- 124     47 140  17S 211 256 201 -6.3 +5.6 +9.9+9.9 .000  -90.0     16 11 51.3 -25 53  1 388.0 659.1
24 Apr  1  7 14 18.3 r  186346 F5  7.6  7.4   58- 100     31 129  37N 322  24 324 -6.7 +7.1 +0.4-2.0 .311  141.0     18  8 52.1 -28 45 19 380.2 738.4
24 Apr  1  8 12  5.1 r  186391cA2  7.8  7.7   58-  99     41 138  50S 230 279 231 -6.8 +7.1 +3.7+2.7 .220 -128.2     18 10 18.2 -29 12 47 379.1 655.4
    186391 is double: AB 8.3 8.8 0.38"  94.9, dT = +1.2sec
    186391 is a close double. Observations are highly desired
24 Apr  1  9 12 26.9 R    2631 B9  6.5  6.5v  58-  99     50 152  41N 319 351 321 -7.1 +7.2 +2.0-2.5 .241  138.4     18 11 58.2 -28 54  6 378.2 592.3
   R2631 = V4045 Sagittarii
      2631 = V4045 Sgr, 6.51 to 6.54, V, Type ACV, Period 2.8855 days
24 Apr  4 10  0 19.3 r  190168 G5  8.2  7.9   25-  60     33 120  75N 264 332 281 -4.7 +6.5 +1.6+0.4 .413  167.0     21 15 14.8 -21 17 42 364.1 749.3
24 Apr  4 10 10 27.0 r  190177 F3  8.2  8.0   25-  60     35 121  66S 225 290 242 -4.7 +6.5 +1.8+1.9 .375 -154.1     21 15 52.6 -21 26 23 363.9 736.6
24 Apr  5 10 36 31.3 R    3265PK0  6.6  6.1   15-  46  -6 30 112  24S 179 252 199 -3.2 +5.5 +1.2+5.2 .193 -114.8     22 14 38.2 -15 49  7 360.1 802.0
      3265 is double: AB 4.3 11.9 22.0"  65.0, dT = +47sec
24 Apr  6 15 58 58.4 r    3421cM3  4.9  4.1v   7-  30  74 73 217  43S 196 159 217 -2.1 +3.4 +0.7+2.7 .371 -150.9 .01 23 16 50.9 - 7 43 35 353.8 729.0
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16 16 55   GrVenus      -3.8 -3.8    2-  15  78 83 196 -21S 134 114 153 -0.1 +1.6 +9.9+9.9 .000  -90.0      0 12 29.6 - 0 16 40 352.5 646.3
24 Apr  7 16 17  3   GrVenus      -3.8 -3.8    2-  15  78 81 ** GRAZE: CA-18.5S; Dist.  4km in az. 311deg. [Lat =  6.37+1.16(E.Long+75.33)]
24 Apr 10 23 55  3.6 d   75776 G5  8.5  8.1    7+  30     16 290  23S 135  46 149 +4.4 -4.3 -0.3-2.8 .272  -57.9      3 11 14.2  21  5 50 366.2 908.6
24 Apr 14  2 20 11.0 d   78165cA2  7.4  7.2v  32+  69     22 299  33N  32 297  30 +6.1 -6.7 +4.1+4.9 .141   72.4      6 16 22.2  28 51  7 384.0 867.4
     78165 is double: ** 7.6 9.1
     78165 = V0395 Aur, 7.34 to 7.43, V, Type ELL, Period 23.166 days, Phase  39%
24 Apr 14  3 42 38.5 d   78233SA3  7.5        33+  70      5 298  81S  99  13  96 +6.0 -6.6 -0.1-0.4 .544    4.9      6 19 59.0  28 25 36 386.21022.0
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.26sec : AB,C 7.5 9.6 2.9" 265.3, dT = -5sec : BA 8.7 9.3 58" 268.1, dT = -104sec
     78233 is a close double. Observations are highly desired
24 Apr 15  1  8 28.6 d   79180 F2  8.1  7.8   42+  81     49 306  66S 120   6 113 +6.1 -7.0 +1.5-1.5 .354   -7.9      7 13  6.6  27 46 57 387.0 670.6
24 Apr 16  0 55 18.2 d    1229SF5  8.1  7.9   52+  92     62 316  73S 120 349 108 +5.7 -6.8 +2.2-1.5 .319    0.0      8  8 20.1  25 33 10 391.1 605.4
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.27sec : AB 8.2 12.8 3.1" 302.7, dT = -10sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr 16  1 53 16.1 d   79987SK5  7.5  6.7   52+  93     52 304  68N  80 326  68 +5.4 -6.7 +3.1+0.4 .268   40.9      8  9 42.4  25 33 33 391.9 673.8
     79987 is triple: **Aa,Ab 8.9 8.9 0.10"  90.0, dT = +0.37sec : AB 7.6 10.7 28.9"  98.1, dT = +103sec
     79987 has been reported as non-instantaneous (OCc  78). Observations are highly desired
24 Apr 16  2 28 34.8 D    1233SG8  5.7  5.3S  52+  93     44 300  54N  67 320  55 +5.3 -6.7 +3.4+1.3 .222   54.2      8 10 27.2  25 30 26 392.6 723.7
   R1233 = psi Cancri
      1233 is quadruple: **Aa,Ab 6.6 6.6 0.10" 270.0, dT = -0.41sec : AC 5.8 11.8 82" 220.7, dT = -333sec : AB 5.8 13.1 91" 319.0, dT = -124sec
      1233 has been reported as non-instantaneous (OCc  73). Observations are highly desired
      1233 = NSV 17752, 5.73, , Type VAR:
24 Apr 18 23 56 54.5 d    1545 F2  8.0  7.8   79+ 126     63  74  28S 177 278 156 +3.0 -4.7 +0.7-4.6 .207  -47.5     10 32 16.9  12 55  9 399.4 592.5
24 Apr 20  5 23 38   D    1645cF8  6.7  6.4   87+ 138     47 273  32N  58 330  36 +0.4 -2.8 +6.6+4.7 .094   75.2     11 21 26.8   6 38  6 401.0 715.3
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Apr 20  6 22 18   Gr   1644 B9  4.1  4.1   87+ 138     31 ** GRAZE: CA-13.4S; Dist.204km in az.  29deg. [Lat =  8.42-0.55(E.Long+75.33)]
24 Apr 20  6 25 38   m    1644 B9  4.1  4.1   87+ 138     31 273 -13S 218 132 197 +0.2 -2.6 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 402.3 793.0
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 30 29.4 D    1732cK0  6.8  6.1v  92+ 148     52  95  75S 131 213 109 +0.4 -2.1 +1.7-1.7 .345    1.4     11 59 23.9   1 49 36 400.2 669.5
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.29sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4 26 46.2 d  138955 K2  7.2  6.5   97+ 160     75 223  88N 111  68  90 -1.8 -0.1 +3.1-1.3 .281   27.2     12 45 32.0 - 4 48 39 397.6 609.5
24 Apr 26  4 33 53.7 R    2269cB5  5.4  5.4   95- 154     47 137  66S 266 315 256 -5.0 +5.2 +2.9+0.4 .290 -143.8     15 53 53.9 -24 31 59 388.6 678.2
24 Apr 26  8  1  5.1 R    2286kB5  5.4  5.5v  95- 153     53 211  57N 324 289 313 -5.9 +5.6 +2.6-2.8 .252  146.4     15 58 34.9 -24 49 53 387.7 568.0
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  24%
24 Apr 30  7 12  5.1 r  188688 G8  7.7  7.2   62- 104     33 128  74S 244 306 255 -5.1 +7.2 +2.1+1.3 .362 -159.3     19 54 10.3 -26 41 46 374.7 703.3
24 Apr 30  7 38 50   gr   2910cG3  4.7  4.3   62- 104     38 131  -3N 353  49   4 -5.2 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 374.1 669.9
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Apr 30  7 38 51   Gr   2910cG3  4.7  4.3   62- 104     40 ** GRAZE: CA -2.5N; Dist.  4km in az.  12deg. [Lat =  6.35-0.22(E.Long+75.33)]
   Distance of 2910 to Terminator = 0.5"; to 3km sunlit peak = 0.0"
24 Apr 30  8 19  9.2 r  188724cF5  7.7  7.5   62- 104     45 139  85N 265 312 276 -5.3 +7.2 +2.6+0.4 .345  174.7     19 55 52.2 -26 33  0 373.4 626.8
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.22sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Apr 30  9 20 40.9 d    2914cG8  4.8  4.4   62- 104     54 154 -30N  19  48  31 -5.6 +7.2 +2.3+4.3 .192   54.0     19 58 57.2 -26 11 45 372.7 592.5
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Apr 30 10 22 20.1 R    2914cG8  4.8  4.4   62- 103  -7 58 178  48N 302 304 313 -5.8 +7.2 +4.5-2.4 .193  126.1     19 58 57.2 -26 11 45 372.3 592.5
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 May 10 23 58 56.6 d   77551cB9  8.3  8.2   10+  37     24 299  63N  55 319  56 +5.1 -6.5 +1.8+1.3 .332   45.3      5 47 14.3  28 37 26 377.5 863.0
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -1.9sec
     77551 is a close double. Observations are highly desired
24 May 11  0 34 55.9 d   77582 B3  8.4  8.3   10+  37     16 298  61S 111  20 112 +5.1 -6.5 +0.1-0.9 .497  -11.3      5 48 41.3  28 19 29 378.4 929.9
24 May 11 23 41  6.0 d   78745 K2  8.6  8.0   17+  49  -8 40 302  54S 126  19 121 +5.5 -6.9 +0.9-1.6 .386  -16.8      6 47 32.4  28 11 42 381.5 745.2
24 May 12  0 48 18.7 d   78776 K5  8.1  7.3   18+  49     26 298  60N  61 324  56 +5.3 -6.7 +1.9+1.1 .308   48.3      6 49 41.2  28 19  4 383.1 860.0
24 May 12 16 58 38.1 d    1149SK5  4.1  3.3s  24+  59  78 26  63  44S 142 239 133 +6.9 -6.9 +2.3-2.6 .251  -53.2 .03  7 35 55.4  26 53 45 386.8 786.7
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.05sec : AB 4.1 13.2 57"  39.0, dT = -52sec
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 17 21  4   Gr   1149SK5  4.1  3.3s  24+  59  73 31 ** GRAZE: CA  6.4S; Dist.358km in az. 157deg. [Lat =  2.80+0.43(E.Long+75.33)]
24 May 12 17 46  9.2 r    1149SK5  4.1  3.3s  25+  59  73 36  61 -31S 218 320 208 +6.7 -7.0 +0.4+3.4 .225 -126.6 .03  7 35 55.4  26 53 45 385.9 705.4
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.15sec : AB 4.1 13.2 57"  39.0, dT = +252sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 23 46 17.4 d    1173WB8  7.9  7.9   26+  61  -9 50 305  53N  60 306  50 +5.4 -6.8 +4.2+2.0 .197   57.3      7 45 53.0  26 43 32 386.1 683.9
24 May 13  2  4 21.3 D    1181cG8  7.0        26+  62     21 296  59N  67 333  56 +5.0 -6.5 +1.5+0.8 .315   49.0      7 49 47.7  26 15 50 389.2 905.7
      1181 is double: AB 7.04 10.09 0.40" 200.1, dT = -0.9sec
      1181 is a close double. Observations are highly desired
24 May 15  2 29 14.6 d   98640 K0  8.0  7.5   46+  85     38 289  78S 121  24 103 +3.6 -5.3 +1.0-1.4 .404    6.9      9 33 38.6  18 44 12 396.2 782.1
24 May 17  0 39 14.8 D    1603 A0  7.2  7.2   64+ 107     85 307  73N  97 330  75 +1.8 -3.5 +4.1-0.5 .232   41.6     11  2 32.9   9 10 23 397.9 598.7
24 May 17  2  8 10.1 d  118637 F5  8.1  7.9   65+ 107     64 277  85S 119  25  97 +1.5 -3.3 +2.3-1.6 .318   18.2     11  3 43.5   8 43 48 398.6 647.9
24 May 19  1  1 12.7 d  138796cG5  8.0  7.6   81+ 129     77 131  74S 130 178 108 -0.7 -0.8 +2.3-1.9 .314    9.7     12 27 46.4 - 2 23  7 397.5 613.6
    138796 is double: ** 9.2 9.2 0.10"  90.0, dT = +0.25sec
    138796 has been reported as non-instantaneous (OCc 140). Observations are highly desired
24 May 19  2 38 15   M    1790 M4  6.9  6.0v  82+ 129     74 238  25N  48 351  27 -1.1 -0.5 +9.9+9.9 .000   90.0     12 29  9.7 - 2 25 46 397.5 611.5
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 May 19 23 42 12.0 d    1890 K0  7.3  6.8   88+ 140  -8 48 109  79N 101 172  80 -1.5 +0.4 +2.3-0.4 .309   32.8     13  9 46.3 - 7 39 19 397.3 708.0
24 May 21  3 44 21.3 D    2002 K0  6.8  6.3   94+ 152     67 206  89N 105  79  87 -3.4 +2.4 +3.3-0.9 .277   26.9     13 58 29.8 -14  7 19 393.1 593.3
24 May 23  3 49 28   m    2227SK0  5.8  5.2  100+ 174     58 159  59N  33  55  21 -4.6 +5.0 +9.9+9.9 .000   90.0     15 37 48.0 -23  8 30 386.7 607.9
      2227 is triple: **     5.5 0.010" 102.0 : ** 3.4 8.9 0.010" 102.0
   Distance of 2227 to Terminator = 3.9"; to 3km sunlit peak = 0.0"
24 May 24  1 28  8.8 D    2366dM1  1.1  0.1v 100- 172     24 123 -65S 157 226 150 -4.4 +5.7 -0.4-2.2 .343  -40.7 .13 16 29 24.5 -26 25 55 386.3 846.2
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -4sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 23 39.3 R    2366dM1  1.1  0.1v  99- 172     36 129  36S 257 317 249 -4.5 +5.8 +2.4+0.9 .307 -139.5 .14 16 29 24.5 -26 25 55 385.1 754.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 3.3"; to 3km sunlit peak = 0.0"
24 May 24  3 43  1.4 r    2373 K1  6.1  5.5   99- 171     49 144  64S 284 325 277 -4.7 +6.0 +2.4-0.5 .340 -167.8     16 31 22.8 -26 32 16 383.8 647.5
   Distance of 2373 to Terminator = 8.7"; to 3km sunlit peak = 1.2"
24 May 28  6 26 24.9 r    3012 A7  6.9  6.8   76- 121     39 128  17S 185 244 199 -3.5 +6.7 +2.7+7.1 .128 -109.8     20 38  4.9 -24 13 44 371.6 681.5
24 May 28  8 37 24.5 R    3018 G8  6.4  6.0   75- 121     58 162  85S 253 272 268 -4.0 +6.6 +3.0+0.8 .334  170.3     20 40 11.8 -23 46 26 369.9 608.8
24 May 29  7 20 49.8 r  164498cF3  8.0  7.7   65- 108     41 123  82N 260 323 278 -2.8 +5.9 +2.1+0.6 .375  165.0     21 35 19.0 -19 14 41 368.9 694.4
    164498 is double: ** 9.1 9.1 0.10"  90.0, dT = +0.26sec
    164498 has been reported as non-instantaneous (OCc  70). Observations are highly desired
24 May 29  7 24 39   m    3164SB3  4.5  4.6v  65- 108     42 123  -8S 155 217 173 -2.8 +5.9 +9.9+9.9 .000  -90.0     21 37  4.8 -19 27 58 368.9 692.1
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7 : AB 4.5 10.1 66"  45.9
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 May 29  8 33 34.6 r  164528 B8  7.5  7.5   65- 107     55 137  44S 206 252 224 -3.0 +5.8 +1.8+2.8 .304 -147.4     21 37 37.7 -19 13 52 367.8 644.5
24 May 31  7 28 20.9 r    3436kF0  7.9  7.7   43-  81     24 100  66N 271 351 292 -0.8 +3.4 +1.1+0.2 .413  148.4     23 21 14.6 - 7  1 23 366.9 862.2
24 Jun  1  8 41  2.4 r  128649cA5  8.6  8.4   31-  68     31  94  86S 242 325 264 +0.2 +1.7 +1.0+1.2 .481  171.9      0 14  4.1 - 0  2  0 365.1 859.9
    128649 is double: AB 8.6 12.3 0.20" 198.0, dT = -0.3sec
    128649 is a close double. Observations are highly desired
24 Jun  1 10 25 25.4 r  109113SF8  7.9  7.6   30-  67  -5 56  99  23S 179 259 201 +0.0 +1.4 -0.1+3.7 .284 -132.0      0 17 28.8   0 19 16 363.1 748.4
    109113 is triple: AB 7.9 10.3 10.1" 208.8, dT = -31sec : AC 7.9 12.4 99" 273.3, dT = +25sec
24 Jun  2  8  2 26.8 R     148DA0  7.1        21-  54     11  84  52N 285  10 306 +1.4 +0.1 +0.5-0.4 .388  132.5      1  3 47.1   6 45 53 366.91021.8
       148 is double: AB 7.14 10.44 1.72" 242.8, dT = -3sec
       148 is a close double. Observations are highly desired
24 Jun  2  8 23  9   m     152 F8  7.9  7.7   21-  54     16  84  11N 326  52 347 +1.4 +0.0 +9.9+9.9 .000   90.0      1  4 50.4   7  2 45 366.4 989.9
24 Jun  3  9 48 34.3 r   92748cF5  8.3  8.0   12-  40     24  78  10S 172 261 191 +2.5 -1.8 -1.1+4.1 .244 -116.9      2  0 49.0  13 23  5 366.0 954.9
     92748 is double: ** 9.5 9.5 0.060"  56.0, dT = +0.11sec
     92748 has been reported as non-instantaneous (OCc 429). Observations are highly desired
24 Jun  4 10  7 51.5 r   93190cF   9.1  8.9    5-  27  -9 17  72  46S 215 304 230 +3.7 -3.3 -0.2+1.7 .519 -155.8      2 55 49.5  19  9 13 368.31015.4
     93190 is double: AB 9.3 10.4 0.33"  21.7, dT = +0.6sec
     93190 is a close double. Observations are highly desired
24 Jun  8 19 28 22.9 d    1103 M1  5.8  4.9s   6+  29  51 68 348  54N  52 245  44 +5.2 -6.9 +4.5+3.2 .180   54.5 .02  7 15 57.2  27 53 51 380.7 571.0
   R1103 = 53 Geminorum
      1103 = NSV 3485, 5.75, range 0.01, 2V, Type VAR, Period 6.22084 days
24 Jun  9  0 11 33.9 d   79350 A3  9.4  9.4    7+  30     17 296  34S 146  54 138 +4.4 -6.4 -0.5-1.9 .421  -33.9      7 23 24.1  26 49 44 385.7 947.7
24 Jun 10  0 10 38.2 D   80089 G5  7.2  6.7   13+  42     29 294  26S 162  66 149 +4.2 -6.1 -0.6-2.7 .335  -42.5      8 19  9.2  24 10 29 389.1 856.3
24 Jun 10  0 53 10.5 D    1251 B9  5.9  5.9   13+  43     20 293  31S 157  65 144 +4.1 -6.0 -0.6-2.3 .382  -38.8      8 20 32.1  24  1 20 390.2 929.2
   R1251 = lambda Cancri
24 Jun 10  1 20 35.0 d   80129 F2  8.4  8.2   13+  43     14 293  68S 120  31 107 +4.1 -6.0 +0.0-1.0 .515   -2.9      8 21 57.6  24  1 26 390.9 976.9
24 Jun 11  0 16 40.8 d   80684kG   8.7  8.4   21+  54     39 291  52S 142  43 126 +3.7 -5.5 +0.4-2.0 .396  -16.2      9 11 45.2  20 25 39 392.5 785.2
24 Jun 11  0 26 56.4 d    1369 G5  8.9  8.3   21+  54     37 291  38S 157  59 140 +3.6 -5.5 +0.0-2.5 .360  -31.2      9 11 45.7  20 21 13 392.7 800.5
24 Jun 11  0 57  1   m   80693 G0  8.4  8.1   21+  54     30 290  20N  34 300  18 +3.6 -5.4 +9.9+9.9 .000   90.0      9 12 42.5  20 40 24 393.4 848.8
24 Jun 11  0 57 15   Gr  80693 G0  8.4  8.1   21+  54     28 ** GRAZE: CA 20.0N; Dist. 15km in az. 216deg. [Lat =  6.15-0.72(E.Long+75.33)]
24 Jun 12  0 25 41.7 D   98892dK0  7.7  7.1   29+  65     48 287  79S 120  22 101 +2.8 -4.6 +1.4-1.4 .373   11.0     10  0 31.6  15 51 51 395.3 728.0
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +25sec
24 Jun 12  1  7 16.5 D   98897 K0  7.6  7.0   29+  66     39 285  74S 125  31 106 +2.7 -4.5 +0.9-1.5 .407    3.9     10  1 20.7  15 40 14 396.1 782.9
24 Jun 13  2  3  5.9 d   99296kA3  8.0  7.9v  39+  77     35 278  61N  82 353  61 +1.5 -3.3 +2.0+0.1 .275   47.3     10 47 46.5  10 26 37 399.0 785.1
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase   7%
24 Jun 13  2 58 54.9 d   99302kA0  7.4  7.3   39+  77     22 278  71N  92   5  71 +1.4 -3.2 +0.9-0.4 .371   33.7     10 49  3.3  10  9 28 400.4 866.2
24 Jun 15  3 51 37.4 d    1760pK0  7.5  7.0   58+ 100     27 265  83S 120  38  98 -1.4 -0.5 +1.0-1.4 .400    5.2     12 15  0.0 - 1 19 36 400.9 780.2
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +40sec
24 Jun 17  1 49 19.1 d    1957kG5  7.7  7.2   76+ 121     68 214  82S 118  83  99 -3.2 +2.1 +2.8-1.5 .298   15.4     13 39 17.8 -12  5 32 394.3 592.0
24 Jun 20  3 26 18.4 d  184209KK0  7.7  7.2   96+ 156     58 183  41S 139 136 129 -5.3 +5.8 +2.4-2.3 .278  -25.6     16 11 51.3 -25 53  1 382.8 573.1
24 Jun 22  1 18 48   D    2617cK0  4.6  4.1  100- 175     25 125  58N  22  89  23 -4.3 +6.8 +9.9+9.9 .067   81.3 .03 18  8  5.0 -28 27 26 377.3 810.5
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = +4sec
      2617 is a close double. Observations are highly desired
   Distance of 2617 to Terminator = 2.9"; to 3km sunlit peak = 0.0"
24 Jun 22  1 24  9   Gr   2617cK0  4.6  4.1  100- 175     27 ** GRAZE: CA 65.9N; Dist. 20km in az.  31deg. [Lat =  6.53-0.61(E.Long+75.33)]
   Distance of 2617 to Terminator = 3.6"; to 3km sunlit peak = 0.0"
24 Jun 22  1 29 44   R    2617cK0  4.6  4.1  100- 175     27 126  74N   4  70   6 -4.3 +6.8 +9.9+9.9 .065   98.7 .03 18  8  5.0 -28 27 26 377.1 791.2
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = -4sec
      2617 is a close double. Observations are highly desired
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 2617 to Terminator = 3.8"; to 3km sunlit peak = 0.0"
24 Jun 22  8  6 45.3 r    2645 A5  6.2  6.1  100- 174     36 227  55S 293 237 295 -5.6 +6.9 +2.6-1.3 .316  143.0     18 17 24.1 -28 39  7 375.2 720.7
   Distance of 2645 to Terminator = 3.6"; to 3km sunlit peak = 0.0"
24 Jun 23  0 27 37.2 r    2784cK1  3.3  2.7   98- 166      2 118  71N 303  25 310 -3.6 +6.8 -0.3-0.8 .480  151.8     19  6 56.4 -27 40 14 376.2 994.4
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 309.8, dT = -0.02sec
24 Jun 25  4 35 11.6 R    3106 K0  5.2  4.6   87- 138     32 119  45N 303  11 320 -2.0 +6.0 +1.5-1.7 .259  128.1     21 15 37.9 -20 39  6 367.7 748.8
   R3106 = phi Capricorni
24 Jun 25  6  5 44   Gr   3116 K0  6.6  6.1   87- 138     51 ** GRAZE: CA 13.8N; Dist. 31km in az. 343deg. [Lat =  6.61+0.31(E.Long+75.33)]
24 Jun 25  6 12 57   R    3116 K0  6.6  6.1   87- 138     52 134  24N 324  13 341 -2.2 +6.0 +9.9+9.9 .061   99.4 .01 21 18 26.1 -20 20  8 366.0 656.1
24 Jun 26  6 39 35.3 r  164948kF2  7.2  7.0   78- 124     50 122  61S 222 283 242 -1.1 +4.8 +1.8+2.0 .380 -165.4     22 14 37.2 -15  6  6 364.9 694.5
24 Jun 26  7 42 57   m  164962cK2  7.9  7.2   78- 124     62 138  19N 322   6 342 -1.3 +4.7 +9.9+9.9 .000   90.0     22 16  0.7 -14 26  9 364.1 666.6
    164962 is double: ** 8.7 8.7 0.050"
    164962 has been reported as non-instantaneous (OCc1619). Observations are highly desired
24 Jun 26  8 32 55.5 r    3271 F5  7.2  6.9   78- 124     68 162  65S 226 244 246 -1.4 +4.6 +2.0+1.8 .376 -176.8     22 16 56.3 -14 39 25 363.8 664.8
24 Jun 27  9 22  7.8 r    3404PG0  7.3  7.0   67- 110     75 154  62N 276 302 297 -0.4 +3.1 +4.2-0.4 .245  129.2     23 10 24.7 - 7 48 43 363.1 682.2
      3404 is double: AB 5.9 10.7 42" 256.0, dT = -160sec
24 Jun 28  7 20 41.9 r    3528 F0  7.5  7.3v  56-  97     41  98  53S 210 290 232 +1.1 +1.8 +0.9+2.2 .419 -158.4     23 59 35.0 - 1 51  0 365.3 797.3
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jun 28  8 27 12.2 r Neptune     7.9  7.9   56-  97     57 102  74N 263 339 285 +1.0 +1.7 +2.6+0.6 .339  144.4      0  0 30.6 - 1 20 11 364.2 735.5
   Neptune limb contacts offset by ±3.6 secs, at  8 27  8.5 and  8 27 15.8  Both contacts are against the bright limb of Neptune
24 Jun 28 10 26 53.1 r  128552wK0  8.1  7.4   55-  96  -6 82 159  78S 234 255 256 +0.6 +1.4 +2.2+1.6 .383  168.6      0  2 57.1 - 0 53 38 363.2 689.3
    128552 is double: AB 8.2 13.4 25.8"  75.6, dT = +63sec
24 Jun 29 10 19 34.0 r     120pG5  7.9  7.4   44-  83  -8 74  90  54S 211 299 232 +1.8 -0.3 +1.3+2.4 .389 -166.8      0 53 58.2   5 48 33 364.2 705.7
       120 is double: ** 7.9      0.10"  51.0, dT = +0.23sec
       120 has been reported as non-instantaneous (OCc1778). Observations are highly desired
24 Jul  2  9 48 10.0 R   76001 K0  8.2  7.6   14-  44     29  67  80S 251 346 263 +4.6 -4.5 +0.7+0.8 .492  168.6      3 34 30.3  22 45 34 372.5 906.8
24 Jul  2 15 26 45.5 d     537SB6  3.7  3.8s  13-  42  61 63 314 -65N  57 289  69 +3.6 -5.2 +2.7+1.5 .335   11.7      3 44 52.5  24  6 48 370.5 614.3
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.3sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.5"       : AB 3.7 13.0 98" 144.0, dT =
+17sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Jul  2 16 40 37.4 d     541SB8  3.9  3.9s  13-  42  72 48 300 -14N   6 257  18 +3.4 -5.3 +2.7+7.4 .129   69.7      3 45 49.6  24 22  4 371.5 668.2
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +348sec : AB 3.8 13.7 113"  72.8, dT = +347sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Jul  2 16 53 27.8 R     537SB6  3.7  3.8s  13-  41  73 45 298  84N 269 162 280 +3.4 -5.3 +2.0-0.1 .371  168.0      3 44 52.5  24  6 48 371.8 684.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.46sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.5"       : AB 3.7 13.0 98" 144.0, dT =
+150sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Jul  2 16 55  6   Gr    541SB8  3.9  3.9s  13-  41  74 44 ** GRAZE: CA  5.3N; Dist.109km in az.   7deg. [Lat =  7.30-0.12(E.Long+75.33)]
24 Jul  2 17  3 27.4 D     552SB7  2.9  2.9s  12-  41  73 44 298 -76S  96 351 108 +3.3 -5.3 +1.9-0.5 .363  -19.2      3 47 29.1  24  6 18 371.9 693.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.03sec : AE 2.8 15.0 78" 232.4, dT = -155sec : AB 2.8 6.3 118"
291.1, dT = -314sec
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17  8 28.7 R     541SB8  3.9  3.9s  12-  41  73 42 298  25N 328 223 339 +3.3 -5.3 +0.9-6.4 .135  110.3      3 45 49.6  24 22  4 372.1 701.5
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +220sec : AB 3.8 13.7 113"  72.8, dT = +222sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Jul  2 17 27 32.9 r     545SB6  4.1  4.2v  12-  41  72 38 296  43S 215 114 226 +3.3 -5.3 +2.2+2.5 .290 -136.1      3 46 19.6  23 56 54 372.4 727.4
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.25sec : AB 4.2 14.4 110" 180.2, dT = -312sec : AC 4.2 12.9 147" 336.0, dT = +261sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 18  8 40.8 d     560SB8  3.6  3.7s  12-  41  67 29 294 -45S 128  31 139 +3.2 -5.3 +0.6-2.2 .301  -46.3      3 49  9.7  24  3 12 373.3 787.5
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.03sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.6sec : AC 3.6 15.0 50"  36.5, dT = -4sec : AH
3.6 16.0 68" 221.6, dT = -15sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 18 17 48.8 R     552SB7  2.9  2.9s  12-  41  66 27 294  71S 243 148 254 +3.2 -5.3 +1.4+0.8 .421 -161.3      3 47 29.1  24  6 18 373.6 805.6
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.06sec : AE 2.8 15.0 78" 232.4, dT = -183sec : AB 2.8 6.3 118"
291.1, dT = -187sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 57 44.6 r     560SB8  3.6  3.7s  12-  41  58 18 293  45S 217 126 229 +3.1 -5.3 +1.5+2.0 .334 -133.9      3 49  9.7  24  3 12 374.5 875.5
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = +0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = +0.32sec : AC 3.6 15.0 50"  36.5, dT = +149sec :
AH 3.6 16.0 68" 221.6, dT = -204sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  9  0 30 19.5 d    1431WB9  8.3  8.3    9+  35     17 286  12S 182  94 164 +2.7 -4.5 -1.1-3.7 .248  -59.4      9 42 18.8  17  4 56 396.5 934.0
      1431 is double: AB 8.3 11.4 18.0" 224.2, dT = +54sec
24 Jul 10  0 29 23.6 D   99157pF2  7.4        16+  46     28 280  77S 122  33 102 +1.7 -3.5 +0.6-1.3 .434    5.4     10 29 25.6  12 11 13 398.3 842.5
     99157 is double: AB 7.69 8.76 0.10"  94.3, dT = +0.2sec
     99157 is a close double. Observations are highly desired
24 Jul 11 23 45 35.3 d  119112 K5  8.3  7.5   32+  68  -7 57 262  89N 112  32  91 -0.5 -1.0 +2.4-1.3 .312   22.8     11 55  3.9   1 19  2 398.9 655.0
24 Jul 12  0 19 44.7 D  119114 F2  7.2  7.0   32+  68     49 264  67S 136  55 114 -0.6 -1.0 +1.4-2.1 .352   -3.4     11 55 23.9   1  5 45 399.5 684.2
24 Jul 12  2 26  6.9 d  119138 K0  7.4  6.9   32+  69     18 269  43N  67 343  45 -1.0 -0.7 +1.2+1.2 .237   56.8     11 58 13.0   0 52  9 402.3 846.6
24 Jul 12  2 59 53.0 D    1730wK2  6.2  5.5   32+  69     10 269  88S 115  32  93 -1.0 -0.7 +0.3-1.1 .458    5.7     11 59  3.3   0 31 50 403.2 899.9
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +16sec
24 Jul 14  0 15  9.7 d  139285kK0  8.1  7.5   50+  90     64 231  61S 141  89 121 -3.1 +1.8 +2.0-2.4 .307   -7.7     13 20 28.1 -10 11 26 396.9 595.6
24 Jul 14  0 42 25.5 D    1917pG5  7.2  6.7   50+  91     58 239  47N  69   9  48 -3.2 +1.9 +5.3+2.1 .143   62.9     13 21 12.2 - 9 59 57 397.1 605.9
      1917 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.6sec
      1917 has been reported as non-instantaneous (OCc 141). Observations are highly desired
24 Jul 15  4 51  1.6 D    2029 M1  4.9  4.1v  61+ 103     10 252  37S 161  81 143 -5.1 +3.4 +1.2-3.4 .265  -52.6 .02 14 10 50.5 -16 18  7 398.2 841.8
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 16  0 22 35   d  158880cF2  7.5  7.3   70+ 113     64 182  36N  52  50  36 -5.0 +4.4 +9.8+7.0 .078   75.2     14 53 40.1 -19 58 21 390.4 578.0
24 Jul 16  2 31  5.8 d  183010cK0  8.0  7.4   70+ 114     48 229  55N  70  17  55 -5.6 +4.6 +3.2+1.1 .220   45.5     14 56 11.2 -20 23 21 391.0 595.8
    183010 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.43sec
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    183010 has been reported as non-instantaneous (OCc 145). Observations are highly desired
24 Jul 17  6 18 31.6 d    2269cB5  5.4  5.4   80+ 126     10 244  29N  38 320  27 -6.7 +5.6 -0.7+2.5 .249   56.9     15 53 53.9 -24 31 59 389.1 861.2
24 Jul 18  0 53 38.5 d  184563pM0  7.9  7.0   86+ 137     53 155  82N  84 112  77 -5.8 +6.3 +3.3+0.4 .289   28.2     16 42 47.0 -27 11 16 381.1 606.3
    184563 is double: AB 8.8 15.9 10.8" 123.5, dT = +29sec
24 Jul 18  2  6 24.3 D    2405SA2  6.6     s  87+ 137     56 182  67S 115 113 108 -6.0 +6.4 +3.0-1.2 .304   -8.1     16 44 17.4 -27 27 22 380.6 566.2
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = -0.5sec : AC 6.6 14.0 24.3" 195.9, dT = +13sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 18  2 28 15.7 d  184599 F2  7.9  7.7   87+ 137     56 190  74S 108  96 101 -6.1 +6.4 +3.2-0.9 .305   -2.9     16 44 49.8 -27 27 22 380.6 563.6
24 Jul 22  6 34 35.8 r    3062 K2  7.5  6.8   99- 168     60 198  88N 278 259 294 -3.3 +6.0 +3.6-0.5 .285  138.0     20 56 52.7 -22  0 21 361.8 672.7
24 Jul 24  3 36  0.7 r    3339 M0  6.7  5.8v  90- 142     27 106  77S 239 316 260 +0.3 +3.9 +1.1+1.3 .479 -177.8     22 46 14.2 -11  9 59 362.0 842.3
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  5  6 26.9 R    3347 A9  6.2  6.1v  89- 142     48 113  48N 293   1 314 +0.1 +3.7 +3.2-1.5 .219  121.2     22 48 30.2 -10 33 20 360.2 741.0
   R3347 = 70 Aquarii (FM)
      3347 = FM Aqr, 6.16 to 6.19, V, Type DSCTC, Period 0.087 days
24 Jul 24  8 14 26.2 R    3355KF8  6.7  6.5   89- 141     72 204  53S 214 189 235 -0.4 +3.3 +1.4+2.1 .398 -168.5     22 52 46.5 -10  3 32 358.9 707.0
24 Jul 25  7 41  9.5 r    3496 F8  7.3  7.0   80- 127     74 125  88N 249 304 271 +1.3 +1.8 +2.6+1.1 .367  154.9     23 44 32.5 - 3 10 31 359.5 706.1
24 Jul 25  9 42 47.3 R    3505WG8  5.5  5.0   80- 126     71 242  18S 175 113 197 +0.9 +1.4 -0.4+3.9 .270 -131.0     23 47 56.5 - 2 45 42 359.7 719.5
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = +170sec
24 Jul 26  5 55 42.9 r      69 G4  7.5  7.0   70- 114     39  91  82N 255 339 276 +2.9 +0.4 +1.4+0.8 .434  156.2      0 33 54.2   3 19 12 363.1 835.0
24 Jul 27  7 57 44.6 r   92457cK5  8.2        59- 100     57  80  43S 201 296 221 +3.9 -1.6 +0.6+2.6 .387 -153.8      1 29  5.5  10 25 56 364.4 762.9
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.5sec
     92457 is a close double. Observations are highly desired
24 Jul 27  9 36 40.4 R     222 G5  7.0  6.5   58-  99     80  61   9S 167 285 187 +3.6 -1.9 -1.2+4.9 .207 -121.9      1 31 42.7  10 53 22 363.6 689.2
24 Jul 28  8 40 26.4 R     348cA2  6.8  6.7   47-  86     54  69  80N 261   5 279 +4.8 -3.2 +2.2+0.6 .366  148.9      2 22 33.2  16 52 13 367.6 763.1
      348 is double: ** 7.0 9.0
24 Jul 29  6 22 23.8 R     472cA1  4.9  4.9   36-  74     10  70   8S 174 261 188 +5.7 -4.2 -1.7+4.3 .219 -112.3      3 14 54.1  21  2 40 374.61044.7
   R472 = zeta Arietis
      472 is double: ** 5.8 5.8 0.10"  96.0, dT = -0.1sec
      472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 31 14  6 53.8 D     810SB7  1.7  1.7   16-  46  44 67 351 -53N  55 246  58 +5.5 -6.7 +3.1+2.0 .271   28.2      5 26 17.5  28 36 27 377.9 563.3
   R810 = El Nath = beta Tauri
      810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +16sec : AD 1.9 18.5 9.8"  70.0, dT = +35sec : AE 1.9      10.9"  80.0, dT = +37sec : AF 1.9
15.8 11.6" 296.0, dT = -21sec
      810 is a close double. Observations are highly desired
24 Jul 31 15 31 40.2 R     810SB7  1.7  1.7   15-  46  64 57 316  62N 300 172 303 +5.2 -6.7 +2.4-1.7 .288  151.4      5 26 17.5  28 36 27 378.6 603.1
   R810 = El Nath = beta Tauri
      810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -16sec : AD 1.9 18.5 9.8"  70.0, dT = +22sec : AE 1.9      10.9"  80.0, dT = +29sec : AF 1.9
15.8 11.6" 296.0, dT = -40sec
      810 is a close double. Observations are highly desired
24 Aug  1  8 57 45.2 r   78154 A0  8.5  8.4    9-  36      7  62  25S 214 301 212 +6.5 -6.6 -0.9+2.1 .377 -135.2      6 16  3.2  28 12  6 385.7 994.7
24 Aug  6 15 27 31.9 d    1576 A2  5.3  5.3    5+  25  64 40  82  74N  91 181  70 +2.9 -3.5 +2.0+0.2 .301   32.6     10 49 15.4  10 32 43 398.5 690.9
   R1576 = 53 Leonis
24 Aug  8  0 31  3.5 d  118996SK0  8.9  8.3   11+  39     16 271  51N  74 349  52 -0.3 -1.0 +0.9+0.6 .287   50.0     11 41 40.9   2 52 14 402.9 871.1
    118996 is triple: AB 8.9 11.0 2.5" 203.8, dT = -6sec : AC 9.3 14.4 120" 289.6, dT = -340sec
    118996 is a close double. Observations are highly desired
24 Aug  8  1 21 56.0 d    1696 F5  6.9  6.7   11+  39      4 272  43S 159  76 137 -0.3 -1.0 +0.0-2.4 .377  -39.2     11 42 25.5   2 21 44 404.3 953.9
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug  9 23 56 40.1 D  139140 K0  7.9  7.3   25+  60 -10 41 253  61S 142  69 121 -2.8 +1.7 +1.5-2.4 .331  -16.0     13  4 47.0 - 8 34 16 400.6 668.6
24 Aug 10  2 28  5.7 D    1886cK3  5.6  5.0   26+  61      6 260  86S 118  35  97 -3.2 +1.8 +0.4-1.1 .452   -2.7     13  8 32.5 - 8 59  4 404.1 887.0
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.2sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 13  0 55 52.2 d  183445pF2  8.1        54+  94     49 223  32S 162 115 149 -6.3 +5.5 +2.3-4.3 .194  -50.3     15 24 53.8 -23 21 34 391.4 575.0
    183445 is triple: AB 8.73 8.84 0.68" 197.4, dT = +2.9sec : AC 8.7 13.0 9.4" 123.2, dT = +38sec
    183445 is a close double. Observations are highly desired
24 Aug 15 23 35 38.6 d  186563 K2  7.8  6.9   82+ 130  -6 44 141  72N  66 111  67 -6.3 +7.2 +3.0+1.3 .298   32.3     18 16 20.4 -28 55 54 375.5 642.5
24 Aug 16  2 16 22.9 d  186672 G5  7.4  6.9   83+ 131     54 192  83S  90  76  93 -6.9 +7.3 +3.2-0.1 .317   -6.9     18 20 25.4 -29  3 59 374.1 579.9
24 Aug 17  3 17 33.3 D    2831kB2  6.0  6.1s  90+ 144     55 193  27S 137 122 145 -6.3 +7.1 +5.4-4.6 .138  -66.4     19 24 30.2 -27 51 57 367.9 616.3
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 17  3 34  8   Gr   2831kB2  6.0  6.1s  90+ 144     54 ** GRAZE: CA  4.5S; Dist.152km in az. 150deg. [Lat =  4.73+0.56(E.Long+75.33)]
   Distance of 2831 to Terminator = 4.2"; to 3km sunlit peak = 0.0"
24 Aug 17  6 28 28.1 D    2848pK1  5.6  4.9   91+ 145     27 235  65N  49 343  58 -6.8 +6.8 +0.4+1.1 .456   16.2     19 29 52.2 -26 59  8 369.5 851.4
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = -1.4sec
      2848 is a close double. Observations are highly desired
24 Aug 18  4 16 48.8 d    2984cG6  7.1  6.6   96+ 157     59 195  76N  50  34  63 -5.2 +6.5 +2.0+1.6 .368   10.1     20 28 29.3 -24  9 48 362.3 657.5
      2984 is double: AB 6.9      0.20"  81.0, dT = +0.46sec
      2984 is a close double. Observations are highly desired
24 Aug 18  4 47 45.5 d    2985SK2  6.8  6.2   96+ 158     56 207  47N  21 351  34 -5.3 +6.4 +0.8+2.8 .306   38.0     20 28 44.2 -23 59  2 362.4 681.5
      2985 is triple: ** 7.7 7.7 0.10"  90.0, dT = +0.12sec : AB 6.8      10.1"  40.0, dT = +31sec
      2985 has been reported as non-instantaneous (OCc1595). Observations are highly desired
24 Aug 19  5  8 42.2 D    3150 F3  6.6  6.4   99+ 171     64 195  79S  54  38  72 -3.7 +5.4 +2.1+1.4 .398   -2.2     21 29 59.6 -19  8 52 357.8 690.9
   Distance of 3150 to Terminator = 11.0"; to 3km sunlit peak = 2.6"
24 Aug 20  4 18 18.4 r    3288 K0  5.8  5.3  100- 173     63 138  56S 243 287 264 -1.6 +4.2 +2.4+1.2 .396  167.7     22 24 27.1 -13 31 46 355.4 699.0
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 4.5"; to 3km sunlit peak = 0.0"
24 Aug 21  1  3 38.4 D Saturn      0.7  0.7   97- 161     10  98 -39N  23 105  45 +0.6 +2.9 +0.4+2.3 .441   39.4     23 15 39.0 - 7  6 51 359.1 992.9
   Saturn ring contacts offset by ±15.1 secs, at  1  3 23 and  1  3 54
   Saturn limb contacts offset by ±19.8 secs, at  1  3 19 and  1  3 58  Both contacts are against the bright limb of Saturn
24 Aug 21  1 51 34.7 R Saturn      0.7  0.7   97- 161     22 100  64N 279 359 301 +0.6 +2.9 +1.0-0.1 .406  140.5     23 15 39.0 - 7  6 51 357.8 913.7
   Saturn ring contacts offset by ±53.2 secs, at  1 50 41 and  1 52 28
   Saturn limb contacts offset by ±23.5 secs, at  1 51 11 and  1 51 58  Both contacts are against the bright limb of Saturn
24 Aug 21  2 29 47.5 r    3422kF0  6.7  6.5   97- 160     31 102  69S 232 310 254 +0.5 +2.8 +1.1+1.5 .492 -174.8     23 16 59.2 - 7  9 39 356.9 854.3
24 Aug 21  5 41 28.4 r  146658 K0  7.3  6.8   97- 159     74 139  87S 248 289 270 +0.1 +2.4 +2.6+1.1 .384  156.9     23 21 15.4 - 6 11 33 354.1 717.4
24 Aug 22  5 21 30   m      26 F5  7.0  6.8   91- 145     62  99  21N 316  36 338 +2.1 +0.7 +9.9+9.9 .000   90.0      0 14 36.6   1 17 49 355.4 759.2
24 Aug 22  8  1 23.9 R      35 K0  6.2  5.7   91- 144     78 249  71S 228 160 250 +1.7 +0.2 +1.9+1.7 .418  176.1      0 17 47.7   1 41 19 355.0 721.0
24 Aug 24 10  9  1.8 R     313cK0  7.1  6.2s  72- 116     70 300  74S 233 116 251 +4.6 -3.5 +2.2+1.6 .379 -179.7      2  8  3.9  15 48 16 361.7 664.3
       313 = NSV 15445, 7.12 to 7.18, Hp
24 Aug 25 10 13  8.3 R   75715cK0  7.3  6.7   61- 102 -11 74 341  60N 284 124 298 +5.8 -4.8 +4.1-1.0 .245  133.8      3  4 15.2  21 28 22 366.0 628.7
     75715 is double: ** 8.2 8.2 0.10" 222.0, dT = -0.19sec
     75715 has been reported as non-instantaneous (OCc 751). Observations are highly desired
24 Aug 26  6 21 31.6 R     587 K0  6.2  5.5   51-  91     26  66  27S 196 291 206 +7.2 -5.4 -0.7+2.7 .353 -134.1      3 57 26.4  24 27 43 373.3 917.6
24 Aug 27  6  6 33.3 r   76841cK1  7.3  6.7   40-  78     10  63  56S 231 319 236 +7.7 -6.1 -0.3+1.3 .521 -161.0      4 55 34.6  27 12  9 379.71015.7
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.13sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 28  8 13 57   m   77830 F2  7.5  7.3   29-  65     25  61  17N 346  82 345 +7.7 -6.8 +9.9+9.9 .000   90.0      6  0 37.0  29  0 19 383.2 847.9
24 Aug 28  9  1 30.0 r   77843 K0  8.8  8.2   29-  65     35  59  90N 273  16 272 +7.6 -6.9 +1.6+0.1 .393  163.0      6  1 18.1  28 48 18 382.3 762.5
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 28  9 47 45.7 R   77883 B2  7.6  7.6   28-  65     44  56  42S 225 336 224 +7.5 -6.9 +0.9+2.2 .315 -147.7      6  2 59.4  28 40 37 381.7 689.6
24 Aug 30  8 55 51.6 R    1196 K1  7.6  7.1   12-  41     10  65  47N 330  58 319 +7.1 -6.5 +1.7-2.9 .248  121.4      7 56 47.9  26  6 19 392.9 906.1
24 Aug 30 10  2 15.5 r   79829 F8  8.7  8.4   12-  41     25  64  69N 309  44 297 +7.0 -6.6 +1.6-1.4 .337  144.9      7 58 39.4  26  1 24 391.5 781.2
24 Aug 31  9 49 20.5 r   80456kG5  9.5  8.9    6-  29     11  69   9S 213 301 198 +6.3 -5.9 -1.2+4.3 .185 -113.9      8 51  9.7  22 13 35 396.3 878.6
24 Sep  8  0 19 14.7 D    2055 K0  7.8  7.2   20+  53     25 247  89S 112  38  95 -4.8 +4.1 +1.4-1.1 .371   -1.0     14 20 27.5 -17 31 42 401.0 720.9
24 Sep  8  0 33 49.5 d  158501wG3  8.3  8.0   20+  53     21 248  72N  94  18  76 -4.9 +4.1 +1.1-0.4 .366   16.8     14 20 53.5 -17 28 53 401.3 743.5
    158501 is double: AB 8.4 17.0 90" 163.0, dT = +86sec
24 Sep  8 23 30 17.8 D    2157 K0  6.1  5.6s  28+  64  -7 43 232  42S 156  98 141 -5.8 +5.3 +2.3-3.6 .222  -44.6     15  6 27.1 -22  1 55 396.7 600.1
      2157 = NSV 6931, 6.17, range 0.09, V
24 Sep  9  0 39 31.6 d  183204pK2  8.0  7.3   28+  64     29 241  64S 134  65 119 -6.0 +5.3 +1.9-2.1 .311  -28.7     15  8 21.6 -22  5 51 397.8 684.0
    183204 is double: AB 8.2 14.1 2.0" 151.0, dT = +6sec
    183204 is a close double. Observations are highly desired
24 Sep  9 20 25 17.5 d    2268MB2  4.5        36+  74  38 54 151  14S 179 211 168 -5.8 +6.0 -0.7-4.9 .169  -57.6     15 53 36.7 -25 19 38 392.6 601.2
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = +0.48sec
      2268 is a close double. Observations are highly desired
24 Sep 10  3  6 53.3 D    2298kK3  5.0  4.3   38+  76      6 243  32S 160  81 150 -7.3 +6.1 +2.6-4.9 .171  -67.9 .01 16  3 20.6 -25 51 55 395.9 875.3
24 Sep 10  3 19 36   Gr   2298kK3  5.0  4.3   38+  76      3 ** GRAZE: CA  9.9S; Dist.129km in az. 154deg. [Lat =  5.02+0.49(E.Long+75.33)]
24 Sep 12  3 59 54.3 D    2586cB3  6.0  6.0   59+ 100     17 237  41N  41 328  41 -8.3 +7.1 -0.2+1.6 .367   36.4     17 58 39.0 -28 45 33 383.9 847.9
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.46sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Sep 13 23 42 30.4 d  188688 G8  7.7  7.2   78+ 124 -11 49 145  44S 121 161 132 -6.6 +7.0 +2.8-1.7 .245  -44.7     19 54 10.3 -26 41 46 369.7 618.8
24 Sep 14  0 49  2.1 d  188724cF5  7.7  7.5   78+ 124     56 166  53S 112 128 122 -6.8 +7.0 +3.7-1.2 .251  -41.5     19 55 52.2 -26 33  0 368.9 599.0
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.16sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  0 52 23.7 D    2910cG3  4.7  4.3   78+ 124     57 167  72N  58  72  68 -6.8 +7.0 +2.7+1.5 .327   12.3     19 55 50.4 -26 17 58 368.9 599.3
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Sep 14  2 25 35.2 r    2910cG3  4.7  4.3   78+ 125     54 204 -90S 255 228 266 -7.1 +6.9 +2.6+0.6 .352  168.5     19 55 50.4 -26 17 58 368.6 643.2
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Sep 14  2 57 26.0 D    2914cG8  4.8  4.4   78+ 125     51 213  63S 102  65 113 -7.2 +6.8 +3.4-0.8 .287  -40.3     19 58 57.2 -26 11 45 368.7 673.3
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 14  3 58 58.0 r    2914cG8  4.8  4.4   79+ 125     41 227 -35S 200 146 211 -7.4 +6.7 +0.1+2.5 .318 -139.4     19 58 57.2 -26 11 45 369.2 750.8
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 15  2 14  8.2 d    3062 K2  7.5  6.8   87+ 138     62 176  13N 351 355   7 -5.9 +6.1 -1.0+6.2 .148   66.3     20 56 52.7 -22  0 21 362.4 645.0
   Distance of 3062 to Terminator = 18.5"; to 3km sunlit peak = 5.4"
24 Sep 16  6  7  0.1 d    3225SG8  7.2  6.6   95+ 153     44 242  82N  55 350  74 -4.9 +4.4 +1.1+1.1 .478   -4.5     22  1 32.9 -15 36 43 357.9 831.6
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0, dT = -16sec : AC 7.2 11.5 109" 291.1, dT = -128sec : AD 7.2 9.9 181" 312.9, dT = -79sec
      3225 is a close double. Observations are highly desired
24 Sep 17  0  1 13.5 D    3347 A9  6.2  6.1v  98+ 165     27 105  47N  14  91  35 -2.1 +3.7 +0.8+3.0 .343   46.6     22 48 30.2 -10 33 20 356.7 862.6
   R3347 = 70 Aquarii (FM)
      3347 = FM Aqr, 6.16 to 6.19, V, Type DSCTC, Period 0.087 days
   Distance of 3347 to Terminator = 18.0"; to 3km sunlit peak = 7.2"
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 17  2 23 23.1 D    3355KF8  6.7  6.5   98+ 166     59 121  89N  55 115  76 -2.4 +3.5 +2.0+1.5 .423   -4.9     22 52 46.5 -10  3 32 353.9 728.2
24 Sep 19  9 36 18.8 r  109485kK2  7.5  6.8   98- 162     36 274  75S 229 142 251 +1.0 -1.3 +1.1+1.3 .490 -173.3      0 49 39.9   6 24 26 354.3 848.1
24 Sep 20  3 43 46   M     240 F0  5.5  5.4   93- 150     46  79  16N 320  53 340 +3.9 -2.1 +9.9+9.9 .000   90.0      1 37  5.9  12  8 30 355.1 852.0
   R240 = pi Piscium
   Distance of 240 to Terminator = 11.7"; to 3km sunlit peak = 2.3"
24 Sep 20  4 20 13.5 R     241 G5  6.8  6.4   93- 150     55  78  69N 267   3 286 +3.8 -2.2 +2.3+0.4 .369  141.6      1 37 40.9  12  4 42 354.6 808.7
24 Sep 21  2 25 22.1 r     371 G5  6.2  5.7   87- 137     15  73  73N 266 354 283 +5.7 -3.5 +0.4+0.4 .530  152.5      2 30 54.4  17 42 14 361.51047.6
   R371 = 27 Arietis
24 Sep 22  4 17  7.8 r   75987pA3  7.2  7.1   77- 122     27  67  52N 292  27 305 +7.1 -5.1 +1.8-0.9 .319  127.2      3 33 23.7  23 22  6 365.5 937.3
     75987 is quadruple: Aa,Ab 7.4 9.1 0.10"       : AB 7.2 12.8 33" 170.0, dT = +55sec : AC 7.2 7.7 69"  32.9, dT = +39sec
     75987 is a close double. Observations are highly desired
24 Sep 22  4 17 44.9 r   75988pG5  7.6  7.0   77- 122     27  67  49N 296  31 308 +7.1 -5.1 +2.0-1.1 .296  124.1      3 33 26.5  23 23  4 365.5 936.3
     75988 is triple: CD 7.7 12.0 10.0" 321.1, dT = -30sec : CA 7.7 7.2 69" 212.9, dT = -30sec
24 Sep 22 10 27 20.3 d     539SB6  4.3  4.4s  75- 120  -7 59 309 -68S  97 336 109 +6.1 -5.8 +2.8-0.5 .326  -25.5      3 45 12.5  24 28  2 364.4 638.5
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.19sec : AC 4.3 14.0 53"  53.5, dT = +118sec : AB 4.3 11.0 72"
328.8, dT = -137sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11  1 29.7 r     536pB7  5.5  5.5   75- 120   2 52 302  20S 185  72 196 +6.0 -5.8 +2.4+7.6 .130 -110.2      3 44 48.2  24 17 22 364.9 665.8
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -120sec : AC 5.4 11.5 218" 196.1, dT = -1645sec
24 Sep 22 11  5 57.1 d     541SB8  3.9  3.9s  75- 120   3 51 302 -27S 138  26 150 +6.0 -5.8 +2.2-4.5 .172  -62.9      3 45 49.6  24 22  4 365.0 668.9
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +277sec : AB 3.8 13.7 113"  72.8, dT = +278sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11 25 39   Gr    541SB8  3.9  3.9s  75- 120   8 44 ** GRAZE: CA  1.7S; Dist.218km in az. 186deg. [Lat =  4.33-0.11(E.Long+75.33)]
   Distance of 541 to Terminator = 9.2"; to 3km sunlit peak = 0.0"
24 Sep 22 11 46 16.9 R     541SB8  3.9  3.9s  75- 120  13 42 298  30S 195  91 207 +5.9 -5.8 +2.6+5.0 .184 -117.2      3 45 49.6  24 22  4 365.8 714.9
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +330sec : AB 3.8 13.7 113"  72.8, dT = +330sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11 47  7.8 r     539SB6  4.3  4.4s  75- 120  13 42 298  68S 233 129 245 +5.9 -5.8 +2.1+1.4 .366 -154.9      3 45 12.5  24 28  2 365.9 716.7
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.15sec : AC 4.3 14.0 53"  53.5, dT = +145sec : AB 4.3 11.0 72"
328.8, dT = +20sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 23  6 26 27.7 R     701SF2  6.6  6.4   66- 108     42  59  60S 231 337 238 +7.9 -6.3 +0.8+1.6 .422 -165.8      4 38 29.5  26 56 23 370.3 781.7
       701 is triple:  6.6 9.2 3.1" 169.4, dT = -4sec : AB 7.36 7.21 4.47" 188.0, dT = -8sec
       701 is a close double. Observations are highly desired
24 Sep 23  6 26 31.4 r X 70481p    7.3  7.2   66- 108     42  59  60S 231 337 238 +7.9 -6.3 +0.8+1.6 .422 -165.9      4 38 29.6  26 56 26 370.3 781.6
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = -8sec : AC 7.4 12.9 92" 203.7, dT = -193sec
   X 70481 is a close double. Observations are highly desired
24 Sep 23  9 54 11.4 r     715cK5  8.0  7.5   65- 107     68 349  61N 291 123 297 +7.3 -6.6 +3.6-1.3 .267  144.4      4 43 35.4  27 41 15 369.5 587.5
       715 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.35sec
       715 has been reported as non-instantaneous (OCc 130). Observations are highly desired
24 Sep 24  7 41 43.9 r   77431 F4  8.1  7.8v  54-  95     44  55  45N 313  64 314 +8.3 -6.9 +3.8-2.8 .203  121.5      5 42 28.1  28 59 56 376.3 710.4
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     77431 = V0356 Aur, 8.00 to 8.16, V, Type DSCT, Period 0.18926777 days
24 Sep 24  9 14 24.0 r   77483DB5  8.0  8.0   54-  95     61  37  74N 284  61 285 +8.0 -7.1 +3.2-0.6 .299  155.0      5 44 37.7  29  1  0 375.5 600.2
     77483 is double: AB 8.1 9.7 8.2"   0.1, dT = -7sec
     77483 is a close double. Observations are highly desired
24 Sep 25  5 57 47.6 r    1022CB7  6.0     s  44-  83     10  62  35S 220 309 216 +8.7 -6.9 -0.7+1.9 .383 -138.7      6 39 33.1  28 15 47 384.8 951.8
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +2.1sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 27 10 14  9.5 R    1290pF8  6.9  6.6   24-  58 -10 43  63  66N 312  56 298 +7.4 -6.3 +2.3-1.9 .300  153.2      8 38 45.5  23 41  9 391.9 638.4
      1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +2109sec
24 Oct  4 23 41 59.5 D  158363 B9  7.3  7.3    4+  23      6 253  74S 133  51 115 -3.7 +3.8 +0.7-1.7 .402  -24.7     14  7 13.8 -16 11 26 404.3 867.7
24 Oct  7  0  7  9.5 D    2248 A2  7.6  7.4S  15+  45     19 242  37N  54 341  42 -6.0 +5.9 +0.4+1.4 .289   42.7     15 44 17.7 -24 23 44 398.4 761.5
      2248 = NSV 20388, 7.59, , Type VAR:
24 Oct  7  0 57 11.1 D    2251KK0  7.5  7.0   15+  46      8 244  74S 124  44 112 -6.1 +5.9 +1.0-1.4 .387  -28.5     15 45 49.8 -24 43  1 399.5 853.0
24 Oct  9 23 59 56.2 D    2688 G6  7.0  6.6s  41+  80     47 213  44S 134  96 137 -7.7 +7.3 +4.7-3.6 .169  -59.0     18 32 14.0 -29 11 25 383.2 608.0
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 10  2 48 27.1 d    2702 K0  6.8  6.3   42+  81     17 238  53N  50 337  54 -8.2 +7.1 +0.1+1.1 .430   21.7     18 37  3.3 -28 30 47 385.3 864.5
24 Oct 13  1 34 35.2 D    3150 F3  6.6  6.4   74+ 119     64 196  67N  46  29  63 -6.4 +5.4 +1.9+1.7 .376    5.4     21 29 59.6 -19  8 52 364.6 667.9
24 Oct 13  2 35 14.7 d  164449DF0  7.2        74+ 119     56 221  36S 123  80 140 -6.6 +5.3 +7.2-4.5 .122  -72.5     21 31 25.5 -19 14 15 364.8 716.6
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = +11sec
    164449 is a close double. Observations are highly desired
24 Oct 14  0 34 39.4 D    3288 K0  5.8  5.3   83+ 132     62 135  85N  60 107  80 -4.9 +4.2 +2.3+1.4 .388   -9.1     22 24 27.1 -13 31 46 359.6 685.0
   R3288 = 50 Aquarii
24 Oct 14  1 23 26.9 d  165049 M3  7.7  6.9s  83+ 132     69 158  29N   5  27  25 -5.0 +4.1 +0.4+3.5 .283   43.7     22 24 33.0 -13 11  6 359.1 681.8
    165049 = NSV 25892, 7.70, range 0.02, 2V, Type VAR, Period 16.15248 days
24 Oct 14 23 20 14.4 d    3422kF0  6.7  6.5   91+ 145  -9 38 104  75S  79 156 101 -3.0 +2.8 +1.6+0.7 .430  -24.1     23 16 59.2 - 7  9 39 357.3 815.7
24 Oct 15  2 37 38.6 d  146658 K0  7.3  6.8   92+ 146     77 169  82S  72  83  93 -3.5 +2.3 +2.8+0.9 .369  -27.4     23 21 15.4 - 6 11 33 354.4 714.5
24 Oct 15  2 56 23.1 D    3432cK0  6.2  5.6   92+ 147     78 191  32N   7 355  28 -3.5 +2.3 +0.4+3.2 .332   37.4     23 20 40.9 - 5 54 29 354.4 717.4
24 Oct 16  2 36 31.7 d      26 F5  7.0  6.8   97+ 161     74 107  50N  25  97  47 -1.4 +0.5 +1.1+2.4 .410   19.1      0 14 36.6   1 17 49 351.9 740.9
24 Oct 16  4 22 45.2 d      32 M5  7.0  6.1v  97+ 161     78 249  46N  22 314  44 -1.7 +0.2 +1.0+2.5 .397   22.2      0 16 39.4   1 51  2 351.6 731.7
       32 = BV Psc, 6.89 to 7.07, Hp, Type SRB:
24 Oct 16  4 44 17.6 D      35 K0  6.2  5.7   97+ 162     73 255  64S  92  18 114 -1.7 +0.1 +3.5-0.2 .295  -47.0      0 17 47.7   1 41 19 351.8 737.8
24 Oct 18  5  5 32.4 r     313cK0  7.1  6.2s  99- 169     80  22  78N 248  45 266 +2.7 -3.5 +2.5+1.0 .394  161.5      2  8  3.9  15 48 16 352.3 709.2
       313 = NSV 15445, 7.12 to 7.18, Hp
   Distance of 313 to Terminator = 16.1"; to 3km sunlit peak = 6.0"
24 Oct 19  6 28 24.0 r   75764SF0  7.6        95- 154     74 353  70S 226  54 241 +4.5 -5.1 +2.1+1.9 .377 -168.3      3 10  6.6  21 44 49 355.8 664.3
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +1.3sec : AB,C 7.6 13.5 48"  44.0, dT = +128sec : AB,D 7.6 15.8 55" 159.0, dT = -56sec
     75764 is a close double. Observations are highly desired
24 Oct 19  6 58 29.1 r     461cK0  7.2  6.7   95- 154     72 331  82S 238  90 253 +4.4 -5.1 +2.4+1.4 .381 -178.2      3 10 39.9  21 53 34 356.0 657.7
24 Oct 19  7 33 17.8 r   75777 B9  7.6  7.5   95- 154     66 314  61N 275 145 290 +4.3 -5.2 +3.1-0.4 .322  147.6      3 11 19.5  22 10 14 356.3 659.4
24 Oct 20  7 53 10.1 r   76514 G5  7.2  6.9   88- 140     68 340  82N 262 105 271 +6.0 -6.3 +3.0+0.3 .348  168.7      4 14 32.2  26 15 21 361.1 621.1
24 Oct 20  9 15 58.9 r   76530 K3  7.8  7.0   88- 140     56 310  89N 256 134 265 +5.7 -6.3 +2.6+0.5 .370 -177.5      4 16 41.6  26 21 29 362.0 651.0
24 Oct 21  2 58  8.3 r     771SA5  6.1  5.9e  81- 129     13  63  49N 302  32 307 +7.9 -6.4 +1.2-1.1 .352  128.6      5  9 45.1  28  1 50 370.11011.2
       771 is triple: Aa,Ab 6.0      0.20" 351.0, dT = -0.38sec : A,BC 6.0 9.1 11.2"  29.1, dT = -1.8sec
       771 is a close double. Observations are highly desired
       771 = V1156 Tau, 6. to 6.1, Hp, Type E:, Period 1.40266 days, Phase  62%
24 Oct 21  7  2 27   m   77089 A*  7.3  7.1   80- 127     61  37   8N 344 121 348 +7.5 -6.9 +9.9+9.9 .000   90.0      5 18 15.4  28 46 48 367.0 634.5
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 77089 to Terminator = 14.1"; to 3km sunlit peak = 1.4"
24 Oct 21 10 32 12.0 r   77138 A*  7.6  7.4   79- 126  -5 53 310  61S 233 113 236 +6.7 -6.9 +3.0+1.8 .283 -140.6      5 23  1.4  28 28  8 368.4 654.2
24 Oct 21 11  9  9.2 D     810SB7  1.7  1.7   79- 126   4 46 305 -81S  92 340  95 +6.6 -6.9 +2.0-0.3 .388    2.9      5 26 17.5  28 36 27 369.1 696.3
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -2sec : AD 1.9 18.5 9.8"  70.0, dT = +23sec : AE 1.9      10.9"  80.0, dT = +27sec : AF 1.9 15.8
11.6" 296.0, dT = -27sec
       810 is a close double. Observations are highly desired
24 Oct 21 12 25 41.2 R     810SB7  1.7  1.7   79- 125  23 30 299  72N 281 182 284 +6.5 -6.8 +0.9-0.6 .454  176.6      5 26 17.5  28 36 27 370.8 818.6
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -5sec : AD 1.9 18.5 9.8"  70.0, dT = +18sec : AE 1.9      10.9"  80.0, dT = +22sec : AF 1.9 15.8
11.6" 296.0, dT = -25sec
       810 is a close double. Observations are highly desired
24 Oct 22  4 35 26.4 r   78165cA2  7.4  7.2v  71- 115     21  61  59N 300  34 298 +8.6 -6.9 +1.5-1.0 .364  138.1      6 16 22.2  28 51  7 376.0 892.4
     78165 is double: ** 7.6 9.1
     78165 = V0395 Aur, 7.34 to 7.43, V, Type ELL, Period 23.166 days, Phase  64%
24 Oct 22  8  4 59.2 r   78282 K0  7.8  7.1   70- 114     61  36  84S 264  42 261 +8.1 -7.1 +2.9+0.4 .327 -176.7      6 22 28.1  28 54 43 373.5 594.1
24 Oct 23  8 11 27.9 r   79358 K2  7.7  7.0   60- 101     53  51  33N 334  94 326 +8.4 -7.0 +3.5-4.7 .171  121.3      7 23 56.5  27 47 40 380.3 608.0
24 Oct 23  8 56  2   M    1122cG9  3.8  3.3   60- 101     61  40  -2N  10 143   1 +8.2 -7.0 +9.9+9.9 .000   90.0      7 25 43.6  27 47 53 380.0 574.3
   R1122 = iota Geminorum
24 Oct 23  8 56 15   Gr   1122cG9  3.8  3.3   60- 101     61 ** GRAZE: CA -2.1N; Dist. 71km in az. 180deg. [Lat =  5.68-0.00(E.Long+75.33)]
   Distance of 1122 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Oct 23  9  0 28.8 R    1119 F0  5.8  5.6V  60- 101     62  39  72N 296  71 287 +8.2 -7.0 +3.1-1.2 .299  164.3      7 24 33.5  27 38 16 380.0 571.6
   R1119 = 59 Geminorum
      1119 = HD 57927, 5.77, , Type DSCT
24 Oct 24  6 52 29.7 r   80070 K0  7.5  7.0   50-  90     26  65  83S 276  12 264 +8.5 -6.4 +1.2+0.0 .406 -179.4      8 17 36.3  24 50 14 388.0 764.3
24 Oct 26  6 50 31.4 r    1462 K0  7.3  6.6   30-  67      4  74  70N 311  36 292 +7.0 -4.6 +0.5-1.2 .429  155.9      9 57 33.7  16 27 33 399.4 910.9
24 Oct 26  8 36 38.2 r   98892dK0  7.7  7.1   30-  66     29  75  24S 226 317 207 +6.8 -4.6 +1.2+5.0 .143 -112.2     10  0 31.6  15 51 51 397.1 730.2
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +41sec
24 Oct 27 10 17 16.3 d    1576 A2  5.3  5.3   21-  55  -8 43  82 -52N  76 168  56 +5.3 -3.3 +2.6+1.3 .231   48.1     10 49 15.4  10 32 43 399.0 670.4
   R1576 = 53 Leonis
24 Oct 29  9 23 35.4 r  138631kK0  9.3  8.8    8-  33     11  92  82N 303  26 281 +2.8 -0.6 +0.3-0.9 .457  179.0     12 10 51.1 - 0 26 40 404.9 896.9
24 Nov  5 23 36 58.5 D  186563 K2  7.8  6.9   18+  50     30 231  90N  93  31  95 -6.8 +7.1 +1.7-0.3 .369  -18.7     18 16 20.4 -28 55 54 388.2 733.4
24 Nov  6  0 23 33.9 D    2645 A5  6.2  6.1   18+  50     21 236  43N  45 336  47 -6.9 +7.0 +0.1+1.4 .378   28.7     18 17 24.1 -28 39  7 389.0 813.5
24 Nov  6  0 47 26.6 d  186621 A2  8.7  8.5   18+  50     17 238  57N  60 347  62 -7.0 +7.0 +0.2+0.8 .440   14.3     18 18 21.2 -28 39 19 389.4 857.0
24 Nov  8 23 20 52.5 D    3089SA0  5.3  5.3   47+  86 -10 62 192  75S  89  76 105 -6.4 +5.7 +3.5+0.0 .287  -35.1     21  8 33.6 -21 11 37 372.6 633.2
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +9sec : AF 5.3 13.0 9.7"  14.0, dT = +9sec : AG 5.3 20.0 13.1"  62.0, dT = +41sec : AC 5.3 15.0
35" 114.8, dT = +109sec
      3089 is a close double. Observations are highly desired
24 Nov  9  0 31 44.8 r    3089SA0  5.3  5.3   47+  87     54 220 -33S 197 154 213 -6.6 +5.6 +0.4+2.8 .311 -144.4     21  8 33.6 -21 11 37 372.9 692.4
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +31sec : AF 5.3 13.0 9.7"  14.0, dT = +31sec : AG 5.3 20.0 13.1"  62.0, dT = +30sec : AC 5.3
15.0 35" 114.8, dT = -16sec
      3089 is a close double. Observations are highly desired
24 Nov  9  1  0 17.2 D    3092 F2  6.3  6.1   47+  87     50 228  19N   2 310  18 -6.7 +5.5 -0.6+3.6 .253   50.7     21  9 33.0 -20 33 24 373.1 723.1
   R3092 = 27 Capricorni
24 Nov  9  2 11 30.9 d  190114 F5  8.0  7.7   48+  87     36 239  62N  45 339  61 -6.9 +5.3 +0.7+1.3 .445    8.7     21 12  2.9 -20 19 59 373.9 816.7
24 Nov 10  2 27 59.5 D    3236KF3  7.1  6.9   59+ 100     46 241  62N  40 336  60 -6.2 +4.1 +0.9+1.6 .435    8.9     22  6 13.2 -14 53 45 368.3 786.4
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 10  3 39 38.1 D    3240 A2  6.7  6.6   59+ 101     30 250  37N  16 302  35 -6.4 +3.9 -0.1+2.3 .393   37.0     22  7 35.3 -14 29 27 369.5 883.0
24 Nov 11  1 50 37.4 D Saturn      0.9  0.9   70+ 113     66 231  86N  62  11  84 -5.1 +2.7 +2.2+1.1 .389  -17.7     22 58 12.9 - 8 52 27 362.6 718.1
   Saturn ring contacts offset by ±44.3 secs, at  1 49 53 and  1 51 22
   Saturn limb contacts offset by ±22.6 secs, at  1 50 15 and  1 51  0  Both contacts are against the bright limb of Saturn
24 Nov 11  3  4 59.8 R Saturn      0.9  0.9   70+ 114     50 248 -53S 209 140 231 -5.3 +2.5 +0.8+2.0 .422 -162.0     22 58 12.9 - 8 52 27 363.3 781.8
   Saturn ring contacts offset by ±20.0 secs, at  3  4 40 and  3  5 20
   Saturn limb contacts offset by ±19.7 secs, at  3  4 40 and  3  5 20  Both contacts are against the bright limb of Saturn
24 Nov 11 23 41 43.8 D    3505WG8  5.5  5.0   80+ 126     63 108  59S  96 167 118 -3.3 +1.4 +3.5-0.2 .269  -50.0     23 47 56.5 - 2 45 42 359.2 729.6
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -676sec
24 Nov 13  4 38 58.4 d  109444kF2  7.8  7.6   89+ 142     55 272  58N  36 308  58 -2.4 -1.1 +1.3+1.9 .424   14.3      0 46  5.8   6  5 25 356.2 755.8
24 Nov 14  1 34  4.7 D     240 F0  5.5  5.4   95+ 155     67  73  60N  42 145  62 +0.0 -2.3 +1.4+1.9 .440    4.7      1 37  5.9  12  8 30 354.4 758.6
   R240 = pi Piscium
24 Nov 14  1 46 10.0 D     241 G5  6.8  6.4   95+ 155     70  72  90S  73 178  93 +0.0 -2.4 +2.4+0.9 .393  -25.8      1 37 40.9  12  4 42 354.3 748.9
24 Nov 14 23 21  9.5 d     371 G5  6.2  5.7   99+ 168 -10 22  73  62N  56 146  73 +2.1 -3.5 +0.3+1.2 .578    1.2      2 30 54.4  17 42 14 357.91004.1
   R371 = 27 Arietis
   Distance of 371 to Terminator = 16.5"; to 3km sunlit peak = 6.3"
24 Nov 16  7 46 29.9 d     541SB8  3.9  3.9s 100- 173     47 300 -17S 110   2 122 +3.0 -5.8 +1.9-1.2 .340  -34.0      3 45 49.6  24 22  4 358.4 712.8
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +263sec : AB 3.8 13.7 113"  72.8, dT = +264sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  8 15 24.2 R     536pB7  5.5  5.5  100- 173     41 297  90S 218 115 230 +2.9 -5.8 +2.1+2.2 .328 -139.6      3 44 48.2  24 17 22 359.0 750.1
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -186sec : AC 5.4 11.5 218" 196.1, dT = -615sec
24 Nov 16  8 41 32.8 R     539SB6  4.3  4.4s 100- 173     35 296  55N 254 154 266 +2.9 -5.8 +1.5+0.4 .449 -173.9      3 45 12.5  24 28  2 359.5 786.9
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.069"  86.1, dT = +0.15sec : AC 4.3 14.0 53"  53.4, dT = +110sec : AB 4.3 11.0 72"
328.8, dT = -42sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
   Distance of 539 to Terminator = 5.1"; to 3km sunlit peak = 0.0"
24 Nov 16  8 42 48.2 r   76152pB9  7.2  7.1S 100- 173     35 295  89N 221 121 232 +2.9 -5.8 +1.9+2.0 .349 -140.6      3 45 37.8  24 20  8 359.6 788.5
     76152 is triple: Aa,Ab 7.4 9.0 0.011" 349.6, dT = +0.02sec : AB 7.2 9.9 177" 164.1, dT = -278sec
     76152 is a close double. Observations are highly desired
     76152 = NSV 15762, 7.17, , Type VAR:
24 Nov 16  8 51 42.5 R     541SB8  3.9  3.9s 100- 173     33 295  83N 227 128 239 +2.9 -5.8 +1.8+1.6 .382 -146.3      3 45 49.6  24 22  4 359.8 802.1
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +267sec : AB 3.8 13.7 113"  72.8, dT = +267sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 7.5"; to 3km sunlit peak = 0.6"
24 Nov 16  9  3 52.7 r     542pB8  5.8  5.8  100- 173     30 295  44N 267 169 278 +2.9 -5.8 +1.2-0.1 .469  174.9      3 45 54.5  24 33 16 360.1 821.5
   R542 = Asterope = 21 Tauri
       542 is triple: AB 5.8 6.4 150" 130.1, dT = +231sec : AD 5.8 12.7 170"  74.1, dT = +355sec
   Distance of 542 to Terminator = 3.7"; to 3km sunlit peak = 0.0"
24 Nov 17  2  5 52.2 r     701SF2  6.6  6.4   98- 162     32  62  62N 276  16 283 +5.6 -6.1 +1.4+0.0 .438  150.4      4 38 29.5  26 56 23 362.5 885.9
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +2sec : AB 7.36 7.21 4.47" 188.0, dT = -0.43sec
       701 is a close double. Observations are highly desired
24 Nov 17  2  5 52.3 r X 70481p    7.3  7.2   98- 162     32  62  62N 276  16 283 +5.6 -6.1 +1.4+0.0 .438  150.3      4 38 29.6  26 56 26 362.5 885.9
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Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +2.5sec : AC 7.4 12.9 92" 203.7, dT = -65sec
   X 70481 is a close double. Observations are highly desired
24 Nov 17 10  2  9.6 r     731kF2  6.0  5.8   97- 159     31 299  12N 328 228 334 +4.4 -6.5 -0.2-3.3 .263  124.5      4 52 47.1  27 53 51 364.2 820.5
   Distance of 731 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Nov 18  9 31 46.5 R     897 A2  6.4  6.2   92- 146     49 308  55N 297 180 297 +5.8 -6.9 +1.7-1.3 .371  163.2      5 56 33.8  28 56 32 367.6 692.1
24 Nov 20  5 33  6.2 r   79784SK2  7.8  7.1s  77- 122     37  62  57N 311  54 300 +8.0 -6.5 +2.2-1.7 .315  144.9      7 54 28.4  26 10  2 379.6 709.2
     79784 is triple: Aa,Ab 10.0 10.0 0.40" 156.0, dT = +1.1sec : AB 8.7 10.4 16.9" 343.0, dT = -45sec
     79784 is a close double. Observations are highly desired
     79784 = NSV 17648, 7.83, range 0.02, 3V, Type VAR, Period 55.92841 days
24 Nov 20  6 59 48.7 r    1196 K1  7.6  7.1   76- 122     55  52  52N 316  75 305 +7.7 -6.5 +2.8-2.3 .277  146.8      7 56 47.9  26  6 19 378.6 607.7
24 Nov 20 10 15 13.5 R    1206 G8  5.9  5.3   76- 121 -10 64 320  49S 238 103 227 +7.0 -6.3 +5.3+2.9 .165 -119.0      8  0 55.9  25 23 34 378.9 626.6
   R1206 = omega Cancri
24 Nov 21  8 52 22.8 r    1330pG5  7.8  7.5   66- 109     68  42  65N 310  84 294 +7.3 -5.7 +2.6-1.9 .304  169.8      8 54 18.7  22 12 41 384.2 574.8
      1330 is double: ** 8.6 8.6 0.10" 115.0, dT = +0.32sec
      1330 has been reported as non-instantaneous (OCc1075). Observations are highly desired
24 Nov 25  9 43 45.2 R  119138 K0  7.4  6.9   28-  64     45  95  74S 278 360 256 +3.5 -0.7 +2.3-0.2 .298 -146.7     11 58 13.0   0 52  9 400.1 692.4
24 Nov 25 10 11  0   D    1730wK2  6.2  5.5   28-  64 -11 52  97  15S 218 299 196 +3.4 -0.7 +9.9+9.9 .031  -84.8 .05 11 59  3.3   0 31 50 399.7 667.8
      1730 is double: AB 6.3 12.4 15.1" 176.1
24 Nov 25 10 15 21   Gr   1730wK2  6.2  5.5   28-  64 -10 55 ** GRAZE: CA 20.1S; Dist.  8km in az. 217deg. [Lat =  6.22-0.74(E.Long+75.33)]
24 Nov 25 10 19 25   R    1730wK2  6.2  5.5   28-  64  -9 54  98  26S 229 309 207 +3.3 -0.7 +9.9+9.9 .031  -95.2 .05 11 59  3.3   0 31 50 399.5 660.6
      1730 is double: AB 6.3 12.4 15.1" 176.1
24 Nov 26  8 27  6.5 R    1814SK5  6.7  5.8S  20-  53     17  97  75N 308  30 286 +2.3 +0.5 +0.4-1.1 .443  176.4     12 38 43.3 - 4 22 25 403.5 868.2
      1814 is triple: AB 6.8 10.0 57" 110.6, dT = +123sec : AC 6.8 10.2 165" 359.1, dT = -234sec
      1814 = NSV 19445, 6.66, , Type VAR:
24 Nov 27  8 35 13.8 R    1917pG5  7.2  6.7   13-  43      8 101  81S 282   4 261 +0.9 +1.9 +0.3-0.2 .448 -158.5     13 21 12.2 - 9 59 57 404.0 943.5
      1917 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.22sec
      1917 has been reported as non-instantaneous (OCc 141). Observations are highly desired
24 Nov 28  9 43  1.2 r  158370 G5  9.2  8.6    7-  31     14 108  36N 340  59 322 -0.4 +3.2 -0.4-2.1 .383  144.1     14  7 55.8 -15 15 49 402.0 922.2
24 Nov 28 12  4 55   Gr   2029 M1  4.9  4.1v   7-  30  15 47 ** GRAZE: CA 26.8S; Dist. 54km in az.  42deg. [Lat =  6.97-0.89(E.Long+75.33)]
24 Nov 28 12  5 55   m    2029 M1  4.9  4.1v   7-  30  15 45 121  27S 222 284 204 -0.8 +3.6 +9.9+9.9 .000  -90.0     14 10 50.5 -16 18  7 398.8 716.1
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 29 10  4 28.2 R    2129 K0  7.4  6.8    3-  20      8 111  55N 312  33 297 -1.6 +4.4 -0.2-1.1 .492  168.5     14 55  5.7 -20  0 49 400.6 974.7
24 Dec  3 23 29 50.6 d  187540pK0  9.1  8.2    7+  31 -11 19 238  42N  45 333  51 -6.0 +6.7 +0.0+1.2 .428   23.8     18 59 26.9 -27 44 10 385.4 874.0
    187540 is double: AB 9.3 14.3 7.6" 192.4, dT = -15sec
    187540 is a close double. Observations are highly desired
24 Dec  3 23 34 14.1 d  187531 F3  9.1  8.8    7+  31     18 238   8N  11 298  16 -6.0 +6.7 -1.4+3.3 .248   58.3     18 58 59.0 -27 39  7 385.5 882.5
24 Dec  3 23 45 51.1 D    2765 A3  7.9  7.8    7+  31     15 239  49S 133  59 139 -6.0 +6.7 +2.6-3.1 .209  -64.4     19  0  0.2 -28  3  3 385.8 903.9
24 Dec  4  0  1 58.1 d  187563kB9  8.5  8.5    7+  32     12 240  43N  45 329  51 -6.1 +6.6 -0.2+1.2 .454   24.3     19  0 32.7 -27 38 43 386.1 932.9
24 Dec  6 23 23 13.9 d  164651 K0  7.6  6.9   31+  68  -9 57 226  46N  28 340  46 -5.2 +4.4 +0.9+2.2 .367   20.5     21 47 28.8 -16 45 45 372.2 707.6
24 Dec  7  1 27 41.7 d  164689 G6  8.3  7.9   32+  69     31 247  48N  30 318  48 -5.5 +4.1 +0.2+1.8 .437   23.1     21 50 23.1 -16 11 47 374.0 861.1
24 Dec  8  2  8 24.8 D    3332 K0  7.0  6.5   43+  82     35 253  56N  34 319  55 -4.9 +2.6 +0.5+1.7 .451   16.6     22 43  1.2 -10  6 10 370.4 846.2
   R3332 = 65 Aquarii
24 Dec  8 22 44 25.5 d    3461 K3  6.3  5.7   53+  94   0 76 140  55N  32  71  53 -3.4 +1.6 +1.5+2.4 .376   12.2     23 29 32.1 - 4 31 58 365.3 681.9
24 Dec  9  0 26 17.4 D    3465SF8  6.5  6.2   54+  95     71 238  67N  43 345  65 -3.8 +1.4 +1.7+1.8 .396    0.4     23 31 31.5 - 4  5 15 365.2 701.9
      3465 is triple: AD 5.2 12.5 12.0" 223.2, dT = -30sec : A,BC 6.6      451" 262.0, dT = -888sec
24 Dec 10  1 39 54   d      47 F0  7.7  7.5   66+ 108     67 263  28S 129  48 150 -2.9 -0.5 +9.9+9.9 .051  -82.8      0 23 38.5   2 44 35 362.7 710.2
24 Dec 10  1 45  8   Gr     47 F0  7.7  7.5   66+ 108     64 ** GRAZE: CA 20.8S; Dist. 15km in az. 141deg. [Lat =  6.14+0.81(E.Long+75.33)]
24 Dec 10  1 50 57   r      47 F0  7.7  7.5   66+ 108     64 264  13S 144  62 165 -2.9 -0.5 +9.9+9.9 .051  -97.2      0 23 38.5   2 44 35 362.8 715.8
```

Occultation prediction for Jonathan Ospina observatory
E. Longitude - 75 19 59.3, Latitude 6 18 47.6, Alt. 100m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Dec 10  4  1 45.7 d      53wB8  6.9  7.0v  66+ 109     33 271  41N  18 293  40 -3.2 -0.8 +0.6+2.6 .377   37.3      0 26 16.5   3 49 33 364.9 837.6
        53 is double: AB 6.9 12.6 61" 171.2, dT = -145sec
        53 = CF Psc, 6.84 to 6.87, Hp, Type SPB, Period 1.66523 days, Phase  39%
24 Dec 11  1  2 46.9 d  109756 F5  8.0  7.7   76+ 122     86 337  68N  47 250  68 -1.4 -2.0 +2.0+1.8 .394   -1.5      1 14 51.2   9 44 28 360.3 688.6
24 Dec 11  1 37 27.2 d     186pF2  7.3        76+ 122     79 291  85S  74 325  95 -1.6 -2.1 +2.9+0.8 .347  -27.6      1 15 46.7   9 47  5 360.3 685.4
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.5sec
       186 is a close double. Observations are highly desired
24 Dec 11 23 57 15.6 d     313cK0  7.1  6.2s  85+ 135     62  68  69N  51 158  70 +0.2 -3.4 +1.5+1.6 .432   -2.3      2  8  3.9  15 48 16 359.9 754.9
       313 = NSV 15445, 7.12 to 7.18, Hp
24 Dec 13  2 38 51.0 d   75764SF0  7.6        93+ 149     74   4  74S  97 273 112 +1.4 -5.1 +3.6-0.4 .291  -39.6      3 10  6.6  21 44 49 359.4 658.5
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +2.7sec : AB,C 7.6 13.5 48"  44.0, dT = +99sec : AB,D 7.6 15.8 55" 159.0, dT = +89sec
     75764 is a close double. Observations are highly desired
24 Dec 13  3  2 53.1 d     461cK0  7.2  6.7   93+ 149     74 344  88S  84 280  98 +1.3 -5.1 +3.1+0.3 .339  -24.5      3 10 39.9  21 53 34 359.4 650.2
24 Dec 13  3 44  2.3 d   75777 B9  7.6  7.5   93+ 150     69 320  57N  48 272  63 +1.2 -5.2 +2.3+1.8 .360   13.7      3 11 19.5  22 10 14 359.6 647.0
24 Dec 14  4 17 21.0 d   76514 G5  7.2  6.9   98+ 163     68 339  51N  57 260  66 +2.7 -6.2 +2.6+1.5 .345   14.5      4 14 32.2  26 15 21 361.1 624.3
24 Dec 15  8 31  9.2 D     810SB7  1.7  1.7  100+ 175     34 300 -45N  30 287  33 +3.5 -6.7 +3.8+4.5 .171   67.8      5 26 17.5  28 36 27 366.8 804.2
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +41sec : AD 1.9 18.5 9.8"  70.0, dT = +44sec : AE 1.9      10.9"  80.0, dT = +41sec : AF 1.9
15.8 11.6" 296.0, dT = -4sec
       810 is a close double. Observations are highly desired
24 Dec 15  8 43 42   Gr    810SB7  1.7  1.7  100+ 175     30 ** GRAZE: CA-68.0N; Dist.127km in az.  29deg. [Lat =  7.62-0.54(E.Long+75.33)]
24 Dec 15  8 57 12.7 R     810SB7  1.7  1.7  100+ 175     28 299 -89S 346 247 349 +3.5 -6.6 -1.7-5.2 .180  112.2      5 26 17.5  28 36 27 367.4 850.5
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -46sec : AD 1.9 18.5 9.8"  70.0, dT = -6sec : AE 1.9      10.9"  80.0, dT = +4sec : AF 1.9 15.8
11.6" 296.0, dT = -42sec
       810 is a close double. Observations are highly desired
24 Dec 16  2 35  2.8 r   78233SA3  7.5        99- 168     41  58  72S 227 335 225 +5.8 -6.8 +0.8+2.0 .347 -146.2      6 19 59.0  28 25 36 369.1 747.4
     78233 is quadruple: AB 8.16 8.35 0.15" 287.1, dT = -0.22sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -126sec
     78233 is a close double. Observations are highly desired
   Distance of 78233 to Terminator = 17.2"; to 3km sunlit peak = 6.7"
24 Dec 16  4 31 37.0 r   78294 A0  7.6  7.6   99- 168     62  36  81N 256  35 253 +5.5 -6.9 +2.7+0.8 .337 -167.6      6 23  0.3  28 37 17 368.0 615.4
24 Dec 16  8 48 57.4 r     996cA2  6.9  6.8   99- 167     43 303  52S 213 104 210 +4.6 -6.7 +5.8+6.3 .118 -106.4      6 30 22.0  28 12 44 370.1 753.7
       996 is double:  7.6 7.6
   Distance of 996 to Terminator = 16.0"; to 3km sunlit peak = 5.9"
24 Dec 17  5 27 46.4 r   79402 B8  7.3  6.9   95- 155     62  39  37N 321  96 313 +6.2 -6.6 +2.9-2.8 .254  140.2      7 27 48.9  27 17 33 372.9 598.7
24 Dec 18  2 13  6.0 r    1251 B9  5.9  5.9   90- 144     11  67  48S 235 323 223 +7.1 -5.9 -0.2+1.6 .374 -139.2      8 20 32.1  24  1 20 381.9 914.2
   R1251 = lambda Cancri
24 Dec 18  4 41 47.3 r   80165 F2  7.5  7.3   90- 143     44  63  69S 256   1 243 +6.8 -5.9 +1.9+0.9 .323 -152.5      8 24 55.2  23 56 43 379.2 670.4
24 Dec 22  9 25 57   M    1696 F5  6.9  6.7   55-  96     71 102  24S 228 305 206 +3.5 -0.8 +9.9+9.9 .000  -90.0     11 42 25.5   2 21 44 396.1 617.0
24 Dec 24 10 41 14.9 R    1886cK3  5.6  5.0   36-  73  -7 66 129  81N 300 352 280 +0.7 +2.1 +2.4-1.4 .310 -162.7     13  8 32.5 - 8 59  4 398.7 628.2
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.28sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 25  8 47 47.0 R    1986 F3  7.1  6.9   27-  63     30 110  30N 350  64 331 -0.1 +3.1 -0.3-2.8 .312  138.9     13 51  5.9 -13 40 45 400.6 803.7
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Lunar Occultation predictions
Museo de Astronomía
El Meteorito
Mexico

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3  9 23 50.4 D    1772cA2  3.9  3.9s  57-  98     42 114 -86N 109 167  87 -2.6 -1.8 +1.8-0.1 .343   21.3     12 19 54.3 - 0 40  1 398.8 711.3
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = -0.05sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  3 10  2 45.9 R    1770 A5  5.9  5.8   56-  97     50 122  56S 259 310 237 -2.7 -1.7 +3.5+1.8 .206 -126.0     12 18 40.3 - 0 47 14 398.1 676.7
   R1770 = 13 Virginis
24 Jan  3 10 42  8.6 R    1772cA2  3.9  3.9s  56-  97     57 133  47N 336  19 315 -2.9 -1.6 +1.0-2.4 .314  158.5     12 19 54.3 - 0 40  1 397.5 651.7
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = -0.35sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  5 13  3 42.1 r  158184pM1  7.9  7.0   36-  74  -6 53 166  67N 313 326 294 -5.4 +1.5 +1.9-1.5 .339  180.0     13 49 44.9 -12 33  5 390.4 642.3
    158184 is double: AB 7.7 14.0 2.4" 217.0, dT = +0.8sec
    158184 is a close double. Observations are highly desired
24 Jan  7 10 31 41.7 R X 39461pK0  7.5  7.0   19-  52     10 119  67S 259 319 246 -5.9 +3.9 +1.0+1.3 .377 -138.7     15 25 22.6 -21 55 45 384.4 935.1
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = -10sec : AC 7.9 13.5 40" 190.5, dT = -38sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 13 54 47.9 D    2366dM1  1.1  0.1v  11-  38   5 31 146 -30S 153 189 145 -6.1 +5.5 +0.5-1.6 .318  -37.2 .14 16 29 24.5 -26 25 55 375.5 727.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -4sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15  0 46.9 R    2366dM1  1.1  0.1v  10-  38  18 38 162  74S 257 276 250 -6.3 +5.7 +3.1+0.9 .291 -143.2 .15 16 29 24.5 -26 25 55 374.6 660.8
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 12 26 25.8 d  185420 B8  8.1  8.0    5-  26      7 125  -2S 171 231 169 -5.2 +6.2 -1.5-3.0 .233  -63.3     17 27 45.7 -28 21 32 372.9 936.3
24 Jan 14  1 40 22.0 d  164859 G0  8.4  8.1    9+  35     15 245  82N  67   7  87 -0.2 +5.3 +0.5+0.0 .549  -10.8     22  5 58.3 -16  0  2 360.9 977.7
24 Jan 15  1 49 58.9 D    3377 K0  7.9  7.4   17+  49     27 245  70N  50 352  72 +1.4 +4.0 +0.7+0.6 .512    2.6     23  1  7.9 - 9 33 14 361.2 898.2
24 Jan 16  1 13 30.8 D    3514cG9  5.9  5.4   26+  62     48 236  61S  96  46 118 +2.9 +2.7 +2.7-1.1 .300  -47.6     23 52 55.6 - 3  9 20 362.0 781.1
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9, dT = +0.29sec
      3514 is a close double. Observations are highly desired
24 Jan 18  1 59 15.7 d     232 K0  8.1  7.4   49+  89     66 243  81N  59   3  79 +4.9 -0.7 +2.1+1.0 .383   -8.1      1 35 33.4  10 33 42 368.5 691.4
24 Jan 19  2 31 52.8 D     363 F0  7.2  7.0   60+ 102     72 253  45N  27 321  44 +5.4 -2.3 +1.5+2.7 .319   28.7      2 27 32.1  16 38 37 372.5 656.2
24 Jan 20  2 15 35.4 d X 65442C    8.1  7.9e  70+ 114     88 211  45S 121  90 135 +5.9 -3.7 +5.0-3.3 .161  -62.4      3 21 13.6  21  8 49 376.2 632.2
   X 65442 is double: BA 8.1 5.3 0.9"  32.6, dT = +0.14sec
   X 65442 is a close double. Observations are highly desired
   X 65442 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  2 15 37.2 D     486CB5  5.3     e  70+ 114     88 211  45S 121  90 135 +5.9 -3.7 +5.0-3.3 .161  -62.4      3 21 13.6  21  8 49 376.2 632.2
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6, dT = -0.14sec
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  2 34 44   Gr    486CB5  5.3     e  70+ 114     83 ** GRAZE: CA 16.9S; Dist.208km in az. 152deg. [Lat = 21.00+0.49(E.Long+101.11)]
24 Jan 20  6  3 23.4 d   75929 K7  8.0  7.1   71+ 115     38 281  71N  58 340  71 +5.1 -3.9 +1.5+0.6 .393   18.0      3 26 39.3  21 57  1 379.3 760.3
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan 21  6 23 40.5 D     647WB9  5.4  5.4s  80+ 127     46 284  43N  37 314  45 +5.1 -5.0 +2.3+2.2 .265   46.4      4 22 34.9  25 37 46 382.6 713.1
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = +72sec
       647 = NSV 15957, 5.34 to 5.39, Hp
24 Jan 23  6 40 23.2 d   78191 A0  7.7  7.7   94+ 151     66 287  22S 169  73 167 +4.7 -6.4 -0.2-8.5 .115  -69.6      6 17 59.9  28  0 24 388.3 624.3
   Distance of 78191 to Terminator = 19.1"; to 3km sunlit peak = 7.2"
24 Jan 24  8  6 45.7 d   79256 K0  7.8  7.3   98+ 163     59 285  90S 114  24 107 +3.9 -6.5 +1.7-1.6 .354   -3.4      7 17 59.4  27  8 31 391.8 674.0
24 Jan 24  9 27  1.8 d    1108cG8  7.0  6.5   98+ 163     42 286  46S 159  77 151 +3.7 -6.4 -0.4-3.4 .281  -47.0      7 19 30.8  26 49 23 393.2 786.2
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.13sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 29  9 45 30.3 R    1645cF8  6.7  6.4   88- 140     73 190  67N 314 305 292 -1.2 -3.0 +2.0-2.0 .321 -177.5     11 21 26.8   6 38  6 399.7 623.7
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Jan 30  5 48 46.4 r    1732cK0  6.8  6.1v  82- 130     24  99  86S 288 354 266 -1.6 -2.2 +0.9+0.1 .398 -164.3     11 59 23.9   1 49 36 402.8 807.3
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.23sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  9 17  1.2 r  138955 K2  7.2  6.5   74- 118     54 138  51S 254 292 233 -3.5 -0.4 +4.8+2.3 .164 -118.7     12 45 32.0 - 4 48 39 398.5 660.1
24 Feb  2 10 24 52   m    2040cK0  8.0  7.3   55-  96     43 144  22S 221 256 204 -5.9 +2.6 +9.9+9.9 .000  -90.0     14 15 50.2 -16  4 53 392.6 689.2
      2040 is double: ** 8.8 8.8 0.10"  90.0
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4 11  1 17.8 R    2286kB5  5.4  5.5v  35-  72     27 137  49S 239 283 229 -7.0 +5.1 +3.6+3.0 .198 -118.9     15 58 34.9 -24 49 53 383.3 761.6
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  4 13  2 15.0 r  184032kA2  7.8  7.6   34-  71  -5 40 166  51S 241 255 231 -7.4 +5.4 +4.5+2.1 .186 -122.8     16  1 26.6 -25 11 55 381.5 635.3
24 Feb  5 11 55 53.2 R    2437pA0  7.9  7.8   25-  59     25 139  88N 274 317 269 -7.0 +6.2 +1.7+0.5 .394 -162.2     16 57 53.9 -27 36 39 377.0 757.3
      2437 is double: AB 7.9 9.3 11.2"  29.9, dT = +12sec
24 Feb  5 12 47  1.7 r  184877 K0  8.5  8.0   24-  59  -9 32 149  73S 255 287 250 -7.2 +6.3 +2.7+1.2 .309 -144.2     16 59 20.9 -27 49 29 376.2 694.2
24 Feb  6 11 14 14.4 R    2586cB3  6.0  6.0   16-  47      8 126  82N 272 331 273 -6.3 +6.8 +0.7+0.7 .491 -168.7     17 58 39.0 -28 45 33 372.8 905.2
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.6sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb  6 11 19 15.5 r  186031 K0  8.4  7.8   16-  47      9 126  69S 243 301 244 -6.3 +6.8 +1.4+1.7 .377 -139.4     17 58 57.8 -28 54  4 372.7 897.2
24 Feb  6 12  6  8.1 r  186085 A0  8.7  8.8   16-  47     17 132  48N 306 357 307 -6.4 +6.9 +0.6-0.4 .420  157.2     18  0 43.1 -28 42 41 371.6 821.0
24 Feb 12  2 12 33.2 d  146777cG5  9.2         6+  29      7 261  89S  72   6  94 +1.4 +2.8 +0.2-0.1 .585  -13.3     23 33 46.5 - 5  7 57 358.91046.4
    146777 is double: AB 9.33 11.24 0.77"  66.8, dT = +1.3sec
    146777 is a close double. Observations are highly desired
24 Feb 13  1 42 50.9 D      50dG5  5.8  5.3S  13+  43     28 260  63N  41 336  63 +3.1 +1.2 +0.7+1.0 .496   15.0      0 25 24.2   1 56 23 359.7 895.0
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 13  1 55 39.2 d  109200 A0  8.5  8.5   13+  43     25 261  78N  55 350  77 +3.1 +1.2 +0.7+0.5 .522    1.5      0 25 57.2   1 56 59 360.0 911.6
24 Feb 13 22 36 16   m     180SA7  5.2  5.1S  22+  55  26 75 190  21S 137 128 158 +5.1 -0.1 +9.9+9.9 .000  -90.0      1 13 43.9   7 34 31 360.3 714.8
   R180 = zeta Piscium A
       180 is triple: Aa,Ab 5.6 6.4 0.20"       : AB 5.2 6.3 22.8"  62.9
       180 is a close double. Observations are highly desired
       180 = NSV 15259, 5.31,
24 Feb 14  4 29 49.4 d     205 F0  7.4  7.3   23+  58      5 278  45S 112  45 133 +4.5 -0.7 -0.1-1.8 .402  -46.0      1 23  6.8   9 11 15 367.11029.6
24 Feb 15  1 24 35.6 d   92820 K2  8.2  7.6   33+  70 -11 59 261  71N  50 340  69 +5.8 -2.1 +1.8+1.2 .392    7.3      2 10 15.7  15  1 23 366.6 702.2
24 Feb 15  1 45 31.7 d   92821 K0  8.1  7.3   33+  70     54 264  53N  33 321  51 +5.7 -2.2 +1.5+2.0 .359   26.7      2 10 29.4  15  9  5 367.0 716.0
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb 15  3  7 15.9 D     326cM0  5.7  4.9s  33+  70     36 273  89S  71 359  89 +5.5 -2.3 +1.3+0.0 .444   -6.0      2 13  3.3  15 16 48 368.7 797.6
   R326 = 19 Arietis
       326 is double: ** 6.8 6.8 0.050"
       326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
       326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  4 26  7.6 D     459SK2  6.4  5.8   45+  84     32 281  83N  67 352  81 +6.0 -3.8 +1.1+0.1 .441    7.8      3  9 20.1  20 45 40 374.9 809.8
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -275sec : AB 6.5 8.8 122" 239.0, dT = -275sec
       459 is a close double. Observations are highly desired
24 Feb 18  2 41 57.4 D     746WB7  7.0  6.9   65+ 108     79 295  77N  73 323  78 +6.7 -5.8 +2.8+0.7 .314    6.8      4 59 53.7  27 19 32 382.1 586.9
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -45sec
24 Feb 21  2  3 58.2 d    1181cG8  7.0        90+ 142     56  77  90N 107 194  96 +5.5 -6.7 +2.3-0.2 .324   -9.5      7 49 47.7  26 15 50 394.6 628.7
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.07sec
      1181 is a close double. Observations are highly desired
24 Feb 21  5 49  4.5 d   79784SK2  7.8  7.1s  90+ 143     73 285  34N  51 314  41 +4.5 -6.6 +5.2+3.6 .141   63.9      7 54 28.4  26 10  2 394.2 612.8
     79784 is triple: Aa,Ab 10.0 10.0 0.40" 156.0, dT = -0.7sec : AB 8.7 10.4 16.9" 343.0, dT = +44sec
     79784 is a close double. Observations are highly desired
     79784 = NSV 17648, 7.83, range 0.02, 3V, Type VAR, Period 55.92841 days
24 Feb 21  9 48 10.3 D    1206 G8  5.9  5.3   91+ 145     21 289  53N  71 357  60 +3.9 -6.2 +0.9-0.2 .353   43.5      8  0 55.9  25 23 34 398.4 942.1
   R1206 = omega Cancri
24 Feb 21 10 14 58.6 d    1211SA1  6.3  6.3   91+ 145     16 291  76S 122  50 110 +3.9 -6.1 -0.2-1.5 .505   -8.2      8  1 43.8  25  5 22 399.1 986.8
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.3, dT = -7sec : AC 6.3 11.6 106" 295.0, dT = -208sec
24 Feb 27  5 50 50.5 r    1790 M4  6.9  6.0v  93- 150     40 115  85N 297 354 276 -2.0 -0.9 +1.5-0.5 .363 -166.4     12 29  9.7 - 2 25 46 401.3 726.2
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 29  8  7 12.1 R    2002 K0  6.8  6.3   80- 127     42 138  71S 272 312 254 -4.9 +2.2 +2.7+0.6 .278 -140.1     13 58 29.8 -14  7 19 396.8 698.2
24 Mar  1 11 31 24.4 r    2115 A6  7.2  7.1   71- 115     46 192  41S 239 228 224 -6.6 +4.0 +5.6+2.4 .132 -114.8     14 49 27.7 -19 54 13 392.5 599.1
24 Mar  2  8 41 48.3 R    2227SK0  5.8  5.2   62- 104     26 134   9N   5  52 353 -6.7 +4.9 -1.7-4.0 .185  117.2     15 37 48.0 -23  8 30 390.4 767.1
      2227 is triple: **     5.5 0.010" 102.0, dT = +0.01sec : ** 3.4 8.9 0.010" 102.0, dT = +0.01sec
24 Mar  2  9 56  7.9 d    2237cK3  5.0  4.3s  62- 104     36 149 -64S 130 161 118 -6.9 +5.0 +1.4-0.9 .357   -6.8     15 40 16.9 -23 49  5 389.2 678.6
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.17sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 10 56 38.7 r  183671kF0  8.1  7.9   62- 104     42 166  85S 279 293 267 -7.2 +5.2 +2.8-0.1 .306 -157.4     15 39 35.9 -23 48  3 388.5 623.8
24 Mar  2 11 26  2.6 R    2237cK3  5.0  4.3s  62- 103     43 175  80N 294 299 282 -7.3 +5.2 +2.5-0.8 .320 -174.0     15 40 16.9 -23 49  5 388.3 606.3
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.22sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12 23  3   m  183713 A5  7.4  7.2   61- 103 -10 42 192  12S 206 194 194 -7.5 +5.3 +9.9+9.9 .000  -90.0     15 41 57.8 -24 18  0 388.2 590.7
24 Mar  3  7 50 14.9 R    2366dM1  1.1  0.1v  52-  93      6 122  81S 270 330 262 -7.0 +5.8 +0.7+0.8 .444 -155.1 .10 16 29 24.5 -26 25 55 387.6 921.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8 50 41.1 R    2373 K1  6.1  5.5   52-  92     17 130  77N 291 344 284 -7.1 +5.9 +0.8+0.1 .438 -175.5     16 31 22.8 -26 32 16 386.1 823.6
24 Mar  3 10 56 54.9 r X 41147 K0  8.0  7.3   52-  92     35 154  55S 243 271 236 -7.5 +6.2 +3.7+2.0 .220 -128.5     16 34 45.8 -27  6 37 383.9 659.2
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar  6 10 55 31.3 r    2869cK0  8.1  7.5   21-  54      8 124  79N 267 327 277 -6.0 +7.4 +0.8+0.8 .492 -177.9     19 38 56.5 -27 22 17 368.8 880.3
      2869 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.2sec
      2869 has been reported as non-instantaneous (OCc1581). Observations are highly desired
24 Mar  6 11 39 21.7 r  188426 A0  8.5  8.5   20-  54     15 129  64N 281 335 291 -6.0 +7.4 +1.0+0.4 .442  166.4     19 40 31.3 -27 17 50 367.8 810.7
24 Mar 14  2 53 15.5 d     408cA5  8.3  8.1   19+  51     23 282  87N  68 356  84 +5.4 -3.4 +0.8+0.0 .501    5.0      2 46 20.3  18 50 17 367.2 895.1
       408 is double: ** 9.2 9.2 0.10"  85.0, dT = +0.19sec
       408 has been reported as non-instantaneous (OCc 873). Observations are highly desired
24 Mar 15  3 13 17.7 d   76103SA9  7.9  7.8S  28+  64     32 285  62N  47 331  59 +6.2 -4.7 +1.4+1.0 .384   32.7      3 43 41.5  23 38 57 372.5 824.0
     76103 is triple: Aa,Ab 7.9 8.9      250.7, dT = +0.28sec : AB 8.0 9.6 197" 175.1, dT = -314sec
     76103 is a close double. Observations are highly desired
     76103 = NSV 15745, 7.92, , Type VAR:
24 Mar 15  4 27 23.6 d   76175pA0  8.2  8.0   29+  65     16 289  89S  76   5  88 +6.1 -4.7 +0.4-0.3 .518    6.4      3 46 34.2  23 37 26 374.4 947.2
     76175 is double: ** 8.7 10.7 0.050"
     76175 has been reported as non-instantaneous (OCc 297). Observations are highly desired
24 Mar 15  4 49 45.2 D   76189pF8  7.0  6.7   29+  65     11 291  72N  58 348  69 +6.1 -4.7 +0.5+0.3 .491   25.2      3 47 17.1  23 43 36 375.0 986.9
     76189 is multiple: AE 7.0 12.7 8.1"  42.0, dT = +16sec : AB 7.0 12.6 66" 226.6, dT = -132sec : AD 7.0 13.4 131" 243.9, dT = -265sec : AC 7.0
12.4 147" 252.9, dT = -289sec
     76189 is a close double. Observations are highly desired
24 Mar 15  4 51 10.1 d   76198KA3  7.8  7.7v  29+  65     11 291  84N  70   0  81 +6.1 -4.6 +0.3-0.1 .530   13.1      3 47 26.8  23 40 42 375.1 989.3
     76198 = V0650 Tau, 7.76, range 0.03, V, Type DSCTC, Period 0.03065278 days
24 Mar 15  4 53 43.2 d   76202wK0  7.8  7.1   29+  65     10 291  80S  86  17  97 +6.1 -4.6 +0.1-0.6 .546   -2.9      3 47 37.0  23 36 33 375.1 993.9
     76202 is double: AB 7.9 13.0 49" 210.0, dT = -50sec
24 Mar 15  4 58  7.4 d     550pA1  7.0  7.0   29+  65     10 292  53N  38 329  50 +6.1 -4.6 +0.8+1.1 .389   45.0      3 47 21.0  23 48 12 375.21002.2
       550 is double: AB 7.1 14.0 29.8" 276.9, dT = -40sec
24 Mar 15  5 21 25.6 D     556pB8  5.4  5.5S  29+  65      5 294  27S 139  72 150 +6.1 -4.6 -1.0-2.8 .324  -55.6      3 48 20.8  23 25 17 375.91044.4
       556 is triple: Aa,Ab 5.7 7.7 0.10"       : AB 5.4 14.1 177" 298.3, dT = -511sec
       556 is a close double. Observations are highly desired
       556 = NSV 1321, 5.44, , Type EA, Period 2.2663 days, Phase  47%
24 Mar 17  1 29 43.6 d   77349 B1  8.4  8.2v  49+  89  -9 78 301  73N  70 315  72 +7.1 -6.5 +2.9+0.9 .303   17.0      5 38 58.0  28 27 36 381.3 586.4
     77349 = V1163 Tau, 8.4 to 8.53, Hp, Type BE
24 Mar 17  3 16 20.3 d   77397 A2  8.1  8.0V  49+  89     56 287  69N  67 337  69 +6.7 -6.4 +2.4+0.5 .318   28.0      5 41 38.6  28 27 24 382.7 668.1
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  76%
24 Mar 17  5  6  2.1 d   77495cA0  8.1  8.1   50+  90     33 290  73S 105  26 106 +6.5 -6.3 +0.6-1.3 .440   -6.5      5 44 59.0  28 11 40 385.0 827.5
     77495 is double: AB 8.0 8.0 0.20"  43.7, dT = +0.22sec
     77495 is a close double. Observations are highly desired
24 Mar 18  3  1  5.4 d X 91013C    7.8  7.8s  59+ 101     71 290  57S 128  27 124 +6.6 -6.8 +2.0-2.4 .289  -25.9      6 39 33.2  28 15 48 387.2 604.0
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = +0.2sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3  1  5.7 D    1022CB7  6.0     s  59+ 101     71 290  57S 128  27 124 +6.6 -6.8 +2.0-2.4 .289  -26.0      6 39 33.1  28 15 47 387.2 604.0
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = -0.2sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4  9 49.7 D    1026SG5  6.5  5.9   60+ 101     56 287  64S 121  30 116 +6.3 -6.7 +1.4-2.0 .346  -14.9      6 41 20.9  28 11 48 388.1 674.7
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +27sec : AC 6.6 12.8 58"  61.3, dT = +84sec
24 Mar 19  2 54 29.6 D    1149SK5  4.1  3.3s  69+ 112     84 310  77S 115 347 106 +6.1 -6.8 +2.6-1.5 .301   -5.5 .02  7 35 55.4  26 53 45 391.3 574.4
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.09sec : AB 4.1 13.2 57"  39.0, dT = +46sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 29 48.9 R    1149SK5  4.1  3.3s  69+ 113     63 284 -82N 290 198 280 +5.7 -6.7 +2.0-1.4 .341 -175.3 .02  7 35 55.4  26 53 45 392.2 651.6
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.09sec : AB 4.1 13.2 57"  39.0, dT = +56sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2 33 44.3 D    1270cF0  6.1  5.9v  78+ 124     79  82  62S 136 229 122 +5.4 -6.5 +2.4-2.3 .275  -22.2      8 28 36.8  24  8 42 394.9 569.1
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 20  3 15 53.1 D   80209 K0  7.1  6.5   78+ 124     88  52  47N  65 192  51 +5.2 -6.5 +4.4+2.3 .183   52.3      8 29 40.1  24 20 41 394.9 574.3
24 Mar 20  4 45 42.8 D    1274cF0  5.7  5.5s  78+ 124     71 277  56N  73 344  59 +4.8 -6.4 +3.8+0.7 .218   48.5      8 31 30.5  24  4 52 395.4 630.1
   R1274 = upsilon 1 Cancri
      1274 = NSV 17909, 5.691, range 0.01, 4w, Type PULS, Period 0.109096 days, Phase  60%
24 Mar 21  3 13 59.9 d   80764cK2  7.8  7.0v  85+ 135     77  99  49N  72 148  55 +4.2 -5.9 +4.1+2.0 .194   49.9      9 19 39.5  20 32 47 397.6 581.6
     80764 is double: ** 7.8 10.7 0.042"  73.0, dT = +0.22sec
     80764 has been reported as non-instantaneous (OCc1108). Observations are highly desired
     80764 = HIP 45747, 7.77, range 0.01, 2V, Type VAR, Period 6.12595 days
24 Mar 22  2 48  8.1 D    1479 F2  6.4  6.2   91+ 146     60  99  58S 148 219 129 +3.2 -5.1 +1.7-2.4 .289  -25.0     10  5 40.9  15 45 27 399.9 618.0
24 Mar 27  5  4 18.6 r  158105PF5  7.5  7.2   96- 158     33 123  87S 291 343 272 -3.3 +1.7 +1.4-0.1 .374 -161.1     13 42 35.7 -12  5 13 398.8 765.4
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.13sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 27  7  3 45.8 R    1971SG8  5.5        96- 158     51 154  14N  11  36 352 -3.7 +2.0 -1.2-4.3 .185  122.9     13 45 56.3 -12 25 36 397.1 656.4
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1, dT = -1.9sec : AC 5.7 11.9 27.4" 162.6, dT = +130sec
      1971 is a close double. Observations are highly desired
   Distance of 1971 to Terminator = 4.4"; to 3km sunlit peak = 0.0"
24 Apr  1  8 22 29.3 r    2631 B9  6.5  6.5v  58-  99     13 130  30N 329  23 331 -6.6 +7.2 -0.3-1.4 .302  133.1     18 11 58.2 -28 54  6 381.8 816.9
   R2631 = V4045 Sagittarii
      2631 = V4045 Sgr, 6.51 to 6.54, V, Type ACV, Period 2.8855 days
24 Apr  4 11 37 35.8 r  190225 G6  8.7  8.2   24-  59     22 126  87S 246 299 263 -4.7 +6.7 +1.4+1.4 .442 -174.8     21 19  5.4 -21 16 43 364.9 785.3
24 Apr  4 11 37 44.5 r  190226 F2  8.8  8.6   24-  59     22 126  85S 243 296 261 -4.7 +6.7 +1.5+1.5 .439 -172.0     21 19  6.9 -21 17 25 364.9 785.3
24 Apr  5 10 52  6.0 R    3265PK0  6.6  6.1   15-  46      5 109  78S 232 297 252 -3.2 +5.6 +0.6+1.7 .519 -163.2     22 14 38.2 -15 49  7 362.8 953.2
      3265 is double: AB 4.3 11.9 22.0"  65.0, dT = +41sec
24 Apr  5 11  0 29.0 r  164952kK5  7.9  7.1   15-  46      7 110  80N 254 318 274 -3.2 +5.6 +0.6+1.2 .532  174.7     22 14 44.4 -15 42  6 362.5 939.7
24 Apr  6 15  4 43   m    3421cM3  4.9  4.1v   7-  30  34 48 134  10N 321   3 343 -1.7 +3.9 +9.9+9.9 .000   90.0     23 16 50.9 - 7 43 35 355.2 762.9
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 15 40  4.0 D Venus      -3.8 -3.8    2-  15  43 50 121 -25N 358  47  17 +0.3 +2.1 -0.3+3.8 .259   51.7      0 12 29.6 - 0 16 40 353.9 717.4
   Venus contacts: Dark limb 15 39 44; Terminator 15 39 45; Bright limb 15 40 24: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 16 32 56.3 R Venus      -3.8 -3.8    2-  15  54 60 137  55N 273 315 298 +0.2 +2.0 +3.7+0.2 .249  128.5      0 12 29.6 - 0 16 40 353.3 686.2
   Venus contacts: Dark limb 16 32 36; Terminator 16 32 45; Bright limb 16 33 17: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 29 18   m     472cA1  4.9  4.9    7+  31  -7 24 284  -7S 167  93 181 +4.5 -4.1 +9.9+9.9 .000  -90.0      3 14 54.1  21  2 40 365.7 898.7
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 41 41.7 d   75819 F2  7.9  7.7    7+  31  -9 21 285  19S 141  68 155 +4.5 -4.1 -0.5-4.3 .229  -63.8      3 15 46.1  21  9 55 366.0 918.4
24 Apr 13  3 57 56.1 D     797cB9  6.4  6.3e  23+  58     19 293  58N  51 338  54 +6.0 -6.1 +1.1+0.6 .370   44.4      5 20 59.3  27 57 26 378.7 950.7
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase 100%
24 Apr 14  1 46 34   m   78165cA2  7.4  7.2v  32+  69 -10 59 288  11N  11 278   9 +6.5 -6.7 +9.9+9.9 .000   90.0      6 16 22.2  28 51  7 380.8 669.2
     78165 is double: ** 7.6 9.1
     78165 = V0395 Aur, 7.34 to 7.43, V, Type ELL, Period 23.166 days, Phase  39%
24 Apr 14  3 18  7.3 D   78233SA3  7.5        33+  70     40 289  85S  95  13  93 +6.3 -6.6 +1.1-1.0 .423    8.2      6 19 59.0  28 25 36 382.6 793.9
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.33sec : AB,C 7.5 9.6 2.9" 265.3, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -135sec
     78233 is a close double. Observations are highly desired
24 Apr 15  2 15 14   M    1103 M1  5.8  4.9s  43+  81     65 287  14N  20 285  13 +6.3 -6.8 +9.9+9.9 .000   90.0      7 15 57.2  27 53 51 386.3 647.0
   R1103 = 53 Geminorum
      1103 = NSV 3485, 5.75, range 0.01, 2V, Type VAR, Period 6.22084 days
24 Apr 15  3 38  1.5 d   79264 G2  8.0  7.7   43+  82     47 286  55S 132  47 125 +6.0 -6.7 +0.7-2.2 .375  -20.1      7 18 28.9  27 15 10 387.7 750.7
24 Apr 15  3 48 24.7 d   79256 K0  7.8  7.3   43+  82     45 286  11S 176  93 169 +6.0 -6.7 -1.6-5.3 .176  -64.4      7 17 59.4  27  8 31 387.9 766.6
24 Apr 16  1  7  8.9 D    1233SG8  5.7  5.3S  52+  93  -1 87  44  57N  69 204  57 +6.1 -6.7 +3.8+1.6 .219   43.8      8 10 27.2  25 30 26 390.4 574.8
   R1233 = psi Cancri
      1233 is quadruple: **Aa,Ab 6.6 6.6 0.10" 270.0, dT = -0.43sec : AC 5.8 11.8 82" 220.7, dT = -330sec : AB 5.8 13.1 91" 319.0, dT = -144sec
      1233 has been reported as non-instantaneous (OCc  73). Observations are highly desired
      1233 = NSV 17752, 5.73, , Type VAR:
24 Apr 16  6 59 26.1 d   80089 G5  7.2  6.7   54+  95     15 290  59S 135  64 122 +5.1 -6.1 -0.4-1.7 .489  -19.5      8 19  9.2  24 10 29 396.2 996.2
24 Apr 16  7 39  6.1 d    1251 B9  5.9  5.9   54+  95      6 293  57S 137  69 124 +5.0 -6.0 -0.6-1.7 .506  -23.4      8 20 32.1  24  1 20 397.21061.5
   R1251 = lambda Cancri
24 Apr 17  2 18 25.4 d    1348 G5  8.1  7.6   63+ 104     87 243  31S 166 105 151 +5.0 -6.1 +0.8-4.2 .227  -43.0      9  2 45.2  21 31  9 394.5 592.6
24 Apr 20  3 35 47.3 D    1645cF8  6.7  6.4   87+ 138     71 151  76N 102 129  80 +1.3 -2.9 +3.2-0.5 .266   33.9     11 21 26.8   6 38  6 399.6 621.4
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Apr 20  7 26  1.2 d    1656 K2  7.4  6.6   88+ 139     41 257  70N  95  31  74 +0.4 -2.4 +1.9-1.1 .314   35.1     11 25 11.2   5 44 22 401.4 746.8
24 Apr 22  3  5 37.8 d  138955 K2  7.2  6.5   97+ 160     45 124  69S 134 184 113 -1.0 -0.2 +1.3-1.2 .364   -1.0     12 45 32.0 - 4 48 39 399.3 704.9
24 Apr 26  3 57 15.4 r    2269cB5  5.4  5.4   95- 154     10 122  59S 259 318 248 -4.7 +5.2 +1.2+1.3 .365 -140.5     15 53 53.9 -24 31 59 392.2 901.6
24 Apr 26  6 38  9.6 R    2286kB5  5.4  5.5v  95- 153     36 150  55N 325 356 314 -5.1 +5.6 +1.0-1.4 .327  155.4     15 58 34.9 -24 49 53 389.3 679.1
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  24%
24 Apr 27 11 33 34.0 r  184936kA3  7.3  7.2   88- 140 -10 30 213  39N 333 298 328 -6.5 +6.7 +3.2-3.9 .172  120.1     17  1 56.3 -27 56 20 385.6 640.5
24 Apr 28 10 23  7.7 r  186041 K0  7.1  6.5   81- 128     38 181  53S 237 235 237 -6.2 +7.3 +2.9+1.2 .262 -145.1     17 59 14.9 -29 23 24 381.5 590.7
24 Apr 28 11 32  2.2 r  186100 K0  7.7  7.1   81- 128 -10 35 199  34S 218 198 219 -6.5 +7.3 +1.9+1.8 .224 -132.5     18  1 12.8 -29 26 39 381.5 613.6
24 May  2 10 26 33.2 R    3214 A0  6.8  6.7   39-  77     24 123  11S 169 223 188 -3.7 +6.0 +1.2+7.6 .101 -103.3     21 56 46.0 -17 53 49 367.6 781.0
24 May  3 10 21  7.4 r  165316 A5  7.6  7.4   28-  64     16 110  18N 318  20 339 -2.5 +4.7 +1.0-3.3 .128  104.9     22 49 26.5 -11 20 57 365.2 882.2
24 May 10  2 15 40.8 d   76791 M0  9.2  8.3    5+  25     12 294  64S 100  30 106 +4.6 -5.6 -0.1-1.0 .557   -8.2      4 51 47.0  26 46 18 373.81020.7
24 May 10  2 24 41.9 d   76793 A2  9.2  8.9    5+  25     10 295  83N  67 358  73 +4.6 -5.6 +0.3-0.1 .521   24.2      4 52  5.2  26 55  2 374.01037.0
24 May 10  2 43  7.2 D     732pK3  7.5  6.8    5+  26      6 296  67S  97  30 103 +4.6 -5.6 -0.2-0.9 .586   -5.8      4 52 58.2  26 46 39 374.51070.0
       732 is double: ** 7.9 10.2 0.040"  69.0, dT = +0.06sec
       732 has been reported as non-instantaneous (OCc 778). Observations are highly desired
24 May 11  2 14 22.7 d   77674 K5  8.3  7.6   11+  38     25 292  85N  78   2  78 +5.2 -6.3 +0.8-0.4 .467   21.8      5 53 19.0  28 16 31 377.9 922.0
24 May 12  3 11  7.5 d X 95310     9.1  8.6   18+  51     25 291  80S 102  26  96 +5.4 -6.4 +0.4-1.1 .496    6.2      6 55 43.4  27 42 39 383.7 929.1
24 May 12  4 15 40.9 d   78917 M0  8.3  7.5   19+  51     12 295  79N  81  11  75 +5.3 -6.3 +0.2-0.5 .502   25.8      6 58 11.0  27 38 13 385.31041.1
24 May 13  3  4 30.3 d   79763 K0  8.6  8.1   27+  63     38 286  69N  78 358  67 +5.2 -6.3 +1.6-0.4 .349   38.2      7 52 47.4  25 55 35 387.9 834.1
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 May 14  3 35 35.3 d    1317 A2  8.2  8.1   37+  74     41 280  40S 154  76 140 +4.6 -5.8 +0.0-2.7 .358  -32.4      8 46 28.9  22 21  8 392.4 806.1
24 May 15  2 35 47.2 d   98646 K2  8.2  7.3v  46+  85     64 265  24S 174  99 156 +4.0 -5.2 -0.2-3.9 .249  -45.2      9 34 26.7  18 24 22 394.5 675.5
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 18  4 27  5.6 d  119068 F5  7.8  7.5   74+ 119     59 232  60S 144  98 122 +0.1 -1.6 +1.4-2.4 .335   -8.9     11 49 46.8   2 13 55 399.1 656.3
24 May 18  6 20 36   D    1712SF8  3.6  3.3   75+ 120     35 255  -7S 211 148 189 -0.3 -1.4 +9.9+9.9 .051  -82.4 .03 11 50 41.7   1 45 53 400.9 755.3
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = +1654sec : AC 3.7 9.6 406"  78.5, dT = -5325sec
24 May 18  6 25 51   Gr   1712SF8  3.6  3.3   75+ 120     33 ** GRAZE: CA-14.2S; Dist. 20km in az. 215deg. [Lat = 22.90-0.64(E.Long+101.11)]
24 May 18  6 30 13   R    1712SF8  3.6  3.3   75+ 120     33 256 -21S 225 162 203 -0.3 -1.3 +7.2+7.7 .052  -97.6 .03 11 50 41.7   1 45 53 401.1 766.9
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -3148sec : AC 3.7 9.6 406"  78.5, dT = +6523sec
24 May 21  2 25 54.7 d    2002 K0  6.8  6.3   94+ 152     39 134  70S 127 171 108 -2.7 +2.3 +1.3-0.8 .378    4.1     13 58 29.8 -14  7 19 395.1 726.1
24 May 21  7 56 34.4 D    2017kK1  6.4  5.8   95+ 154     31 234  32N  47 356  29 -4.0 +3.0 +3.0+3.0 .111   71.9     14  4 27.0 -14 58 18 395.1 687.4
24 May 21  8  7 40   Gr   2017kK1  6.4  5.8   95+ 154     27 ** GRAZE: CA 13.2N; Dist.158km in az.  13deg. [Lat = 24.58-0.21(E.Long+101.11)]
   Distance of 2017 to Terminator = 8.8"; to 3km sunlit peak = 0.9"
24 May 23  2 45 11.1 d    2227SK0  5.8  5.2  100+ 174     21 128  76N  51 103  38 -4.1 +4.9 +4.1+4.9 .144   70.8     15 37 48.0 -23  8 30 390.1 827.9
      2227 is triple: **     5.5 0.010" 102.0, dT = +0.04sec : ** 3.4 8.9 0.010" 102.0, dT = +0.04sec
   Distance of 2227 to Terminator = 4.9"; to 3km sunlit peak = 0.0"
24 May 23  2 56 33   Gr   2227SK0  5.8  5.2  100+ 174     23 ** GRAZE: CA 58.0N; Dist. 96km in az.  37deg. [Lat = 24.21-0.69(E.Long+101.11)]
   Distance of 2227 to Terminator = 3.9"; to 3km sunlit peak = 0.0"
24 May 24  2  3 19.9 r    2366dM1  1.1  0.1v  99- 172  -9  2 120  36S 257 320 249 -4.3 +5.8 +0.7+1.3 .414 -143.4 .11 16 29 24.5 -26 25 55 388.6 971.6
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 3.3"; to 3km sunlit peak = 0.0"
24 May 25  9 18 52.5 r    2540 B3  7.2  7.1e  96- 158     36 198  86S 281 262 280 -5.5 +7.1 +2.7-0.7 .327  169.1     17 40 23.9 -28 55 24 380.5 613.7
      2540 = V2382 Oph, 7.26 to 7.29, Hp, Type E+BE, Period 0.9215 days, Phase  77%
24 May 27 10 43 52.1 r    2885 K0  7.6  7.0   84- 132     39 190  17S 192 182 202 -4.8 +7.3 +0.7+3.3 .192 -123.0     19 46 19.3 -27 15 56 373.8 639.7
24 May 28  7 29 17.0 r    3018 G8  6.4  6.0   75- 121     21 129  30N 318  10 333 -3.5 +6.9 +0.8-1.8 .203  118.9     20 40 11.8 -23 46 26 373.3 759.9
24 May 28  7 39 48.0 r  189555 G1  7.2  6.9   75- 121     22 131  63S 231 281 246 -3.5 +6.9 +1.8+1.9 .373 -154.8     20 40 22.3 -24  7  5 373.1 745.9
24 May 28 11 14 42.8 r    3032 A2  7.5  7.5   75- 119 -10 43 183  33S 201 198 216 -4.1 +6.7 +1.2+2.3 .280 -140.3     20 46 16.7 -23 43 26 370.7 653.6
24 May 29  7 42 54.8 R    3164SB3  4.5  4.6v  65- 108     16 120  64S 226 284 244 -2.7 +6.1 +1.2+2.0 .415 -155.3     21 37  4.8 -19 27 58 371.4 822.0
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -72sec : AB 4.5 10.1 66"  45.9, dT = +160sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 11 49.5 r  164528 B8  7.5  7.5   65- 107     21 123  77N 265 320 283 -2.7 +6.1 +1.3+1.0 .419  164.2     21 37 37.7 -19 13 52 370.7 782.7
24 May 29  9 58 18.3 d    3175 G8  4.7  4.3   64- 107     39 142 -81S  81 118  99 -3.0 +6.0 +2.3+0.9 .360  -20.2     21 42 39.5 -18 51 59 368.9 686.7
   R3175 = kappa Capricorni
24 May 29 10  6 12.6 r  164567cK5  7.3  6.5   64- 107     40 145  75N 267 301 285 -3.0 +6.0 +2.5+0.7 .340  153.4     21 40 34.8 -18 53 44 368.8 680.8
    164567 is double:  7.1 7.6
24 May 29 11 17 41.1 R    3175 G8  4.7  4.3   64- 106  -9 47 166  53S 215 229 234 -3.2 +5.9 +1.7+1.9 .350 -159.6     21 42 39.5 -18 51 59 368.1 666.7
   R3175 = kappa Capricorni
24 May 30 11 47 33.5 r  165197cK3  7.5  6.8   53-  93  -3 51 156  58S 216 239 237 -2.3 +4.7 +1.6+2.0 .377 -165.3     22 37  5.4 -12 53 52 365.8 692.2
    165197 is double: ** 7.7 9.3 0.063" 246.0, dT = -0.14sec
    165197 has been reported as non-instantaneous (OCc1656). Observations are highly desired
24 May 31 10 22 33.7 r    3449 K2  7.3  6.7   41-  80     35 116  85N 251 307 273 -1.0 +3.4 +1.5+1.4 .431  163.7     23 26 34.3 - 6 36 28 365.8 796.9
24 Jun  1 10 30  6.7 r  109113SF8  7.9  7.6   30-  67     30 103  68N 268 331 289 +0.2 +1.8 +1.2+0.9 .411  146.7      0 17 28.8   0 19 16 365.2 872.2
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    109113 is triple: AB 7.9 10.3 10.1" 208.8, dT = -13sec : AC 7.9 12.4 99" 273.3, dT = -239sec
24 Jun  1 10 38  5   m  109126 G5  7.2  6.5   30-  67     31 104  12N 324  27 346 +0.1 +1.8 +9.9+9.9 .000   90.0      0 18  3.6   0 37  0 365.1 863.9
24 Jun  1 11 36 48.3 r      38 G0  7.9  7.7   30-  66  -5 44 113  85S 241 299 263 +0.1 +1.6 +1.4+1.6 .445  169.5      0 19 16.6   0 31 14 363.9 799.3
24 Jun  3 10 21 14.5 r   92748cF5  8.3  8.0   12-  40     11  80  85N 256 325 275 +2.5 -1.5 +0.1+1.1 .576  163.0      2  0 49.0  13 23  5 367.51072.9
     92748 is double: ** 9.5 9.5 0.060"  56.0, dT = +0.1sec
     92748 has been reported as non-instantaneous (OCc 429). Observations are highly desired
24 Jun  3 11  4 22.6 R     299 M2  6.0  5.1S  11-  40 -12 20  83  63S 225 295 243 +2.5 -1.6 +0.1+1.7 .553 -167.4      2  2 35.1  13 28 36 366.51006.6
   R299 = 12 H1. Arietis
       299 = NSV 15429, 5.94, , Type VAR:
24 Jun  9  2 21 26   m   79413 M0  8.9  8.1    7+  32 -11 19 292  20N  21 308  12 +4.5 -6.1 +9.9+9.9 .000   90.0      7 28 34.9  26 49  9 385.9 990.6
24 Jun  9  3  9  2.5 d   79458 M0  9.2  8.3v   8+  32      9 295  89N  91  22  82 +4.5 -6.1 +0.0-0.7 .539   18.8      7 31  8.2  26 24 59 387.11069.8
     79458 = ASAS J073108+2624.9, 9.2, range 0.04, V, Type MISC, Period 27.37 days, Phase  77%
24 Jun 10  2 29 30.9 D   80165 F2  7.5  7.3   14+  43     28 286  45N  54 339  41 +4.2 -5.8 +2.2+1.1 .213   63.8      8 24 55.2  23 56 43 389.7 915.1
24 Jun 10  2 46 54.0 d   80173 K0  8.3  7.8   14+  44     24 287  54S 135  61 122 +4.2 -5.7 -0.1-1.8 .474  -17.9      8 25 21.5  23 32 58 390.1 942.3
24 Jun 10  3 40 36.8 d   80192kG5  8.5  8.0   14+  44     13 291  28N  37 327  24 +4.2 -5.6 +2.9+3.8 .114   77.9      8 27  4.2  23 43 39 391.51031.7
24 Jun 11  4 59 18.5 d   98510kG5  7.2  6.8   22+  56      4 289  41S 154  87 137 +3.5 -4.8 -0.6-2.1 .442  -37.0      9 20 37.9  19  5 26 396.81065.9
24 Jun 12  2 51  4.5 d   98936 K0  8.0  7.2   30+  66     41 270  85N 104  32  85 +2.8 -4.2 +1.3-1.4 .377   23.5     10  5  3.5  15  8  4 396.1 790.0
24 Jun 13  1 59  1.4 d   99302kA0  7.4  7.3   39+  77  -7 60 249  81N 102  42  81 +1.9 -3.2 +2.5-1.2 .300   31.5     10 49  3.3  10  9 28 397.1 678.6
24 Jun 15  2 39 56.2 d    1760pK0  7.5  7.0   58+ 100     60 219  79S 125  89 103 -0.7 -0.5 +2.1-1.8 .324   11.0     12 15  0.0 - 1 19 36 398.4 638.3
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +41sec
24 Jun 16  3 49 59   m    1863 K0  7.8  7.2   68+ 111     50 224  20N  42   2  21 -2.2 +1.0 +9.9+9.9 .000   90.0     12 58 35.9 - 6 56 54 397.6 641.1
24 Jun 23  9 31 55.6 R    2831kB2  6.0  6.1s  98- 162     35 204  36S 226 201 234 -4.7 +7.2 +1.5+1.0 .348 -156.4     19 24 30.2 -27 51 57 371.7 685.1
       2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
   Distance of 2831 to Terminator = 16.3"; to 3km sunlit peak = 5.9"
24 Jun 24  5 44 30.4 r    2965 G2  7.2  6.9   94- 151     23 133  70S 246 294 259 -3.0 +6.9 +1.8+1.4 .404 -167.3     20 19 45.2 -25 13 43 370.5 743.5
24 Jun 24 11 20 53.2 r    2984cG6  7.1  6.6   93- 149  -9 32 218  55N 299 261 313 -4.0 +6.6 +3.7-2.6 .216  120.2     20 28 29.3 -24  9 48 369.1 770.1
      2984 is double: AB 6.9      0.20"  81.0, dT = +0.7sec
      2984 is a close double. Observations are highly desired
24 Jun 25  7  0  0.1 r  190252 F2  7.2  7.0   87- 137     30 133  42S 209 255 226 -2.1 +6.2 +1.7+2.6 .318 -140.9     21 21  3.2 -20 49 16 367.8 730.2
24 Jun 26  7 22 28   m    3271 F5  7.2  6.9   78- 124     28 122  10N 332  25 352 -1.0 +5.0 +9.9+9.9 .000   90.0     22 16 56.3 -14 39 25 366.7 779.3
24 Jun 26 10 35 36.7 r  165019kM0  7.8  6.9v  77- 123     53 175  41S 202 206 222 -1.5 +4.7 +1.1+2.2 .348 -152.1     22 21 33.4 -14 27 25 364.6 695.5
    165019 = KT Aqr, 7.83 to 7.94, Hp, Type LB:
24 Jun 27 11 29 31.0 r  146589kM*  7.4  6.5s  66- 109  -7 59 177  71S 228 232 250 -0.5 +3.2 +1.8+1.5 .402  177.8     23 14 49.7 - 7 42 10 363.8 709.1
    146589 = NSV 26046, 7.37, range 0.02, 3V, Type VAR, Period 13.38688 days
24 Jun 27 16  4 26.4 D Saturn      1.1  1.1   65- 107  53 20 254 -78S  79  16 101 -1.0 +2.5 +0.8-0.4 .475  -24.6     23 22 57.1 - 6  7 54 367.1 929.0
   Saturn ring contacts offset by ±41.0 secs, at 16  3 45 and 16  5  7
   Saturn limb contacts offset by ±18.7 secs, at 16  4  8 and 16  4 45  Both contacts are against the bright limb of Saturn
24 Jun 27 16 59 24.1 R Saturn      1.1  1.1   65- 107  65  8 260  56S 213 148 235 -1.0 +2.4 +0.0+1.1 .515 -155.5     23 22 57.1 - 6  7 54 368.41012.1
   Saturn ring contacts offset by ±18.7 secs, at 16 59  5 and 16 59 43
   Saturn limb contacts offset by ±16.0 secs, at 16 59  8 and 16 59 40  Both contacts are against the bright limb of Saturn
24 Jul  2 10 50 27.2 r   76030kG0  8.9  8.6   14-  43     24  74  88S 259 333 271 +4.6 -4.3 +0.4+1.1 .522  163.6      3 36 57.6  22 38 47 373.0 984.3
24 Jul  2 11 29 57.8 R     524kA0  6.7  6.7   13-  43  -8 33  77  49S 220 296 232 +4.6 -4.4 +0.1+2.0 .475 -158.7      3 38 40.7  22 39 35 372.3 921.2
24 Jul  2 16 21 56.7 D     552SB7  2.9  2.9s  12-  41  56 82 281 -30N  22 284  33 +3.8 -5.0 +1.6+3.7 .253   44.5      3 47 29.1  24  6 18 369.9 637.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.12sec : AE 2.8 15.0 78" 232.4, dT = -266sec : AB 2.8 6.3 118"
291.1, dT = -4sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul  2 16 39 56.0 R     545SB6  4.1  4.2v  12-  41  60 78 278  71N 281 189 293 +3.8 -5.0 +3.0-1.0 .296  146.3      3 46 19.6  23 56 54 370.1 638.2
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +1sec : AB 4.2 14.4 110" 180.2, dT = +70sec : AC 4.2 12.9 147" 336.0, dT = -286sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17  4 25.4 d     560SB8  3.6  3.7s  12-  41  66 73 278 -76N  68 338  79 +3.7 -5.0 +2.5+0.8 .357    1.7      3 49  9.7  24  3 12 370.2 641.8
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.02sec : AC 3.6 15.0 50"  36.5, dT = +119sec :
AH 3.6 16.0 68" 221.6, dT = -172sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 17 23 42.6 R     552SB7  2.9  2.9s  12-  41  70 68 278  57N 295 207 307 +3.6 -5.0 +2.8-2.3 .259  135.6      3 47 29.1  24  6 18 370.4 650.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = 0.00sec : AE 2.8 15.0 78" 232.4, dT = -138sec : AB 2.8 6.3 118"
291.1, dT = -454sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 31  5.6 R     560SB8  3.6  3.7s  12-  41  86 53 280  86S 258 175 269 +3.4 -5.1 +2.0-0.1 .389  178.1      3 49  9.7  24  3 12 371.4 700.7
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.11sec : AC 3.6 15.0 50"  36.5, dT = +96sec :
AH 3.6 16.0 68" 221.6, dT = -142sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 18 32 42.9 r     561SB7  5.1  5.1V  12-  41  86 53 280  77N 276 192 287 +3.4 -5.1 +1.9-1.0 .368  160.9      3 49 11.2  24  8 12 371.4 702.3
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.41sec : AF 5.0 14.5 4.7" 221.0, dT = -7sec : AE 5.1 14.8 96"  76.8, dT = +248sec : AD 5.1
14.7 144"  65.9, dT = +340sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  47%
24 Jul  4 10 49 44.7 r     840cK0  6.3  5.5    3-  18      2  61  71S 263 328 264 +5.6 -5.8 -0.4+0.8 .611  174.2      5 35 55.5  27 39 44 381.31136.6
       840 is double: ** 7.3 7.3 0.050"
       840 has been reported as non-instantaneous (OCc1267). Observations are highly desired
24 Jul  8  2 35  8.4 d   80537kF8  8.7  8.4    5+  25      8 289  18S 170 101 154 +3.5 -5.0 -0.9-2.7 .330  -53.2      8 57 49.3  20 49 41 394.31052.4
24 Jul  8  2 45 59.0 D    1342KG5  7.6  7.3    5+  25      6 290  50N  58 350  43 +3.5 -5.0 +0.5+0.4 .294   58.3      8 58 55.7  21  9 59 394.61069.6
24 Jul 12  1 41 57   Gr 119138 K0  7.4  6.9   32+  69  -2 48 ** GRAZE: CA 19.4N; Dist. 38km in az.  47deg. [Lat = 23.62-0.98(E.Long+101.11)]
24 Jul 12  1 50 36   r  119138 K0  7.4  6.9   32+  69  -4 48 244   9N  32 337  10 -0.5 -0.7 +9.9+9.9 .062  100.0     11 58 13.0   0 52  9 399.6 689.2
24 Jul 12  2 12 16.7 D    1730wK2  6.2  5.5   32+  69  -9 43 247  76N 100  41  78 -0.6 -0.6 +2.1-1.3 .311   31.3     11 59  3.3   0 31 50 400.0 707.0
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +11sec
24 Jul 12  4 26 38.8 d    1737WA2  7.8  7.6   33+  70     13 264  52N  76   9  54 -0.9 -0.4 +0.7-0.4 .310   46.0     12  1 57.0   0  6  8 402.9 873.4
      1737 is double: AB 7.8 8.5 73" 175.7, dT = -40sec
24 Jul 13  2 55 59.5 d  138921KG5  8.1  7.7   42+  81     39 242  54N  77  22  55 -2.0 +0.8 +2.7-0.2 .222   51.4     12 41 59.6 - 5 13 15 400.0 691.6
24 Jul 13  3 27 55.1 d  138924 F2  7.7  7.5   42+  81     32 247  84N 107  49  86 -2.1 +0.9 +1.5-1.5 .353   18.5     12 42 35.9 - 5 28  6 400.6 723.1
24 Jul 14  2 12 13.2 d  157912kF0  7.8  7.6   51+  91  -9 49 216  61S 140 107 120 -3.1 +2.1 +1.8-2.2 .318   -9.9     13 23 56.5 -10 52 15 397.6 622.7
24 Jul 14  3 30 34.3 D    1925SB1  1.0  1.1v  52+  92     36 235  51S 151 100 130 -3.4 +2.3 +1.4-2.7 .311  -26.2     13 25 11.6 -11  9 41 398.6 669.6
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -229sec : AC 1.0 10.5 368"  60.8, dT =
+3sec
      1925 is a close double. Observations are highly desired
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 14  4 42 18.7 R    1925SB1  1.0  1.1v  52+  92     22 247 -71S 273 213 252 -3.6 +2.4 +1.3-1.0 .347 -153.6     13 25 11.6 -11  9 41 399.8 750.0
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +225sec : AC 1.0 10.5 368"  60.8, dT =
+903sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  3 36 24.7 D    2029 M1  4.9  4.1v  61+ 103     39 223  85S 114  73  96 -4.5 +3.6 +2.3-1.5 .326    7.9 .02 14 10 50.5 -16 18  7 395.5 631.1
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  5 45 16.8 d X134481M    7.0  6.9   80+ 127     27 223  19S 169 125 158 -6.3 +5.9 +2.8-5.3 .139  -67.0     15 53 36.6 -25 19 38 387.5 666.3
   X134481 is triple: Ab,Aa 5.6 5.6 0.10" 170.0, dT = +0.7sec : BA 7.0 4.7 2.4"  87.5, dT = +2.5sec
   X134481 is a close double. Observations are highly desired
24 Jul 17  5 45 18.5 D    2268MB2  4.5        80+ 127     27 223  20S 169 125 158 -6.3 +5.9 +2.8-5.3 .139  -66.9     15 53 36.7 -25 19 38 387.5 666.3
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -2.6sec
      2268 is a close double. Observations are highly desired
24 Jul 17  5 59  7.3 D    2273 B8  5.9  5.9v  80+ 127     25 225  62S 126  80 115 -6.4 +5.9 +2.1-1.9 .328  -25.2     15 54 39.5 -25 14 37 387.6 681.1
   R2273 = 3 Scorpii (V927)
      2273 = V0927 Sco, 5.8, range 0.03, V, Type SXARI, Period 1.45937 days, Phase  38%
24 Jul 21  4 18 47.6 D    2910cG3  4.7  4.3  100+ 174     30 142  67S  39  78  50 -4.0 +7.1 +2.3+2.4 .297   41.1     19 55 50.4 -26 17 58 367.7 702.9
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Jul 21  6  4 57.6 D    2914cG8  4.8  4.4  100+ 174     40 168  46S  55  68  66 -4.3 +7.1 +2.3+1.3 .350   16.4     19 58 57.2 -26 11 45 366.5 649.1
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
   Distance of 2914 to Terminator = 2.7"; to 3km sunlit peak = 0.0"
24 Jul 24  8 16 50.1 r  165373 K0  7.7  7.1   88- 140     52 150  56S 217 245 238 -0.1 +3.7 +1.5+2.0 .404 -167.2     22 54 30.0 -10 17 59 359.9 723.0
24 Jul 25  8 57 45   Gr   3505WG8  5.5  5.0   80- 126     59 ** GRAZE: CA 20.8N; Dist.103km in az. 132deg. [Lat = 21.74+1.02(E.Long+101.11)]
24 Jul 25  9  0  8   M    3505WG8  5.5  5.0   80- 126     58 140  21N 317 353 339 +1.3 +2.0 +9.9+9.9 .000   90.0     23 47 56.5 - 2 45 42 360.3 739.4
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7
24 Jul 25 11 24 55.8 r  146935 K0  7.9  7.1   79- 125 -11 60 213  48S 205 175 227 +0.9 +1.6 +1.0+2.1 .396 -159.1     23 51  9.9 - 2 31 14 360.3 740.2
24 Jul 26  7  0  2.6 R      81 K4  6.4  5.7   70- 114     28  99  15S 173 238 194 +2.9 +0.6 -0.4+3.8 .241 -118.2      0 37 30.5   3  8  7 364.3 903.7
24 Jul 26  8 44  9.4 r  109355pG5  7.7  7.1   69- 113     50 114  33S 190 248 212 +2.8 +0.3 +0.3+2.9 .350 -141.2      0 39 46.9   3 39 10 362.4 788.7
    109355 is double: ** 9.1 9.1 0.10"  90.0, dT = +0.05sec
    109355 has been reported as non-instantaneous (OCc1143). Observations are highly desired
24 Jul 26 10 10 36.1 r  109365kG5  8.0  7.5   69- 112     67 141  39N 298 334 320 +2.5 +0.1 +6.7-3.1 .126  107.5      0 40 49.9   4 28 42 361.6 733.2
24 Jul 26 10 29  5.7 r      90SF8  7.6        69- 112     69 151  12S 169 195 190 +2.5 +0.1 -0.9+4.3 .225 -123.0      0 42 23.2   4 10  0 361.6 726.2
        90 is triple: AB 7.86 9.71 2.14" 212.6, dT = -7sec : AC 7.9 13.4 47" 275.5, dT = +61sec
        90 is a close double. Observations are highly desired
24 Jul 27  9 26 24.6 R     222 G5  7.0  6.5   58-  99     53 102  46N 292 359 312 +3.9 -1.4 +3.6-0.7 .207  117.2      1 31 42.7  10 53 22 364.8 799.0
24 Jul 27 10 38 31.8 r X  2178 F8  8.0  7.7   58-  99     68 119  55S 213 268 233 +3.7 -1.6 +1.1+2.3 .404 -165.6      1 33 43.4  10 54 15 364.1 736.9
24 Jul 29  7  2 16.7 R     472cA1  4.9  4.9   36-  74      2  68  84N 262 328 276 +5.6 -3.9 -0.3+0.9 .603  163.1      3 14 54.1  21  2 40 375.61149.0
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.16sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 29 11 45  0.7 R     493 A0  6.9  6.9   35-  72  -7 63  86  38S 205 288 218 +5.3 -4.6 +0.6+2.9 .344 -147.8      3 24 34.5  22  2 25 370.8 731.8
24 Jul 30 10 43 33.8 d     647WB9  5.4  5.4s  25-  60     38  75 -76S  97 177 105 +6.0 -5.4 +1.3+0.6 .401  -32.2      4 22 34.9  25 37 46 375.9 863.7
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = +15sec
       647 = NSV 15957, 5.34 to 5.39, Hp
24 Jul 30 10 43 45.8 R   76559 B9  7.8  7.7   25-  60     38  74  44N 309  29 318 +6.0 -5.4 +3.0-1.7 .201  115.2      4 20 30.4  25 49 39 375.8 861.9
24 Jul 30 11 43 20.4 R     647WB9  5.4  5.4s  24-  59  -8 51  77  38S 212 296 220 +5.9 -5.5 +0.4+2.7 .359 -147.7      4 22 34.9  25 37 46 375.0 773.3
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = +54sec
       647 = NSV 15957, 5.34 to 5.39, Hp
24 Jul 31 11 10 36.4 R     797cB9  6.4  6.3e  16-  47     32  70  54N 307  26 310 +6.3 -6.1 +2.0-1.0 .272  124.7      5 20 59.3  27 57 26 380.0 879.8
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase   0%
24 Aug  1 10  3 18.6 r   78191 A0  7.7  7.7    9-  35      7  62  61S 250 317 247 +6.5 -6.2 -0.4+1.1 .559 -169.0      6 17 59.9  28  0 24 385.91065.8
24 Aug  1 10 22 54.0 r   78206 K0  8.0  7.4    9-  35     11  64  65S 254 323 252 +6.5 -6.3 -0.2+1.1 .548 -173.6      6 18 47.3  28  3 20 385.61030.8
24 Aug  1 10 30  8   M   78233SA3  7.5         9-  35     12  64  19N 350  61 348 +6.5 -6.3 +9.9+9.9 .000   90.0      6 19 59.0  28 25 36 385.41019.3
     78233 is quadruple: AB 8.16 8.35 0.15" 285.5 : AB,C 7.5 9.6 2.9" 265.3 : BA 8.7 9.3 58" 268.1
     78233 is a close double. Observations are highly desired
24 Aug  1 11  0 49.0 r   78240 K0  8.6  8.0    9-  35     18  67  56S 246 319 243 +6.4 -6.4 -0.1+1.4 .499 -165.4      6 20 21.4  28  4 38 384.8 962.7
24 Aug  1 19 46 14.1 r    1008 A0  5.3  5.3s   8-  32  76 47 287  42S 234 148 230 +4.9 -6.5 +2.8+1.3 .245 -127.2      6 35 12.1  28  1 20 383.4 752.7
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 Aug  2 10 42 46.6 r   79256 K0  7.8  7.3    4-  23      3  62  74N 305  11 297 +6.3 -6.3 +0.3-0.3 .447  142.6      7 17 59.4  27  8 31 389.91064.4
24 Aug  2 11 16 25.8 R    1108cG8  7.0  6.5    4-  23     10  65  25S 224 293 216 +6.3 -6.3 -0.8+2.2 .384 -136.2      7 19 30.8  26 49 23 389.31003.7
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.18sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Aug  2 11 18 30.2 r   79279 F0  8.3  8.2    4-  23     10  65  69S 268 337 260 +6.3 -6.3 +0.0+0.8 .529  179.5      7 19 14.6  27  0  0 389.2 999.5
24 Aug  9  2 22 22.9 d    1786SG5  8.6        18+  51     21 256  57N  81  18  60 -1.6 +0.7 +1.1-0.7 .307   41.5     12 27  0.8 - 3 32  6 403.0 802.4
      1786 is quadruple: AB 8.89 10.03 0.54"  97.0, dT = +1.7sec : AB,D 8.5 10.2 25.1" 146.4, dT = +34sec : AB,C 8.5 14.5 33" 319.2, dT = -58sec
      1786 is a close double. Observations are highly desired
24 Aug 10  1 46 14.6 D    1886cK3  5.6  5.0   26+  61  -6 34 241  54N  78  24  57 -2.8 +2.0 +2.3-0.4 .242   47.1     13  8 32.5 - 8 59  4 401.2 691.4
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.4sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 10  3  2 36.9 D    1887 K0  6.3  5.8   26+  62     18 251  25S 179 117 158 -3.1 +2.1 +0.7-4.2 .202  -59.8     13  9 14.2 - 9 32 17 402.7 783.2
24 Aug 11  2 10 57.6 d  158207 F0  7.4  7.2   35+  73 -12 33 232  47S 154 105 135 -4.2 +3.4 +1.5-2.9 .284  -33.3     13 52 15.4 -14 40 36 399.5 659.6
24 Aug 11  3  0 52.7 d    1992cF0  7.5     S  35+  73     24 241  85N 106  50  87 -4.4 +3.4 +1.5-1.4 .361   10.7     13 53 51.7 -14 39 51 400.3 712.5
      1992 is double: AB 7.85 8.92 0.28" 323.3, dT = -0.6sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
24 Aug 13  3 51 13.4 d  183537kK0  7.3  6.6   55+  95     26 227  60N  73  26  60 -6.5 +5.8 +1.8-0.2 .297   31.6     15 31  7.0 -23 39 24 392.9 665.4
24 Aug 13  4 36 11.0 d  183548 M4  6.8  6.0v  55+  96     18 233  83S 110  56  97 -6.7 +5.8 +1.5-1.5 .375   -8.4     15 32 15.1 -23 52 49 393.6 723.0
    183548 = GG Lib, 6.868, range 0.23, 6w, Type SR:, Period 35.65 days, Phase  49%
24 Aug 14  3 47 29.0 d    2354kA0  7.5  7.4s  65+ 107     31 214  41S 147 112 139 -7.1 +6.6 +2.7-3.0 .223  -48.0     16 24 30.4 -27  9  4 387.4 626.0
      2354 = NSV 20613, 7.46 to 7.49, V, Type VAR:
24 Aug 17  1 57  4.6 D    2831kB2  6.0  6.1s  90+ 144 -10 28 143  87S  77 116  85 -5.7 +7.4 +2.1+1.0 .385    9.1     19 24 30.2 -27 51 57 370.5 700.1
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 20  7 19 53.2 r    3303kF2  6.4  6.2  100- 172     54 180  73S 255 255 276 -1.8 +4.2 +2.5+0.6 .379  153.6     22 30  1.5 -12 54 54 355.7 731.0
   Distance of 3303 to Terminator = 8.3"; to 3km sunlit peak = 1.0"
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 21  9 49  6.1 r  146724 K2  7.0  6.2   96- 158     53 222  40S 201 162 223 -0.2 +2.1 +0.7+2.0 .407 -153.9     23 28 46.7 - 5 23 22 355.1 780.6
24 Aug 22  8 27 59.8 r  109142cG5  7.6  7.1   90- 144     67 158  84S 241 261 263 +1.9 +0.6 +2.1+1.3 .417  164.6      0 19 57.1   1 34 57 355.4 745.0
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = +0.06sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 22 11 11  7   gr     47 F0  7.7  7.5   90- 143     53 241  17N 319 265 341 +1.5 +0.2 +9.9+9.9 .000   90.0      0 23 38.5   2 44 35 356.4 778.9
24 Aug 22 11 11  9   Gr     47 F0  7.7  7.5   90- 143     52 ** GRAZE: CA 17.4N; Dist.  5km in az. 328deg. [Lat = 23.18+0.57(E.Long+101.11)]
24 Aug 23  8 53 17.7 r  109738 G5  7.8  7.1   82- 130     70 133  54N 283 326 304 +3.6 -1.2 +3.9-0.6 .238  123.6      1 13 41.8   8 58 29 357.8 745.7
24 Aug 25  6 15 20.1 r     439cF0  7.3  7.1   62- 104     18  75  88N 255 326 270 +6.4 -3.9 +0.2+1.1 .560  165.6      2 59 10.4  19 59 23 369.41035.7
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.18sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25  8  3 55.4 r   75708 K0  8.0  7.1   61- 103     42  83  50S 213 290 228 +6.4 -4.1 +0.2+2.2 .448 -156.6      3  3  9.6  20 20 10 367.5 869.1
24 Aug 25  9 48 53.2 r     452 A2  7.7  7.6   61- 102     65  90  84S 247 328 262 +6.1 -4.4 +1.8+1.4 .407  167.8      3  5 30.3  20 54  9 366.2 739.5
24 Aug 26  6 38  9.7 r     587 K0  6.2  5.5   51-  91     12  68  56N 293   3 303 +7.2 -5.0 +0.5+0.1 .404  133.3      3 57 26.4  24 27 43 374.81072.0
24 Aug 27  8  5 56.9 R     746WB7  7.0  6.9   39-  77     20  68  81N 275 348 279 +7.6 -6.0 +0.4+0.6 .493  156.2      4 59 53.7  27 19 32 379.1 990.5
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -15sec
24 Aug 27 10 27 25.0 R     756 F0  6.6  6.5   38-  76     50  74  86N 270 357 275 +7.4 -6.3 +1.7+0.7 .389  159.3      5  4 38.0  27 41 46 376.8 760.3
24 Aug 28  8 13 51.6 R   77818 K5  6.7  5.8   29-  65     10  63  52S 235 304 234 +7.7 -6.3 -0.5+1.5 .512 -156.4      6  0  4.9  28  7 33 384.81043.3
24 Aug 28  9 10 46   m   77883 B2  7.6  7.6   29-  65     21  67  15N 348  62 347 +7.7 -6.5 +9.9+9.9 .000   90.0      6  2 59.4  28 40 37 383.7 943.0
24 Aug 28 10  3  7.1 r     917 K2  8.1  7.4S  28-  64     32  70  46S 229 308 228 +7.6 -6.6 +0.1+2.1 .402 -151.3      6  4 16.2  28 18  3 382.8 850.4
       917 = NSV 2811, 8.4,
24 Aug 29 11 12 42.0 r   79037 K0  9.1  8.6   19-  52     35  71  85N 286   6 279 +7.4 -6.6 +1.3+0.2 .400  161.1      7  5  3.3  27 47 37 386.9 792.8
24 Aug 29 11 13  6   m   79050 M0  8.5  7.7   19-  52     35  71  14N 357  77 350 +7.4 -6.6 +9.9+9.9 .000   90.0      7  6  6.8  27 59 48 386.9 793.4
24 Aug 30 10 54 17.9 r   79859 F0  8.5  8.4   12-  40     19  70  58N 320  33 308 +7.0 -6.3 +1.2-1.2 .323  133.7      8  0 45.3  25 37 35 392.2 888.5
24 Aug 30 11 10 56.1 R    1206 G8  5.9  5.3   12-  40     23  71  65S 263 337 251 +7.0 -6.3 +0.4+1.1 .443 -169.0      8  0 55.9  25 23 34 391.9 858.8
   R1206 = omega Cancri
24 Aug 31 10 57 12.8 r   80481kK0  9.6  9.1    6-  29      8  70  78S 282 350 266 +6.3 -5.6 +0.1+0.4 .495  178.0      8 52 50.0  22  0 26 396.7 952.7
24 Aug 31 11  3 33   M    1330pG5  7.8  7.5    6-  29      9  70  14N  10  79 355 +6.3 -5.6 +9.9+9.9 .000   90.0      8 54 18.7  22 12 41 396.6 942.9
      1330 is double: ** 8.6 8.6 0.10" 115.0
      1330 has been reported as non-instantaneous (OCc1075). Observations are highly desired
24 Aug 31 11 25  0.1 r   80490kF8  9.3  9.1    6-  29     14  72  33S 237 308 222 +6.3 -5.6 -0.3+2.3 .342 -136.7      8 53 56.3  21 46 54 396.1 903.6
24 Aug 31 11 47 40.0 R   80499 K0  8.2  7.6    6-  28 -10 19  74  51S 255 327 240 +6.3 -5.6 +0.2+1.4 .404 -153.7      8 54 32.2  21 49 13 395.6 863.7
24 Sep 10  1 46 31.8 d  184047pM2  7.5  6.7v  38+  76     31 216  44S 148 111 138 -6.8 +6.5 +2.6-3.0 .225  -45.6     16  2 29.1 -26  8 53 393.6 615.5
    184047 is double: AB 7.6      9.9"   1.5, dT = -37sec
    184047 is a close double. Observations are highly desired
    184047 = V1043 Sco, 7.45 to 7.58, Hp, Type SRB
24 Sep 10  2  2 59.0 D    2298kK3  5.0  4.3   38+  76     29 219  57N  70  30  60 -6.8 +6.5 +2.0+0.0 .282   31.2     16  3 20.6 -25 51 55 393.7 630.6
24 Sep 11  3 43  9.2 d  184914 K2  7.5  6.9   48+  88     20 225  56S 130  81 124 -7.8 +7.1 +2.3-2.3 .282  -41.6     17  1  3.3 -28 33 11 389.4 712.3
24 Sep 12  3 16 33.6 d  186041 K0  7.1  6.5   59+ 100     30 210  85S  94  62  94 -7.9 +7.5 +2.4-0.7 .340  -12.2     17 59 14.9 -29 23 24 382.8 646.1
24 Sep 14  0 38 43   m    2910cG3  4.7  4.3   78+ 124   2 29 142   5N 350  29   1 -6.4 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 371.2 690.1
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
   Distance of 2910 to Terminator = 7.8"; to 3km sunlit peak = 0.0"
24 Sep 14  2 21  4.2 D    2914cG8  4.8  4.4   79+ 125     39 166  23N   8  23  19 -6.8 +7.2 +1.4+4.4 .157   63.6     19 58 57.2 -26 11 45 369.8 634.4
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 14  3  3 49.0 r    2914cG8  4.8  4.4   79+ 125     41 178 -33N 312 314 323 -6.9 +7.1 +4.4-2.8 .158  116.4     19 58 57.2 -26 11 45 369.5 637.3
   R2914 = 60 Sagittarii
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 15  7 52 38.6 D    3089SA0  5.3  5.3   88+ 140     21 234  72S  85  32 101 -6.4 +5.8 +1.2-0.6 .448  -28.6     21  8 33.6 -21 11 37 364.4 902.3
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +7sec : AF 5.3 13.0 9.7"  14.0, dT = +7sec : AG 5.3 20.0 13.1"  62.0, dT = +27sec : AC 5.3 15.0
35" 114.8, dT = +68sec
      3089 is a close double. Observations are highly desired
24 Sep 17  7  8 53.8 d    3375 F2  6.8  6.6   99+ 168     54 210  70N  36   8  57 -2.8 +3.1 +1.2+1.5 .441   11.5     23  0 19.9 - 8 52 50 353.7 771.2
   Distance of 3375 to Terminator = 18.6"; to 3km sunlit peak = 7.7"
24 Sep 17 10 28  3.2 d    3391kA0  6.7  6.7   99+ 169     19 253  81S  65   3  87 -3.0 +2.6 +0.6+0.1 .555  -10.5     23  5 52.5 - 7 56 12 356.5 976.1
   R3391 = 85 Aquarii
   Distance of 3391 to Terminator = 15.8"; to 3km sunlit peak = 5.7"
24 Sep 19  6 59 48.1 R     104PK2  5.7  5.3   98- 163     70 150  36S 192 220 213 +1.6 -0.5 +0.5+2.8 .367 -145.7      0 48 23.0   5 16 50 351.8 759.0
      104 is triple: AB 5.8      2.7" 341.0, dT = +6sec : AC 5.8 12.3 149" 250.6, dT = -210sec
      104 is a close double. Observations are highly desired
   Distance of 104 to Terminator = 14.3"; to 3km sunlit peak = 4.5"
24 Sep 21  7 40 58.6 r     397MB9  7.5  7.5   85- 134     66  95  87N 252 328 269 +5.5 -3.9 +1.9+1.2 .418  160.9      2 41  6.6  18 48  1 358.3 768.2
      397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +6sec : AC 7.7 9.5 66" 242.2, dT = -155sec
      397 is a close double. Observations are highly desired
24 Sep 21  7 41  4.6 r X  3591MB9  7.9  7.9   85- 134     66  95  87N 252 328 268 +5.5 -3.9 +1.9+1.2 .418  161.1      2 41  6.8  18 47 59 358.3 768.1
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -6sec : BC 7.5 9.5 67" 243.0, dT = -159sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  5 49 51.8 R     521kA2  6.7  6.7v  76- 122     29  75  82N 262 338 275 +7.1 -4.9 +0.7+1.0 .508  159.2      3 36 58.0  23 12 40 365.6 964.2
   R521 = 9 Tauri (V486)
      521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9  1 26.1 D     537SB6  3.7  3.8s  75- 120     71  82 -80N  65 154  77 +6.7 -5.3 +1.9+1.4 .402   -4.6      3 44 52.5  24  6 48 363.4 711.0
   R537 = Electra = 17 Tauri
      537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.3sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+47sec
      537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
      537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22  9 52 11.1 D     541SB8  3.9  3.9s  75- 120     82  77 -55N  40 139  52 +6.6 -5.4 +1.6+2.4 .353   22.4      3 45 49.6  24 22  4 363.4 672.3
   R541 = Maia = 20 Tauri
      541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +270sec : AB 3.8 13.7 113"  72.8, dT = +270sec
      541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 10  5 39.7 d     539SB6  4.3  4.4s  75- 120     85  69  -7N 352 101   3 +6.5 -5.5 -1.5+8.6 .120   71.4      3 45 12.5  24 28  2 363.4 665.1
   R539 = Taygeta = 19 Tauri
      539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = -0.03sec : AC 4.3 14.0 53"  53.5, dT = +207sec : AB 4.3 11.0 72"
328.8, dT = +555sec
      539 is a close double. Observations are highly desired
      539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 18 30   m     545SB6  4.1  4.2v  75- 120     88  55 -11S 154 278 165 +6.5 -5.5 +9.9+9.9 .000  -90.0      3 46 19.6  23 56 54 363.4 659.5
   R545 = Merope = 23 Tauri
      545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0 : AB 4.2 14.4 110" 180.2 : AC 4.2 12.9 147" 336.0
      545 is a close double. Observations are highly desired
      545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Sep 22 10 19 56   Gr    539SB6  4.3  4.4s  75- 120     89 ** GRAZE: CA 11.0N; Dist. 88km in az. 334deg. [Lat = 24.00+0.45(E.Long+101.11)]
24 Sep 22 10 22 28   Gr    545SB6  4.1  4.2v  75- 120     88 ** GRAZE: CA-10.7S; Dist.282km in az. 335deg. [Lat = 25.92+0.43(E.Long+101.11)]
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 22 10 26 35.7 R     537SB6  3.7  3.8s  75- 120     89 331  74S 239  88 251 +6.5 -5.5 +2.2+1.5 .371 -174.8      3 44 52.5  24  6 48 363.4 656.8
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.28sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+23sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 30 31.6 R     536pB7  5.5  5.5   75- 120     88 311  70N 275 144 287 +6.5 -5.5 +3.0-0.3 .320  149.3      3 44 48.2  24 17 22 363.4 655.6
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -272sec : AC 5.4 11.5 218" 196.1, dT = -131sec
24 Sep 22 10 32 10.0 R     539SB6  4.3  4.4s  75- 120     88 309  29N 316 187 328 +6.5 -5.5 +5.6-6.4 .119  108.7      3 45 12.5  24 28  2 363.5 654.8
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.33sec : AC 4.3 14.0 53"  53.5, dT = +59sec : AB 4.3 11.0 72"
328.8, dT = -594sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 32 27.2 r   76145pA3  8.1  8.0   75- 120     88 301  46S 211  90 222 +6.5 -5.5 +1.6+2.9 .309 -146.2      3 45 26.1  24  2  7 363.5 655.0
     76145 is triple: AB 8.1 13.6 123" 356.9, dT = +332sec : AC 8.1 15.0 139" 136.9, dT = -126sec
24 Sep 22 10 41 53.5 r   76158pA0  7.9  7.8s  75- 120     86 287  35S 201  95 212 +6.4 -5.5 +1.4+3.7 .263 -135.3      3 45 51.6  24  2 20 363.5 652.7
     76158 is double: AB 7.9 14.5 164" 321.1, dT = +317sec
     76158 = NSV 15764, 7.9 to 8.0, pg, Type VAR:
24 Sep 22 10 47  5   Gr    542pB8  5.8  5.8   75- 120     83 ** GRAZE: CA  9.4N; Dist. 23km in az. 339deg. [Lat = 23.35+0.36(E.Long+101.11)]
24 Sep 22 10 53 54   R     542pB8  5.8  5.8   75- 120     83 285  19N 326 224 338 +6.4 -5.5 +9.9+9.9 .062   99.7      3 45 54.5  24 33 16 363.6 650.5
   R542 = Asterope = 21 Tauri
       542 is triple: AB 5.8 6.4 150" 130.1, dT = +2321sec : AD 5.8 12.7 170"  74.1, dT = +838sec
24 Sep 22 11  4 11.3 r   76152pB9  7.2  7.1S  75- 120     81 281  78N 267 170 278 +6.4 -5.5 +2.8+0.0 .347  160.1      3 45 37.8  24 20  8 363.7 650.3
     76152 is triple: Aa,Ab 7.4 9.0 0.012" 349.6, dT = 0.00sec : AB 7.2 9.9 177" 164.1, dT = +111sec
     76152 is a close double. Observations are highly desired
     76152 = NSV 15762, 7.17, , Type VAR:
24 Sep 22 11 11  1   M     552SB7  2.9  2.9s  75- 120     80 279  -8S 157  63 169 +6.3 -5.5 +9.9+9.9 .000  -90.0      3 47 29.1  24  6 18 363.7 649.8
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1 : AE 2.8 15.0 78" 232.4 : AB 2.8 6.3 118" 291.1
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 11 11 44   Gr    552SB7  2.9  2.9s  75- 120     78 ** GRAZE: CA -7.7S; Dist. 75km in az. 343deg. [Lat = 23.83+0.28(E.Long+101.11)]
24 Sep 22 11 12 13.3 R     541SB8  3.9  3.9s  75- 120     79 280  76N 269 174 281 +6.3 -5.5 +2.8-0.2 .342  158.0      3 45 49.6  24 22  4 363.7 650.4
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +317sec : AB 3.8 13.7 113"  72.8, dT = +318sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11 12 40.6 R     543pA0  6.4  6.4   75- 120     79 281  40N 305 209 316 +6.3 -5.6 +3.7-3.4 .199  122.7      3 46  2.9  24 31 40 363.7 650.2
   R543 = 22 Tauri
       543 is triple: BC 6.4 15.1 52" 267.8, dT = -207sec : BA 6.4 5.8 150" 310.1, dT = -749sec
24 Sep 22 11 15 56.5 r   76167SK2  7.6  7.0S  75- 120     78 279  63S 228 134 240 +6.3 -5.6 +2.2+1.8 .348 -160.5      3 46 13.7  24 11 48 363.8 650.7
     76167 is triple: CD 7.7 12.9 18.3"   4.6, dT = +38sec : C,AB 7.7 8.1 39" 128.3, dT = +19sec
     76167 = NSV 15768, 7.7,
24 Sep 22 11 16 12.2 r   76169pA3  8.1  7.9   75- 120     78 279  61S 226 132 237 +6.3 -5.6 +2.2+1.9 .343 -158.3      3 46 16.0  24 11 24 363.8 650.7
     76169 is triple: AB 8.1 9.4 1.1" 178.4, dT = -2.1sec : AB,C 8.1 7.7 39" 308.3, dT = -15sec
     76169 has been reported as non-instantaneous (S   437). Observations are highly desired
24 Sep 22 11 19  9   R     549SA0  6.3  6.3   75- 120     78 278   8S 173  80 185 +6.3 -5.6 +9.9+9.9 .098 -105.4      3 47 21.0  24  6 59 363.8 650.5
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = +46sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = +513sec : BC 6.3 8.2 86" 345.0, dT =
+873sec
24 Sep 22 11 28 54.5 r     546pA0  7.3  7.3   75- 119     75 278  71S 236 144 247 +6.3 -5.6 +2.3+1.4 .360 -167.0      3 46 27.3  24 15 18 363.9 652.4
       546 is triple: Aa,Ab 7.3      0.20" 157.8, dT = -0.12sec : AB 7.3 14.8 119"  34.8, dT = +310sec
       546 is a close double. Observations are highly desired
24 Sep 22 11 57 21.3 R     548pB9  6.8  6.8   74- 119  -9 69 279  65N 281 191 292 +6.2 -5.6 +2.6-1.1 .326  150.5      3 46 59.4  24 31 12 364.2 661.1
       548 is quadruple: Aa,Ab 6.8 6.9 0.020" 237.5, dT = -0.05sec : AB 6.8 14.8 101" 299.2, dT = -295sec : AC 6.8 13.0 123" 190.1, dT = +2.6sec
       548 is a close double. Observations are highly desired
24 Sep 22 12  3 30.4 R     553pA0  6.8  6.8e  74- 119  -8 68 278  59S 225 136 236 +6.2 -5.6 +2.2+1.8 .335 -153.2      3 47 29.5  24 17 18 364.3 664.0
       553 is double: AB 6.8 15.5 95"  16.8, dT = +251sec
       553 = V1229 Tau, 6.83 to 6.94, V, Type EA, Period 2.46113408 days, Phase  41%
24 Sep 22 12 11 17.8 r   76194PA0  7.7  7.6v  74- 119  -6 66 279  56N 289 201 301 +6.2 -5.6 +2.5-1.7 .301  142.8      3 47 24.1  24 35 19 364.4 667.9
     76194 is quadruple: ** 7.7      0.050" 298.0, dT = -0.16sec : AB 7.7 14.6 32"  94.4, dT = +104sec : AC 7.7 14.4 130"  62.8, dT = +298sec
     76194 has been reported as non-instantaneous (OCc1829). Observations are highly desired
     76194 = V1228 Tau, 7.71, range 0.02, v, Type DSCTC, Period 0.0603 days
24 Sep 24  9 56  4.8 r   77551cB9  8.3  8.2   54-  94     58  72  88S 266 358 267 +8.2 -6.7 +2.0+0.8 .376  171.0      5 47 14.3  28 37 26 375.9 693.3
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -0.8sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 56 38.0 r    1026SG5  6.5  5.9   44-  83      8  63  73N 292 360 287 +8.7 -6.5 +0.2+0.1 .489  151.6      6 41 20.9  28 11 48 385.31038.3
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +29sec : AC 6.6 12.8 58"  61.4, dT = +75sec
24 Sep 25 11  9 18.6 r   78776 K5  8.1  7.3   42-  81     61  73  89N 277  10 272 +8.2 -6.9 +2.3+0.3 .344  172.5      6 49 41.2  28 19  4 381.5 641.1
24 Sep 28 10 35 51.3 r   98603 M2  8.9  8.1v  16-  47     19  77  63N 319  31 302 +6.7 -5.1 +0.9-1.1 .367  146.7      9 29 50.1  19  5 58 397.9 847.3
     98603 = EG Leo, 8.78 to 8.97, Hp, Type LB, Period 24.252901 days, Phase  39%
24 Oct  6  1 34 17.8 d  183039SK5  8.2         9+  35      6 243  50S 152  90 137 -4.9 +5.3 +1.4-3.1 .275  -48.7     14 57 26.5 -21 24 42 402.3 812.1
    183039 is multiple: BC 8.2 9.5 0.15" 223.2, dT = +0.17sec : Ba,Bb 8.2 9.8 0.23" 190.9, dT = +0.6sec : BA 8.2 5.9 26.3" 127.7, dT = +87sec : BG
8.2 18.0 234" 317.0, dT = -821sec
    183039 is a close double. Observations are highly desired
24 Oct  6  1 35 45.2 D    2134SK4  5.9  5.2v   9+  35      6 244  49S 153  91 138 -4.9 +5.3 +1.4-3.2 .270  -49.7     14 57 28.0 -21 24 56 402.3 814.5
      2134 is multiple: AB 5.9 8.2 26.3" 307.7, dT = -88sec : AE 5.9 13.1 155" 349.2, dT = -553sec : AC 5.9 14.0 228" 353.9, dT = -790sec : AG 5.9
18.0 258" 316.0, dT = -914sec
      2134 = KX Lib, 5.72, range 0.04, V, Type BY
24 Oct  7  1 53 54.5 D  183802pA0  7.2        16+  46     10 237  50S 147  89 136 -6.0 +6.2 +1.9-3.1 .256  -50.3     15 48  3.3 -25 12 56 399.2 778.0
    183802 is double: AB 7.60 8.49 0.10"  94.2, dT = +0.23sec
    183802 is a close double. Observations are highly desired
24 Oct  8  1 43 18.8 D    2397 K1  6.5  5.9   23+  58     19 227  85S 107  57  99 -6.8 +6.9 +1.8-1.3 .355  -15.5     16 41 37.6 -27 48 35 394.7 704.6
24 Oct  9  3 12  5.5 d    2540 B3  7.2  7.1e  33+  70     13 231  37N  41 347  39 -7.7 +7.3 +0.0+1.0 .322   39.4     17 40 23.9 -28 55 24 390.8 790.2
      2540 = V2382 Oph, 7.26 to 7.29, Hp, Type E+BE, Period 0.9215 days, Phase  17%
24 Oct 12  2 33 35   m  189469 K0  7.7  7.1   64+ 106     42 191  14S 150 138 163 -7.2 +6.6 +9.9+9.9 .000  -90.0     20 35 49.0 -24 22 24 371.6 661.9
24 Oct 13  1 51 57.7 d  164449DF0  7.2        74+ 119     46 161  26N   5  24  22 -6.1 +5.7 +0.7+3.4 .231   52.3     21 31 25.5 -19 14 15 365.7 671.9
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -10sec
    164449 is a close double. Observations are highly desired
24 Oct 13  5 10 16.4 d  164516 K3  6.9  6.2   75+ 120     37 222  63S  96  56 113 -6.7 +5.3 +2.5-1.0 .323  -43.5     21 36 58.6 -18 44 38 365.7 789.2
24 Oct 13  5 34  7.7 d  164524 F3  7.2  7.0   75+ 120     33 227  74N  53   8  70 -6.7 +5.2 +1.0+0.6 .460    0.1     21 37 21.1 -18 26 28 365.9 816.8
24 Oct 14  3 45  0.1 D    3303kF2  6.4  6.2   84+ 133     54 181  76N  51  50  71 -5.1 +4.2 +1.8+1.3 .411   -2.3     22 30  1.5 -12 54 54 359.4 717.0
24 Oct 15  7 18  4   m  146724 K2  7.0  6.2   93+ 148     42 239  15S 139  87 161 -3.8 +2.0 +9.9+9.9 .000  -90.0     23 28 46.7 - 5 23 22 355.8 834.1
   Distance of 146724 to Terminator = 11.2"; to 3km sunlit peak = 2.0"
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct 15  8 20 23.9 D    3461 K3  6.3  5.7   93+ 149     29 251  25N 359 299  21 -3.9 +1.8 -0.2+3.1 .310   53.5     23 29 32.1 - 4 31 58 356.8 902.3
24 Oct 16  5  3 36.9 d  109142cG5  7.6  7.1   98+ 162     68 166  81S  74  87  96 -1.5 +0.5 +2.5+0.8 .388  -28.5      0 19 57.1   1 34 57 351.9 754.2
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = +0.08sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Oct 19  5 35 28.7 r   75768 K0  7.6  7.1   95- 155     56  85  87S 245 325 259 +4.9 -4.5 +1.3+1.4 .469  171.9      3 10 14.5  21 16 19 356.5 819.6
24 Oct 21  7 47 59.8 R     797cB9  6.4  6.3e  80- 126     59  74  31S 203 295 207 +7.7 -6.5 +0.3+3.9 .260 -129.9      5 20 59.3  27 57 26 367.4 723.7
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  69%
24 Oct 21  9 24 16.8 r   77138 A*  7.6  7.4   79- 126     79  58  59N 294  51 297 +7.4 -6.6 +3.1-1.2 .292  144.6      5 23  1.4  28 28  8 367.0 638.3
24 Oct 21 10 13 48.7 D     810SB7  1.7  1.7   79- 126     84 354 -50N  43 229  46 +7.2 -6.7 +2.4+2.8 .268   40.0      5 26 17.5  28 36 27 367.1 622.5
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +22sec : AD 1.9 18.5 9.8"  70.0, dT = +33sec : AE 1.9      10.9"  80.0, dT = +32sec : AF 1.9
15.8 11.6" 296.0, dT = -13sec
       810 is a close double. Observations are highly desired
24 Oct 21 11 21 34.9 R     810SB7  1.7  1.7   79- 125     73 293  45N 309 203 311 +7.0 -6.7 +2.3-2.7 .274  140.0      5 26 17.5  28 36 27 367.6 638.0
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -20sec : AD 1.9 18.5 9.8"  70.0, dT = +19sec : AE 1.9      10.9"  80.0, dT = +26sec : AF 1.9
15.8 11.6" 296.0, dT = -41sec
       810 is a close double. Observations are highly desired
24 Oct 22  6  9  5.1 r   78233SA3  7.5        71- 114     25  68  89N 271 347 268 +8.6 -6.6 +0.6+0.7 .497  169.4      6 19 59.0  28 25 36 375.9 920.9
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.29sec : AB,C 7.5 9.6 2.9" 265.4, dT = -6sec : BA 8.7 9.3 58" 268.1, dT = -116sec
     78233 is a close double. Observations are highly desired
24 Oct 22  7 33 46.2 r   78294 A0  7.6  7.6   70- 114     43  72  71N 289  13 287 +8.5 -6.7 +1.7+0.0 .378  151.9      6 23  0.3  28 37 17 374.7 779.8
24 Oct 22 11 27 18.7 r   78431 B5  7.5  7.6   69- 112     83 327  48N 313 167 309 +7.8 -6.9 +2.5-2.6 .271  144.2      6 29 39.5  28 46 50 373.7 605.3
24 Oct 23  9 44 25.0 r   79394cA2  8.0  7.9   59- 100     58  75  60N 308  37 299 +8.4 -6.7 +2.5-1.4 .298  147.9      7 27 16.8  27 17 55 380.3 649.2
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.27sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10  4 16.3 r   79402 B8  7.3  6.9   59- 100     63  75  59N 309  41 301 +8.4 -6.7 +2.6-1.6 .290  147.9      7 27 48.9  27 17 33 380.2 631.2
24 Oct 23 11 19 53.3 r   79431 K2  8.2  7.3   59- 100     79  67  54S 242 350 233 +8.1 -6.6 +3.2+2.3 .240 -138.1      7 29 32.0  26 55 43 379.9 593.1
24 Oct 23 14 41 48   m    1149SK5  4.1  3.3s  58-  99  25 56 284 -17N  25 297  16 +7.4 -6.4 +9.9+9.9 .000   90.0      7 35 55.4  26 53 45 381.7 721.2
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0 : AB 4.1 13.2 57"  39.0
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Oct 23 14 43 48   Gr   1149SK5  4.1  3.3s  58-  99  26 53 ** GRAZE: CA-16.8N; Dist.119km in az. 218deg. [Lat = 21.75-0.72(E.Long+101.11)]
24 Oct 24  7 19 36.6 r   80089 G5  7.2  6.7   50-  89     15  70  24S 217 288 204 +8.6 -6.0 -0.9+3.6 .252 -121.3      8 19  9.2  24 10 29 389.3 915.5
24 Oct 24 10 35 30   r   80165 F2  7.5  7.3   48-  88     58  81  19S 213 297 200 +8.1 -6.1 +2.3+9.4 .099 -107.0      8 24 55.2  23 56 43 386.3 633.9
24 Oct 24 12 53  3.4 r    1270cF0  6.1  5.9v  48-  88   1 88  58  10N   5 126 351 +7.6 -6.0 -0.5-7.9 .125  113.2      8 28 36.8  24  8 42 385.8 595.5
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Oct 26  8 31 38.4 r   98892dK0  7.7  7.1   30-  66      7  76  69N 313  21 293 +6.9 -4.3 +0.4-0.7 .434  155.6     10  0 31.6  15 51 51 399.3 924.1
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +20sec
24 Oct 26  9  6 33.3 r   98897 K0  7.6  7.0   30-  66     15  79  83S 284 354 265 +6.9 -4.3 +0.5+0.3 .445 -174.8     10  1 20.7  15 40 14 398.6 864.8
24 Oct 26 11 35 41.8 r   98936 K0  8.0  7.2   29-  65     48  93  50S 252 324 233 +6.5 -4.2 +2.4+2.3 .233 -132.3     10  5  3.5  15  8  4 395.9 664.7
24 Oct 27  9 56 59.8 r   99296kA3  8.0  7.9v  21-  55     15  85  55N 329  38 308 +5.6 -3.1 +0.6-1.5 .367  146.5     10 47 46.5  10 26 37 401.6 857.7
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct 27 11  1 19.4 R   99302kA0  7.4  7.3   21-  54     30  91  82N 302  11 281 +5.5 -3.0 +1.1-0.5 .393  177.7      10 49  3.3  10  9 28 400.2 763.4
24 Oct 27 11 48 51.9 r   99312 F5  9.0  8.8   21-  54     40  97  55S 259 327 238 +5.3 -3.0 +2.0+1.7 .262 -136.0      10 49 57.8   9 49 26 399.4 706.8
24 Oct 29 11 13 41.2 R  138654KF2  8.3  8.0    8-  32     10  96  73S 276 343 255 +2.8 -0.3 +0.4+0.6 .413 -154.5      12 13 36.2 - 1 14 13 404.9 898.2
24 Oct 29 12  3 50.0 R    1760pK0  7.5  7.0    8-  32 -11 21 101  79N 305   9 283 +2.7 -0.2 +0.7-0.5 .422 -179.7      12 15  0.0 - 1 19 36 403.7 825.8
      1760 is double: AB 7.6 11.8 36"  56.1, dT = +31sec
24 Nov  6  0 41 47.3 d  186642 B8  8.3  8.3v  18+  51  -9 25 218  47N  50   9  52 -6.7 +7.4 +1.1+0.7 .331   25.8      18 19 24.3 -28 59 59 388.5 693.9
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  6  0 55  4.0 d  186657 G1  8.7  8.4v  18+  51     23 220  62S 121  78 123 -6.7 +7.3 +2.7-2.1 .264  -45.5      18 19 52.2 -29 16 33 388.7 712.0
    186657 = V5826 Sgr, 8.74 to 8.95, V, Type RS, Period 0.5710 days, Phase  15%
24 Nov  6  1  9 30.2 D  186672 G5  7.4  6.9   18+  51     21 223  75N  78  32  80 -6.8 +7.3 +1.4-0.3 .388   -2.5      18 20 25.4 -29  3 59 388.9 732.1
24 Nov  9  1  8 48.9 d  190125 K0  7.9  7.3   48+  87     46 188  86S  77  68  93 -6.4 +5.9 +2.6+0.4 .341  -21.5      21 12 36.7 -21  0 43 373.3 663.2
24 Nov  9  2 59 37.9 d  190163 G6  8.1  7.7   48+  88     35 219  41S 121  83 138 -6.8 +5.6 +4.8-3.7 .158  -67.8      21 14 57.8 -20 47 21 373.8 759.1
24 Nov  9  3 23 26.9 D    3106 K0  5.2  4.6   48+  88     32 224  50S 112  69 129 -6.8 +5.6 +3.3-2.3 .228  -58.3      21 15 37.9 -20 39  6 374.1 787.5
   R3106 = phi Capricorni
24 Nov  9  4 10 12.9 d  190191 K1  7.6  7.0   48+  88     24 233  67N  49 358  66 -6.9 +5.4 +0.6+0.6 .464    5.9      21 16 39.7 -20 10 29 374.7 848.3
24 Nov 10  5 50 13.1 D    3256cF0  6.1     s  60+ 102     18 245  39N  18 318  37 -6.4 +4.0 -0.2+1.8 .414   36.8      22 12 25.8 -14 11 38 370.2 927.9
   R3256 = 39 Aquarii
      3256 is double: AB 6.19 9.34 0.08" 309.1, dT = +0.07sec
      3256 is a close double. Observations are highly desired
      3256 = NSV 14068, 6.02 to 6.07, V
24 Nov 11  2 27 15.8 D    3375 F2  6.8  6.6   70+ 114     58 182  58N  34  32  55 -4.9 +3.1 +1.4+1.9 .395   12.6      23  0 19.9 - 8 52 50 362.9 711.7
24 Nov 11  6 14  9.2 d    3389WG8  7.1  6.5   71+ 115     27 248  52N  29 329  50 -5.4 +2.5 +0.3+1.4 .460   24.1      23  5 18.5 - 7 45 17 364.8 891.0
   R3389 = 84 Aquarii
      3389 is double: C,AB 7.2 5.5 257" 329.2, dT = +286sec
24 Nov 11  6 14 41.0 D    3391kA0  6.7  6.7   71+ 115     27 248  78S  78  19 100 -5.4 +2.5 +1.1-0.3 .454  -25.7      23  5 52.5 - 7 56 12 364.8 891.6
   R3391 = 85 Aquarii
24 Nov 11  6 20 39.1 D    3388SF2  5.5        71+ 115     25 249  35N  11 311  32 -5.4 +2.5 +0.0+2.2 .377   42.1      23  5  9.8 - 7 41 38 364.9 899.5
   R3388 = 83 Aquarii
      3388 is triple: AB 6.20 6.34 0.15" 214.8, dT = -0.36sec : AB,C 5.5 7.2 257" 149.2, dT = -509sec
      3388 is a close double. Observations are highly desired
24 Nov 12  1  8 37.7 d  146935 K0  7.9  7.1   80+ 127     51 127  79S  76 124  98 -3.3 +1.6 +2.1+1.1 .389  -27.6      23 51  9.9 - 2 31 14 359.7 765.6
24 Nov 12  1  8 57.8 d Neptune     7.8  7.8   80+ 127     51 127  76N  52  99  73 -3.3 +1.6 +1.5+1.7 .439   -2.8      23 50 57.8 - 2 24 44 359.7 766.5
   Neptune limb contacts offset by ±2.8 secs, at  1  8 55.0 and  1  9  0.6  Both contacts are against the bright limb of Neptune
24 Nov 12  4  7  7   m    3519cK5  7.6  6.7   81+ 128     62 210  20S 136 109 158 -3.7 +1.1 +9.9+9.9 .000  -90.0      23 54 38.7 - 1 56 46 358.6 740.3
      3519 is double: ** 8.2 8.7 0.050" 269.0
      3519 has been reported as non-instantaneous (OCc 126). Observations are highly desired
24 Nov 12  8  1 58.7 d    3530 M2  6.8  6.0v  82+ 130     17 262  38N  14 309  36 -4.1 +0.6 +0.2+2.1 .400   42.9      23 59 46.5 - 0 16 48 361.8 958.9
      3530 = DQ Psc, 6.82 to 6.94, Hp, Type SRB
24 Nov 13  6 32 30.7 d  109485kK2  7.5  6.8   90+ 143     51 251  20N 359 297  20 -2.4 -1.0 +0.2+3.8 .269   53.7       0 49 39.9   6 24 26 356.4 783.6
24 Nov 15  4 36 40.8 d     397MB9  7.5  7.5   99+ 170     73 100  70N  69 143  86 +1.9 -3.9 +2.0+1.2 .422  -15.8       2 41  6.6  18 48  1 354.5 753.2
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +5sec : AC 7.7 9.5 66" 242.2, dT = -154sec
       397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 12.6"; to 3km sunlit peak = 3.6"
24 Nov 16  6  3  1.2 d     537SB6  3.7  3.8s 100- 173     80  81 -69S  60 154  72 +3.7 -5.4 +2.0+1.5 .407    2.6       3 44 52.5  24  6 48 356.6 705.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.26sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+24sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  6 55 40.9 d     541SB8  3.9  3.9s 100- 173     88 312 -81N  31 260  43 +3.5 -5.4 +1.6+2.8 .326   33.9      3 45 49.6  24 22  4 356.6 680.3
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +260sec : AB 3.8 13.7 113"  72.8, dT = +260sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  7  9 33   d     545SB6  4.1  4.2v 100- 173     85 283  12S 142  41 154 +3.5 -5.5 +6.0-9.1 .096  -75.9      3 46 19.6  23 56 54 356.6 677.4
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +2.7sec : AB 4.2 14.4 110" 180.2, dT = +904sec : AC 4.2 12.9 147" 336.0, dT = -1494sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 0.3"; to 3km sunlit peak = 0.0"
24 Nov 16  7 20 25   Gr    545SB6  4.1  4.2v 100- 173     81 ** GRAZE: CA 26.3S; Dist. 56km in az. 161deg. [Lat = 22.59+0.32(E.Long+101.11)]
   Distance of 545 to Terminator = 1.7"; to 3km sunlit peak = 0.0"
24 Nov 16  7 27 14.3 R     537SB6  3.7  3.8s 100- 173     81 280  61N 249 154 261 +3.4 -5.5 +2.4+0.8 .391  177.8      3 44 52.5  24  6 48 356.7 676.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.34sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+66sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 5.4"; to 3km sunlit peak = 0.0"
24 Nov 16  7 31 39   R     545SB6  4.1  4.2v 100- 173     80 278  41S 172  78 183 +3.4 -5.5 +9.9+9.9 .095 -104.1      3 46 19.6  23 56 54 356.8 676.1
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = -1.5sec : AB 4.2 14.4 110" 180.2, dT = -1143sec : AC 4.2 12.9 147" 336.0, dT = +1488sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 3.1"; to 3km sunlit peak = 0.0"
24 Nov 16  7 43  9.5 D     552SB7  2.9  2.9s 100- 173     78 278  -9S 122  29 134 +3.4 -5.5 +3.3-2.8 .233  -53.5      3 47 29.1  24  6 18 356.8 676.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.01sec : AE 2.8 15.0 78" 232.4, dT = -118sec : AB 2.8 6.3 118"
291.1, dT = -496sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8  4 36.1 R     541SB8  3.9  3.9s 100- 173     72 279  28N 284 193 295 +3.3 -5.5 +2.7-1.2 .327  146.2      3 45 49.6  24 22  4 357.0 681.9
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +296sec : AB 3.8 13.7 113"  72.8, dT = +297sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 1.6"; to 3km sunlit peak = 0.0"
24 Nov 16  8  7 35   Gr    552SB7  2.9  2.9s 100- 173     70 ** GRAZE: CA 28.9S; Dist.364km in az. 169deg. [Lat = 19.78+0.18(E.Long+101.11)]
   Distance of 552 to Terminator = 2.1"; to 3km sunlit peak = 0.0"
24 Nov 16  8 35 43.5 r     549SA0  6.3  6.3  100- 173     66 278  73S 205 118 217 +3.3 -5.5 +2.0+3.2 .273 -133.0      3 47 21.0  24  6 59 357.4 695.3
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -3sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = +46sec : BC 6.3 8.2 86" 345.0, dT =
+240sec
   Distance of 549 to Terminator = 7.1"; to 3km sunlit peak = 0.3"
24 Nov 16  8 35 55.2 R     552SB7  2.9  2.9s 100- 173     66 278  67S 199 112 211 +3.2 -5.5 +1.9+3.9 .239 -126.5      3 47 29.1  24  6 18 357.4 695.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.13sec : AE 2.8 15.0 78" 232.4, dT = -274sec : AB 2.8 6.3 118"
291.1, dT = +18sec
```

Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 6.6"; to 3km sunlit peak = 0.1"
24 Nov 16  9  9 25   m     561SB7  5.1  5.1V 100- 172     58 279  32S 165  80 176 +3.2 -5.6 +9.9+9.9 .000  -90.0      3 49 11.2  24  8 12 357.8 718.1
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0 : AF 5.0 14.5 4.7" 221.0 : AE 5.1 14.8 96"  76.8 : AD 5.1 14.7 144"  65.9
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 2.3"; to 3km sunlit peak = 0.0"
24 Nov 16  9  9 31   Gr    561SB7  5.1  5.1V 100- 172     57 ** GRAZE: CA 31.7S; Dist.176km in az.   1deg. [Lat = 24.71-0.02(E.Long+101.11)]
   Distance of 561 to Terminator = 2.6"; to 3km sunlit peak = 0.0"
24 Nov 16 10  1 31.0 r     562pB9  6.6  6.6  100- 172     47 282  74N 241 159 252 +3.1 -5.6 +1.7+0.5 .423 -162.2      3 49 21.8  24 22 51 358.7 772.8
       562 is multiple: Aa,Ab 7.3 7.4 5.2"       : AB 6.6 7.5 87" 309.1, dT = -76sec : AE 6.6 13.8 115"  82.8, dT = +253sec : AG 6.6 15.1 158" 212.2,
dT = -329sec
       562 is a close double. Observations are highly desired
   Distance of 562 to Terminator = 8.1"; to 3km sunlit peak = 0.9"
24 Nov 17 12 48 12.9 r     746WB7  7.0  6.9   96- 158  -3 25 291  62S 225 149 230 +4.5 -6.2 +1.4+1.1 .349 -131.4      4 59 53.7  27 19 32 365.3 935.1
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -56sec
24 Nov 18 12  0 33.3 r   77883 B2  7.6  7.6   91- 145     49 288  42N 312 225 311 +5.8 -6.6 +0.8-2.3 .372  149.6      6  2 59.4  28 40 37 368.3 770.8
24 Nov 20  9  4  9.0 R    1206 G8  5.9  5.3   75- 121     66  79  81S 270 360 258 +7.7 -6.2 +2.5+0.5 .329 -164.6      8  0 55.9  25 23 34 378.5 625.4
   R1206 = omega Cancri
24 Nov 21  9 32 15.3 R    1334kG5  7.0  6.6   66- 108     61  86  36N 338  60 323 +7.6 -5.4 +1.9-3.5 .238  134.6      8 57  5.1  21 51 38 384.7 631.5
24 Nov 21 11  7 38   Gr   1342KG5  7.6  7.3   65- 108     84 ** GRAZE: CA 15.8S; Dist. 33km in az. 209deg. [Lat = 22.78-0.50(E.Long+101.11)]
24 Nov 21 11 16 37   r    1342KG5  7.6  7.3   65- 108     84 108  27S 222 293 207 +7.2 -5.3 +9.9+9.9 .062 -101.0      8 58 55.7  21  9 59 384.3 606.9
24 Nov 22 11 47 46.5 r   98792wK2  7.8  7.0   55-  96     79 122  36N 343  38 324 +6.5 -4.2 +1.1-3.5 .264  144.7      9 49 52.8  16 50 18 389.7 610.0
     98792 is double: AB 7.9 11.1 25.3" 320.7, dT = -89sec
24 Nov 23 11 43 10.4 R   99198WK2  7.3  6.6   46-  85     66 115  35N 347  45 326 +5.7 -3.1 +1.0-3.4 .262  143.4     10 36  6.7  11 36 52 394.2 623.7
     99198 is double: AB 7.4 9.7 60" 330.4, dT = -220sec
24 Nov 25  9  9 49.4 r  119138 K0  7.4  6.9   28-  64     11  94  73N 311  18 289 +3.8 -0.6 +0.3-0.7 .448  169.8     11 58 13.0   0 52  9 403.4 891.4
24 Nov 25  9 53 22.3 R    1730wK2  6.2  5.5   28-  63     20  99  65S 269 334 247 +3.7 -0.6 +0.9+1.0 .348 -145.1     11 59  3.3   0 31 50 402.4 828.0
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +2sec
24 Nov 25 12 12 23.9 R    1737WA2  7.8  7.6   27-  63     50 120  86N 297 350 276 +3.3 -0.3 +1.9-0.7 .336 -164.4     12  1 57.0   0  6  8 399.9 676.4
      1737 is double: AB 7.8 8.5 73" 175.7, dT = +114sec
24 Nov 25 12 14 10.9 r  119175W    8.3  7.6   27-  63 -12 50 121  89N 294 347 272 +3.3 -0.3 +2.0-0.5 .329 -161.0     12  1 57.2   0  4 55 399.9 675.1
    119175 is double: BA 8.5 7.8 73" 355.7, dT = -105sec
24 Nov 25 12 38 44.9 r  119179kK0  8.2  7.7   27-  63  -6 55 127  74N 310 357 288 +3.2 -0.2 +1.8-1.3 .339 -175.2     12  2 30.2   0  2 30 399.6 658.7
24 Nov 26 10 38 33.4 r  138921KG5  8.1  7.7   19-  52     19 105  85S 288 351 266 +2.2 +0.9 +0.8+0.1 .409 -162.1     12 41 59.6 - 5 13 15 403.2 841.2
24 Nov 26 11  6 10.7 R  138924 F2  7.7  7.5   19-  52     25 108  55S 257 318 235 +2.1 +0.9 +1.7+1.9 .261 -129.3     12 42 35.9 - 5 28  6 402.6 804.6
24 Nov 28 11 21 12.7 D    2029 M1  4.9  4.1v   7-  30      6 111   2S 197 261 179 -0.5 +3.6 -2.2-6.7 .132  -74.1 .04 14 10 50.5 -16 18  7 402.8 940.9
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 11 30 24   Gr    2029 M1  4.9  4.1v   7-  30      9 ** GRAZE: CA 18.6S; Dist. 69km in az. 203deg. [Lat = 22.44-0.39(E.Long+101.11)]
24 Nov 28 11 38 59.1 R    2029 M1  4.9  4.1v   7-  30     10 113  35S 230 292 212 -0.5 +3.6 +2.8+6.1 .128 -105.9 .04 14 10 50.5 -16 18  7 402.3 913.0
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  4 20 52 42.7 d    2910cG3  4.7  4.3   13+  43  34 39 165  88N  83  99  94 -5.1 +6.9 +2.8+0.5 .324  -11.3     19 55 50.4 -26 17 58 380.5 609.4
   R2910 = omega Sagittarii
       2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 23 32 23   m    2914cG8  4.8  4.4   14+  44   5 35 209  22S 152 123 163 -5.7 +6.6 +9.9+9.9 .000  -90.0     19 58 57.2 -26 11 45 380.5 690.2
   R2914 = 60 Sagittarii
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Dec  4 23 32 28   Gr   2914cG8  4.8  4.4   14+  44   5 33 ** GRAZE: CA 21.7S; Dist. 15km in az. 319deg. [Lat = 23.31+0.81(E.Long+101.11)]
24 Dec  6  0 12 32.3 d    3062 K2  7.5  6.8   22+  56  -4 40 208  89S  78  50  93 -5.5 +5.8 +2.3+0.0 .355  -22.7     20 56 52.7 -22  0 21 376.6 703.9
24 Dec  6  1 19 35.8 d  189879 F3  8.7  8.5   23+  57     31 224  34N  21 338  36 -5.7 +5.6 +0.2+1.8 .351   34.4     20 57 46.6 -21 33 24 377.3 778.1
24 Dec  7  0 10 52.0 D    3197 K3  6.4  5.6   32+  69  -3 49 195  46N  28  14  46 -5.0 +4.7 +1.1+1.9 .351   22.6     21 50 13.0 -16 50 42 372.6 686.4
24 Dec  9  0 29 14.9 D    3472PF5  6.9  6.7   54+  95  -7 61 161  80N  57  75  79 -3.5 +1.8 +2.1+1.4 .391  -11.2     23 33 28.6 - 4 24  5 365.7 707.1
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.21sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 13  3.2 D  146789kF2  7.2  7.0   55+  95     59 213  64N  40  10  62 -3.8 +1.5 +1.4+1.6 .407    5.4     23 35 14.7 - 3 51 14 365.6 725.1
24 Dec 10  1  7 50.8 d      47 F0  7.7  7.5   66+ 108     67 150  10N 346  14   8 -2.5 +0.0 -1.1+4.5 .211   59.1      0 23 38.5   2 44 35 362.7 723.8
24 Dec 11  5 41 45.8 d     201kG5  7.5  7.1   78+ 123     46 261  42S 117  49 137 -1.9 -2.3 +2.6-3.2 .221  -60.0      1 22 43.4  10 22 10 361.7 775.2
24 Dec 11  6 15 53.3 d   92410 F0  7.6  7.5   78+ 124     39 266  60N  39 330  60 -2.0 -2.3 +1.1+1.3 .433   19.9      1 23 19.1  10 50 34 362.3 809.4
24 Dec 13  1 40 57.9 d   75768 K0  7.6  7.1   93+ 149     52  84  87N  77 157  92 +1.8 -4.5 +1.5+1.1 .446  -20.2      3 10 14.5  21 16 19 360.5 831.5
24 Dec 16  7 58 41.7 r     996cA2  6.9  6.8   99- 167     82 315  85S 247 114 243 +5.2 -6.6 +2.9+1.2 .302 -148.7      6 30 22.0  28 12 44 367.9 631.8
       996 is double:  7.6 7.6
24 Dec 16  9 47 43.2 r   78496 K0  7.5  6.9   99- 166     60 287  58S 221 129 218 +4.9 -6.5 +4.0+3.4 .179 -116.7      6 33 41.4  27 58 49 369.1 712.7
24 Dec 16 10 50 19.2 R    1008 A0  5.3  5.3s  98- 166     47 287  83N 261 176 257 +4.7 -6.4 +1.7-0.4 .400 -154.6      6 35 12.1  28  1 20 370.2 794.8
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 Dec 19  5 25 44.0 r   98510kG5  7.2  6.8   83- 131     23  78  29S 224 297 207 +6.9 -4.7 +0.0+4.3 .209 -117.9      9 20 37.9  19  5 26 386.6 838.5
24 Dec 20 12 35  0   M    1506cG0  7.0  6.7   73- 117 -10 66 248  23S 223 162 203 +5.0 -2.9 +9.9+9.9 .000  -90.0     10 18 21.3  12 37 16 389.7 678.2
      1506 is double: ** 7.9 7.9 0.10"  90.0
      1506 has been reported as non-instantaneous (OCc1413). Observations are highly desired
24 Dec 21 12 15 42.0 d    1609SF2  4.6  4.5   63- 105     73 204 -69N  92  70  70 +4.3 -1.7 +3.7-0.3 .238   44.5     11  5  1.0   7 20 10 393.4 637.4
   R1609 = chi Leonis
      1609 is quadruple: AB 4.7 11.0 5.2" 271.2, dT = -22sec : AC 4.7 10.6 252" 310.7, dT = -819sec : AD 4.7 11.7 286" 298.0, dT = -1077sec
      1609 is a close double. Observations are highly desired
24 Dec 21 12 16 12.4 r  118636 K0  7.3  6.7s  63- 105     73 205  40N 343 319 321 +4.3 -1.7 +0.8-3.0 .300  153.5     11  3 41.3   7 34 55 393.4 638.2
    118636 = NSV 18595, 7.38 to 7.43, Hp
24 Dec 21 13 19 30.3 R    1609SF2  4.6  4.5   63- 105  -1 63 238  23N 360 308 339 +4.0 -1.5 -0.2-3.7 .248  135.2     11  5  1.0   7 20 10 393.9 669.0
   R1609 = chi Leonis
      1609 is quadruple: AB 4.7 11.0 5.2" 271.2, dT = -0.47sec : AC 4.7 10.6 252" 310.7, dT = -662sec : AD 4.7 11.7 286" 298.0, dT = -543sec
      1609 is a close double. Observations are highly desired
24 Dec 22  8 30 56.1 r    1696 F5  6.9  6.7   55-  95     30 101  37S 241 305 219 +4.1 -0.8 +2.3+4.2 .169 -115.0     11 42 25.5   2 21 44 398.8 770.3
24 Dec 23 12  9 59   Gr 138809KF0  8.2  8.0   44-  83     61 ** GRAZE: CA 23.7S; Dist. 34km in az.  47deg. [Lat = 23.57-1.00(E.Long+101.11)]
24 Dec 23 12 10 48   m  138809KF0  8.2  8.0   44-  83     60 153  24S 227 252 205 +2.0 +1.1 +9.9+9.9 .000  -90.0     12 28 44.5 - 4 17 26 398.6 636.7
24 Dec 24  9 45 40.3 R    1886cK3  5.6  5.0   36-  73     24 112  87N 294 354 273 +1.2 +2.1 +0.9-0.1 .403 -166.3     13  8 32.5 - 8 59  4 401.9 809.4
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.23sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 25 10 59 25.4 R    1992cF0  7.5     S  27-  62     28 122  67S 266 319 247 -0.3 +3.5 +1.9+1.2 .293 -136.8     13 53 51.7 -14 39 51 400.7 782.2
      1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.5sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
24 Dec 25 12 20 24.1 r  158242 F5  8.8  8.6   26-  62     42 139  61N 317 357 299 -0.5 +3.7 +1.2-1.2 .355  174.4     13 55 48.1 -14 47 38 399.3 690.6
24 Dec 27 11 57 29.6 R  183537kK0  7.3  6.6   11-  40     17 126  75S 263 318 250 -2.5 +5.7 +1.4+1.2 .345 -142.4     15 31  7.0 -23 39 24 396.9 839.4
24 Dec 27 12 37 21.0 R  183548 M4  6.8  6.0v  11-  39 -11 23 132  57S 245 294 232 -2.6 +5.8 +2.9+2.5 .222 -123.1     15 32 15.1 -23 52 49 396.1 781.0
    183548 = GG Lib, 6.868, range 0.23, 6w, Type SR:, Period 35.65 days, Phase  32%
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Occultation prediction for Museo de Astronomía El Meteorito
E. Longitude -101 6 23.0, Latitude 23 7 11.9, Alt. 2020m; Telescope dia 15cm; dMag 0.0

	day	Time		P	Star	Sp	Mag	Mag	%	Elon	Sun	Moon	CA	PA	VA	AA	Libration		A	B	RV	Cct	durn	R.A. (J2000)			Dec			Mdist	SV
y	m	d	h m s		No	D	v	r V	ill		Alt	Alt Az	o	o	o	o	L	B	m/o	m/o	"/s	o	sec	h	m	s	o	m	s	Mm	m/s
24	Dec	28	12 3 1.2	R	184370	G0	8.4	8.1	6-	28		6 123	53S	233	293	225	-3.3	+6.4	+2.1	+3.2	.230	-118.9		16	24	40.5	-26	48	26	394.4	908.4
24	Dec	28	12 35 14.9	R	184386	cB9	8.1	8.0	6-	28	-11	12 126	41N	319	15	310	-3.3	+6.5	+0.0	-0.8	.409	156.0		16	25	50.7	-26	34	6	393.7	854.9

184386 is double: AB 7.4 9.4 0.20" 318.0, dT = -0.49sec
184386 is a close double. Observations are highly desired

Lunar Occultation predictions
Observatorio Ricardo Sanchez
Argentina

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 12 23 29.7 d    1772cA2  3.9  3.9s  57-  98  42 36 299 -27S 176  42 154 -4.1 -2.0 +0.2-3.0 .256  -48.0     12 19 54.3 - 0 40  1 399.0 738.7
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = -0.5sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  3 13 12 57.9 R    1772cA2  3.9  3.9s  56-  97  52 27 289  54S 257 128 235 -4.2 -1.9 +1.5+2.3 .273 -132.0     12 19 54.3 - 0 40  1 399.8 789.8
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = +0.21sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  4  5 12  0.7 R    1850cK0  6.5  5.9   49-  89     18  83  76N 307  72 286 -3.8 -1.5 +0.4-2.0 .454  176.2     12 53 38.1 - 4 13 29 398.8 879.8
      1850 is double: AB 6.4      0.024"  68.7, dT = +0.03sec
      1850 is a close double. Observations are highly desired
24 Jan  4  6 22 39.5 r  139039 G5  7.3  6.8   49-  88     32  72  72N 311  79 290 -4.0 -1.4 +0.8-2.1 .412  175.8     12 55 21.8 - 4 30 15 397.2 795.1
24 Jan  4  7 16 45.8 R    1855DA0  7.2  7.1   48-  88     43  61  74S 276  50 255 -4.1 -1.3 +1.9-1.4 .323 -146.8     12 56 15.0 - 4 51 50 396.2 742.2
      1855 is double: AB 7.2 8.9 5.8" 150.0, dT = +11sec
      1855 is a close double. Observations are highly desired
24 Jan  5  6 30 57.1 r    1959kK0  8.0  7.4   39-  77     29  82  73N 308  72 289 -5.0 +0.0 +0.5-2.0 .449  176.8     13 39 34.5 -10  6 50 393.7 857.7
24 Jan  5  7 49 25.7 r  158088kMA  7.8  7.0   38-  77 -11 45  69  74N 307  76 288 -5.2 +0.2 +1.0-2.0 .405 -178.6     13 41 22.7 -10 27  9 392.1 769.8
24 Jan  6  7 19 26.2 r  158575 K0  7.8  7.2   29-  65     33  87  56S 254  15 237 -5.8 +1.5 +1.5-0.7 .298 -129.9     14 27 25.4 -15 48 48 388.3 875.4
24 Jan  7  8  2 42   m  183380KF3  8.4  8.1   20-  53  -9 35  93  17S 210 328 197 -6.1 +3.0 +9.9+9.9 .000  -90.0     15 19 48.2 -20 52 17 382.4 899.8
24 Jan  8  6 47  1.7 r  184216SA2  8.4  8.3   13-  42     11 112  56N 311  74 302 -6.0 +4.0 -0.4-1.6 .563  160.8     16 12  9.9 -23 55 18 379.31097.1
    184216 is triple: AC 7.5 11.8 3.6" 129.0, dT = +6sec : AB 8.5 14.0 12.4" 182.4, dT = +14sec
    184216 is a close double. Observations are highly desired
24 Jan  8  7 18 54   Gr   2328pB6  6.4     v  12-  41     19 ** GRAZE: CA 15.4S; Dist.201km in az. 221deg. [Lat =-37.05-0.72(E.Long+58.46)]
24 Jan  8  7 25 53.8 R    2328pB6  6.4     v  12-  41     19 107  38S 225 345 216 -6.0 +4.1 +1.5+0.8 .212 -112.0     16 13 45.5 -24 25 20 378.31040.3
      2328 is triple: AB 6.43 10.33 1.72" 216.3, dT = -8sec : AC 6.1 16.0 10.3" 331.0, dT = +14sec
      2328 is a close double. Observations are highly desired
      2328 = V1051 Sco, 6.4 to 6.43, Hp, Type SXARI, Period 1.6956 days, Phase  82%
24 Jan  8  7 36  2.1 r  184242 A1  8.4  8.2   12-  41     21 106  87S 273  33 265 -6.0 +4.1 +0.2-1.2 .527 -160.6     16 13 48.1 -24 15 20 378.11024.0
24 Jan  8  7 53 50   m  184260kA0  8.4  8.3   12-  41 -11 24 104  17S 203 322 194 -6.0 +4.1 +9.9+9.9 .000  -90.0     16 15  8.1 -24 35 18 377.7 999.2
24 Jan  8  8 37 18.2 r    2336dB9  6.7  6.6   12-  41  -3 32  99  44N 322  79 313 -6.0 +4.2 -0.1-2.2 .451  152.0     16 16 26.7 -24 16 55 376.7 933.3
      2336 is double: AB 6.7 11.7 1.3" 313.5, dT = -2.8sec
      2336 is a close double. Observations are highly desired
24 Jan  9  6 49 58.1 r  185126pA6  7.8         6-  29      3 121  74S 252  20 248 -5.5 +4.9 -0.2-0.6 .550 -147.6     17 11 36.8 -26 42  9 374.51184.6
    185126 is triple: AB 8.05 9.21 0.92" 170.4, dT = -0.24sec : AC 8.1 11.3 66" 145.4, dT = +34sec
    185126 is a close double. Observations are highly desired
24 Jan  9  7 21 59.3 d    2479MK2  5.1  4.6    6-  29      8 117 -70N  68 192  64 -5.4 +5.0 +0.0-0.5 .502   37.1     17 15 20.8 -26 36  6 373.81140.5
   R2479 = 36 Ophiuchi N
      2479 is multiple: AB 5.1 5.1 5.1" 137.9, dT = +3sec : AE 5.1 12.3 38" 317.5, dT = -26sec : AD 5.1 7.8 290" 344.5, dT = +67sec : AC 5.1 6.5 732"
74.0, dT = +1450sec
      2479 is a close double. Observations are highly desired
24 Jan  9  7 26 37   D    2476kF2  6.6  6.4    6-  29      9 116  12S 190 314 186 -5.4 +5.0 -5.7-9.8 .063  -84.3     17 14 14.2 -26 59  4 373.71132.2
24 Jan  9  7 29 30   Gr   2476kF2  6.6  6.4    6-  29     11 ** GRAZE: CA 17.8S; Dist. 13km in az. 218deg. [Lat =-34.79-0.64(E.Long+58.46)]
24 Jan  9  7 32 13   R    2476kF2  6.6  6.4    6-  29     10 116  24S 201 325 198 -5.4 +5.0 +5.2+7.5 .062  -95.7     17 14 14.2 -26 59  4 373.61124.0
24 Jan  9  7 51  0.3 R    2478MG8  7.6  7.0    6-  28 -11 13 113  12N 346 108 342 -5.4 +5.1 -1.2-2.9 .302  120.0     17 15 13.2 -26 31 50 373.11094.1
      2478 is triple: DB 7.8 5.1 288" 166.9, dT = +953sec : DA 7.8 5.1 290" 164.5, dT = +959sec
24 Jan  9  8  3 23.2 R    2479MK2  5.1  4.6    6-  28  -9 16 112  34N 323  84 320 -5.4 +5.1 -0.6-2.0 .474  142.9     17 15 20.8 -26 36  6 372.81074.5
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R2479 = 36 Ophiuchi N
      2479 is multiple: AB 5.1 5.1 5.1" 137.9, dT = +11sec : AE 5.1 12.3 38" 317.5, dT = -80sec : AD 5.1 7.8 290" 344.5, dT = -570sec : AC 5.1 6.5
732"  74.0, dT = +551sec
      2479 is a close double. Observations are highly desired
24 Jan  9  8  3 35.6 R    2480MK2  5.2         6-  28  -9 16 112  34N 323  84 319 -5.4 +5.1 -0.6-2.0 .475  143.1     17 15 21.0 -26 36 10 372.81074.2
   R2480 = 36 Ophiuchi S
      2480 is quadruple: BA 5.1 5.1 5.1" 317.9, dT = -11sec : EA 12.3 5.1 38" 137.5, dT = +80sec : BD 5.1 7.8 288" 346.9, dT = -554sec
      2480 is a close double. Observations are highly desired
24 Jan 13 23 42 32.3 d    3225SG8  7.2  6.6    9+  34  -7 17 263  72S  92 330 112 +0.0 +4.4 +0.3+1.1 .516  -32.2     22  1 32.9 -15 36 43 360.61067.0
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0, dT = -18sec : AC 7.2 11.5 109" 291.0, dT = -201sec : AD 7.2 9.9 181" 312.9, dT = -266sec
      3225 is a close double. Observations are highly desired
24 Jan 15 22 59 49.4 d    3505WG8  5.5  5.0   26+  61   1 38 298  74S  84 310 106 +3.1 +1.9 +1.5+1.2 .411  -31.1     23 47 56.5 - 2 45 42 362.6 843.9
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 182" 279.7, dT = -426sec
24 Jan 17  0 19 32.6 d  109365kG5  8.0  7.5   37+  75     28 298  86S  70 297  92 +4.2 +0.1 +1.1+1.6 .457  -14.6      0 40 49.9   4 28 42 367.2 841.8
24 Jan 18  0 30 34.7 D     222 G5  7.0  6.5   48+  88     29 310  62S  97 317 117 +5.0 -1.5 +1.8+0.9 .334  -39.3      1 31 42.7  10 53 22 371.0 776.2
24 Jan 19  0 10 43.8 D     348cA2  6.8  6.7   59+ 101 -12 33 330  76N  58 264  75 +5.6 -3.0 +1.8+1.4 .388    1.1      2 22 33.2  16 52 13 374.7 705.5
       348 is double: ** 7.0 9.0
24 Jan 22  0 30 39.0 d     768 A2  7.0  6.7S  87+ 137     27   7  31N  31 205  36 +5.8 -6.5 +1.6+1.4 .242   44.6      5  8 35.3  28 16 24 387.0 638.7
       768 = NSV 16250, 7., , Type VAR:
24 Jan 22  0 55 59.2 D     771SA5  6.1  5.9e  87+ 137     27   1  78S 103 282 107 +5.7 -6.5 +2.6-0.4 .305  -25.0      5  9 45.1  28  1 50 387.0 631.0
       771 is triple: Aa,Ab 6.0      0.20" 351.0, dT = -0.24sec : A,BC 6.0 9.1 11.2"  29.1, dT = +10sec
       771 is a close double. Observations are highly desired
       771 = V1156 Tau, 6. to 6.1, Hp, Type E:, Period 1.40266 days, Phase  90%
24 Jan 24  2 48 17.4 d    1081 B9  6.5  6.5   97+ 161     27   1  53S 150 330 144 +4.4 -7.3 +1.9-1.9 .206  -50.2      7  7 24.9  28 10 36 393.7 615.4
24 Jan 27  4 36 47.7 r    1435wK0  6.5  5.9   98- 163     36  11  45N 318 128 299 +1.6 -6.2 +1.8-1.5 .316  166.1      9 44 30.0  18 51 49 400.2 632.3
      1435 is double: AB 6.5 12.6 31" 264.1, dT = -59sec
24 Jan 27  5 41 42.0 r    1436 K0  6.8  6.1   98- 163     37 353  37N 327 153 308 +1.3 -6.1 +1.3-1.4 .313  159.5      9 45 51.9  18 41  1 400.2 649.3
   Distance of 1436 to Terminator = 15.0"; to 3km sunlit peak = 5.0"
24 Jan 28  2 59 45.4 r    1535 K0  6.9  6.3   95- 153     26  49  33N 340 120 319 +0.8 -5.4 +1.2-2.7 .275  140.2     10 28 48.5  14 20 37 402.4 698.8
24 Jan 31  3 33 30.9 r    1808KF5  7.0  6.7   76- 121     22  77  69N 314  80 292 -3.2 -1.7 +0.5-2.1 .424  170.7     12 37  6.8 - 2 19 20 401.8 837.2
24 Jan 31  6  1 56.8 r    1818 K0  8.0  7.5   75- 120     49  46  74S 276  60 255 -3.7 -1.4 +2.4-1.2 .292 -144.3     12 39 53.6 - 3  3 59 399.1 696.9
24 Feb  1  7 26 51.2 r    1926kA2  8.0  8.0   66- 108     60  36  38N 344 134 324 -5.1 +0.2 +0.6-2.9 .301  148.3     13 25 14.8 - 8 47  9 395.7 680.0
24 Feb  2  7 40 55.6 r  158393 G8  7.6  7.1   56-  97     60  53  62N 318  95 300 -6.2 +1.6 +1.2-2.2 .366  171.5     14 10 19.8 -14 13 16 391.9 703.2
24 Feb  3  3 50 56.9 r    2120 K0  6.3  5.7   48-  87      9 106  63S 260  23 244 -6.5 +2.4 +0.1-0.9 .438 -142.6     14 51 51.3 -18 21 19 392.41049.7
   R2120 = 10 Librae
24 Feb  3  6 18 48.9 r    2131 F5  7.7  7.4   47-  86     39  87  73S 269  29 254 -6.6 +2.7 +1.2-1.2 .375 -146.8     14 56 19.4 -18 55 42 388.9 844.6
24 Feb  3  8 34 12.2 r  158952 K2  8.3  7.6   46-  85  -9 65  58  73N 302  75 288 -7.0 +3.0 +1.6-1.8 .373 -177.9     14 59 43.4 -19 18 18 386.7 700.6
24 Feb  4  5  0 58.6 R    2249cK1  6.7  6.0   37-  75     16 107  72S 264  25 252 -7.0 +3.7 +0.2-1.0 .475 -149.1     15 45 42.9 -22 45 12 386.01036.0
      2249 is double: AB 7.6 7.8 0.033"  47.5, dT = +0.06sec
      2249 is a close double. Observations are highly desired
24 Feb  4  7 35  3.0 R    2262 F5  7.5  7.2   36-  74     46  89  88S 279  35 268 -7.2 +4.1 +1.2-1.4 .416 -160.6     15 50 39.9 -23 15 29 382.4 817.8
24 Feb  6  6 19 10.7 d    2554cF7  4.5  4.2V  18-  50     12 116 -32S 146 269 145 -6.5 +5.6 -0.8-2.1 .441  -43.5     17 47 33.6 -27 49 51 373.71103.0
   R2554 = X Sagittarii
      2554 is double: AB 2.5 8.1      132.0, dT = 0.00sec
      2554 = X Sgr, 4.22 to 4.86, V, Type DCEP, Period 7.012770 days, Phase  69%
24 Feb  6  6 29 32.8 r  185726 K5  8.6  7.6   18-  50     13 114  41N 316  79 316 -6.5 +5.7 -0.6-1.9 .494  145.7     17 46 30.9 -27 26 19 373.41084.0
24 Feb  6  6 58 38.9 R    2554cF7  4.5  4.2V  17-  49     19 111  62S 239 359 239 -6.5 +5.7 +0.6-0.2 .417 -136.5     17 47 33.6 -27 49 51 372.71038.5
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R2554 = X Sagittarii
      2554 is double: AB 2.5 8.1      132.0, dT = 0.00sec
      2554 = X Sgr, 4.22 to 4.86, V, Type DCEP, Period 7.012770 days, Phase  69%
24 Feb  6  8 33 58.8 r  185840cB9  8.6  8.6   17-  49  -9 37 101  74N 282  36 282 -6.5 +5.9 +0.6-1.4 .496 -179.2     17 51  9.8 -27 49 46 370.5 890.9
    185840 is double: ** 9.2 9.2 0.10"  90.0, dT = +0.2sec
    185840 has been reported as non-instantaneous (OCc 122). Observations are highly desired
24 Feb  7  7 16 24   Gr   2743cA5  7.6  7.4   10-  36     12 ** GRAZE: CA 16.2S; Dist. 29km in az.  35deg. [Lat =-34.32-0.57(E.Long+58.46)]
24 Feb  7  7 16 43   M    2743cA5  7.6  7.4   10-  36     11 116  16S 184 308 190 -5.4 +6.1 +9.9+9.9 .000  -90.0     18 53  7.6 -27 45 23 367.61105.2
      2743 is double: AB 7.7 8.9 0.39" 348.7
      2743 is a close double. Observations are highly desired
24 Feb  7 12 59 26.7 D    2784cK1  3.3  2.7    8-  34  44 77  63 -55S 111 235 118 -5.8 +6.5 +2.2-1.4 .351  -27.7 .01 19  6 56.4 -27 40 14 361.3 694.8
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 313.6, dT = -0.02sec
24 Feb  7 14 11 58.2 R    2784cK1  3.3  2.7    8-  33  58 82 329  65S 231  80 238 -6.0 +6.5 +1.9+2.0 .351 -152.2 .01 19  6 56.4 -27 40 14 360.9 694.3
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 313.6, dT = 0.00sec
24 Feb 13 23 45 19.7 d  109738 G5  7.8  7.1   22+  56 -12 17 294  63S  94 324 115 +4.8 -1.3 +0.9+1.1 .418  -33.5      1 13 41.8   8 58 29 364.8 888.2
24 Feb 15  1  7 50.8 d     313cK0  7.1  6.2s  33+  70      6 294  46N  25 257  43 +5.7 -2.9 +0.9+2.5 .365   42.8      2  8  3.9  15 48 16 371.4 896.2
       313 = NSV 15445, 7.12 to 7.18, Hp
24 Feb 16 18 23 57.9 D     552SB7  2.9  2.9s  52+  93  52 12  49  79N  66 204  78 +7.7 -5.0 +0.7-0.4 .464   -4.9      3 47 29.1  24  6 18 380.1 859.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.05sec : AE 2.8 15.0 78" 232.4, dT = -164sec : AB 2.8 6.3 118"
291.1, dT = -180sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Feb 16 19 32 57   D     560SB8  3.6  3.7s  53+  93  39 22  36  30S 138 286 149 +7.6 -5.2 +6.3-6.8 .095  -76.9      3 49  9.7  24  3 12 379.3 772.6
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.016" 156.1, dT = +0.16sec : Aa,Ab 3.8 6.8 0.22" 336.6, dT = -2.2sec : AC 3.6 15.0 50"  36.5, dT = -104sec :
AH 3.6 16.0 68" 221.6, dT = +78sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Feb 16 19 34 55.1 r     552SB7  2.9  2.9s  53+  93  38 22  35 -68S 236  24 247 +7.6 -5.2 +1.1+0.1 .417 -174.9      3 47 29.1  24  6 18 379.3 769.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.07sec : AE 2.8 15.0 78" 232.4, dT = -188sec : AB 2.8 6.3 118"
291.1, dT = -160sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Feb 16 19 41 50   Gr    560SB8  3.6  3.7s  53+  93  37 24 ** GRAZE: CA 16.8S; Dist. 51km in az. 137deg. [Lat =-35.28+0.78(E.Long+58.46)]
24 Feb 16 19 50 27   R     560SB8  3.6  3.7s  53+  93  35 24  32   4S 164 315 175 +7.5 -5.2 -4.0+6.7 .093 -103.1      3 49  9.7  24  3 12 379.2 753.7
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.016" 156.1, dT = -0.17sec : Aa,Ab 3.8 6.8 0.22" 336.6, dT = +2.4sec : AC 3.6 15.0 50"  36.5, dT = +328sec :
AH 3.6 16.0 68" 221.6, dT = -396sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Feb 17 23 42 50.0 D     731kF2  6.0  5.8   64+ 106     27 349  64N  59 249  65 +6.8 -6.5 +2.3+1.0 .319   19.8      4 52 47.1  27 53 51 384.9 632.3
24 Feb 19  3 17 55.8 d     897 A2  6.4  6.2   74+ 119     11 317  68S 114 334 114 +5.8 -7.1 +0.9+0.4 .385  -15.8      5 56 33.8  28 56 32 391.8 759.4
24 Feb 23  4 15 56.4 d    1408cK3  7.4  6.7S  98+ 164     34 343  37N  73 268  55 +2.3 -6.3 +3.6+1.4 .205   53.1      9 31 44.0  20  0 20 400.9 664.8
      1408 is double: ** 8.2 8.2 0.10"  90.0, dT = +0.47sec
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1408 has been reported as non-instantaneous (OCc1404). Observations are highly desired
      1408 = NSV 18224, 7.42,
   Distance of 1408 to Terminator = 13.0"; to 3km sunlit peak = 3.7"
24 Feb 26  3 16 16.8 r  119000kG0  7.3  7.0   98- 162     42  42  78N 298  84 276 -1.0 -3.2 +1.8-1.7 .344 -167.4     11 42  7.3   4 44 50 402.0 686.3
24 Mar  2  3 23 19.6 r    2206 K0  7.0  6.4   65- 107     21 102  69N 306  66 293 -6.6 +3.6 -0.1-1.8 .508  171.1     15 26  5.4 -21 22 49 392.0 978.3
24 Mar  2  5 52 48.0 r  183534KG3  7.8  7.5   64- 106     51  83  46N 328  87 316 -6.9 +3.9 +0.4-2.7 .365  152.6     15 30 42.8 -21 52 43 388.9 775.9
24 Mar  2  6 28 58.7 r    2216pB9  7.2  7.2   64- 106     58  76  15N 359 120 347 -7.0 +4.0 -0.8-4.5 .206  121.9     15 32 10.3 -21 58  1 388.3 736.0
      2216 is double: AB 7.1 10.9 0.70"  41.0, dT = -2.5sec
      2216 is a close double. Observations are highly desired
24 Mar  4  5 20 27.0 r X 42243pF7  7.9  7.6   43-  82     26 107  68N 295  52 292 -7.3 +5.7 +0.0-1.6 .518  171.9     17 20 54.7 -27 20 40 380.4 965.4
   X 42243 is double: AB 8.4 9.6 5.4"  91.1, dT = +10sec
   X 42243 is a close double. Observations are highly desired
24 Mar  4  5 27 33.1 r  185295 G8  7.4  6.8   43-  82     27 106  81N 282  39 279 -7.3 +5.7 +0.3-1.4 .516 -175.2     17 21  5.6 -27 25  5 380.2 954.4
24 Mar  4  7 47 45.1 r    2512pB9  7.5  7.5   42-  81     55  90  47N 315  67 313 -7.5 +6.0 +0.7-2.6 .362  151.1     17 26  5.9 -27 35 59 377.3 757.3
      2512 is double: AB 7.5 11.3 5.8" 347.8, dT = -13sec
      2512 is a close double. Observations are highly desired
24 Mar  5  7 57 34.8 r  186842 F3  8.2  8.0   32-  69     45  97  50S 225 337 228 -7.0 +6.4 +2.1+1.2 .274 -127.3     18 28  4.5 -28 23  9 371.9 814.7
24 Mar  6  7 23 40.0 r X168596D    8.8  8.4   22-  56     26 106  55S 223 340 232 -6.0 +6.5 +1.2+0.6 .363 -133.0     19 29 52.5 -26 59 14 367.8 950.0
   X168596 is double: BA 8.8 5.6 7.6" 324.1, dT = +4sec
   X168596 is a close double. Observations are highly desired
24 Mar  6  7 23 43.9 R    2848pK1  5.6  4.9   22-  56     26 106  56S 223 341 232 -6.0 +6.5 +1.1+0.6 .367 -133.5     19 29 52.2 -26 59  8 367.8 949.9
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = -4sec
      2848 is a close double. Observations are highly desired
24 Mar  7  8 54 18.4 r  189467 K0  8.4  7.9   13-  42 -11 30  99  82N 258  16 272 -4.7 +6.2 +0.7-0.7 .517 -178.4     20 35 28.5 -23 32  9 361.6 906.7
24 Mar  8  8 41 14.7 r X179916D    9.5  9.4    6-  28     14 103  80S 233 355 251 -2.9 +5.4 +0.4+0.0 .550 -159.3     21 35 32.2 -18 46 15 359.01024.4
   X179916 is double: BA 9.6 8.7 1.2" 175.0, dT = -1.1sec
   X179916 is a close double. Observations are highly desired
24 Mar  8  8 41 14.7 R X 50506SA0  8.7  8.7    6-  28     14 103  80S 233 355 251 -2.9 +5.4 +0.4+0.0 .550 -159.3     21 35 32.2 -18 46 15 359.01024.4
   X 50506 is triple: AB 8.7 9.6 1.2" 355.0, dT = +1.1sec : AC 8.7 13.1 44"  68.5, dT = +76sec
   X 50506 is a close double. Observations are highly desired
24 Mar  8  9  3 38.6 R    3161 F2  7.9  7.7    6-  28 -10 18 100  30N 303  64 321 -2.9 +5.4 -0.1-2.6 .367  130.1     21 36 22.2 -18 23 32 358.5 991.1
24 Mar  8  9 12  2.6 R  164516 K3  6.9  6.2    6-  28  -8 20 100  63S 216 337 234 -2.9 +5.4 +0.7+0.8 .452 -143.4     21 36 58.6 -18 44 38 358.3 978.4
24 Mar  8  9 34 57.1 r  164524 F3  7.2  7.0    6-  27  -3 24  96  60N 273  33 291 -2.9 +5.4 +0.5-1.2 .509  159.0     21 37 21.1 -18 26 28 357.8 945.1
24 Mar 16 19  9 21.5 D     810SB7  1.7  1.7   47+  86  35 17  35  47S 129 277 132 +7.9 -7.0 +2.9-2.7 .222  -55.7      5 26 17.5  28 36 27 384.1 735.0
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -26sec : AD 1.9 18.5 9.8"  70.0, dT = +22sec : AE 1.9      10.9"  80.0, dT = +32sec : AF 1.9
15.8 11.6" 296.0, dT = -51sec
       810 is a close double. Observations are highly desired
24 Mar 16 19 56  9.7 R     810SB7  1.7  1.7   47+  86  26 22  25 -23S 200 356 202 +7.7 -7.0 +0.4+1.8 .207 -124.1      5 26 17.5  28 36 27 383.8 686.2
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +38sec : AD 1.9 18.5 9.8"  70.0, dT = +30sec : AE 1.9      10.9"  80.0, dT = +26sec : AF 1.9
15.8 11.6" 296.0, dT = +6sec
       810 is a close double. Observations are highly desired
24 Mar 19  0  2 19.7 D    1134 A4  5.1  5.0   68+ 111     27 354  49N  60 246  52 +6.0 -7.6 +3.2+1.2 .222   46.7      7 29 20.4  28  7  6 394.3 617.8
   R1134 = 64 Geminorum
24 Mar 19  0 16 57.2 D    1137SK2  5.0  4.4   68+ 111     27 350  89S 102 291  93 +6.0 -7.6 +2.3+0.0 .325    5.7      7 29 48.8  27 54 58 394.3 624.4
   R1137 = 65 Geminorum
      1137 is triple: Aa,Ab 5.0      0.31" 190.8, dT = +0.02sec : AB 5.0 13.6 10.5" 290.0, dT = -32sec
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1137 is a close double. Observations are highly desired
24 Mar 19  0 51 38.0 d    1139 F5  7.1  6.9   68+ 111     25 342  79N  90 287  81 +5.9 -7.5 +2.4+0.5 .317   19.8      7 30 39.6  27 54 31 394.6 645.9
24 Mar 19 22 43 53.9 d    1252cK3  7.3  6.5   76+ 122  -9 26  25  38S 159 317 146 +5.5 -7.4 +2.0-2.8 .198  -52.4      8 20 41.0  25 20 11 397.9 624.9
      1252 is double: ** 8.2 8.2 0.10"  90.0, dT = +0.18sec
      1252 has been reported as non-instantaneous (OCc  99). Observations are highly desired
24 Mar 26  7 12  2.2 r    1865 A2  7.3  7.2   99- 170     44 299  66N 317 183 296 -3.5 -0.1 +1.3-1.0 .362  170.8     12 59  0.2 - 6  5 27 399.5 710.1
   Distance of 1865 to Terminator = 12.7"; to 3km sunlit peak = 3.7"
24 Mar 27  9 39  2.0 R    1971SG8  5.5        96- 158  -6 28 274  32S 235 113 216 -5.0 +1.5 +0.9+4.3 .203 -119.3     13 45 56.3 -12 25 36 398.8 801.1
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1, dT = -1.5sec : AC 5.7 11.9 27.4" 162.6, dT = -40sec
      1971 is a close double. Observations are highly desired
24 Mar 28  3 15 51.2 R    2063 A1  6.7  6.6   93- 148     50  73  73S 274  39 257 -4.7 +2.3 +1.8-1.2 .334 -146.9     14 23 57.7 -16  6  7 395.1 763.6
24 Mar 30  3 28 47.1 r  184104 K0  7.3  6.5   79- 125     37  96  42N 331  87 322 -6.2 +4.7 -0.2-2.6 .375  145.0     16  5 35.0 -24 13 24 389.4 864.7
24 Mar 30  4 45 51.0 R    2311 B8  6.3  6.3   79- 125     53  86  36N 337  93 328 -6.3 +4.8 +0.1-3.2 .309  139.5     16  7 51.9 -24 27 44 387.9 763.8
24 Mar 30  7 25 24.8 r  184198kK3  8.1  7.3   78- 124     81  11  78S 271  81 262 -6.9 +5.1 +2.6-0.1 .316 -158.8     16 11  1.8 -25  7  4 386.3 635.5
24 Mar 30 10  2 44.5 R    2332wB8  6.1  6.0V  77- 123  -1 57 276  56S 249 134 240 -7.4 +5.2 +1.8+2.1 .305 -147.8     16 14 53.4 -25 28 37 386.8 676.9
      2332 is double: AB 6.1 9.9 46"  35.8, dT = +126sec
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  55%
24 Mar 30 12 24 11.2 d    2349SB1  2.9     v  77- 122  27 30 258 -83S 110 353 101 -7.8 +5.2 +0.8+0.5 .435  -15.2     16 21 11.3 -25 35 34 388.6 849.0
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 291.9, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 207.3, dT = -0.13sec : AB 2.9 8.4 20.3" 273.1, dT = -45sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  63%
24 Mar 30 13 26 13.6 R    2349SB1  2.9     v  76- 122  37 17 250  66S 258 137 249 -7.8 +5.2 +0.0+1.4 .484 -164.6     16 21 11.3 -25 35 34 389.6 949.4
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 291.9, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 207.3, dT = -0.5sec : AB 2.9 8.4 20.3" 273.1, dT = -40sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  63%
24 Mar 31  4 39 31.2 r    2449 K2  7.4  6.7   70- 113     42  97  82N 285  39 281 -6.6 +5.7 +0.8-1.5 .445 -175.7     17  3  4.5 -27  5 52 384.5 831.4
24 Mar 31  5 12  0.0 r  184981 F6  7.7  7.5   69- 113     49  93  90N 277  29 273 -6.7 +5.8 +1.2-1.3 .413 -167.3     17  4  2.0 -27 12 55 383.9 787.3
24 Mar 31  8 56 16.6 r  185097pF2  7.9  7.7   68- 112     81 316  51S 237  97 233 -7.4 +6.0 +2.6+2.4 .251 -137.6     17 10  9.1 -27 46 24 381.7 629.1
    185097 is double: AB 7.9 11.4 1.8"  61.4, dT = +7sec
    185097 is a close double. Observations are highly desired
24 Apr  1  2 24 14.5 r    2583cA7  5.8  5.7   60- 102      7 120  65S 246  11 246 -6.6 +6.0 +0.0-0.5 .492 -145.1     17 56 41.8 -28  3 55 383.71116.0
24 Apr  1  6 31 27.8 d    2617cK0  4.6  4.1   59- 100     53  93 -70S 110 220 111 -6.9 +6.4 +1.2-1.7 .403   -9.8     18  8  5.0 -28 27 26 378.5 750.6
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = -0.09sec
      2617 is a close double. Observations are highly desired
24 Apr  1  6 53 16.6 r  186281 K0  7.8  7.2   59- 100     58  90  58S 238 348 239 -6.9 +6.5 +2.3+0.7 .295 -138.4     18  6 36.0 -28 31 56 378.1 723.7
24 Apr  1  7  4 32.7 R  186286 B7  7.1  7.1   59- 100     60  88  81N 279  29 280 -6.9 +6.5 +1.7-1.2 .388 -179.8     18  6 45.8 -28 21 50 378.0 711.7
24 Apr  1  7 51 36.5 R    2617cK0  4.6  4.1   58- 100     70  79  87S 267  20 269 -7.1 +6.5 +2.1-0.5 .362 -170.6     18  8  5.0 -28 27 26 377.4 671.2
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = +0.19sec
      2617 is a close double. Observations are highly desired
24 Apr  2  5 27 23.0 D    2784cK1  3.3  2.7   48-  88     29 105 -72S 101 217 108 -6.4 +6.6 +0.3-1.4 .496   -8.2     19  6 56.4 -27 40 14 375.6 913.4
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.005" 266.6, dT = -0.01sec
24 Apr  2  6 33 43.2 R    2784cK1  3.3  2.7   48-  88     42  98  89N 264  17 271 -6.5 +6.6 +1.1-0.9 .443 -172.1 .01 19  6 56.4 -27 40 14 374.2 812.6
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.005" 266.6, dT = -0.01sec
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr  3  7 33 23.3 R    2939 A9  7.5  7.2v  36-  74     41  95  71S 237 352 250 -5.8 +6.5 +1.4+0.2 .413 -155.5     20 10  6.8 -25 17  2 368.8 812.1
      2939 = BD Cap, 7.51 to 7.57, Hp, Type DSCTC, Period 0.160222 days, Phase  23%
24 Apr  4  7  8  5.4 R    3089SA0  5.3  5.3   26-  61     23 100  82S 242   2 259 -4.6 +5.9 +0.6-0.2 .512 -165.9     21  8 33.6 -21 11 37 365.6 935.9
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +13sec : AF 5.3 13.0 9.7"  14.0, dT = +13sec : AG 5.3 20.0 13.1"  62.0, dT = +26sec : AC 5.3
15.0 35" 114.8, dT = +41sec
      3089 is a close double. Observations are highly desired
24 Apr  4  7 39 53.3 r  190070 K1  8.4  7.8   26-  61     29  96  80N 260  19 277 -4.6 +5.9 +0.7-0.8 .501  174.9     21  9 34.7 -21  2 46 364.9 890.2
24 Apr  4  9  2  1.0 R  190125 K0  7.9  7.3   25-  60     46  85  62S 222 340 239 -4.7 +5.9 +1.4+1.0 .393 -151.1     21 12 36.7 -21  0 43 363.2 790.9
24 Apr  4  9 39  2.5 d    3106 K0  5.2  4.6   25-  60  -7 52  79 -83S  77 197  94 -4.8 +5.9 +1.6-0.4 .427   -8.8     21 15 37.9 -20 39  6 362.6 760.2
   R3106 = phi Capricorni
24 Apr  4 10 56 25.8 r    3106 K0  5.2  4.6   25-  60   9 67  58  75S 234   7 251 -5.0 +5.8 +1.8+1.0 .404 -171.2     21 15 37.9 -20 39  6 361.5 717.6
   R3106 = phi Capricorni
24 Apr  5  9 12 56.8 r    3250kG5  9.1  8.8   16-  47     34  85  49N 287  49 307 -3.2 +4.8 +1.0-2.1 .369  138.3     22  9 49.0 -15  7 18 360.0 864.0
24 Apr  6  9 36 14   m    3395 K2  8.0  7.4    8-  32  -8 24  84  -2S 151 275 173 -1.4 +3.4 +9.9+9.9 .000  -90.0     23  7 17.3 - 8 48 56 357.8 930.1
24 Apr  7  8 59 21   Gr   3528 F0  7.5  7.3v   3-  19      4 ** GRAZE: CA -0.8S; Dist. 49km in az.   0deg. [Lat =-34.20-0.00(E.Long+58.46)]
24 Apr 11 22 42 41.9 D   76472cG8  7.2  6.5   13+  43      7 308  78S  86 312  96 +5.7 -6.0 +0.9+1.2 .463   -3.6      4  8 39.0  25 52 40 372.5 837.8
24 Apr 12 22 28  7.3 D     768 A2  7.0  6.7S  22+  56     15 322  36S 135 350 139 +6.4 -6.9 +0.9-0.4 .285  -45.3      5  8 35.3  28 16 24 377.6 742.9
       768 = NSV 16250, 7., , Type VAR:
24 Apr 13 22 35 45.9 d   78046MF5  8.3        31+  68     20 332  59S 119 326 118 +6.6 -7.4 +1.5+0.0 .345  -21.6      6  9 43.4  29 14 19 383.3 690.3
     78046 is triple: AB 8.0 9.6 0.60" 335.0, dT = -1.4sec : AC 8.0 10.2 53" 130.9, dT = +151sec
     78046 is a close double. Observations are highly desired
24 Apr 15 22 17 48.4 d    1213CA2  7.1        51+  91 -11 29   1  26S 166 345 154 +6.0 -7.5 +1.1-2.5 .187  -54.9      8  3 18.5  26 16  3 393.1 618.2
      1213 is double: AB 7.71 7.93 1.02"  73.3, dT = -0.25sec
      1213 is a close double. Observations are highly desired
24 Apr 16  2 22  8.1 d    1232SK0  6.4  5.7   52+  93      8 309  82N  94 320  82 +5.2 -7.1 +0.9+1.0 .409   22.0      8 10 13.1  25 50 40 396.1 846.8
   R1232 = 13 Cancri
      1232 is triple: AB 6.6 9.3 80"  48.9, dT = +137sec : AC 6.6 8.8 188"  22.0, dT = +138sec
24 Apr 17 22 11 58.9 D    1435wK0  6.5  5.9   70+ 114 -10 32  28  83S 118 274 100 +4.1 -6.2 +2.1-1.5 .328    1.8      9 44 30.0  18 51 49 399.8 636.2
      1435 is double: AB 6.5 12.6 31" 264.1, dT = -79sec
24 Apr 17 23 20 42.8 D    1436 K0  6.8  6.1   70+ 114     36  10  88S 113 285  95 +3.9 -6.2 +2.3-1.0 .318   11.2      9 45 51.9  18 41  1 399.5 627.4
24 Apr 25 23 58 59.3 r    2249cK1  6.7  6.0   96- 156     20 105  42N 338  98 326 -4.8 +4.1 -0.6-2.4 .387  137.5     15 45 42.9 -22 45 12 391.7 997.8
      2249 is double: AB 7.6 7.8 0.032"  47.7, dT = -0.03sec
      2249 is a close double. Observations are highly desired
24 Apr 26  5 28 58.2 R    2270 B2  5.4  5.4e  95- 154     80   2  89S 288 107 278 -5.6 +4.8 +2.3-0.9 .340 -173.5     15 53 55.9 -23 58 41 386.9 642.0
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  26%
24 Apr 26  9 50 45.7 r  184027 K4  7.2  6.4   94- 153  -8 35 262  49N 329 213 319 -6.4 +4.9 +1.6-1.8 .268  128.8     16  1  8.1 -24 16  0 388.9 807.1
24 Apr 27  2 58 14.3 r    2409 B9  7.0  7.0   90- 143     47  94  49S 241 354 235 -5.4 +5.5 +2.2+0.2 .272 -129.0     16 45 48.5 -26 38 58 385.5 808.5
24 Apr 27  5 38 20.9 r    2420dA3  7.5  7.4   90- 142     78  54  68N 305  76 299 -5.9 +5.7 +1.9-1.9 .335  162.9     16 50 10.7 -26 44 33 383.5 651.0
      2420 is double: AB 7.3 15.4 6.6" 229.0, dT = -5sec
      2420 is a close double. Observations are highly desired
24 Apr 27  6 49  4.3 r  184724 F0  7.5  7.4   89- 142     81 323  73N 299 153 293 -6.1 +5.8 +2.2-1.3 .327  164.2     16 51 51.8 -26 52 26 383.2 632.3
24 Apr 28  2 35 22.3 R    2545cF0  6.4  6.2   83- 131     32 104  75N 291  46 290 -5.4 +6.1 +0.3-1.6 .485  173.6     17 43 17.7 -27 53  2 383.2 907.4
      2545 is double: ** 6.6 8.5 0.09" 200.4, dT = 0.00sec
      2545 has been reported as non-instantaneous (OCc 113). Observations are highly desired
24 Apr 28  4  0  8   m    2554cF7  4.5  4.2V  83- 131     48  95  -8N  13 125  13 -5.6 +6.2 +9.9+9.9 .000   90.0     17 47 33.6 -27 49 51 381.6 786.6
   R2554 = X Sagittarii
      2554 is double: AB 2.5 8.1      132.0
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2554 = X Sgr, 4.22 to 4.86, V, Type DCEP, Period 7.012770 days, Phase  38%
24 Apr 28  9 49  4   Gr   2583cA7  5.8  5.7   81- 129  -8 57 ** GRAZE: CA 10.5N; Dist. 50km in az. 337deg. [Lat =-34.15+0.34(E.Long+58.46)]
24 Apr 28  9 58  5   R    2583cA7  5.8  5.7   81- 129  -7 57 270  24N 340 229 340 -6.7 +6.4 +4.9-8.3 .091  103.5     17 56 41.8 -28  3 55 380.1 722.4
24 Apr 29  4  7 19   m    2727kA*  7.4  7.4v  74- 118     38 101   8S 185 299 190 -5.4 +6.5 +9.9+9.9 .000  -90.0     18 47 37.1 -28 16 47 378.6 842.1
      2727 = HIP 92215, 7.45 to 7.48, V, Type ACV, Period 1.93789 days, Phase  47%
24 Apr 29  7 36 56.5 r  187398 K0  8.2  7.6   73- 117     79  56  62S 239   8 245 -5.9 +6.7 +2.3+1.3 .320 -154.4     18 52 58.5 -28  8 43 375.7 647.7
24 May  1  5 26  1.1 r    3037cF7  7.3  7.0s  52-  92     29  99  72S 237 355 252 -4.4 +6.1 +0.9+0.0 .455 -158.4     20 48 21.8 -22 44 27 371.5 881.5
      3037 is double: ** 8.1 8.1 0.050"
      3037 has been reported as non-instantaneous (OCc1598). Observations are highly desired
      3037 = NSV 25336, 7.41 to 7.46, Hp, Type EA, Period 5.15195 days, Phase  87%
24 May  1  9 33  0.9 r  189843 K2  8.3  7.7   51-  91     75  37  89N 255  43 270 -4.9 +6.0 +2.2+0.5 .378  168.7     20 55 18.7 -22  7 25 367.8 687.2
24 May  2  5 55 59.6 r  164637 K2  7.5  6.8   41-  79     21  97  26S 186 307 205 -3.5 +5.2 +1.3+3.7 .216 -114.6     21 46 27.4 -17 55 25 368.5 927.7
24 May  2  6 48 36.7 r  164653DB9  7.7  7.7v  40-  79     32  90  18N 322  82 340 -3.5 +5.2 +0.5-7.2 .142  107.2     21 47 36.4 -17 17 41 367.3 856.6
    164653 is double: AB 7.7 11.4 4.5" 207.2, dT = +13sec
    164653 is a close double. Observations are highly desired
    164653 = AP Cap, 7.6 to 7.65, V, Type ACV, Period 2.6733 days, Phase  44%
24 May  2 10  2 11.4 r    3204 K0  7.9  7.3   39-  77  -6 68  43  68S 227  12 246 -3.9 +5.0 +1.6+1.4 .399 -170.0     21 52 41.6 -17  4  0 364.3 716.2
24 May  3  6 25 53.3 r  165228 K3  7.9  7.1   29-  66     14  94  65N 272  35 292 -2.4 +4.0 +0.3-1.2 .498  154.6     22 40 20.7 -11 36 19 365.9 978.8
24 May  3  9 24 33.5 R    3339 M0  6.7  5.8v  28-  64     49  65  49S 206 336 227 -2.5 +3.8 +1.0+1.8 .382 -149.3     22 46 14.2 -11  9 59 362.3 781.2
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 May 10 22  7 45.5 D     864 K1  6.6  6.1   10+  36      7 313  56N  47 271  48 +5.3 -7.1 +2.0+2.5 .291   49.9      5 43 22.8  29 12  1 378.8 828.5
24 May 11 22  9 21.0 D    1032 K4  5.4  4.7   17+  48     15 322  86N  85 301  81 +5.6 -7.4 +1.6+1.1 .385   19.8      6 44 45.5  28 58 15 383.6 760.2
   R1032 = 28 Geminorum
24 May 16 23  2 57.5 d    1596pA2  7.2  7.1   64+ 106     46   4  52S 152 329 131 +1.8 -4.2 +1.2-2.0 .315  -19.5     10 59 33.1   9 55 51 399.7 648.1
      1596 is double: AB 7.2 12.0 1.9" 279.1, dT = -4sec
      1596 is a close double. Observations are highly desired
24 May 17  2  7 55.9 d    1603 A0  7.2  7.2   64+ 107     31 309  34S 170  30 148 +1.1 -3.8 +0.1-2.2 .297  -40.1     11  2 32.9   9 10 23 401.1 754.2
24 May 17 22 13 29.4 d  118995KF0  8.0  7.8   72+ 117     45  36  67S 138 289 116 +0.7 -3.0 +1.4-2.0 .344   -6.5     11 41 38.2   4 35 26 400.2 673.0
24 May 17 22 22  8.7 d  119000kG0  7.3  7.0   72+ 117     45  33  64N  89 242  67 +0.7 -3.0 +2.9-0.8 .252   43.0     11 42  7.3   4 44 50 400.1 669.3
24 May 19  3 34 17.6 d    1790 M4  6.9  6.0v  82+ 129     38 297  49S 155  22 133 -1.7 -1.0 +0.8-1.7 .338  -27.2     12 29  9.7 - 2 25 46 399.7 736.9
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 May 20  1 29 30.5 d    1890 K0  7.3  6.8   88+ 140     63 350  40S 162 350 141 -2.4 +0.2 +0.9-2.7 .300  -29.3     13  9 46.3 - 7 39 19 396.2 660.3
24 May 25  2  1  2.9 r    2512pB9  7.5  7.5   97- 161     50  94  81N 295  47 293 -4.7 +5.9 +0.9-1.8 .423  170.9     17 26  5.9 -27 35 59 380.4 789.9
      2512 is double: AB 7.5 11.3 5.8" 347.8, dT = -8sec
      2512 is a close double. Observations are highly desired
24 May 25  9  9 36.5 r  185573 K5  6.8  5.8s  96- 158     41 261  57S 251 138 250 -5.9 +6.1 +0.7+1.7 .434 -167.1     17 38 12.0 -28  2 48 380.1 821.7
    185573 = NSV 23046, 6.83, range 0.01, 8V, Type VAR, Period 1.18268 days
24 May 26  3 56  6.7 r  186903 K4  7.7  6.8   92- 148     61  86  39N 325  77 329 -4.7 +6.5 +0.9-4.0 .246  128.9     18 30 53.7 -27 57  6 376.1 712.7
24 May 27  2 29 11   Gr   2848pK1  5.6  4.9   86- 136     33 ** GRAZE: CA  3.2S; Dist. 97km in az. 206deg. [Lat =-35.62-0.41(E.Long+58.46)]
   Distance of 2848 to Terminator = 5.2"; to 3km sunlit peak = 0.0"
24 May 27  2 38 32.8 R    2848pK1  5.6  4.9   86- 136     33 102  22S 198 313 207 -4.0 +6.4 +2.8+4.3 .153 -108.6 .01 19 29 52.2 -26 59  8 375.3 871.7
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = -29sec
      2848 is a close double. Observations are highly desired
24 May 28  2 25 55.6 r    2985SK2  6.8  6.2   77- 123     18 107  33S 202 323 216 -3.3 +6.0 +1.3+2.0 .267 -120.0     20 28 44.2 -23 59  2 374.0 969.3
      2985 is triple: ** 7.7 7.7 0.10"  90.0, dT = +0.14sec : AB 6.8      10.1"  40.0, dT = +36sec
      2985 has been reported as non-instantaneous (OCc1595). Observations are highly desired
24 May 29  4 49 46.1 R    3150 F3  6.6  6.4   66- 109     34  91  73S 236 355 253 -2.6 +5.3 +1.0+0.2 .452 -164.8     21 29 59.6 -19  8 52 369.8 841.1
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 May 29  4 59 39   r  164449DF0  7.2        66- 109     35  90   8S 170 290 188 -2.6 +5.3 +9.9+9.9 .080  -99.9     21 31 25.5 -19 14 15 369.7 830.3
    164449 is double: AB 7.21 11.24 2.34" 179.4, dT = -29sec
    164449 is a close double. Observations are highly desired
24 May 29  8 53 52.9 r    3161 F2  7.9  7.7   65- 107     74   7  76S 238  53 257 -3.1 +5.1 +1.9+1.3 .398  178.1     21 36 22.2 -18 23 32 366.9 707.7
24 May 29  9 11  7.3 R  164524 F3  7.2  7.0   65- 107     74 353  38S 200  26 218 -3.2 +5.0 +0.9+2.9 .325 -144.1     21 37 21.1 -18 26 28 366.9 712.8
24 May 30  5  2 15.8 R    3288 K0  5.8  5.3   55-  96     23  91  66S 225 347 246 -1.7 +4.2 +0.7+0.5 .474 -159.1     22 24 27.1 -13 31 46 368.8 907.2
   R3288 = 50 Aquarii
24 May 30  5 11 49.8 r  165049 M3  7.7  6.9s  55-  96     25  89  42N 297  59 317 -1.7 +4.2 +0.6-2.8 .314  128.9     22 24 33.0 -13 11  6 368.6 895.1
    165049 = NSV 25892, 7.70, range 0.02, 2V, Type VAR, Period 16.15248 days
24 May 30  8  9 42.6 R    3303kF2  6.4  6.2   54-  94     58  53  37S 195 333 216 -2.0 +4.0 +0.9+2.7 .319 -140.1     22 30  1.5 -12 54 54 365.6 737.2
24 May 31  5 20 17.0 r    3422kF0  6.7  6.5   43-  82     13  89  49S 206 330 228 -0.7 +2.8 +0.4+1.2 .436 -143.2     23 16 59.2 - 7  9 39 368.2 972.0
24 May 31  6 42 19.9 D Saturn      1.2  1.2   43-  82     29  77 -35N  12 137  33 -0.7 +2.7 +0.5+2.3 .333   47.0     23 20 10.1 - 6 18 13 366.5 867.5
   Saturn ring contacts offset by ±7.1 secs, at  6 42 13 and  6 42 27
   Saturn limb contacts offset by ±23.1 secs, at  6 41 57 and  6 42 43  Both contacts are against the bright limb of Saturn
24 May 31  7 27 42.1 r  146653KA3  8.1  8.0v  43-  81     38  69  47S 204 333 226 -0.8 +2.7 +0.8+1.6 .393 -148.0     23 20 43.1 - 6 37 27 365.6 822.1
    146653 = HIP 115260, 8.12, range 0.01, 4V, Type VAR, Period 0.10847 days
24 May 31  7 30 30.6 R Saturn      1.2  1.2   43-  81     38  68  54N 283  52 304 -0.8 +2.7 +1.8-2.0 .314  133.0     23 20 10.1 - 6 18 13 365.6 816.6
   Saturn ring contacts offset by ±60.8 secs, at  7 29 30 and  7 31 31
   Saturn limb contacts offset by ±27.1 secs, at  7 30  4 and  7 30 58  Both contacts are against the bright limb of Saturn
24 May 31  8 15 34.1 R  146658 K0  7.3  6.8   42-  81     46  58  72N 264  40 286 -0.9 +2.6 +1.8-0.7 .380  149.0     23 21 15.4 - 6 11 33 364.9 784.1
24 Jun  1  9 45 33   Gr     26 F5  7.0  6.8   31-  67     48 ** GRAZE: CA 17.1N; Dist. 45km in az. 142deg. [Lat =-35.16+0.65(E.Long+58.46)]
24 Jun  1  9 46  3   M      26 F5  7.0  6.8   31-  67     47  39  17N 319 108 341 +0.1 +0.8 +9.9+9.9 .000   90.0      0 14 36.6   1 17 49 363.8 780.3
24 Jun  2  7 22  4.8 r  109609kG0  7.8  7.3   21-  55     10  74  41N 297  64 318 +1.4 -0.6 +1.0-3.2 .276  119.8      1  1 39.6   7 18 19 367.0 990.1
24 Jun  2  8  0 30.8 r  109626kA0  7.8  7.8S  21-  54     17  68  41N 297  67 318 +1.4 -0.7 +1.6-3.4 .247  117.8      1  2 49.4   7 30  3 366.2 941.1
    109626 = NSV 15228, 7.83, , Type ACV, Period 3.7931 days, Phase  94%
24 Jun  2  9 20 28.1 r  109658 K2  8.8  8.2   20-  54     31  53  43N 296  74 316 +1.3 -0.8 +2.8-3.4 .212  116.1      1  4 59.1   7 53 43 364.8 852.5
24 Jun  2  9 32 40.7 r  109659 K0  9.0  8.5   20-  54     33  50  61N 278  58 298 +1.3 -0.9 +2.0-1.5 .328  133.6      1  5 11.8   7 52 29 364.7 840.5
24 Jun  3  9 12  2   m   92724 F5  8.0  7.7   12-  40     16  59  17N 325  98 344 +2.5 -2.5 +9.9+9.9 .000   90.0      1 57 46.2  14 23 20 366.8 930.2
24 Jun  3 10  3  9.5 r   92733c    9.0  8.5   12-  40 -10 25  49  87N 255  35 274 +2.5 -2.6 +1.2-0.5 .455  158.5      1 58 48.1  14 20 27 366.0 868.9
     92733 is double: ** 9.5 9.5 0.10" 172.0, dT = -0.03sec
     92733 has been reported as non-instantaneous (OCc 726). Observations are highly desired
24 Jun  8 21 14  3.4 r    1103 M1  5.8  4.9s   6+  29  -5 13 317 -75S 253 112 245 +4.6 -7.2 +1.8+1.6 .342 -142.9      7 15 57.2  27 53 51 385.5 802.8
   R1103 = 53 Geminorum
      1103 = NSV 3485, 5.75, range 0.01, 2V, Type VAR, Period 6.22084 days
24 Jun  9 23 13 44.2 d   80070 K0  7.5  7.0   13+  42      5 305  28S 159  27 146 +4.2 -6.7 -0.5-1.2 .347  -42.6      8 17 36.3  24 50 14 391.4 895.9
24 Jun 14 21 54 52.0 D    1746KF2  7.0  6.8   56+  97     54  14  59S 144 312 122 -0.4 -1.8 +1.4-2.0 .336   -9.9     12  8  0.6   0 37 17 398.8 658.8
24 Jun 15  0 57 18.6 d  119259 K0  7.6  7.0   57+  98     41 307  44N  68 289  46 -1.1 -1.4 +3.5+3.5 .170   62.4     12 11 25.4   0 11 38 399.7 712.0
24 Jun 16 20 41  5.7 D    1945kK0  5.2  4.7   74+ 119   1 42  71  77N  98 225  78 -2.5 +0.9 +1.5-1.4 .349   30.5     13 32 58.1 -10  9 54 396.6 778.4
   R1945 = 76 Virginis
24 Jun 18 22 10 58.2 d  183232cF6  7.2  7.0   90+ 143     47  83  71S 121 240 106 -4.3 +3.6 +0.9-1.9 .425    1.7     15  9 48.7 -20 31 14 388.8 801.2
    183232 is double: ** 7.5 8.8 0.060" 328.0, dT = -0.13sec
    183232 has been reported as non-instantaneous (OCc1709). Observations are highly desired
24 Jun 19 21 27 21.7 d  184027 K4  7.2  6.4   95+ 154  -8 30 100  29S 155 272 145 -4.6 +4.6 -0.4-2.5 .382  -39.8     16  1  8.1 -24 16  0 386.1 931.1
24 Jun 20 23 32 41.9 d    2449 K2  7.4  6.7   99+ 167     45  95  56S 111 224 106 -4.8 +5.6 +0.8-1.7 .448   -2.0     17  3  4.5 -27  5 52 380.0 826.6
   Distance of 2449 to Terminator = 17.6"; to 3km sunlit peak = 7.0"
24 Jun 23  0 43 12.9 r  187672kA*  7.4  7.4   98- 166     36 101  88S 280  35 287 -3.8 +6.3 +0.7-1.4 .474  171.6     19  6 19.2 -27 17 14 372.7 866.4
24 Jun 23  2  8  3.7 r    2796 K0  6.9  6.3   98- 165     53  90  44N 328  80 335 -3.9 +6.4 +0.5-4.7 .215  120.7     19  9 43.8 -27  6 52 371.2 757.6
   Distance of 2796 to Terminator = 14.9"; to 3km sunlit peak = 5.1"
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jun 25  2  6 10.6 R    3092 F2  6.3  6.1   88- 140     27  97  79N 269  28 285 -1.9 +5.4 +0.6-1.1 .490  166.1     21  9 33.0 -20 33 24 368.4 902.3
   R3092 = 27 Capricorni
24 Jun 25  5  5 35.2 r  190162 K0  7.7  7.1   87- 138     62  66  70N 277  44 294 -2.2 +5.3 +2.2-1.1 .344  147.6     21 14 57.1 -20  4 14 365.4 722.6
24 Jun 25  5 54 34.0 r  190191 K1  7.6  7.0   87- 138     70  48  50S 217 356 234 -2.3 +5.3 +1.5+2.0 .363 -155.0     21 16 39.7 -20 10 29 365.0 708.5
24 Jun 26  5 54 48   Gr   3256cF0  6.1     s  78- 125     59 ** GRAZE: CA 13.9N; Dist. 99km in az. 337deg. [Lat =-33.68+0.35(E.Long+58.46)]
24 Jun 26  6  7  7.5 R    3256cF0  6.1     s  78- 125     59  54  33N 308  84 328 -1.1 +4.2 +4.1-5.8 .136  109.1     22 12 25.8 -14 11 38 364.3 738.2
   R3256 = 39 Aquarii
      3256 is double: AB 6.19 9.34 0.08" 308.5, dT = -0.6sec
      3256 is a close double. Observations are highly desired
      3256 = NSV 14068, 6.02 to 6.07, V
24 Jun 26 10 47 19.3 R    3275 K0  6.0  5.4   77- 123  -3 45 288  75S 235 109 255 -1.7 +3.6 +0.9+1.8 .481  178.3     22 19  0.7 -13 18 18 365.1 852.3
   R3275 = 45 Aquarii
24 Jun 27  3 15 18.7 r    3375 F2  6.8  6.6   69- 113     14  91  78S 236 360 258 +0.3 +3.0 +0.4+0.0 .540 -172.3     23  0 19.9 - 8 52 50 367.8 972.4
24 Jun 27  6 41 28.3 R    3391kA0  6.7  6.7   68- 111     52  52  81N 257  36 278 +0.0 +2.7 +1.9-0.2 .395  156.1     23  5 52.5 - 7 56 12 364.3 763.6
   R3391 = 85 Aquarii
24 Jun 27  7 39 29.7 r    3394kA0  7.4  7.3   68- 111     60  30  84N 253  49 275 -0.1 +2.6 +2.1+0.3 .388  156.9     23  7 11.7 - 7 41 41 363.8 743.7
   R3394 = 87 Aquarii
24 Jun 27  9  9 59.3 r  146534pK2  8.1  7.4   67- 110     62 344  88S 246  79 267 -0.3 +2.4 +1.9+1.1 .406  162.9     23  9 11.5 - 7 18 50 363.7 749.1
    146534 is double: AB 8.1 10.4 4.6" 106.9, dT = +9sec
    146534 is a close double. Observations are highly desired
24 Jun 27 12 35 24   Gr   3412 M2  4.2  3.4s  66- 109  18 30 ** GRAZE: CA 13.4N; Dist.341km in az. 320deg. [Lat =-30.61+0.70(E.Long+58.46)]
24 Jun 27 12 42 45.5 r    3412 M2  4.2  3.4s  66- 109  16 28 283  40N 297 171 319 -0.7 +1.9 +1.8+0.2 .240  117.9 .02 23 14 19.4 - 6  2 56 366.3 912.3
   R3412 = phi Aquarii
      3412 = NSV 26044, 4.3 to 4.33, Hp
24 Jun 28  9 11  9.5 R  147023 K0  7.3  6.6   56-  97     56   7  55N 282  96 304 +0.8 +0.8 +3.4-0.9 .247  125.7      0  0 11.6 - 0 21 38 364.3 746.1
24 Jun 28  9 42 21   Gr 147034cF8  8.1  7.8   56-  97     57 ** GRAZE: CA 19.3N; Dist. 47km in az. 310deg. [Lat =-33.98+0.97(E.Long+58.46)]
24 Jun 28  9 49 33   r  147034cF8  8.1  7.8   56-  96     55 351  32N 305 133 327 +0.7 +0.7 +7.6-4.8 .093  102.8      0  1 10.2 - 0  4 34 364.3 746.7
    147034 is double: AB 8.1 12.0 0.30"  72.0, dT = +1.9sec
    147034 is a close double. Observations are highly desired
24 Jun 30  6 13 16.4 r     241 G5  6.8  6.4   34-  71      8  69  46N 293  61 313 +3.1 -2.0 +1.1-2.7 .301  123.4      1 37 40.9  12  4 42 370.5 984.7
24 Jun 30  9 47 40.6 r   92595 F8  8.6  8.3   33-  70     39  24  81N 259  59 279 +2.8 -2.5 +2.1-0.1 .375  151.2      1 43 14.3  12 57 17 367.6 762.1
24 Jul  2  9 50  4.1 R   75987pA3  7.2  7.1   14-  44     19  42  68S 239  22 252 +4.5 -5.2 +0.9-0.1 .460 -178.8      3 33 23.7  23 22  6 373.5 833.2
     75987 is quadruple: Aa,Ab 7.4 9.1 0.10"       : AB 7.2 12.8 33" 170.0, dT = -25sec : AC 7.2 7.7 69"  32.9, dT = +134sec
     75987 is a close double. Observations are highly desired
24 Jul  2  9 52 20.2 R   75988pG5  7.6  7.0   14-  44     19  42  70S 241  24 253 +4.5 -5.3 +0.9-0.1 .458  179.3      3 33 26.5  23 23  4 373.5 830.5
     75988 is triple: CD 7.7 12.0 10.0" 321.1, dT = -4sec : CA 7.7 7.2 69" 212.9, dT = -132sec
24 Jul  2  9 55 24.4 r   75986 G5  9.0  8.5   14-  44     19  41  89N 262  46 274 +4.5 -5.3 +1.4-0.7 .424  158.1      3 33 23.6  23 29 20 373.5 826.8
24 Jul  9 22 27 21.1 d   99115 G5  8.5  8.0   15+  46     23 306  40S 158  22 138 +1.8 -4.2 +0.2-1.4 .356  -31.0     10 26  5.7  13  9  9 398.6 802.5
24 Jul 10 22 20 12.2 D  118702 K5  7.5  6.6s  22+  57     35 312  85S 117 335  95 +0.7 -3.0 +1.4-0.1 .370   14.0     11 10 30.8   7 53 30 399.6 738.5
    118702 = NSV 18681, 7.56 to 7.62, Hp
24 Jul 12 22 38 20.2 d  138861kK5  7.9  7.2   40+  79     52 320  78S 125 337 104 -1.8 -0.3 +1.8-0.9 .344    6.5     12 35 27.6 - 3 32 46 399.1 671.1
24 Jul 13  1 51  3.6 d    1814SK5  6.7  5.8S  41+  80     18 277  29S 174  49 153 -2.4 +0.0 +0.3-2.9 .256  -53.8     12 38 43.3 - 4 22 25 402.0 843.3
      1814 is triple: AB 6.8 10.0 57" 110.5, dT = +99sec : AC 6.8 10.2 165" 359.1, dT = -642sec
      1814 = NSV 19445, 6.66, , Type VAR:
24 Jul 13 21 59 50.8 D    1911 F8  7.3  7.0   50+  89     64 351  40N  62 250  42 -2.9 +1.0 +6.0+3.8 .115   70.0     13 17 44.1 - 8 44  0 397.1 649.9
24 Jul 15  0 35 38.0 D  158333kG6  7.2  6.7   60+ 101     55 296  71S 129 359 110 -4.6 +2.6 +1.7-1.0 .345   -7.1     14  5 13.0 -14 51 25 394.6 665.9
24 Jul 15  0 42 44.8 D    2017kK1  6.4  5.8   60+ 101     54 294  14S 186  57 167 -4.6 +2.6 +0.3-6.0 .152  -64.3     14  4 27.0 -14 58 18 394.7 670.4
24 Jul 16  2 27  0.2 d    2129 K0  7.4  6.8   70+ 113     45 276  36S 159  40 144 -5.8 +3.9 +1.5-2.7 .250  -48.6     14 55  5.7 -20  0 49 391.2 716.6
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 16 20 58 47.8 d    2235kB9  6.3  6.3   77+ 123   0 50  85  44S 147 263 135 -5.2 +4.5 +0.4-2.6 .371  -27.3     15 39 21.4 -23  9  1 387.3 784.9
24 Jul 16 22 21 41.8 d  183712 F3  7.9  7.6   78+ 124     67  68  86S 105 229  93 -5.5 +4.7 +1.9-1.3 .361   14.3     15 41 53.2 -23 16 19 386.0 698.3
24 Jul 17  2 57 42.6 D    2257 A2  6.7  6.6S  79+ 125     51 273  83N  92 337  81 -6.4 +5.0 +1.6+0.9 .372   10.8     15 48 26.6 -23 50  3 386.0 708.5
      2257 = NSV 20404, 6.72, , Type VAR:
24 Jul 17  5 52 37.2 D    2270 B2  5.4  5.4e  80+ 126     16 252  70N  80 318  68 -6.7 +4.9 +0.0+1.4 .483   16.8     15 53 55.9 -23 58 41 388.5 951.4
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  92%
24 Jul 18  0 14 45.7 d    2393 G8  7.9  7.3   86+ 136     79  46  41N  44 182  37 -6.0 +5.7 +3.9+4.2 .155   64.2     16 40 13.3 -26 19 20 380.1 655.0
24 Jul 18  2 28 21.0 D    2404pG2  6.7  6.4   87+ 137     68 284  67S 116 359 109 -6.4 +5.8 +2.2-0.6 .343  -16.7     16 43 51.4 -26 48 32 379.9 660.4
      2404 is double: AB 6.7 17.0 26.7" 255.3, dT = -59sec
24 Jul 18  3 37 45.2 d    2409 B9  7.0  7.0   87+ 137     54 271  66N  68 316  62 -6.6 +5.8 +1.4+2.0 .349   26.0     16 45 48.5 -26 38 58 380.4 716.1
24 Jul 18  5 50 54.9 d    2420dA3  7.5  7.4   87+ 138     28 255  81N  83 327  77 -6.9 +5.7 +0.4+1.3 .480    6.3     16 50 10.7 -26 44 33 382.1 894.8
      2420 is double: AB 7.3 15.4 6.6" 229.0, dT = -11sec
      2420 is a close double. Observations are highly desired
24 Jul 18 22 52 45.3 D  185573 K5  6.8  5.8s  92+ 148     53  92  70S 105 216 103 -5.5 +6.2 +1.2-1.5 .423   -1.2     17 38 12.0 -28  2 48 376.2 772.0
    185573 = NSV 23046, 6.83, range 0.01, 8V, Type VAR, Period 1.18268 days
24 Jul 19  2 34 10   m    2545cF0  6.4  6.2   93+ 149     78 301   8N   1 234 360 -6.1 +6.3 +9.9+9.9 .000   90.0     17 43 17.7 -27 53  2 374.2 657.2
      2545 is double: ** 6.6 8.5 0.09" 200.4
      2545 has been reported as non-instantaneous (OCc 113). Observations are highly desired
   Distance of 2545 to Terminator = 2.9"; to 3km sunlit peak = 0.0"
24 Jul 19  5  5 34   m    2554cF7  4.5  4.2V  93+ 150     49 266   0N 353 241 352 -6.5 +6.2 +9.9+9.9 .000   90.0     17 47 33.6 -27 49 51 375.1 784.5
   R2554 = X Sagittarii
      2554 is double: AB 2.5 8.1      132.0
      2554 = X Sgr, 4.22 to 4.86, V, Type DCEP, Period 7.012770 days, Phase   6%
   Distance of 2554 to Terminator = 0.0"; to 3km sunlit peak = 0.0"
24 Jul 19  8 38 19.0 d    2583cA7  5.8  5.7   94+ 152      9 242  32S 140  15 139 -6.6 +6.0 +0.6-0.5 .323  -57.7     17 56 41.8 -28  3 55 378.21109.9
24 Jul 20  5 52 16.3 d    2743cA5  7.6  7.4   98+ 163     52 268  51S 108 356 113 -5.8 +6.3 +1.8+0.3 .371  -34.4     18 53  7.6 -27 45 23 369.8 805.3
      2743 is double: AB 7.7 8.9 0.39" 349.0, dT = -0.5sec
      2743 is a close double. Observations are highly desired
24 Jul 22  0 47 27.1 r  189680 K2  7.4  6.7   99- 170     38  93  66N 304  61 319 -2.6 +5.6 +0.7-2.9 .319  131.8     20 46 30.1 -22  9 50 364.1 844.0
   Distance of 189680 to Terminator = 11.5"; to 3km sunlit peak = 2.9"
24 Jul 23  2  8 48.0 r  164651 K0  7.6  6.9   96- 157     40  83  39N 309  71 328 -1.2 +4.6 +1.4-4.6 .210  116.5     21 47 28.8 -16 45 45 361.6 826.7
24 Jul 23  3 40 44.1 R    3197 K3  6.4  5.6   96- 156     58  64  51S 219 348 237 -1.3 +4.5 +1.4+1.5 .401 -158.1     21 50 13.0 -16 50 42 360.3 754.4
24 Jul 23  8 41 10   m    3217wA2  7.4  7.3   95- 154     46 285  21N 324 200 344 -2.0 +3.9 +9.9+9.9 .000   90.0     21 57 47.4 -15  7 24 360.8 869.2
      3217 is double: AB 7.4 11.1 17.3" 326.6
   Distance of 3217 to Terminator = 13.9"; to 3km sunlit peak = 3.9"
24 Jul 26  7 33 13.9 r      75kF0  7.6  7.5   70- 113     50  15  45S 202   9 223 +2.7 -0.6 +0.8+1.9 .388 -154.0      0 35 28.6   4 17 41 362.4 759.1
24 Jul 27  4 58 23.8 r     201kG5  7.5  7.1   60- 101     18  63  90N 248  20 268 +4.1 -1.9 +0.7-0.4 .504  166.3      1 22 43.4  10 22 10 367.4 923.8
24 Jul 28  9 42 15.8 r   92911 A2  7.5  7.4   47-  86     38   3  63S 225  42 242 +4.5 -4.1 +1.5+1.1 .394 -170.2      2 22 59.6  17 35 52 369.0 716.6
24 Jul 29  9 23  1.4 r   75845 A3  7.6  7.5   36-  73     30  21  48N 298  99 312 +5.3 -5.3 +3.6-2.1 .207  120.7      3 17 49.8  22 49 56 373.0 734.1
24 Jul 30  8 45 23.0 R   76514 G5  7.2  6.9   26-  61     17  39  90S 262  47 271 +5.9 -6.2 +1.4-0.7 .418  162.4      4 14 32.2  26 15 21 377.6 802.6
24 Jul 30  9 56 13.0 r   76530 K3  7.8  7.0   25-  60 -11 25  25  65S 238  35 247 +5.8 -6.4 +1.4+0.2 .393 -172.3      4 16 41.6  26 21 29 377.0 725.7
24 Jul 31  9 59 15   M     788 F0  6.8  6.4   16-  48 -10 17  35  18N 343 131 347 +6.1 -7.0 +9.9+9.9 .000   90.0      5 17 15.5  28 54 18 381.3 753.2
24 Jul 31  9 59 25   Gr    788 F0  6.8  6.4   16-  48 -10 18 ** GRAZE: CA 17.5N; Dist. 38km in az. 139deg. [Lat =-35.10+0.72(E.Long+58.46)]
24 Jul 31 15 18  3   M     810SB7  1.7  1.7   15-  46  37 17 325   0S 183  35 185 +5.1 -7.2 +9.9+9.9 .000  -90.0      5 26 17.5  28 36 27 382.1 723.1
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
   Distance of 810 to Terminator = 6.3"; to 3km sunlit peak = 0.0"
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug  2 16 17 45.5 r    1122cG9  3.8  3.3    4-  22  38 23 335  88S 291 134 283 +4.9 -7.2 +1.7+0.1 .369  179.5      7 25 43.6  27 47 53 388.5 695.2
   R1122 = iota Geminorum
24 Aug  6 17 12 30.5 d    1576 A2  5.3  5.3    5+  25  36 45  10  31S 164 336 143 +2.0 -3.8 +0.8-2.4 .285  -33.1     10 49 15.4  10 32 43 398.3 656.5
   R1576 = 53 Leonis
24 Aug  7 22 36 54.2 d  118959 K0  8.3  7.8   11+  38     20 289  14S 187  59 166 -0.2 -1.8 -0.4-4.1 .199  -62.2     11 38  5.1   3 37 19 402.5 834.1
24 Aug  7 23 30 21.0 d    1694 G5  8.5  8.1   11+  38     10 281  67N  88 323  67 -0.3 -1.7 +0.5+1.4 .381   34.1     11 40 30.8   3 39 15 403.6 901.4
24 Aug 10 22  8 31.7 d  158150 K2  8.1  7.5   33+  71 -10 58 305  51S 151  15 132 -4.0 +2.3 +1.4-2.1 .306  -25.4     13 45 50.4 -12 57 53 398.0 653.9
24 Aug 11  2  0 46.6 d    1986 F3  7.1  6.9   35+  72     13 262  38S 163  41 144 -4.7 +2.5 +0.7-2.1 .282  -52.1     13 51  5.9 -13 40 45 401.6 895.1
24 Aug 13  1 52 28.9 d  183474kK0  8.1  7.5   54+  94     37 266  72N  86 329  73 -6.7 +4.8 +1.0+1.4 .385   16.8     15 26 44.6 -22 30 20 392.2 765.3
24 Aug 13 22 22 11.6 D    2332wB8  6.1  6.0V  63+ 105     80  23  69N  79 237  69 -6.6 +5.6 +2.8+0.5 .285   32.9     16 14 53.4 -25 28 37 385.6 634.9
      2332 is double: AB 6.1 9.9 46"  35.8, dT = +119sec
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  44%
24 Aug 14  1 24 33.6 d  184310 K1  8.2  7.8   64+ 106     54 273  73N  81 327  72 -7.2 +5.7 +1.6+1.4 .353   17.4     16 19 22.5 -25 45 39 386.0 692.7
24 Aug 14  3  0  4   Gr   2349SB1  2.9     v  64+ 106     34 ** GRAZE: CA -3.9N; Dist.142km in az. 158deg. [Lat =-36.02+0.33(E.Long+58.46)]
24 Aug 14  3  1 39   M    2349SB1  2.9     v  64+ 106     35 261  -4N   4 248 355 -7.4 +5.7 +9.9+9.9 .000   90.0     16 21 11.3 -25 35 34 387.2 813.8
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.002" 223.1 : Aa,Ab 3.06 5.24 0.42" 206.6 : AB 2.9 8.4 20.2" 273.1
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  96%
24 Aug 14 22 28 35.2 D    2470kB9  6.1  6.2   73+ 117     75  68  87S  95 215  91 -6.7 +6.2 +2.2-0.7 .353    9.0     17 12 25.1 -27 45 44 380.1 658.9
24 Aug 14 23 31 16.1 D    2474kF2  6.7  6.4   73+ 117     83   5  83N  86 261  81 -6.9 +6.3 +2.5+0.2 .334   14.2     17 14  2.0 -27 47 48 379.6 635.0
24 Aug 15  1 45 27.7 d  185228SB0  7.9  7.6   73+ 118     62 275  61N  63 311  59 -7.4 +6.3 +1.6+2.1 .331   27.3     17 17 27.6 -27 46  1 379.8 686.4
    185228 is triple: AB 7.9 16.0 4.0" 204.0, dT = -9sec : AC 7.9 15.0 7.8" 146.4, dT = +2.7sec
    185228 is a close double. Observations are highly desired
24 Aug 15 20  5 34.2 d    2617cK0  4.6  4.1   81+ 128  14 35 103  33S 143 256 144 -6.1 +6.4 -0.2-2.8 .356  -42.4     18  8  5.0 -28 27 26 377.1 880.8
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = -0.48sec
      2617 is a close double. Observations are highly desired
24 Aug 15 22 18 33.2 d  186461cA2  7.4  7.2v  82+ 129 -12 62  86  58N  52 163  54 -6.4 +6.5 +2.5+1.2 .282   44.1     18 12 37.6 -28 14 11 374.7 713.0
    186461 is double: ** 8.2 8.2 0.050"
    186461 has been reported as non-instantaneous (OCc1536). Observations are highly desired
    186461 = V4385 Sgr, 7.42 to 7.46, Hp, Type ELL:, Period 2.62462 days, Phase  40%
24 Aug 15 23 51 59.5 d  186536cA3  7.5  7.4   82+ 130     80  58  43S 131 258 133 -6.7 +6.6 +2.1-2.7 .276  -40.1     18 15 13.5 -28 36 49 373.6 654.8
    186536 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.27sec
    186536 has been reported as non-instantaneous (OCc 151). Observations are highly desired
24 Aug 16  1  6 55.4 D    2644cF8  6.4  6.1   82+ 130     80 308  66N  60 287  62 -6.9 +6.6 +2.1+1.8 .327   25.5     18 17 23.8 -28 17 20 373.3 656.3
      2644 is double: ** 7.1 7.1 0.10"  90.0, dT = +0.26sec
      2644 has been reported as non-instantaneous (OCc 168). Observations are highly desired
24 Aug 16  1 24 57.7 D    2645 A5  6.2  6.1   82+ 130     77 294  21S 153  32 155 -7.0 +6.6 +3.5-6.4 .131  -69.1     18 17 24.1 -28 39  7 373.3 663.4
24 Aug 16  1 39 24   Gr   2645 A5  6.2  6.1   82+ 130     73 ** GRAZE: CA  0.7S; Dist.111km in az. 165deg. [Lat =-35.68+0.22(E.Long+58.46)]
   Distance of 2645 to Terminator = 2.6"; to 3km sunlit peak = 0.0"
24 Aug 16  3 48 10.5 D    2660 A3  6.2  6.0   83+ 131     49 265  42S 131  20 133 -7.3 +6.5 +2.4-1.1 .260  -53.7     18 22  0.1 -28 25 48 374.1 795.5
24 Aug 20  1 33 10.8 r    3275 K0  6.0  5.4  100- 174     47  71  79N 290  57 310 -1.4 +3.8 +1.9-2.4 .297  129.4     22 19  0.7 -13 18 18 356.7 808.9
   R3275 = 45 Aquarii
   Distance of 3275 to Terminator = 4.2"; to 3km sunlit peak = 0.0"
24 Aug 22  2 22 15.1 r      16cK2  7.5        92- 147     28  67  78S 235   6 257 +2.4 +0.4 +0.8+0.2 .520  179.1      0  8 52.2   0 41 33 357.9 902.9
        16 is double: AB 7.67 9.31 0.30"  94.2, dT = +0.45sec
        16 is a close double. Observations are highly desired
24 Aug 22  5  2 34.0 r      24 K0  6.8  6.1   91- 145     51  25  24S 180 339 202 +2.1 +0.0 +0.0+2.9 .304 -131.9      0 13 47.6   1 23  1 356.1 786.4
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 23  2 56 57.8 R     146cK0  4.3  3.8   84- 132     20  64  63S 219 351 240 +4.0 -1.5 +0.4+0.6 .515 -164.9      1  2 56.6   7 53 24 360.9 933.1
   R146 = epsilon Piscium
24 Aug 23  4 38 50.6 r     162kF0  6.9  6.8s  83- 132     36  43  11S 167 312 188 +3.9 -1.7 -1.1+4.0 .214 -116.8      1  6 37.6   8 21 36 359.5 830.1
       162 = NSV 15244, 6.93, range 0.01, 2V, Type GDOR, Period 0.74488 days, Phase  30%
   Distance of 162 to Terminator = 19.7"; to 3km sunlit peak = 5.2"
24 Aug 23  5 38 31.4 r  109678kA3  7.7  7.5   83- 131     43  26  79N 258  56 278 +3.8 -1.9 +2.0-0.1 .398  151.5      1  6 42.0   8 52  7 359.1 788.4
24 Aug 23  8 32 40.4 r  109718PG0  7.2  6.9   82- 130     40 328  72S 228  74 249 +3.4 -2.3 +1.5+1.6 .439 -175.8      1 10 54.3   9 33 50 359.6 767.5
    109718 is double: AB 7.3 12.7 58" 233.0, dT = -131sec
24 Aug 25  6 16 49.7 d     440SA2  4.7        62- 104     25  36 -53N  36 184  51 +6.3 -5.0 +0.6+0.7 .422   21.1      2 59 12.7  21 20 25 368.7 808.8
   R440 = epsilon Arietis
       440 is triple: AB 5.17 5.57 1.29" 210.5, dT = -3sec : AC 5.2 12.7 146" 192.0, dT = -316sec
       440 is a close double. Observations are highly desired
24 Aug 25  7 26 35.3 R     440SA2  4.7        62- 103     32  20  85N 258  60 273 +6.1 -5.1 +2.0-0.1 .390  159.2      2 59 12.7  21 20 25 368.2 744.3
   R440 = epsilon Arietis
       440 is triple: AB 5.17 5.57 1.29" 210.5, dT = -2.2sec : AC 5.2 12.7 146" 192.0, dT = -154sec
       440 is a close double. Observations are highly desired
24 Aug 25  7 26 36.5 R X 54005DA2  5.6  5.5   62- 103     32  20  85N 258  60 273 +6.1 -5.1 +2.0-0.1 .390  159.2      2 59 12.7  21 20 24 368.2 744.3
   X 54005 is double: BA 5.6 5.2 1.3"  30.5, dT = +2.2sec
   X 54005 is a close double. Observations are highly desired
24 Aug 25  9 30 38.8 r   75705 K0  7.8  7.3   61- 103 -11 33 346  35S 198  30 212 +5.8 -5.4 +1.1+2.1 .278 -135.6      3  3  2.1  21 33 55 368.5 696.7
24 Aug 26  7  4 33.6 r   76345kG8  7.5  7.0   51-  91     21  36  41S 209 357 220 +7.0 -6.2 +0.4+0.9 .361 -146.4      3 57 11.8  25 16 58 374.0 786.7
24 Aug 29  8 56 51.0 r   78930 K2  8.3  7.8   20-  53     10  44  73S 263  42 257 +7.2 -7.5 +1.2-0.9 .401 -175.3      6 58 54.3  28 39 32 389.0 759.7
24 Sep  5 22 46 59.4 d  138994 K2  8.6  8.0    7+  30     15 273  80N 103 339  82 -2.1 +0.8 +0.5+0.8 .427   15.1     12 50 55.3 - 6  3 40 404.5 867.4
24 Sep  5 23 14 23.4 d  139004WK0  8.5  7.8    7+  31     10 269  74N  98 334  76 -2.2 +0.8 +0.3+1.0 .434   19.6     12 51 40.3 - 6  7 59 405.1 905.5
    139004 is double: AB 8.4 10.7 15.7" 197.0, dT = -6sec
24 Sep  5 23 35 18.5 d    1847 A2  8.0  7.8    7+  31      6 266  46N  70 306  49 -2.2 +0.8 +0.0+2.3 .330   46.1     12 52 12.6 - 6  5 25 405.5 935.9
24 Sep  6 23 10 46.8 D  158011dF2  7.1  6.9   12+  41     21 270  68N  92 329  72 -3.5 +2.2 +0.6+1.3 .389   23.7     13 34 17.8 -11 32 15 403.1 829.6
    158011 is double: AB 7.2 12.9 3.6" 245.6, dT = -8sec
    158011 is a close double. Observations are highly desired
24 Sep  9 20 42 45.1 d    2269cB5  5.4  5.4   36+  74  11 80 345  85N  99 292  88 -6.3 +5.4 +2.5-0.4 .315   14.7     15 53 53.9 -24 31 59 391.5 618.0
24 Sep  9 22 14 27.6 r    2269cB5  5.4  5.4   37+  74  -8 66 287 -71N 302 182 291 -6.6 +5.5 +2.2-0.9 .322  165.1     15 53 53.9 -24 31 59 391.7 632.1
24 Sep  9 23 58 27.1 D    2286kB5  5.4  5.5v  37+  75     45 268  83N  96 341  85 -7.0 +5.5 +1.4+0.9 .377    4.0     15 58 34.9 -24 49 53 392.6 720.1
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  90%
24 Sep 10  2 17 58.2 d    2295pA0  7.2  7.1   38+  76     18 252  82S 111 350 100 -7.3 +5.5 +0.4+0.5 .463  -15.9     16  2 51.9 -25  0 51 394.8 922.3
      2295 is double: AB 7.2 9.4 4.5" 344.5, dT = -6sec
      2295 is a close double. Observations are highly desired
24 Sep 10  3  2 14.2 d    2299kK2  6.2  5.5   38+  76     10 246  12N  25 261  14 -7.3 +5.4 -1.9+4.8 .179   69.8 .01 16  3 54.7 -24 43 35 395.5 995.0
24 Sep 12  1 47 40   m X 43016SK0  7.9  7.3   58+  99     46 263   9S 171  60 171 -8.1 +6.5 +9.9+9.9 .000  -90.0     17 53 48.2 -28 41 19 381.7 779.9
   X 43016 is triple:  5.4 10.6 0.10"       : AB 9.4 12.2 7.5"   0.9
   X 43016 is a close double. Observations are highly desired
24 Sep 12  1 47 46   GrX 43016SK0  7.9  7.3   58+  99     45 ** GRAZE: CA  8.7S; Dist.  8km in az. 330deg. [Lat =-34.56+0.48(E.Long+58.46)]
24 Sep 12  3 13 12.1 D    2583cA7  5.8  5.7   58+ 100     29 255   9N   9 253   9 -8.2 +6.4 -2.1+5.7 .155   71.5     17 56 41.8 -28  3 55 382.9 906.0
24 Sep 13  0 31 41.3 d  187398 K0  8.2  7.6   68+ 111     73 287  56S 117   0 122 -7.6 +6.7 +2.7-1.0 .282  -41.0     18 52 58.5 -28  8 43 374.5 678.3
24 Sep 13  0 54 31.8 d    2743cA5  7.6  7.4   68+ 111     68 282  37N  29 275  34 -7.7 +6.6 +0.9+3.7 .267   45.9     18 53  7.6 -27 45 23 374.5 695.7
      2743 is double: AB 7.7 8.9 0.39" 349.0, dT = +1.1sec
      2743 is a close double. Observations are highly desired
24 Sep 15  7 15 29.4 d    3081 K3  6.5  5.9   88+ 140     13 254  88S  71 308  87 -6.2 +4.7 -0.1+1.3 .621   -7.4     21  6 41.5 -20 10 49 365.41110.7
24 Sep 15 22 56 51.7 D    3197 K3  6.4  5.6   93+ 150     45  79  70S  84 207 103 -3.9 +4.5 +1.4-0.8 .436  -20.1     21 50 13.0 -16 50 42 359.1 809.4
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 19  8 21 32.0 R      98 G8  6.0  5.5   98- 163     25 298  84S 236 103 258 +1.3 -1.7 +0.9+1.7 .513 -179.4      0 47 23.6   6 44 27 355.2 884.1
   R98 = 60 Piscium
24 Sep 20  3 17 18.4 r     230SA3  7.3  7.2   94- 150     33  40  42N 293  80 313 +3.9 -2.8 +3.1-2.6 .233  118.3      1 34 51.6  12 33 31 356.2 847.1
   R230 = 100 Piscium
       230 is quadruple: AB 7.3 8.3 15.7"  76.7, dT = +54sec : AC 7.3 13.6 77" 312.1, dT = -313sec : AD 7.3 11.6 125"   8.0, dT = -138sec
24 Sep 21  4 30  2.7 r     375cA5  6.8  6.7   86- 136     30  32  81S 239  32 256 +5.5 -4.6 +1.3+0.2 .464  175.4      2 33 36.5  18 52 48 360.4 813.7
       375 is double: ** 7.6 7.6 0.10"  90.0, dT = +0.19sec
       375 has been reported as non-instantaneous (OCc1189). Observations are highly desired
24 Sep 21  7 51  5.8 r   93033SK0  7.2  6.4   85- 135     32 338  88N 250  90 267 +5.1 -5.0 +2.0+1.0 .413  170.4      2 38 37.3  19 43 40 360.7 732.9
     93033 is triple: **Aa,Ab 7.5 8.5 0.30"  70.0, dT = +0.7sec : AB 7.2 14.4 45"  57.7, dT = +106sec
     93033 has been reported as non-instantaneous (OCc 312). Observations are highly desired
24 Sep 22  5 22 48   M     518SA3  6.0     s  76- 122     24  30  13N 331 123 343 +6.8 -5.9 +9.9+9.9 .000   90.0      3 34 26.6  24 27 52 366.0 787.2
   R518 = 7 Tauri
       518 is triple: AB 6.60 6.86 0.78" 348.6 : AB,C 5.9 9.9 22.5"  52.4
       518 is a close double. Observations are highly desired
       518 = NSV 1192, 5.92 to 5.96, V
24 Sep 22  8 34 53.3 r   76046cA0  7.1  7.1   76- 121     29 343  86N 258  93 270 +6.3 -6.3 +2.1+0.7 .388  171.2      3 39  6.7  24 42 10 366.3 698.1
     76046 is double: AB 7.1            45.0, dT = -22sec
24 Sep 24  6 48 37.5 R     850cB2  6.0  5.9v  55-  96     17  34  68S 246  34 247 +8.2 -7.4 +1.3-0.3 .397 -168.9      5 39 18.3  29 12 55 378.6 742.2
       850 is double: ** 6.2 8.2
       850 = V0433 Aur, 6.02 to 6.06, Hp, Type SPB:, Period 4.6382 days, Phase  90%
24 Sep 24  8  1 35.4 r   77394WA   7.1  7.2   55-  95     23  19  70N 288  89 289 +8.0 -7.5 +2.4-1.0 .328  153.0      5 41 21.5  29 29 40 378.3 674.8
     77394 is double: BA 7.1 6.4 25.4" 193.8, dT = +5sec
24 Sep 24  8  1 37.8 R     855WB8  6.4  6.4e  55-  95     23  19  72N 286  88 287 +8.0 -7.5 +2.4-0.9 .332  154.6      5 41 21.0  29 29 15 378.3 674.8
       855 is double: AB 6.4 7.1 25.4"  13.8, dT = -2.7sec
       855 = HIP 26781, 5.93, range 0.02, H1, Type EA, Period 0.674 days, Phase  54%
24 Sep 24  8 45 39.8 R     864 K1  6.6  6.1   54-  95 -12 26   9  18S 196   8 197 +7.9 -7.6 +1.2+3.0 .138 -112.8      5 43 22.8  29 12  1 378.2 651.3
24 Sep 25  6  1 17.8 r    1018cB9  5.8     s  45-  84      3  52  54S 239  11 235 +8.4 -7.5 +0.3-0.3 .409 -154.9      6 38 23.0  28 59  4 385.7 843.8
   R1018 = 53 Aurigae
      1018 is double: AB 6.97 6.20 0.14" 328.9, dT = 0.00sec
      1018 is a close double. Observations are highly desired
      1018 = NSV 16937, 5.77, range 0.02, V, Type ACV, Period 2.7112 days, Phase  64%
24 Sep 25  8  9 36.5 r   78658 B9  7.5  7.5   44-  83     19  30  48N 317 109 313 +8.1 -7.6 +2.6-2.3 .244  131.5      6 42 32.8  29 22 31 384.3 684.6
24 Sep 25  9 28 24.9 R    1032 K4  5.4  4.7   44-  83  -3 25  13  32S 218  25 213 +7.9 -7.6 +2.2+1.5 .188 -123.4 .02  6 44 45.5  28 58 15 384.0 635.6
   R1032 = 28 Geminorum
24 Sep 27  9 17 51.6 r    1283 A0  7.0  7.0   24-  59  -4 19  40  36S 234  19 220 +7.1 -6.8 +1.6+0.2 .221 -128.0      8 36  2.5  24  3  4 394.0 685.2
24 Oct  5 23 15 36.7 D  158880cF2  7.5  7.3    8+  34     18 257  77N  98 337  83 -4.9 +4.3 +0.3+0.9 .452    5.7     14 53 40.1 -19 58 21 401.2 884.6
24 Oct  5 23 59  6.0 D    2129 K0  7.4  6.8    9+  34      9 252  68N  89 326  74 -5.0 +4.3 -0.1+1.2 .475   13.6     14 55  5.7 -20  0 49 402.1 952.9
24 Oct  6 21 37 25.4 d    2237cK3  5.0  4.3s  14+  44   4 48 272  76S 122   6 109 -5.7 +5.3 +1.7-0.4 .344  -18.2     15 40 16.9 -23 49  5 396.0 695.8
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.19sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Oct  6 22 50 47.6 r    2237cK3  5.0  4.3s  15+  45 -11 33 262 -64S 261 145 249 -5.9 +5.3 +0.7+1.6 .388 -161.5     15 40 16.9 -23 49  5 397.1 789.1
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.2sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct  7 13 47 45.5 D    2349SB1  2.9     v  20+  53  51 22 107  78N  90 209  81 -5.1 +5.5 +0.3-1.2 .469   22.0     16 21 11.3 -25 35 34 396.3 971.9
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 343.5, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 206.4, dT = -0.39sec : AB 2.9 8.4 20.2" 273.1, dT = -43sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase   9%
24 Oct  7 14 45 26.9 R    2349SB1  2.9     v  20+  54  58 33 100 -57N 316  72 307 -5.2 +5.6 +0.0-2.2 .427  158.0     16 21 11.3 -25 35 34 395.0 882.2
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 343.5, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 206.4, dT = +0.33sec : AB 2.9 8.4 20.2" 273.1, dT = -35sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase   9%
24 Oct  7 18 46 57.2 D    2366dM1  1.1  0.1v  21+  55  39 80  41  86N  98 241  90 -5.9 +6.0 +2.4-0.6 .322   11.8 .14 16 29 24.5 -26 25 55 391.6 624.4
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  54%
24 Oct  7 20 20 16.2 R    2366dM1  1.1  0.1v  22+  55  20 74 296 -76N 295 171 288 -6.3 +6.1 +2.3-0.9 .317  167.9 .14 16 29 24.5 -26 25 55 391.5 615.3
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  54%
24 Oct  7 22 56 44.7 d  184475cB8  8.6        22+  56 -12 44 265  32N  43 289  35 -6.8 +6.1 +0.4+3.7 .250   50.2     16 35 15.2 -26 28 42 392.8 743.9
    184475 is double: AB 8.88 9.89 0.65" 309.5, dT = -0.15sec
    184475 is a close double. Observations are highly desired
24 Oct  8 17 31 47.8 d    2505 K4  5.3  4.5   30+  66  52 56  90  76S 110 220 106 -6.2 +6.4 +1.4-1.7 .381   -3.5     17 23 21.6 -28  8 34 388.7 719.6
   R2505 = 43 Ophiuchi
24 Oct  9  0 46 22.7 d  185524kK1  8.5  7.8   32+  68     33 256  87N  91 337  89 -7.6 +6.4 +0.7+1.1 .446   -8.5     17 35 10.4 -28 12 13 389.2 851.9
24 Oct  9  2 10 30.6 D  185573 K5  6.8  5.8s  32+  69     17 248  71N  75 315  73 -7.7 +6.3 -0.1+1.4 .516    7.5     17 38 12.0 -28  2 48 390.5 986.1
    185573 = NSV 23046, 6.83, range 0.01, 8V, Type VAR, Period 1.18268 days
24 Oct 10 23 11 12.8 D    2848pK1  5.6  4.9   52+  92     74 293  59S 112 350 121 -7.5 +6.5 +2.8-0.8 .277  -41.9     19 29 52.2 -26 59  8 376.4 678.4
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = +23sec
      2848 is a close double. Observations are highly desired
24 Oct 11 23 33 53   M    2985SK2  6.8  6.2   63+ 105     77 323  12S 153   6 166 -7.0 +5.9 +9.9+9.9 .000  -90.0     20 28 44.2 -23 59  2 370.4 693.7
      2985 is triple: ** 7.7 7.7 0.10"  90.0 : AB 6.8      10.1"  40.0
      2985 has been reported as non-instantaneous (OCc1595). Observations are highly desired
24 Oct 12  4 27 52.0 d    3009 F5  7.4  7.2   64+ 107     20 256  63N  47 287  61 -7.5 +5.3 -0.2+1.8 .547   16.5     20 37 43.4 -22 26 34 373.21032.6
24 Oct 12 23 57 29.1 d    3140 K1  7.8  7.0s  73+ 118     74 357  59S 101 283 118 -6.2 +4.9 +2.9-0.6 .289  -44.4     21 27  3.1 -19  3 29 364.5 716.3
      3140 = NSV 25600, 7.86 to 7.95, Hp
24 Oct 13 22  9 45.5 D    3275 K0  6.0  5.4   83+ 131  -1 49  68  38N  14 142  34 -4.6 +3.7 +0.9+2.6 .318   44.5     22 19  0.7 -13 18 18 360.9 781.8
   R3275 = 45 Aquarii
24 Oct 14 23 48 14.2 d  146591kG5  7.5  7.0   91+ 145     52  47  21N 356 139  18 -3.1 +2.0 +0.0+3.6 .262   55.1     23 15 13.0 - 6  7 19 356.0 790.6
24 Oct 15 23  3 29.7 d      16cK2  7.5        97+ 159 -12 31  64  77S  79 211 101 -1.1 +0.3 +1.2-0.6 .469  -25.4      0  8 52.2   0 41 33 355.0 893.0
        16 is double: AB 7.67 9.31 0.30"  93.7, dT = +0.6sec
        16 is a close double. Observations are highly desired
24 Oct 16  0  6 28.8 d  109039cG5  7.3  6.6   97+ 160     42  49  25N   2 143  24 -1.1 +0.2 +0.0+2.7 .322   48.7      0  9 28.0   1 14 39 354.0 838.5
    109039 is double: ** 8.6 8.6 0.20"  90.0, dT = +0.02sec
    109039 has been reported as non-instantaneous (OCc1137). Observations are highly desired
   Distance of 109039 to Terminator = 11.4"; to 3km sunlit peak = 2.6"
24 Oct 16 22 58 37.3 D     146cK0  4.3  3.8  100+ 173 -11 16  68  76S  92 222 113 +1.0 -1.5 +0.9-1.3 .457  -36.7      1  2 56.6   7 53 24 355.4 982.3
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R146 = epsilon Piscium
   Distance of 146 to Terminator = 5.8"; to 3km sunlit peak = 0.0"
24 Oct 19  3  2 39.9 r   75715cK0  7.3  6.7   96- 156     27  33  31S 186 337 200 +4.9 -5.3 -0.3+2.0 .291 -127.9      3  4 15.2  21 28 22 358.5 823.4
     75715 is double: ** 8.2 8.2 0.10" 222.0, dT = -0.28sec
     75715 has been reported as non-instantaneous (OCc 751). Observations are highly desired
24 Oct 20  6 11 53.9 R     616 F2  5.4  5.2v  89- 141     29 359  81S 244  64 253 +6.1 -6.7 +2.0+0.6 .396 -173.8      4 10 49.9  26 28 51 363.5 702.3
   R616 = 44 Tauri (IM)
       616 = IM Tau, 5.33 to 5.46, V, Type DSCT, Period 0.14497 days, Phase  36%
24 Oct 21  7 37 33.0 r     788 F0  6.8  6.4   80- 127     26 354  65S 237  62 240 +7.1 -7.4 +2.2+0.9 .334 -153.2      5 17 15.5  28 54 18 369.9 670.7
24 Oct 22  4 43 14.8 R     948 G8  4.3  3.8   71- 115     10  43  61N 298  78 296 +8.3 -7.5 +1.8-1.9 .351  143.3      6 15 22.7  29 29 53 377.1 800.1
   R948 = kappa Aurigae
24 Oct 22  7 59 23.6 r     967 F0  7.0  6.8   70- 114     26   3  71S 251  68 248 +7.8 -7.6 +2.4+0.4 .330 -157.9      6 21  4.1  29 22 18 376.3 649.4
24 Oct 22  8  4 39.3 R     968cA1  6.4        70- 114     26   2  72N 288 106 286 +7.8 -7.6 +2.3-0.4 .344  165.0      6 21 11.9  29 32 27 376.3 649.3
       968 is double: AB 6.54 9.03 0.069" 126.8, dT = +0.19sec
       968 is a close double. Observations are highly desired
24 Oct 23  7 12 29.7 r   79295 A2  7.2  7.1   60- 102     22  27  75S 262  57 254 +8.2 -7.5 +2.0-0.6 .349 -165.4      7 20 22.8  28  7 20 382.8 669.6
24 Oct 23  9 27  4.6 d    1122cG9  3.8  3.3   60- 101   4 28 356 -44S 143 327 135 +7.8 -7.4 +1.7-1.3 .278  -36.6 .01  7 25 43.6  27 47 53 382.7 642.8
   R1122 = iota Geminorum
24 Oct 23 10 39 20.1 R    1122cG9  3.8  3.3   59- 101  19 24 339  67S 254  94 246 +7.5 -7.3 +2.6+1.1 .297 -143.8 .01  7 25 43.6  27 47 53 383.4 685.5
   R1122 = iota Geminorum
24 Oct 25  7 52 32.5 r   80677kF0  7.6  7.5   40-  78     20  44  52N 326 108 310 +7.3 -6.2 +1.7-2.4 .297  144.8      9 10 30.0  21 40 17 393.9 694.5
24 Oct 29  7 50 27.5 r    1746KF2  7.0  6.8    9-  34      4  87  51N 335  99 313 +2.6 -1.2 +0.1-2.4 .391  144.9     12  8  0.6   0 37 17 405.6 938.6
24 Nov  3 22 52 14   Gr   2349SB1  2.9     v   5+  26  -5 19 ** GRAZE: CA-15.5N; Dist.175km in az. 152deg. [Lat =-36.43+0.44(E.Long+58.46)]
24 Nov  3 22 54 19   M    2349SB1  2.9     v   5+  26  -6 19 252 -16N   2 243 354 -5.6 +5.7 +9.9+9.9 .000   90.0     16 21 11.3 -25 35 34 396.1 922.9
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  15.4 : Aa,Ab 3.06 5.24 0.42" 206.2 : AB 2.9 8.4 20.2" 273.1
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  48%
24 Nov  4  0  1 13.5 d  184364kA1  9.2  8.9    5+  27      7 244  26N  44 279  35 -5.7 +5.7 -0.9+2.4 .357   48.1     16 24 25.5 -25 42 26 397.31030.6
24 Nov  5  0  7  4.2 d  185274kA2  8.7  8.6   11+  38     17 248  88N  98 337  94 -6.4 +6.2 +0.2+0.9 .501  -13.0     17 20  7.5 -27 46 23 393.1 979.8
24 Nov  5 18 42 41.6 d    2617cK0  4.6  4.1   17+  48  45 83  35  79N  83 230  83 -5.9 +6.6 +2.5+0.2 .328    7.8     18  8  5.0 -28 27 26 385.9 619.6
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = +0.26sec
      2617 is a close double. Observations are highly desired
24 Nov  5 23 23 25.4 d  186549 B8  8.3  8.4   18+  50 -11 36 258  48N  51 297  53 -6.8 +6.4 +0.2+2.2 .407   26.2     18 15 39.0 -28  4 48 387.7 853.8
24 Nov  5 23 34 15.7 d  186560 A0  8.7  8.7   18+  50     34 257  58N  61 306  62 -6.8 +6.4 +0.3+1.9 .443   16.6     18 16  7.6 -28  5 51 387.9 870.3
24 Nov  5 23 42 52.0 d  186569dK0  8.9  8.3   18+  50     32 256  70S 112 357 114 -6.8 +6.4 +1.1+0.5 .385  -34.9     18 16 28.9 -28 18 19 388.0 883.5
    186569 is double: AB 9.0 13.3 9.0" 151.2, dT = +18sec
    186569 is a close double. Observations are highly desired
24 Nov  6  0  3 17.3 d  186568 M0  8.5  7.7   18+  50     28 254  14N  17 260  19 -6.8 +6.4 -1.2+3.8 .239   60.6     18 16 27.9 -27 55 39 388.4 915.9
24 Nov  6  0 10 47.1 D    2644cF8  6.4  6.1   18+  50     27 253  62S 121   4 122 -6.8 +6.3 +1.0+0.2 .359  -43.2     18 17 23.8 -28 17 20 388.5 927.5
      2644 is double: ** 7.1 7.1 0.10"  90.0, dT = +0.24sec
      2644 has been reported as non-instantaneous (OCc 168). Observations are highly desired
24 Nov  6  0 11 44.9 d  186596 K0  8.7  8.2   18+  50     27 253  68S 115 358 116 -6.8 +6.3 +0.9+0.4 .392  -37.3     18 17 29.4 -28 15 53 388.5 928.9
24 Nov  6  0 13 11.1 d  186599cA0  8.3  8.2   18+  50     26 253  75N  78 321  79 -6.8 +6.3 +0.2+1.4 .494   -0.3     18 17 37.3 -28  6  2 388.5 930.9
    186599 is double: ** 9.4 9.4 0.10"  90.0, dT = +0.2sec
    186599 has been reported as non-instantaneous (OCc 119). Observations are highly desired
24 Nov  6  0 35 35.4 d  186598cB9  7.5  7.4   18+  50     22 250  11N  13 255  15 -6.8 +6.3 -1.5+3.9 .222   64.3     18 17 35.3 -27 51 56 388.9 967.3
    186598 is double: AB 8.0 9.0 0.63"  28.6, dT = +2.8sec
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    186598 is a close double. Observations are highly desired
24 Nov  6  0 40 49.4 d  186619 K7  8.6  7.7   18+  50     21 250  36N  38 279  40 -6.8 +6.3 -0.6+2.3 .398   39.6     18 18 14.1 -27 54 13 389.0 975.3
24 Nov  6  0 55  6.5 d  186635 B9  8.9  8.9   18+  50     19 248  60S 122   2 124 -6.9 +6.3 +0.7+0.2 .378  -44.4     18 19  3.2 -28 12 55 389.2 998.2
24 Nov  6  1 40 40.3 d  186680 A0  8.0  7.9   18+  51     10 243  63S 119 355 121 -6.9 +6.2 +0.2+0.3 .428  -40.8     18 20 55.7 -28  7  8 390.01070.4
24 Nov  6 18 53 51.7 D    2784cK1  3.3  2.7   25+  60  43 75  67  75S 102 222 108 -6.1 +6.6 +2.3-1.1 .325  -19.3 .01 19  6 56.4 -27 40 14 382.1 638.0
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 306.0, dT = -0.02sec
24 Nov  6 20 18 24.8 r    2784cK1  3.3  2.7   25+  61  25 82 324 -61S 237  91 243 -6.4 +6.5 +2.1+1.8 .325 -160.6 .01 19  6 56.4 -27 40 14 381.7 637.8
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 306.0, dT = -0.01sec
24 Nov  6 23 41 36.2 D    2805kF3  7.1  6.9   26+  62     43 264  26N  21 267  28 -7.0 +6.3 -0.4+3.4 .294   48.8     19 13 56.4 -26 52 35 383.0 831.0
24 Nov  7 23 43 24.2 d    2943 A4  8.4  8.2v  36+  74     52 274  29N  18 262  30 -6.9 +5.8 -0.1+3.3 .306   44.9     20 11 28.7 -24 13 37 377.9 791.5
      2943 = HD 191579, 8.342, range 0.02, 6w, Type VAR, Period 0.0726 days, Phase  68%
24 Nov  8 23  7 55.8 d  190029 K0  8.2  7.6   47+  86  -8 67 303  84S  80 307  95 -6.4 +5.0 +2.0+1.0 .373  -22.9     21  7 19.8 -20 29 59 372.4 730.9
24 Nov  8 23 35 37.2 D    3081 K3  6.5  5.9   47+  86     62 294   7N 350 223   6 -6.5 +5.0 -1.5+5.5 .167   66.4     21  6 41.5 -20 10 49 372.6 754.3
24 Nov  9  0 11 31.5 d  190037 K0  8.2  7.7   47+  87     55 285  19N   2 240  18 -6.5 +4.9 -0.6+3.8 .252   54.8     21  7 49.8 -20  2 10 372.9 789.4
24 Nov  9  0 24 51.3 D    3090 K0  6.7  6.2   47+  87     53 283  85S  78 317  94 -6.6 +4.8 +1.5+1.3 .414  -21.2     21  9 15.4 -20 11 35 373.0 803.7
   R3090 = 26 Capricorni
24 Nov 10  0 32  0.3 d  164837 K0  7.9  7.3   58+ 100     58 301  62S  97 324 116 -5.9 +3.7 +2.5+0.5 .308  -45.3     22  3 23.0 -14 57  6 367.8 781.0
24 Nov 10  1 30 28.2 d  164844 K5  7.4  6.6   59+ 100     47 287  62N  41 276  61 -6.0 +3.5 +0.7+2.1 .458   11.8     22  4 27.9 -14 26 49 368.4 836.6
24 Nov 10  3 22 57   d    3237cB8  4.3  4.3   59+ 101     24 269  -6N 333 211 353 -6.1 +3.3 -5.4+9.6 .056   84.1     22  6 26.2 -13 52 11 370.1 975.5
   R3237 = iota Aquarii
      3237 is double: ** 5.2 5.2 0.050"
      3237 has been reported as non-instantaneous (OCc1616). Observations are highly desired
24 Nov 10  3 26 12   Gr   3237cB8  4.3  4.3   59+ 101     22 ** GRAZE: CA-11.4N; Dist. 16km in az. 320deg. [Lat =-34.45+0.70(E.Long+58.46)]
24 Nov 10  3 28 51   r    3237cB8  4.3  4.3   59+ 101     23 269 -17N 322 200 341 -6.1 +3.3 +5.6-6.1 .056   95.9     22  6 26.2 -13 52 11 370.2 983.9
   R3237 = iota Aquarii
      3237 is double: ** 5.2 5.2 0.050"
      3237 has been reported as non-instantaneous (OCc1616). Observations are highly desired
24 Nov 13  2 27 18   m  109393 A3  7.7  7.6V  89+ 141     45 331  18S 140 344 162 -2.0 -1.5 +9.9+9.9 .000  -90.0      0 42 32.8   5 40 31 357.1 778.9
    109393 = HD 3992, 7.70, , Type ACV, Period 0.9898 days, Phase  94%
24 Nov 13  5 19  8.8 D      98 G8  6.0  5.5   90+ 142     18 292  78S  81 311 102 -2.3 -1.8 +0.9+1.4 .484  -22.2      0 47 23.6   6 44 27 359.4 910.6
   R98 = 60 Piscium
24 Nov 14  0 49 32.3 d     230SA3  7.3  7.2   95+ 154     40  21  66N  49 211  69 +0.0 -3.0 +1.3+0.8 .460    1.3      1 34 51.6  12 33 31 356.1 794.1
   R230 = 100 Piscium
       230 is quadruple: AB 7.3 8.3 15.7"  76.7, dT = +30sec : AC 7.3 13.6 77" 312.1, dT = -21sec : AD 7.3 11.6 125"   8.0, dT = +204sec
24 Nov 15  1 31 14.6 d     375cA5  6.8  6.7   99+ 168     33  23  85N  85 246 102 +1.9 -4.6 +2.1-0.4 .396  -30.3      2 33 36.5  18 52 48 356.9 794.2
       375 is double: ** 7.6 7.6 0.10"  90.0, dT = +0.25sec
       375 has been reported as non-instantaneous (OCc1189). Observations are highly desired
   Distance of 375 to Terminator = 19.2"; to 3km sunlit peak = 8.1"
24 Nov 15  4 46 31.7 d   93033SK0  7.2  6.4   99+ 169     30 330  62N  66 272  83 +1.5 -5.0 +1.8+1.2 .437   -3.1      2 38 37.3  19 43 40 357.4 758.6
      93033 is triple: **Aa,Ab 7.5 8.5 0.30"  70.0, dT = +0.7sec : AB 7.2 14.4 45"  57.7, dT = +102sec
      93033 has been reported as non-instantaneous (OCc 312). Observations are highly desired
   Distance of 93033 to Terminator = 12.5"; to 3km sunlit peak = 3.5"
24 Nov 15  6 48  0.0 d     399SA0  5.7  5.8   99+ 170     13 306  78N  85 310 101 +1.3 -5.1 +1.0+1.2 .478  -14.3      2 42 21.9  20  0 41 359.3 860.0
   R399 = mu Arietis
       399 is multiple: Ba,Bb 12.4 14.5            : B     2.4 0.004" 189.0, dT = 0.00sec : Aa,Ab 5.7 6.2 0.025" 125.3, dT = +0.04sec : AB 5.7 12.2
18.6" 264.9, dT = -39sec
```

Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2, Latitude -34 38 32.3, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       399 is a close double. Observations are highly desired
   Distance of 399 to Terminator = 13.3"; to 3km sunlit peak = 4.0"
24 Nov 20  5 45  8.0 R    1189cA3  5.0  4.9   77- 122     22  30  54N 313 106 303 +7.6 -7.0 +2.1-1.8 .315  148.5      7 53 29.8  26 45 57 381.1 682.0
   R1189 = phi Geminorum
      1189 is double: AB 5.0      0.006"  18.8, dT = -0.01sec
24 Nov 23  6  2 14.2 r   99123 K0  7.3  6.5   48-  87     14  62  51N 330 101 310 +6.1 -4.2 +1.0-2.5 .338  146.2     10 26 45.2  13 37 35 397.6 783.1
24 Nov 23  7 37 37.6 r   99149 A2  7.1  7.0   47-  87 -11 30  45  66N 315  99 295 +5.8 -4.1 +1.5-2.1 .351  167.4     10 28 42.4  13 17 20 396.2 690.4
24 Nov 24  6 19 50.0 r  118702 K5  7.5  6.6s  38-  76     13  71  69S 272  41 251 +4.9 -2.9 +0.8-1.4 .375 -152.7     11 10 30.8   7 53 30 400.9 820.6
    118702 = NSV 18681, 7.56 to 7.62, Hp
24 Nov 24 14  1 49.5 d    1644 B9  4.1  4.1   36-  74  64 31 304 -86N 109 332  88 +3.3 -2.0 +1.4+0.3 .368   20.4     11 21  8.2   6  1 46 399.9 760.6
   R1644 = Shang Tseang = sigma Leo
24 Nov 24 15 10 42.8 r    1644 B9  4.1  4.1   36-  74  75 19 291  57N 326 197 305 +3.1 -1.9 +0.3-0.9 .404  159.6     11 21  8.2   6  1 46 401.3 838.4
   R1644 = Shang Tseang = sigma Leo
24 Nov 26  7  0  6.6 r  138861kK5  7.9  7.2   21-  54     13  86  72S 276  40 254 +2.1 -0.1 +0.4-1.4 .413 -153.4     12 35 27.6 - 3 32 46 403.9 904.3
24 Nov 28  7 29 19.0 r  158302kK0  9.0  8.4    8-  33      9 102  78S 275  39 257 -0.7 +2.5 +0.0-1.3 .474 -155.8     14  2 34.2 -14 21 26 402.71015.1
24 Dec  2 23 57 12.0 D    2601SK4  6.8         3+  20 -12  6 241  57N  69 303  69 -5.7 +6.1 -0.5+1.3 .572   11.6     18  2 54.3 -27 49 36 390.01103.8
   R2601 = 7 Sagittarii
      2601 is triple: Aa,Ab 6.90 9.37 0.33" 345.0, dT = +0.06sec : AB 6.9 13.0 9.7"  47.7, dT = +16sec
      2601 is a close double. Observations are highly desired
24 Dec  5 23 59 11.8 D  189827 A3  8.0  7.9   22+  56 -12 34 267  76N  62 304  77 -5.6 +4.7 +0.4+1.7 .502   -1.8     20 54 43.6 -20 56 58 377.2 919.6
24 Dec  6  2 10 34.7 d    3068cG2  8.2  7.9   23+  57      8 251  89N  75 311  90 -5.6 +4.5 -0.2+1.3 .593  -10.2     20 59 24.3 -20 26 40 379.61108.8
      3068 is double: ** 7.9 10.4 0.047" 326.0, dT = -0.03sec
      3068 has been reported as non-instantaneous (OCc 668). Observations are highly desired
24 Dec  6 23 16 23.4 D    3190SA5  2.9  2.8e  32+  68  -4 50 287  65N  46 281  64 -5.1 +3.7 +0.8+2.1 .446    7.7     21 47  2.4 -16  7 38 372.7 814.2
   R3190 = Deneb Algedi = delta Capricorni
      3190 is triple: AB 2.9 15.0 45"  51.0, dT = +100sec : AC 2.9 13.1 168" 306.1, dT = -66sec
      3190 = del Cap, 2.81 to 3.05, V, Type EA, Period 1.0227688 days, Phase   8%
24 Dec  6 23 40  3.8 d  164659 G3  8.1  7.7   32+  68  -8 45 283  80N  61 298  80 -5.1 +3.7 +1.0+1.8 .461   -6.8     21 47 50.3 -16  4 47 373.0 840.0
24 Dec  7  0 23 32.6 R    3190SA5  2.9  2.8e  32+  69     36 275 -82S 243 122 262 -5.2 +3.6 +0.7+1.7 .489  172.4     21 47  2.4 -16  7 38 373.7 894.4
   R3190 = Deneb Algedi = delta Capricorni
      3190 is triple: AB 2.9 15.0 45"  51.0, dT = +89sec : AC 2.9 13.1 168" 306.1, dT = -158sec
      3190 = del Cap, 2.81 to 3.05, V, Type EA, Period 1.0227688 days, Phase   8%
24 Dec  7 23 36 57.3 d  165215KG0  8.2  7.9   42+  81  -8 51 301  47N  25 251  46 -4.4 +2.3 +0.6+2.4 .401   25.2     22 38 57.6 -10  6  8 369.4 793.8
24 Dec  7 23 51 46.5 D    3324KG0  6.9  6.6   43+  81 -10 49 297  45N  23 251  44 -4.5 +2.3 +0.5+2.5 .397   28.1     22 39 16.0 -10  1 40 369.5 806.7
   R3324 = 64 Aquarii
24 Dec  9  1 48 59.0 d    3470kA0  7.1  7.0   55+  95     31 290  71N  48 278  69 -3.8 +0.5 +0.7+1.9 .485    6.2     23 32 55.4 - 3  1  0 367.8 869.9
24 Dec  9 23 21 51.9 d      40 M0  7.5  6.7v  65+ 108  -5 52 350  90N  67 255  89 -2.5 -0.8 +2.0+1.0 .400  -19.2      0 20  9.5   3  2  1 363.7 747.7
        40 = BZ Psc, 7.563, range 0.08, 4w, Type SRB:, Period 19.1 days, Phase  87%
24 Dec 10  0 18 18.4 d  109153 K0  8.1  7.5   65+ 108     48 330  43N  20 225  42 -2.6 -1.0 +0.8+2.3 .376   29.0      0 20 43.6   3 26 58 364.0 759.5
24 Dec 10  2  7  1.0 d  109180SK0  7.9  7.4   66+ 109     32 302  81S  77 301  98 -2.8 -1.2 +1.4+1.4 .432  -22.5      0 23 57.0   3 45 40 365.1 828.2
    109180 is triple: **Aa,Ab 8.8 8.8 0.10"  35.0, dT = +0.17sec : AB 8.9 13.0 50" 290.1, dT = -96sec
    109180 has been reported as non-instantaneous (OCc 951). Observations are highly desired
24 Dec 14  2 34 46.4 D     616 F2  5.4  5.2v  98+ 162     29 360  69N  76 256  86 +2.9 -6.7 +2.1+0.3 .398   -5.2      4 10 49.9  26 28 51 363.8 704.9
   R616 = 44 Tauri (IM)
       616 = IM Tau, 5.33 to 5.46, V, Type DSCT, Period 0.14497 days, Phase  88%
24 Dec 17  3 47 38.5 d    1122cG9  3.8  3.3   96- 156     23  26 -83N  78 234  70 +6.1 -7.1 +1.9-0.4 .356   20.1      7 25 43.6  27 47 53 375.8 691.3
   R1122 = iota Geminorum
24 Dec 17  4 29 58.5 R    1119 F0  5.8  5.6V  96- 156     26  16  81S 257  62 249 +6.0 -7.1 +2.3-0.1 .335 -155.7      7 24 33.5  27 38 16 375.6 670.4
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Occultation prediction for Ricardo Sanchez Observatorio
E. Longitude - 58 27 33.2,  Latitude -34 38 32.3,  Alt.    2m;  Telescope dia 15cm;  dMag 0.0
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1119 = 59 Geminorum          1119 = HD 57927, 5.77, , Type DSCT
24 Dec 17  5  6 54.9 R    1122cG9  3.8  3.3   96- 156     27   7  52N 304 117 296 +5.9 -7.1 +2.1-1.0 .343  160.0      7 25 43.6  27 47 53 375.6 664.2
   R1122 = iota Geminorum
24 Dec 17  7  0  7.6 r    1132cK2  6.4  5.7   95- 155     25 340  61N 296 134 287 +5.5 -7.0 +1.7-0.1 .387  174.9      7 28 39.9  27 33 11 376.2 709.1
      1132 is double: ** 7.4 7.4 0.10"  90.0, dT = +0.23sec
      1132 has been reported as non-instantaneous (OCc 157). Observations are highly desired
24 Dec 18  6 35 31.2 r    1263DF0  6.9  6.8S  90- 143     31 359  52N 316 136 302 +6.0 -6.4 +1.7-1.1 .341  160.7      8 26 39.8  24 32  3 380.8 666.8
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.7"  51.8, dT = +1.8sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Dec 18  8  8 42.8 R    1270cF0  6.1  5.9v  90- 142  -6 27 336  82N 286 128 272 +5.7 -6.2 +1.8+0.2 .380 -166.2      8 28 36.8  24  8 42 381.5 723.3
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Dec 20  3 45 36.8 r    1479 F2  6.4  6.2   75- 120     11  62  50N 329  99 309 +6.0 -4.5 +1.0-2.5 .347  145.1     10  5 40.9  15 45 27 392.6 806.2
24 Dec 20  5 24  6.4 r    1485 G0  7.1  6.8   75- 120     27  45  50S 249  32 229 +5.8 -4.4 +2.3-0.4 .232 -128.7     10  7 39.3  15  9 27 391.2 704.7
24 Dec 25  6  5 13.9 R    1971SG8  5.5        28-  64     15  95  35N 345 108 326 -0.2 +2.3 -0.4-2.5 .352  136.4     13 45 56.3 -12 25 36 402.2 947.6
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.88" 305.2, dT = -1.9sec : AC 5.7 11.9 27.4" 162.6, dT = +78sec
      1971 is a close double. Observations are highly desired
24 Dec 26  6 54 22.4 r    2081 A2  8.5  8.4   20-  53     20  99  31S 227 348 210 -1.5 +3.6 +2.0+1.0 .142 -106.7     14 32 21.8 -17 52 52 400.0 954.9
24 Dec 28  7 33 28   Gr   2332wB8  6.1  6.0V   7-  31     13 ** GRAZE: CA 17.5S; Dist. 85km in az.  39deg. [Lat =-33.66-0.67(E.Long+58.46)]
24 Dec 28  7 34 48   M    2332wB8  6.1  6.0V   7-  31     13 112  18S 201 323 191 -3.3 +5.3 +9.9+9.9 .000  -90.0     16 14 53.4 -25 28 37 394.41052.4
      2332 is double: AB 6.1 9.9 46"  35.7
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  28%
24 Dec 28  8  4 41.8 r  184267KG8  7.7  7.3    7-  30  -7 18 108  37N 326  86 316 -3.3 +5.4 -0.5-2.1 .436  145.9     16 15 46.9 -25  7 18 393.81005.9
24 Dec 28  9 57 55.1 D    2349SB1  2.9     v   6-  30  13 40  96 -66N  68 183  59 -3.5 +5.6 +1.7-0.4 .309   45.7     16 21 11.3 -25 35 34 391.4 840.3
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.003" 134.5, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 206.0, dT = -1sec : AB 2.9 8.4 20.2" 273.1, dT = -59sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  61%
24 Dec 28 10 47 49.0 R    2349SB1  2.9     v   6-  29  23 51  90  22N 340  94 331 -3.6 +5.7 -0.1-3.4 .284  134.2     16 21 11.3 -25 35 34 390.4 771.7
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.003" 134.5, dT = +0.01sec : Aa,Ab 3.06 5.24 0.42" 206.0, dT = +1sec : AB 2.9 8.4 20.2" 273.1, dT = -28sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  61%
24 Dec 28 15 21 16.9 D    2366dM1  1.1  0.1v   6-  28  76 70 287 -77S 103 345  95 -4.5 +6.0 +2.3-0.1 .338   -2.5 .13 16 29 24.5 -26 25 55 388.7 637.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  58%
24 Dec 28 16 47 43.0 R    2366dM1  1.1  0.1v   6-  27  74 52 270  87N 272 160 264 -4.8 +6.0 +1.6+0.9 .374 -177.1 .12 16 29 24.5 -26 25 55 389.4 706.4
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -7sec
      2366 is a close double. Observations are highly desired    2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  58%
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Lunar Occultation predictions
Chicago Astronomer Observatory
Chicago
USA

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  1  6 57  1   Gr   1576 A2  5.3  5.3   75- 120     40 ** GRAZE: CA 10.7S; Dist. 55km in az.  15deg. [Lat = 42.36-0.21(E.Long+87.67)]
24 Jan  1  6 57  5   M    1576 A2  5.3  5.3   75- 120     39 115  11S 211 255 190 +0.3 -4.1 +9.9+9.9 .000  -90.0     10 49 15.4  10 32 43 400.8 732.8
   R1576 = 53 Leonis
24 Jan  3 10 12 51.1 R    1770 A5  5.9  5.8   56-  97     45 156  37N 346   4 324 -2.9 -1.4 +0.6-2.2 .296  145.4     12 18 40.3 - 0 47 14 398.5 695.8
   R1770 = 13 Virginis
24 Jan  4  8 29 41.5 r    1865 A2  7.3  7.2   47-  87     23 122  60N 322   2 301 -3.7 -0.2 +0.6-0.6 .404  164.2     12 59  0.2 - 6  5 27 397.9 809.3
24 Jan  5 10 29  6.8 r  158148 K2  8.0  7.4   37-  75     28 143  58S 259 286 240 -5.0 +1.5 +2.4+1.8 .259 -130.5     13 45 37.2 -12 23  3 393.0 759.4
24 Jan  5 10 44 49.3 R    1971SG8  5.5        37-  75     30 147  63S 264 288 245 -5.1 +1.5 +2.3+1.3 .279 -135.3     13 45 56.3 -12 25 36 392.8 747.5
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1, dT = -2.4sec : AC 5.7 11.9 27.4" 162.6, dT = +19sec
      1971 is a close double. Observations are highly desired
24 Jan  7 10 38 31.4 r X 39461pK0  7.5  7.0   19-  52     10 131  27N 345  22 332 -6.0 +4.2 -0.3-1.2 .328  134.7     15 25 22.6 -21 55 45 384.4 869.4
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +26sec : AC 7.9 13.5 40" 190.5, dT = +108sec
   X 39461 is a close double. Observations are highly desired
24 Jan  7 10 44 35.3 r    2204kK0  7.7  7.1   19-  52     10 132  64N 308 344 295 -6.0 +4.2 +0.5+0.2 .458  172.0     15 24 57.6 -22  2 37 384.3 861.9
24 Jan  7 11 57 32.2 r  183474kK0  8.1  7.5   19-  51     19 147  71S 262 288 250 -6.2 +4.4 +1.9+1.3 .334 -142.2     15 26 44.6 -22 30 20 383.1 784.8
24 Jan  8 14 10 33.5 D    2366dM1  1.1  0.1v  11-  38   7 20 166 -85N  88 100  80 -6.3 +5.8 +2.0+0.5 .368   22.5 .12 16 29 24.5 -26 25 55 376.5 727.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 26 49.7 R    2366dM1  1.1  0.1v  10-  38  17 22 184  53N 310 307 302 -6.5 +5.9 +1.7-0.8 .354  157.3 .12 16 29 24.5 -26 25 55 376.1 700.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan 13 23 40  2.8 D  164829DA0  7.1  7.0e   8+  34 -11 16 229  63S 103  67 123 -0.2 +5.7 +1.5-1.8 .360  -46.8     22  2 26.2 -16 57 53 360.8 921.9
    164829 is double: AB 7.2 7.2 3.8" 247.1, dT = -8sec
    164829 has been reported as non-instantaneous (S   802). Observations are highly desired
    164829 = DX Aqr, 6.34 to 6.76, V, Type EA, Period 0.9450106 days, Phase  97%
24 Jan 13 23 40 10.7 D    3228SA0  7.2  6.7    8+  34 -11 16 229  63S 104  67 123 -0.2 +5.7 +1.5-1.8 .360  -46.9     22  2 26.5 -16 57 52 360.8 922.1
   R3228 = 29 Aquarii (DX)
      3228 is triple: BA 7.2 7.2 3.8"  67.1, dT = +8sec : AC 7.2 13.0 144" 291.0, dT = -395sec
      3228 has been reported as non-instantaneous (S   802). Observations are highly desired
24 Jan 16  0 28 20.1 d  146937kG0  8.6  8.0   26+  61     34 226  89S  69  37  91 +2.9 +3.0 +1.3-0.2 .457  -16.7     23 51 32.6 - 3 30 31 363.1 839.6
24 Jan 16  0 29 22.2 d  146938kF8  8.3  8.0   26+  61     34 226  87N  64  32  86 +2.9 +3.0 +1.2-0.1 .466  -12.2     23 51 32.3 - 3 29  0 363.1 840.4
24 Jan 16  0 33 27.7 d  146936 K5  7.9  7.2   26+  61     34 227  71N  49  16  71 +2.9 +3.0 +1.0+0.4 .478    3.0     23 51 28.9 - 3 24 14 363.2 843.3
24 Jan 16  1 26 55.2 D    3514cG9  5.9  5.4   26+  62     26 239  75N  53  13  75 +2.8 +2.9 +0.8+0.1 .503    1.5     23 52 55.6 - 3  9 20 364.0 888.2
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9, dT = +0.18sec
      3514 is a close double. Observations are highly desired
24 Jan 16  2 19  5.2 d  146969 F8  8.4  8.1   27+  62     18 249  86S  72  27  94 +2.7 +2.8 +0.6-0.7 .513  -15.1     23 54 34.8 - 2 58 47 365.0 941.4
24 Jan 18  0 23 34.1 d  109947 K0  7.8  7.2   48+  88     57 202  15N 353 337  13 +5.0 -0.2 -0.3+4.2 .213   59.4      1 31 53.2   9 59 18 368.7 749.4
24 Jan 18  2 45 27.0 d     232 K0  8.1  7.4   49+  89     39 246  28N   7 322  26 +4.7 -0.5 +0.6+2.9 .274   52.7      1 35 33.4  10 33 42 370.5 812.6
24 Jan 19  0 15 55.4 d     353cF0  7.9  7.7v  59+ 101     64 175  56S 106 110 123 +5.6 -1.8 +2.9-0.9 .259  -50.3      2 24 27.2  15 31 30 372.4 731.6
       353 is double: ** 8.6 8.6 0.050"
       353 has been reported as non-instantaneous (OCc1185). Observations are highly desired
       353 = ASAS J022427+1531.5, 7.87, range 0.04, V, Type MISC, Period 0.120914 days, Phase  37%
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan 19 20 35 25.1 d     465 K2  4.4  3.8s  68+ 112  18 29  89  69S  97 149 111 +6.4 -2.7 +0.7+1.2 .424  -35.2      3 11 37.8  19 43 36 378.5 953.0
   R465 = Botein = delta Arietis
       465 = NSV 1066, 4.33 to 4.37, V
24 Jan 19 23 32 45.1 d   75820 A0  8.1  8.0   69+ 113  -8 60 127  31N  17  57  31 +6.1 -3.1 +0.3+3.1 .310   42.0      3 15 53.3  20 42  8 376.6 760.4
24 Jan 20  2 41 29.6 d X 65442C    8.1  7.9e  70+ 114     63 227  79N  65  29  79 +5.6 -3.4 +1.8+0.4 .386    1.0      3 21 13.6  21  8 49 377.0 705.4
   X 65442 is double: BA 8.1 5.3 0.9"  32.6, dT = +2.1sec
   X 65442 is a close double. Observations are highly desired
   X 65442 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  2 41 32.1 D     486CB5  5.3     e  70+ 114     63 227  79N  65  29  79 +5.6 -3.4 +1.8+0.4 .386    1.1      3 21 13.6  21  8 49 377.0 705.4
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6, dT = -2.1sec
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 23  6 19 38.9 d   78191 A0  7.7  7.7   94+ 151     59 255  65N  75  20  73 +4.7 -6.0 +1.8-0.4 .352   23.3      6 17 59.9  28  0 24 388.6 721.5
24 Jan 24  4 54 53.2 d X 99111S    7.2  7.0s  98+ 162     76 182  68N  90  89  83 +4.5 -6.3 +2.2+0.0 .338   10.9      7 12 49.0  27 13 30 390.8 651.5
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +1.9sec : BC 7.3 12.7 14.0"  68.0, dT = +38sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  4 54 53.2 D    1093SF8  6.6     s  98+ 162     76 182  68N  90  89  83 +4.5 -6.3 +2.2+0.0 .338   10.9      7 12 49.0  27 13 30 390.8 651.5
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -1.9sec : AC 7.2 12.8 13.7"  74.4, dT = +39sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  8  0 20.9 D    1105cG7  6.5        98+ 163     50 263  45S 158 102 150 +3.9 -6.2 -0.1-3.6 .266  -49.6      7 17  3.4  26 41 22 392.4 782.3
      1105 is double: AB 7.00 7.70 0.20" 236.3, dT = +0.15sec
      1105 is a close double. Observations are highly desired
24 Jan 24  8 58  8.1 d    1108cG8  7.0  6.5   98+ 163     39 273  60N  84  27  76 +3.8 -6.1 +1.0-1.2 .406   24.8      7 19 30.8  26 49 23 393.4 853.7
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.24sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 52  4.1 d    1206 G8  5.9  5.3   99+ 171     30  82  30N  74 129  63 +4.6 -6.2 +0.3+1.9 .419   20.3      8  0 55.9  25 23 34 396.0 857.9
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 2.7"; to 3km sunlit peak = 0.0"
24 Jan 25  1 31 22.1 d    1211SA1  6.3  6.3   99+ 172     37  88  79S 146 202 135 +4.5 -6.2 +1.5-1.3 .268  -50.4      8  1 43.8  25  5 22 395.5 805.3
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.3, dT = -82sec : AC 6.3 11.6 106" 295.0, dT = -337sec
   Distance of 1211 to Terminator = 9.7"; to 3km sunlit peak = 1.8"
24 Jan 27  8  8 11.8 r   98792wK2  7.8  7.0   98- 162     63 207  66S 255 233 236 +1.5 -4.9 +3.0+0.4 .225 -129.2      9 49 52.8  16 50 18 398.5 689.3
     98792 is double: AB 7.9 11.1 25.3" 320.7, dT = -45sec
24 Jan 29  9 24 15.5 d    1644 B9  4.1  4.1   88- 140     53 198 -18S 183 169 161 -1.1 -2.7 -0.2-3.5 .222  -51.3     11 21  8.2   6  1 46 400.7 689.7
   R1644 = Shang Tseang = sigma Leo
24 Jan 29 10 15 37.1 R    1644 B9  4.1  4.1   88- 140     48 217  58S 259 232 238 -1.3 -2.6 +2.8-0.5 .230 -128.8     11 21  8.2   6  1 46 401.0 712.2
   R1644 = Shang Tseang = sigma Leo
24 Jan 31  9 32 18.1 r  138955 K2  7.2  6.5   74- 118     43 172  44N 339 345 317 -3.7 -0.1 +0.8-1.9 .316  153.2     12 45 32.0 - 4 48 39 399.3 686.9
24 Feb  2 11 10 52.2 r    2040cK0  8.0  7.3   55-  95     32 178  67N 313 315 295 -6.2 +2.9 +1.5-0.9 .356  173.3     14 15 50.2 -16  4 53 393.4 684.4
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.21sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4  9  0 26.2 R    2269cB5  5.4  5.4   35-  73      5 130  78S 268 308 258 -7.0 +5.2 +1.0+1.4 .414 -151.8     15 53 53.9 -24 31 59 386.1 879.7
24 Feb  4 11 35 22.7 R    2286kB5  5.4  5.5v  35-  72     21 161  53N 317 333 307 -7.3 +5.5 +1.1-0.4 .362  158.8     15 58 34.9 -24 49 53 383.8 722.5
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb  5 10 51 37.5 r  184783 G6  7.9  7.4   25-  60     10 142  77S 260 292 255 -7.1 +6.3 +1.5+1.4 .386 -150.6     16 54 49.6 -27 44 55 379.0 814.2
24 Feb  6 11 36 11   m  186041 K0  7.1  6.5   16-  47      6 140  16S 191 224 191 -6.6 +7.1 +9.9+9.9 .000  -90.0     17 59 14.9 -29 23 24 372.9 830.7
24 Feb 12  0  4  3.2 d  146740 K0  8.7  8.2    6+  28  -9 16 246  47S 115  71 137 +1.4 +3.3 +1.3-3.1 .290  -58.8     23 29 58.2 - 6 15 51 357.7 971.4
24 Feb 13  1  4 51.4 d  109178 K0  8.9  8.3   13+  43     20 254  27N   5 319  27 +3.1 +1.5 +0.2+2.2 .330   52.7      0 23 55.0   1 32 19 360.5 950.6
24 Feb 13  1 10 19.9 D  109182 G0  7.8  7.4   13+  43     19 255  38N  16 330  38 +3.1 +1.5 +0.3+1.5 .405   42.2      0 24 17.3   1 33 22 360.6 956.4
24 Feb 13 22 53 28.4 d     180SA7  5.2  5.1S  21+  55   4 52 214  67S  91  66 111 +4.8 +0.1 +2.1-0.7 .353  -37.8      1 13 43.9   7 34 31 361.5 784.6
   R180 = zeta Piscium A
       180 is triple: Aa,Ab 5.6 6.4 0.20"       : AB 5.2 6.3 22.8"  62.9, dT = +57sec
       180 is a close double. Observations are highly desired
       180 = NSV 15259, 5.31,
24 Feb 13 23 51 47.5 r     180SA7  5.2  5.1S  22+  56  -6 44 232 -39S 197 161 218 +4.7 +0.0 +0.7+1.9 .364 -142.1      1 13 43.9   7 34 31 362.2 811.5
   R180 = zeta Piscium A
       180 is triple: Aa,Ab 5.6 6.4 0.20"       : AB 5.2 6.3 22.8"  62.9, dT = +44sec
       180 is a close double. Observations are highly desired
       180 = NSV 15259, 5.31,
24 Feb 14  2 24 27.9 d     193cK0  7.9  7.4   23+  57     19 264  49S 109  60 130 +4.5 -0.3 +0.5-2.4 .369  -46.5      1 19 28.3   8 23 47 365.1 949.3
       193 is double: ** 8.7 8.7 0.10" 133.0, dT = +0.25sec
       193 has been reported as non-instantaneous (OCc 712). Observations are highly desired
24 Feb 17  0 25 59.8 D   76358kB9  7.2  7.2   54+  95     72 196  68N  57  44  67 +6.9 -4.5 +1.8+1.3 .369   11.6      3 58 20.9  24  4 52 376.8 688.2
24 Feb 17  4 10 50.6 D     598SG0  5.5  5.0S  55+  96     38 270  23S 146  91 156 +6.3 -4.6 -0.1-5.3 .189  -65.0      4  4 21.7  24  6 22 379.7 825.5
   R598 = 36 Tauri
       598 is triple: Aa,Ab 5.5 5.5 0.020"  84.8, dT = +0.05sec : AB 5.5 12.2 25.7" 258.0, dT = -51sec
       598 is a close double. Observations are highly desired
       598 = NSV 15883, 5.47,
24 Feb 17  4 27 47   Gr    598SG0  5.5  5.0S  55+  96     33 ** GRAZE: CA -2.2S; Dist.176km in az. 200deg. [Lat = 40.16-0.27(E.Long+87.67)]
   Distance of 598 to Terminator = 5.8"; to 3km sunlit peak = 0.0"
24 Feb 18  6  2 16.6 d   76945 A2  7.5  7.4   66+ 109     29 281  13S 163 108 168 +6.1 -5.5 -1.7-6.2 .144  -72.6      5  4 50.1  26 43 15 386.0 901.9
24 Feb 18  6 41 11.5 d   76965cG   7.6  7.2   66+ 109     22 287  86N  83  29  87 +6.0 -5.4 +0.3-1.1 .504    8.8      5  7  5.1  26 59 45 386.7 956.4
     76965 is double: ** 9.1 9.1 0.050"
     76965 has been reported as non-instantaneous (OCc1253). Observations are highly desired
24 Feb 19  4 24 32.7 D   77818 K5  6.7  5.8   75+ 120     57 257  77N  80  24  80 +6.0 -6.1 +1.7-0.6 .369   15.8      6  0  4.9  28  7 33 387.8 722.1
24 Feb 20  7  4  5.7 d    1067cK2  7.1  6.4   84+ 133     38 275  27S 163 106 157 +5.1 -6.2 -0.7-3.7 .247  -56.6      7  0 58.1  27  9 26 393.5 857.7
      1067 is double: ** 8.0 8.0 0.10"  90.0, dT = +0.12sec
      1067 has been reported as non-instantaneous (OCc1341). Observations are highly desired
24 Feb 21  0 16 48.6 d   79672DK5  7.6        89+ 142  -9 46  95  57S 139 195 129 +5.6 -6.4 +1.7-1.1 .282  -43.4      7 45 32.1  25 59 19 395.0 744.9
     79672 is double: AB 7.58 11.58 2.70" 228.3, dT = +0.12sec
     79672 is a close double. Observations are highly desired
24 Feb 21  9 54 56.1 d    1211SA1  6.3  6.3   91+ 145     16 290  46N  64  13  53 +4.1 -5.9 +0.3-0.8 .367   46.4      8  1 43.8  25  5 22 399.01030.9
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.3, dT = +98sec : AC 6.3 11.6 106" 295.0, dT = -182sec
24 Feb 26  9 47 29   D    1712SF8  3.6  3.3   97- 160     38 230  13S 214 179 192 -1.7 -1.5 +9.9+9.9 .036  -84.6 .04 11 50 41.7   1 45 53 402.2 743.3
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2 : AC 3.7 9.6 406"  78.5
   Distance of 1712 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Feb 26  9 52  3   Gr   1712SF8  3.6  3.3   97- 160     37 ** GRAZE: CA 17.9S; Dist. 12km in az. 236deg. [Lat = 41.65-1.11(E.Long+87.67)]
   Distance of 1712 to Terminator = 8.0"; to 3km sunlit peak = 0.6"
24 Feb 26  9 55 19   R    1712SF8  3.6  3.3   97- 160     37 232  23S 224 188 202 -1.7 -1.5 +9.9+9.9 .036  -95.4 .04 11 50 41.7   1 45 53 402.3 748.6
   R1712 = Zavijava = beta Virginis
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1712 is triple: AB 3.7 11.6 337" 286.2 : AC 3.7 9.6 406"  78.5
   Distance of 1712 to Terminator = 9.7"; to 3km sunlit peak = 1.6"
24 Feb 29  8 10 14.2 r    2002 K0  6.8  6.3   80- 127     32 161  30N 352   6 333 -5.1 +2.5 +0.2-1.9 .268  137.0     13 58 29.8 -14  7 19 397.7 706.2
24 Mar  1 11 58  4.3 r    2115 A6  7.2  7.1   71- 115  -6 23 210  82N 296 273 281 -6.8 +4.2 +1.7-1.4 .358 -180.0     14 49 27.7 -19 54 13 394.6 684.4
24 Mar  2 11 19 50.7 R    2237cK3  5.0  4.3s  62- 104     24 188  20N 355 348 343 -7.4 +5.4 +0.6-2.4 .174  119.5 .02 15 40 16.9 -23 49  5 390.1 666.0
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.04sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  7 45 59.1 R    2366dM1  1.1  0.1v  53-  93      4 131   9N   0  39 353 -7.2 +6.1 -1.6-2.9 .175  112.4 .25 16 29 24.5 -26 25 55 387.9 865.9
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -1.8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar 13  1  2 57.5 d X  2509 K0  9.1  8.6   10+  37     22 267  80N  58   8  77 +4.1 -1.3 +0.5-0.2 .538    7.3      1 47 49.8  12 16  4 361.6 951.8
24 Mar 14  3  8 55.0 d   93106 K5  7.9  7.1   19+  51     13 284  84S  77  27  93 +5.4 -3.0 +0.1-0.9 .571   -3.1      2 47 33.2  18 30 37 368.41022.1
24 Mar 14  3 54 53.2 d   93126 G5  7.9  7.4   19+  52      5 291  73N  54   7  70 +5.4 -3.0 +0.0-0.2 .566   21.0      2 49 11.9  18 43 47 369.41086.4
24 Mar 15  0 25  2.6 D     524kA0  6.7  6.7   27+  63  -6 54 250  36S 129  79 141 +6.5 -4.3 +1.6-3.8 .234  -56.2      3 38 40.7  22 39 35 370.0 754.0
24 Mar 15  0 46 13.0 D   76056kA0  7.8  7.8   27+  63 -10 51 255  68S  97  45 109 +6.4 -4.3 +1.4-1.4 .394  -23.0      3 39 32.9  22 50 24 370.3 769.5
24 Mar 15  3 38 34.4 d   76144pG0  8.5  8.1   28+  64     20 284  84S  82  30  94 +6.2 -4.3 +0.2-1.1 .536   -1.3      3 45 22.4  23 12 17 373.8 972.5
     76144 is double: AB 8.5 10.8 57" 141.1, dT = +55sec
24 Mar 15  3 49 59.1 D   76156pA0  6.9  6.9   28+  64     18 286  68S  98  46 110 +6.2 -4.3 +0.0-1.5 .521  -17.2      3 45 48.8  23  8 50 374.1 988.8
     76156 is triple: AB 6.9 10.1 3.2" 339.0, dT = -3sec : AC 6.9 16.5 16.6" 153.4, dT = +18sec
     76156 is a close double. Observations are highly desired
24 Mar 15  4 56  1.2 D     556pB8  5.4  5.5S  29+  65      7 295  72N  58  11  69 +6.2 -4.3 +0.0-0.4 .544   23.8      3 48 20.8  23 25 17 375.51083.4
       556 is triple: Aa,Ab 5.7 7.7 0.10"       : AB 5.4 14.1 177" 298.3, dT = -161sec
       556 is a close double. Observations are highly desired
       556 = NSV 1321, 5.44, , Type EA, Period 2.2663 days, Phase  47%
24 Mar 17  0 28 32.4 d   77314 B8  8.2  8.1   48+  88  -6 74 214  62S 116  88 118 +7.2 -6.1 +2.0-1.7 .313  -29.8      5 36 39.8  27 54 42 381.2 665.6
24 Mar 17  3  4 49.1 d   77383 F5  8.2  8.0   49+  89     49 266  26S 152  95 153 +6.7 -6.1 +0.0-4.5 .222  -57.8      5 40 40.3  27 47  7 383.1 776.4
24 Mar 17  4 49 21.5 d     868SA0  7.5  7.5   50+  90     30 282  34S 144  89 145 +6.6 -6.0 -0.4-3.0 .326  -48.0      5 44 21.2  27 43 53 385.2 911.6
       868 is triple: AB 7.5 9.8 8.6" 254.1, dT = -9sec : AC 7.5 12.7 48"  40.4, dT = -35sec
       868 is a close double. Observations are highly desired
24 Mar 17  7 26 53.5 d     885wG7  5.6  5.1   51+  91      4 304  48N  47   3  47 +6.6 -5.8 +0.1-0.2 .397   48.7      5 50 58.1  27 58  4 388.51135.2
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -27sec
24 Mar 18  0 38 10.7 D    1008 A0  5.3  5.3s  59+ 100  -8 76 175  48S 137 141 133 +6.9 -6.5 +2.0-2.7 .255  -42.6      6 35 12.1  28  1 20 386.5 648.2
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 Mar 18  0 43 22.6 d   78530cB9  7.8  7.8   59+ 100  -9 77 180  73N  77  78  74 +6.9 -6.5 +2.2+0.6 .330   17.2      6 35 40.3  28 15 51 386.5 648.4
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = +0.45sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 20 49.6 d   78580SA2  7.3  7.2   59+ 101     56 259  10S 175 119 171 +6.4 -6.4 -1.4-7.9 .117  -72.7      6 38 53.6  27 48 16 388.0 738.3
     78580 is triple: AC 7.3 13.8 26.7" 237.2, dT = +107sec : AB 7.3 10.5 28.6" 130.5, dT = +174sec
24 Mar 18  3 23 15.7 D    1022CB7  6.0     s  59+ 101     56 260  32N  36 340  32 +6.4 -6.4 +3.3+3.0 .159   66.2      6 39 33.1  28 15 47 388.0 740.7
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +5sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 18  3 23 19.9 d X 91013C    7.8  7.8s  59+ 101     56 260  31N  36 340  32 +6.4 -6.4 +3.3+3.0 .158   66.3      6 39 33.2  28 15 48 388.0 740.8
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -5sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 36  3   Gr   1022CB7  6.0     s  60+ 101     52 ** GRAZE: CA  7.7N; Dist.163km in az.  32deg. [Lat = 43.58-0.46(E.Long+87.67)]
24 Mar 18  4 35 19   M    1026SG5  6.5  5.9   60+ 101     42 272   9N  14 316  10 +6.3 -6.4 +9.9+9.9 .000   90.0      6 41 20.9  28 11 48 389.2 825.5
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1 : AC 6.6 12.8 58"  61.3
24 Mar 18  4 36 12   Gr   1026SG5  6.5  5.9   60+ 101     41 ** GRAZE: CA  8.9N; Dist. 51km in az. 218deg. [Lat = 41.27-0.59(E.Long+87.67)]
24 Mar 18  6 14 38.0 D    1035cK3  6.7  6.0   60+ 102     25 286  77S 109  55 104 +6.1 -6.2 +0.0-1.6 .505   -5.0      6 45 35.1  27 40 24 391.2 960.9
      1035 is double: ** 7.6 7.6 0.12"  90.0, dT = +0.23sec
      1035 has been reported as non-instantaneous (OCc 233). Observations are highly desired
24 Mar 19  2 55 38.4 d   79530 K0  8.2  7.6   69+ 112     68 232  83S 108  67  99 +6.0 -6.5 +1.7-1.4 .357    0.6      7 35 21.1  26 36  8 391.7 678.1
24 Mar 19  7 49 19.3 D    1169 K5  5.3  4.5s  70+ 114     16 290  65S 127  76 117 +5.4 -6.1 -0.4-1.8 .507  -17.9      7 44  6.9  25 47  3 396.71025.2
   R1169 = 76 Geminorum
      1169 = NSV 3703, 5.28 to 5.32, V
24 Mar 20  3 23  8   M    1270cF0  6.1  5.9v  78+ 124     69 217   9N  26 357  13 +5.1 -6.2 +9.9+9.9 .000   90.0      8 28 36.8  24  8 42 395.3 672.8
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 20  3 23 37   Gr   1270cF0  6.1  5.9v  78+ 124     69 ** GRAZE: CA  9.2N; Dist. 33km in az. 215deg. [Lat = 41.49-0.51(E.Long+87.67)]
24 Mar 22  3 25 44   D    1479 F2  6.4  6.2   91+ 146     63 163  21N  47  60  28 +3.0 -4.7 +7.1+9.2 .070   78.1     10  5 40.9  15 45 27 399.7 664.2
24 Mar 22  3 33 53   Gr   1479 F2  6.4  6.2   91+ 146     64 ** GRAZE: CA  9.7N; Dist. 38km in az.  36deg. [Lat = 42.28-0.55(E.Long+87.67)]
   Distance of 1479 to Terminator = 10.0"; to 3km sunlit peak = 1.1"
24 Mar 22  4 58 46.3 d    1485 G0  7.1  6.8   92+ 146     60 210  90S 116  93  96 +2.6 -4.6 +1.7-1.5 .350   11.5     10  7 39.3  15  9 27 400.0 693.0
24 Mar 23  2 29 58.9 D    1576 A2  5.3  5.3   96+ 157     48 129  84N 113 149  92 +2.0 -3.7 +1.7+0.0 .351   12.3     10 49 15.4  10 32 43 401.4 699.4
   R1576 = 53 Leonis
24 Apr  4 10  3 12.0 r  190165 K0  7.2  6.7   25-  60      4 124  79S 238 280 255 -4.9 +6.9 +0.9+1.8 .477 -165.0     21 15  3.2 -21 48 55 367.1 878.9
24 Apr  7 16 42 32.4 D Venus      -3.8 -3.8    2-  15  52 48 174 -10N 333 345   2 -0.2 +2.1 -1.6+4.5 .165   67.1      0 12 29.6 - 0 16 40 354.1 727.0
   Venus contacts: Dark limb 16 42  1; Terminator 16 42  1; Bright limb 16 43  3: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17  0 30   GrVenus      -3.8 -3.8    2-  15  51 45 ** GRAZE: CA 21.2N; Dist.165km in az. 310deg. [Lat = 44.15+0.88(E.Long+87.67)]
24 Apr  7 17 13 44.3 R Venus      -3.8 -3.8    2-  15  54 48 186  36N 286 290 317 -0.2 +2.0 +4.4-2.3 .166  113.0      0 12 29.6 - 0 16 40 354.1 727.0
   Venus contacts: Dark limb 17 13 13; Terminator 17 13 22; Bright limb 17 14 15: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  0 54 41.1 D     472cA1  4.9  4.9    7+  30  -6 24 278  88N  68  15  82 +4.6 -3.8 +0.5-0.6 .534    8.1      3 14 54.1  21  2 40 365.7 956.2
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.17sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 21 31.8 D   75819 F2  7.9  7.7    7+  31 -11 19 282  73N  52   1  66 +4.6 -3.8 +0.5-0.2 .510   24.2      3 15 46.1  21  9 55 366.2 993.0
24 Apr 11  1 52  2.3 r     472cA1  4.9  4.9    7+  31     13 287 -75N 266 215 279 +4.6 -3.8 +0.0-1.1 .578  171.7      3 14 54.1  21  2 40 367.01039.2
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.17sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 12  2 45 56.0 d     632 A2  8.5  8.2   14+  45     17 289  44S 122  71 131 +5.6 -4.9 -0.4-2.1 .449  -37.6      4 18 27.8  25  0 14 372.51023.6
24 Apr 14  1 11 57.8 d   78154 A0  8.5  8.4   32+  69  -8 56 259  75S 105  49 103 +6.6 -6.4 +1.3-1.6 .404   -6.4      6 16  3.2  28 12  6 380.9 750.4
24 Apr 14  2 22  8.4 d   78191 A0  7.7  7.7   33+  70     43 272  46S 134  76 132 +6.4 -6.3 +0.3-2.6 .374  -33.5      6 17 59.9  28  0 24 382.1 830.5
24 Apr 14  2 39  2.0 d   78206 K0  8.0  7.4   33+  70     40 274  65S 115  57 113 +6.4 -6.3 +0.5-1.9 .446  -14.1      6 18 47.3  28  3 20 382.4 852.0
24 Apr 14  3 20 43.7 d   78240 K0  8.6  8.0   33+  70     33 280  84S  96  39  94 +6.3 -6.2 +0.5-1.4 .487    5.1      6 20 21.4  28  4 38 383.3 908.5
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr 14  4 24 49.4 d   78291 K0  7.7  7.0   33+  70     21 289  87S  93  40  91 +6.3 -6.2 +0.1-1.3 .532    7.4      6 22 47.9  27 59 12 384.6 999.9
24 Apr 15  0 30 36.6 d    1093SF8  6.6     s  42+  81  -1 71 225  31S 155 119 148 +6.5 -6.6 +1.0-4.1 .228  -50.8      7 12 49.0  27 13 30 385.7 675.7
      1093 is triple: AB 7.24 7.27 0.72" 298.4, dT = -2.5sec : AC 7.2 12.8 13.7"  74.4, dT = +9sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Apr 15  0 30 36.6 d X 99111S    7.2  7.0s  42+  81  -1 71 225  31S 155 119 148 +6.5 -6.6 +1.0-4.1 .228  -50.8      7 12 49.0  27 13 30 385.7 675.7
   X 99111 is triple: BA 7.3 7.2 0.7" 118.4, dT = +2.5sec : BC 7.3 12.7 14.0"  67.9, dT = +2.8sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Apr 15  3  9 42.7 d   79256 K0  7.8  7.3   43+  82     44 269  85N  92  35  85 +6.1 -6.4 +1.0-1.3 .420   16.6      7 17 59.4  27  8 31 387.9 824.7
24 Apr 15  3 32 52.5 d   79264 G2  8.0  7.7   43+  82     40 273  46N  53 356  45 +6.1 -6.3 +1.9+0.2 .253   56.1      7 18 28.9  27 15 10 388.3 854.8
24 Apr 15  4  7 40.1 D    1108cG8  7.0  6.5   43+  82     33 278  50S 137  81 129 +6.0 -6.3 -0.1-2.3 .419  -28.7      7 19 30.8  26 49 23 389.0 901.1
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.16sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Apr 16  1 24 14.0 D   79980 G8  7.3  6.8   52+  93 -10 69 222  31S 162 129 150 +5.9 -6.3 +0.6-3.9 .238  -48.4      8  9 24.9  24 49 34 390.9 678.5
24 Apr 16  6 32  4.4 d   80089 G5  7.2  6.7   54+  95     16 289  69N  82  31  70 +5.3 -5.8 +0.1-1.2 .463   30.1      8 19  9.2  24 10 29 396.01028.1
24 Apr 16  7  8 59.3 d    1251 B9  5.9  5.9   54+  95      9 294  75N  89  40  76 +5.3 -5.8 -0.2-1.2 .517   22.5      8 20 32.1  24  1 20 396.81077.0
   R1251 = lambda Cancri
24 Apr 17  2 10 39.3 d    1348 G5  8.1  7.6   62+ 104     66 216  64N  82  54  66 +4.9 -5.7 +2.5-0.1 .278   38.8      9  2 45.2  21 31  9 395.0 682.7
24 Apr 18  2 26 46.3 d   98792wK2  7.8  7.0   72+ 116     64 198  14S 188 174 169 +3.9 -4.9 -0.8-5.2 .163  -62.3      9 49 52.8  16 50 18 397.8 675.0
     98792 is double: AB 7.9 11.1 25.3" 320.7, dT = -106sec
24 Apr 20  4 23 17.3 D    1644 B9  4.1  4.1   87+ 138     51 207  60S 145 126 124 +1.0 -2.5 +1.1-2.1 .349  -13.9     11 21  8.2   6  1 46 400.6 698.6
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  5 41  3.3 r    1644 B9  4.1  4.1   88+ 139     42 232 -89N 296 260 274 +0.8 -2.3 +1.3-1.8 .372 -166.4     11 21  8.2   6  1 46 401.3 745.2
   R1644 = Shang Tseang = sigma Leo
24 Apr 26  4  5 48.1 r    2269cB5  5.4  5.4   95- 154      9 135  38N 343  19 332 -4.9 +5.5 -0.3-1.1 .305  134.0     15 53 53.9 -24 31 59 392.3 836.0
24 Apr 26 10 32 25.4 R    2298kK3  5.0  4.3   94- 152  -4 11 220  26S 226 194 216 -6.0 +6.0 +1.0+0.0 .218 -124.2 .01 16  3 20.6 -25 51 55 391.2 737.3
24 Apr 30  8 10 27   m    2912 K3  4.5  3.8   62- 104      9 140   2S 172 205 183 -5.4 +7.6 +9.9+9.9 .000  -90.0     19 56 56.8 -27 10 12 377.0 778.1
   R2912 = 59 Sagittarii
   Distance of 2912 to Terminator = 7.0"; to 3km sunlit peak = 0.0"
24 May  4  9 39 20.2 r    3486 K2  7.7  6.9   18-  51 -11  7 104  44S 198 245 220 -1.5 +3.4 +0.3+2.3 .407 -136.9     23 39 50.6 - 5 32 48 363.9 983.8
24 May 10  2 23 46   m   76791 M0  9.2  8.3    5+  25      8 299  14N 359 312   5 +4.7 -5.3 +9.9+9.9 .000   90.0      4 51 47.0  26 46 18 374.21116.3
24 May 10  2 24 20   Gr  76791 M0  9.2  8.3    5+  25      7 ** GRAZE: CA 14.2N; Dist. 51km in az. 216deg. [Lat = 41.28-0.55(E.Long+87.67)]
24 May 10  2 49 19   M     732pK3  7.5  6.8    5+  26      4 302  14N 359 314   5 +4.8 -5.3 +9.9+9.9 .000   90.0      4 52 58.2  26 46 39 374.81152.0
       732 is double: ** 7.9 10.2 0.040"  69.0
       732 has been reported as non-instantaneous (OCc 778). Observations are highly desired
24 May 10  2 49 59   Gr    732pK3  7.5  6.8    5+  26      3 ** GRAZE: CA 13.9N; Dist. 63km in az. 217deg. [Lat = 41.15-0.56(E.Long+87.67)]
24 May 11  0 58 59.2 d     885wG7  5.6  5.1   10+  37  -1 34 279  83S  90  33  90 +5.3 -6.0 +0.6-1.3 .495    7.3      5 50 58.1  27 58  4 376.7 911.2
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -18sec
24 May 11  2 25 24.8 d     890cA0  4.6  4.6s  11+  38     18 291  -1S 175 123 175 +5.3 -5.9 -2.9-6.1 .119  -77.8      5 53 19.6  27 36 44 378.61035.9
   R890 = 136 Tauri
       890 is double: ** 4.8 6.3 0.050" 270.0, dT = -0.04sec
       890 has been reported as non-instantaneous (OCc 206). Observations are highly desired
       890 = NSV 2696, 4.50 to 4.61, V
24 May 11  2 32  5   Gr    890cA0  4.6  4.6s  11+  38     16 ** GRAZE: CA-13.1S; Dist. 53km in az. 219deg. [Lat = 41.24-0.60(E.Long+87.67)]
24 May 11  2 37  2.7 r     890cA0  4.6  4.6s  11+  38     16 293 -25S 199 148 199 +5.3 -5.9 +2.6+3.3 .121 -102.2      5 53 19.6  27 36 44 378.81053.5
   R890 = 136 Tauri
       890 is double: ** 4.8 6.3 0.050" 270.0, dT = -0.13sec
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       890 has been reported as non-instantaneous (OCc 206). Observations are highly desired
       890 = NSV 2696, 4.50 to 4.61, V
24 May 11  2 57 52.3 D   77724 B1  7.0  7.0   11+  38     13 295  56S 118  68 118 +5.3 -5.9 -0.4-1.6 .549  -21.0      5 55 40.3  27 42 56 379.31081.4
24 May 12  2 23 57.3 d   78848 A0  8.9  8.9   18+  50     29 282  73S 108  53 103 +5.5 -6.2 +0.2-1.6 .512   -3.1      6 54 27.1  27 27 30 383.2 952.6
24 May 12  2 47 22.5 d   78862CF0  8.6        18+  51     25 286  60S 121  67 116 +5.5 -6.1 -0.1-1.8 .508  -16.5      6 55 13.7  27 21 11 383.7 985.7
     78862 is double: BA 10.9 8.7 0.9"  78.7, dT = +1.4sec
     78862 is a close double. Observations are highly desired
24 May 12  2 47 22.5 d X 95186C    8.6  8.5   18+  51     25 286  60S 121  67 116 +5.5 -6.1 -0.1-1.8 .508  -16.5      6 55 13.7  27 21 11 383.7 985.7
   X 95186 is double: AB 8.66 10.93 0.94" 258.7, dT = -1.4sec
   X 95186 is a close double. Observations are highly desired
24 May 12  3  7 16.9 D    1056 B9  7.2  7.3   18+  51     21 288  54S 127  74 122 +5.5 -6.1 -0.3-1.9 .502  -22.8      6 55 56.2  27 17  9 384.11014.1
24 May 12  3  7 35.1 D   78873 A2  7.8  7.7   18+  51     21 288  44S 138  85 132 +5.5 -6.1 -0.5-2.1 .454  -33.6      6 55 48.1  27 14 58 384.11014.7
24 May 12  4 59 55.8 d    1067cK2  7.1  6.4   19+  52      3 304  85S  97  53  91 +5.6 -6.0 -0.5-1.1 .620    5.2      7  0 58.1  27  9 26 386.51166.9
      1067 is double: ** 8.0 8.0 0.10"  90.0, dT = +0.16sec
      1067 has been reported as non-instantaneous (OCc1341). Observations are highly desired
24 May 14  3  7 32.1 d    1317 A2  8.2  8.1   37+  74     37 268  77N  91  37  76 +4.8 -5.6 +0.9-1.4 .405   27.2      8 46 28.9  22 21  8 392.7 867.9
24 May 15  1 48 48   m   98640 K0  8.0  7.5   46+  85  -8 56 236  16N  34 354  17 +4.2 -5.0 +9.9+9.9 .000   90.0      9 33 38.6  18 44 12 394.8 733.0
24 May 15  2  6 21.2 d   98646 K2  8.2  7.3v  46+  85 -11 53 241  82N 101  57  83 +4.1 -5.0 +1.6-1.4 .357   23.6      9 34 26.7  18 24 22 395.0 747.2
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 18  4 21  2.2 d  119068 F5  7.8  7.5   74+ 119     39 229  59N  83  48  61 +0.2 -1.3 +2.2-1.1 .262   46.5     11 49 46.8   2 13 55 400.6 738.6
24 May 18  5 22 50.5 D    1712SF8  3.6  3.3   75+ 120     29 243  64S 140  98 118 +0.0 -1.2 +0.7-2.2 .394  -13.4     11 50 41.7   1 45 53 401.4 789.4
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -713sec : AC 3.7 9.6 406"  78.5, dT = +495sec
24 May 18  6 30 35.2 r    1712SF8  3.6  3.3   75+ 120     17 257 -86S 290 243 268 -0.2 -1.1 +0.6-1.8 .430 -166.6     11 50 41.7   1 45 53 402.6 863.3
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -783sec : AC 3.7 9.6 406"  78.5, dT = +809sec
24 May 22  5 34 14.9 d    2115 A6  7.2  7.1   98+ 164     27 194  81S 104  93  88 -4.3 +4.3 +2.0-0.8 .344   15.7     14 49 27.7 -19 54 13 392.5 680.8
24 May 23  5  8 17.4 D    2237cK3  5.0  4.3s 100+ 174     24 175  83N  49  53  37 -4.7 +5.5 +4.0+2.2 .142   67.1 .02 15 40 16.9 -23 49  5 389.3 688.7
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.41sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 4.9"; to 3km sunlit peak = 0.0"
24 May 24  2  9 59.6 R    2366dM1  1.1  0.1v  99- 172 -10  2 129  62N 341  22 334 -4.5 +6.1 -0.5-1.0 .310  130.8 .14 16 29 24.5 -26 25 55 388.6 892.2
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -4sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 7.7"; to 3km sunlit peak = 0.7"
24 May 28  8 28  3.1 r  189555 G1  7.2  6.9   75- 121     20 156  83N 265 285 280 -3.9 +7.1 +1.8+0.8 .388  164.9     20 40 22.3 -24  7  5 373.2 727.2
24 May 29  8 30 34.8 R    3164SB3  4.5  4.6v  65- 108     20 143  83N 259 288 277 -3.1 +6.2 +1.5+1.2 .414  165.7     21 37  4.8 -19 27 58 370.9 769.3
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +10sec : AB 4.5 10.1 66"  45.9, dT = +133sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 45  9.7 r  164528 B8  7.5  7.5   65- 107     22 146  41N 302 328 320 -3.1 +6.2 +2.1+0.2 .227  122.5     21 37 37.7 -19 13 52 370.7 761.0
24 May 29  8 49 58.1 r  164544 F7  7.3  7.0   65- 107     22 147  11S 174 200 192 -3.1 +6.2 +0.5+3.4 .142 -109.7     21 38 50.6 -19 37 31 370.7 758.7
24 May 29 12  0  5.8 r    3175 G8  4.7  4.3   64- 106  16 28 195  66S 228 216 246 -3.6 +5.9 +1.2+0.5 .423 -172.1     21 42 39.5 -18 51 59 369.7 765.1
   R3175 = kappa Capricorni
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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      day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 May 30  9 17 37.4 r  165149wG0  7.7  7.4   54-  94 -10 25 139  85N 253 284 274 -2.2 +5.1 +1.4+1.4 .430  165.8     22 32  9.4 -13 35 52 368.3 791.6
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +91sec
24 Jun 10  2 22 47.6 d   80173 K0  8.3  7.8   14+  44  -9 22 282  69N  78  26  65 +4.4 -5.5 +0.4-1.1 .426   35.6      8 25 21.5  23 32 58 390.2 991.5
24 Jun 10  3  9  5.4 d   80191kG0  8.9  8.7   14+  44     14 289  73N  83  33  70 +4.4 -5.4 +0.0-1.2 .483   29.7      8 27  2.5  23 21 54 391.21053.8
24 Jun 10  3 23 20.8 d    1267pA0  8.1  8.0   14+  44     12 291  69S 121  72 108 +4.4 -5.4 -0.4-1.6 .558   -8.9      8 27 25.7  23  9  8 391.51072.5
      1267 is double: AB 8.1 9.7 24.9" 163.0, dT = +33sec
24 Jun 11  4 22 44.7 D   98510kG5  7.2  6.8   22+  56      7 289  86S 110  61  93 +3.8 -4.7 -0.3-1.5 .555    5.7      9 20 37.9  19  5 26 396.41072.9
24 Jun 13  4  9 52.9 d    1580kK2  7.6  7.0   40+  78     18 266  43S 159 110 138 +1.7 -2.7 -0.1-2.4 .375  -36.9     10 51 19.1   9  8 56 400.9 910.9
24 Jun 15  3  7 18   m    1760pK0  7.5  7.0   58+ 100     34 230  15N  38   3  16 -0.8 -0.2 +9.9+9.9 .000   90.0     12 15  0.0 - 1 19 36 400.3 738.3
      1760 is double: AB 7.6 11.8 36"  56.0
24 Jun 17  2 42 17.9 d  158085kK0  7.3  6.6   76+ 122 -12 34 196  70S 130 118 110 -3.1 +2.5 +1.6-1.3 .354   -2.6     13 40 59.7 -12 46 59 396.6 681.0
24 Jun 19  2  4 44.2 D    2183 K2  5.5  4.8   91+ 144  -6 24 162  47S 142 157 128 -4.5 +5.0 +1.0-0.6 .353  -21.6     15 16 23.0 -22 23 58 390.3 718.2
24 Jun 23  9 51 18.5 r    2831kB2  6.0  6.1s  98- 162  -5 11 216  56S 246 216 254 -4.8 +7.3 +1.0-0.5 .450 -175.2     19 24 30.2 -27 51 57 374.0 819.8
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Jun 25  7 54 57.7 r  190252 F2  7.2  7.0   87- 137     26 164  66S 233 246 251 -2.5 +6.3 +1.6+1.1 .410 -171.0     21 21  3.2 -20 49 16 368.1 741.2
24 Jun 28  7 36 41   m    3528 F0  7.5  7.3v  57-  98     23 115  11N 326   9 348 +0.8 +2.3 +9.9+9.9 .000   90.0     23 59 35.0 - 1 51  0 367.0 892.7
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jul  2  8 41 22.3 r     511pF2  8.9  8.7   14-  45     15  74  66S 235 286 248 +4.3 -3.9 -0.3+1.6 .590 -168.9      3 31 28.3  21 49 19 373.81090.8
       511 is triple: CD 8.9 12.0 26.8"  48.5, dT = +45sec : CA 8.9 9.8 122" 230.2, dT = -206sec
24 Jul 11 19 14  0.7 D    1712SF8  3.6  3.3   31+  67  64 32 121  56S 147 187 125 +0.9 -1.2 +0.8-1.0 .367  -20.7     11 50 41.7   1 45 53 400.8 763.6
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = -695sec : AC 3.7 9.6 406"  78.5, dT = +403sec
24 Jul 11 20 28 33.1 r    1712SF8  3.6  3.3   31+  68  52 43 140 -86S 289 318 267 +0.7 -1.0 +1.7+0.1 .343 -159.4     11 50 41.7   1 45 53 399.9 711.1
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = -981sec : AC 3.7 9.6 406"  78.5, dT = +1017sec
24 Jul 14  2  9 26.1 d  157912kF0  7.8  7.6   51+  91  -8 28 221  68N  90  60  70 -3.1 +2.4 +1.9-1.2 .302   34.3     13 23 56.5 -10 52 15 399.5 708.2
24 Jul 14  3 10 18.1 D    1925SB1  1.0  1.1v  52+  92     19 234  88N 110  72  90 -3.3 +2.4 +1.2-1.8 .381   10.6     13 25 11.6 -11  9 41 400.2 753.2
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +91sec : AC 1.0 10.5 368"  60.8, dT =
+631sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 14  4 22 48.1 R    1925SB1  1.0  1.1v  52+  92      8 247 -75N 307 262 287 -3.5 +2.5 +0.7-2.1 .420  169.6     13 25 11.6 -11  9 41 401.4 831.3
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -26sec : AC 1.0 10.5 368"  60.8, dT =
+353sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  3 41 24.6 D    2029 M1  4.9  4.1v  61+ 103     17 228  51N  70  34  52 -4.5 +3.8 +1.5-0.9 .264   46.4 .02 14 10 50.5 -16 18  7 397.6 738.0
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  5 22 11.3 D    2268MB2  4.5        80+ 126      9 224  61S 127  92 116 -6.3 +6.1 +1.4-1.9 .362  -25.7     15 53 36.7 -25 19 38 389.5 759.5
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Jul 18  1 59 58   d    2405SA2  6.6     s  87+ 137  -7 20 168  25N  27  37  20 -5.8 +6.8 +6.3+6.3 .062   80.5     16 44 17.4 -27 27 22 383.8 696.2
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +39sec : AC 6.6 14.0 24.3" 195.9, dT = -386sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 18  2  7 12   Gr   2405SA2  6.6     s  87+ 137  -8 20 ** GRAZE: CA 15.2N; Dist. 48km in az.  44deg. [Lat = 42.45-0.72(E.Long+87.67)]
24 Jul 21  5 37 37   M    2910cG3  4.7  4.3  100+ 174     22 177  58N 342 344 353 -4.5 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 368.2 726.9
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
   Distance of 2910 to Terminator = 4.1"; to 3km sunlit peak = 0.0"
24 Jul 21  6 47 26.8 D    2914cG8  4.8  4.4  100+ 174     21 193  67S  34  23  45 -4.6 +7.1 +1.0+0.7 .347   34.5     19 58 57.2 -26 11 45 368.2 751.9
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
   Distance of 2914 to Terminator = 4.5"; to 3km sunlit peak = 0.0"
24 Jul 24  9  2 35.3 r  165373 K0  7.7  7.1   88- 140     38 188  67S 228 222 249 -0.5 +3.7 +1.3+0.8 .451 -177.0     22 54 30.0 -10 17 59 361.0 790.1
24 Jul 26  7 54 32.6 R      81 K4  6.4  5.7   70- 113     41 132  35S 193 226 214 +2.5 +0.6 +0.3+2.4 .366 -140.8      0 37 30.5   3  8  7 363.1 832.3
24 Jul 26  9 38 32.2 r  109355pG5  7.7  7.1   69- 113 -10 51 166  45S 202 213 224 +2.3 +0.4 +0.7+2.0 .395 -152.6      0 39 46.9   3 39 10 362.5 783.4
    109355 is double: ** 9.1 9.1 0.10"  90.0, dT = +0.1sec
    109355 has been reported as non-instantaneous (OCc1143). Observations are highly desired
24 Jul 27  9 58 29   M     222 G5  7.0  6.5   58-  99  -8 56 151  17N 322 343 342 +3.5 -1.3 +9.9+9.9 .000   90.0      1 31 42.7  10 53 22 364.7 784.3
24 Jul 28  8 14 10.0 r   92903cF5  8.2  7.9   47-  87     38 103  65S 227 276 244 +4.6 -2.6 +0.4+2.0 .497 -169.7      2 22  0.5  15 59 30 368.8 903.9
     92903 is double: ** 8.9 8.9 0.050"
     92903 has been reported as non-instantaneous (OCc1183). Observations are highly desired
24 Jul 28  8 18 27.9 r     347 K0  7.9  7.4   47-  87     39 103  78N 263 312 280 +4.6 -2.6 +1.0+1.4 .452  154.0      2 21 50.3  16  9 45 368.8 899.2
24 Jul 29  7 21 19.7 R     472cA1  4.9  4.9   36-  74     22  81  63N 283 335 297 +5.4 -3.8 +0.5+1.1 .436  140.2      3 14 54.1  21  2 40 373.51027.9
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.23sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 45  0.4 r   75819 F2  7.9  7.7   36-  74     26  84  58N 288 341 302 +5.4 -3.8 +0.8+1.0 .388  134.8      3 15 46.1  21  9 55 373.1 996.5
24 Jul 30  7 15 26.0 r   76493 G8  8.2  7.5   26-  62     13  69  54S 226 276 235 +5.9 -4.8 -0.5+1.7 .547 -156.0      4 12  1.8  24 34  5 377.81096.8
24 Aug  1  8 43 51.5 r   78128 K2  8.3  7.7   10-  36     11  63  15S 203 251 201 +6.3 -6.0 -1.3+2.8 .289 -119.8      6 14 35.7  27 36 49 385.31088.2
24 Aug  1  9 31 49.4 R     952 K2  8.0  7.2    9-  36     19  69  71S 259 311 257 +6.3 -6.1 -0.1+1.4 .545 -176.5      6 15 54.8  27 51 42 384.51018.4
24 Aug  2  9 35 21.0 r   79200 G0  8.8  8.6    4-  24     10  63  22S 220 268 212 +6.2 -6.0 -0.9+2.4 .365 -130.2      7 14 46.3  26 38 54 389.01068.5
24 Aug  2 10 35 29.7 r    1105cG7  6.5         4-  23  -3 19  71  32S 231 283 223 +6.2 -6.1 -0.4+2.3 .407 -141.4      7 17  3.4  26 41 22 388.1 980.2
      1105 is double: AB 7.00 7.70 0.20" 236.4, dT = -0.49sec
      1105 is a close double. Observations are highly desired
24 Aug 10  2 21 53.3 D    1887 K0  6.3  5.8   26+  62      9 249  68S 135  90 114 -2.8 +2.2 +0.6-2.2 .407  -17.0     13  9 14.2 - 9 32 17 403.8 833.3
24 Aug 11  1 49 37.0 d  158207 F0  7.4  7.2   35+  72 -10 16 232  86S 115  78  96 -4.1 +3.5 +1.2-1.8 .383    2.2     13 52 15.4 -14 40 36 401.2 745.4
24 Aug 17  2 50 50.6 D    2831kB2  6.0  6.1s  90+ 144     20 170  53N  37  45  45 -6.1 +7.5 +1.7+1.2 .296   41.6     19 24 30.2 -27 51 57 371.1 711.8
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 20  7 49 31.6 r    3303kF2  6.4  6.2  100- 172     32 204  90N 273 255 294 -2.1 +4.2 +2.1-0.8 .361  139.1     22 30  1.5 -12 54 54 357.5 828.9
24 Aug 21  2 34 30.6 R    3421cM3  4.9  4.1v  97- 161     10 110  48S 213 258 234 +0.2 +3.3 +0.5+2.0 .488 -152.1     23 16 50.9 - 7 43 35 359.0 961.3
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Aug 21 10 19 49.5 r  146724 K2  7.0  6.2   96- 157  -9 28 233  73S 234 197 256 -0.4 +2.3 +0.8+0.1 .518  179.2     23 28 46.7 - 5 23 22 357.3 896.9
24 Aug 22  9  7 38.3 r  109142cG5  7.6  7.1   90- 144     48 203  78N 260 243 282 +1.6 +0.7 +1.9-0.1 .405  150.3      0 19 57.1   1 34 57 356.6 807.6
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = +0.08sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 18  7   m  109738 G5  7.8  7.1   82- 130     57 190  16N 322 314 342 +3.3 -1.1 +9.9+9.9 .000   90.0      1 13 41.8   8 58 29 358.5 783.8
24 Aug 25  6 45 43.2 r     439cF0  7.3  7.1   62- 104     37  96  72N 272 324 287 +6.1 -3.8 +1.0+1.3 .442  148.4      2 59 10.4  19 59 23 367.6 926.1
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.25sec
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25  8 52 53.3 r   75708 K0  8.0  7.1   61- 103     59 125  67S 231 271 246 +6.0 -4.1 +1.0+1.9 .443 -172.0      3  3  9.6  20 20 10 366.4 794.2
24 Aug 25 10 31 39.6 r     452 A2  7.7  7.6   61- 102  -8 69 174  66N 278 282 292 +5.7 -4.2 +2.3-0.3 .333  143.3      3  5 30.3  20 54  9 366.2 736.8
24 Aug 26  6 44 34   Gr    587 K0  6.2  5.5   51-  91     31 ** GRAZE: CA 12.5N; Dist. 77km in az. 132deg. [Lat = 40.82+0.82(E.Long+87.67)]
24 Aug 26  6 46 14   M     587 K0  6.2  5.5   51-  91     30  83  12N 336  31 347 +6.9 -4.9 +9.9+9.9 .000   90.0      3 57 26.4  24 27 43 373.0 976.4
24 Aug 26  7 14 24.9 r   76358kB9  7.2  7.2   51-  91     35  87  41S 210 265 220 +6.9 -4.9 -0.2+2.4 .420 -144.1      3 58 20.9  24  4 52 372.6 937.8
24 Aug 27  8 28 54.8 R     746WB7  7.0  6.9   39-  77     40  87  54N 302 359 307 +7.3 -5.8 +1.5+0.2 .314  130.4      4 59 53.7  27 19 32 377.2 885.1
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = +6sec
24 Aug 27 10 52 39.2 R     756 F0  6.6  6.5   38-  76  -4 65 117  38N 318   7 323 +7.1 -6.1 +3.2-2.9 .178  116.4      5  4 38.0  27 41 46 376.0 728.4
24 Aug 28  6 31 57.6 r   77724 B1  7.0  7.0   30-  66     10  62  16S 198 245 197 +7.5 -6.0 -1.4+2.9 .265 -116.7      5 55 40.3  27 42 56 384.41101.5
24 Aug 28  8 41 28.4 R   77818 K5  6.7  5.8   29-  65     32  79  79S 261 317 261 +7.5 -6.2 +0.4+1.5 .493  178.6      6  0  4.9  28  7 33 382.5 914.2
24 Aug 28 10 46 44.5 r     917 K2  8.1  7.4S  28-  64  -6 55  99  82S 266 322 265 +7.3 -6.4 +1.4+1.2 .409  176.4      6  4 16.2  28 18  3 381.1 756.6
       917 = NSV 2811, 8.4,
24 Aug 29  7 18 56.5 r   78873 A2  7.8  7.7   20-  54      8  61  28S 217 264 212 +7.4 -6.1 -1.0+2.3 .368 -129.8      6 55 48.1  27 14 58 389.01086.3
24 Aug 29  7 25 50.2 R    1056 B9  7.2  7.3   20-  54      9  62  39S 228 276 223 +7.4 -6.2 -0.8+2.0 .443 -140.9      6 55 56.2  27 17  9 388.91076.3
24 Aug 29  8 21 32.9 r   78917 M0  8.3  7.5   20-  53     18  69  62N 308 360 302 +7.4 -6.2 +0.5+0.3 .402  139.6      6 58 11.0  27 38 13 388.1 995.0
24 Aug 29  9 50 18.2 r   78976wA0  8.2  8.1   20-  53     34  82  49S 239 296 233 +7.3 -6.3 +0.2+2.3 .404 -151.1      7  1 24.5  27 22 49 386.8 866.6
     78976 is double: AB 8.1 12.0 30" 248.0, dT = -73sec
24 Aug 31  9 32 56.7 r   80443kK2  9.1  8.6    6-  29      9  69  61S 264 313 249 +6.3 -5.4 -0.2+1.4 .498 -163.2      8 49  8.5  21 53 34 396.4 999.6
24 Sep  6 15 30 31.2 D    1925SB1  1.0  1.1v  11+  40  43  7 111  37S 167 212 146 -1.4 +2.3 -0.2-1.5 .335  -43.1     13 25 11.6 -11  9 41 405.0 900.8
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -317sec : AC 1.0 10.5 368"  60.8, dT = -
302sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  38%
24 Sep  6 16 19 59.7 R    1925SB1  1.0  1.1v  12+  40  49 15 121 -59S 263 304 243 -1.5 +2.4 +1.2+1.9 .314 -136.9     13 25 11.6 -11  9 41 404.1 841.7
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +316sec : AC 1.0 10.5 368"  60.8, dT =
+1087sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  38%
24 Sep  9 23 40  1.4 D    2287SB1  2.9  3.0v  37+  75   5 20 196  31S 162 149 151 -6.4 +6.6 +1.5-2.1 .200  -54.1     15 58 51.1 -26  6 51 395.0 652.7
   R2287 = pi Scorpii
      2287 is triple: Aa,Ab 5.1 13.4 2.0" 244.0, dT = +1.4sec : AB 2.9 11.9 50" 128.2, dT = +210sec
      2287 is a close double. Observations are highly desired
      2287 = pi Sco, 2.88 to 2.91, V, Type ELL, Period 1.570103 days, Phase  54%
24 Sep 10  0 29 25.7 R    2287SB1  2.9  3.0v  38+  76  -5 17 207 -38S 231 208 220 -6.5 +6.6 +1.9+0.1 .205 -125.9     15 58 51.1 -26  6 51 395.2 672.1
   R2287 = pi Scorpii
      2287 is triple: Aa,Ab 5.1 13.4 2.0" 244.0, dT = -9sec : AB 2.9 11.9 50" 128.2, dT = +53sec
      2287 is a close double. Observations are highly desired
      2287 = pi Sco, 2.88 to 2.91, V, Type ELL, Period 1.570103 days, Phase  54%
24 Sep 10  1 36 10.1 d  184047pM2  7.5  6.7v  38+  76     10 220  78S 115  82 104 -6.8 +6.6 +1.5-1.6 .365  -14.0     16  2 29.1 -26  8 53 395.7 721.7
    184047 is double: AB 7.6      9.9"   1.5, dT = -11sec
    184047 is a close double. Observations are highly desired
    184047 = V1043 Sco, 7.45 to 7.58, Hp, Type SRB
24 Sep 10  2 26 23.2 D    2298kK3  5.0  4.3   38+  76      4 229  11N  23 344  13 -6.9 +6.6 -0.9+2.3 .105   75.0 .02 16  3 20.6 -25 51 55 396.2 776.2
24 Sep 13  1  4 49.7 d    2751 G6  6.7  6.2   68+ 111 -12 19 177  36S 136 138 141 -7.4 +7.7 +2.3-1.0 .219  -54.0     18 55 25.9 -29 12 47 378.3 683.3
24 Sep 19  7 50 44.3 R     104PK2  5.7  5.3   98- 163     51 206  58S 214 195 236 +1.2 -0.4 +1.0+1.3 .455 -163.0      0 48 23.0   5 16 50 352.9 815.1
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
       104 is triple: AB 5.8      2.7" 341.0, dT = +4sec : AC 5.8 12.3 149" 250.6, dT = -263sec
       104 is a close double. Observations are highly desired
24 Sep 21  8 21 18.2 r     397MB9  7.5  7.5   85- 135     67 174  59N 281 285 297 +5.1 -3.8 +2.4-0.5 .326  137.5      2 41  6.6  18 48  1 358.4 768.5
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +10sec : AC 7.7 9.5 66" 242.2, dT = -157sec
       397 is a close double. Observations are highly desired
24 Sep 21  8 21 27.1 r X  3591MB9  7.9  7.9   85- 135     67 175  59N 281 285 297 +5.1 -3.8 +2.4-0.5 .327  137.7      2 41  6.8  18 47 59 358.4 768.5
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -10sec : BC 7.5 9.5 67" 243.0, dT = -163sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  6 22 44.3 R     521kA2  6.7  6.7v  76- 122     48 102  63N 282 335 294 +6.7 -4.8 +1.5+0.8 .381  140.7      3 36 58.0  23 12 40 364.1 869.8
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22 10  0 56.5 D     537SB6  3.7  3.8s  75- 120     71 203 -37N  22   4  34 +6.3 -5.2 +1.2+3.1 .285   46.3      3 44 52.5  24  6 48 363.7 727.1
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = -0.06sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
184sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10  1 35.4 r   76103SA9  7.9  7.8S  75- 120     71 203  55S 220 201 231 +6.3 -5.2 +1.5+1.9 .362 -151.5      3 43 41.5  23 38 57 363.7 727.9
     76103 is triple: Aa,Ab 7.9 8.9      251.6, dT = +0.28sec : AB 8.0 9.6 197" 175.1, dT = -388sec
     76103 is a close double. Observations are highly desired
     76103 = NSV 15745, 7.92, , Type VAR:
24 Sep 22 10 25 54.4 d     545SB6  4.1  4.2v  75- 120     69 217 -80S  84  55  96 +6.2 -5.2 +1.9-0.2 .398  -15.0      3 46 19.6  23 56 54 363.9 727.6
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.7sec : AB 4.2 14.4 110" 180.2, dT = -27sec : AC 4.2 12.9 147" 336.0, dT = -118sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Sep 22 10 54 19.5 R     537SB6  3.7  3.8s  75- 120  -9 65 232  48N 297 257 309 +6.2 -5.2 +2.1-2.3 .288  133.7      3 44 52.5  24  6 48 364.1 734.7
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.7sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+306sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11  8 26.1 D     552SB7  2.9  2.9s  75- 120  -6 63 236 -87N  72  29  84 +6.1 -5.2 +1.7+0.1 .418    0.2      3 47 29.1  24  6 18 364.3 738.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.05sec : AE 2.8 15.0 78" 232.4, dT = -177sec : AB 2.8 6.3 118"
291.1, dT = -218sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 11 42 23.0 R     545SB6  4.1  4.2v  75- 120   0 58 247  74S 239 190 250 +6.1 -5.3 +1.6+0.4 .414 -165.0      3 46 19.6  23 56 54 364.7 757.2
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.45sec : AB 4.2 14.4 110" 180.2, dT = -138sec : AC 4.2 12.9 147" 336.0, dT = +44sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Sep 22 12  4 18.9 d     560SB8  3.6  3.7s  75- 119   4 54 253 -58S 107  56 118 +6.0 -5.3 +1.4-1.8 .370  -31.6      3 49  9.7  24  3 12 365.0 770.0
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.008" 188.2, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.2, dT = -0.38sec : AC 3.6 15.0 50"  36.5, dT = +45sec : AH
3.6 16.0 68" 221.7, dT = -77sec
       560 is a close double. Observations are highly desired
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Sep 22 12 24 34.8 R     552SB7  2.9  2.9s  74- 119   8 50 258  89N 257 203 268 +6.0 -5.3 +1.4-0.6 .445  179.6      3 47 29.1  24  6 18 365.4 788.5
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6           : AB     1.6 0.031" 207.1, dT = -0.05sec : AE 2.8 15.0 78" 232.4, dT = -161sec : AB 2.8 6.3 118"
291.1, dT = -218sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 13  7 12.3 R     560SB8  3.6  3.7s  74- 119  16 43 266  61S 227 172 238 +5.9 -5.3 +1.3+0.5 .399 -148.6      3 49  9.7  24  3 12 366.1 829.7
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.008" 188.2, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.2, dT = +0.18sec : AC 3.6 15.0 50"  36.5, dT = +123sec :
AH 3.6 16.0 68" 221.7, dT = -171sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Sep 22 13 14 23.0 r     561SB7  5.1  5.1V  74- 119  17 41 267  80S 245 190 257 +5.9 -5.3 +1.1-0.3 .459 -166.6      3 49 11.2  24  8 12 366.2 837.6
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.43sec : AF 5.0 14.5 4.7" 221.0, dT = -9sec : AE 5.1 14.8 96"  76.8, dT = +206sec : AD 5.1
14.7 144"  65.9, dT = +313sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  47%
24 Sep 24  4 52 51.4 r     840cK0  6.3  5.5   56-  96     14  66  35S 212 262 214 +8.4 -6.0 -0.8+2.2 .409 -134.0      5 35 55.5  27 39 44 378.41080.9
       840 is double: ** 7.3 7.3 0.050"
       840 has been reported as non-instantaneous (OCc1267). Observations are highly desired
24 Sep 24  9 11 59.3 r   77495cA0  8.1  8.1   54-  95     60 106  60S 238 293 239 +8.1 -6.4 +1.2+2.1 .379 -158.1      5 44 59.0  28 11 40 375.5 743.5
     77495 is double: AB 8.0 8.0 0.20"  43.4, dT = +0.5sec
     77495 is a close double. Observations are highly desired
24 Sep 24 10 14 34.3 r   77551cB9  8.3  8.2   54-  94     71 127  30N 329  12 330 +7.9 -6.5 +3.0-4.7 .157  114.2      5 47 14.3  28 37 26 375.3 698.3
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = +3sec
     77551 is a close double. Observations are highly desired
24 Sep 25  4 44 36.8 R    1008 A0  5.3  5.3s  45-  84      4  56  52N 312 356 308 +8.5 -6.2 +0.0+0.2 .421  133.7      6 35 12.1  28  1 20 385.21139.3
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
24 Sep 25  6 13 40.6 r   78580SA2  7.3  7.2   44-  84     18  69  59S 244 295 239 +8.5 -6.3 -0.3+1.8 .505 -158.4      6 38 53.6  27 48 16 384.01011.7
     78580 is triple: AC 7.3 13.8 26.7" 237.2, dT = -52sec : AB 7.3 10.5 28.6" 130.5, dT = +22sec
24 Sep 25  6 53  3   Gr   1026SG5  6.5  5.9   44-  83     26 ** GRAZE: CA  9.6N; Dist.102km in az. 324deg. [Lat = 42.99+0.54(E.Long+87.67)]
24 Sep 25  7  0 37.4 R    1026SG5  6.5  5.9   44-  83     26  75  27N 338  32 333 +8.5 -6.4 +2.4-2.7 .153  107.6      6 41 20.9  28 11 48 383.4 943.1
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = -68sec : AC 6.6 12.8 58"  61.4, dT = -40sec
24 Sep 26 10 47  9.0 R   79672DK5  7.6        33-  70 -11 56 106  54S 247 300 237 +7.9 -6.3 +1.5+2.3 .318 -147.3      7 45 32.1  25 59 19 386.8 707.9
     79672 is double: AB 7.58 11.58 2.70" 228.3, dT = -8sec
     79672 is a close double. Observations are highly desired
24 Sep 27  9 13 28.8 r   80288pK5  8.6  8.2v  24-  59     28  83  45N 333  26 318 +7.6 -5.7 +1.2-1.3 .280  128.6      8 36 55.8  23 14 49 393.1 853.8
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = -9sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9 10 51.1 r   98565cA0  8.9        16-  47     17  79  69S 270 321 253 +6.7 -4.8 +0.2+1.4 .455 -164.2      9 26  2.7  18 54  2 397.9 912.1
     98565 is double: AB 8.87 11.83 1.27" 237.3, dT = -2.3sec
     98565 is a close double. Observations are highly desired
24 Sep 28  9 17 50.3 R   98567 A3  7.5  7.4   16-  47     18  80  67N 315   6 297 +6.7 -4.8 +0.6-0.1 .411  151.5      9 26 34.5  19  3 36 397.8 902.4
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 29 11 36 52.4 R    1504 M1  5.4  4.6    9-  35  -3 32 100  85S 290 339 270 +5.4 -3.7 +1.0+0.6 .404 -174.0 .01 10 16 40.7  13 43 42 399.4 786.2
   R1504 = 37 Leonis
24 Sep 30 14 52 23   m    1609SF2  4.6  4.5    4-  23  31 51 145  12S 219 244 198 +3.7 -2.2 +9.9+9.9 .000  -90.0     11  5  1.0   7 20 10 400.0 693.3
   R1609 = chi Leonis
      1609 is quadruple: AB 4.7 11.0 5.1" 271.1 : AC 4.7 10.6 252" 310.7 : AD 4.7 11.7 287" 298.0
      1609 is a close double. Observations are highly desired
24 Oct  8  0 20 18.4 d  184520kF5  8.1  7.8   23+  57 -12  9 219  62S 130  98 122 -6.6 +7.1 +1.8-2.0 .309  -35.2     16 39  4.4 -27 58 56 396.0 726.3
24 Oct 11  0  0 32.8 d  188257kK0  7.1  6.8   52+  92  -9 20 179  36S 134 135 143 -7.4 +7.5 +2.8-1.3 .188  -59.6     19 32 40.3 -28  1 11 380.1 682.9
24 Oct 12  0 48  9   m  189406 K4  7.3  6.5v  63+ 105     23 177   8S 156 158 169 -7.1 +6.9 +9.9+9.9 .000  -90.0     20 32 18.9 -24 52 14 373.7 711.0
    189406 = HIP 101336, 7.33, range 0.00, 9V, Type VAR, Period 3.93345 days
24 Oct 13  5 18 15.8 d  164516 K3  6.9  6.2   75+ 120     14 228  87N  66  30  84 -6.8 +5.4 +0.8-0.5 .498   -8.9     21 36 58.6 -18 44 38 367.9 899.2
24 Oct 14  4 22 15.8 D    3303kF2  6.4  6.2   84+ 133     31 207  61N  36  16  56 -5.4 +4.2 +0.8+0.8 .450   16.2     22 30  1.5 -12 54 54 361.2 820.1
24 Oct 14 23 29 16.6 D    3421cM3  4.9  4.1v  91+ 145  -4 16 116  57S  97 139 118 -3.3 +3.2 +0.9+1.3 .421  -37.2 .01 23 16 50.9 - 7 43 35 359.4 921.0
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Oct 15  7 10 17.1 d  146724 K2  7.0  6.2   93+ 148     24 239  74S  80  41 102 -3.9 +2.2 +1.0-0.9 .476  -26.4     23 28 46.7 - 5 23 22 357.5 921.8
24 Oct 16  5 42 52.6 d  109142cG5  7.6  7.1   98+ 162     47 207  79N  54  34  76 -1.8 +0.6 +1.3+0.6 .480   -3.6      0 19 57.1   1 34 57 353.1 822.9
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = +0.04sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Oct 19  5 15 46.7 R     459SK2  6.4  5.8   95- 155     58 122  36S 194 236 208 +4.6 -4.3 +0.1+3.1 .335 -134.1      3  9 20.1  20 45 40 356.3 832.6
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -258sec : AB 6.5 8.8 122" 239.0, dT = -258sec
       459 is a close double. Observations are highly desired
24 Oct 19  6 18 24.9 r   75768 K0  7.6  7.1   95- 155     67 148  68N 269 294 283 +4.5 -4.4 +1.9+0.4 .401  151.6      3 10 14.5  21 16 19 356.0 788.3
24 Oct 20 10 35 22.2 r   76559 B9  7.8  7.7   88- 139     57 252  72S 238 186 247 +5.7 -5.7 +1.6+0.4 .408 -158.0      4 20 30.4  25 49 39 362.3 772.7
24 Oct 21  3 26 15.3 r     773wF8  7.0  6.7   81- 129     22  72  40N 311   5 316 +7.7 -5.9 +0.9+0.1 .322  123.3      5 10  3.9  27 33 23 369.31047.9
       773 is double: AB 7.0 9.3 315" 353.1, dT = -730sec
24 Oct 21  8 49 47.6 R     797cB9  6.4  6.3e  80- 126     76 160  85S 258 275 262 +7.2 -6.3 +1.9+0.7 .398 -177.1      5 20 59.3  27 57 26 366.9 709.3
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  69%
24 Oct 22  5 32 54.5 r   78191 A0  7.7  7.7   71- 115     34  81  43S 223 280 221 +8.4 -6.3 -0.1+2.6 .387 -140.6      6 17 59.9  28  0 24 374.9 911.6
24 Oct 22  6 31 28.9 r   78233SA3  7.5        71- 114     45  89  51N 309   7 306 +8.4 -6.4 +1.7-0.3 .323  134.7      6 19 59.0  28 25 36 374.2 833.6
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.43sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -136sec
     78233 is a close double. Observations are highly desired
24 Oct 23  6 11  7.0 r    1108cG8  7.0  6.5   60- 102     30  79  46S 233 288 225 +8.7 -6.3 -0.1+2.5 .384 -142.2      7 19 30.8  26 49 23 381.7 900.7
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.21sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Oct 23 11 40 39.2 r   79431 K2  8.2  7.3   59- 100  -7 74 204  43N 325 305 316 +7.9 -6.3 +1.4-2.9 .292  142.2      7 29 32.0  26 55 43 380.1 680.9
24 Oct 24  8  1 40.0 r   80089 G5  7.2  6.7   49-  89     38  90  82S 276 331 263 +8.4 -5.8 +0.9+1.1 .423 -175.1      8 19  9.2  24 10 29 387.1 797.4
24 Oct 24  8 47 28.1 R    1251 B9  5.9  5.9   49-  89     47  99  62S 256 309 243 +8.2 -5.8 +1.2+1.9 .354 -152.8      8 20 32.1  24  1 20 386.6 747.1
   R1251 = lambda Cancri
24 Oct 24 11 29 59.8 r   80165 F2  7.5  7.3   48-  88  -9 71 156  66N 308 328 295 +7.8 -5.8 +1.8-1.5 .343  164.5      8 24 55.2  23 56 43 385.8 665.6
24 Oct 26  8 58 59.3 r   98897 K0  7.6  7.0   30-  66     26  92  19N   2  53 343 +6.8 -4.0 +1.1-5.3 .148  110.3     10  1 20.7  15 40 14 397.4 824.9
24 Oct 26 10  3 25.2 r   98907 F8  8.5  8.3   29-  66     38 104  83N 299 347 280 +6.6 -4.0 +1.2+0.2 .392  177.3     10  2  3.1  15 21 38 396.5 754.3
24 Oct 26 11 54 52.6 r   98936 K0  8.0  7.2   29-  65  -5 56 133  44N 338  12 318 +6.3 -3.9 +1.1-2.3 .292  145.1     10  5  3.5  15  8  4 395.4 681.9
24 Oct 27  8 38  3.7 R   99272 K2  7.5  6.8   21-  55     12  87  87N 296 346 276 +5.6 -2.8 +0.3+0.5 .466  178.1     10 44 26.0  10 22 29 401.9 909.1
24 Oct 29 11  5 52.7 R  138654KF2  8.3  8.0    8-  32     16 107  22N   1  47 340 +2.7 +0.0 -0.1-3.1 .231  122.0     12 13 36.2 - 1 14 13 404.3 855.2
24 Nov  5 23 48 49.8 d  186607 B8  8.6  8.6   18+  50     10 215  68N  71  42  73 -6.6 +7.5 +1.2-0.7 .393    7.9     18 17 56.3 -29 15 26 390.3 751.1
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov  9  3 23 14.0 D    3106 K0  5.2  4.6   48+  88     11 229  86S  77  39  93 -6.9 +5.7 +0.9-0.8 .463  -18.2     21 15 37.9 -20 39  6 376.2 888.8
   R3106 = phi Capricorni
24 Nov 11  3  9 59.0 D    3375 F2  6.8  6.6   70+ 114     35 211  39N  16 353  37 -5.2 +3.1 +0.4+1.5 .375   35.3     23  0 19.9 - 8 52 50 364.6 811.4
24 Nov 12  0 34 12.3 D    3505WG8  5.5  5.0   80+ 126     40 147   8N 343   7   5 -3.6 +1.8 -1.1+3.7 .173   68.0     23 47 56.5 - 2 45 42 360.6 808.0
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = +470sec
   Distance of 3505 to Terminator = 15.2"; to 3km sunlit peak = 1.8"
24 Nov 12  1 55  0.0 d  146935 K0  7.9  7.1   80+ 127     46 172  90S  66  72  88 -3.7 +1.7 +1.7+0.9 .433  -16.4     23 51  9.9 - 2 31 14 360.0 788.7
24 Nov 12  1 58  5.0 d Neptune     7.8  7.8   80+ 127     46 174  66N  42  47  64 -3.7 +1.6 +1.2+1.4 .448    7.7     23 50 57.8 - 2 24 44 360.0 789.6
   Neptune limb contacts offset by ±2.8 secs, at  1 58  2.2 and  1 58  7.8  Both contacts are against the bright limb of Neptune
24 Nov 12  4 19 50.8 d    3519cK5  7.6  6.7   81+ 128     39 220  60S  96  67 117 -4.0 +1.3 +2.0-1.3 .339  -44.4     23 54 38.7 - 1 56 46 360.2 828.8
      3519 is double: ** 8.2 8.7 0.050" 269.0, dT = -0.15sec
      3519 has been reported as non-instantaneous (OCc 126). Observations are highly desired
24 Nov 13  0 58 35.7 d      90SF8  7.6        88+ 140     43 135  60S  96 129 118 -2.0 +0.1 +2.0+0.8 .345  -44.8      0 42 23.2   4 10  0 357.4 844.4
        90 is triple: AB 7.86 9.71 2.14" 212.7, dT = -2.8sec : AC 7.9 13.4 47" 275.5, dT = -137sec
        90 is a close double. Observations are highly desired
24 Nov 13  5 23 41   M     104PK2  5.7  5.3   89+ 142     43 229  14S 144 109 165 -2.4 -0.6 +9.9+9.9 .000  -90.0      0 48 23.0   5 16 50 357.0 831.9
       104 is triple: AB 5.8      2.7" 341.0 : AC 5.8 12.3 149" 250.7
       104 is a close double. Observations are highly desired
   Distance of 104 to Terminator = 15.4"; to 3km sunlit peak = 4.0"
24 Nov 13  5 23 44   Gr    104PK2  5.7  5.3   89+ 142     42 ** GRAZE: CA 13.8S; Dist. 13km in az. 333deg. [Lat = 41.98+0.38(E.Long+87.67)]
24 Nov 16  7 16  8   d     537SB6  3.7  3.8s 100- 173     66 231 -40N 351 312   3 +3.2 -5.2 +9.9+9.9 .076   80.1      3 44 52.5  24  6 48 357.2 760.1
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = -1.5sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT = -
1156sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  7 20  5.8 d     545SB6  4.1  4.2v 100- 173     65 232 -62S  69  29  81 +3.2 -5.2 +1.7+0.3 .439    2.7      3 46 19.6  23 56 54 357.2 760.8
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.5sec : AB 4.2 14.4 110" 180.2, dT = -91sec : AC 4.2 12.9 147" 336.0, dT = -18sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Nov 16  7 22 18   Gr    537SB6  3.7  3.8s 100- 173     64 ** GRAZE: CA-30.4N; Dist. 26km in az. 352deg. [Lat = 42.09+0.10(E.Long+87.67)]
24 Nov 16  7 28 28   r     537SB6  3.7  3.8s 100- 173     64 236 -21N 332 289 344 +3.2 -5.2 +9.9+9.9 .076   99.9      3 44 52.5  24  6 48 357.3 764.6
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +2.1sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+1280sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  8  2 26.9 D     552SB7  2.9  2.9s 100- 173     58 246 -78S  54   6  66 +3.2 -5.2 +1.5+0.6 .423   20.0      3 47 29.1  24  6 18 357.7 780.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.07sec : AE 2.8 15.0 78" 232.4, dT = -185sec : AB 2.8 6.3 118"
291.1, dT = -152sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 34  7.8 R     545SB6  4.1  4.2v 100- 173     53 255  55N 258 206 270 +3.1 -5.2 +1.4-0.5 .462  177.3      3 46 19.6  23 56 54 358.1 804.2
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.5sec : AB 4.2 14.4 110" 180.2, dT = -49sec : AC 4.2 12.9 147" 336.0, dT = -68sec
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Nov 16  8 47 13.1 d     560SB8  3.6  3.7s 100- 173     51 257 -49S  85  32  97 +3.1 -5.2 +1.3-0.9 .462   -8.8      3 49  9.7  24  3 12 358.3 812.7
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7, dT = +0.01sec : Aa,Ab 3.8 6.8 0.22" 336.1, dT = -0.16sec : AC 3.6 15.0 50"  36.4, dT = +71sec :
AH 3.6 16.0 68" 221.7, dT = -107sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Nov 16  9  9 14.3 R     552SB7  2.9  2.9s 100- 173     46 262  37N 278 223 289 +3.1 -5.2 +1.1-1.4 .451  159.9      3 47 29.1  24  6 18 358.6 835.2
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.02sec : AE 2.8 15.0 78" 232.4, dT = -123sec : AB 2.8 6.3 118"
291.1, dT = -254sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Nov 16  9 31 47.5 r     559pF0  6.5  6.3  100- 173     42 266  70S 206 151 217 +3.0 -5.2 +1.5+1.9 .298 -127.2      3 48 56.9  23 51 26 359.0 858.0
   R559 = 26 Tauri
       559 is quadruple: Aa,Ab 6.4 9.3            : AB 6.5 14.5 79" 242.5, dT = -212sec : AC 6.5 15.0 87" 331.9, dT = +173sec
   Distance of 559 to Terminator = 6.9"; to 3km sunlit peak = 0.2"
24 Nov 16  9 55  7.4 R     560SB8  3.6  3.7s 100- 172     38 270  66N 251 196 262 +3.0 -5.2 +0.9-0.6 .502 -171.4      3 49  9.7  24  3 12 359.4 884.9
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.1, dT = -0.04sec : AC 3.6 15.0 50"  36.4, dT = +82sec : AH
3.6 16.0 68" 221.7, dT = -119sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 6.8"; to 3km sunlit peak = 0.2"
24 Nov 16  9 57 36.0 R     561SB7  5.1  5.1V 100- 172     38 270  49N 268 213 279 +3.0 -5.2 +0.8-1.1 .504  171.9      3 49 11.2  24  8 12 359.5 887.9
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.33sec : AF 5.0 14.5 4.7" 221.0, dT = -6sec : AE 5.1 14.8 96"  76.8, dT = +188sec : AD 5.1
14.7 144"  65.9, dT = +265sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 4.7"; to 3km sunlit peak = 0.0"
24 Nov 17 10 55 56.4 r   76841cK1  7.3  6.7   97- 159     40 273  68N 274 217 280 +4.6 -6.0 +0.8-1.3 .499  175.1      4 55 34.6  27 12  9 363.5 882.7
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.16sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 18  5 33 44.7 R     885wG7  5.6  5.1   92- 148     59 105  39S 211 266 211 +6.6 -6.3 +0.5+3.7 .279 -129.4      5 50 58.1  27 58  4 366.1 780.8
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -36sec
24 Nov 18 10 41 38.1 R   77818 K5  6.7  5.8   91- 146     55 261  75S 248 191 248 +5.9 -6.3 +1.6-0.2 .390 -150.9      6  0  4.9  28  7 33 367.5 796.6
24 Nov 20  8 55 48   R    1206 G8  5.9  5.3   76- 121     70 139   5N   4  36 353 +7.5 -5.9 +9.9+9.9 .087  103.5 .01  8  0 55.9  25 23 34 378.3 684.7
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 10.0"; to 3km sunlit peak = 0.0"
24 Nov 20  9 23 46.4 r   79855 A0  8.0  7.9   76- 121     72 158  72S 261 279 250 +7.5 -5.9 +2.2+0.7 .328 -151.8      8  0 26.2  25  2  2 378.4 682.6
24 Nov 20 10 10  8.9 R    1211SA1  6.3  6.3   75- 120     73 192  74N 295 285 284 +7.3 -5.8 +1.8-1.2 .375  176.0      8  1 43.8  25  5 22 378.5 690.6
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +4sec : AC 6.3 11.6 106" 295.0, dT = -282sec
24 Nov 21 11 46 59.1 r    1342KG5  7.6  7.3   65- 108 -11 66 216  52N 323 295 308 +7.0 -4.9 +1.1-2.4 .351  157.6      8 58 55.7  21  9 59 385.0 709.4
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Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 23  7 28 50.2 r   99157pF2  7.4        47-  86     23  94  47N 335  25 315 +6.4 -3.1 +0.7-1.3 .337  140.3     10 29 25.6  12 11 13 396.9 842.7
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.16sec
     99157 is a close double. Observations are highly desired
24 Nov 24  8 34 10   m    1628 K0  7.1  6.5   37-  75     23 103   7S 211 258 189 +5.1 -1.7 +9.9+9.9 .000  -90.0     11 14 32.5   5 59 34 400.2 823.0
24 Nov 25  9 54 11.0 R    1730wK2  6.2  5.5   28-  64     26 115  30N 353  36 331 +3.6 -0.2 +0.2-2.4 .274  132.2     11 59  3.3   0 31 50 401.8 793.9
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +55sec
24 Nov 26 11 16 45.7 R  138924 F2  7.7  7.5   19-  52     28 129  37N 345  21 324 +2.0 +1.3 +0.3-1.7 .316  143.4     12 42 35.9 - 5 28  6 402.3 769.2
24 Nov 26 11 26 50.8 r  138922kK5  9.1  8.3   19-  52     30 131  76N 306 340 284 +2.0 +1.3 +1.0-0.1 .389 -176.8     12 42 15.1 - 5 36 15 402.2 760.5
24 Nov 27 10 28 57.0 D    1925SB1  1.0  1.1v  13-  42     10 115 -66S 134 177 114 +0.7 +2.5 +0.3-0.1 .442   -9.4     13 25 11.6 -11  9 41 403.7 876.4
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -65sec : AC 1.0 10.5 368"  60.8, dT =
+243sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 10 38 33.0 R  157912kF0  7.8  7.6   13-  42     12 117  69N 310 353 290 +0.7 +2.6 +0.4+0.0 .439  174.5     13 23 56.5 -10 52 15 403.5 862.7
24 Nov 27 11 37 28.6 R    1925SB1  1.0  1.1v  12-  41     21 129  81N 298 334 278 +0.6 +2.7 +0.9+0.3 .404 -170.6     13 25 11.6 -11  9 41 402.5 799.9
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +34sec : AC 1.0 10.5 368"  60.8, dT =
+495sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 12  5 23.8 R    2029 M1  4.9  4.1v   7-  30  -9 15 129  45N 329   6 311 -0.7 +4.0 +0.2-0.6 .387  155.9 .01 14 10 50.5 -16 18  7 401.7 825.2
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  4 22 51  9.4 r    2910cG3  4.7  4.3   14+  43  -6 17 208 -76S 250 227 261 -5.7 +6.8 +1.3-0.4 .409  175.8     19 55 50.4 -26 17 58 382.4 761.1
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 23 23  5.8 D    2914cG8  4.8  4.4   14+  44 -11 14 214  67S 107  79 118 -5.7 +6.8 +2.0-1.6 .319  -41.6     19 58 57.2 -26 11 45 382.6 791.4
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Dec  5 23 36 30.7 d  189831 K0  8.5  7.9   22+  56     21 208  33N  20 358  35 -5.5 +6.0 +0.3+1.0 .328   39.1     20 54 50.6 -22  6  6 378.5 775.6
24 Dec  5 23 42  4.8 d  189843 K2  8.3  7.7   22+  56     21 209  52N  39  16  54 -5.6 +6.0 +0.8+0.4 .399   20.3     20 55 18.7 -22  7 25 378.5 780.2
24 Dec  6  0 30 56.0 D    3062 K2  7.5  6.8   22+  56     16 219  71N  58  27  73 -5.7 +5.9 +0.9-0.2 .450    1.5     20 56 52.7 -22  0 21 378.9 827.2
24 Dec  6 23  0  4.1 d  164653DB9  7.7  7.7v  31+  68  -7 31 187  26N   8   3  26 -5.0 +5.0 +0.3+1.8 .278   47.0     21 47 36.4 -17 17 41 374.4 740.2
    164653 is double: AB 7.7 11.4 4.5" 207.2, dT = -15sec
    164653 is a close double. Observations are highly desired
    164653 = AP Cap, 7.6 to 7.65, V, Type ACV, Period 2.6733 days, Phase  23%
24 Dec  7  0 49 27.9 D    3197 K3  6.4  5.6   32+  69     24 215  25N   6 340  25 -5.3 +4.8 -0.2+1.8 .297   48.2     21 50 13.0 -16 50 42 374.8 810.4
24 Dec  7 23  2  7.2 d  165228 K3  7.9  7.1   42+  81  -8 37 173  89S  70  75  90 -4.4 +3.7 +1.8+0.7 .397  -17.7     22 40 20.7 -11 36 19 370.6 748.4
24 Dec  8 23  8 37.4 d  146747 K0  8.0  7.5   54+  94  -9 41 159  87N  63  79  85 -3.6 +2.1 +1.6+1.2 .422  -12.8     23 30 57.4 - 5  3 39 367.2 770.1
24 Dec  9  1 13 36.2 D    3472PF5  6.9  6.7   54+  95     42 201  66N  43  28  65 -3.9 +1.8 +1.1+0.9 .435    6.7     23 33 28.6 - 4 24  5 366.9 780.2
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.16sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 53 43.1 d  146789kF2  7.2  7.0   55+  95     32 229  32N   9 334  30 -4.1 +1.6 +0.2+2.0 .340   43.7     23 35 14.7 - 3 51 14 367.6 838.8
24 Dec 10  3 25  3.3 d      58 G4  7.2  6.7   66+ 109     40 229  61S  96  61 117 -3.1 -0.1 +1.8-1.4 .341  -42.7      0 27 20.3   2 48 51 364.3 819.7
24 Dec 11  0 10 16.9 d  109738 G5  7.8  7.1   76+ 121     51 141  34N  12  41  33 -1.4 -1.3 +0.3+2.6 .359   39.2      1 13 41.8   8 58 29 361.7 812.8
24 Dec 11  5 45 29.2 d     201kG5  7.5  7.1   78+ 123     31 256  70N  49   2  70 -2.0 -2.0 +0.8+0.2 .491   12.1      1 22 43.4  10 22 10 363.1 883.5
24 Dec 12  8 13 40.1 d     348cA2  6.8  6.7   87+ 138     18 277  69S  95  45 113 -0.6 -3.5 +0.2-1.5 .513  -24.2      2 22 33.2  16 52 13 363.5 990.9
```

Occultation prediction for Chicago Astronomer Observatory
E. Longitude - 87 40 16.3, Latitude 41 51 8.6, Alt. 182m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       348 is double: ** 7.0 9.0
24 Dec 13  2  5 32   M     459SK2  6.4  5.8   93+ 149     62 132  19S 150 187 165 +1.5 -4.4 +9.9+9.9 .000  -90.0      3  9 20.1  20 45 40 359.9 800.5
       459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0 : AB 6.5 8.8 122" 239.0
       459 is a close double. Observations are highly desired
   Distance of 459 to Terminator = 17.8"; to 3km sunlit peak = 6.2"
24 Dec 13  2 26 45.0 d   75768 K0  7.6  7.1   93+ 149     65 140  65N  55  86  70 +1.4 -4.4 +1.3+1.6 .449    5.5      3 10 14.5  21 16 19 359.8 786.6
24 Dec 14  8 15 53.6 D     647WB9  5.4  5.4s  98+ 165     43 268  39S 148  92 157 +2.4 -5.7 +0.1-5.0 .210  -64.3      4 22 34.9  25 37 46 363.0 851.8
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9, dT = -51sec
       647 = NSV 15957, 5.34 to 5.39, Hp
   Distance of 647 to Terminator = 12.8"; to 3km sunlit peak = 3.6"
24 Dec 14  8 32 41   Gr    647WB9  5.4  5.4s  98+ 165     39 ** GRAZE: CA 12.4S; Dist.185km in az. 201deg. [Lat = 40.07-0.28(E.Long+87.67)]
   Distance of 647 to Terminator = 2.3"; to 3km sunlit peak = 0.0"
24 Dec 16  4 15 21.0 r   78291 K0  7.7  7.0   99- 168     59 105  84N 256 310 253 +5.6 -6.2 +1.3+1.5 .423 -168.6      6 22 47.9  27 59 12 368.1 769.9
   Distance of 78291 to Terminator = 19.9"; to 3km sunlit peak = 8.7"
24 Dec 16  9 46  0.4 r   78480cK5  7.5  6.7   99- 166     50 264  75N 270 212 266 +4.9 -6.1 +1.2-1.1 .450 -166.5      6 33  2.1  27 49 31 369.7 829.5
     78480 is double: ** 8.3 8.3 0.10"  63.0, dT = +0.2sec
     78480 has been reported as non-instantaneous (OCc 720). Observations are highly desired
24 Dec 17  5 13 13   r    1131 A2  7.3  7.3   95- 155     57 107  21S 200 252 191 +6.4 -6.0 +9.9+9.9 .088 -102.3      7 28  0.9  26 13 39 373.2 746.8
   Distance of 1131 to Terminator = 12.2"; to 3km sunlit peak = 2.9"
24 Dec 19  6  6 58.6 r   98510kG5  7.2  6.8   82- 131     43 104  75N 300 350 283 +6.7 -4.4 +1.3+0.0 .403  171.6      9 20 37.9  19  5 26 384.9 761.0
24 Dec 19  6 54 56.1 r    1388pG0  7.7  7.4   82- 130     51 116  55S 250 295 233 +6.5 -4.4 +1.9+2.4 .276 -135.2      9 21 47.1  18 44 47 384.5 724.0
      1388 is double: AB 7.7 16.0 23.3" 350.8, dT = +16sec
24 Dec 19 12 31 19.3 r    1402 K0  7.3  6.5   81- 128  -8 44 253  66S 262 214 245 +5.6 -3.8 +1.6-1.1 .331 -138.6      9 29 32.9  17 39  7 386.3 825.1
24 Dec 20 12 51  4.7 r    1506cG0  7.0  6.7   72- 117  -5 45 242  72N 308 266 288 +5.0 -2.6 +0.9-2.0 .414  179.1     10 18 21.3  12 37 16 391.1 785.8
      1506 is double: ** 7.9 7.9 0.10"  90.0, dT = +0.19sec
      1506 has been reported as non-instantaneous (OCc1413). Observations are highly desired
24 Dec 22  8 56  4.3 R    1696 F5  6.9  6.7   55-  95     38 129  50N 334  10 312 +3.9 -0.4 +0.8-1.4 .344  154.1     11 42 25.5   2 21 44 398.1 737.5
24 Dec 24 11  5 16.1 R    1887 K0  6.3  5.8   35-  73     34 149  82N 300 323 279 +0.9 +2.6 +1.5-0.2 .363 -169.5     13  9 14.2 - 9 32 17 400.9 718.2
24 Dec 24 12 36 36.5 r  139199 A0  7.9  7.9   35-  73  -7 38 176  49S 250 253 229 +0.5 +2.8 +3.9+1.4 .171 -119.4     13 10 50.2 -10  6 11 400.5 678.6
24 Dec 25 10 28  4.1 R  158207 F0  7.4  7.2   27-  62     20 134  88N 291 325 271 -0.3 +3.8 +1.1+0.6 .389 -163.9     13 52 15.4 -14 40 36 401.5 788.4
24 Dec 25 11  4 41.7 r    1992cF0  7.5     S  27-  62     25 141  28N 351  20 332 -0.4 +3.8 -0.1-1.8 .280  136.1     13 53 51.7 -14 39 51 401.0 754.5
      1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.9sec
      1992 is a close double. Observations are highly desired
      1992 = NSV 19984, 7.4, , Type VAR:
24 Dec 26 12 38  5.7 r    2095 K0  7.0  6.5   18-  51  -7 25 156  87N 287 306 271 -1.9 +5.1 +1.7+0.3 .354 -163.0     14 41 25.4 -19 55 41 398.9 715.5
24 Dec 27 11 32 27   m  183520kA5  8.2  8.0   12-  40      9 134  20S 209 245 196 -2.6 +5.9 +9.9+9.9 .000  -90.0     15 29 53.1 -24  2 41 397.8 826.5
24 Dec 27 12  5 13.7 R  183537kK0  7.3  6.6   12-  40     13 140  22N 346  18 333 -2.7 +6.0 -0.2-1.3 .277  132.6     15 31  7.0 -23 39 24 397.2 788.3
```

Lunar Occultation predictions
Varney Observatory
Pembroke Pines
Florida
USA

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 10 53 30.7 R    1770 A5  5.9  5.8   56-  97     63 181  61N 322 321 300 -3.2 -1.4 +1.6-2.1 .327  174.6     12 18 40.3 - 0 47 14 397.2 632.4
   R1770 = 13 Virginis
24 Jan  4  8 40  3.4 r    1865 A2  7.3  7.2   47-  87     38 122  79S 282 332 261 -3.8 -0.4 +1.9+0.3 .333 -150.7     12 59  0.2 - 6  5 27 396.4 734.9
24 Jan  5  8 37 30.7 r    1966kK2  7.8  7.1   38-  76     26 119  24N 357  50 338 -4.8 +1.1 -0.4-2.8 .277  131.0     13 44 15.6 -11 26 12 393.6 807.4
24 Jan  5 10 39 33   M    1971SG8  5.5        37-  75     46 147  22S 223 253 203 -5.1 +1.3 +9.9+9.9 .000  -90.0     13 45 56.3 -12 25 36 391.4 685.3
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1 : AC 5.7 11.9 27.4" 162.6
      1971 is a close double. Observations are highly desired
24 Jan  7 10 46 13.5 R    2204kK0  7.7  7.1   19-  52     26 134  84S 276 320 263 -6.0 +4.1 +1.6+0.6 .381 -153.1     15 24 57.6 -22  2 37 382.6 792.7
24 Jan  7 10 52 32.1 R X 39461pK0  7.5  7.0   19-  52     27 135  62N 310 353 297 -6.0 +4.1 +0.9-0.5 .420  173.3     15 25 22.6 -21 55 45 382.5 784.5
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +11sec : AC 7.9 13.5 40" 190.5, dT = +46sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8 10 42 58.1 R    2349SB1  2.9     v  11-  39     14 128  69N 295 347 287 -5.8 +5.3 +0.6+0.1 .478 -179.0     16 21 11.3 -25 35 34 378.0 875.9
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -0.04sec : AB 2.9 8.4 20.3" 273.1, dT = -39sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 25 28.9 D    2366dM1  1.1  0.1v  11-  38  25 38 175 -75S 109 113 101 -6.4 +5.7 +2.4-0.5 .352    2.5 .12 16 29 24.5 -26 25 55 374.8 640.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 15 56 58.1 R    2366dM1  1.1  0.1v  10-  38  37 35 200  76N 287 266 279 -6.8 +5.8 +2.5-0.9 .351  177.2 .12 16 29 24.5 -26 25 55 374.7 638.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 10 53 20.7 r  185324kA0  8.7  8.5    5-  27      4 124  80N 274 332 271 -5.2 +6.2 +0.6+0.7 .507 -165.8     17 22 16.8 -28  0  8 373.5 948.2
24 Jan  9 11 22 29.4 R    2505 K4  5.3  4.5    5-  27 -11  9 128  87S 260 314 258 -5.3 +6.3 +1.1+1.2 .440 -151.9     17 23 21.6 -28  8 34 372.8 900.7
   R2505 = 43 Ophiuchi
24 Jan 13 23 50 55.0 d  164823 G0  8.6  8.2    8+  34     18 240  43S 123  68 143 -0.3 +5.4 +2.6-3.8 .208  -67.4     22  1 50.2 -16 46 39 360.5 947.6
24 Jan 14  0 59 27.8 d    3232 K0  8.1  7.4    9+  34      5 249  80N  66   5  85 -0.3 +5.3 +0.2-0.1 .591   -7.3     22  4 12.2 -16  9 46 362.01046.6
24 Jan 14 23 36  4.2 d    3365kA0  8.2  8.1   16+  47 -10 35 235  76N  56   8  78 +1.4 +4.3 +1.1+0.5 .483   -5.3     22 56 49.4 -10 15 47 360.3 846.9
24 Jan 15  1 59 59.4 d    3377 K0  7.9  7.4   17+  48      7 256  85N  65   2  86 +1.3 +4.0 +0.2+0.0 .583   -6.7     23  1  7.9 - 9 33 14 363.41034.7
24 Jan 16  1  8 25   m  146936 K5  7.9  7.2   26+  62     31 249  15S 143  86 165 +2.7 +2.6 +9.9+9.9 .000  -90.0     23 51 28.9 - 3 24 14 363.5 868.2
24 Jan 16  1  8 29   Gr 146936 K5  7.9  7.2   26+  62     29 ** GRAZE: CA 14.6S; Dist.  9km in az. 337deg. [Lat = 26.09+0.38(E.Long+80.50)]
24 Jan 16  2  1 38   M    3514cG9  5.9  5.4   27+  62     20 256  12S 146  85 168 +2.7 +2.5 +9.9+9.9 .000  -90.0     23 52 55.6 - 3  9 20 364.8 935.1
   R3514 = 24 Piscium
      3514 is double: AB 6.7 6.7 0.10"  72.9
      3514 is a close double. Observations are highly desired
24 Jan 16  2  1 49   Gr   3514cG9  5.9  5.4   27+  62     18 ** GRAZE: CA 11.6S; Dist. 59km in az. 345deg. [Lat = 26.55+0.24(E.Long+80.50)]
24 Jan 17  0 18 33.5 d  109370 K2  8.2  7.5   37+  75     54 237  67N  45 356  66 +4.0 +1.1 +1.4+1.3 .420    5.0      0 41 21.3   3 35 58 365.0 746.8
24 Jan 17 23 57 50.8 d  109947 K0  7.8  7.2   48+  88     70 219  82N  61  25  81 +5.0 -0.5 +2.1+1.1 .381  -11.2      1 31 53.2   9 59 18 368.0 693.7
24 Jan 18  2 37 51.4 d     232 K0  8.1  7.4   49+  89     39 263  84S  75   9  95 +4.6 -0.8 +1.4-0.2 .423  -15.4      1 35 33.4  10 33 42 370.5 788.2
24 Jan 19  3 10 47.6 d     363 F0  7.2  7.0   60+ 102     45 268  56N  37 327  55 +5.1 -2.3 +1.5+1.6 .363   27.3      2 27 32.1  16 38 37 374.2 741.6
24 Jan 20  3 29 34   D     486CB5  5.3     e  70+ 114     53 272  13S 153  78 167 +5.3 -3.7 +9.9+9.9 .046  -82.9      3 21 13.6  21  8 49 377.7 690.2
   R486 = Tau Arietis
       486 is double: AB 5.34 8.09 0.94" 212.6
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       486 is a close double. Observations are highly desired
       486 = tau 1 Ari, 5.26 to 5.32, Hp, Type EB:, Period 2.20356 days, Phase  13%
24 Jan 20  3 35  0   Gr    486CB5  5.3     e  70+ 114     50 ** GRAZE: CA  5.9S; Dist. 14km in az. 179deg. [Lat = 25.87+0.01(E.Long+80.50)]
24 Jan 23  6 48 34.6 d   78191 A0  7.7  7.7   94+ 151     47 284  75S 115  34 113 +4.4 -6.2 +1.0-1.8 .383  -12.9      6 17 59.9  28  0 24 389.5 742.4
24 Jan 24  5 33 42.9 d X 99111S    7.2  7.0s  98+ 162     74 279  63S 140  49 133 +4.2 -6.5 +1.6-3.0 .271  -33.2      7 12 49.0  27 13 30 390.9 614.4
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.5sec : BC 7.3 12.7 14.0"  68.0, dT = +16sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  5 33 42.9 D    1093SF8  6.6     s  98+ 162     74 279  63S 140  49 133 +4.2 -6.5 +1.6-3.0 .271  -33.2      7 12 49.0  27 13 30 390.9 614.4
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.5sec : AC 7.2 12.8 13.7"  74.4, dT = +21sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  9 22 57.5 d    1108cG8  7.0  6.5   98+ 163     25 289  86N 109  37 101 +3.6 -6.2 +0.2-1.4 .480    0.8      7 19 30.8  26 49 23 394.7 919.3
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.2sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Jan 25  0 48 33.8 D    1206 G8  5.9  5.3   99+ 171     32  75  88S 137 212 126 +4.6 -6.4 +1.7-1.3 .298  -43.7      8  0 55.9  25 23 34 395.8 790.8
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 10.8"; to 3km sunlit peak = 2.5"
24 Jan 28  2 43 53.8 r   99149 A2  7.1  7.0   94- 153     23  86  89N 285 353 265 +1.4 -4.6 +0.8+0.4 .409 -171.6     10 28 42.4  13 17 20 402.6 806.3
24 Jan 28  7 19 37.2 r   99185pA3  7.9  7.7   94- 152     76 170  78S 274 283 253 +0.4 -4.3 +3.4-0.2 .251 -141.6     10 34  7.3  12 22 28 399.1 619.3
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.05sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 22 23.5 R    1625SK3  5.8  5.2   89- 142     21  91  26N 354  59 332 +0.0 -3.5 +0.6-3.4 .237  124.4     11 14  1.8   8  3 39 403.5 822.4
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.04sec : AB 5.8 11.8 23.8" 260.1, dT = +7sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29 10 30 55   Gr   1644 B9  4.1  4.1   88- 140     50 ** GRAZE: CA 21.5S; Dist. 79km in az.  49deg. [Lat = 27.08-1.04(E.Long+80.50)]
24 Jan 29 10 33 18   M    1644 B9  4.1  4.1   88- 140     51 246  22S 222 167 201 -1.6 -2.7 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 400.8 701.5
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6 10 56.1 R    1732cK0  6.8  6.1v  82- 130     45 116  60N 322  16 300 -1.8 -2.0 +1.2-1.5 .349  168.3     11 59 23.9   1 49 36 400.8 693.6
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.28sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 12 10.5 r    1824pG0  7.8  7.5   74- 119     46 128  42N 341  26 319 -3.3 -0.5 +0.6-2.2 .316  152.2     12 42 59.3 - 4  2 58 399.3 693.1
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -3sec
      1824 is a close double. Observations are highly desired
24 Jan 31 10 12 44.8 r  138955 K2  7.2  6.5   74- 118     57 201  62N 321 302 300 -4.0 -0.1 +1.7-2.1 .326  174.0     12 45 32.0 - 4 48 39 398.2 632.4
24 Feb  2 11 43 25.8 r    2040cK0  8.0  7.3   55-  95  -6 46 198  82N 297 280 280 -6.5 +2.9 +2.4-1.3 .320 -170.2     14 15 50.2 -16  4 53 392.1 617.9
      2040 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.28sec
      2040 has been reported as non-instantaneous (OCc 142). Observations are highly desired
24 Feb  4  8 16 36.8 R    2270 B2  5.4  5.4e  36-  73     13 125  16N 355  49 344 -6.9 +4.9 -1.1-2.7 .261  123.7     15 53 55.9 -23 58 41 385.5 879.3
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4  8 31 57   Gr   2269cB5  5.4  5.4   35-  73     16 ** GRAZE: CA 18.3S; Dist.110km in az.  35deg. [Lat = 27.21-0.64(E.Long+80.50)]
24 Feb  4  8 32  6   M    2269cB5  5.4  5.4   35-  73     15 128  19S 209 261 198 -6.9 +4.9 +9.9+9.9 .000  -90.0     15 53 53.9 -24 31 59 385.1 856.9
24 Feb  4 11 56 25.7 R    2286kB5  5.4  5.5v  35-  72  -3 39 172  73N 297 306 287 -7.5 +5.4 +2.3-0.7 .341  179.8     15 58 34.9 -24 49 53 382.0 631.4
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  69%
24 Feb  5 10 33 55.7 r  184783 G6  7.9  7.4   25-  60     23 141  36S 220 260 214 -7.1 +6.2 +5.3+5.5 .124 -107.4     16 54 49.6 -27 44 55 377.6 759.1
24 Feb  5 10 35 41.9 r  184777pA0  8.4  8.4   25-  60     24 141  82S 266 306 260 -7.1 +6.2 +1.9+0.9 .369 -153.5     16 54 27.0 -27 34  9 377.5 756.1
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.47sec
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    184777 is a close double. Observations are highly desired
24 Feb  6 11 29 52.1 R    2586cB3  6.0  6.0   16-  47  -8 22 141  37N 318 358 318 -6.5 +7.0 +0.7-0.8 .343  144.8     17 58 39.0 -28 45 33 371.2 756.4
      2586 is double: ** 6.3 7.3 0.30" 276.0, dT = -0.7sec
      2586 has been reported as non-instantaneous (OCc1519). Observations are highly desired
24 Feb  7 10 44 44   GrX163280MG1  8.3  8.0    9-  34      6 ** GRAZE: CA 19.4S; Dist. 37km in az. 213deg. [Lat = 25.60-0.58(E.Long+80.50)]
24 Feb  7 10 51 14   r X163280MG1  8.3  8.0    9-  34      6 126  31S 196 252 202 -5.4 +7.2 +5.1+8.4 .098 -101.2     19  2 32.1 -28 38 41 367.3 899.5
   X163280 is triple: AB 9.0 9.3 2.2"  52.6, dT = +18sec : AC 9.0 8.9 241" 265.0, dT = -874sec
   X163280 is a close double. Observations are highly desired
24 Feb 11 23 42 40.5 d  146719KF8  8.1  7.8    6+  28  -7 20 253  61N  42 342  64 +1.3 +3.1 +0.4+0.8 .538   13.4     23 28 17.0 - 5 49  4 357.2 958.4
24 Feb 13  0 57 36.5 d  109178 K0  8.9  8.3   13+  42     18 263  85S  73  10  95 +3.0 +1.3 +0.6-0.3 .527  -15.0      0 23 55.0   1 32 19 360.6 954.3
24 Feb 13  1  8 27.9 D  109182 G0  7.8  7.4   13+  42     16 264  77S  81  17 103 +3.0 +1.3 +0.5-0.5 .514  -21.9      0 24 17.3   1 33 22 360.8 969.6
24 Feb 13  1 53 52.2 D      50dG5  5.8  5.3S  13+  43      6 269  62N  39 335  61 +3.0 +1.2 +0.2+0.8 .548   21.8      0 25 24.2   1 56 23 362.01036.2
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14 23 41 33.1 d     309 F0  8.2  8.0V  32+  69  -7 62 252  64N  44 342  62 +5.8 -2.0 +1.7+1.5 .387   12.3      2  6 41.6  14 35  2 366.1 703.3
      309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  1 57 39.1 d   92820 K2  8.2  7.6   33+  70     33 272  71N  51 342  69 +5.5 -2.1 +1.1+0.7 .446   14.8      2 10 15.7  15  1 23 368.8 825.2
24 Feb 15  2 16 57.3 d   92821 K0  8.1  7.3   33+  70     28 274  48N  28 320  46 +5.4 -2.2 +1.0+1.7 .371   38.8      2 10 29.4  15  9  5 369.3 851.5
24 Feb 15  3 24 47.6 D     326cM0  5.7  4.9s  33+  70     14 281  74N  54 347  72 +5.4 -2.2 +0.5+0.3 .508   16.4      2 13  3.3  15 16 48 371.0 953.8
   R326 = 19 Arietis
      326 is double: ** 6.8 6.8 0.050"
      326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
      326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 25 52.3 d   75708 K0  8.0  7.1   43+  82     53 270  53N  36 323  51 +6.2 -3.6 +1.8+1.9 .333   31.4      3  3  9.6  20 20 10 372.5 704.1
24 Feb 16  4 45 17.8 d     459SK2  6.4  5.8   45+  84     10 288  50N  34 328  48 +5.9 -3.6 +0.7+1.2 .384   44.4      3  9 20.1  20 45 40 377.3 984.7
      459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -288sec : AB 6.5 8.8 122" 239.0, dT = -288sec
      459 is a close double. Observations are highly desired
24 Feb 17  0 35 52.7 D     587 K0  6.2  5.5   54+  95     76 268  30N  19 297  29 +6.8 -4.8 +1.7+4.2 .217   50.5      3 57 26.4  24 27 43 376.7 622.5
24 Feb 17  0 51  7.3 D   76358kB9  7.2  7.2   54+  95     73 268  41S 128  47 138 +6.7 -4.8 +3.3-3.9 .185  -57.3      3 58 20.9  24  4 52 376.8 626.2
24 Feb 18  0 44  5.3 d   76841cK1  7.3  6.7   65+ 107     86 293  58N  53 301  58 +6.8 -5.7 +2.5+2.0 .295   23.4      4 55 34.6  27 12  9 381.6 595.8
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.24sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 36 22.3 D     746WB7  7.0  6.9   65+ 108     49 283  55N  50 329  56 +6.2 -5.8 +2.3+1.2 .296   38.7      4 59 53.7  27 19 32 383.7 705.1
      746 is double: AB 7.0 8.7 20.4" 206.0, dT = -63sec
24 Feb 18 23 20 24   M     885wG7  5.6  5.1   74+ 118  -2 63  79  14S 168 255 168 +6.9 -6.3 +9.9+9.9 .000  -90.0      5 50 58.1  27 58  4 386.6 650.5
      885 is double: AB 5.7 12.5 10.9" 233.1
24 Feb 19  4 56  8.7 D   77818 K5  6.7  5.8   75+ 120     44 285  62S 121  41 121 +5.7 -6.3 +0.8-2.0 .371  -21.1      6  0  4.9  28  7 33 388.8 749.5
24 Feb 21  2 59 23.4 D    1181cG8  7.0        90+ 142     87  82  75N  92 189  82 +5.0 -6.6 +3.0-0.1 .290   16.6      7 49 47.7  26 15 50 393.6 576.8
     1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.43sec
     1181 is a close double. Observations are highly desired
24 Feb 22  0 31 55.0 d    1290pF8  6.9  6.6   94+ 153     44  81  28N  52 129  38 +4.7 -6.3 +1.2+3.5 .231   50.0      8 38 45.5  23 41  9 397.8 692.3
     1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +1222sec
24 Feb 27  6 11 14.8 r    1790 M4  6.9  6.0v  93- 150     56 145  33N 349  21 328 -2.3 -0.7 +0.5-2.9 .281  146.3     12 29  9.7 - 2 25 46 400.1 655.1
   R1790 = FZ Virginis
     1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 27 22.7 r    1890 K0  7.3  6.8   88- 140     28 115  40N 342  38 322 -3.2 +0.5 +0.2-2.0 .339  146.3     13  9 46.3 - 7 39 19 401.0 791.1
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb 29  8 46 52.3 R    2002 K0  6.8  6.3   80- 127     50 180  51N 330 330 312 -5.3 +2.5 +1.4-2.1 .308  161.4      13 58 29.8 -14  7 19 396.1 625.3
24 Mar  2 10 47 23.7 d    2237cK3  5.0  4.3s  62- 104     40 188 -68N  82  75  70 -7.4 +5.2 +3.3+0.1 .263   34.4 .01 15 40 16.9 -23 49  5 388.7 600.9
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.29sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12  9 24.8 r    2237cK3  5.0  4.3s  62- 104   5 34 210  49N 325 295 313 -7.7 +5.3 +2.2-2.4 .270  145.4 .01 15 40 16.9 -23 49  5 389.0 617.8
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.17sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  6 58 57.5 D    2366dM1  1.1  0.1v  53-  93     11 127 -84N  93 147  85 -7.1 +5.8 +0.9+0.8 .429   22.3 .10 16 29 24.5 -26 25 55 387.3 871.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8  4  4.6 R    2366dM1  1.1  0.1v  53-  93     22 136  50N 318   2 311 -7.2 +6.0 +0.5-0.8 .381  157.5 .11 16 29 24.5 -26 25 55 385.9 771.3
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9  0 39.7 R    2373 K1  6.1  5.5   52-  93     29 147  23N 346  19 338 -7.4 +6.1 -0.1-2.3 .240  129.8      16 31 22.8 -26 32 16 384.9 699.7
24 Mar  5  9 32 56.7 R    2688 G6  7.0  6.6s  31-  68     16 134  65S 239 287 243 -7.0 +7.4 +2.0+1.9 .337 -140.7      18 32 14.0 -29 11 25 374.3 790.8
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 21 22.8 r  188343 K0  8.4  7.8   21-  54     15 131  70N 276 326 286 -6.1 +7.5 +1.1+0.7 .446  171.8      19 36 57.4 -27 30  4 368.2 804.4
24 Mar  7 10 46 13.6 R  189555 G1  7.2  6.9   12-  41     11 124  68N 270 326 285 -4.8 +7.1 +0.9+0.8 .479  168.8      20 40 22.3 -24  7  5 363.2 860.8
24 Mar  8 11 40  4.0 r    3175 G8  4.7  4.3    5-  27   0 13 118  36N 294 351 313 -3.0 +6.3 +0.7+0.1 .367  136.3      21 42 39.5 -18 51 59 358.7 882.1
   R3175 = kappa Capricorni
24 Mar 13  0 48 16.1 d   92623 K5  8.9  8.4   10+  36     18 275  84N  61 355  81 +4.0 -1.6 +0.6+0.1 .539    4.9       1 46 38.7  12 24 42 361.9 948.9
24 Mar 14 23 57 17.9 D     521kA2  6.7  6.7v  27+  63  -7 56 274  54N  39 321  51 +6.4 -4.6 +2.0+1.9 .322   33.9       3 36 58.0  23 12 40 369.7 696.3
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 18  1 15 24.8 d   78530cB9  7.8  7.8   59+ 100     76 283  52S 132  36 128 +6.7 -6.8 +2.1-2.8 .270  -32.3       6 35 40.3  28 15 51 386.7 598.6
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = -0.03sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 33 36.2 D    1022CB7  6.0     s  59+ 101     47 285  81N  86   5  82 +6.2 -6.6 +1.6-0.7 .372   20.0       6 39 33.1  28 15 47 388.7 746.4
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +1.3sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 33 37.5 d X 91013C    7.8  7.8s  59+ 101     47 285  81N  86   5  82 +6.2 -6.6 +1.6-0.7 .372   20.1       6 39 33.2  28 15 48 388.7 746.5
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -1.3sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 33 56.1 D    1026SG5  6.5  5.9   60+ 101     34 288  69N  74 358  70 +6.1 -6.5 +1.3-0.4 .376   32.2       6 41 20.9  28 11 48 390.0 839.8
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +75sec : AC 6.6 12.8 58"  61.3, dT = +149sec
24 Mar 19  1  1 30.6 D   79479 K1  7.2  6.6   68+ 112     88  47  78N  89 221  80 +6.2 -6.8 +3.0+0.1 .290   17.2       7 32 12.9  27  7 31 391.0 574.7
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 19  3 47 25.0 D    1149SK5  4.1  3.3s  69+ 112     55 281  55N  66 344  57 +5.6 -6.6 +2.9+0.5 .248   48.1 .03  7 35 55.4  26 53 45 392.6 706.8
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.16sec : AB 4.1 13.2 57"  39.0, dT = +204sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 39 16.1 r    1149SK5  4.1  3.3s  69+ 113     44 283 -29N 343 264 333 +5.5 -6.5 -0.5-3.5 .272  131.7 .02  7 35 55.4  26 53 45 393.6 781.0
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = -0.01sec : AB 4.1 13.2 57"  39.0, dT = -115sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2  1 24.8 D    1263DF0  6.9  6.8S  77+ 123     88 210  29N  46  16  33 +5.2 -6.5 +6.2+6.5 .102   70.5      8 26 39.8  24 32  3 394.7 585.9
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +55sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  2  2 25   d   80185SF0  7.7  7.4   77+ 123     88 217  28N  45   9  32 +5.2 -6.5 +6.5+7.0 .097   71.6      8 26 40.1  24 32  7 394.7 586.3
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.8sec : BC,A 7.5 6.9 5.6" 231.8, dT = -58sec
     80185 is a close double. Observations are highly desired
24 Mar 20  3 22  3.7 D    1270cF0  6.1  5.9v  78+ 124     71 269  75N  92  12  79 +4.9 -6.4 +2.8-0.6 .292   28.5      8 28 36.8  24  8 42 395.2 637.6
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 31  8.9 D    1479 F2  6.4  6.2   91+ 146     80 184  76N 102  99  83 +2.8 -4.9 +3.0-0.7 .279   28.4     10  5 40.9  15 45 27 399.2 614.0
24 Mar 22  5 40 12.2 d    1485 G0  7.1  6.8   92+ 146     58 257  70S 135  70 116 +2.3 -4.6 +1.2-2.3 .360   -4.8     10  7 39.3  15  9 27 400.1 701.6
24 Mar 23  3  1 46.7 D    1576 A2  5.3  5.3   96+ 157     68 131  57S 152 195 131 +1.7 -3.9 +1.4-2.5 .300  -20.6     10 49 15.4  10 32 43 400.3 623.4
   R1576 = 53 Leonis
24 Mar 27  5 23 25.4 r  158105PF5  7.5  7.2   96- 158     47 150  39N 346  14 327 -3.6 +1.9 +0.5-2.4 .294  147.4     13 42 35.7 -12  5 13 397.6 672.9
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  7  0 27.8 r  184209KK0  7.7  7.2   78- 124     30 148  81S 274 306 265 -6.3 +5.9 +2.2+0.5 .335 -155.8     16 11 51.3 -25 53  1 389.4 693.5
24 Apr  2 10 35 49   Gr   2813 K2  7.7  7.1   46-  86  -9 33 ** GRAZE: CA  1.6S; Dist. 38km in az. 184deg. [Lat = 25.66-0.07(E.Long+80.50)]
24 Apr  2 10 43 23   r    2813 K2  7.7  7.1   46-  86  -7 33 161  10S 182 202 190 -6.9 +7.6 +9.9+9.9 .057  -99.4 .01 19 16 48.8 -28 40  2 374.1 633.2
24 Apr  4  9 38 39.9 R  190165 K0  7.2  6.7   25-  60     14 123  49S 208 263 225 -4.8 +6.8 +1.5+2.7 .330 -134.5     21 15  3.2 -21 48 55 366.2 834.9
24 Apr  4 10 24 34.7 r  190177 F3  8.2  8.0   25-  60 -11 22 129  62N 277 325 294 -4.8 +6.8 +1.4+0.7 .395  154.3     21 15 52.6 -21 26 23 365.1 775.6
24 Apr  6 16 17 56.2 r    3421cM3  4.9  4.1v   7-  30  65 55 197  71N 261 245 283 -2.2 +3.6 +2.6+0.2 .365  145.9 .01 23 16 50.9 - 7 43 35 354.6 758.6
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16  4 16.4 D Venus      -3.8 -3.8    2-  16  63 63 166 -70N  41  54  63 -0.1 +2.0 +1.6+1.9 .395    2.8      0 12 29.6 - 0 16 40 353.2 677.3
   Venus contacts: Dark limb 16  4  3; Terminator 16  4  4; Bright limb 16  4 29: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17 29 41.3 R Venus      -3.8 -3.8    2-  15  71 60 211  75S 231 199 248 -0.3 +1.7 +1.7+1.5 .400  177.9      0 12 29.6 - 0 16 40 353.3 685.4
   Venus contacts: Dark limb 17 29 29; Terminator 17 29 39.0; Bright limb 17 29 54: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 11  1 13 38.8 D     472cA1  4.9  4.9    7+  31     10 289  44S 116  50 130 +4.5 -4.0 -0.3-1.7 .454  -37.4      3 14 54.1  21  2 40 367.11017.8
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.21sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 11  1 32 25.5 D   75819 F2  7.9  7.7    7+  31      6 290  63S  97  32 111 +4.5 -4.0 -0.2-1.0 .560  -18.1      3 15 46.1  21  9 55 367.61049.7
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Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr 14  3 41 39.5 d   78233SA3  7.5        33+  70     18 293  40N  40 331  38 +6.1 -6.4 +1.6+1.4 .245   62.2      6 19 59.0  28 25 36 384.8 980.1
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.26sec : AB,C 7.5 9.6 2.9" 265.3, dT = -8sec : BA 8.7 9.3 58" 268.1, dT = -159sec
     78233 is a close double. Observations are highly desired
24 Apr 15  0 45 23.5 d   79180 F2  8.1  7.8   42+  81     67 281  58N  65 336  58 +6.3 -6.8 +3.2+1.0 .248   44.4      7 13  6.6  27 46 57 385.9 648.8
24 Apr 15  3 38 13.2 d   79256 K0  7.8  7.3   43+  82     30 288  69S 118  44 110 +5.9 -6.5 +0.3-1.6 .466   -7.3      7 17 59.4  27  8 31 389.2 887.3
24 Apr 15  3 49 10.0 d   79264 G2  8.0  7.7   43+  82     28 289  79N  85  12  78 +5.9 -6.5 +0.7-0.8 .434   25.1      7 18 28.9  27 15 10 389.5 905.5
24 Apr 15  4 44 41.1 d    1108cG8  7.0  6.5   43+  82     16 292  17S 170 101 162 +5.8 -6.4 -1.4-3.4 .257  -60.7      7 19 30.8  26 49 23 390.9 999.1
      1108 is double: ** 7.7 7.7 0.10"  90.0, dT = +0.07sec
      1108 has been reported as non-instantaneous (OCc1353). Observations are highly desired
24 Apr 16  0 33 17.3 d    1229SF5  8.1  7.9   52+  92 -11 81 270  49N  62 336  50 +5.9 -6.6 +4.2+2.1 .187   54.1      8  8 20.1  25 33 10 390.4 605.2
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.47sec : AB 8.2 12.8 3.1" 302.7, dT = -8sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 17  2 42 13.8 d    1348 G5  8.1  7.6   62+ 104     62 267  86S 112  37  96 +4.6 -5.9 +1.9-1.6 .347   13.4      9  2 45.2  21 31  9 395.2 683.6
24 Apr 19  1 13 56.6 d   99185pA3  7.9  7.7   80+ 126     72 135  52S 153 193 132 +2.8 -4.3 +1.4-2.6 .295  -21.7     10 34  7.3  12 22 28 399.0 613.5
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.6sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5  9 22.3 D    1644 B9  4.1  4.1   87+ 138     51 245  45S 161 105 139 +0.7 -2.6 +0.6-2.9 .319  -27.7     11 21  8.2   6  1 46 400.7 701.5
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 17 54.4 r    1644 B9  4.1  4.1   88+ 139     36 258 -76S 281 219 260 +0.4 -2.4 +1.4-1.4 .351 -152.3     11 21  8.2   6  1 46 401.8 772.8
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 21 29.3 d    1732cK0  6.8  6.1v  92+ 148  -8 40 111  40N  66 123  44 +0.5 -1.8 +3.2+3.7 .168   63.1     11 59 23.9   1 49 36 401.1 722.7
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.27sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4  8 49   d  138955 K2  7.2  6.5   97+ 160     59 181  36N  58  57  37 -1.5 +0.1 +9.9+9.9 .071   77.7 .01 12 45 32.0 - 4 48 39 398.3 639.2
24 Apr 22  4 17 31   Gr 138955 K2  7.2  6.5   97+ 160     59 ** GRAZE: CA 23.4N; Dist. 44km in az.  51deg. [Lat = 26.63-1.12(E.Long+80.50)]
   Distance of 138955 to Terminator = 11.9"; to 3km sunlit peak = 2.9"
24 Apr 26  4 19 44.7 R    2269cB5  5.4  5.4   95- 154     27 139  70N 311 351 300 -4.9 +5.4 +0.9-0.6 .389  169.7     15 53 53.9 -24 31 59 390.4 748.0
24 May 11  1 23 18.6 D     885wG7  5.6  5.1   10+  38     19 293  52S 121  51 122 +5.2 -6.2 -0.2-1.6 .496  -22.4      5 50 58.1  27 58  4 378.3 983.3
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -8sec
24 May 11  1 33 26.2 d   77638 B8  8.2  8.1   10+  38     17 294  83S  90  21  90 +5.2 -6.1 +0.2-0.8 .538    9.2      5 51 33.0  28  5 32 378.61000.8
24 May 11  1 50 17.3 d   77639 K0  8.3  7.7   10+  38     13 295  24S 149  82 149 +5.2 -6.1 -1.0-2.6 .357  -50.4      5 51 40.2  27 50 31 379.01030.9
24 May 12  3 33 52.7 d    1056 B9  7.2  7.3   18+  51      4 298  25S 157  94 151 +5.4 -6.2 -1.2-2.4 .367  -51.9      6 55 56.2  27 17  9 386.01113.7
24 May 12 16 56  4.6 d    1149SK5  4.1  3.3s  24+  59  81 28  72  56N  62 136  53 +6.9 -6.6 +0.2+1.9 .398   27.9 .02  7 35 55.4  26 53 45 386.5 845.1
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.1sec : AB 4.1 13.2 57"  39.0, dT = +131sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 18  0  7.3 r    1149SK5  4.1  3.3s  25+  60  78 42  76 -67N 300  18 290 +6.7 -6.6 +1.8-0.4 .352  152.4 .02  7 35 55.4  26 53 45 385.5 742.3
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.07sec : AB 4.1 13.2 57"  39.0, dT = +27sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 14  3 34 10.3 d    1317 A2  8.2  8.1   36+  74     24 284  84S 110  40  96 +4.5 -5.7 +0.3-1.4 .485    8.1      8 46 28.9  22 21  8 394.0 935.9
24 May 15  2  0 44.1 d   98640 K0  8.0  7.5   46+  85     53 267  62N  80   8  62 +3.9 -5.1 +2.7-0.4 .259   47.5      9 33 38.6  18 44 12 395.0 734.1
24 May 15  2 41 55.1 d   98646 K2  8.2  7.3v  46+  85     44 271  79S 119  48 102 +3.8 -5.1 +1.0-1.8 .406    6.6      9 34 26.7  18 24 22 395.8 784.7
     98646 = ASAS J093427+1824.4, 8.15, range 0.1, V, Type MISC, Period 26.57 days, Phase  24%
24 May 16  0 51  6.3 d   99052 G0  8.2  7.8   55+  96 -11 74 224  55S 147 107 127 +3.1 -4.3 +1.3-2.6 .320  -14.5     10 18 26.1  13 56  1 396.6 636.3
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 May 17  1 35 12.2 d  118637 F5  8.1  7.9   65+ 107     69 216  54N  78  45  56 +1.8 -3.1 +4.6+0.6 .179   57.4      11  3 43.5   8 43 48 398.4 641.2
24 May 18  1 38 10.6 d  119033PK0  8.1  7.6v  74+ 118     67 189  38S 167 159 145 +0.6 -1.8 +0.7-3.0 .284  -30.0      11 45 42.3   2 49 17 398.7 633.0
    119033 is double: AB 6.3      11.9" 186.0, dT = +40sec
    119033 = EPIC 201650346, 8.55, range 0.04, 0Kp, Type VAR, Period 11.495508 days
24 May 18  4 54 22.0 d  119068 F5  7.8  7.5   74+ 119     35 253  76N 100  40  78 -0.2 -1.4 +1.5-1.4 .342   28.5      11 49 46.8   2 13 55 400.9 757.8
24 May 18  6  4  8.6 D    1712SF8  3.6  3.3   75+ 120     20 262  46S 158  95 136 -0.4 -1.3 +0.3-2.6 .358  -34.3      11 50 41.7   1 45 53 402.4 845.5
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -581sec : AC 3.7 9.6 406"  78.5, dT = +203sec
24 May 21  3 40 55   m    2002 K0  6.8  6.3   94+ 152     50 186  25N  41  35  22 -3.3 +2.7 +9.9+9.9 .000   90.0      13 58 29.8 -14  7 19 394.1 630.1
24 May 21  3 41 45   Gr   2002 K0  6.8  6.3   94+ 152     51 ** GRAZE: CA 24.7N; Dist. 43km in az. 229deg. [Lat = 25.42-1.03(E.Long+80.50)]
24 May 22  6  8 21.3 d    2115 A6  7.2  7.1   98+ 164     36 215  63S 122  89 106 -4.6 +4.2 +2.2-1.6 .334   -4.1      14 49 27.7 -19 54 13 391.6 636.3
24 May 23  5 15 43.1 D    2237cK3  5.0  4.3s 100+ 174     40 185  69S  79  74  67 -4.8 +5.4 +3.4+0.4 .257   38.1 .01 15 40 16.9 -23 49  5 387.8 614.0
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.3sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 4.3"; to 3km sunlit peak = 0.0"
24 May 24  1 13  5.6 D    2366dM1  1.1  0.1v 100- 172      6 123 -60N 104 161  96 -4.3 +5.8 +0.5+0.4 .480   10.2 .09 16 29 24.5 -26 25 55 388.2 917.9
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 18 55.9 R    2366dM1  1.1  0.1v  99- 172     18 133  83S 306 353 298 -4.5 +6.0 +0.6-0.3 .426  169.7 .10 16 29 24.5 -26 25 55 386.8 812.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 9.8"; to 3km sunlit peak = 1.8"
24 May 24  3 17 58.9 r    2373 K1  6.1  5.5   99- 171     27 143  73N 329   6 321 -4.6 +6.1 +0.5-1.3 .327  146.7      16 31 22.8 -26 32 16 385.8 732.4
   Distance of 2373 to Terminator = 9.9"; to 3km sunlit peak = 1.9"
24 May 28  7  2 54.6 r    3012 A7  6.9  6.8   76- 121     28 140  82S 251 290 265 -3.7 +7.0 +2.0+1.3 .387 -177.0      20 38  4.9 -24 13 44 372.6 700.1
24 May 28  7 57  2   Gr   3018 G8  6.4  6.0   76- 121     36 ** GRAZE: CA  8.9N; Dist.129km in az. 163deg. [Lat = 24.79+0.27(E.Long+80.50)]
24 May 28  7 58 27   M    3018 G8  6.4  6.0   76- 121     35 152   9N 339   7 354 -3.8 +6.9 +9.9+9.9 .000   90.0      20 40 11.8 -23 46 26 371.8 663.1
24 May 28  8 26 58.2 r  189555 G1  7.2  6.9   75- 121     37 159  67S 235 256 250 -3.9 +6.9 +2.2+1.4 .354 -168.3      20 40 22.3 -24  7  5 371.5 652.3
24 May 29  7  4  9.6 d    3164SB3  4.5  4.6v  65- 108     22 127 -82S  81 131  99 -2.8 +6.2 +1.4+1.1 .417  -12.8      21 37  4.8 -19 27 58 370.7 769.5
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +14sec : AB 4.5 10.1 66"  45.9, dT = +130sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 20 38.9 R    3164SB3  4.5  4.6v  65- 108     35 142  68S 230 266 248 -3.0 +6.1 +1.9+1.8 .380 -167.4      21 37  4.8 -19 27 58 369.4 698.5
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -69sec : AB 4.5 10.1 66"  45.9, dT = +173sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 53 59.4 r  164528 B8  7.5  7.5   65- 107     39 150  81N 261 290 280 -3.1 +6.1 +2.4+0.8 .355  158.7      21 37 37.7 -19 13 52 369.0 682.1
24 May 29 11 37  4.7 r    3175 G8  4.7  4.3   64- 107  13 43 200   4S 166 147 184 -3.6 +5.8 -1.9+4.7 .159 -113.4      21 42 39.5 -18 51 59 368.4 716.0
   R3175 = kappa Capricorni
   Distance of 3175 to Terminator = 18.4"; to 3km sunlit peak = 0.0"
24 May 30  9  3 20.3 r  165149wG0  7.7  7.4   54-  94     38 135  63S 222 263 243 -2.1 +4.9 +1.5+2.0 .396 -165.5      22 32  9.4 -13 35 52 367.1 728.2
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +65sec
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jun  1  9  7 31.3 r      27DA5  8.2  8.0   31-  68     29 106  68S 224 284 246 +0.1 +1.9 +0.7+2.0 .483 -169.1      0 14 50.2 - 0 18 11 365.3 871.2
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
        27 is a close double. Observations are highly desired
24 Jun  2  9 39 24.8 r  109680 K5  8.7  7.9   20-  54 -11 29  97  70S 228 292 248 +1.2 +0.2 +0.5+1.8 .515 -173.3      1  6 43.7   6 40  0 365.0 917.5
24 Jun  4  9 25  8.3 r   93167 A5  9.1  8.8    6-  27      8  73  56S 224 289 239 +3.5 -2.9 -0.4+1.6 .590 -160.9      2 53 46.8  18 38  3 369.11117.1
24 Jun  9  2  2 33.7 D    1131 A2  7.3  7.3    7+  31      6 296  31S 151  86 142 +4.5 -6.0 -0.9-2.1 .433  -42.3      7 28  0.9  26 13 39 387.21099.7
24 Jun 10  0 16 58.6 d    1251 B9  5.9  5.9   13+  42  -2 39 281  75S 114  39 101 +4.4 -5.9 +0.7-1.6 .446    4.8      8 20 32.1  24  1 20 388.2 842.8
   R1251 = lambda Cancri
24 Jun 10  1  2 23.4 d   80129 F2  8.4  8.2   13+  43 -10 29 284  67N  76   3  63 +4.3 -5.8 +1.1-0.5 .363   41.4      8 21 57.6  24  1 26 389.3 913.0
24 Jun 10  2  1 56.3 d   80146 A2  8.0  7.9   14+  43     16 289  46S 143  75 130 +4.2 -5.7 -0.5-2.0 .468  -28.3      8 23 31.3  23 32  4 390.81008.3
24 Jun 10  2 40 37.5 d   80173 K0  8.3  7.8   14+  44      8 292  89S 100  35  87 +4.2 -5.6 -0.2-1.0 .547   13.9      8 25 21.5  23 32 58 391.71070.2
24 Jun 12  0 35 19.2 d   98897 K0  7.6  7.0   29+  66  -5 53 262  68N  87  19  68 +3.0 -4.3 +2.4-0.7 .282   42.6     10  1 20.7  15 40 14 395.0 734.1
24 Jun 12  1 15 28.4 d   98907 F8  8.5  8.3   29+  66     44 267  77S 121  53 102 +2.9 -4.2 +1.0-1.8 .404    6.3     10  2  3.1  15 21 38 395.7 780.6
24 Jun 15  3 25 25.5 d    1760pK0  7.5  7.0   58+ 100     34 249  50N  73  16  51 -1.1 -0.3 +2.3-0.3 .221   54.6     12 15  0.0 - 1 19 36 400.3 740.5
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +157sec
24 Jun 17  1 20 13.6 d    1957kG5  7.7  7.2   76+ 121     52 180  58N  78  77  58 -2.9 +2.2 +4.5+0.9 .188   55.1     13 39 17.8 -12  5 32 395.3 630.3
24 Jun 17  3 22 52.1 d  158085kK0  7.3  6.6   76+ 122     41 221  56S 144 107 125 -3.4 +2.5 +1.6-2.3 .320  -18.0     13 40 59.7 -12 46 59 395.9 645.3
24 Jun 19  2 34 56.0 D    2183 K2  5.5  4.8   91+ 144     42 176  26S 164 168 150 -4.7 +4.9 +0.9-2.5 .249  -41.5     15 16 23.0 -22 23 58 388.5 626.7
24 Jun 24  6 31 49.5 r    2965 G2  7.2  6.9   94- 151     37 163  75S 252 269 265 -3.4 +7.0 +2.4+0.9 .367  177.9     20 19 45.2 -25 13 43 369.1 656.6
24 Jun 25  7 39 32.1 r  190252 F2  7.2  7.0   87- 137     42 164  27S 194 209 211 -2.5 +6.1 +1.1+2.7 .268 -134.7     21 21  3.2 -20 49 16 366.6 676.9
24 Jun 26  6 52  7.7 r  164948kF2  7.2  7.0   78- 124     36 135  64N 278 319 298 -1.2 +5.1 +2.3+0.5 .321  141.0     22 14 37.2 -15  6  6 366.0 734.3
24 Jun 26  8 29 35.7 r    3271 F5  7.2  6.9   78- 124     48 162  47N 295 312 315 -1.5 +4.9 +4.4-1.3 .185  117.9     22 16 56.3 -14 39 25 365.0 698.4
24 Jun 28  7 45 14.8 r    3528 F0  7.5  7.3v  56-  97     36 114  72N 264 320 286 +1.0 +2.1 +1.6+1.1 .392  148.4     23 59 35.0 - 1 51  0 365.7 816.8
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jul  2  9 41 14   m   76001 K0  8.2  7.6   14-  44 -11 28  77  18N 332  44 344 +4.5 -4.2 +9.9+9.9 .000   90.0      3 34 30.3  22 45 34 372.5 961.4
24 Jul  2 17 12 10.0 D     552SB7  2.9  2.9s  12-  41  85 52 277 -27N  19 300  30 +3.4 -5.0 +2.2+3.9 .214   57.4      3 47 29.1  24  6 18 371.3 713.6
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.14sec : AE 2.8 15.0 78" 232.4, dT = -306sec : AB 2.8 6.3 118"
291.1, dT = +22sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 24  4.1 r     545SB6  4.1  4.2v  12-  41  86 49 277  65N 287 209 299 +3.3 -5.0 +1.6-1.7 .349  149.7      3 46 19.6  23 56 54 371.5 728.1
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.9sec : AB 4.2 14.4 110" 180.2, dT = +92sec : AC 4.2 12.9 147" 336.0, dT = -277sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 32 14   Gr    552SB7  2.9  2.9s  12-  41  84 47 ** GRAZE: CA  4.5N; Dist.263km in az.   8deg. [Lat = 28.40-0.13(E.Long+80.50)]
24 Jul  2 17 49  8.6 d     560SB8  3.6  3.7s  12-  41  84 45 279 -65N  57 340  68 +3.3 -5.0 +1.7+0.6 .389   21.6      3 49  9.7  24  3 12 371.9 755.0
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = 0.00sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = +0.09sec : AC 3.6 15.0 50"  36.5, dT = +120sec :
AH 3.6 16.0 68" 221.6, dT = -170sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 17 52 47.2 R     552SB7  2.9  2.9s  12-  41  83 43 280  36N 316 240 328 +3.3 -5.0 +0.8-4.1 .227  122.5      3 47 29.1  24  6 18 372.0 762.0
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.04sec : AE 2.8 15.0 78" 232.4, dT = -37sec : AB 2.8 6.3 118"
291.1, dT = -469sec
       552 is a close double. Observations are highly desired
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 18 55 28.7 R     560SB8  3.6  3.7s  12-  41  69 30 284  69N 284 211 295 +3.2 -5.0 +0.6-1.4 .437  158.1      3 49  9.7  24  3 12 373.4 852.5
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.02sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.3sec : AC 3.6 15.0 50"  36.5, dT = +44sec : AH
3.6 16.0 68" 221.6, dT = -74sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 10  1  9 27.6 d   99162S    8.7  8.2   16+  47 -11 25 271  44S 155  89 135 +1.9 -3.2 +0.0-2.4 .392  -30.4     10 30 25.7  11 37 51 398.7 878.2
     99162 is triple: AB 8.8 12.8 14.6"  84.4, dT = +12sec : AC 8.8 11.0 47" 202.9, dT = +81sec
24 Jul 11  1 53 39.3 d    1628 K0  7.1  6.5   24+  58     22 266  11S 191 127 170 +0.6 -1.9 -0.8-4.4 .175  -66.6     11 14 32.5   5 59 34 401.0 860.2
24 Jul 11 20  6  6   d    1712SF8  3.6  3.3   31+  68  54 55 129  -5S 208 252 186 +0.6 -1.3 -3.8-9.3 .092  -74.3 .02 11 50 41.7   1 45 53 399.0 660.0
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = +737sec : AC 3.7 9.6 406"  78.5, dT = -2801sec
24 Jul 11 20 19 35   Gr   1712SF8  3.6  3.3   31+  68  51 59 ** GRAZE: CA-21.3S; Dist. 66km in az. 220deg. [Lat = 25.22-0.76(E.Long+80.50)]
24 Jul 11 20 30 47   r    1712SF8  3.6  3.3   31+  68  48 59 137 -37S 240 278 218 +0.5 -1.2 +7.7+6.2 .091 -105.7 .02 11 50 41.7   1 45 53 398.8 647.7
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3, dT = -2593sec : AC 3.7 9.6 406"  78.5, dT = +4263sec
24 Jul 12  2 46 47.0 D    1730wK2  6.2  5.5   33+  70     17 262  33N  56 353  34 -0.8 -0.5 +1.3+0.9 .173   66.7     11 59  3.3   0 31 50 402.5 855.3
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -44sec
24 Jul 14  2 44 16.9 d  157912kF0  7.8  7.6   51+  91     28 240  87N 109  56  89 -3.4 +2.3 +1.5-1.6 .360   12.4     13 23 56.5 -10 52 15 399.4 714.0
24 Jul 14  3 48 20.5 D    1925SB1  1.0  1.1v  52+  92     15 249  69S 133  74 113 -3.6 +2.3 +0.9-2.1 .393  -16.1     13 25 11.6 -11  9 41 400.7 794.0
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -68sec : AC 1.0 10.5 368"  60.8, dT =
+285sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  2 11  5.3 d  158363 B9  7.3  7.3   61+ 102     37 221  20S 179 141 161 -4.4 +3.6 +0.8-4.1 .180  -57.3     14  7 13.8 -16 11 26 395.8 639.4
24 Jul 15  4  8 13.1 D    2029 M1  4.9  4.1v  61+ 103     16 242  81N 100  44  81 -4.8 +3.7 +1.1-1.3 .382   13.3 .01 14 10 50.5 -16 18  7 397.6 757.2
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  0 45 13.1 d    2251KK0  7.5  7.0   79+ 125  -7 38 168  31S 159 171 147 -5.5 +5.7 +1.0-2.1 .259  -39.6     15 45 49.8 -24 43  1 387.4 632.1
24 Jul 18  1 50  7.5 D    2405SA2  6.6     s  87+ 137     36 171  66N  68  77  62 -5.9 +6.6 +3.3+1.1 .256   40.2     16 44 17.4 -27 27 22 382.2 621.4
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +7sec : AC 6.6 14.0 24.3" 195.9, dT = -58sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5  9 36.8 D    2910cG3  4.7  4.3  100+ 174     38 177  67S  40  43  50 -4.4 +7.1 +1.9+1.6 .319   30.5     19 55 50.4 -26 17 58 366.8 659.1
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Jul 24  3 43  5.9 r    3339 M0  6.7  5.8v  90- 142     17 112  44N 298 357 319 +0.2 +4.1 +1.0-0.2 .279  123.8     22 46 14.2 -11  9 59 363.0 883.0
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  8 18 42.3 R    3355KF8  6.7  6.5   89- 141     54 185  58N 283 278 304 -0.4 +3.6 +3.9-0.9 .241  125.1     22 52 46.5 -10  3 32 359.8 732.5
24 Jul 25 10 15 34.2 R    3505WG8  5.5  5.0   80- 126  -7 56 217  89S 247 214 269 +0.8 +1.7 +2.0+0.6 .406  160.2     23 47 56.5 - 2 45 42 360.5 754.7
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -377sec
24 Jul 27  8 25 12.6 r   92457cK5  8.2        58- 100     57 112  78N 261 319 281 +3.7 -1.4 +2.1+1.0 .376  148.3      1 29  5.5  10 25 56 364.5 781.1
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.2sec
     92457 is a close double. Observations are highly desired
24 Jul 27 10 22 52.6 R     222 G5  7.0  6.5   58-  99  -6 75 171  82S 241 249 261 +3.4 -1.7 +2.1+1.3 .393  167.5      1 31 42.7  10 53 22 363.9 710.6
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 28  7 57 23.4 r     347 K0  7.9  7.4   47-  87     42  91  61S 222 291 239 +4.8 -2.8 +0.5+2.0 .471 -167.7      2 21 50.3  16  9 45 368.4 862.0
24 Jul 29  7  3 52.7 R     472cA1  4.9  4.9   36-  74     21  76  78S 244 313 258 +5.6 -4.0 +0.1+1.4 .557  177.8      3 14 54.1  21  2 40 373.61009.1
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.15sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jul 29  7 29 45.2 r   75819 F2  7.9  7.7   36-  74     26  78  79S 245 316 259 +5.5 -4.0 +0.3+1.4 .533  175.2      3 15 46.1  21  9 55 373.1 968.5
24 Jul 31  9 36 52.0 r     786 K5  9.1  8.3   16-  48     31  72  76N 284 359 287 +6.3 -6.0 +1.1+0.4 .413  147.9      5 16 52.5  27 43  3 379.8 897.1
24 Aug  1  8 57 56.3 r     952 K2  8.0  7.2   10-  36     12  65  13S 201 268 199 +6.4 -6.2 -1.4+3.2 .280 -120.5      6 15 54.8  27 51 42 385.21031.1
24 Aug  1  9 19 12.1 r   78154 A0  8.5  8.4    9-  36     16  66  84N 285 354 283 +6.4 -6.3 +0.4+0.4 .484  155.3      6 16  3.2  28 12  6 384.8 993.2
24 Aug  1 10  0 56.6 R   78191 A0  7.7  7.7    9-  35 -11 25  69  33S 222 295 220 +6.4 -6.3 -0.4+2.3 .390 -142.2      6 17 59.9  28  0 24 384.0 920.5
24 Aug  8  0 45  5.9 D    1696 F5  6.9  6.7   11+  39 -10 17 264  88N 111  47  89 -0.1 -0.8 +0.5-1.6 .433   12.5     11 42 25.5   2 21 44 402.9 867.6
24 Aug 10  2 16 53.3 D    1886cK3  5.6  5.0   26+  61      9 255  29N  52 350  31 -3.0 +2.1 +0.5+1.0 .184   64.7     13  8 32.5 - 8 59  4 403.7 843.9
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.43sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 11  2 30  3.6 d  158207 F0  7.4  7.2   35+  72     12 247  59S 142  83 123 -4.4 +3.4 +1.0-2.4 .356  -28.6     13 52 15.4 -14 40 36 401.6 790.6
24 Aug 16  2 24 29.5 d  186672 G5  7.4  6.9   83+ 131     35 185  36N  29  23  31 -6.9 +7.5 +2.1+2.6 .189   56.2     18 20 25.4 -29  3 59 375.6 619.1
24 Aug 17  2 49 27.7 D    2831kB2  6.0  6.1s  90+ 144     36 176  86N  70  74  78 -6.2 +7.4 +2.5+0.7 .356    6.0     19 24 30.2 -27 51 57 369.5 641.3
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 19  5 53 45.4 d  164449DF0  7.2        99+ 171     43 197  81S  51  35  68 -3.8 +5.6 +1.6+0.9 .424    3.0     21 31 25.5 -19 14 15 359.1 739.4
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -3sec
    164449 is a close double. Observations are highly desired
   Distance of 164449 to Terminator = 10.8"; to 3km sunlit peak = 2.5"
24 Aug 20  3 58  4   m    3288 K0  5.8  5.3  100- 173     42 141  46N 325   0 345 -1.7 +4.5 +9.9+9.9 .000   90.0     22 24 27.1 -13 31 46 356.9 748.5
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
24 Aug 21  2 41 13.1 r    3422kF0  6.7  6.5   97- 161     23 111  55N 289 347 311 +0.4 +3.1 +1.3+0.2 .320  128.7     23 16 59.2 - 7  9 39 357.7 888.3
24 Aug 22  7 45  5   M      35 K0  6.2  5.7   91- 144     66 185  21N 316 311 338 +1.7 +0.6 +9.9+9.9 .000   90.0      0 17 47.7   1 41 19 355.4 747.6
24 Aug 22  9  2 50.2 r  109142cG5  7.6  7.1   90- 144     58 223  43S 201 162 222 +1.5 +0.4 +0.8+2.2 .394 -152.9      0 19 57.1   1 34 57 355.9 764.7
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = -0.01sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Aug 23  9 49 25.0 r  109738 G5  7.8  7.1   82- 130     64 233  81S 238 191 258 +3.1 -1.4 +1.9+1.0 .420  172.5      1 13 41.8   8 58 29 358.2 736.1
24 Aug 25  6 26 42.9 r     439cF0  7.3  7.1   62- 104     39  85  65S 228 301 243 +6.3 -4.0 +0.5+1.9 .494 -171.2      2 59 10.4  19 59 23 367.3 889.9
       439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.15sec
       439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25 10 29 45.9 r     452 A2  7.7  7.6   61- 102  -7 84 221  51S 214 175 229 +5.7 -4.5 +1.6+2.5 .342 -155.2      3  5 30.3  20 54  9 365.8 667.6
24 Aug 26  6 53 12.1 R     587 K0  6.2  5.5   51-  91     35  77  87N 261 335 272 +7.1 -5.1 +0.8+1.1 .478  161.8      3 57 26.4  24 27 43 372.6 908.9
24 Aug 26  8 12  9.5 r   76374kG0  8.3  8.0   50-  90     51  82  80S 249 328 259 +7.0 -5.3 +1.2+1.5 .437  173.1      3 59 54.8  24 41 44 371.5 793.7
24 Aug 27  6 19 37.5 r   76841cK1  7.3  6.7   40-  78     17  67  59N 296   5 301 +7.6 -5.8 +0.7+0.1 .396  135.1      4 55 34.6  27 12  9 379.11027.9
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.17sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 21 11.0 R     746WB7  7.0  6.9   39-  77     42  75  69S 245 323 250 +7.4 -6.1 +0.7+1.6 .451 -175.2      4 59 53.7  27 19 32 377.0 827.1
       746 is double: AB 7.0 8.7 20.4" 206.0, dT = -35sec
24 Aug 28  8  7 23.0 R   77818 K5  6.7  5.8   29-  65     27  70  18S 201 274 200 +7.6 -6.4 -1.0+3.5 .267 -123.1      6  0  4.9  28  7 33 382.9 906.7
24 Aug 28  9 54  5.5 R   77883 B2  7.6  7.6   28-  64     49  75  61N 303  25 302 +7.4 -6.6 +2.4-0.8 .288  136.2      6  2 59.4  28 40 37 381.3 738.0
24 Aug 28 10 10 19.3 r     917 K2  8.1  7.4S  28-  64 -12 53  76   7S 190 274 189 +7.4 -6.6 -1.2+7.2 .138 -110.8      6  4 16.2  28 18  3 381.1 716.3
       917 = NSV 2811, 8.4,
24 Aug 29  8 10 24.2 r   78917 M0  8.3  7.5   20-  53     16  67  63S 253 322 247 +7.5 -6.5 -0.1+1.3 .500 -167.7      6 58 11.0  27 38 13 388.3 964.3
24 Aug 29  9 26 10.0 r   78965 K0  9.0  8.4   20-  53     31  72  90S 280 355 274 +7.4 -6.6 +1.0+0.6 .431  166.1      7  0 51.9  27 48 16 387.0 833.0
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Aug 31 10  9 21.2 r   80456kG5  9.5  8.9    6-  29     17  73  83N 301  10 286 +6.3 -5.6 +0.6-0.2 .434  159.3      8 51  9.7  22 13 35 395.6 889.3
24 Sep  8  0  6 59.9 d    2055 K0  7.8  7.2   20+  53  -8 22 236  26N  48 357  30 -4.6 +4.4 +1.6+1.7 .148   65.8     14 20 27.5 -17 31 42 401.2 701.6
24 Sep  9  0  6  9.1 d  183204pK2  8.0  7.3   28+  64  -8 27 224  61N  79  37  65 -5.7 +5.5 +2.0-0.5 .289   30.6     15  8 21.6 -22  5 51 398.0 648.4
    183204 is double: AB 8.2 14.1 2.0" 151.0, dT = +2.2sec
    183204 is a close double. Observations are highly desired
24 Sep  9 19 39 37.4 d    2268MB2  4.5        36+  74  50 29 144  63S 130 166 119 -5.6 +6.1 +1.1-0.6 .363   -9.6     15 53 36.7 -25 19 38 394.9 704.2
   R2268 = 2 Scorpii
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Sep 10  2 29 14.4 D    2298kK3  5.0  4.3   38+  76      9 236  69N  82  26  71 -7.1 +6.4 +0.8-0.7 .397   13.8     16  3 20.6 -25 51 55 395.8 783.8
24 Sep 14  0 42 48.0 d  188724cF5  7.7  7.5   78+ 124     36 163  71N  56  73  66 -6.8 +7.3 +2.3+1.3 .342   17.7     19 55 52.2 -26 33  0 370.5 644.5
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.29sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  1 41  0   m    2910cG3  4.7  4.3   78+ 124     38 179  -6N 339 340 350 -7.0 +7.2 +9.9+9.9 .000   90.0     19 55 50.4 -26 17 58 370.1 645.2
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Sep 14  2 55 14.4 D    2914cG8  4.8  4.4   78+ 125     36 199  53N  38  19  49 -7.2 +7.1 +1.3+1.3 .341   26.9     19 58 57.2 -26 11 45 370.0 686.0
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 17  7 37 49.5 d    3375 F2  6.8  6.6   99+ 168     34 238  76S  70  20  92 -3.1 +3.0 +1.3+0.0 .478  -19.5     23  0 19.9 - 8 52 50 355.2 874.3
   Distance of 3375 to Terminator = 20.0"; to 3km sunlit peak = 8.7"
24 Sep 21  8 22  0.3 r     397MB9  7.5  7.5   85- 135     82 215  58S 217 184 234 +5.0 -4.1 +1.6+2.1 .382 -161.0      2 41  6.6  18 48  1 358.0 700.7
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +1.5sec : AC 7.7 9.5 66" 242.2, dT = -156sec
       397 is a close double. Observations are highly desired
24 Sep 21  8 22  1.7 r X  3591MB9  7.9  7.9   85- 135     82 215  58S 217 184 233 +5.0 -4.1 +1.6+2.1 .381 -160.8      2 41  6.8  18 47 59 358.0 700.7
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = -1.4sec : BC 7.5 9.5 67" 243.0, dT = -159sec
   X  3591 is a close double. Observations are highly desired
24 Sep 22  6  9 58.0 R     521kA2  6.7  6.7v  76- 122     53  85  65S 230 307 242 +6.8 -5.0 +0.8+1.9 .454 -170.1      3 36 58.0  23 12 40 363.8 814.1
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22  9 53 56.6 D     537SB6  3.7  3.8s  75- 120     78 265 -76S  88   9 100 +6.2 -5.4 +2.6-0.2 .351  -20.6      3 44 52.5  24  6 48 363.4 660.8
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.49sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+158sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 39 29.5 d     539SB6  4.3  4.4s  75- 120  -8 68 272 -33N  17 296  29 +6.1 -5.5 +1.8+4.1 .226   53.8      3 45 12.5  24 28  2 364.0 673.8
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.11sec : AC 4.3 14.0 53"  53.5, dT = +190sec : AB 4.3 11.0 72"
328.8, dT = +212sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 39 42.7 D     541SB8  3.9  3.9s  75- 120  -8 68 272 -69N  54 333  66 +6.1 -5.5 +2.2+1.2 .365   17.2      3 45 49.6  24 22  4 363.9 673.6
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +294sec : AB 3.8 13.7 113"  72.8, dT = +295sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11  3 53   Gr    539SB6  4.3  4.4s  75- 120  -2 61 ** GRAZE: CA  1.7N; Dist.321km in az. 358deg. [Lat = 28.89+0.03(E.Long+80.50)]
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Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 539 to Terminator = 9.2"; to 3km sunlit peak = 0.0"
24 Sep 22 11 15 49.5 R     537SB6  3.7  3.8s  75- 120   0 59 274  68S 233 154 245 +6.0 -5.5 +2.0+1.1 .370 -159.4      3 44 52.5  24  6 48 364.5 698.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.23sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
3sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 21 48.4 r     536pB7  5.5  5.5   75- 120   2 58 275  75N 271 191 282 +6.0 -5.5 +2.0-0.7 .382  163.9      3 44 48.2  24 17 22 364.6 703.0
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -231sec : AC 5.4 11.5 218" 196.1, dT = -154sec
24 Sep 22 11 26 55.7 R     539SB6  4.3  4.4s  75- 120   3 57 276  36N 309 229 320 +6.0 -5.5 +1.9-3.6 .236  126.2      3 45 12.5  24 28  2 364.7 706.8
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.19sec : AC 4.3 14.0 53"  53.5, dT = +57sec : AB 4.3 11.0 72"
328.8, dT = -288sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 11 51 55.1 D     552SB7  2.9  2.9s  75- 120   8 52 277 -16S 149  71 161 +5.9 -5.5 +1.1-8.4 .121  -72.9      3 47 29.1  24  6 18 365.1 729.3
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.14sec : AE 2.8 15.0 78" 232.4, dT = +79sec : AB 2.8 6.3 118"
291.1, dT = -761sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 22 11 57 16.5 R     541SB8  3.9  3.9s  75- 120  10 50 278  71N 274 196 286 +5.9 -5.5 +1.7-1.0 .397  162.5      3 45 49.6  24 22  4 365.2 736.4
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +265sec : AB 3.8 13.7 113"  72.8, dT = +266sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 12  4 35   Gr    552SB7  2.9  2.9s  75- 120  11 48 ** GRAZE: CA  2.3S; Dist. 81km in az. 188deg. [Lat = 25.27-0.13(E.Long+80.50)]
   Distance of 552 to Terminator = 11.6"; to 3km sunlit peak = 0.0"
24 Sep 22 12 16 18.9 R     552SB7  2.9  2.9s  75- 119  14 47 279  20S 185 108 197 +5.9 -5.5 +2.7+7.5 .126 -107.2      3 47 29.1  24  6 18 365.6 756.7
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.23sec : AE 2.8 15.0 78" 232.4, dT = -423sec : AB 2.8 6.3 118"
291.1, dT = +256sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Sep 23  6 29  6.8 r X 70481p    7.3  7.2   66- 108     45  77  43N 308  27 315 +7.9 -6.0 +3.0-1.4 .222  118.7      4 38 29.6  26 56 26 370.1 830.1
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +18sec : AC 7.4 12.9 92" 203.7, dT = +102sec
   X 70481 is a close double. Observations are highly desired
24 Sep 23  6 29 11.5 R     701SF2  6.6  6.4   66- 108     45  77  43N 308  27 315 +7.9 -6.0 +3.0-1.4 .223  118.9      4 38 29.5  26 56 23 370.1 830.0
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +10sec : AB 7.36 7.21 4.47" 188.0, dT = +10sec
       701 is a close double. Observations are highly desired
24 Sep 24  7 26  8.3 r   77397 A2  8.1  8.0V  54-  95     45  75  87N 271 351 272 +8.4 -6.6 +1.4+0.8 .417  164.5      5 41 38.6  28 27 24 376.2 789.1
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 24 10 47 27.3 r   77551cB9  8.3  8.2   54-  94  -6 87  33  77S 256  42 256 +7.8 -6.8 +2.7+0.8 .329 -169.7      5 47 14.3  28 37 26 375.1 607.6
     77551 is double: AB 8.4 10.7 0.8" 197.5, dT = -1.3sec
     77551 is a close double. Observations are highly desired
24 Sep 25  6 15 28.9 R    1022CB7  6.0     s  44-  83     18  67  72N 293   2 288 +8.6 -6.6 +0.6+0.2 .448  150.4      6 39 33.1  28 15 47 384.0 960.7
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +0.37sec
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  6 25.6 R    1026SG5  6.5  5.9   44-  83     28  70  81S 266 340 261 +8.6 -6.6 +0.6+1.0 .469  177.3      6 41 20.9  28 11 48 383.2 871.8
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +53sec : AC 6.6 12.8 58"  61.4, dT = +112sec
24 Sep 25  8 10 35.9 r   78673 G5  8.3  7.7   44-  83     42  74  65N 300  20 296 +8.5 -6.7 +1.9-0.5 .335  143.9      6 43 38.2  28 24  6 382.2 768.2
24 Sep 27  9 19  9.0 r   80288pK5  8.6  8.2v  24-  59     33  78  68S 266 339 252 +7.6 -5.9 +0.9+1.1 .391 -164.9      8 36 55.8  23 14 49 392.7 772.1
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = +0.6sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 28  9  9 18.1 R   98567 A3  7.5  7.4   16-  47     19  78  50S 252 320 235 +6.8 -5.1 +0.3+1.8 .367 -146.1      9 26 34.5  19  3 36 397.6 852.9
24 Sep 28  9 58 16.1 r    1400cF5  8.3        16-  47     29  82  20N   2  72 344 +6.7 -5.1 +2.2-7.7 .115  106.5      9 29  0.7  19 17 19 396.7 777.3
      1400 is double: AB 8.42 9.96 1.09" 223.7, dT = +7sec
      1400 is a close double. Observations are highly desired
24 Sep 29 11  5 16   Gr   1504 M1  5.4  4.6    9-  35  -3 34 ** GRAZE: CA  0.9S; Dist.162km in az.   3deg. [Lat = 27.46-0.04(E.Long+80.50)]
24 Sep 29 11  5 30   M    1504 M1  5.4  4.6    9-  35  -3 33  90   1S 206 274 187 +5.5 -4.0 +9.9+9.9 .000  -90.0     10 16 40.7  13 43 42 399.3 750.6
   R1504 = 37 Leonis
   Distance of 1504 to Terminator = 15.0"; to 3km sunlit peak = 0.0"
24 Oct  7  0 42 44.8 d    2251KK0  7.5  7.0   15+  46      6 239  37N  55 357  43 -5.9 +6.2 +0.2+0.3 .306   42.4     15 45 49.8 -24 43  1 399.7 803.7
24 Oct  8 23 39 48.7 d  185508 K5  8.4  7.5   32+  68 -10 28 208  89S  96  66  94 -7.2 +7.4 +2.4-0.8 .328   -9.1     17 33 54.3 -29 13 24 389.9 627.9
24 Oct  9 23 29 40.5 D    2688 G6  7.0  6.6s  41+  80  -8 34 193  70N  68  54  71 -7.5 +7.6 +2.4+0.4 .318   12.2     18 32 14.0 -29 11 25 384.4 606.3
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2 21 45.0 d  164449DF0  7.2        74+ 119     43 198  65N  44  27  62 -6.5 +5.6 +1.5+1.1 .400    9.0     21 31 25.5 -19 14 15 365.8 717.9
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -4sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1 12 16.6 D    3288 K0  5.8  5.3   83+ 132     48 157  23N 358  19  18 -5.0 +4.4 +0.1+3.4 .241   54.0     22 24 27.1 -13 31 46 360.4 716.4
   R3288 = 50 Aquarii
24 Oct 14  4 30 52.7 D    3303kF2  6.4  6.2   84+ 133     40 223  60S  95  56 115 -5.5 +4.0 +2.5-1.0 .323  -45.5     22 30  1.5 -12 54 54 360.4 806.3
24 Oct 14 23 33 44   M    3421cM3  4.9  4.1v  91+ 145 -10 29 116   7S 147 201 168 -3.1 +3.0 +9.9+9.9 .000  -90.0     23 16 50.9 - 7 43 35 358.0 846.8
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
   Distance of 3421 to Terminator = 3.1"; to 3km sunlit peak = 0.0"
24 Oct 14 23 46 16.4 d    3422kF0  6.7  6.5   91+ 145     32 117  53N  26  80  48 -3.2 +3.0 +0.8+2.3 .419   29.6     23 16 59.2 - 7  9 39 357.7 835.1
24 Oct 15  3  4 51.2 d  146658 K0  7.3  6.8   92+ 147     58 179  35N   9  10  31 -3.6 +2.6 +0.4+2.6 .344   37.5     23 21 15.4 - 6 11 33 355.2 746.6
24 Oct 16  4 57 28.6 D      35 K0  6.2  5.7   97+ 162     62 212  46N  21 352  43 -1.8 +0.5 +0.9+2.2 .404   25.8      0 17 47.7   1 41 19 352.2 766.2
24 Oct 19  3 36  9.0 r     452 A2  7.7  7.6   96- 156     49  87  65N 273 347 287 +4.9 -4.3 +1.7+0.7 .409  144.6      3  5 30.3  20 54  9 356.7 868.4
24 Oct 19  6  7 25.5 r   75768 K0  7.6  7.1   95- 155     81 119  52S 209 267 223 +4.6 -4.7 +1.1+2.7 .365 -150.8      3 10 14.5  21 16 19 355.6 720.4
24 Oct 21  3 18 16.4 r     773wF8  7.0  6.7   81- 129     21  69  86S 258 329 262 +7.8 -6.1 +0.2+1.1 .563  174.6      5 10  3.9  27 33 23 369.41013.5
       773 is double: AB 7.0 9.3 315" 353.1, dT = +52sec
24 Oct 21 10 15  9.2 r   77138 A*  7.6  7.4   79- 126     70 283  51N 302 210 305 +6.9 -6.6 +2.1-2.2 .311  147.2      5 23  1.4  28 28  8 367.4 659.6
24 Oct 21 11 28  9   M     810SB7  1.7  1.7   79- 126   0 54 284 -11N   4 279   7 +6.7 -6.6 +9.9+9.9 .000   90.0      5 26 17.5  28 36 27 368.5 726.6
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Oct 21 11 29 12   Gr    810SB7  1.7  1.7   79- 126   1 53 ** GRAZE: CA-10.8N; Dist.141km in az. 202deg. [Lat = 24.63-0.36(E.Long+80.50)]
24 Oct 22  6 28 59.9 r   78233SA3  7.5        71- 114     48  75  66S 246 328 243 +8.4 -6.7 +1.1+1.7 .401 -164.1      6 19 59.0  28 25 36 374.0 757.1
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.28sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -133sec
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     78233 is a close double. Observations are highly desired
24 Oct 22  8 17 28.2 r   78294 A0  7.6  7.6   70- 114     71  77  88N 273   6 270 +8.1 -6.8 +2.5+0.3 .353  174.6      6 23  0.3  28 37 17 373.2 640.8
24 Oct 23 10 30 39.9 r   79394cA2  8.0  7.9   59- 101     87  59  45N 323  82 314 +8.0 -6.6 +2.2-3.0 .262  143.2      7 27 16.8  27 17 55 379.6 602.6
     79394 is double: ** 9.0 9.0 0.10"  90.0, dT = +0.23sec
     79394 has been reported as non-instantaneous (OCc 158). Observations are highly desired
24 Oct 23 10 47 33.8 r   79402 B8  7.3  6.9   59- 100  -9 88 318  37N 330 193 322 +7.9 -6.6 +1.8-3.7 .240  136.9      7 27 48.9  27 17 33 379.7 606.1
24 Oct 26  8 44 59.8 r   98892dK0  7.7  7.1   30-  66     29  86  70N 311  20 292 +6.8 -4.3 +1.1-0.8 .380  161.6     10  0 31.6  15 51 51 397.1 770.9
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +23sec
24 Oct 26  9 26 47.2 R   98897 K0  7.6  7.0   30-  66     39  90  88S 289 359 270 +6.7 -4.3 +1.5+0.1 .371 -173.6     10  1 20.7  15 40 14 396.3 716.8
24 Oct 27 10  8  3.7 r   99296kA3  8.0  7.9v  21-  55     36  96  38N 346  52 325 +5.5 -3.0 +0.9-3.0 .266  135.0     10 47 46.5  10 26 37 399.5 729.4
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Oct 29 10 27  2.2 r  138642 K0  9.5  9.0    8-  33     18 101  72S 276 338 254 +2.8 -0.3 +0.8+0.8 .380 -151.9     12 12  1.9 - 1  5 53 404.0 844.4
24 Nov  5 23 45 34.7 d  186563 K2  7.8  6.9   18+  50     19 223  16N  19 335  21 -6.7 +7.4 -0.5+2.4 .211   57.4     18 16 20.4 -28 55 54 389.3 738.6
24 Nov  6  0 18 44.1 d  186607 B8  8.6  8.6   18+  50     14 227  61S 123  73 124 -6.8 +7.3 +2.2-2.3 .284  -47.0     18 17 56.3 -29 15 26 389.8 787.7
24 Nov  6  0 59 25.1 d  186642 B8  8.3  8.3v  18+  50      7 233  77N  79  24  81 -6.9 +7.2 +0.7-0.6 .449   -4.0     18 19 24.3 -28 59 59 390.4 852.8
    186642 = HIP 89786, 8.29, range 0.01, 8V, Type VAR, Period 19.08397 days
24 Nov  8 23 27 30   m  190052 F8  7.9  7.6   47+  86     43 183  17S 147 144 163 -6.4 +6.0 +9.9+9.9 .000  -90.0     21  8 36.9 -21 40 59 373.9 661.2
24 Nov  8 23 31 33.1 D    3089SA0  5.3  5.3   47+  86     43 185  44N  28  23  44 -6.4 +6.0 +1.3+1.9 .320   28.9     21  8 33.6 -21 11 37 373.9 663.2
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +29sec : AF 5.3 13.0 9.7"  14.0, dT = +29sec : AG 5.3 20.0 13.1"  62.0, dT = +34sec : AC 5.3
15.0 35" 114.8, dT = +5sec
      3089 is a close double. Observations are highly desired
24 Nov 11  2 26 31.0 D Saturn      0.9  0.9   70+ 113     49 215  13N 350 318  11 -5.2 +3.0 -0.9+3.9 .228   57.9     22 58 12.9 - 8 52 27 363.5 756.4
   Saturn ring contacts offset by ±25.7 secs, at  2 26  5 and  2 26 57
   Saturn limb contacts offset by ±36.2 secs, at  2 25 55 and  2 27  7  Both contacts are against the bright limb of Saturn
24 Nov 11  2 48 52   GrSaturn      0.9  0.9   70+ 114     42 ** GRAZE: CA-17.7N; Dist.271km in az. 320deg. [Lat = 29.16+0.74(E.Long+80.50)]
24 Nov 11  3  5 22.0 D    3375 F2  6.8  6.6   70+ 114     44 225  82S  75  34  96 -5.3 +2.9 +1.9+0.0 .399  -26.3     23  0 19.9 - 8 52 50 363.8 784.9
24 Nov 11  3  5 48.0 R Saturn      0.9  0.9   70+ 114     44 226 -50N 286 245 308 -5.3 +2.9 +3.3-2.0 .237  122.2     22 58 12.9 - 8 52 27 363.8 787.0
   Saturn ring contacts offset by ±84.8 secs, at  3  4 23 and  3  7 13
   Saturn limb contacts offset by ±38.0 secs, at  3  5 10 and  3  6 26  Both contacts are against the bright limb of Saturn
24 Nov 11 23 56 29.8 D    3505WG8  5.5  5.0   79+ 126     51 133  60N  36  77  58 -3.4 +1.7 +1.2+2.1 .426   12.7     23 47 56.5 - 2 45 42 359.9 762.6
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -189sec
24 Nov 12  2  0 20.9 d Neptune     7.8  7.8   80+ 127     62 187  59S  96  90 118 -3.7 +1.4 +3.5-0.5 .270  -50.5     23 50 57.8 - 2 24 44 358.9 737.9
   Neptune limb contacts offset by ±4.6 secs, at  2  0 16.2 and  2  0 25.5  Both contacts are against the bright limb of Neptune
24 Nov 12  2 19 50   m  146935 K0  7.9  7.1   80+ 127     61 197  20S 136 121 158 -3.8 +1.3 +9.9+9.9 .000  -90.0     23 51  9.9 - 2 31 14 358.9 740.4
24 Nov 14  2 18 40.4 D     241 G5  6.8  6.4   95+ 155     69 127  26N   8  55  28 -0.2 -2.1 +0.2+3.1 .337   41.3      1 37 40.9  12  4 42 354.3 769.7
   Distance of 241 to Terminator = 18.4"; to 3km sunlit peak = 7.0"
24 Nov 15  5 32 21.2 d     397MB9  7.5  7.5   99+ 170     73 249  76S 104  42 121 +1.4 -4.1 +3.0-1.4 .294  -45.0      2 41  6.6  18 48  1 354.5 714.2
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = +11sec : AC 7.7 9.5 66" 242.2, dT = -165sec
       397 is a close double. Observations are highly desired
   Distance of 397 to Terminator = 13.5"; to 3km sunlit peak = 4.2"
24 Nov 16  6 52 15.0 d     537SB6  3.7  3.8s 100- 173     70 270 -53S  75 354  87 +3.2 -5.4 +2.3+0.3 .401   -4.3      3 44 52.5  24  6 48 357.0 695.6
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.36sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+88sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 16  7 41 51.2 d     541SB8  3.9  3.9s 100- 173     59 275 -87N  36 316  48 +3.1 -5.5 +2.0+2.1 .328   38.2      3 45 49.6  24 22  4 357.6 725.0
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +277sec : AB 3.8 13.7 113"  72.8, dT = +277sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  7 58 34.1 d     545SB6  4.1  4.2v 100- 173     55 275  14S 144  66 156 +3.0 -5.5 +1.6-6.5 .154  -68.8      3 46 19.6  23 56 54 357.9 740.0
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +1.6sec : AB 4.2 14.4 110" 180.2, dT = +580sec : AC 4.2 12.9 147" 336.0, dT = -937sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 0.4"; to 3km sunlit peak = 0.0"
24 Nov 16  8 12 36.5 R     537SB6  3.7  3.8s 100- 173     52 277  58N 252 174 264 +3.0 -5.5 +1.8+0.0 .434 -176.0      3 44 52.5  24  6 48 358.1 755.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.32sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+71sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 5.0"; to 3km sunlit peak = 0.0"
24 Nov 16  8 13 30   Gr    545SB6  4.1  4.2v 100- 173     51 ** GRAZE: CA 36.0S; Dist.123km in az. 186deg. [Lat = 24.89-0.09(E.Long+80.50)]
   Distance of 545 to Terminator = 2.8"; to 3km sunlit peak = 0.0"
24 Nov 16  8 23  9.7 D     552SB7  2.9  2.9s 100- 173     50 277 -17S 114  36 125 +3.0 -5.5 +1.5-2.0 .353  -36.6      3 47 29.1  24  6 18 358.3 763.9
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.01sec : AE 2.8 15.0 78" 232.4, dT = -106sec : AB 2.8 6.3 118"
291.1, dT = -333sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  8 27 30.7 R     545SB6  4.1  4.2v 100- 173     49 278  57S 189 111 200 +3.0 -5.5 +2.3+5.9 .160 -111.2      3 46 19.6  23 56 54 358.4 770.3
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = -0.41sec : AB 4.2 14.4 110" 180.2, dT = -680sec : AC 4.2 12.9 147" 336.0, dT = +775sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
   Distance of 545 to Terminator = 5.1"; to 3km sunlit peak = 0.0"
24 Nov 16  8 40 34.3 r     541SB8  3.9  3.9s 100- 173     46 279  15N 297 219 308 +3.0 -5.5 +1.2-2.1 .354  141.6      3 45 49.6  24 22  4 358.6 785.9
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +230sec : AB 3.8 13.7 113"  72.8, dT = +231sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 0.5"; to 3km sunlit peak = 0.0"
24 Nov 16  9 20 28.8 r     549SA0  6.3  6.3  100- 173     38 282  85N 228 153 240 +2.9 -5.5 +1.5+0.9 .407 -147.8      3 47 21.0  24  6 59 359.4 838.4
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -12sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = -41sec : BC 6.3 8.2 86" 345.0, dT =
+96sec
   Distance of 549 to Terminator = 7.6"; to 3km sunlit peak = 0.6"
24 Nov 16  9 22 35.1 R     552SB7  2.9  2.9s 100- 173     37 282  89N 224 149 235 +2.9 -5.5 +1.5+1.1 .389 -143.7      3 47 29.1  24  6 18 359.4 841.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.08sec : AE 2.8 15.0 78" 232.4, dT = -199sec : AB 2.8 6.3 118"
291.1, dT = -118sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Nov 16  9 40 49   Gr    560SB8  3.6  3.7s 100- 173     32 ** GRAZE: CA 37.4S; Dist. 12km in az.  17deg. [Lat = 26.12-0.28(E.Long+80.50)]
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   Distance of 560 to Terminator = 3.4"; to 3km sunlit peak = 0.0"
24 Nov 16  9 40 53   M     560SB8  3.6  3.7s 100- 173     33 283  37S 171  97 183 +2.9 -5.5 +9.9+9.9 .000  -90.0      3 49  9.7  24  3 12 359.8 866.8
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.015" 160.7 : Aa,Ab 3.8 6.8 0.22" 336.1 : AC 3.6 15.0 50"  36.4 : AH 3.6 16.0 68" 221.7
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
   Distance of 560 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Nov 16 10  6 10.3 R     561SB7  5.1  5.1V 100- 172     28 285  82S 216 144 228 +2.9 -5.4 +1.4+1.4 .361 -134.1      3 49 11.2  24  8 12 360.4 907.4
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +0.5sec : AF 5.0 14.5 4.7" 221.0, dT = -13sec : AE 5.1 14.8 96"  76.8, dT = +203sec : AD 5.1
14.7 144"  65.9, dT = +346sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 8.1"; to 3km sunlit peak = 0.9"
24 Nov 17 11 10 40.6 r   76841cK1  7.3  6.7   97- 159  -7 28 288  70S 232 158 237 +4.5 -6.2 +1.3+0.6 .396 -139.7      4 55 34.6  27 12  9 364.6 917.9
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.18sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Nov 20  9 56 57.4 R    1206 G8  5.9  5.3   76- 121     83 268  70N 299 215 288 +7.2 -6.1 +2.2-1.6 .345  175.8      8  0 55.9  25 23 34 378.2 633.9
   R1206 = omega Cancri
24 Nov 20 10 34 54.4 R    1211SA1  6.3  6.3   75- 121     74 271  63S 253 169 241 +7.1 -6.0 +3.3+0.7 .258 -136.0      8  1 43.8  25  5 22 378.6 659.3
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +122sec : AC 6.3 11.6 106" 295.0, dT = -302sec
24 Nov 21  8 58 53.9 r   80499 K0  8.2  7.6   66- 109     72  99  77N 298  11 282 +7.4 -5.4 +2.4-1.0 .331  179.0      8 54 32.2  21 49 13 384.1 616.9
24 Nov 23  7 37 43.2 r   99157pF2  7.4        47-  86     31  91  73S 274 341 254 +6.3 -3.3 +1.2+0.8 .365 -156.9     10 29 25.6  12 11 13 396.1 761.7
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.25sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 41  0.9 R  119114 F2  7.2  7.0   28-  64     10  94  85S 289 353 267 +3.9 -0.7 +0.3+0.2 .450 -168.7     11 55 23.9   1  5 45 403.5 898.3
24 Nov 25  9 16 48.6 R  119138 K0  7.4  6.9   28-  64     30 105  47N 337  37 315 +3.7 -0.5 +0.6-1.9 .341  149.7     11 58 13.0   0 52  9 401.4 768.7
24 Nov 25 10 20 53.0 R    1730wK2  6.2  5.5   28-  63     43 117  79N 305 359 283 +3.5 -0.4 +1.5-0.8 .360 -174.2     11 59  3.3   0 31 50 400.3 702.8
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +26sec
24 Nov 26 10 55 20.3 R  138921KG5  8.1  7.7   20-  52     39 122  55N 327  17 306 +2.0 +1.1 +0.8-1.5 .358  164.5     12 41 59.6 - 5 13 15 401.3 723.9
24 Nov 27 10 36  6.4 R  157912kF0  7.8  7.6   13-  42     24 117  65S 264 319 244 +0.7 +2.4 +1.6+1.4 .298 -136.0     13 23 56.5 -10 52 15 402.2 807.6
24 Nov 27 10 52  2.6 D    1925SB1  1.0  1.1v  13-  42     27 119 -14S 186 239 165 +0.7 +2.4 -0.8-3.7 .224  -56.5     13 25 11.6 -11  9 41 401.9 789.6
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -609sec : AC 1.0 10.5 368"  60.8, dT = -
939sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 11 16 13   Gr   1925SB1  1.0  1.1v  13-  41  -7 35 ** GRAZE: CA 21.2S; Dist.294km in az. 215deg. [Lat = 22.75-0.64(E.Long+80.50)]
24 Nov 27 11 35 10.4 R    1925SB1  1.0  1.1v  12-  41  -4 35 127  55S 255 302 235 +0.6 +2.5 +3.1+2.2 .210 -123.6     13 25 11.6 -11  9 41 401.1 739.0
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +545sec : AC 1.0 10.5 368"  60.8, dT =
+1700sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11  5 20.9 d    2029 M1  4.9  4.1v   7-  31 -10 18 120 -54S 140 195 122 -0.6 +3.7 +0.3-0.9 .419  -14.3 .01 14 10 50.5 -16 18  7 401.4 841.8
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 16 30.7 r    2029 M1  4.9  4.1v   7-  30   5 32 132  79N 295 339 277 -0.8 +3.8 +1.4-0.2 .374 -165.8 .01 14 10 50.5 -16 18  7 400.0 748.5
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  3 23 28  6.0 D    2765 A3  7.9  7.8    7+  32     11 231  49N  52 359  57 -5.9 +7.0 +0.3+0.3 .429   18.4     19  0  0.2 -28  3  3 386.2 847.7
24 Dec  4 21 53 30.9 d    2910cG3  4.7  4.3   13+  43   7 33 205  65S 109  85 120 -5.6 +6.7 +3.3-1.4 .257  -45.8     19 55 50.4 -26 17 58 380.9 682.0
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 22 49 43.7 r    2910cG3  4.7  4.3   14+  43  -5 27 217 -22S 196 159 207 -5.8 +6.6 -0.1+2.0 .280 -134.0     19 55 50.4 -26 17 58 381.4 745.0
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Dec  4 23  9 53   Gr 188749 G1  8.1  7.8   14+  43  -9 23 ** GRAZE: CA 21.7S; Dist.  1km in az. 320deg. [Lat = 26.01+0.76(E.Long+80.50)]
24 Dec  4 23  9 53   gr 188749 G1  8.1  7.8   14+  43  -9 24 221  22S 152 111 163 -5.8 +6.6 +9.9+9.9 .000  -90.0     19 57 15.5 -26 13  3 381.6 770.4
24 Dec  5  0 42 12.0 d  188809 F5  8.7  8.4   14+  44     10 235  77S  97  42 108 -6.0 +6.4 +1.1-1.2 .406  -33.5     20  0 36.8 -25 42 10 382.9 905.2
24 Dec  5 23 36 15.6 d  189831 K0  8.5  7.9   22+  56     31 218  87N  74  37  89 -5.7 +5.8 +1.7-0.1 .394  -18.3     20 54 50.6 -22  6  6 377.5 760.6
24 Dec  5 23 53 24.7 d  189843 K2  8.3  7.7   22+  56     29 222  73S  94  53 109 -5.7 +5.7 +2.1-1.0 .338  -37.6     20 55 18.7 -22  7 25 377.7 780.9
24 Dec  6  1  2 54.8 d    3062 K2  7.5  6.8   22+  56     18 234  32S 135  83 150 -5.8 +5.6 +5.4-7.6 .104  -77.4     20 56 52.7 -22  0 21 378.7 875.5
24 Dec  6  1 10 30   Gr   3062 K2  7.5  6.8   22+  56     15 ** GRAZE: CA 18.9S; Dist. 43km in az. 146deg. [Lat = 25.53+0.60(E.Long+80.50)]
24 Dec  6 22 47 13.2 d  164653DB9  7.7  7.7v  31+  68  -4 46 194  76N  58  45  76 -5.0 +4.8 +2.0+0.9 .380   -6.9     21 47 36.4 -17 17 41 373.1 693.3
    164653 is double: AB 7.7 11.4 4.5" 207.2, dT = -10sec
    164653 is a close double. Observations are highly desired
    164653 = AP Cap, 7.6 to 7.65, V, Type ACV, Period 2.6733 days, Phase  23%
24 Dec  7  0 41 29.5 D    3197 K3  6.4  5.6   32+  69     33 225  85N  67  25  85 -5.4 +4.5 +1.4+0.1 .422  -15.2     21 50 13.0 -16 50 42 373.9 792.3
24 Dec  7 23 31 28   m  165228 K3  7.9  7.1   42+  81     52 195  21S 137 124 158 -4.5 +3.4 +9.9+9.9 .000  -90.0     22 40 20.7 -11 36 19 369.4 709.6
24 Dec  8 23 32 47   m  146747 K0  8.0  7.5   54+  94     59 176  21S 136 140 158 -3.6 +1.8 +9.9+9.9 .000  -90.0     23 30 57.4 - 5  3 39 365.9 712.2
24 Dec  9  1 28  9.6 D    3472PF5  6.9  6.7   54+  95     51 224  47S 109  71 131 -4.0 +1.5 +4.1-2.5 .199  -62.1     23 33 28.6 - 4 24  5 366.2 754.2
      3472 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.48sec
      3472 has been reported as non-instantaneous (OCc1644). Observations are highly desired
24 Dec  9  2 46 58.4 d  146789kF2  7.2  7.0   55+  95     37 243  83S  73  20  95 -4.1 +1.3 +1.5-0.1 .425  -22.7     23 35 14.7 - 3 51 14 367.1 820.3
24 Dec 10  1 27 35.4 d      47 F0  7.7  7.5   66+ 108     63 214  60N  37   7  59 -2.9 -0.1 +1.4+1.7 .408    9.9      0 23 38.5   2 44 35 362.9 728.1
24 Dec 10 23 44 38.4 d  109738 G5  7.8  7.1   76+ 121     63 123  82N  60 110  81 -1.3 -1.5 +1.7+1.5 .426  -12.3      1 13 41.8   8 58 29 361.1 763.7
24 Dec 11  2  8 19.4 d     186pF2  7.3        76+ 122     70 219  23N   2 327  22 -1.7 -1.9 +0.2+3.7 .277   47.6      1 15 46.7   9 47  5 360.6 719.2
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.21sec
       186 is a close double. Observations are highly desired
24 Dec 12 23 43 43.6 d     452 A2  7.7  7.6   93+ 148     45  85  62N  51 125  66 +1.7 -4.3 +0.7+1.8 .498    6.4      3  5 30.3  20 54  9 361.0 878.2
24 Dec 13  2 39 31.8 d   75768 K0  7.6  7.1   93+ 149     83 127  44S 127 178 141 +1.4 -4.7 +5.2-3.9 .151  -68.1      3 10 14.5  21 16 19 359.2 704.8
24 Dec 13  2 54 28.9 d   75764SF0  7.6        93+ 149     85 150  31N  22  51  37 +1.3 -4.8 +1.1+3.1 .319   37.3      3 10  6.6  21 44 49 359.2 697.9
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +0.6sec : AB,C 7.6 13.5 48"  44.0, dT = +141sec : AB,D 7.6 15.8 55" 159.0, dT = -125sec
     75764 is a close double. Observations are highly desired
24 Dec 16  8 47 27.2 r     996cA2  6.9  6.8   99- 167     55 283  59N 284 199 280 +4.8 -6.4 +1.5-1.2 .419 -178.8      6 30 22.0  28 12 44 369.2 750.2
       996 is double:  7.6 7.6
   Distance of 996 to Terminator = 18.6"; to 3km sunlit peak = 7.7"
24 Dec 16 10  0 56.7 r   78480cK5  7.5  6.7   99- 166     40 286  65S 228 150 225 +4.6 -6.3 +2.5+1.4 .253 -122.3      6 33  2.1  27 49 31 370.6 853.0
     78480 is double: ** 8.3 8.3 0.10"  63.0, dT = +0.38sec
     78480 has been reported as non-instantaneous (OCc 720). Observations are highly desired
24 Dec 16 11  2 29.1 R    1008 A0  5.3  5.3s  98- 166     27 290  38N 307 233 303 +4.6 -6.2 +0.0-1.8 .495  159.4      6 35 12.1  28  1 20 371.9 953.7
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 11.2"; to 3km sunlit peak = 2.6"
24 Dec 18  2 19 22.1 r    1251 B9  5.9  5.9   90- 144     15  70  54N 314  22 301 +7.1 -5.6 +0.8-0.7 .410  143.0      8 20 32.1  24  1 20 381.4 949.1
   R1251 = lambda Cancri
```

Occultation prediction for Varney Observatory
E. Longitude - 80 30 0.0, Latitude 26 0 0.0, Alt. 2m; Telescope dia 15cm; dMag 0.0

y	m	day d	Time h	m	s	P	Star No	Sp D	Mag v	Mag r	V	% ill	Elon	Sun Alt	Moon Alt	Az	CA o	PA o	VA o	AA o	Libration L	B	A m/o	B m/o	RV "/s	Cct o	durn sec	R.A. (J2000) h	m	s	Dec o	m	s	Mdist Mm	SV m/s
24	Dec	18	4	19	33.6	r	80165	F2	7.5	7.3		90-	143	40	80		30N	338	53	325	+6.9	-5.6	+2.1	-3.2	.228	123.6		8	24	55.2	23	56	43	379.4	757.5
24	Dec	19	5	59	2.1	r	98510	kG5	7.2	6.8		83-	131	50	91		40S	235	307	218	+6.6	-4.7	+2.2	+4.2	.190	-121.0		9	20	37.9	19	5	26	384.4	688.9
24	Dec	22	9	22	29.9	R	1696	F5	6.9	6.7		55-	95	57	131		87N	297	339	275	+3.7	-0.5	+2.2	-0.7	.326	-162.9		11	42	25.5	2	21	44	396.8	656.6
24	Dec	24	7	33	46.4	r	139140	K0	7.9	7.3		36-	74	14	107		75S	277	338	257	+1.4	+2.0	+0.7	+0.7	.397	-152.4		13	4	47.0	- 8	34	16	403.0	875.7
24	Dec	24	10	0	6.6	R	1886	cK3	5.6	5.0		36-	73	42	132		40N	341	24	320	+1.0	+2.3	+0.5	-2.1	.318	151.6		13	8	32.5	- 8	59	4	400.3	702.9

1886 is double: ** 6.5 6.5 0.10" 90.0, dT = +0.1sec
1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired

24	Dec	24	11	22	31.5	R	1887	K0	6.3	5.8		35-	73	-10	52	157	72S	273	294	253	+0.7	+2.5	+3.4	+0.2	.248	-138.1		13	9	14.2	- 9	32	17	399.4	644.7
24	Dec	25	10	23	30.9	R	158207	F0	7.4	7.2		27-	62		35	133	50S	249	292	230	-0.3	+3.6	+3.8	+2.9	.177	-118.2		13	52	15.4	-14	40	36	400.1	728.7
24	Dec	25	11	32	42.2	r	1992	cF0	7.5		S	27-	62	-8	44	150	57N	322	350	303	-0.6	+3.7	+1.3	-1.4	.338	170.2		13	53	51.7	-14	39	51	399.2	664.0

1992 is double: AB 7.85 8.92 0.28" 322.7, dT = -0.8sec
1992 is a close double. Observations are highly desired
1992 = NSV 19984, 7.4, , Type VAR:

Lunar Occultation predictions
Santiago de Cuba
Cuba

Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  3 11 15 43.3 R    1770 A5  5.9  5.8   56-  97  -5 66 210  61N 322 294 300 -3.4 -1.4 +1.7-2.3 .323  175.0     12 18 40.3 - 0 47 14 397.0 624.4
   R1770 = 13 Virginis
24 Jan  4  8 49 50.2 R    1865 A2  7.3  7.2   47-  87     47 124  70S 273 324 252 -3.9 -0.4 +2.7+0.5 .275 -139.3     12 59  0.2 - 6  5 27 395.6 694.6
24 Jan  5  8  9 38.0 r  158111kA0  8.1  8.0e  38-  76     28 116  60N 321  21 301 -4.7 +0.9 +0.5-1.2 .413  167.7     13 42 57.7 -11 18  8 393.5 806.4
    158111 = ASAS J134258-1118.1, 7.752, range 0.08, 1Ic, Type EC|ESD, Period 3.89092 days, Phase  46%
24 Jan  5  8 51 42.1 r    1966kK2  7.8  7.1   38-  76     36 122  35N 345  40 326 -4.8 +1.0 +0.1-2.3 .326  145.2     13 44 15.6 -11 26 12 392.6 754.9
24 Jan  7 10 53  5.7 R    2204kK0  7.7  7.1   19-  52 -10 35 137  79S 270 314 257 -6.1 +4.1 +2.3+0.6 .333 -145.8     15 24 57.6 -22  2 37 381.7 746.2
24 Jan  7 11  2  3.8 R X 39461pK0  7.5  7.0   19-  52  -8 36 139  67N 305 346 292 -6.1 +4.1 +1.3-0.7 .397  179.5     15 25 22.6 -21 55 45 381.6 735.1
   X 39461 is triple: AB 7.9 9.7 9.6" 192.1, dT = +9sec : AC 7.9 13.5 40" 190.5, dT = +41sec
   X 39461 is a close double. Observations are highly desired
24 Jan  8  9 42  4.1 D    2349SB1  2.9     v  12-  40     10 122 -60S 125 187 116 -5.8 +5.1 +0.2-0.4 .503   -9.3     16 21 11.3 -25 35 34 378.7 936.3
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = +0.11sec : AB 2.9 8.4 20.3" 273.1, dT = -34sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 10 23 44.7 r  184332 A0  8.8  8.6v  11-  40     18 127  46N 319  15 310 -5.8 +5.2 +0.2-0.9 .438  157.9     16 20 49.3 -25 23 39 377.7 865.0
    184332 = V0961 Sco, 10.17 to 10.25, U, Type ACV, Period 2.0025 days, Phase  84%
24 Jan  8 10 47  1.5 R    2349SB1  2.9     v  11-  39 -12 22 130  76N 288 341 280 -5.9 +5.2 +1.0+0.0 .447 -170.8     16 21 11.3 -25 35 34 377.1 828.7
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  42.7, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 207.7, dT = -0.16sec : AB 2.9 8.4 20.3" 273.1, dT = -44sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  43%
24 Jan  8 14 43 41.5 D    2366dM1  1.1  0.1v  11-  38  35 43 187 -67S 116 108 108 -6.6 +5.7 +2.6-1.0 .335   -6.9 .13 16 29 24.5 -26 25 55 374.2 612.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  8 16 15  7.9 R    2366dM1  1.1  0.1v  10-  38  46 36 212  89N 274 240 266 -6.9 +5.7 +2.4-0.6 .352 -173.0 .12 16 29 24.5 -26 25 55 374.5 643.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  41%
24 Jan  9 10 38  3.8 r X 42283pK0  8.8  8.3    5-  27      9 124   3N 351  53 349 -5.2 +6.1 -1.5-3.1 .236  117.2     17 22 46.2 -27 40 34 373.0 933.2
   X 42283 is double: AB 9.2 10.7 3.6"  42.9, dT = -10sec
   X 42283 is a close double. Observations are highly desired
24 Jan  9 10 52 57.6 r  185324kA0  8.7  8.5    5-  27 -11 12 126  89N 265 325 263 -5.2 +6.2 +1.0+0.8 .460 -156.4     17 22 16.8 -28  0  8 372.7 906.9
24 Jan  9 11 22 17.3 R    2505 K4  5.3  4.5    5-  27  -4 17 129  78S 252 307 249 -5.3 +6.2 +1.6+1.4 .378 -142.5     17 23 21.6 -28  8 34 372.0 858.4
   R2505 = 43 Ophiuchi
24 Jan 14 23 43  4.0 D    3365kA0  8.2  8.1   16+  47     32 243  74S  87  28 108 +1.3 +4.1 +1.5-0.5 .408  -35.1     22 56 49.4 -10 15 47 360.6 872.5
24 Jan 16 23 52 35.2 d  109355pG5  7.7  7.1   37+  74     58 244  30N   7 309  28 +4.0 +1.1 +0.4+3.2 .308   41.8      0 39 46.9   3 39 10 364.7 732.3
    109355 is double: ** 9.1 9.1 0.10"  90.0, dT = +0.04sec
    109355 has been reported as non-instantaneous (OCc1143). Observations are highly desired
24 Jan 17  0 23 15.1 d  109370 K2  8.2  7.5   37+  75     51 250  84S  73  11  95 +3.9 +1.0 +2.0+0.2 .391  -23.0      0 41 21.3   3 35 58 365.2 752.8
24 Jan 17  1 47  6.3 d      90SF8  7.6        37+  75     33 262  27N   4 295  26 +3.8 +0.8 +0.3+3.3 .291   51.8      0 42 23.2   4 10  0 366.9 837.3
        90 is triple: AB 7.86 9.71 2.13" 212.5, dT = -6sec : AC 7.9 13.4 47" 275.5, dT = +4sec
        90 is a close double. Observations are highly desired
24 Jan 18  0  9 59.7 d  109947 K0  7.8  7.2   48+  88     67 247  65S  93  31 113 +4.9 -0.6 +3.2-0.6 .283  -42.7      1 31 53.2   9 59 18 368.1 686.4
24 Jan 18 23 22 53.2 d   92903cF5  8.2  7.9   59+ 100 -10 86 149  45N  26  56  44 +5.7 -2.1 +1.2+2.8 .334   24.5      2 22  0.5  15 59 30 371.7 661.2
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     92903 is double: ** 8.9 8.9 0.050"
     92903 has been reported as non-instantaneous (OCc1183). Observations are highly desired
24 Jan 19  3 12 46.3 d     363 F0  7.2  7.0   60+ 101     39 276  79N  61 344  78 +5.0 -2.4 +1.5+0.5 .415    5.0      2 27 32.1  16 38 37 374.7 756.9
24 Jan 19 23 19 26.7 D     472cA1  4.9  4.9   69+ 113  -9 75  82  19N   5  97  19 +6.1 -3.5 +0.0+4.3 .236   49.8      3 14 54.1  21  2 40 375.9 665.6
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = -0.01sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jan 19 23 19 46.4 d   75820 A0  8.1  8.0   69+ 113  -9 75  84  58S 107 198 121 +6.1 -3.5 +4.1-1.0 .223  -52.4      3 15 53.3  20 42  8 375.9 665.3
24 Jan 19 23 56 12.7 d   75819 F2  7.9  7.7   70+ 113     84  76  24N  10 112  24 +6.0 -3.5 +0.5+4.1 .244   46.1      3 15 46.1  21  9 55 375.9 640.7
24 Jan 20  0 16  9.9 r     472cA1  4.9  4.9   70+ 113     88  42 -60N 287  64 300 +5.9 -3.6 +4.1-1.3 .225  130.5      3 14 54.1  21  2 40 375.9 631.1
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.44sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Jan 21  7  8 35   m     647WB9  5.4  5.4s  81+ 128     12 293   5N 358 285   6 +4.9 -4.9 +9.9+9.9 .000   90.0      4 22 34.9  25 37 46 385.9 961.4
   R647 = chi Tauri
       647 is double: AB 5.4 8.5 19.4"  24.9
       647 = NSV 15957, 5.34 to 5.39, Hp
   Distance of 647 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Jan 22  0 42 26.4 d     773wF8  7.0  6.7   87+ 137     69  65  32N  32 138  36 +5.9 -5.7 +1.2+3.5 .259   39.6      5 10  3.9  27 33 23 384.0 626.6
       773 is double: AB 7.0 9.3 315" 353.1, dT = +949sec
24 Jan 24  6  0 37.7 D    1093SF8  6.6     s  98+ 162     62 291  49S 154  55 147 +4.0 -6.6 +0.7-3.8 .245  -43.9      7 12 49.0  27 13 30 391.4 645.4
      1093 is triple: AB 7.24 7.27 0.73" 298.7, dT = -2.4sec : AC 7.2 12.8 13.7"  74.4, dT = +10sec
      1093 is a close double. Observations are highly desired
      1093 = NSV 3453, 6.43 to 6.46, V
24 Jan 24  6  0 37.7 d X 99111S    7.2  7.0s  98+ 162     62 291  49S 154  55 147 +4.0 -6.6 +0.7-3.8 .245  -43.9      7 12 49.0  27 13 30 391.4 645.4
   X 99111 is triple: BA 7.3 7.2 0.7" 118.7, dT = +2.4sec : BC 7.3 12.7 14.0"  68.0, dT = +4sec
   X 99111 is a close double. Observations are highly desired
   X 99111 = NSV 3453, 6.43 to 6.46, V
24 Jan 25  1 21  1   m    1206 G8  5.9  5.3   99+ 171     42  73  42S 186 271 174 +4.5 -6.6 +9.9+9.9 .000  -90.0      8  0 55.9  25 23 34 395.0 696.9
   R1206 = omega Cancri
   Distance of 1206 to Terminator = 4.8"; to 3km sunlit peak = 0.0"
24 Jan 28  2 44 18.1 r   99149 A2  7.1  7.0   95- 153     28  85  67S 261 336 241 +1.3 -4.7 +1.1+1.3 .326 -146.2     10 28 42.4  13 17 20 402.1 765.0
24 Jan 28  7 40 41.5 r   99185pA3  7.9  7.7   94- 152     79 227  74S 270 225 249 +0.2 -4.3 +3.9-0.2 .230 -136.0     10 34  7.3  12 22 28 399.1 620.3
     99185 is double: AB 7.7      0.20" 180.0, dT = 0.00sec
     99185 is a close double. Observations are highly desired
24 Jan 29  3 40 32.6 R    1625SK3  5.8  5.2   89- 142     30  92  52N 327  39 306 -0.1 -3.6 +0.9-1.8 .348  153.7     11 14  1.8   8  3 39 402.6 757.9
      1625 is triple: **Aa,Ab 6.7 6.7 0.10"  90.0, dT = +0.15sec : AB 5.8 11.8 23.8" 260.1, dT = -26sec
      1625 has been reported as non-instantaneous (OCc 137). Observations are highly desired
24 Jan 29 10 47 59   Gr   1644 B9  4.1  4.1   88- 140     43 ** GRAZE: CA 20.2S; Dist.145km in az.  43deg. [Lat = 21.80-0.88(E.Long+75.09)]
24 Jan 29 10 51 39   M    1644 B9  4.1  4.1   88- 140 -11 44 259  20S 221 153 199 -1.8 -2.7 +9.9+9.9 .000  -90.0     11 21  8.2   6  1 46 401.4 731.6
   R1644 = Shang Tseang = sigma Leo
24 Jan 30  6 27 42.5 R    1732cK0  6.8  6.1v  82- 130     56 119  68N 314   9 292 -1.9 -2.0 +1.7-1.5 .337  179.9     11 59 23.9   1 49 36 400.1 653.1
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.3sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Jan 31  7 30 15.4 r    1824pG0  7.8  7.5   74- 119     57 134  48N 335  18 314 -3.4 -0.6 +1.0-2.3 .319  160.6     12 42 59.3 - 4  2 58 398.5 653.1
      1824 is double: AB 6.2 10.0 1.1" 359.0, dT = -3sec
      1824 is a close double. Observations are highly desired
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan 31 10 35 13.9 r  138955 K2  7.2  6.5   74- 118     57 224  62N 321 281 300 -4.2 -0.1 +1.7-2.3 .324  173.2     12 45 32.0 - 4 48 39 398.2 631.2
24 Feb  4  8 26 11.9 R    2270 B2  5.4  5.4e  36-  73     22 128  28N 343  38 332 -6.9 +4.9 -0.4-2.0 .323  137.0     15 53 55.9 -23 58 41 384.4 824.5
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  80%
24 Feb  4  8 38 10   M    2269cB5  5.4  5.4   35-  73     24 130  20S 211 263 200 -6.9 +4.9 +9.9+9.9 .000  -90.0     15 53 53.9 -24 31 59 384.2 807.9
24 Feb  5  9  5 41.8 r  184734 M0  8.2  7.3   26-  61     17 128  30N 334  30 329 -6.9 +6.0 -0.3-1.6 .347  138.8     16 52 17.9 -27  0 58 378.6 846.3
24 Feb  5 10 30 53   m  184783 G6  7.9  7.4   25-  60     31 142  20S 203 243 198 -7.1 +6.2 +9.9+9.9 .000  -90.0     16 54 49.6 -27 44 55 376.9 722.9
24 Feb  5 10 42 13.2 r  184777pA0  8.4  8.4   25-  60     33 145  76S 260 298 255 -7.1 +6.2 +2.5+1.0 .325 -147.1     16 54 27.0 -27 34  9 376.6 707.5
    184777 is double: AB 9.0 9.1 0.20"  56.9, dT = +0.6sec
    184777 is a close double. Observations are highly desired
24 Feb  6  9 20 52.9 r X 43016SK0  7.9  7.3   17-  48      9 125  88N 268 330 268 -6.3 +6.7 +0.8+0.7 .483 -163.3     17 53 48.2 -28 41 19 373.2 911.8
   X 43016 is triple:  5.4 10.6 0.10"       : AB 9.4 12.2 7.4"   0.9, dT = +0.8sec
   X 43016 is a close double. Observations are highly desired
24 Feb  7 10 45 25   m X163280MG1  8.3  8.0    9-  34 -12 12 127  20S 185 244 191 -5.3 +7.2 +9.9+9.9 .000  -90.0     19  2 32.1 -28 38 41 366.6 864.9
   X163280 is triple: AB 9.0 9.3 2.2"  52.6 : AC 9.0 8.9 241" 265.0
   X163280 is a close double. Observations are highly desired
24 Feb 11 23 42 39.2 D  146719KF8  8.1  7.8    6+  28 -11 17 257  87N  68   1  90 +1.3 +2.9 +0.5+0.1 .555  -12.1     23 28 17.0 - 5 49  4 357.6 984.9
24 Feb 12  0 30 51.6 D  146724 K2  7.0  6.2    6+  28      6 262  16N 356 287  18 +1.3 +2.8 -0.4+3.6 .283   62.2     23 28 46.7 - 5 23 22 358.81058.4
24 Feb 13  1  4 44.7 d  109178 K0  8.9  8.3   13+  42     12 267  57S 100  30 122 +3.0 +1.1 +0.5-1.2 .431  -40.5      0 23 55.0   1 32 19 361.2 993.5
24 Feb 13  1 17 19.2 d  109182 G0  7.8  7.4   13+  43     10 268  48S 110  39 131 +3.0 +1.1 +0.4-1.8 .377  -49.2      0 24 17.3   1 33 22 361.61013.3
24 Feb 13  1 51 28.0 d      50dG5  5.8  5.3S  13+  43      2 272  84N  62 352  84 +3.0 +1.1 +0.1+0.3 .607    0.5      0 25 24.2   1 56 23 362.51066.4
   R50 = 44 Piscium
        50 is double: AB 5.8 9.0 1.0"
        50 is a close double. Observations are highly desired
        50 = NSV 15087, 5.77, , Type VAR:
24 Feb 14  1 15 25.0 d  109763cG5  8.1  7.6   22+  56     23 271  40N  18 306  38 +4.4 -0.6 +0.7+2.3 .366   43.7      1 15 37.1   8 46  5 364.4 894.8
24 Feb 14 23 46 22.5 d     309 F0  8.2  8.0V  32+  69 -12 57 266  88S  71 355  89 +5.7 -2.1 +2.1+0.4 .385  -13.4      2  6 41.6  14 35  2 366.4 703.6
      309 = HD 12899, 8.20, , Type DSCTC
24 Feb 15  2  1 23.1 d   92820 K2  8.2  7.6   33+  70     26 278  88S  72 357  90 +5.4 -2.2 +0.9+0.0 .474   -4.9      2 10 15.7  15  1 23 369.4 852.6
24 Feb 15  2 15  8.7 d   92821 K0  8.1  7.3   33+  70     23 279  71N  51 337  69 +5.4 -2.2 +0.9+0.7 .466   16.9      2 10 29.4  15  9  5 369.8 873.5
24 Feb 15  3 25 59.9 D     326cM0  5.7  4.9s  33+  70      7 284  88S  71   0  89 +5.4 -2.3 +0.2-0.1 .549    0.0      2 13  3.3  15 16 48 371.7 990.3
   R326 = 19 Arietis
      326 is double: ** 6.8 6.8 0.050"
      326 has been reported as non-instantaneous (OCc1180). Observations are highly desired
      326 = NSV 748, 5.68 to 5.76, V
24 Feb 16  1 28 21.0 d   75708 K0  8.0  7.1   43+  82     47 279  77N  60 338  75 +6.1 -3.7 +1.8+0.7 .390    9.0      3  3  9.6  20 20 10 373.0 714.4
24 Feb 16  4 43  2.7 d     459SK2  6.4  5.8   45+  84      4 291  67N  51 341  65 +5.9 -3.7 +0.3+0.6 .490   28.3      3  9 20.1  20 45 40 377.91019.4
      459 is quadruple: Aa,Ab 7.1 8.1 0.10"       : AB 6.5 8.8 122" 239.0, dT = -247sec : AB 6.5 8.8 122" 239.0, dT = -247sec
      459 is a close double. Observations are highly desired
24 Feb 17  0 31  4.3 D     587 K0  6.2  5.5   54+  95     71 288  61N  50 309  60 +6.7 -4.9 +2.5+1.8 .313   20.3      3 57 26.4  24 27 43 376.8 609.2
24 Feb 17 23 30 17   m     732pK3  7.5  6.8   64+ 106  -8 79  47  13S 161 291 167 +7.0 -5.8 +9.9+9.9 .000  -90.0      4 52 58.2  26 46 39 381.5 594.7
      732 is double: ** 7.9 10.2 0.040"  69.0
      732 has been reported as non-instantaneous (OCc 778). Observations are highly desired
24 Feb 17 23 31  1   Gr    732pK3  7.5  6.8   64+ 106  -8 81 ** GRAZE: CA 13.4S; Dist. 57km in az. 338deg. [Lat = 20.57+0.37(E.Long+75.09)]
24 Feb 18  0 51 48.3 d   76841cK1  7.3  6.7   64+ 107     77 308  83N  78 314  83 +6.7 -5.8 +2.9+0.5 .313    0.5      4 55 34.6  27 12  9 381.8 578.7
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.26sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Feb 18  3 43 18.1 D     746WB7  7.0  6.9   65+ 108     41 289  71N  67 340  72 +6.1 -5.8 +1.8+0.3 .359   24.1      4 59 53.7  27 19 32 384.4 733.5
      746 is double: AB 7.0 8.7 20.4" 206.0, dT = -43sec
```

Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb 19  5 11 39.7 D   77818 K5  6.7  5.8   75+ 120     34 291  51S 132  48 131 +5.6 -6.3 +0.2-2.2 .366  -30.3      6  0  4.9  28  7 33 389.7 800.8
24 Feb 21  3 18 50.8 D    1181cG8  7.0        90+ 142     81 314  89N 106 335  96 +4.8 -6.7 +2.9-1.0 .299    6.6      7 49 47.7  26 15 50 393.7 574.1
      1181 is double: AB 7.04 10.09 0.40" 200.2, dT = -0.1sec
      1181 is a close double. Observations are highly desired
24 Feb 22  0 27 26.7 d    1290pF8  6.9  6.6   94+ 153     46  76  58N  83 168  68 +4.7 -6.4 +1.8+1.1 .319   20.8      8 38 45.5  23 41  9 397.6 657.2
      1290 is triple: AB 6.9 16.7      301.1, dT = 0.00sec : AC 6.9 11.4 654" 117.0, dT = +1695sec
24 Feb 27  6 31 53.3 r    1790 M4  6.9  6.0v  93- 150     66 160  35N 347   6 325 -2.5 -0.7 +0.7-3.0 .282  150.7     12 29  9.7 - 2 25 46 399.5 627.6
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Feb 28  4 40 44.9 r    1890 K0  7.3  6.8   88- 140     38 117  51N 331  29 311 -3.3 +0.4 +0.6-1.8 .359  160.1     13  9 46.3 - 7 39 19 400.0 741.3
24 Feb 29  9  8 30.3 R    2002 K0  6.8  6.3   80- 127     54 198  52N 329 312 311 -5.5 +2.5 +1.6-2.4 .298  161.5     13 58 29.8 -14  7 19 395.8 603.5
24 Mar  2 11  5 26.2 d    2237cK3  5.0  4.3s  62- 104  -4 43 201 -75N  90  68  78 -7.6 +5.2 +3.1-0.3 .282   24.5     15 40 16.9 -23 49  5 388.4 584.4
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.28sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  2 12 35 11.1 r    2237cK3  5.0  4.3s  62- 104  17 32 223  63N 310 266 299 -7.9 +5.3 +2.3-2.1 .308  155.7     15 40 16.9 -23 49  5 389.1 638.1
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.19sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Mar  3  7  0 52.8 D    2366dM1  1.1  0.1v  53-  93     19 128 -89S 101 156  93 -7.1 +5.8 +1.1+0.3 .424   15.9 .10 16 29 24.5 -26 25 55 386.4 827.0
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  8 13  3.0 R    2366dM1  1.1  0.1v  53-  93     31 140  56N 313 355 305 -7.3 +5.9 +1.0-0.9 .370  163.8 .12 16 29 24.5 -26 25 55 384.9 718.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  44%
24 Mar  3  9 15 58.9 R    2373 K1  6.1  5.5   52-  93     39 154  30N 339   7 332 -7.5 +6.1 +0.6-2.4 .251  136.3     16 31 22.8 -26 32 16 384.0 645.8
24 Mar  4  7 29 24.5 r  185400 F5  7.2  7.0   42-  81     13 127  83N 279 337 276 -7.2 +6.6 +0.8+0.4 .458 -170.0     17 26 15.7 -28 25  0 381.2 859.2
24 Mar  5  8 41 27.5 r    2681cA1  7.8        31-  68     15 129  47N 307   4 311 -6.9 +7.2 +0.4-0.5 .403  152.4     18 30 31.0 -28 47 43 374.6 826.6
      2681 is double: AB 8.47 8.71 0.14" 223.1, dT = -0.04sec
      2681 is a close double. Observations are highly desired
24 Mar  5  9 32 36.7 R    2688 G6  7.0  6.6s  31-  68     23 136  55S 229 277 233 -7.0 +7.3 +2.7+2.5 .268 -130.6     18 32 14.0 -29 11 25 373.5 748.0
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Mar  6 10 24 29.1 r  188343 K0  8.4  7.8   21-  54     23 133  79N 267 318 277 -6.1 +7.4 +1.6+0.7 .425 -179.8     19 36 57.4 -27 30  4 367.3 756.7
24 Mar  7  9 41 24.2 R    3012 A7  6.9  6.8   12-  41      6 118  82N 256 322 271 -4.7 +7.0 +0.7+1.0 .520 -174.9     20 38  4.9 -24 13 44 364.0 921.2
24 Mar  7 10 46 34.3 r  189555 G1  7.2  6.9   12-  41  -7 18 125  78N 260 318 275 -4.7 +7.1 +1.2+0.9 .465  178.4     20 40 22.3 -24  7  5 362.4 816.8
24 Mar  8 10 30 35.9 R  164567cK5  7.3  6.5    6-  27 -11  6 112  11N 320  27 338 -3.0 +6.2 -0.4-2.3 .212  113.0     21 40 34.8 -18 53 44 359.6 947.8
    164567 is double:  7.1 7.6
24 Mar  8 10 45 20.3 d    3175 G8  4.7  4.3    5-  27  -8  9 114 -72N  43 108  61 -3.0 +6.2 +0.9+2.0 .463   29.5     21 42 39.5 -18 51 59 359.3 926.2
   R3175 = kappa Capricorni
24 Mar  8 11 43 30.2 r    3175 G8  4.7  4.3    5-  27   6 21 120  52N 279 338 297 -3.0 +6.2 +1.1+0.4 .418  150.3     21 42 39.5 -18 51 59 357.8 835.6
   R3175 = kappa Capricorni
24 Mar 13  0 51 25.3 d   92623 K5  8.9  8.4   10+  36     12 279  76S  81   9 100 +4.0 -1.7 +0.3-0.4 .545  -13.4      1 46 38.7  12 24 42 362.6 985.0
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Mar 14  0 44 44.9 d     395cF5  8.1  7.9   18+  50     27 282  30N  10 294  27 +5.3 -3.3 +1.5+3.8 .234   61.1      2 40 33.1  18 35 59 366.4 861.9
       395 is double: ** 8.6 8.6 0.050"
       395 has been reported as non-instantaneous (OCc1192). Observations are highly desired
24 Mar 15  0  0 47.0 D     521kA2  6.7  6.7v  27+  63     49 283  77N  62 336  74 +6.3 -4.7 +1.9+0.7 .384   12.5      3 36 58.0  23 12 40 370.2 706.4
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  24%
24 Mar 18  1 44 16.3 d   78530cB9  7.8  7.8   59+ 100     63 294  34S 150  48 146 +6.5 -6.8 +1.0-4.0 .230  -46.3      6 35 40.3  28 15 51 387.2 624.4
     78530 is double: AB 8.6 8.9 0.19"  39.6, dT = -0.29sec
     78530 is a close double. Observations are highly desired
24 Mar 18  3 45 48.0 D    1022CB7  6.0     s  59+ 101     37 291  89N  94   8  90 +6.1 -6.6 +1.2-0.8 .408   13.1      6 39 33.1  28 15 47 389.5 791.2
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.80"  34.2, dT = +1sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  3 45 49.0 d X 91013C    7.8  7.8s  59+ 101     37 291  89N  94   8  90 +6.1 -6.6 +1.2-0.8 .408   13.2      6 39 33.2  28 15 48 389.5 791.3
   X 91013 is double: BA 7.8 6.2 0.8" 214.2, dT = -1sec
   X 91013 is a close double. Observations are highly desired
   X 91013 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  48%
24 Mar 18  4 42  6.2 D    1026SG5  6.5  5.9   60+ 101     26 293  77N  82   2  78 +6.0 -6.6 +0.8-0.4 .424   25.1      6 41 20.9  28 11 48 390.8 887.4
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.1, dT = +61sec : AC 6.6 12.8 58"  61.3, dT = +127sec
24 Mar 19  1 20 19.5 D   79479 K1  7.2  6.6   68+ 112     79 314  88S 104 333  95 +6.0 -6.9 +2.9-0.9 .300    6.2      7 32 12.9  27  7 31 391.1 572.1
24 Mar 19  3 59 59.7 D    1149SK5  4.1  3.3s  69+ 112     46 288  63N  74 346  65 +5.5 -6.6 +2.3+0.1 .295   41.1 .02  7 35 55.4  26 53 45 393.3 745.5
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.14sec : AB 4.1 13.2 57"  39.0, dT = +158sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 19  4 55 22.2 r    1149SK5  4.1  3.3s  69+ 113     33 290 -36N 336 253 326 +5.3 -6.5 -0.5-2.8 .328  138.8 .02  7 35 55.4  26 53 45 394.5 835.6
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.01sec : AB 4.1 13.2 57"  39.0, dT = -77sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 Mar 20  2  8 48.0 D    1263DF0  6.9  6.8S  77+ 123     81 303  50N  67 307  54 +5.1 -6.5 +4.6+1.8 .186   52.5      8 26 39.8  24 32  3 394.8 584.0
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.6"  51.8, dT = +29sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Mar 20  2  9 18.6 d   80185SF0  7.7  7.4   77+ 123     81 302  49N  66 307  53 +5.1 -6.5 +4.6+1.9 .183   53.1      8 26 40.1  24 32  7 394.8 584.3
     80185 is triple: BC 8.5 8.5 0.14" 281.1, dT = -0.6sec : BC,A 7.5 6.9 5.6" 231.8, dT = -30sec
     80185 is a close double. Observations are highly desired
24 Mar 20  3 40 49.2 D    1270cF0  6.1  5.9v  78+ 124     61 284  80N  98   5  84 +4.7 -6.4 +2.4-0.9 .316   24.5      8 28 36.8  24  8 42 395.7 667.3
   R1270 = 28 Cancri (CX)
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Mar 22  3 52 57.4 D    1479 F2  6.4  6.2   91+ 146     78 251  80N 106  38  86 +2.6 -4.9 +2.9-1.1 .286   27.0     10  5 40.9  15 45 27 399.2 621.2
24 Mar 22  5 59  6.3 d    1485 G0  7.1  6.8   92+ 146     49 270  69S 137  60 117 +2.1 -4.6 +0.9-2.2 .377   -6.4     10  7 39.3  15  9 27 400.7 737.5
24 Mar 23  3 25 28.7 D    1576 A2  5.3  5.3   96+ 157     79 151  52S 157 185 136 +1.5 -3.9 +1.2-3.0 .289  -22.7     10 49 15.4  10 32 43 399.9 608.1
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R1576 = 53 Leonis
24 Mar 27  5 41 40.5 r  158105PF5  7.5  7.2   96- 158     56 161  40N 344   2 325 -3.8 +1.9 +0.7-2.7 .287  150.4     13 42 35.7 -12  5 13 396.9 635.8
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Mar 30  7 11 28.5 r  184209KK0  7.7  7.2   78- 124     39 154  77S 270 298 261 -6.4 +5.8 +2.8+0.4 .300 -151.3     16 11 51.3 -25 53  1 388.6 645.3
24 Apr  1  8 28  5.4 r  186391cA2  7.8  7.7   58-  99     33 148  85N 275 310 276 -6.9 +7.3 +2.2+0.3 .354 -175.0     18 10 18.2 -29 12 47 379.8 654.5
    186391 is double: AB 8.3 8.8 0.38"  94.9, dT = +1.1sec
    186391 is a close double. Observations are highly desired
24 Apr  1  8 55 15   m  186445 B9  7.8  7.7   58-  99     35 154   8S 188 216 190 -7.0 +7.4 +9.9+9.9 .000  -90.0     18 12  0.8 -29 34 16 379.4 629.0
24 Apr  4  9 27 48.5 R  190165 K0  7.2  6.7   25-  60     19 123  29S 189 247 206 -4.8 +6.7 +2.0+4.6 .194 -115.1     21 15  3.2 -21 48 55 365.6 808.5
24 Apr  4  9 55 55.7 r  190168 G5  8.2  7.9   25-  60     25 126  26N 314   8 331 -4.8 +6.7 +1.2-1.8 .204  117.9     21 15 14.8 -21 17 42 364.9 770.8
24 Apr  6  9 30  8.1 r  146509pK0  7.1  6.6    8-  33      2 101  82S 234 304 256 -1.6 +4.3 +0.3+1.5 .573 -169.0     23  6 17.2 - 9 36 22 360.21019.6
    146509 is double: ** 8.1 8.1 0.10"  67.0, dT = +0.17sec
    146509 has been reported as non-instantaneous (OCc 709). Observations are highly desired
24 Apr  6  9 43 15.6 r  146518pF0  8.3  8.1    8-  33      5 102  26S 178 247 199 -1.6 +4.3 +0.7+4.2 .227 -113.4     23  7 42.1 - 9 40  2 359.9 999.7
    146518 is double: AB 8.3 13.1 3.6" 252.1, dT = -4sec
    146518 is a close double. Observations are highly desired
24 Apr  6 16 25 18.8 r    3421cM3  4.9  4.1v   7-  30  74 58 213  79S 231 200 253 -2.3 +3.5 +1.7+1.2 .440  174.9 .01 23 16 50.9 - 7 43 35 354.5 759.6
   R3421 = chi Aquarii
      3421 is double:  5.8 5.9
      3421 = khi Aqr, 4.75 to 5.10, V, Type SR, Period 35.250 days
24 Apr  7 16  6 24.7 D Venus      -3.8 -3.8    2-  16  71 70 179 -83S  68  70  90 -0.1 +1.8 +2.7+1.1 .348  -26.0      0 12 29.6 - 0 16 40 352.9 662.7
   Venus contacts: Dark limb 16  6 10; Terminator 16  6 11; Bright limb 16  6 39: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr  7 17 24 42.9 R Venus      -3.8 -3.8    2-  15  76 63 225  45S 207 155 219 -0.3 +1.6 +0.8+2.6 .355 -153.5      0 12 29.6 - 0 16 40 353.2 679.3
   Venus contacts: Dark limb 17 24 28; Terminator 17 24 35; Bright limb 17 24 57: diam = 10.2"; %illum = 96.6%; PA bright limb = 61.1
24 Apr 10 23 31 10.0 d   75768 K0  7.6  7.1    7+  30  -4 26 285  44N  23 306  37 +4.4 -4.1 +1.5+2.5 .298   53.1      3 10 14.5  21 16 19 365.2 878.8
24 Apr 11  1 23  1.5 D     472cA1  4.9  4.9    7+  31      1 292  24S 135  66 149 +4.4 -4.0 -1.0-2.6 .337  -55.9      3 14 54.1  21  2 40 368.11074.2
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.23sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
24 Apr 13  0 24  4.8 d   77030 K0  8.6  7.9   22+  56     40 290  37S 135  49 139 +6.1 -6.2 +0.4-2.8 .313  -42.1      5 12 34.1  27 36 15 375.7 769.1
24 Apr 14  3 42 31.6 d   78233SA3  7.5        33+  70     11 296  53N  53 340  51 +6.1 -6.4 +0.8+0.7 .351   50.0      6 19 59.0  28 25 36 385.61021.7
     78233 is quadruple: AB 8.16 8.35 0.14" 284.1, dT = -0.25sec : AB,C 7.5 9.6 2.9" 265.3, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -134sec
     78233 is a close double. Observations are highly desired
24 Apr 15  0 58 35.2 d   79180 F2  8.1  7.8   42+  81     58 291  70N  76 340  69 +6.2 -6.8 +2.7+0.1 .296   34.8      7 13  6.6  27 46 57 386.4 674.9
24 Apr 15  3 48  6.1 d   79256 K0  7.8  7.3   43+  82     21 292  63S 124  46 116 +5.8 -6.5 -0.1-1.5 .484  -13.1      7 17 59.4  27  8 31 390.1 940.0
24 Apr 16  0 47 12.7 d    1229SF5  8.1  7.9   52+  92     72 291  62N  75 331  63 +5.7 -6.6 +3.7+0.6 .236   43.6      8  8 20.1  25 33 10 390.6 617.2
      1229 is triple: **Aa,Ab 9.0 9.0 0.10"  90.0, dT = +0.41sec : AB 8.2 12.8 3.1" 302.7, dT = -9sec
      1229 has been reported as non-instantaneous (OCc  81). Observations are highly desired
24 Apr 17  3  0 49.2 d    1348 G5  8.1  7.6   62+ 104     53 280  83S 114  30  99 +4.5 -5.9 +1.5-1.6 .369   11.1      9  2 45.2  21 31  9 395.8 721.1
24 Apr 19  1 38 22.4 d   99185pA3  7.9  7.7   79+ 126     82 168  47S 158 169 137 +2.6 -4.3 +1.2-3.1 .286  -23.6     10 34  7.3  12 22 28 398.8 603.4
     99185 is double: AB 7.7      0.20" 180.0, dT = +0.6sec
     99185 is a close double. Observations are highly desired
24 Apr 20  5 29 19.2 D    1644 B9  4.1  4.1   87+ 138     44 259  43S 162  94 140 +0.5 -2.6 +0.4-2.9 .324  -30.8     11 21  8.2   6  1 46 401.2 732.9
   R1644 = Shang Tseang = sigma Leo
24 Apr 20  6 32 25.1 r    1644 B9  4.1  4.1   87+ 139     29 266 -71S 276 206 255 +0.3 -2.4 +1.2-1.1 .357 -149.2     11 21  8.2   6  1 46 402.5 812.4
   R1644 = Shang Tseang = sigma Leo
24 Apr 21  0 24  9.2 d    1732cK0  6.8  6.1v  92+ 148     47 110  59N  85 147  63 +0.5 -1.9 +2.8+1.2 .244   46.6     11 59 23.9   1 49 36 400.5 689.0
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1732 is double: ** 7.6 7.6 0.10" 129.0, dT = +0.29sec
      1732 has been reported as non-instantaneous (OCc 708). Observations are highly desired
      1732 = HIP 58466, 6.82, range 0.00, 6V, Type VAR, Period 0.08566 days
24 Apr 22  4 31 57   d  138955 K2  7.2  6.5   97+ 160     63 207  34N  57  32  35 -1.7 +0.1 +9.9+9.9 .058   79.7 .02 12 45 32.0 - 4 48 39 398.1 627.4
   Distance of 138955 to Terminator = 18.7"; to 3km sunlit peak = 7.5"
24 Apr 22  4 39 36   Gr 138955 K2  7.2  6.5   97+ 160     61 ** GRAZE: CA 23.4N; Dist. 33km in az.  50deg. [Lat = 20.48-1.13(E.Long+75.09)]
   Distance of 138955 to Terminator = 11.9"; to 3km sunlit peak = 2.9"
24 Apr 26  4 29 59.2 R    2269cB5  5.4  5.4   95- 154     36 144  74N 306 344 296 -5.0 +5.4 +1.4-0.8 .368  175.0     15 53 53.9 -24 31 59 389.5 697.0
24 Apr 30  7 21 17.3 r  188688 G8  7.7  7.2   62- 104     26 135  66N 284 332 295 -5.2 +7.4 +1.6+0.2 .364  159.6     19 54 10.3 -26 41 46 375.3 707.5
24 Apr 30  8 15  5.6 r  188724cF5  7.7  7.5   62- 104     34 145  42N 308 345 319 -5.4 +7.4 +2.1-1.3 .239  131.8     19 55 52.2 -26 33  0 374.4 651.6
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.05sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 May  3  8 48  1.2 r  165283cG8  8.4  7.9   29-  65     20 112  57S 213 277 234 -2.6 +4.8 +0.9+2.3 .421 -150.7     22 46  8.8 -12  9 32 365.0 854.6
    165283 is double: AB 8.3      0.30" 245.0, dT = -0.6sec
    165283 is a close double. Observations are highly desired
24 May 11  0 29 11.3 d   77582 B3  8.4  8.3   10+  37     23 293  75N  68 349  68 +5.1 -6.3 +0.9+0.1 .429   31.8      5 48 41.3  28 19 29 377.7 925.3
24 May 11  1 30 57.9 D     885wG7  5.6  5.1   10+  38     10 296  43S 130  57 131 +5.1 -6.2 -0.6-1.7 .483  -31.0      5 50 58.1  27 58  4 379.31037.4
       885 is double: AB 5.7 12.5 10.9" 233.1, dT = -5sec
24 May 11  1 38 22.7 d   77638 B8  8.2  8.1   10+  38      9 297  75S  97  26  98 +5.1 -6.2 -0.1-0.8 .571    1.5      5 51 33.0  28  5 32 379.41050.5
24 May 12 16 51 20.2 D    1149SK5  4.1  3.3s  24+  59  88 30  70  84N  90 172  81 +6.9 -6.7 +0.9+0.7 .432   -0.4 .01  7 35 55.4  26 53 45 386.3 808.7
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.09sec : AB 4.1 13.2 57"  39.0, dT = +83sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 12 18  9  4.5 r    1149SK5  4.1  3.3s  25+  60  73 47  72 -85S 272   1 263 +6.7 -6.8 +1.8+0.6 .368 -179.1 .02  7 35 55.4  26 53 45 385.1 687.0
   R1149 = upsilon Geminorum
      1149 is triple: ** 4.1 8.5 0.040"  70.0, dT = +0.1sec : AB 4.1 13.2 57"  39.0, dT = +93sec
      1149 has been reported as non-instantaneous (OCc1122). Observations are highly desired
      1149 = NSV 3652, 4.04 to 4.09, V, Type LB
24 May 13  0 36 31.4 d   79685 G5  8.5  8.2s  26+  61     45 287  42S 146  58 136 +5.3 -6.5 +0.3-2.6 .356  -29.6      7 46 58.5  26  1 29 386.7 769.1
     79685 = NSV 17596, 8.49 to 8.53, V, Type ROT
24 May 15  2 16 27.0 d   98640 K0  8.0  7.5   46+  85     44 277  64N  83   3  65 +3.7 -5.2 +2.2-0.4 .288   44.4      9 33 38.6  18 44 12 395.7 774.1
24 May 16  1 13 35.1 d   99052 G0  8.2  7.8   55+  96     68 258  53S 148  77 128 +2.9 -4.3 +1.1-2.7 .329  -14.8     10 18 26.1  13 56  1 396.9 654.6
24 May 17  1 57 29.0 d  118637 F5  8.1  7.9   65+ 107     65 247  54N  78  17  56 +1.6 -3.1 +4.6+0.4 .180   57.9     11  3 43.5   8 43 48 398.6 655.2
24 May 18  2  0 30.6 d  119033PK0  8.1  7.6v  74+ 118     68 221  38S 166 128 144 +0.3 -1.8 +0.7-3.2 .286  -29.0     11 45 42.3   2 49 17 398.7 632.1
    119033 is double: AB 6.3      11.9" 186.0, dT = +39sec
    119033 = EPIC 201650346, 8.55, range 0.04, 0Kp, Type VAR, Period 11.495508 days
24 May 18  6 21 34.2 D    1712SF8  3.6  3.3   75+ 120     11 268  33S 171 101 149 -0.5 -1.3 +0.0-3.1 .302  -49.1     11 50 41.7   1 45 53 403.3 900.6
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.2, dT = -482sec : AC 3.7 9.6 406"  78.5, dT = -53sec
24 May 19  0 48 56.6 d  138796cG5  8.0  7.6   81+ 129     64 149  66N  90 119  68 -0.6 -0.6 +4.0+0.3 .221   47.6     12 27 46.4 - 2 23  7 398.0 633.4
    138796 is double: ** 9.2 9.2 0.10"  90.0, dT = +0.45sec
    138796 has been reported as non-instantaneous (OCc 140). Observations are highly desired
24 May 21  4  3 25   Gr   2002 K0  6.8  6.3   94+ 152     53 ** GRAZE: CA 23.5N; Dist.  5km in az.  44deg. [Lat = 20.07-0.90(E.Long+75.09)]
24 May 21  4  3 31   gr   2002 K0  6.8  6.3   94+ 152     53 205  23N  40  16  21 -3.5 +2.7 +9.9+9.9 .000   90.0     13 58 29.8 -14  7 19 393.8 613.0
   Distance of 2002 to Terminator = 19.9"; to 3km sunlit peak = 7.8"
24 May 22  6 30 35.2 d    2115 A6  7.2  7.1   98+ 164     34 227  54S 131  84 115 -4.7 +4.2 +2.0-2.0 .329  -16.9     14 49 27.7 -19 54 13 391.7 652.7
24 May 23  5 32 51.7 D    2237cK3  5.0  4.3s 100+ 174     44 198  62S  86  68  74 -5.0 +5.3 +3.2-0.1 .278   28.6     15 40 16.9 -23 49  5 387.5 594.5
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.28sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
   Distance of 2237 to Terminator = 3.9"; to 3km sunlit peak = 0.0"
24 May 24  1 14 44.0 D    2366dM1  1.1  0.1v 100- 172     14 125 -69N 112 171 104 -4.4 +5.8 +0.6+0.0 .465    3.2 .09 16 29 24.5 -26 25 55 387.4 874.7
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -5sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
24 May 24  2 25 25.8 R    2366dM1  1.1  0.1v  99- 172     27 136  78S 300 347 292 -4.5 +6.0 +1.1-0.4 .406  176.6 .11 16 29 24.5 -26 25 55 385.9 762.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.7, dT = -6sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  48%
   Distance of 2366 to Terminator = 9.4"; to 3km sunlit peak = 1.6"
24 May 24  3 30  7.4 R    2373 K1  6.1  5.5   99- 171     36 148  78N 323 357 316 -4.7 +6.1 +1.0-1.4 .323  152.5     16 31 22.8 -26 32 16 384.9 679.0
   Distance of 2373 to Terminator = 10.3"; to 3km sunlit peak = 2.2"
24 May 28  7  6  4.2 r    3012 A7  6.9  6.8   76- 121     36 143  69S 237 275 251 -3.7 +6.9 +2.3+1.6 .355 -165.1     20 38  4.9 -24 13 44 371.8 663.1
24 May 28  8 28 35.5 r  189555 G1  7.2  6.9   75- 121     45 165  48S 216 232 231 -4.0 +6.8 +2.0+2.1 .307 -151.1     20 40 22.3 -24  7  5 370.9 631.5
24 May 28  8 37 50.7 R    3018 G8  6.4  6.0   75- 121     45 167  54N 294 307 308 -4.0 +6.8 +3.7-1.1 .227  130.3     20 40 11.8 -23 46 26 370.8 631.7
24 May 29  7  8  2.8 d    3164SB3  4.5  4.6v  65- 108     31 129 -67S  96 147 114 -2.9 +6.1 +1.9+0.5 .353  -29.4     21 37  4.8 -19 27 58 369.9 727.3
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = +60sec : AB 4.5 10.1 66"  45.9, dT = +121sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  8 18 34.0 R    3164SB3  4.5  4.6v  65- 108     42 144  49S 212 248 230 -3.0 +6.0 +1.8+2.4 .327 -150.7     21 37  4.8 -19 27 58 368.8 671.3
   R3164 = epsilon Capricorni
      3164 is triple: AC 4.5 14.1 61" 165.7, dT = -130sec : AB 4.5 10.1 66"  45.9, dT = +196sec
      3164 = eps Cap, 4.48 to 4.72, V, Type GCAS
24 May 29  9  0 52.6 r  164528 B8  7.5  7.5   65- 107     47 156  79S 241 266 260 -3.2 +6.0 +2.4+1.3 .368  176.1     21 37 37.7 -19 13 52 368.3 658.0
24 May 30  8 57 24.7 r  165149wG0  7.7  7.4   54-  94     45 135  43S 201 244 222 -2.1 +4.8 +1.3+2.7 .329 -146.3     22 32  9.4 -13 35 52 366.5 703.9
    165149 is double: AB 7.8 9.8 42"  94.0, dT = +37sec
24 Jun  1  8 58 15.4 r      27DA5  8.2  8.0   31-  68     33 104  48S 204 270 226 +0.1 +1.8 +0.6+2.4 .419 -151.0      0 14 50.2 - 0 18 11 364.9 847.1
        27 is double: AB 8.2 11.8 6.9"  59.0, dT = +14sec
        27 is a close double. Observations are highly desired
24 Jun  2  9 29 44.3 r  109680 K5  8.7  7.9   21-  54 -11 32  94  50S 208 278 228 +1.2 +0.1 +0.3+2.3 .456 -154.4      1  6 43.7   6 40  0 364.7 894.6
24 Jun  4  9 11 55.0 r   93167 A5  9.1  8.8    6-  27      8  73  35S 202 274 218 +3.5 -3.0 -0.6+2.1 .477 -140.5      2 53 46.8  18 38  3 369.11105.6
24 Jun  9  0 35 18.9 d    1121wK5  9.2  8.3    7+  31     17 293  58S 123  47 114 +4.5 -6.2 -0.2-1.4 .519  -11.9      7 24 48.6  26 37 39 385.7 992.1
      1121 is double: AB 9.3 11.9 24.7" 190.3, dT = +18sec
24 Jun  9  0 57 13.6 d   79379 G5  9.0  8.6    7+  31     13 294  75S 106  32  98 +4.5 -6.2 -0.1-1.0 .548    4.3      7 25 46.5  26 37 42 386.31030.2
24 Jun 10  0 28 58.4 D    1251 B9  5.9  5.9   13+  42 -11 30 287  70S 118  38 105 +4.3 -5.9 +0.4-1.5 .473    0.2      8 20 32.1  24  1 20 389.1 892.3
   R1251 = lambda Cancri
24 Jun 10  1 10  2.6 d   80129 F2  8.4  8.2   13+  43     21 289  73N  82   5  69 +4.2 -5.8 +0.7-0.5 .417   34.8      8 21 57.6  24  1 26 390.1 960.5
24 Jun 10  2 10 33.5 d   80146 A2  8.0  7.9   14+  43      8 292  38S 151  79 138 +4.2 -5.7 -0.7-2.0 .449  -36.6      8 23 31.3  23 32  4 391.71062.1
24 Jun 12  0 13 12.5 d   98892dK0  7.7  7.1   29+  65  -8 53 270  62N  81   4  62 +3.0 -4.4 +2.9-0.2 .248   49.1     10  0 31.6  15 51 51 394.9 725.6
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +38sec
24 Jun 12  0 51 47.5 D   98897 K0  7.6  7.0   29+  66     44 273  70N  89  12  70 +2.9 -4.3 +2.0-0.7 .309   39.8     10  1 20.7  15 40 14 395.6 772.2
24 Jun 12  1 30 44.5 d   98907 F8  8.5  8.3   29+  66     35 275  75S 124  48 105 +2.8 -4.2 +0.7-1.7 .428    2.6     10  2  3.1  15 21 38 396.5 824.3
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jun 13  3  5 48   m   99302kA0  7.4  7.3   39+  77     21 273  13N  35 323  14 +1.5 -3.0 +9.9+9.9 .000   90.0      10 49  3.3  10  9 28 400.4 883.2
24 Jun 15  3 38 22.9 d    1760pK0  7.5  7.0   58+ 100     28 257  59N  82  16  60 -1.2 -0.3 +1.6-0.5 .288   43.6      12 15  0.0 - 1 19 36 400.9 773.4
      1760 is double: AB 7.6 11.8 36"  56.0, dT = +113sec
24 Jun 17  1 41  8.6 d    1957kG5  7.7  7.2   76+ 121     56 199  59N  79  60  59 -3.1 +2.2 +4.6+0.5 .188   53.8      13 39 17.8 -12  5 32 395.0 610.5
24 Jun 17  3 46 18.6 d  158085kK0  7.3  6.6   76+ 122     37 235  50S 150  98 131 -3.6 +2.4 +1.5-2.7 .308  -27.0      13 40 59.7 -12 46 59 396.1 663.6
24 Jun 19  2 57 42.3 D    2183 K2  5.5  4.8   91+ 144     47 191  21S 169 158 155 -4.9 +4.9 +1.1-3.4 .211  -48.4 .01 15 16 23.0 -22 23 58 388.0 596.8
24 Jun 24  6 38 29.9 r    2965 G2  7.2  6.9   94- 151     44 170  57S 233 244 246 -3.5 +6.9 +2.3+1.4 .347 -166.4      20 19 45.2 -25 13 43 368.4 637.2
24 Jun 26  7  0  8.7 r  164948kF2  7.2  7.0   78- 124     45 138  85N 256 297 276 -1.2 +5.0 +2.3+1.0 .371  159.6      22 14 37.2 -15  6  6 365.2 700.6
24 Jun 26  8 49 29.8 r    3271 F5  7.2  6.9   78- 124     55 176  81N 260 264 280 -1.6 +4.8 +2.9+0.5 .337  149.9      22 16 56.3 -14 39 25 364.4 687.6
24 Jun 28  7 46  2.5 r    3528 F0  7.5  7.3v  56-  97     44 113  86S 243 303 265 +1.0 +2.0 +1.5+1.5 .432  167.8      23 59 35.0 - 1 51  0 365.1 783.4
      3528 = BT Psc, 7.8, range 0.09, B, Type GDOR, Period 1.2323 days
24 Jun 28  8 20 14   m Neptune     7.9  7.9   56-  97     51 119  18N 319  14 341 +0.9 +1.9 +9.9+9.9 .000   90.0       0  0 30.6 - 1 20 11 364.6 756.0
24 Jul  2 16 17 22   Gr    537SB6  3.7  3.8s  13-  42  78 57 ** GRAZE: CA  8.1N; Dist.130km in az. 180deg. [Lat = 18.85+0.01(E.Long+75.09)]
24 Jul  2 16 17 40   M     537SB6  3.7  3.8s  13-  42  79 58 284   8N 344 253 355 +3.4 -5.0 +9.9+9.9 .000   90.0       3 44 52.5  24  6 48 370.8 669.4
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0 : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.5"       : AB 3.7 13.0 98" 144.0
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Jul  2 17  9 18.1 D     552SB7  2.9  2.9s  12-  41  86 47 285 -55N  46 320  58 +3.3 -5.1 +2.0+1.4 .342   31.2       3 47 29.1  24  6 18 371.7 720.4
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.09sec : AE 2.8 15.0 78" 232.4, dT = -228sec : AB 2.8 6.3 118"
291.1, dT = -147sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 17 38 30.9 r     545SB6  4.1  4.2v  12-  41  81 40 285  85N 268 184 279 +3.2 -5.1 +1.4-0.6 .417  171.8       3 46 19.6  23 56 54 372.3 761.2
   R545 = Merope = 23 Tauri
       545 is quadruple: Aa,Ab 4.1 8.1 0.30" 111.0, dT = +0.7sec : AB 4.2 14.4 110" 180.2, dT = -13sec : AC 4.2 12.9 147" 336.0, dT = -129sec
       545 is a close double. Observations are highly desired
       545 = V0971 Tau, 4.18, range 0.01, 1Kp, Type SPB|LERI, Period 0.4881 days
24 Jul  2 17 56  2.6 d     560SB8  3.6  3.7s  12-  41  78 37 286 -83N  75 352  86 +3.2 -5.1 +1.4-0.1 .431    5.6       3 49  9.7  24  3 12 372.6 783.1
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.08sec : AC 3.6 15.0 50"  36.5, dT = +91sec :
AH 3.6 16.0 68" 221.6, dT = -133sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul  2 18 12 47.3 R     552SB7  2.9  2.9s  12-  41  74 33 287  60N 293 212 304 +3.2 -5.1 +0.7-1.7 .383  148.5       3 47 29.1  24  6 18 373.0 811.6
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.01sec : AE 2.8 15.0 78" 232.4, dT = -102sec : AB 2.8 6.3 118"
291.1, dT = -307sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Jul  2 19  4 33.2 r     560SB8  3.6  3.7s  12-  41  62 21 289  83N 269 192 280 +3.1 -5.0 +0.5-0.6 .492  174.1       3 49  9.7  24  3 12 374.2 898.1
   R560 = Atlas = 27 Tauri
       560 is multiple: Aa1,2 3.8 5.5 0.010" 331.8, dT = -0.01sec : Aa,Ab 3.8 6.8 0.22" 336.3, dT = -0.17sec : AC 3.6 15.0 50"  36.5, dT = +62sec :
AH 3.6 16.0 68" 221.6, dT = -94sec
       560 is a close double. Observations are highly desired
       560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Jul 10  0 15 47.5 d   99157pF2  7.4        16+  46  -8 32 272  66N  85  11  65 +1.9 -3.3 +1.5-0.6 .319   42.2      10 29 25.6  12 11 13 397.9 830.5
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
     99157 is double: AB 7.69 8.76 0.10"  94.3, dT = +0.3sec
     99157 is a close double. Observations are highly desired
24 Jul 10  1 23 33.1 d   99162S    8.7  8.2   16+  47     17 277  37S 163  90 142 +1.8 -3.2 -0.3-2.6 .370  -39.5     10 30 25.7  11 37 51 399.6 930.1
     99162 is triple: AB 8.8 12.8 14.6"  84.4, dT = +8sec : AC 8.8 11.0 47" 202.9, dT = +97sec
24 Jul 11 20 38 59   Gr   1712SF8  3.6  3.3   31+  68  41 69 ** GRAZE: CA-23.8S; Dist. 49km in az.  46deg. [Lat = 20.65-0.96(E.Long+75.09)]
24 Jul 11 20 40 18   m    1712SF8  3.6  3.3   31+  68  40 68 144 -24S 227 261 205 +0.4 -1.3 +9.9+9.9 .000  -90.0     11 50 41.7   1 45 53 398.3 624.5
   R1712 = Zavijava = beta Virginis
      1712 is triple: AB 3.7 11.6 337" 286.3 : AC 3.7 9.6 406"  78.5
24 Jul 11 23 56 59.7 d  119114 F2  7.2  7.0   32+  68  -4 51 246  80N 104  45  82 -0.4 -0.8 +2.3-1.3 .305   29.5     11 55 23.9   1  5 45 399.4 678.8
24 Jul 12  2 50 26.9 D    1730wK2  6.2  5.5   32+  69     11 266  51N  74   5  52 -0.9 -0.5 +0.6-0.2 .311   47.0     11 59  3.3   0 31 50 403.1 889.9
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = -10sec
24 Jul 14  3  1 22.9 d  157912kF0  7.8  7.6   51+  91     22 249  82S 119  56  99 -3.6 +2.2 +1.2-1.7 .388   -0.4     13 23 56.5 -10 52 15 400.0 751.8
24 Jul 14  4  6  2.2 D    1925SB1  1.0  1.1v  52+  92      8 255  53S 149  81 129 -3.7 +2.3 +0.7-2.5 .359  -34.6     13 25 11.6 -11  9 41 401.4 848.7
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -188sec : AC 1.0 10.5 368"  60.8, dT =
+30sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  77%
24 Jul 15  4 22  7.5 D    2029 M1  4.9  4.1v  61+ 103     11 248  83S 116  50  97 -4.9 +3.6 +0.9-1.5 .414   -4.9 .01 14 10 50.5 -16 18  7 398.1 802.1
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  62%
24 Jul 17  1  6 20.8 d    2251KK0  7.5  7.0   79+ 125     45 180  25S 164 164 152 -5.7 +5.7 +1.2-3.1 .217  -46.6     15 45 49.8 -24 43  1 386.8 593.6
24 Jul 18  2  3 19.4 D    2405SA2  6.6     s  87+ 137     43 181  75N  77  76  71 -6.0 +6.6 +3.3+0.5 .279   29.1     16 44 17.4 -27 27 22 381.6 590.7
      2405 is triple: AB 6.58 10.15 2.44"  21.4, dT = +5sec : AC 6.6 14.0 24.3" 195.9, dT = -42sec
      2405 is a close double. Observations are highly desired
      2405 = NSV 7935, 6.58, range 0.03, V, Type E:
24 Jul 21  5 13 38.2 D    2910cG3  4.7  4.3  100+ 174     44 184  47S  61  56  72 -4.5 +7.0 +2.3+0.9 .363    7.0     19 55 50.4 -26 17 58 366.3 649.3
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
   Distance of 2910 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Jul 24  3 48 22.3 r    3339 M0  6.7  5.8v  90- 142     25 113  65N 277 339 298 +0.2 +4.1 +1.3+0.5 .382  143.3     22 46 14.2 -11  9 59 362.2 837.1
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 Jul 24  8 34 10.9 R    3355KF8  6.7  6.5   89- 141     58 204  87S 248 226 269 -0.5 +3.5 +2.3+0.7 .392  158.6     22 52 46.5 -10  3 32 359.5 734.0
24 Jul 25  7 40 31.9 r    3496 F8  7.3  7.0   80- 127     64 150  38N 300 328 322 +1.2 +2.0 +7.3-3.6 .115  106.1     23 44 32.5 - 3 10 31 359.9 723.5
24 Jul 25 10 18  3.5 R    3505WG8  5.5  5.0   80- 126  -4 56 231  60S 218 171 240 +0.8 +1.6 +1.3+1.6 .427 -171.1     23 47 56.5 - 2 45 42 360.4 756.2
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -201sec
24 Jul 26  5 56 17.0 r      69 G4  7.5  7.0   70- 114     38 102  32N 305  12 327 +2.8 +0.6 +4.0-2.6 .135  106.3      0 33 54.2   3 19 12 363.2 844.7
24 Jul 27  8 26 59.3 r   92457cK5  8.2        58- 100     64 107  76S 234 300 254 +3.7 -1.5 +1.6+1.7 .422  173.4      1 29  5.5  10 25 56 364.1 749.7
     92457 is double: AB 8.62 9.47 0.20" 192.8, dT = -0.36sec
     92457 is a close double. Observations are highly desired
24 Jul 27 10 21 45.5 r     222 G5  7.0  6.5   58-  99  -4 81 197  54S 212 196 232 +3.4 -1.8 +1.4+2.3 .378 -164.7      1 31 42.7  10 53 22 363.7 691.7
24 Jul 28  7 45  0.1 r     347 K0  7.9  7.4   47-  87     44  86  35S 196 274 214 +4.8 -2.9 +0.0+2.7 .377 -143.1      2 21 50.3  16  9 45 368.2 842.1
24 Jul 28  8 31 40   M     348cA2  6.8  6.7   47-  86     55  89  20N 322  41 339 +4.7 -3.0 +9.9+9.9 .000   90.0      2 22 33.2  16 52 13 367.5 785.5
       348 is double: ** 7.0 9.0
24 Jul 29  6 54 26.9 R     472cA1  4.9  4.9   36-  74     22  75  57S 222 299 236 +5.6 -4.1 -0.1+1.8 .518 -161.9      3 14 54.1  21  2 40 373.4 987.5
   R472 = zeta Arietis
       472 is double: ** 5.8 5.8 0.10"  96.0, dT = +0.11sec
       472 has been reported as non-instantaneous (OCc 837). Observations are highly desired
```

Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 29  7 21  4.9 r   75819 F2  7.9  7.7   36-  74     28  76  57S 223 301 237 +5.6 -4.1 +0.1+1.8 .501 -163.7      3 15 46.1  21  9 55 372.9 944.4
24 Jul 31  9 37 13.0 r     786 K5  9.1  8.3   16-  48     34  69  76S 256 340 260 +6.3 -6.1 +0.8+1.1 .462  174.6      5 16 52.5  27 43  3 379.5 854.2
24 Aug  1  9 16 31.1 r   78154 A0  8.5  8.4    9-  36     18  66  70S 259 335 257 +6.5 -6.4 +0.1+1.0 .513 -179.4      6 16  3.2  28 12  6 384.6 957.6
24 Aug  2  9 21 53   m   79219 K2  8.8  8.1    4-  24      7  63  22N 357  68 350 +6.3 -6.4 +9.9+9.9 .000   90.0      7 15 46.5  27 28 11 389.31019.5
24 Aug  8  0 56 28.9 D    1696 F5  6.9  6.7   11+  39     10 269  82S 121  50  99 -0.2 -0.8 +0.2-1.6 .467    1.0     11 42 25.5   2 21 44 403.7 914.9
24 Aug 10  2 18  0.6 D    1886cK3  5.6  5.0   26+  61      5 258  53N  76   7  55 -3.1 +2.0 +0.3-0.3 .346   39.2     13  8 32.5 - 8 59  4 404.1 875.8
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.28sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Aug 13  0 22 12.7 d  183445pF2  8.1        54+  94     42 206  73S 121  94 108 -6.1 +5.6 +2.6-1.5 .304   -6.4     15 24 53.8 -23 21 34 392.1 581.7
    183445 is triple: AB 8.73 8.84 0.68" 197.4, dT = +0.5sec : AC 8.7 13.0 9.4" 123.2, dT = +31sec
    183445 is a close double. Observations are highly desired
24 Aug 16  2 26  1.9 d  186672 G5  7.4  6.9   83+ 131     40 192  59N  52  39  54 -7.0 +7.4 +2.4+1.3 .287   31.0     18 20 25.4 -29  3 59 375.1 608.8
24 Aug 17  3  1 40.4 D    2831kB2  6.0  6.1s  90+ 144     42 186  76S  88  82  96 -6.3 +7.3 +2.8+0.0 .340  -15.5     19 24 30.2 -27 51 57 368.9 631.9
      2831 = NSV 24772, 5.98 to 6.03, V, Type SXARI, Period 0.5214404 days
24 Aug 18  4 46 30.2 d    2984cG6  7.1  6.6   96+ 157     43 200  35N   8 347  21 -5.3 +6.6 +0.1+3.0 .244   52.1     20 28 29.3 -24  9 48 363.3 700.6
      2984 is double: AB 6.9      0.20"  81.0, dT = +0.24sec
      2984 is a close double. Observations are highly desired
24 Aug 19  5 33 31.1 d    3150 F3  6.6  6.4   99+ 171     49 200  66N  18 359  36 -3.8 +5.6 +0.7+2.2 .343   34.8     21 29 59.6 -19  8 52 358.7 726.6
   Distance of 3150 to Terminator = 9.5"; to 3km sunlit peak = 1.7"
24 Aug 20  4 26 37.3 r    3288 K0  5.8  5.3  100- 173     53 154  87N 282 307 302 -1.8 +4.4 +3.5-0.3 .265  129.7     22 24 27.1 -13 31 46 356.0 717.1
   R3288 = 50 Aquarii
   Distance of 3288 to Terminator = 6.6"; to 3km sunlit peak = 0.1"
24 Aug 21  2 45 26.3 r    3422kF0  6.7  6.5   97- 160     31 112  76N 268 329 289 +0.4 +3.0 +1.4+0.8 .418  148.7     23 16 59.2 - 7  9 39 356.9 846.3
24 Aug 21  5 42 50.4 r  146658 K0  7.3  6.8   97- 159     62 158  47N 296 316 317 +0.0 +2.6 +5.9-2.4 .152  110.9     23 21 15.4 - 6 11 33 354.6 735.2
24 Aug 22  8 13 57.6 R      35 K0  6.2  5.7   91- 144     67 220  69N 268 230 290 +1.6 +0.4 +3.0-0.2 .321  138.2      0 17 47.7   1 41 19 355.4 742.0
24 Aug 23  9 48 57.7 r  109738 G5  7.8  7.1   82- 130     63 250  52S 209 146 230 +3.1 -1.6 +1.3+2.1 .391 -158.5      1 13 41.8   8 58 29 358.3 730.1
24 Aug 24 10 16 29.6 R     313cK0  7.1  6.2s  72- 116  -7 71 261  60N 279 204 297 +4.5 -3.2 +3.3-1.0 .279  135.5      2  8  3.9  15 48 16 361.7 686.6
      313 = NSV 15445, 7.12 to 7.18, Hp
24 Aug 25  6 15 15.4 r     439cF0  7.3  7.1   62- 104     41  80  40S 203 284 218 +6.3 -4.1 +0.0+2.5 .408 -146.7      2 59 10.4  19 59 23 367.2 868.5
      439 is double: ** 8.2 9.8 0.11" 275.8, dT = -0.08sec
      439 has been reported as non-instantaneous (OCc1198). Observations are highly desired
24 Aug 25 10 12 31.0 r     452 A2  7.7  7.6   61- 102  -8 85 283  11S 174  73 189 +5.7 -4.6 -0.4+6.6 .159 -115.6      3  5 30.3  20 54  9 365.8 650.3
24 Aug 26  6 48 40.5 R     587 K0  6.2  5.5   51-  91     37  74  68S 236 319 247 +7.1 -5.3 +0.5+1.6 .483 -174.5      3 57 26.4  24 27 43 372.4 876.1
24 Aug 26  8  6 51.1 r   76374kG0  8.3  8.0   50-  90     54  75  53S 222 311 232 +6.9 -5.4 +0.8+2.2 .399 -160.7      3 59 54.8  24 41 44 371.3 761.5
24 Aug 27  6 19 40.0 r   76841cK1  7.3  6.7   40-  78     19  67  87N 268 345 274 +7.6 -6.0 +0.3+0.7 .511  161.6      4 55 34.6  27 12  9 378.8 989.4
     76841 is double: ** 7.6 10.1 0.08"  82.0, dT = +0.16sec
     76841 has been reported as non-instantaneous (OCc 753). Observations are highly desired
24 Aug 27  8 12  4.8 R     746WB7  7.0  6.9   39-  77     43  71  41S 216 304 221 +7.5 -6.2 +0.2+2.5 .369 -147.7      4 59 53.7  27 19 32 376.9 799.3
      746 is double: AB 7.0 8.7 20.4" 206.0, dT = -54sec
24 Aug 28 10  6 20.8 R   77883 B2  7.6  7.6   28-  64  -9 55  68  88S 271   7 270 +7.4 -6.8 +2.1+0.5 .360  168.2      6  2 59.4  28 40 37 381.0 679.7
24 Aug 29  7 58 52.7 r   78917 M0  8.3  7.5   20-  53     16  66  34S 224 299 218 +7.5 -6.6 -0.6+2.2 .377 -138.8      6 58 11.0  27 38 13 388.3 944.2
24 Aug 29  9 25 13.0 r   78965 K0  9.0  8.4   20-  53     34  69  62S 252 336 246 +7.4 -6.7 +0.8+1.4 .410 -166.7      7  0 51.9  27 48 16 386.7 790.1
24 Sep  8  0 11 14.4 d    2055 K0  7.8  7.2   20+  53     20 241  50N  71  11  54 -4.7 +4.3 +1.2+0.0 .282   40.6     14 20 27.5 -17 31 42 401.4 724.2
24 Sep  9  0 20 35.3 d  183204pK2  8.0  7.3   28+  64     25 233  77N  95  41  80 -5.9 +5.4 +1.7-0.9 .342   12.2     15  8 21.6 -22  5 51 398.2 675.4
    183204 is double: AB 8.2 14.1 2.0" 151.0, dT = +3sec
    183204 is a close double. Observations are highly desired
24 Sep  9 19 51 37.2 d    2268MB2  4.5        36+  74  45 38 149  60S 134 166 123 -5.7 +6.1 +1.4-1.1 .334  -12.6     15 53 36.7 -25 19 38 394.0 653.0
   R2268 = 2 Scorpii
```

Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2268 is triple: Aa,Ab 5.6 5.6 0.10"       : AB 4.69 6.98 2.39" 267.5, dT = -5sec
      2268 is a close double. Observations are highly desired
24 Sep 10  2 39  0.9 D    2298kK3  5.0  4.3   38+  76      6 240  88S 105  40  94 -7.2 +6.3 +0.8-1.2 .425  -10.8     16  3 20.6 -25 51 55 396.1 830.5
24 Sep 13 23 40 54.1 d  188688 G8  7.7  7.2   78+ 124  -9 37 151  85S  80 111  91 -6.6 +7.2 +2.5+0.8 .357   -3.6     19 54 10.3 -26 41 46 370.6 642.3
24 Sep 14  0 50  1.2 d  188724cF5  7.7  7.5   78+ 124     43 170  88N  73  84  83 -6.9 +7.2 +2.7+0.8 .347   -2.1     19 55 52.2 -26 33  0 369.9 623.0
    188724 is double: ** 8.4 8.4 0.10"  45.0, dT = +0.26sec
    188724 has been reported as non-instantaneous (OCc 727). Observations are highly desired
24 Sep 14  1 24  2.1 D    2910cG3  4.7  4.3   78+ 124     44 180  30N  14  14  25 -7.0 +7.1 +1.2+3.3 .208   53.6     19 55 50.4 -26 17 58 369.7 628.9
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Sep 14  2 19 48.7 r    2910cG3  4.7  4.3   78+ 124     42 197 -47N 298 280 309 -7.2 +7.1 +4.0-1.9 .220  126.7     19 55 50.4 -26 17 58 369.6 659.8
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3, dT = 0.00sec
24 Sep 14  2 58 34.8 D    2914cG8  4.8  4.4   78+ 125     39 207  78N  63  35  74 -7.3 +7.0 +1.9+0.5 .387    0.0     19 58 57.2 -26 11 45 369.7 694.1
   R2914 = 60 Sagittarii
      2914 is double: ** 5.8 5.8 0.050"
      2914 has been reported as non-instantaneous (OCc1589). Observations are highly desired
24 Sep 16  6 27 30.2 d    3225SG8  7.2  6.6   95+ 153     32 236  40N  13 319  32 -4.9 +4.5 -0.1+2.1 .387   39.3     22  1 32.9 -15 36 43 358.9 870.6
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0, dT = -5sec : AC 7.2 11.5 109" 291.1, dT = +40sec : AD 7.2 9.9 181" 312.9, dT = +234sec
      3225 is a close double. Observations are highly desired
24 Sep 17  2 51  2.8 d    3355KF8  6.7  6.5   98+ 166     55 146  56N  22  55  43 -2.5 +3.6 +1.1+2.4 .380   27.6     22 52 46.5 -10  3 32 354.1 735.9
   Distance of 3355 to Terminator = 19.8"; to 3km sunlit peak = 8.6"
24 Sep 17  7 50 14.6 d    3375 F2  6.8  6.6   99+ 168     30 247  41S 106  45 127 -3.1 +2.8 +2.0-1.8 .310  -53.9     23  0 19.9 - 8 52 50 355.6 907.9
   Distance of 3375 to Terminator = 9.2"; to 3km sunlit peak = 1.5"
24 Sep 20  4 15 15   m     241 G5  6.8  6.4   93- 150     54  97  17N 320  32 339 +3.7 -2.0 +9.9+9.9 .000   90.0      1 37 40.9  12  4 42 354.6 826.3
   Distance of 241 to Terminator = 12.4"; to 3km sunlit peak = 2.7"
24 Sep 21  2 15 27   Gr    371 G5  6.2  5.7   87- 137     17 ** GRAZE: CA 10.1N; Dist.116km in az. 150deg. [Lat = 18.80+0.55(E.Long+75.09)]
   Distance of 371 to Terminator = 19.8"; to 3km sunlit peak = 6.2"
24 Sep 21  2 17  2   m     371 G5  6.2  5.7   87- 137     16  77  10N 329  43 346 +5.6 -3.3 +9.9+9.9 .000   90.0      2 30 54.4  17 42 14 361.31060.9
   R371 = 27 Arietis
   Distance of 371 to Terminator = 12.2"; to 3km sunlit peak = 1.7"
24 Sep 21  8  9 37.9 r X  3591MB9  7.9  7.9   85- 135     83 263  22S 181 101 198 +5.0 -4.2 +0.3+4.7 .228 -125.4      2 41  6.8  18 47 59 357.9 683.2
   X  3591 is triple: BA 7.5 7.7 3.4" 298.0, dT = +7sec : BC 7.5 9.5 67" 243.0, dT = -140sec
   X  3591 is a close double. Observations are highly desired
24 Sep 21  8  9 44.1 r     397MB9  7.5  7.5   85- 135     83 263  23S 182 101 198 +5.0 -4.2 +0.3+4.6 .230 -125.7      2 41  6.6  18 48  1 357.9 683.2
       397 is triple: AB 7.7 7.5 3.4" 118.0, dT = -7sec : AC 7.7 9.5 66" 242.2, dT = -141sec
       397 is a close double. Observations are highly desired
24 Sep 22  5 58 50.4 R     521kA2  6.7  6.7v  76- 122     54  77  36S 200 288 213 +6.8 -5.1 +0.1+2.9 .352 -141.7      3 36 58.0  23 12 40 363.6 790.3
   R521 = 9 Tauri (V486)
       521 = V0486 Tau, 6.65 to 6.78, V, Type ACV, Period 10.61 days, Phase  27%
24 Sep 22 10 16 19.5 D     537SB6  3.7  3.8s  75- 120  -9 67 285 -45S 119  23 131 +6.1 -5.6 +2.9-2.6 .247  -48.4      3 44 52.5  24  6 48 363.9 656.5
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.8sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT =
+362sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 10 35 20.7 d     539SB6  4.3  4.4s  75- 120  -4 63 285 -63N  48 314  60 +6.0 -5.6 +2.3+1.6 .344   24.4      3 45 12.5  24 28  2 364.2 666.8
   R539 = Taygeta = 19 Tauri
```

Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.15sec : AC 4.3 14.0 53"  53.5, dT = +153sec : AB 4.3 11.0 72"
328.8, dT = +39sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 10 47 59.6 D     541SB8  3.9  3.9s  75- 120  -1 60 285 -87S  77 345  89 +6.0 -5.6 +2.3+0.1 .381   -4.0      3 45 49.6  24 22  4 364.4 675.5
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +296sec : AB 3.8 13.7 113"  72.8, dT = +296sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 22 11 15 52.0 R     537SB6  3.7  3.8s  75- 120   5 54 284  42S 207 118 219 +5.9 -5.6 +2.2+3.0 .264 -131.7      3 44 52.5  24  6 48 364.9 701.9
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = 0.00sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.6"       : AB 3.7 13.0 98" 144.0, dT = -
168sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Sep 22 11 48 56.0 r     539SB6  4.3  4.4s  75- 120  13 46 285  62N 283 196 294 +5.9 -5.6 +1.5-1.2 .378  155.3      3 45 12.5  24 28  2 365.5 738.6
   R539 = Taygeta = 19 Tauri
       539 is multiple: Aa,Ab 4.6 6.1            : AB          0.063"  84.3, dT = +0.16sec : AC 4.3 14.0 53"  53.5, dT = +91sec : AB 4.3 11.0 72"
328.8, dT = -132sec
       539 is a close double. Observations are highly desired
       539 = NSV 1264, 4.30, range 0.00, 1Kp, Type SPB, Period 1.5664 days
24 Sep 22 12  8 59.2 R     541SB8  3.9  3.9s  75- 120  18 42 285  89N 256 171 267 +5.8 -5.6 +1.5-0.1 .430 -176.4      3 45 49.6  24 22  4 366.0 764.4
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +263sec : AB 3.8 13.7 113"  72.8, dT = +263sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Sep 23  6 41 54.0 R     701SF2  6.6  6.4   66- 108     51  71  80N 271   2 278 +7.8 -6.1 +1.9+0.6 .391  155.4      4 38 29.5  26 56 23 369.7 770.0
       701 is triple:  6.6 9.2 3.1" 169.4, dT = +1.5sec : AB 7.36 7.21 4.47" 188.0, dT = -1.5sec
       701 is a close double. Observations are highly desired
24 Sep 23  6 41 55.6 r X 70481p    7.3  7.2   66- 108     51  71  80N 271   2 278 +7.8 -6.1 +1.9+0.6 .390  155.3      4 38 29.6  26 56 26 369.7 769.9
   X 70481 is triple:  7.3 9.2 5.8" 174.9, dT = +1.5sec : AC 7.4 12.9 92" 203.7, dT = -92sec
   X 70481 is a close double. Observations are highly desired
24 Sep 24  7 25 44.2 r   77397 A2  8.1  8.0V  55-  95     48  69  65S 243 334 244 +8.3 -6.7 +1.1+1.6 .401 -168.2      5 41 38.6  28 27 24 375.9 746.8
     77397 = HD 37683, 8.09, , Type ACV, Period 3.2739 days, Phase  17%
24 Sep 25  6 14 58.5 R    1022CB7  6.0     s  44-  83     20  66  80S 265 343 261 +8.7 -6.7 +0.3+0.8 .493  177.1      6 39 33.1  28 15 47 383.8 919.6
   R1022 = 54 Aurigae
      1022 is double: AB 6.21 7.85 0.81"  34.3, dT = +1sec
      1022 is a close double. Observations are highly desired
      1022 = NSV 3065, 6.03, range 0.02, V, Type EA, Period 1.8797 days, Phase  20%
24 Sep 25  7  0 36.4 R    1026SG5  6.5  5.9   44-  83     30  68  53S 238 320 234 +8.6 -6.8 +0.3+1.8 .411 -155.6      6 41 20.9  28 11 48 383.0 837.8
   R1026 = 25 Geminorum
      1026 is triple: AB 6.4 11.7 31"  48.2, dT = +75sec : AC 6.6 12.8 58"  61.4, dT = +140sec
24 Sep 25  8 19 27.9 r   78673 G5  8.3  7.7   44-  83     47  69  85S 271   1 266 +8.4 -6.9 +1.7+0.6 .382  173.9      6 43 38.2  28 24  6 381.8 711.6
24 Sep 26  9 36 12.6 r   79642 K5  8.6  7.9   33-  70     51  72  89N 283  14 274 +8.0 -6.6 +2.1+0.0 .346  173.0      7 43 29.1  26 35 43 386.8 654.3
24 Sep 27  9 13 14.0 r   80288pK5  8.6  8.2v  24-  59     35  75  38S 236 317 222 +7.6 -6.0 +0.8+2.8 .271 -134.3      8 36 55.8  23 14 49 392.5 737.7
     80288 is double: AB 9.62 9.76 2.70"   0.6, dT = +6sec
     80288 is a close double. Observations are highly desired
     80288 = HO Cnc, 8.73, range 0.03, V, Type BY, Period 5.21 days
24 Sep 30  9 36 35.4 r X 16475KF8  9.2  9.0    5-  25      7  83  69S 277 348 256 +4.4 -2.9 +0.2+0.5 .446 -162.2     10 57 49.3   9  1  7 403.8 917.5
24 Oct  7  0 45 13.1 d    2251KK0  7.5  7.0   15+  46      4 242  64N  81  15  69 -6.0 +6.1 +0.4-0.5 .418   15.0     15 45 49.8 -24 43  1 399.9 839.1
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct  9  0  0 47.2 d  185508 K5  8.4  7.5   32+  68     28 219  67S 118  76 116 -7.4 +7.3 +2.7-1.8 .287  -34.6     17 33 54.3 -29 13 24 389.8 659.6
24 Oct  9 23 42 57.2 D    2688 G6  7.0  6.6s  41+  80     37 203  90S  88  63  91 -7.6 +7.5 +2.7-0.3 .324  -10.7     18 32 14.0 -29 11 25 384.1 613.8
      2688 = NSV 24489, 7.03 to 7.07, V, Type VAR:
24 Oct 13  2  4 41.9 D    3150 F3  6.6  6.4   74+ 119     48 202  29N   8 346  25 -6.6 +5.5 +0.2+2.8 .286   44.3     21 29 59.6 -19  8 52 365.4 707.7
24 Oct 13  2 26 44.9 d  164449DF0  7.2        74+ 119     46 209  88S  71  42  88 -6.6 +5.5 +2.2+0.4 .387  -19.2     21 31 25.5 -19 14 15 365.5 725.9
    164449 is double: AB 7.21 11.24 2.34" 179.3, dT = -1.9sec
    164449 is a close double. Observations are highly desired
24 Oct 14  1  0 34.5 D    3288 K0  5.8  5.3   83+ 132     54 157  52N  27  49  47 -5.0 +4.4 +1.3+2.3 .368   23.3     22 24 27.1 -13 31 46 360.0 700.3
   R3288 = 50 Aquarii
24 Oct 14 23 39 12.7 d    3422kF0  6.7  6.5   91+ 145     37 116  72N  45 103  67 -3.1 +2.9 +1.2+1.9 .461    9.2     23 16 59.2 - 7  9 39 357.2 808.6
24 Oct 15  2 57 23.9 d  146658 K0  7.3  6.8   92+ 146     64 186  64N  38  32  60 -3.6 +2.5 +1.5+1.8 .424    7.3     23 21 15.4 - 6 11 33 354.9 735.3
24 Oct 16  4 54 15.2 D      35 K0  6.2  5.7   97+ 162     64 228  75N  50   6  72 -1.8 +0.3 +1.7+1.3 .444   -3.7      0 17 47.7   1 41 19 352.1 759.3
24 Oct 19  3 37 54.0 r     452 A2  7.7  7.6   96- 156     53  81  88S 245 329 259 +4.8 -4.5 +1.3+1.4 .474  171.1      3  5 30.3  20 54  9 356.4 828.5
24 Oct 19  6 42 19.8 r   75764SF0  7.6        95- 154     84 291  66N 270 162 285 +4.4 -4.9 +2.9-0.1 .342  149.8      3 10  6.6  21 44 49 355.6 682.2
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +2.3sec : AB,C 7.6 13.5 48"  44.0, dT = +98sec : AB,D 7.6 15.8 55" 159.0, dT = +58sec
     75764 is a close double. Observations are highly desired
24 Oct 19  7  2 49.0 r     461cK0  7.2  6.7   95- 154     80 284  50N 287 187 301 +4.4 -4.9 +3.4-1.3 .277  134.8      3 10 39.9  21 53 34 355.8 679.7
24 Oct 20  9  2 40.4 r   76530 K3  7.8  7.0   88- 140     66 290  33N 311 211 320 +5.7 -6.1 +2.5-3.6 .223  126.0      4 16 41.6  26 21 29 361.5 665.4
24 Oct 21  3 10 33.2 r     773wF8  7.0  6.7   81- 129     22  67  62S 233 311 237 +7.9 -6.2 -0.1+1.6 .523 -161.6      5 10  3.9  27 33 23 369.3 987.1
       773 is double: AB 7.0 9.3 315" 353.1, dT = +301sec
24 Oct 21 10 35 38.5 r   77138 A*  7.6  7.4   79- 126  -6 59 292  69N 284 185 286 +6.8 -6.7 +2.0-1.1 .374  168.8      5 23  1.4  28 28  8 368.1 679.9
24 Oct 21 11 20 51.3 D     810SB7  1.7  1.7   79- 126   5 50 291 -43N  36 304  39 +6.6 -6.7 +3.2+3.0 .213   58.6      5 26 17.5  28 36 27 368.9 731.4
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +30sec : AD 1.9 18.5 9.8"  70.0, dT = +38sec : AE 1.9      10.9"  80.0, dT = +37sec : AF 1.9
15.8 11.6" 296.0, dT = -10sec
       810 is a close double. Observations are highly desired
24 Oct 21 11 38 36   Gr    810SB7  1.7  1.7   79- 126   8 45 ** GRAZE: CA-12.3N; Dist.250km in az.  25deg. [Lat = 22.50-0.44(E.Long+75.09)]
24 Oct 21 11 59 43.0 R     810SB7  1.7  1.7   79- 125  13 41 291  18N 335 247 338 +6.6 -6.6 -0.4-4.3 .228  121.3      5 26 17.5  28 36 27 369.7 788.9
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -34sec : AD 1.9 18.5 9.8"  70.0, dT = +4sec : AE 1.9      10.9"  80.0, dT = +12sec : AF 1.9 15.8
11.6" 296.0, dT = -39sec
       810 is a close double. Observations are highly desired
24 Oct 22  6 18 58.3 r   78233SA3  7.5        71- 114     49  69  33S 213 304 211 +8.4 -6.8 +0.4+3.5 .266 -131.5      6 19 59.0  28 25 36 373.9 728.7
     78233 is quadruple: AB 8.16 8.35 0.15" 286.4, dT = -0.16sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -123sec
     78233 is a close double. Observations are highly desired
24 Oct 22  7 53 56.0 r   78282 K0  7.8  7.1   70- 114     69  61  43N 317  67 315 +8.1 -6.9 +3.3-2.9 .220  129.6      6 22 28.1  28 54 43 373.1 624.7
24 Oct 22  8 26  8.0 r   78294 A0  7.6  7.6   70- 114     75  52  68S 248  10 245 +8.0 -6.9 +2.7+1.5 .311 -158.3      6 23  0.3  28 37 17 373.1 605.3
24 Oct 23  8 15 13   M    1119 F0  5.8  5.6V  60- 101     61  69   1N   6 105 358 +8.4 -6.7 +9.9+9.9 .000   90.0      7 24 33.5  27 38 16 379.8 626.1
   R1119 = 59 Geminorum
      1119 = HD 57927, 5.77, , Type DSCT
   Distance of 1119 to Terminator = 5.2"; to 3km sunlit peak = 0.0"
24 Oct 24  6 40 43.4 r   80070 K0  7.5  7.0   50-  90     29  72  43N 330  50 318 +8.5 -6.2 +2.0-2.5 .252  126.7      8 17 36.3  24 50 14 387.7 794.5
24 Oct 26  8 54 25.9 R   98892dK0  7.7  7.1   30-  66     36  85  87S 289   6 270 +6.7 -4.4 +1.4-0.1 .371 -174.0     10  0 31.6  15 51 51 396.5 717.6
     98892 is double: AB 9.8 12.7 10.1" 100.0, dT = +27sec
24 Oct 26  9 33 31.6 R   98897 K0  7.6  7.0   30-  66     45  88  67S 269 346 249 +6.6 -4.3 +2.0+0.9 .304 -150.4     10  1 20.7  15 40 14 395.8 672.0
24 Oct 27 10 28 25.9 r   99296kA3  8.0  7.9v  21-  55  -8 47  96  57N 327  38 306 +5.3 -3.1 +1.4-2.0 .324  158.5     10 47 46.5  10 26 37 398.7 673.1
     99296 = ASAS J104746+1026.6, 8.03, range 0.04, V, Type BCEP|DSCT, Period 0.075877 days, Phase  93%
24 Nov  5 23 39 35.8 D  186563 K2  7.8  6.9   18+  50     21 227  49N  53   1  54 -6.8 +7.3 +0.7+0.6 .368   22.7     18 16 20.4 -28 55 54 389.2 752.0
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov  8 23 31 24.5 D    3089SA0  5.3  5.3   47+  86     48 193  70N  53  40  69 -6.5 +5.9 +2.0+1.2 .364    1.7     21  8 33.6 -21 11 37 373.5 659.8
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +21sec : AF 5.3 13.0 9.7"  14.0, dT = +21sec : AG 5.3 20.0 13.1"  62.0, dT = +36sec : AC 5.3
15.0 35" 114.8, dT = +45sec
      3089 is a close double. Observations are highly desired
24 Nov 10  2 58 57.6 d    3236KF3  7.1  6.9   59+ 100     32 237  13N 352 297  11 -6.3 +4.2 -1.2+3.9 .234   60.0     22  6 13.2 -14 53 45 369.4 838.3
24 Nov 10 22 49 14   m  165373 K0  7.7  7.1   69+ 112  -7 50 137  16S 141 181 162 -4.6 +3.4 +9.9+9.9 .000  -90.0     22 54 30.0 -10 17 59 364.1 712.1
24 Nov 11  2 11 57.0 D Saturn      0.9  0.9   70+ 113     53 221  50N  27 347  48 -5.2 +2.9 +0.9+1.9 .399   20.2     22 58 12.9 - 8 52 27 363.3 749.4
   Saturn ring contacts offset by ±19.0 secs, at  2 11 38 and  2 12 16
   Saturn limb contacts offset by ±20.8 secs, at  2 11 36 and  2 12 18  Both contacts are against the bright limb of Saturn
24 Nov 11  3 21  7.6 R Saturn      0.9  0.9   70+ 114     40 239 -87N 249 195 270 -5.4 +2.7 +1.5+0.3 .433  160.0     22 58 12.9 - 8 52 27 364.0 813.2
   Saturn ring contacts offset by ±42.5 secs, at  3 20 25 and  3 21 50
   Saturn limb contacts offset by ±20.5 secs, at  3 20 47 and  3 21 28  Both contacts are against the bright limb of Saturn
24 Nov 11  3 25 46.1 D    3375 F2  6.8  6.6   70+ 114     40 239  39S 118  63 139 -5.4 +2.7 +4.1-3.8 .171  -68.3     23  0 19.9 - 8 52 50 364.1 815.9
24 Nov 11 23 54  8.0 D    3505WG8  5.5  5.0   79+ 126     59 133  84N  59 102  81 -3.4 +1.6 +1.9+1.5 .415  -12.3     23 47 56.5 - 2 45 42 359.4 739.5
   R3505 = 20 Piscium
      3505 is double: AB 5.6 9.8 183" 279.7, dT = -335sec
24 Nov 14  2  7 48.0 D     241 G5  6.8  6.4   95+ 155     74 117  56N  38  97  58 -0.2 -2.2 +1.3+2.1 .430   10.1      1 37 40.9  12  4 42 354.1 750.0
24 Nov 14  2  8 47.9 D     240 F0  5.5  5.4   95+ 155     75 118  23N   5  63  25 -0.2 -2.2 +0.1+3.4 .319   43.1      1 37  5.9  12  8 30 354.1 749.3
   R240 = pi Piscium
   Distance of 240 to Terminator = 14.7"; to 3km sunlit peak = 4.5"
24 Nov 14 23 45  6.0 d     371 G5  6.2  5.7   99+ 168     31  81  26N  19  97  36 +2.0 -3.4 -0.2+2.4 .446   37.0      2 30 54.4  17 42 14 357.0 968.4
   R371 = 27 Arietis
   Distance of 371 to Terminator = 4.1"; to 3km sunlit peak = 0.0"
24 Nov 16  7  6 49.0 d     537SB6  3.7  3.8s 100- 173     61 284 -28S  99   7 111 +3.1 -5.5 +2.3-1.0 .362  -26.2      3 44 52.5  24  6 48 357.4 699.2
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.5sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT =
+194sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
24 Nov 16  7 44 38.2 d     541SB8  3.9  3.9s 100- 173     53 285 -68S  60 331  72 +3.0 -5.6 +2.0+0.8 .405   16.2      3 45 49.6  24 22  4 358.0 732.1
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +273sec : AB 3.8 13.7 113"  72.8, dT = +273sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
24 Nov 16  8 19 10.4 R     537SB6  3.7  3.8s 100- 173     45 285  77N 232 147 244 +2.9 -5.6 +1.8+1.0 .400 -154.0      3 44 52.5  24  6 48 358.7 774.3
   R537 = Electra = 17 Tauri
       537 is multiple: ** 3.9 7.5 0.20" 117.0, dT = +0.21sec : Aa,Ac 3.9 7.5 0.20"       : Aa,Ab 3.9 7.0 25.7"       : AB 3.7 13.0 98" 144.0, dT = -
7sec
       537 has been reported as non-instantaneous (OCc1693). Observations are highly desired
       537 = NSV 15755, 3.70, range 0.00, 1Kp, Type SPB, Period 1.1073 days
   Distance of 537 to Terminator = 6.7"; to 3km sunlit peak = 0.1"
24 Nov 16  8 24 52.0 R     536pB7  5.5  5.5  100- 173     43 285  40N 270 184 281 +2.9 -5.6 +1.5-0.6 .441  169.1      3 44 48.2  24 17 22 358.8 781.8
   R536 = Celaeno = 16 Tauri
       536 is triple: AB 5.4 13.2 89" 264.4, dT = -200sec : AC 5.4 11.5 218" 196.1, dT = -141sec
   Distance of 536 to Terminator = 3.0"; to 3km sunlit peak = 0.0"
24 Nov 16  8 46 23.8 D     552SB7  2.9  2.9s 100- 173     39 286  11S 142  59 154 +2.9 -5.6 +0.4-4.4 .218  -62.0      3 47 29.1  24  6 18 359.2 808.9
   R552 = Alcyone = eta Tauri
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Occultation prediction for Santiago de Cuba

E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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      day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D     v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = +0.06sec : AE 2.8 15.0 78" 232.4, dT = -3sec : AB 2.8 6.3 118"
291.1, dT = -463sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 0.3"; to 3km sunlit peak = 0.0"
24 Nov 16  8 55 31.0 R     541SB8  3.9  3.9s 100- 173     37 286  34N 277 194 289 +2.9 -5.6 +1.1-0.9 .453  163.5      3 45 49.6  24 22  4 359.4 824.3
   R541 = Maia = 20 Tauri
       541 is quadruple: Aa,Ab 4.4 5.4            : AB 3.8 13.7 113"  72.7, dT = +228sec : AB 3.8 13.7 113"  72.8, dT = +228sec
       541 = NSV 1279, 3.87, range 0.00, 4Kp, Type ACV, Period 10.288 days
   Distance of 541 to Terminator = 2.4"; to 3km sunlit peak = 0.0"
24 Nov 16  9  4 12   Gr    552SB7  2.9  2.9s 100- 173     33 ** GRAZE: CA 39.6S; Dist.210km in az. 196deg. [Lat = 18.05-0.27(E.Long+75.09)]
   Distance of 552 to Terminator = 3.5"; to 3km sunlit peak = 0.0"
24 Nov 16  9 19 40.2 r     549SA0  6.3  6.3  100- 173     31 287  74S 206 125 217 +2.8 -5.5 +1.9+2.7 .278 -124.3      3 47 21.0  24  6 59 360.0 860.6
   R549 = 24 Tauri
       549 is multiple: AB               109.9, dT = -4sec :  6.7 7.8            : BD 6.3 8.7 75" 305.1, dT = +44sec : BC 6.3 8.2 86" 345.0, dT =
+235sec
   Distance of 549 to Terminator = 7.1"; to 3km sunlit peak = 0.3"
24 Nov 16  9 20  0.9 R     552SB7  2.9  2.9s 100- 173     31 287  67S 200 119 211 +2.8 -5.5 +2.1+3.5 .232 -118.1      3 47 29.1  24  6 18 360.0 861.0
   R552 = Alcyone = eta Tauri
       552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.13sec : AE 2.8 15.0 78" 232.4, dT = -283sec : AB 2.8 6.3 118"
291.1, dT = +14sec
       552 is a close double. Observations are highly desired
       552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
   Distance of 552 to Terminator = 6.6"; to 3km sunlit peak = 0.1"
24 Nov 16  9 51 26   Gr    561SB7  5.1  5.1V 100- 172     23 ** GRAZE: CA 39.4S; Dist. 53km in az. 201deg. [Lat = 19.51-0.35(E.Long+75.09)]
   Distance of 561 to Terminator = 3.7"; to 3km sunlit peak = 0.0"
24 Nov 16  9 58 54.7 R     561SB7  5.1  5.1V 100- 172     23 289  53S 187 109 198 +2.8 -5.5 +3.3+7.0 .128 -104.0      3 49 11.2  24  8 12 360.9 925.2
   R561 = Pleione = 28 BU Tauri
       561 is multiple: Aa,Ab 5.1      0.20"  55.0, dT = +1sec : AF 5.0 14.5 4.7" 221.0, dT = -30sec : AE 5.1 14.8 96"  76.8, dT = +260sec : AD 5.1
14.7 144"  65.9, dT = +580sec
       561 is a close double. Observations are highly desired
       561 = BU Tau, 4.83 to 5.38, V, Type GCAS+LERI|S, Period 12630. days, Phase  48%
   Distance of 561 to Terminator = 5.3"; to 3km sunlit peak = 0.0"
24 Nov 20 10 17 40.6 R    1206 G8  5.9  5.3   76- 121     72 291  79N 290 186 279 +7.0 -6.1 +2.3-1.3 .350 -172.3      8  0 55.9  25 23 34 378.6 649.1
   R1206 = omega Cancri
24 Nov 20 10 48 11.9 R    1211SA1  6.3  6.3   75- 121  -6 65 287  52S 241 144 230 +6.9 -6.0 +4.2+1.8 .198 -122.5      8  1 43.8  25  5 22 379.0 678.3
   R1211 = 4 Cancri
      1211 is triple: AB 6.3 11.0 45"  27.4, dT = +188sec : AC 6.3 11.6 106" 295.0, dT = -313sec
24 Nov 21  9 18 19.9 r   80499 K0  8.2  7.6   66- 109     82  76  90S 285  26 269 +7.2 -5.4 +2.9-0.6 .308 -164.1      8 54 32.2  21 49 13 383.9 597.2
24 Nov 23  7 36 46.8 r   99157pF2  7.4        47-  86     36  89  48S 250 324 229 +6.3 -3.4 +1.7+2.4 .244 -130.3     10 29 25.6  12 11 13 395.6 724.4
     99157 is double: AB 7.69 8.76 0.09" 102.3, dT = +0.31sec
     99157 is a close double. Observations are highly desired
24 Nov 25  7 40 14.4 R  119114 F2  7.2  7.0   28-  64     15  94  64S 268 337 246 +3.8 -0.7 +0.7+1.0 .365 -145.8     11 55 23.9   1  5 45 402.9 862.0
24 Nov 25  9 31 19.6 R  119138 K0  7.4  6.9   28-  64     40 107  61N 323  27 301 +3.6 -0.6 +1.0-1.6 .360  167.1     11 58 13.0   0 52  9 400.5 717.9
24 Nov 25 10 35  2.5 R    1730wK2  6.2  5.5   28-  63 -10 53 118  87N 297 352 275 +3.3 -0.4 +2.1-0.8 .326 -162.6     11 59  3.3   0 31 50 399.6 662.8
      1730 is double: AB 6.3 12.4 15.1" 176.1, dT = +23sec
24 Nov 26  7 59 41.4 R    1814SK5  6.7  5.8S  20-  54      8  98  16N   6  76 345 +2.4 +0.7 -0.4-4.5 .204  115.9 .01 12 38 43.3 - 4 22 25 404.4 914.7
      1814 is triple: AB 6.8 10.0 57" 110.6, dT = +68sec : AC 6.8 10.2 165" 359.1, dT = -801sec
      1814 = NSV 19445, 6.66, , Type VAR:
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Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 27  8 25 24.3 r    1917pG5  7.2  6.7   13-  43      3 102  51N 329  38 309 +1.0 +2.0 -0.2-1.3 .435  153.0     13 21 12.2 - 9 59 57 404.6 959.0
      1917 is double: ** 7.8 7.8 0.10"  90.0, dT = +0.12sec
      1917 has been reported as non-instantaneous (OCc 141). Observations are highly desired
24 Nov 27 10 36 17.8 R  157912kF0  7.8  7.6   13-  42 -10 31 117  48S 248 306 228 +0.7 +2.3 +3.1+3.0 .185 -117.8     13 23 56.5 -10 52 15 401.5 772.5
24 Nov 27 11 12 53.1 D    1925SB1  1.0  1.1v  13-  42  -2 39 124   5S 204 257 184 +0.6 +2.4 -3.3-7.3 .116  -72.0 .01 13 25 11.6 -11  9 41 400.9 730.4
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = -1309sec : AC 1.0 10.5 368"  60.8, dT =
-2548sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 27 11 27 24   Gr   1925SB1  1.0  1.1v  13-  41   2 44 ** GRAZE: CA 23.3S; Dist. 87km in az. 220deg. [Lat = 19.00-0.78(E.Long+75.09)]
24 Nov 27 11 39  3.8 R    1925SB1  1.0  1.1v  13-  41   4 43 129  42S 241 289 221 +0.5 +2.4 +6.2+5.0 .112 -108.0 .01 13 25 11.6 -11  9 41 400.4 702.9
   R1925 = Spica = alpha Virginis
      1925 is multiple: Aa,Ab 1.3 4.5 0.10"       : Aa,Ac 1.3 7.5 0.50"       : AB 1.0 12.0 154"  33.0, dT = +1208sec : AC 1.0 10.5 368"  60.8, dT =
+3290sec
      1925 is a close double. Observations are highly desired
      1925 = alf Vir, 0.96 to 1.00, V, Type ELL+BCEP, Period 4.0145 days, Phase  75%
24 Nov 28 11 13 47.2 d    2029 M1  4.9  4.1v   7-  31  -2 27 122 -45S 150 206 132 -0.6 +3.6 +0.3-1.5 .380  -21.5 .01 14 10 50.5 -16 18  7 400.5 793.6
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Nov 28 12 26 42.0 r    2029 M1  4.9  4.1v   7-  30  14 41 135  85N 290 333 272 -0.9 +3.8 +1.9-0.3 .338 -158.7 .02 14 10 50.5 -16 18  7 399.2 702.9
      2029 = ET Vir, 4.8 to 5., V, Type SRB, Period 80. days, Phase  32%
24 Dec  3 23 30 52.5 D    2765 A3  7.9  7.8    7+  31     11 235  77N  80  19  85 -6.0 +6.9 +0.7-0.3 .465   -9.9     19  0  0.2 -28  3  3 386.3 883.6
24 Dec  4 22 27 33   M    2910cG3  4.7  4.3   13+  43  -2 32 219  23S 152 110 162 -5.8 +6.6 +9.9+9.9 .000  -90.0     19 55 50.4 -26 17 58 380.9 733.3
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
24 Dec  5 23 52 23.0 d  189831 K0  8.5  7.9   22+  56     30 228  58S 109  60 124 -5.8 +5.6 +2.8-1.9 .259  -53.6     20 54 50.6 -22  6  6 377.6 799.5
24 Dec  6  0 24 14   m  189843 K2  8.3  7.7   22+  56     24 233  20S 147  92 162 -5.8 +5.6 +9.9+9.9 .000  -90.0     20 55 18.7 -22  7 25 378.1 845.1
24 Dec  6 22 57 50.4 d  164653DB9  7.7  7.7v  31+  68  -9 49 207  75S  87  60 105 -5.1 +4.7 +2.9-0.2 .309  -37.2     21 47 36.4 -17 17 41 372.8 702.4
    164653 is double: AB 7.7 11.4 4.5" 207.2, dT = -7sec
    164653 is a close double. Observations are highly desired
    164653 = AP Cap, 7.6 to 7.65, V, Type ACV, Period 2.6733 days, Phase  23%
24 Dec  7  0 53 55.5 D    3197 K3  6.4  5.6   32+  69     31 235  61S 101  48 119 -5.4 +4.4 +2.3-1.4 .300  -48.8     21 50 13.0 -16 50 42 374.1 825.8
24 Dec  8 23 24 38.3 D    3461 K3  6.3  5.7   54+  94     66 184  17N 353 350  15 -3.7 +1.7 -0.5+3.8 .247   51.3     23 29 32.1 - 4 31 58 365.6 700.2
24 Dec  9  0 58 16.9 D    3465SF8  6.5  6.2   54+  95     56 228  27N   4 320  26 -3.9 +1.5 +0.1+3.1 .308   42.1     23 31 31.5 - 4  5 15 365.9 737.0
      3465 is triple: AD 5.2 12.5 12.0" 223.2, dT = -30sec : A,BC 6.6      451" 262.0, dT = -305sec
24 Dec  9  3  1 54.0 d  146789kF2  7.2  7.0   55+  95     31 252  46S 110  46 132 -4.2 +1.2 +2.2-2.4 .255  -57.9     23 35 14.7 - 3 51 14 367.6 854.2
24 Dec  9 22 30 28   Gr 109142cG5  7.6  7.1   65+ 107  -3 62 ** GRAZE: CA 20.3S; Dist. 34km in az. 132deg. [Lat = 19.56+1.03(E.Long+75.09)]
24 Dec  9 22 38 33   r  109142cG5  7.6  7.1   65+ 107  -4 62 128  10S 147 195 169 -2.4 +0.2 -6.5+9.7 .079 -100.9      0 19 57.1   1 34 57 363.2 733.4
    109142 is double: ** 8.7 8.7 0.040" 115.0, dT = -0.43sec
    109142 has been reported as non-instantaneous (OCc1140). Observations are highly desired
24 Dec 10  1 29 34.9 d      47 F0  7.7  7.5   66+ 108     64 232  89N  66  18  87 -2.9 -0.2 +2.2+0.8 .388  -19.0      0 23 38.5   2 44 35 362.8 723.0
24 Dec 10 23 51  5.1 d  109738 G5  7.8  7.1   76+ 121     71 123  69S  90 143 111 -1.3 -1.6 +3.1+0.3 .304  -43.4      1 13 41.8   8 58 29 360.7 733.2
24 Dec 11  1 36 48.5 d  109756 F5  8.0  7.7   76+ 122     76 226  29N   8 324  28 -1.6 -1.9 +0.5+3.3 .306   40.5      1 14 51.2   9 44 28 360.4 704.3
24 Dec 11  1 57 31.2 d     186pF2  7.3        76+ 122     72 238  56N  35 341  56 -1.7 -2.0 +1.5+2.0 .393   13.6      1 15 46.7   9 47  5 360.5 706.2
       186 is double: AB 7.36 9.89 0.18"  73.3, dT = +0.36sec
       186 is a close double. Observations are highly desired
24 Dec 12  0 28 26.2 d     313cK0  7.1  6.2s  85+ 135     71  99  32N  15  90  34 +0.1 -3.3 +0.5+3.0 .349   35.0      2  8  3.9  15 48 16 359.5 741.6
       313 = NSV 15445, 7.12 to 7.18, Hp
```

Occultation prediction for Santiago de Cuba
E. Longitude - 75 5 13.9, Latitude 20 1 0.9, Alt. 800m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Dec 12 23 40 22.5 d     452 A2  7.7  7.6   93+ 148     48  80  87N  76 160  91 +1.8 -4.5 +1.4+1.1 .453  -20.1      3  5 30.3  20 54  9 360.7 844.5
24 Dec 13  2 49 29.4 d   75764SF0  7.6        93+ 149     87 321  62N  53 272  67 +1.3 -4.9 +2.1+1.6 .385    6.7      3 10  6.6  21 44 49 359.2 675.5
     75764 is quadruple: AB 7.81 9.67 0.80"  98.5, dT = +1.4sec : AB,C 7.6 13.5 48"  44.0, dT = +124sec : AB,D 7.6 15.8 55" 159.0, dT = -39sec
     75764 is a close double. Observations are highly desired
24 Dec 13  3 20 33.2 d     461cK0  7.2  6.7   93+ 150     81 285  49N  39 298  54 +1.2 -4.9 +1.9+2.2 .357   21.8      3 10 39.9  21 53 34 359.3 669.5
24 Dec 15  5 28 37.6 d     797cB9  6.4  6.3e 100+ 175     77 311  87N 150  24 154 +4.0 -6.5 +2.6-6.1 .152  -65.0      5 20 59.3  27 57 26 363.7 635.1
       797 is double: ** 6.5 8.5
       797 = HR 1750, 6.21, range 0.03, H1, Type EA, Period 3.315 days, Phase  24%
   Distance of 797 to Terminator = 4.3"; to 3km sunlit peak = 0.0"
24 Dec 15  5 49 27   Gr    797cB9  6.4  6.3e 100+ 175     71 ** GRAZE: CA 67.2S; Dist.176km in az. 186deg. [Lat = 18.42-0.09(E.Long+75.09)]
   Distance of 797 to Terminator = 3.8"; to 3km sunlit peak = 0.0"
24 Dec 16  2 51 17.6 r   78233SA3  7.5        99- 168     51  69  63N 274   7 272 +5.7 -6.6 +1.8+0.4 .405  168.6      6 19 59.0  28 25 36 368.4 738.6
     78233 is quadruple: AB 8.16 8.35 0.15" 287.1, dT = -0.36sec : AB,C 7.5 9.6 2.9" 265.4, dT = -7sec : BA 8.7 9.3 58" 268.1, dT = -142sec
     78233 is a close double. Observations are highly desired
   Distance of 78233 to Terminator = 15.1"; to 3km sunlit peak = 5.2"
24 Dec 16  9  1 30.4 r     996cA2  6.9  6.8   99- 167     46 290  68N 274 184 271 +4.6 -6.5 +1.5-0.8 .430 -168.2      6 30 22.0  28 12 44 369.9 788.6
       996 is double:  7.6 7.6
24 Dec 16 11 11 23.8 R    1008 A0  5.3  5.3s  98- 166  -4 18 294  45N 300 223 296 +4.5 -6.2 -0.1-1.4 .541  166.3      6 35 12.1  28  1 20 372.91006.3
   R1008 = 49 Aurigae
      1008 = NSV 3032, 5.05 to 5.27, V
   Distance of 1008 to Terminator = 14.5"; to 3km sunlit peak = 4.8"
24 Dec 18  2 24  6.7 R    1251 B9  5.9  5.9   90- 144     19  71  83N 285   1 272 +7.1 -5.7 +0.6+0.2 .481  172.3      8 20 32.1  24  1 20 381.1 897.3
   R1251 = lambda Cancri
24 Dec 18  4 41 17.6 r   80165 F2  7.5  7.3   90- 143     49  76  62N 306  33 293 +6.8 -5.7 +2.0-1.1 .348  158.0      8 24 55.2  23 56 43 378.8 689.0
24 Dec 22  9 40 44.4 R    1696 F5  6.9  6.7   55-  95     67 140  89S 292 330 270 +3.5 -0.6 +2.7-0.9 .297 -155.5     11 42 25.5   2 21 44 396.2 628.4
24 Dec 24  7 32 42.8 r  139140 K0  7.9  7.3   36-  74     20 108  58S 259 325 239 +1.4 +1.9 +1.3+1.5 .293 -132.8     13  4 47.0 - 8 34 16 402.3 841.3
24 Dec 24 10 16 40.2 R    1886cK3  5.6  5.0   36-  73     52 137  45N 337  17 316 +0.9 +2.3 +0.8-2.3 .318  158.8     13  8 32.5 - 8 59  4 399.5 660.0
      1886 is double: ** 6.5 6.5 0.10"  90.0, dT = +0.13sec
      1886 has been reported as non-instantaneous (OCc1447). Observations are highly desired
24 Dec 25 10  7 46   d  158207 F0  7.4  7.2   27-  62     40 131   9S 208 256 189 -0.3 +3.5 -5.5-9.4 .085  -76.7     13 52 15.4 -14 40 36 399.6 712.8
24 Dec 25 10 18 13   Gr 158207 F0  7.4  7.2   27-  62     44 ** GRAZE: CA 23.2S; Dist. 48km in az. 222deg. [Lat = 19.44-0.85(E.Long+75.09)]
24 Dec 25 10 27 19   R  158207 F0  7.4  7.2   27-  62     43 135  37S 236 279 217 -0.4 +3.5 +8.5+7.2 .082 -103.3     13 52 15.4 -14 40 36 399.3 691.9
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Lunar Occultation predictions
Observatorio Ofiuco
Santiago del Estero
Argentina

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan  1  9 15 14.7 r    1578cK0  6.9  6.2   75- 120  -2 49 342  29N 351 188 330 -0.8 -4.7 +0.3-2.7 .264  142.5     10 51  8.5  11 34 44 400.1 645.0
      1578 is double: AB 6.8      0.40"  10.0, dT = -1.4sec
      1578 is a close double. Observations are highly desired
24 Jan  3 12  4 46.3 d    1772cA2  3.9  3.9s  57-  98  33 47 303 -43S 160  28 139 -4.0 -2.0 +0.8-2.3 .312  -29.0     12 19 54.3 - 0 40  1 398.1 688.4
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = -0.36sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  3 13 13 41.1 R    1772cA2  3.9  3.9s  56-  97  48 33 289  75S 278 154 256 -4.2 -1.8 +1.5+0.7 .340 -151.0     12 19 54.3 - 0 40  1 399.1 752.9
   R1772 = Zaniah = eta Virginis
      1772 is double: AB 3.9 5.9 0.13"  12.5, dT = +0.03sec
      1772 is a close double. Observations are highly desired
      1772 = NSV 5555, 3.86 to 3.93, V
24 Jan  4  4 58  9.8 r    1850cK0  6.5  5.9   49-  89     11  89  68N 314  72 293 -3.7 -1.5 +0.1-2.0 .466  167.1     12 53 38.1 - 4 13 29 399.6 926.4
      1850 is double: AB 6.4      0.024"  68.7, dT = +0.02sec
      1850 is a close double. Observations are highly desired
24 Jan  4  6  5 35.6 r  139039 G5  7.3  6.8   49-  88     26  81  67N 315  74 294 -3.8 -1.4 +0.5-2.1 .425  170.2     12 55 21.8 - 4 30 15 397.9 833.0
24 Jan  4  6 58 37.5 R    1855DA0  7.2  7.1   48-  88     37  74  76S 279  41 258 -3.9 -1.3 +1.5-1.4 .347 -150.3     12 56 15.0 - 4 51 50 396.7 769.5
      1855 is double: AB 7.2 8.9 5.8" 150.0, dT = +10sec
      1855 is a close double. Observations are highly desired
24 Jan  5  6 16 23.2 r    1959kK0  8.0  7.4   39-  77     22  90  68N 313  69 293 -4.9 +0.1 +0.2-1.9 .466  171.2     13 39 34.5 -10  6 50 394.5 901.5
24 Jan  5  7 31 34.1 r  158088kMA  7.8  7.0   38-  77     38  81  72N 309  67 290 -5.0 +0.2 +0.8-2.0 .421  178.6     13 41 22.7 -10 27  9 392.7 802.8
24 Jan  6  7  7 54.5 r  158575 K0  7.8  7.2   29-  65     26  95  61S 259  13 242 -5.7 +1.6 +1.0-0.7 .349 -135.9     14 27 25.4 -15 48 48 389.0 916.9
24 Jan  7  7 49 50   m  183380KF3  8.4  8.1   20-  53     26 101  17S 210 322 196 -6.0 +3.0 +9.9+9.9 .000  -90.0     15 19 48.2 -20 52 17 383.3 946.8
24 Jan  8  7 22 54.8 R    2328pB6  6.4     v  12-  41     12 112  50S 236 352 227 -5.9 +4.1 +0.6+0.2 .328 -123.8     16 13 45.5 -24 25 20 379.11083.3
      2328 is triple: AB 6.43 10.33 1.72" 216.3, dT = -5sec : AC 6.1 16.0 10.3" 331.0, dT = +2.6sec
      2328 is a close double. Observations are highly desired
      2328 = V1051 Sco, 6.4 to 6.43, Hp, Type SXARI, Period 1.6956 days, Phase  82%
24 Jan  8  7 28 30.1 r  184242 A1  8.4  8.2   12-  41     13 111  87N 279  34 270 -5.9 +4.1 -0.1-1.1 .568 -166.5     16 13 48.1 -24 15 20 379.01073.5
24 Jan  8  7 52 56.7 r  184260kA0  8.4  8.3   12-  41     18 109  34S 220 334 212 -5.9 +4.2 +2.1+2.0 .166 -107.1     16 15  8.1 -24 35 18 378.31036.0
24 Jan  8  8 24 35.9 R    2336dB9  6.7  6.6   12-  41     24 106  38N 328  79 319 -5.9 +4.2 -0.4-2.2 .446  146.1     16 16 26.7 -24 16 55 377.6 984.3
      2336 is double: AB 6.7 11.7 1.3" 313.5, dT = -2.8sec
      2336 is a close double. Observations are highly desired
24 Jan  9  7 36  2.0 R    2476kF2  6.6  6.4    6-  28      4 119  46S 223 343 220 -5.4 +5.1 +0.6+0.8 .298 -117.8     17 14 14.2 -26 59  4 374.21159.8
24 Jan  9  7 54 28.5 R    2479MK2  5.1  4.6    6-  28      7 116  26N 332  89 328 -5.4 +5.1 -0.9-2.1 .434  134.1     17 15 20.8 -26 36  6 373.81129.8
   R2479 = 36 Ophiuchi N
      2479 is multiple: AB 5.1 5.1 5.1" 137.9, dT = +11sec : AE 5.1 12.3 38" 317.5, dT = -85sec : AD 5.1 7.8 290" 344.5, dT = -651sec : AC 5.1 6.5
732"  74.0, dT = +362sec
      2479 is a close double. Observations are highly desired
24 Jan  9  7 54 40.2 R    2480MK2  5.2         6-  28      7 116  26N 331  89 328 -5.4 +5.1 -0.9-2.1 .436  134.4     17 15 21.0 -26 36 10 373.81129.5
   R2480 = 36 Ophiuchi S
      2480 is quadruple: BA 5.1 5.1 5.1" 317.9, dT = -11sec : EA 12.3 5.1 38" 137.5, dT = +85sec : BD 5.1 7.8 288" 346.9, dT = -637sec
      2480 is a close double. Observations are highly desired
24 Jan 13 23 48 15.6 d    3225SG8  7.2  6.6    9+  34  -7 20 263  89N  74 319  93 -0.1 +4.5 +0.3+1.3 .576  -14.9     22  1 32.9 -15 36 43 360.31041.1
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0, dT = -15sec : AC 7.2 11.5 109" 291.0, dT = -151sec : AD 7.2 9.9 181" 312.9, dT = -161sec
      3225 is a close double. Observations are highly desired
24 Jan 14  0  6  1.0 d  164824 M4  8.6  7.9v   9+  34 -10 16 261  59N  44 288  63 -0.1 +4.5 -0.1+1.7 .586   16.1     22  1 52.6 -15 23 54 360.71067.5
    164824 = ASAS J220153-1523.9, 8.61, range 0.32, V, Type MISC, Period 65.766396 days, Phase   3%
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

```
       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Jan 15  1 35 41.3 D    3375 F2  6.8  6.6   17+  49      5 263  65S  95 337 116 +1.6 +3.1 +0.1+0.8 .513  -34.6     23  0 19.9 - 8 52 50 363.51098.6
24 Jan 17  0 23 42.3 d  109365kG5  8.0  7.5   37+  75     34 298  77N  54 286  76 +4.1 +0.2 +1.2+1.8 .455    0.0      0 40 49.9   4 28 42 366.6 808.2
24 Jan 18  0 26 55.9 D     222 G5  7.0  6.5   48+  88     37 313  80S  78 299  98 +5.0 -1.4 +1.9+1.2 .379  -22.7      1 31 42.7  10 53 22 370.2 737.1
24 Jan 19  0 11 24.1 D     348cA2  6.8  6.7   59+ 101 -12 41 333  59N  40 245  58 +5.6 -2.9 +1.7+1.9 .357   16.7      2 22 33.2  16 52 13 374.0 675.7
       348 is double: ** 7.0 9.0
24 Jan 22  0 39 38.8 D     771SA5  6.1  5.9e  87+ 137     33  12  85N  85 254  89 +5.8 -6.4 +2.6-0.1 .325  -10.6      5  9 45.1  28  1 50 386.4 619.6
       771 is triple: Aa,Ab 6.0      0.20" 351.0, dT = -0.04sec : A,BC 6.0 9.1 11.2"  29.1, dT = +19sec
       771 is a close double. Observations are highly desired
       771 = V1156 Tau, 6. to 6.1, Hp, Type E:, Period 1.40266 days, Phase  90%
24 Jan 24  2 22 58.9 d    1081 B9  6.5  6.5   97+ 161     33  13  67S 136 303 130 +4.6 -7.3 +2.7-1.9 .239  -39.7      7  7 24.9  28 10 36 393.2 592.3
24 Jan 27  4 15 14.6 R    1435wK0  6.5  5.9   98- 163     39  25  42N 321 117 302 +1.7 -6.1 +1.9-2.1 .299  161.1      9 44 30.0  18 51 49 399.9 613.3
      1435 is double: AB 6.5 12.6 31" 264.1, dT = -58sec
   Distance of 1435 to Terminator = 18.2"; to 3km sunlit peak = 7.3"
24 Jan 27  5 23  4.0 r    1436 K0  6.8  6.1   98- 163     43   5  35N 329 144 310 +1.5 -6.0 +1.5-2.0 .292  157.3      9 45 51.9  18 41  1 399.6 613.4
   Distance of 1436 to Terminator = 13.6"; to 3km sunlit peak = 4.1"
24 Jan 28  2 33 31.8 r    1535 K0  6.9  6.3   95- 153     21  60  21N 352 121 332 +1.0 -5.4 +1.1-3.7 .213  124.6     10 28 48.5  14 20 37 402.8 731.2
   Distance of 1535 to Terminator = 14.5"; to 3km sunlit peak = 4.3"
24 Jan 31  3 17 42.5 r    1808KF5  7.0  6.7   76- 121     15  85  62N 320  79 299 -3.1 -1.7 +0.3-2.1 .430  162.1     12 37  6.8 - 2 19 20 402.5 881.6
24 Jan 31  5 41 35.7 r    1818 K0  8.0  7.5   75- 120     45  63  75S 277  45 256 -3.5 -1.4 +2.1-1.3 .306 -146.1     12 39 53.6 - 3  3 59 399.4 713.3
24 Feb  1  7  4 52.9 r    1926kA2  8.0  8.0   66- 108     57  60  36N 345 115 325 -4.9 +0.2 +0.4-3.1 .303  147.4     13 25 14.8 - 8 47  9 395.9 691.9
24 Feb  2  7 20 19.3 r  158393 G8  7.6  7.1   56-  97     55  74  60N 320  78 302 -6.0 +1.6 +1.0-2.3 .375  170.0     14 10 19.8 -14 13 16 392.3 725.3
24 Feb  3  6  5 26.8 r    2131 F5  7.7  7.4   47-  86     31  96  77S 273  25 258 -6.5 +2.7 +0.9-1.1 .410 -150.9     14 56 19.4 -18 55 42 389.7 887.1
24 Feb  3  8 14  5.8 r  158952 K2  8.3  7.6   46-  85     59  81  69N 307  59 292 -6.8 +3.0 +1.3-2.0 .385  179.3     14 59 43.4 -19 18 18 387.1 723.3
24 Feb  4  4 54 42.8 r    2249cK1  6.7  6.0   37-  75      8 112  78S 270  27 259 -6.9 +3.8 -0.1-0.9 .528 -156.0     15 45 42.9 -22 45 12 386.81084.7
      2249 is double: AB 7.6 7.8 0.033"  47.5, dT = +0.05sec
      2249 is a close double. Observations are highly desired
24 Feb  4  7 20 42.9 R    2262 F5  7.5  7.2   36-  74     38  99  88N 283  32 273 -7.0 +4.1 +0.9-1.3 .446 -164.7     15 50 39.9 -23 15 29 383.2 859.1
24 Feb  5  8 19  9   m    2420dA3  7.5  7.4   26-  61     40 103  18S 202 308 196 -7.0 +5.2 +9.9+9.9 .000  -90.0     16 50 10.7 -26 44 33 376.6 855.8
      2420 is double: AB 7.3 15.4 6.6" 229.0
      2420 is a close double. Observations are highly desired
24 Feb  5  8 56 22.5 r  184695 A0  9.0  9.0   26-  61 -12 48 100  74S 259   2 253 -7.1 +5.3 +1.8-0.4 .365 -146.3     16 50 41.6 -26 37 24 375.8 800.4
24 Feb  5  9 12 31   m  184724 F0  7.5  7.4   26-  61  -9 51  99  18S 202 305 197 -7.1 +5.3 +9.9+9.9 .000  -90.0     16 51 51.8 -26 52 26 375.5 779.6
24 Feb  6  6 54 21.8 R    2554cF7  4.5  4.2V  17-  49     11 116  71S 248   4 248 -6.4 +5.8 +0.3-0.3 .491 -145.0     17 47 33.6 -27 49 51 373.51085.0
   R2554 = X Sagittarii
      2554 is double: AB 2.5 8.1      132.0, dT = 0.00sec
      2554 = X Sgr, 4.22 to 4.86, V, Type DCEP, Period 7.012770 days, Phase  69%
24 Feb  6  8 22 27.7 r  185840cB9  8.6  8.6   17-  49     29 108  66N 290  39 290 -6.4 +5.9 +0.3-1.4 .517  173.5     17 51  9.8 -27 49 46 371.3 937.2
    185840 is double: ** 9.2 9.2 0.10"  90.0, dT = +0.18sec
    185840 has been reported as non-instantaneous (OCc 122). Observations are highly desired
24 Feb  6  8 46 40.7 r X145167 M0  8.6  6.9V  17-  48     34 107  83S 259   6 259 -6.4 +6.0 +1.0-0.6 .454 -155.3 .03 17 52  0.7 -28  1 21 370.8 898.0
   X145167 = KW Sgr, 11.0 to 13.2, pg, Type SRC, Period 670. days
24 Feb  7  7 24 44.5 r    2743cA5  7.6  7.4   10-  36      5 119  46S 214 333 220 -5.4 +6.2 +0.9+1.2 .309 -119.2     18 53  7.6 -27 45 23 368.21133.4
      2743 is double: AB 7.7 8.9 0.39" 348.7, dT = +0.9sec
      2743 is a close double. Observations are highly desired
24 Feb  7  9 10  5.2 r  187496 K5  8.2  7.3    9-  35  -9 25 109  39N 308  58 314 -5.3 +6.4 -0.1-2.0 .449  146.5     18 57 29.0 -27 27 15 365.6 953.7
24 Feb  7 12 41 44.3 d    2784cK1  3.3  2.7    8-  34  36 69  94 -78S  88 185  95 -5.7 +6.6 +2.2-0.4 .392   -1.8 .01 19  6 56.4 -27 40 14 361.6 687.9
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 313.6, dT = -0.02sec
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Feb  7 14  7 56.9 R    2784cK1  3.3  2.7    8-  33  55 88  75  87N 258   4 265 -5.9 +6.6 +2.4+0.5 .379 -178.3 .01 19  6 56.4 -27 40 14 360.9 663.0
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 313.6, dT = -0.01sec
24 Feb 13 23 47 12.3 d  109738 G5  7.8  7.1   22+  56 -10 23 295  78S  79 314 100 +4.8 -1.2 +1.1+1.3 .452  -20.1      1 13 41.8   8 58 29 364.2 850.0
24 Feb 15  1 21  5.7 d     313cK0  7.1  6.2s  33+  70     10 294  29N   8 245  27 +5.7 -2.9 +1.1+3.6 .247   59.4      2  8  3.9  15 48 16 370.9 872.4
      313 = NSV 15445, 7.12 to 7.18, Hp
24 Feb 16 18 22 36.8 D     552SB7  2.9  2.9s  52+  93  59 13  54  50N  37 167  49 +7.8 -4.9 +0.1+0.7 .440   23.4      3 47 29.1  24  6 18 380.1 884.4
   R552 = Alcyone = eta Tauri
      552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.07sec : AE 2.8 15.0 78" 232.4, dT = -172sec : AB 2.8 6.3 118"
291.1, dT = -76sec
      552 is a close double. Observations are highly desired
      552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Feb 16 19  4 15.8 D     560SB8  3.6  3.7s  52+  93  51 19  47  77S  91 226 102 +7.7 -5.0 +1.5-1.0 .386  -30.5      3 49  9.7  24  3 12 379.5 824.2
   R560 = Atlas = 27 Tauri
      560 is multiple: Aa1,2 3.8 5.5 0.016" 156.1, dT = +0.02sec : Aa,Ab 3.8 6.8 0.22" 336.6, dT = -0.23sec : AC 3.6 15.0 50"  36.5, dT = +76sec :
AH 3.6 16.0 68" 221.6, dT = -116sec
      560 is a close double. Observations are highly desired
      560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Feb 16 19 26 21.5 r     552SB7  2.9  2.9s  53+  93  46 23  43 -85N 263  42 274 +7.7 -5.1 +1.5-0.6 .396  156.7      3 47 29.1  24  6 18 379.2 792.8
   R552 = Alcyone = eta Tauri
      552 is multiple: Aa,Ab 3.0 4.6            : AB     1.6 0.031" 207.1, dT = -0.04sec : AE 2.8 15.0 78" 232.4, dT = -170sec : AB 2.8 6.3 118"
291.1, dT = -262sec
      552 is a close double. Observations are highly desired
      552 = NSV 15775, 2.87, range 0.00, 1Kp, Type ROT+SPB, Period 2.2925 days
24 Feb 16 20  7 53.2 r     560SB8  3.6  3.7s  53+  93  37 29  35 -41S 209 355 220 +7.6 -5.2 +0.5+1.3 .347 -149.3      3 49  9.7  24  3 12 378.8 741.8
   R560 = Atlas = 27 Tauri
      560 is multiple: Aa1,2 3.8 5.5 0.016" 156.1, dT = -0.03sec : Aa,Ab 3.8 6.8 0.22" 336.6, dT = +0.39sec : AC 3.6 15.0 50"  36.5, dT = +142sec :
AH 3.6 16.0 68" 221.6, dT = -192sec
      560 is a close double. Observations are highly desired
      560 = NSV 1345, 3.63, range 0.00, 9Kp, Type SPB, Period 2.4266 days
24 Feb 17  1 18  3   d   76345kG8  7.5  7.0   54+  95     23 319  11N 360 220  10 +6.6 -5.6 +3.2+8.3 .079   78.0      3 57 11.8  25 16 58 380.5 698.5
24 Feb 17 23 38 10.5 D     731kF2  6.0  5.8   64+ 106  -9 34 355  48N  43 228  49 +6.9 -6.4 +2.3+1.6 .272   32.9      4 52 47.1  27 53 51 384.2 604.5
24 Feb 19  3 14 11.6 D     897 A2  6.4  6.2   74+ 119     19 320  75S 107 328 107 +5.8 -7.0 +1.4+0.3 .369   -8.6      5 56 33.8  28 56 32 390.9 708.3
24 Feb 26  2 55 27.4 r  119000kG0  7.3  7.0   98- 162     39  57  76N 300  72 278 -0.9 -3.2 +1.6-1.8 .353 -170.8     11 42  7.3   4 44 50 402.2 698.3
24 Feb 27  7 48 12   m    1790 M4  6.9  6.0v  93- 150     57 316  22S 224  81 202 -3.3 -1.2 +9.9+9.9 .000  -90.0     12 29  9.7 - 2 25 46 400.0 657.7
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 Mar  2  3 13 30.0 r    2206 K0  7.0  6.4   65- 107     12 108  64N 311  67 298 -6.5 +3.6 -0.3-1.7 .523  165.3     15 26  5.4 -21 22 49 392.91029.6
24 Mar  2  5 34 43.6 r  183534KG3  7.8  7.5   64- 106     42  95  42N 333  81 320 -6.7 +3.9 +0.0-2.6 .369  148.7     15 30 42.8 -21 52 43 389.6 817.1
24 Mar  2  6  5 27.5 r    2216pB9  7.2  7.2   64- 106     49  92   6N   8 116 356 -6.8 +4.0 -1.9-5.3 .165  113.6     15 32 10.3 -21 58  1 389.0 776.6
      2216 is double: AB 7.1 10.9 0.70"  41.0, dT = -4sec
      2216 is a close double. Observations are highly desired
24 Mar  4  5 18 24.9 r  185295 G8  7.4  6.8   43-  82     19 112  75N 288  41 285 -7.2 +5.7 +0.0-1.3 .543  178.8     17 21  5.6 -27 25  5 381.11004.7
24 Mar  4  7 27 53.1 r    2512pB9  7.5  7.5   42-  81     45 102  36N 326  69 323 -7.4 +6.0 +0.1-2.9 .341  141.6     17 26  5.9 -27 35 59 378.1 798.6
      2512 is double: AB 7.5 11.3 5.8" 347.8, dT = -16sec
      2512 is a close double. Observations are highly desired
24 Mar  5  7 51 19.4 r  186842 F3  8.2  8.0   32-  69     38 106  66S 240 346 244 -6.9 +6.5 +1.6+0.2 .366 -141.6     18 28  4.5 -28 23  9 372.5 843.6
24 Mar  6  7 20 35.1 R    2848pK1  5.6  4.9   22-  56     19 111  70S 238 350 247 -6.0 +6.5 +0.7+0.1 .464 -147.1     19 29 52.2 -26 59  8 368.5 987.5
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = +1.1sec
      2848 is a close double. Observations are highly desired
24 Mar  6  7 20 35.7 r X168596D    8.8  8.4   22-  56     19 111  70S 237 350 246 -6.0 +6.5 +0.7+0.1 .462 -146.7     19 29 52.5 -26 59 14 368.5 987.5
   X168596 is double: BA 8.8 5.6 7.6" 324.1, dT = -0.9sec
   X168596 is a close double. Observations are highly desired
24 Mar  6  8 51 38   m  188292 K1  8.3  7.7   21-  55     37 104  12S 179 285 188 -6.0 +6.7 +9.9+9.9 .000  -90.0     19 34 24.9 -27  9  9 366.3 841.2
24 Mar  6  8 57 53.2 r  188277pK0  8.9  8.2   21-  55     38 103  54S 221 326 230 -6.0 +6.7 +1.9+1.4 .314 -132.1     19 33 48.7 -27  2 46 366.2 830.7
    188277 is double: AB 9.1 9.8 29.0"  71.8, dT = +79sec
24 Mar  7  8 45 37.4 r  189467 K0  8.4  7.9   13-  42     22 106  66N 274  26 288 -4.6 +6.3 +0.4-1.0 .524  167.1     20 35 28.5 -23 32  9 362.4 945.8
24 Mar  8  8 38 52.3 r X179916D    9.5  9.4    6-  28      7 107  83N 250   7 268 -2.9 +5.5 +0.1-0.3 .606 -175.0     21 35 32.2 -18 46 15 359.71061.9
   X179916 is double: BA 9.6 8.7 1.2" 175.0, dT = -0.5sec
   X179916 is a close double. Observations are highly desired
24 Mar  8  8 38 52.3 r X 50506SA0  8.7  8.7    6-  28      7 107  83N 250   7 268 -2.9 +5.5 +0.1-0.3 .606 -175.0     21 35 32.2 -18 46 15 359.71061.9
   X 50506 is triple: AB 8.7 9.6 1.2" 355.0, dT = +0.5sec : AC 8.7 13.1 44"  68.5, dT = +72sec
   X 50506 is a close double. Observations are highly desired
24 Mar  8  9  8 45.8 r  164513 K2  9.4  8.9    6-  28     13 104  76N 257  13 275 -2.8 +5.5 +0.3-0.5 .581  176.8     21 36 42.1 -18 39 29 359.01012.7
24 Mar  8  9 11 31.4 R  164516 K3  6.9  6.2    6-  28     14 104  83S 236 352 254 -2.8 +5.5 +0.4+0.2 .551 -162.2     21 36 58.6 -18 44 38 358.91008.3
24 Mar  8  9 23 32.0 R  164524 F3  7.2  7.0    6-  27 -12 16 103  38N 295  50 313 -2.8 +5.5 +0.0-1.9 .428  138.8     21 37 21.1 -18 26 28 358.6 989.4
24 Mar 16 18 45 59.5 D     810SB7  1.7  1.7   47+  86  47 16  44  79S  97 233 100 +8.0 -6.8 +1.6-1.1 .378  -25.2      5 26 17.5  28 36 27 384.2 779.1
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -4sec : AD 1.9 18.5 9.8"  70.0, dT = +23sec : AE 1.9      10.9"  80.0, dT = +28sec : AF 1.9 15.8
11.6" 296.0, dT = -29sec
       810 is a close double. Observations are highly desired
24 Mar 16 19 58 12.2 R     810SB7  1.7  1.7   47+  86  32 26  31 -51S 228  17 230 +7.8 -7.0 +1.2+0.6 .332 -154.4      5 26 17.5  28 36 27 383.4 685.3
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = +16sec : AD 1.9 18.5 9.8"  70.0, dT = +27sec : AE 1.9      10.9"  80.0, dT = +28sec : AF 1.9
15.8 11.6" 296.0, dT = -13sec
       810 is a close double. Observations are highly desired
24 Mar 18  3 14 54.1 d    1018cB9  5.8     s  59+ 100      8 309  72N  77 308  73 +6.1 -7.3 +1.3+1.4 .379   29.2      6 38 23.0  28 59  4 392.3 826.6
   R1018 = 53 Aurigae
      1018 is double: AB 6.97 6.20 0.13" 331.8, dT = -0.09sec
      1018 is a close double. Observations are highly desired
      1018 = NSV 16937, 5.77, range 0.02, V, Type ACV, Period 2.7112 days, Phase  11%
24 Mar 18 21 57 30   Gr   1122cG9  3.8  3.3   67+ 110   6 29 ** GRAZE: CA  5.4S; Dist.108km in az. 347deg. [Lat =-27.25+0.21(E.Long+63.95)]
24 Mar 18 21 58 26   M    1122cG9  3.8  3.3   67+ 110   6 28  29   5S 186 336 177 +6.6 -7.6 +9.9+9.9 .000  -90.0      7 25 43.6  27 47 53 393.9 618.4
   R1122 = iota Geminorum
24 Mar 18 23 52 51.8 D    1134 A4  5.1  5.0   68+ 111     34   2  39N  50 228  41 +6.2 -7.5 +3.7+2.0 .174   55.4      7 29 20.4  28  7  6 393.6 582.8
   R1134 = 64 Geminorum
24 Mar 19  0  2  9.2 D    1137SK2  5.0  4.4   68+ 111     34 359  85N  96 277  87 +6.1 -7.5 +2.8-0.2 .302   10.1      7 29 48.8  27 54 58 393.6 584.7
   R1137 = 65 Geminorum
      1137 is triple: Aa,Ab 5.0      0.31" 190.8, dT = -0.08sec : AB 5.0 13.6 10.5" 290.0, dT = -34sec
      1137 is a close double. Observations are highly desired
24 Mar 19  0 40  5.3 d    1139 F5  7.1  6.9   68+ 111     33 349  73N  84 275  76 +6.0 -7.5 +3.0+0.5 .286   24.5      7 30 39.6  27 54 31 393.8 600.2
24 Mar 26  6 55 22.1 r    1865 A2  7.3  7.2   99- 170     55 303  53N 329 197 308 -3.4 +0.0 +1.3-2.0 .327  161.4     12 59  0.2 - 6  5 27 398.8 666.6
   Distance of 1865 to Terminator = 9.8"; to 3km sunlit peak = 1.9"
24 Mar 27  9 48 27.7 R    1971SG8  5.5        96- 158  -9 31 272  64S 268 153 249 -5.0 +1.7 +1.1+1.2 .349 -151.1     13 45 56.3 -12 25 36 398.5 771.6
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.89" 305.1, dT = -2sec : AC 5.7 11.9 27.4" 162.6, dT = +21sec
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1971 is a close double. Observations are highly desired
24 Mar 28  2 58 50.9 R    2063 A1  6.7  6.6   93- 148     43  86  75S 276  30 259 -4.5 +2.3 +1.5-1.2 .358 -149.4     14 23 57.7 -16  6  7 395.7 797.5
24 Mar 30  3 14  1.0 r  184104 K0  7.3  6.5   79- 125     29 104  37N 337  87 327 -6.1 +4.7 -0.5-2.6 .367  139.4     16  5 35.0 -24 13 24 390.2 915.3
24 Mar 30  4 26  5.6 R    2311 B8  6.3  6.3   79- 125     44  98  29N 344  91 335 -6.2 +4.9 -0.4-3.3 .294  133.3     16  7 51.9 -24 27 44 388.7 807.1
24 Mar 30  7  7 32.7 r  184198kK3  8.1  7.3   78- 124     79  78  88N 284  32 275 -6.7 +5.2 +2.4-1.0 .331 -168.9     16 11  1.8 -25  7  4 386.4 631.4
24 Mar 30  9 59 25.2 R    2332wB8  6.1  6.0V  77- 123  -6 63 268  82S 275 173 266 -7.3 +5.3 +2.3+0.4 .335 -172.1     16 14 53.4 -25 28 37 386.5 633.5
      2332 is double: AB 6.1 9.9 46"  35.8, dT = +70sec
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  55%
24 Mar 30 12 25 25.8 d    2349SB1  2.9     v  77- 122  25 33 256 -70N  82 334  74 -7.8 +5.3 +0.8+1.3 .418   12.0     16 21 11.3 -25 35 34 388.3 805.4
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 291.9, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 207.3, dT = -0.6sec : AB 2.9 8.4 20.3" 273.1, dT = -48sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  63%
24 Mar 30 13 31 30.0 R    2349SB1  2.9     v  76- 122  38 19 250  87N 284 172 276 -7.9 +5.3 +0.5+0.5 .475  168.2     16 21 11.3 -25 35 34 389.5 917.3
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 291.9, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 207.3, dT = -0.19sec : AB 2.9 8.4 20.3" 273.1, dT = -42sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  63%
24 Mar 31  4 26 10.7 r    2449 K2  7.4  6.7   70- 113     34 105  75N 292  39 287 -6.5 +5.7 +0.5-1.5 .469  178.7     17  3  4.5 -27  5 52 385.3 877.0
24 Mar 31  4 57 40.5 r  184981 F6  7.7  7.5   69- 113     40 103  83N 284  29 280 -6.6 +5.8 +0.9-1.4 .441 -173.4     17  4  2.0 -27 12 55 384.6 828.0
24 Mar 31  8 49 41.9 r  185097pF2  7.9  7.7   68- 112     90  35  75S 261  47 257 -7.3 +6.1 +2.9+0.5 .305 -159.1     17 10  9.1 -27 46 24 381.6 604.1
    185097 is double: AB 7.9 11.4 1.8"  61.4, dT = +6sec
    185097 is a close double. Observations are highly desired
24 Mar 31 10 22  5.4 R    2470kB9  6.1  6.2   68- 111  -2 70 266  87N 279 183 276 -7.6 +6.2 +2.5+0.0 .336  174.9     17 12 25.1 -27 45 44 381.7 624.4
24 Apr  1  6 15 45.1 d    2617cK0  4.6  4.1   59- 100     44 104 -82S  99 201 100 -6.7 +6.5 +1.1-1.2 .426    3.3     18  8  5.0 -28 27 26 379.2 785.7
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = +0.04sec
      2617 is a close double. Observations are highly desired
24 Apr  1  6 43  3.6 r  186281 K0  7.8  7.2   59- 100     51 102  73S 253 354 254 -6.8 +6.5 +1.9-0.1 .357 -151.7     18  6 36.0 -28 31 56 378.7 745.0
24 Apr  1  6 47 15.8 R  186286 B7  7.1  7.1   59- 100     51 101  68N 292  32 293 -6.8 +6.5 +1.2-1.7 .396  169.4     18  6 45.8 -28 21 50 378.6 739.2
24 Apr  1  7 34 49.6 R    2617cK0  4.6  4.1   58- 100     61  99  77N 283  20 284 -6.9 +6.6 +1.8-1.3 .372  176.3     18  8  5.0 -28 27 26 377.8 683.1
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = -0.01sec
      2617 is a close double. Observations are highly desired
24 Apr  1  7 41 33.3 r  186346 F5  7.6  7.4   58- 100     63  99  28S 208 304 210 -7.0 +6.6 +4.6+6.1 .122 -109.3     18  8 52.1 -28 45 19 377.7 677.0
24 Apr  2  5 18  9.8 D    2784cK1  3.3  2.7   48-  88     20 111 -82S  91 203  98 -6.3 +6.6 +0.3-0.9 .525    3.0     19  6 56.4 -27 40 14 376.5 960.5
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.005" 266.6, dT = -0.01sec
24 Apr  2  6 22  4.6 R    2784cK1  3.3  2.7   48-  88     34 106  76N 276  23 283 -6.4 +6.7 +0.7-1.1 .467  176.8 .01 19  6 56.4 -27 40 14 375.0 850.9
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.005" 266.6, dT = -0.01sec
24 Apr  3  7 25 49.0 r    2939 A9  7.5  7.2v  36-  74     34 103  89S 255   3 267 -5.7 +6.6 +1.1-0.4 .463 -171.2     20 10  6.8 -25 17  2 369.5 839.5
      2939 = BD Cap, 7.51 to 7.57, Hp, Type DSCTC, Period 0.160222 days, Phase  23%
24 Apr  4  7  2 50.5 R    3089SA0  5.3  5.3   26-  61     16 106  82N 259  13 275 -4.6 +6.0 +0.3-0.6 .547  178.8     21  8 33.6 -21 11 37 366.4 973.1
   R3089 = chi Capricorni
      3089 is multiple: AE 5.3 13.0 9.7"  14.0, dT = +8sec : AF 5.3 13.0 9.7"  14.0, dT = +8sec : AG 5.3 20.0 13.1"  62.0, dT = +23sec : AC 5.3 15.0
35" 114.8, dT = +52sec
      3089 is a close double. Observations are highly desired
24 Apr  4  7 30 21.1 r  190070 K1  8.4  7.8   26-  61     22 103  62N 278  31 295 -4.6 +6.0 +0.4-1.2 .486  158.1     21  9 34.7 -21  2 46 365.7 928.6
24 Apr  4  8 57 44.1 R  190125 K0  7.9  7.3   25-  60     40  95  85S 245 355 262 -4.6 +6.0 +1.3+0.1 .452 -172.9     21 12 36.7 -21  0 43 363.7 803.2
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr  4  9 31 32.2 d    3106 K0  5.2  4.6   25-  60     47  91 -73N  53 162  70 -4.7 +6.0 +1.6+0.7 .417   17.1     21 15 37.9 -20 39  6 363.0 767.7
   R3106 = phi Capricorni
24 Apr  4 10 48  1.2 r    3106 K0  5.2  4.6   25-  60   4 64  80  78N 262  14 279 -4.9 +5.9 +2.2-0.2 .384  162.8     21 15 37.9 -20 39  6 361.7 705.7
   R3106 = phi Capricorni
24 Apr  6  9 46 11.7 r  146511kG5  9.0  8.7    8-  32 -10 22  88  81S 234 351 255 -1.4 +3.5 +0.7+0.4 .533 -172.1     23  6 26.2 - 8 45  3 358.0 934.6
24 Apr  6  9 54 48.0 r    3395 K2  8.0  7.4    8-  32  -8 24  87  44S 197 314 219 -1.4 +3.5 +0.6+2.0 .382 -135.9     23  7 17.3 - 8 48 56 357.8 923.5
24 Apr 11 22 44 12.2 D   76472cG8  7.2  6.5   13+  43 -10 14 310  86S  78 306  87 +5.7 -6.0 +1.3+1.2 .439    4.6      4  8 39.0  25 52 40 371.7 793.6
24 Apr 12 22 19 11.1 d     768 A2  7.0  6.7S  22+  55  -5 24 326  47S 124 338 128 +6.4 -6.9 +1.5-0.4 .306  -35.7      5  8 35.3  28 16 24 376.7 688.9
       768 = NSV 16250, 7., , Type VAR:
24 Apr 16  2 22 31.0 D    1232SK0  6.4  5.7   52+  93     16 311  73N  85 313  73 +5.2 -7.1 +1.5+1.2 .354   32.6      8 10 13.1  25 50 40 395.3 806.2
   R1232 = 13 Cancri
      1232 is triple: AB 6.6 9.3 80"  48.9, dT = +182sec : AC 6.6 8.8 188"  22.0, dT = +238sec
24 Apr 16  2 51 34.0 D    1233SG8  5.7  5.3S  52+  93     11 307  41S 152  24 140 +5.2 -7.0 -0.2-1.1 .363  -34.9      8 10 27.2  25 30 26 395.9 849.3
   R1233 = psi Cancri
      1233 is quadruple: **Aa,Ab 6.6 6.6 0.10" 270.0, dT = -0.13sec : AC 5.8 11.8 82" 220.7, dT = +83sec : AB 5.8 13.1 91" 319.0, dT = -243sec
      1233 has been reported as non-instantaneous (OCc  73). Observations are highly desired
      1233 = NSV 17752, 5.73, , Type VAR:
24 Apr 17 23  0 20.3 D    1436 K0  6.8  6.1   70+ 114     40  24  89N 111 269  92 +4.1 -6.1 +2.5-1.2 .306   12.5      9 45 51.9  18 41  1 399.2 606.5
24 Apr 18  2  2 13.3 d    1444 K0  7.8  7.1   71+ 115     38 329  84S 117 326  99 +3.3 -5.8 +1.8-0.4 .343   12.1      9 49  5.5  18  3 28 399.6 679.6
24 Apr 20  5 54 55.9 d    1645cF8  6.7  6.4   87+ 138     20 289  42S 164  41 142 +0.1 -3.1 +0.1-2.0 .338  -37.3     11 21 26.8   6 38  6 403.4 832.4
      1645 is double: AB 6.7 16.2      271.0, dT = 0.00sec
24 Apr 22  6 40 23.7 d    1837 K2  7.4  6.6   97+ 160     33 284  65N  89 328  67 -2.6 -0.3 +1.5+1.2 .317   35.9     12 47 34.1 - 4 40 53 400.1 760.3
24 Apr 26  5  8 26.8 R    2270 B2  5.4  5.4e  95- 154     79  70  79N 300  55 290 -5.4 +4.8 +2.1-1.7 .340  177.7     15 53 55.9 -23 58 41 386.9 638.3
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  26%
24 Apr 27  2 47 23.5 r    2409 B9  7.0  7.0   90- 143     39 103  57S 250 356 244 -5.3 +5.5 +1.7-0.2 .330 -136.9     16 45 48.5 -26 38 58 386.1 845.9
24 Apr 27  5 14 20.0 r    2420dA3  7.5  7.4   90- 142     70  92  54N 319  58 313 -5.7 +5.8 +1.3-2.7 .314  152.0     16 50 10.7 -26 44 33 383.8 661.1
      2420 is double: AB 7.3 15.4 6.6" 229.0, dT = -0.04sec
      2420 is a close double. Observations are highly desired
24 Apr 27  6 24 17.0 r  184724 F0  7.5  7.4   89- 142     85  78  54N 319  64 313 -5.9 +5.9 +2.0-2.8 .281  148.2     16 51 51.8 -26 52 26 383.2 615.4
24 Apr 28  2 24 28.3 R    2545cF0  6.4  6.2   83- 131     23 110  68N 298  49 297 -5.4 +6.1 +0.0-1.6 .501  167.0     17 43 17.7 -27 53  2 384.1 957.6
      2545 is double: ** 6.6 8.5 0.09" 200.4, dT = +0.02sec
      2545 has been reported as non-instantaneous (OCc 113). Observations are highly desired
24 Apr 28  8 11  8.6 r X 43016SK0  7.9  7.3   82- 129     84 263  28S 212 127 213 -6.3 +6.5 +2.5+5.1 .173 -121.4     17 53 48.2 -28 41 19 379.4 610.3
   X 43016 is triple:  5.4 10.6 0.10"       : AB 9.4 12.2 7.5"   0.9, dT = +37sec
   X 43016 is a close double. Observations are highly desired
24 Apr 29  3 57 21   Gr   2727kA*  7.4  7.4v  74- 118     31 ** GRAZE: CA  8.7S; Dist. 59km in az. 211deg. [Lat =-28.87-0.53(E.Long+63.95)]
24 Apr 29  4  4 53.6 r    2727kA*  7.4  7.4v  74- 118     31 108  23S 201 308 206 -5.3 +6.6 +4.1+5.5 .118 -104.5     18 47 37.1 -28 16 47 379.2 870.4
      2727 = HIP 92215, 7.45 to 7.48, V, Type ACV, Period 1.93789 days, Phase  47%
24 Apr 29  7 27 25.0 r  187398 K0  8.2  7.6   73- 117     74  94  85S 262 357 268 -5.8 +6.8 +2.5+0.0 .346 -175.5     18 52 58.5 -28  8 43 375.9 632.8
24 Apr 29  9 21 36.3 r  187463pF0  8.2        72- 116     81 268  70S 247 155 253 -6.2 +6.8 +2.3+1.4 .341 -169.0     18 55 58.8 -28  7 49 375.4 631.6
    187463 is double: AB 8.51 9.25 0.93" 129.2, dT = +1.3sec
    187463 is a close double. Observations are highly desired
24 Apr 29 14 23 23   m    2784cK1  3.3  2.7   71- 115  40 18 248 -13S 162  50 169 -6.8 +6.3 +9.9+9.9 .000  -90.0     19  6 56.4 -27 40 14 378.91017.8
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.004"  13.0
24 Apr 30  7 58 45   m    2910cG3  4.7  4.3   62- 104     68  91  -3S 167 268 178 -5.4 +6.7 +9.9+9.9 .000  -90.0     19 55 50.4 -26 17 58 372.1 656.1
   R2910 = omega Sagittarii
      2910 is double: ** 5.6 5.6 0.001"  51.3
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 Apr 30  7 58 45   Gr   2910cG3  4.7  4.3   62- 104     69 ** GRAZE: CA -2.7S; Dist. 17km in az. 358deg. [Lat =-28.10+0.02(E.Long+63.95)]
   Distance of 2910 to Terminator = 0.2"; to 3km sunlit peak = 0.0"
24 May  1  5 20 27.7 r    3037cF7  7.3  7.0s  52-  92     22 105  89S 253   6 269 -4.3 +6.1 +0.6-0.4 .504 -173.9     20 48 21.8 -22 44 27 372.2 915.6
      3037 is double: ** 8.1 8.1 0.050"
      3037 has been reported as non-instantaneous (OCc1598). Observations are highly desired
      3037 = NSV 25336, 7.41 to 7.46, Hp, Type EA, Period 5.15195 days, Phase  87%
24 May  1  9 16 36.5 r  189843 K2  8.3  7.7   51-  91     72  75  58N 286  39 302 -4.8 +6.1 +2.8-1.5 .283  139.2     20 55 18.7 -22  7 25 367.9 667.1
24 May  1 10 24  5.4 r    3062 K2  7.5  6.8   50-  90  -5 83  22  73N 270  70 286 -5.0 +6.0 +2.8-0.1 .326  150.4     20 56 52.7 -22  0 21 367.5 667.6
24 May  2  6  2 52.2 r  164637 K2  7.5  6.8   40-  79     17 101  56S 216 331 235 -3.4 +5.3 +0.8+1.0 .425 -143.7     21 46 27.4 -17 55 25 368.9 943.4
24 May  2  9 56 28.7 r    3204 K0  7.9  7.3   39-  77 -11 66  67  83N 256  18 275 -3.8 +5.2 +2.3+0.2 .376  162.0     21 52 41.6 -17  4  0 364.4 699.5
24 May  3  9 25 17.0 R    3339 M0  6.7  5.8v  28-  64     47  76  79S 235 354 256 -2.5 +3.9 +1.4+0.7 .443 -177.7     22 46 14.2 -11  9 59 362.5 779.0
      3339 = LQ Aqr, 6.71 to 6.78, Hp, Type LB
24 May 10 22 13 49.7 d     864 K1  6.6  6.1   10+  36  -9 14 315  44N  34 260  35 +5.3 -7.1 +3.0+3.8 .194   63.2      5 43 22.8  29 12  1 378.1 791.1
24 May 10 22 36 13.5 d   77483DB5  8.0  8.0   10+  36     11 311  87N  78 307  79 +5.3 -7.0 +1.3+1.3 .421   20.1      5 44 37.7  29  1  0 378.5 823.5
     77483 is double: AB 8.1 9.7 8.2"   0.1, dT = +4sec
     77483 is a close double. Observations are highly desired
24 May 11 22  5 57.4 D    1032 K4  5.4  4.7   17+  48  -7 23 326  80N  79 294  75 +5.6 -7.4 +2.2+1.1 .343   26.5      6 44 45.5  28 58 15 382.7 711.2
   R1032 = 28 Geminorum
24 May 13  0  7 38.2 d    1173WB8  7.9  7.9   26+  61     16 313  43S 145  11 135 +5.2 -7.1 +0.1-0.9 .371  -29.7      7 45 53.0  26 43 32 389.4 807.5
24 May 16 22 42 11.0 d    1596pA2  7.2  7.1   64+ 106     50  21  52S 151 313 130 +2.0 -4.2 +1.4-2.3 .307  -18.7     10 59 33.1   9 55 51 399.3 627.3
      1596 is double: AB 7.2 12.0 1.9" 279.1, dT = -4sec
      1596 is a close double. Observations are highly desired
24 May 17  1 53 27.6 d    1603 A0  7.2  7.2   64+ 107     41 314  44S 160  20 138 +1.2 -3.7 +0.5-2.0 .324  -27.1     11  2 32.9   9 10 23 400.2 705.4
24 May 17 22  1 16.5 d  119000kG0  7.3  7.0   72+ 117  -7 44  50  63N  87 225  66 +0.9 -3.0 +2.8-0.8 .252   43.3     11 42  7.3   4 44 50 400.2 673.5
24 May 18  2 54 32.2 d    1706kK0  7.9  7.3   73+ 118     41 304  90S 115 342  93 -0.2 -2.3 +1.7-0.3 .352   16.8     11 46 46.6   3 28 27 400.4 713.7
24 May 19  3 18 57.5 D    1790 M4  6.9  6.0v  82+ 129     48 301  63S 141  11 120 -1.6 -0.9 +1.3-1.4 .351  -10.4     12 29  9.7 - 2 25 46 398.9 689.6
   R1790 = FZ Virginis
      1790 = FZ Vir, 6.81 to 6.98, V, Type SRB, Period 25. days
24 May 20  1  7  3.0 d    1890 K0  7.3  6.8   88+ 140     69  19  44S 158 321 137 -2.2 +0.2 +1.0-2.8 .311  -23.3     13  9 46.3 - 7 39 19 396.0 649.2
24 May 25  1 45  6.9 r    2512pB9  7.5  7.5   97- 161     41 104  72N 304  49 301 -4.6 +6.0 +0.5-1.9 .431  163.5     17 26  5.9 -27 35 59 381.2 831.5
      2512 is double: AB 7.5 11.3 5.8" 347.8, dT = -10sec
      2512 is a close double. Observations are highly desired
24 May 25  9 11 12.2 r  185573 K5  6.8  5.8s  96- 158     44 257  85S 279 176 277 -5.9 +6.2 +1.4+0.6 .408  164.9     17 38 12.0 -28  2 48 379.8 777.8
    185573 = NSV 23046, 6.83, range 0.01, 8V, Type VAR, Period 1.18268 days
24 May 26  9  5 24.2 r  187089 B9  7.9  7.8   91- 146     58 261  70S 253 154 257 -5.5 +6.5 +1.5+1.4 .397 -177.3     18 39 13.8 -28 10 50 375.6 724.5
24 May 27  2 40 43.3 R    2848pK1  5.6  4.9   86- 136     28 107  47S 223 332 232 -3.9 +6.5 +1.4+1.0 .331 -132.4     19 29 52.2 -26 59  8 375.8 893.9
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = -5sec
      2848 is a close double. Observations are highly desired
24 May 28  9 53 44.0 r  189586 F3  8.1  7.8   75- 120     71 281  36S 204  94 218 -4.2 +5.9 +0.7+3.1 .324 -144.4     20 41 52.6 -23  8 11 369.2 713.1
24 May 29  4 43 27.2 R    3150 F3  6.6  6.4   66- 109     27  98  87N 256   9 274 -2.5 +5.4 +0.8-0.5 .482  176.3     21 29 59.6 -19  8 52 370.5 867.8
24 May 29  5 13 22.3 r  164449DF0  7.2        66- 109     33  95  50S 213 324 231 -2.6 +5.4 +1.3+1.5 .362 -141.7     21 31 25.5 -19 14 15 369.8 825.9
    164449 is double: AB 7.21 11.24 2.34" 179.4, dT = -5sec
    164449 is a close double. Observations are highly desired
24 May 29  8 20  4.9 R  164516 K3  6.9  6.2   65- 108     72  61  16S 178 303 196 -3.0 +5.3 +0.3+5.4 .189 -119.6     21 36 58.6 -18 44 38 367.0 681.3
24 May 29  8 45 13.9 r    3161 F2  7.9  7.7   65- 107     77  44  74N 269  48 287 -3.1 +5.2 +2.8-0.2 .325  148.1     21 36 22.2 -18 23 32 366.8 680.3
24 May 29  9 17 43.0 R  164524 F3  7.2  7.0   65- 107     80  10  69S 231  42 249 -3.2 +5.2 +1.9+1.7 .384 -175.5     21 37 21.1 -18 26 28 366.7 685.8
24 May 30  4 59 39.2 R    3288 K0  5.8  5.3   55-  96     17  96  88S 247   3 267 -1.6 +4.3 +0.5-0.2 .522 -179.7     22 24 27.1 -13 31 46 369.4 934.5
   R3288 = 50 Aquarii
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
24 May 30  8 14 31.2 R    3303kF2  6.4  6.2   54-  94     58  67  68S 227 350 247 -1.9 +4.1 +1.6+1.2 .404 -171.5     22 30  1.5 -12 54 54 365.6 724.0
24 May 31  5 23  5.1 r    3422kF0  6.7  6.5   43-  82      9  93  74S 231 348 253 -0.7 +2.9 +0.3+0.4 .543 -167.3     23 16 59.2 - 7  9 39 368.7 995.8
24 May 31  7  0 50   GrSaturn      1.2  1.2   43-  82     30 ** GRAZE: CA  8.0N; Dist.325km in az. 169deg. [Lat =-31.23+0.17(E.Long+63.95)]
24 May 31  7  1 38   M Saturn      1.2  1.2   43-  82     30  81   9N 328  87 350 -0.7 +2.8 +9.9+9.9 .000   90.0     23 20 10.1 - 6 18 13 366.4 857.7
24 May 31  7 29 14.9 r  146653KA3  8.1  8.0v  42-  81     36  77  76S 233 353 255 -0.7 +2.8 +1.1+0.6 .465 -176.3     23 20 43.1 - 6 37 27 365.8 827.6
    146653 = HIP 115260, 8.12, range 0.01, 4V, Type VAR, Period 0.10847 days
24 May 31  7 39 54   Gr 146658 K0  7.3  6.8   42-  81     39 ** GRAZE: CA 10.8N; Dist. 25km in az. 342deg. [Lat =-28.01+0.28(E.Long+63.95)]
24 May 31  7 45 53   r  146658 K0  7.3  6.8   42-  81     39  74  21N 316  77 338 -0.8 +2.7 +9.9+9.9 .076   99.6     23 21 15.4 - 6 11 33 365.5 811.6
24 Jun  2  8 26 34.0 r  109647 K2  8.7  8.2   21-  54     20  69  65S 223 346 243 +1.5 -0.6 +0.4+0.7 .512 -168.1      1  4 10.2   7 12 28 365.9 928.0
24 Jun  3  8 27 59.2 r   92714 G5  8.4  7.9   12-  41      7  70  51S 213 334 232 +2.6 -2.2 -0.1+0.9 .518 -155.7      1 56 48.7  13 36 22 367.81013.6
24 Jun  3  9 46 53.5 r   92733c    9.0  8.5   12-  40     22  59  49N 293  62 312 +2.5 -2.4 +2.2-2.7 .259  120.5      1 58 48.1  14 20 27 366.3 905.3
     92733 is double: ** 9.5 9.5 0.10" 172.0, dT = +0.2sec
     92733 has been reported as non-instantaneous (OCc 726). Observations are highly desired
24 Jun  8 22 33  0.2 d X 10920 K5  9.3  8.4    7+  30      9 308  82N  80 312  72 +4.5 -7.0 +1.2+1.3 .397   31.3      7 20 42.0  27 46 33 386.2 870.8
24 Jun  9 23  8 26.6 D   80070 K0  7.5  7.0   13+  42     14 308  40S 148  17 135 +4.2 -6.7 +0.0-0.9 .390  -29.5      8 17 36.3  24 50 14 390.5 847.8
24 Jun 13  3  1 28.2 D    1576 A2  5.3  5.3   39+  77      3 284  89S 113 354  92 +1.2 -3.6 +0.1+0.2 .480    9.2     10 49 15.4  10 32 43 402.4 949.2
   R1576 = 53 Leonis
24 Jun 14 21 33 17.5 d    1746KF2  7.0  6.8   56+  97  -2 56  36  60S 144 292 122 -0.2 -1.8 +1.4-2.3 .333   -9.0     12  8  0.6   0 37 17 398.7 652.6
24 Jun 15  1  1 28   m  119259 K0  7.6  7.0   57+  98     48 307  19N  42 267  21 -1.0 -1.3 +9.9+9.9 .000   90.0     12 11 25.4   0 11 38 399.2 682.3
24 Jun 17  4 46 39.3 d  158105PF5  7.5  7.2   76+ 122     25 269  87S 114 358  94 -4.1 +1.8 +0.9+0.1 .418    1.9     13 42 35.7 -12  5 13 397.2 804.8
    158105 is double: ** 8.2 8.2 0.050" 120.0, dT = +0.12sec
    158105 has been reported as non-instantaneous (OCc 934). Observations are highly desired
24 Jun 18 21 54 58.1 d  183232cF6  7.2  7.0   90+ 143  -6 39  94  75S 118 228 103 -4.2 +3.6 +0.7-1.7 .444    5.0     15  9 48.7 -20 31 14 389.5 841.4
    183232 is double: ** 7.5 8.8 0.060" 328.0, dT = -0.12sec
    183232 has been reported as non-instantaneous (OCc1709). Observations are highly desired
24 Jun 20  5 47 45.2 D    2332wB8  6.1  6.0V  96+ 157     47 262  53S 128  23 119 -6.0 +5.3 +1.9-0.9 .335  -30.3     16 14 53.4 -25 28 37 383.1 721.2
      2332 is double: AB 6.1 9.9 46"  35.8, dT = -5sec
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  45%
24 Jun 20  8 54 16.3 D    2349SB1  2.9     v  96+ 158      9 246  49S 131  14 122 -6.2 +5.2 +0.5-0.4 .424  -38.6     16 21 11.3 -25 35 34 386.11016.3
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004"  50.9, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 206.9, dT = +0.24sec : AB 2.9 8.4 20.2" 273.1, dT = -38sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  15%
24 Jun 20 23 18 48.6 d    2449 K2  7.4  6.7   99+ 167     37 104  63S 105 211  99 -4.6 +5.7 +0.7-1.3 .469    5.6     17  3  4.5 -27  5 52 380.7 869.7
24 Jun 21  5  9  3.6 d    2470kB9  6.1  6.2   99+ 168     68 265  36S 126  29 121 -5.7 +6.1 +2.5-1.4 .300  -32.3     17 12 25.1 -27 45 44 377.6 650.5
   Distance of 2470 to Terminator = 6.9"; to 3km sunlit peak = 0.2"
24 Jun 23  0 18 53   Gr   2784cK1  3.3  2.7   99- 166     26 ** GRAZE: CA -9.5S; Dist.153km in az.  30deg. [Lat =-26.66-0.51(E.Long+63.95)]
24 Jun 23  0 20 21   m    2784cK1  3.3  2.7   99- 166     25 109 -10S 183 293 190 -3.7 +6.4 +9.9+9.9 .000  -90.0     19  6 56.4 -27 40 14 373.8 930.9
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 309.8
24 Jun 25  1 55 28.3 r    3092 F2  6.3  6.1   88- 140     19 104  60N 288  42 304 -1.8 +5.5 +0.1-1.6 .450  148.6     21  9 33.0 -20 33 24 369.2 945.0
   R3092 = 27 Capricorni
24 Jun 25  4 34  0.4 r  190162 K0  7.7  7.1   87- 138     52  87  27N 321  71 337 -2.0 +5.5 +2.3-7.8 .124  107.3     21 14 57.1 -20  4 14 366.0 737.1
24 Jun 25  5 52 37.9 r  190191 K1  7.6  7.0   87- 138     69  72  78S 245   2 262 -2.2 +5.4 +2.1+0.7 .389  177.1     21 16 39.7 -20 10 29 365.0 689.8
24 Jun 26 10 50 26.8 R    3275 K0  6.0  5.4   77- 123  -4 51 284  83N 258 139 278 -1.7 +3.7 +1.6+1.2 .415  153.7     22 19  0.7 -13 18 18 364.7 818.3
   R3275 = 45 Aquarii
24 Jun 27  6 20 42.8 R    3391kA0  6.7  6.7   68- 111     47  69  42N 296  60 318 +0.1 +2.9 +2.9-3.5 .205  118.0     23  5 52.5 - 7 56 12 364.6 773.2
   R3391 = 85 Aquarii
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jun 27  7 19 32.7 r    3394kA0  7.4  7.3   68- 111     58  54  45N 293  67 315 +0.0 +2.8 +3.9-3.0 .193  117.5     23  7 11.7 - 7 41 41 363.9 737.0
   R3394 = 87 Aquarii
24 Jun 27  8 58 54.1 r  146534pK2  8.1  7.4   67- 110     69   2  59N 279  97 300 -0.3 +2.5 +3.6-0.6 .256  128.7     23  9 11.5 - 7 18 50 363.3 722.1
    146534 is double: AB 8.1 10.4 4.6" 106.9, dT = +18sec
    146534 is a close double. Observations are highly desired
24 Jun 27 12 36 20   m    3412 M2  4.2  3.4s  66- 109  16 36 284  15N 323 202 344 -0.7 +2.0 +9.9+9.9 .000   90.0     23 14 19.4 - 6  2 56 365.6 867.1
   R3412 = phi Aquarii
      3412 = NSV 26044, 4.3 to 4.33, Hp
24 Jun 29  6 37 23.4 R     104PK2  5.7  5.3   45-  84     24  69  37S 194 318 216 +2.3 -0.3 +0.1+2.0 .388 -140.5      0 48 23.0   5 16 50 367.6 896.7
       104 is triple: AB 5.8      2.7" 341.0, dT = +6sec : AC 5.8 12.3 149" 250.5, dT = -214sec
       104 is a close double. Observations are highly desired
24 Jul  1  8 14 43.5 r   93009 G5  8.3  7.9   23-  57     16  58  59S 223 351 240 +3.9 -3.6 +0.3+0.6 .496 -166.8      2 35  4.4  18  3 35 371.4 918.4
24 Jul  2  9 41 26.3 R   75987pA3  7.2  7.1   14-  44     19  49  83N 268  41 280 +4.6 -5.1 +1.3-0.8 .420  151.9      3 33 23.7  23 22  6 373.5 862.3
     75987 is quadruple: Aa,Ab 7.4 9.1 0.10"       : AB 7.2 12.8 33" 170.0, dT = +11sec : AC 7.2 7.7 69"  32.9, dT = +94sec
     75987 is a close double. Observations are highly desired
24 Jul  2  9 43  1.1 R   75988pG5  7.6  7.0   14-  44     19  49  81N 270  43 282 +4.6 -5.1 +1.4-0.9 .410  149.7      3 33 26.5  23 23  4 373.5 860.1
     75988 is triple: CD 7.7 12.0 10.0" 321.1, dT = -15sec : CA 7.7 7.2 69" 212.9, dT = -91sec
24 Jul  9 22 16 47.1 d   99115 G5  8.5  8.0   15+  45  -9 32 310  50S 148  12 128 +1.9 -4.2 +0.6-1.3 .371  -18.1     10 26  5.7  13  9  9 397.7 753.7
24 Jul 10 22 10 11.4 D  118702 K5  7.5  6.6s  22+  57  -8 44 317  87N 108 326  87 +0.8 -3.0 +2.1-0.1 .327   24.8     11 10 30.8   7 53 30 398.8 696.2
    118702 = NSV 18681, 7.56 to 7.62, Hp
24 Jul 12 22 21 16.0 d  138861kK5  7.9  7.2   40+  79 -10 62 330  85S 118 325  97 -1.7 -0.3 +2.3-1.0 .317   16.4     12 35 27.6 - 3 32 46 398.5 639.5
24 Jul 13  1 35 55.2 D    1814SK5  6.7  5.8S  41+  80     27 280  56S 148  28 126 -2.4 +0.1 +0.7-1.4 .367  -24.5     12 38 43.3 - 4 22 25 401.1 784.2
      1814 is triple: AB 6.8 10.0 57" 110.5, dT = +124sec : AC 6.8 10.2 165" 359.1, dT = -383sec
      1814 = NSV 19445, 6.66, , Type VAR:
24 Jul 13 21 52 12   m    1911 F8  7.3  7.0   50+  90  -4 71  10  22N  44 215  24 -2.8 +1.0 +9.9+9.9 .000   90.0     13 17 44.1 - 8 44  0 396.8 635.5
24 Jul 13 21 53  5   Gr   1911 F8  7.3  7.0   50+  90  -4 69 ** GRAZE: CA 22.1N; Dist. 31km in az. 226deg. [Lat =-28.65-0.92(E.Long+63.95)]
24 Jul 14  1 46 21.6 d    1917pG5  7.2  6.7   51+  91     36 278  21S 181  63 160 -3.7 +1.5 +0.6-4.6 .192  -59.5     13 21 12.2 - 9 59 57 398.7 733.6
      1917 is double: ** 7.8 7.8 0.10"  90.0, dT = -0.01sec
      1917 has been reported as non-instantaneous (OCc 141). Observations are highly desired
24 Jul 15  0 12  9.8 D    2017kK1  6.4  5.8   60+ 101     67 299  37S 162  35 144 -4.4 +2.6 +1.2-3.2 .263  -36.4     14  4 27.0 -14 58 18 394.1 625.4
24 Jul 15  0 19 12.9 D  158333kG6  7.2  6.7   60+ 101     65 297  85S 114 348  96 -4.5 +2.7 +2.3-0.7 .322   11.3     14  5 13.0 -14 51 25 394.1 627.3
24 Jul 16  1 20 32.0 d  158880cF2  7.5  7.3   70+ 113     64 282  35S 160  47 145 -5.5 +4.0 +1.6-3.4 .243  -42.9     14 53 40.1 -19 58 21 390.2 627.5
24 Jul 16  2  6  5.9 d    2129 K0  7.4  6.8   70+ 113     55 275  64S 132  21 116 -5.7 +4.0 +1.9-1.3 .329  -18.3     14 55  5.7 -20  0 49 390.6 656.0
24 Jul 16 22  3 24.2 d  183712 F3  7.9  7.6   78+ 124  -6 59  89  88N  98 204  86 -5.3 +4.7 +1.9-1.1 .356   22.5     15 41 53.2 -23 16 19 386.5 721.4
24 Jul 17  2 58  8.4 D    2257 A2  6.7  6.6S  79+ 125     55 268  55N  65 320  53 -6.4 +5.1 +1.9+2.4 .275   39.5     15 48 26.6 -23 50  3 385.7 665.9
      2257 = NSV 20404, 6.72, , Type VAR:
24 Jul 17  6  5 57.5 D    2270 B2  5.4  5.4e  80+ 126     16 251  38N  48 293  37 -6.8 +5.0 -0.5+2.7 .330   48.2     15 53 55.9 -23 58 41 388.5 933.5
      2270 = V1040 Sco, 5.39 to 5.43, V, Type EA, Period 1.01655 days, Phase  92%
24 Jul 18  0 12 43   m    2393 G8  7.9  7.3   86+ 136     77  86  17N  20 121  13 -5.9 +5.8 +9.9+9.9 .000   90.0     16 40 13.3 -26 19 20 380.1 644.9
24 Jul 18  2 13 57.5 D    2404pG2  6.7  6.4   87+ 137     77 272  90N  92 353  85 -6.3 +5.9 +2.6+0.2 .332    9.2     16 43 51.4 -26 48 32 379.7 619.2
      2404 is double: AB 6.7 17.0 26.7" 255.3, dT = -77sec
24 Jul 18  3 51 37.6 d    2409 B9  7.0  7.0   87+ 137     56 263  28N  30 289  24 -6.6 +5.9 +0.8+6.0 .162   64.2     16 45 48.5 -26 38 58 380.2 686.2
24 Jul 18  6  0 18.7 d    2420dA3  7.5  7.4   87+ 138     29 253  52N  54 305  48 -6.9 +5.8 +0.1+2.2 .385   34.6     16 50 10.7 -26 44 33 381.9 865.8
      2420 is double: AB 7.3 15.4 6.6" 229.0, dT = -17sec
      2420 is a close double. Observations are highly desired
24 Jul 18 22 37 58.0 d  185573 K5  6.8  5.8s  92+ 148     44 103  80S  95 198  93 -5.3 +6.2 +1.2-1.0 .434   10.3     17 38 12.0 -28  2 48 376.9 807.1
    185573 = NSV 23046, 6.83, range 0.01, 8V, Type VAR, Period 1.18268 days
24 Jul 19  8 36 55.4 d    2583cA7  5.8  5.7   94+ 152     10 244  63S 108 352 108 -6.7 +6.1 +0.2+0.4 .519  -27.7     17 56 41.8 -28  3 55 378.01075.2
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Jul 20  5 47 43.8 d    2743cA5  7.6  7.4   98+ 163     57 261  80S  79 339  84 -5.8 +6.5 +1.6+1.2 .419   -5.4     18 53  7.6 -27 45 23 369.5 754.9
      2743 is double: AB 7.7 8.9 0.39" 349.0, dT = +0.01sec
      2743 is a close double. Observations are highly desired
24 Jul 23  3 37 20.9 R    3197 K3  6.4  5.6   96- 156     55  79  78S 246   2 265 -1.3 +4.6 +1.8+0.3 .427  175.2     21 50 13.0 -16 50 42 360.4 748.3
24 Jul 26  7  8 57.2 r  109296kF5  8.0  7.8   70- 114     52  36  50S 206 355 228 +2.8 -0.4 +0.9+1.8 .404 -159.1      0 35 15.6   4  5 36 362.2 760.0
24 Jul 26  7 36  8.5 r      75kF0  7.6  7.5   70- 113     55  26  73S 230  27 251 +2.7 -0.5 +1.6+1.1 .425  176.8      0 35 28.6   4 17 41 362.1 746.9
24 Jul 27  5 59  1.7 r     209dA0  7.2  7.2   59- 101     28  59  12S 171 300 191 +4.1 -1.9 -1.0+3.9 .231 -118.3      1 25 58.2  10 24 25 366.6 868.9
       209 is double: AB 7.2 14.2 4.4" 127.3, dT = -14sec
       209 is a close double. Observations are highly desired
24 Jul 28  9 37 39.0 r   92911 A2  7.5  7.4   47-  86     43  12  87S 248  57 266 +4.6 -4.0 +2.2+0.5 .380  164.0      2 22 59.6  17 35 52 368.5 707.6
24 Jul 30  8 27 58.0 R   76514 G5  7.2  6.9   26-  61     16  48  57N 295  69 305 +6.0 -6.1 +2.2-2.2 .287  128.5      4 14 32.2  26 15 21 377.7 844.2
24 Jul 30  9 46 26.1 R   76530 K3  7.8  7.0   25-  60     27  33  90S 263  50 272 +5.9 -6.2 +1.9-0.5 .384  161.4      4 16 41.6  26 21 29 376.8 740.3
24 Jul 31 15 12 10   M     810SB7  1.7  1.7   15-  46  41 26 329   0S 182  33 185 +5.1 -7.1 +9.9+9.9 .000  -90.0      5 26 17.5  28 36 27 381.2 672.8
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0 : AD 1.9 18.5 9.8"  70.0 : AE 1.9      10.9"  80.0 : AF 1.9 15.8 11.6" 296.0
       810 is a close double. Observations are highly desired
24 Jul 31 15 13  9   Gr    810SB7  1.7  1.7   15-  46  42 26 ** GRAZE: CA -0.1S; Dist.137km in az.  26deg. [Lat =-26.87-0.43(E.Long+63.95)]
24 Aug  1  9 31 16.7 r   78165cA2  7.4  7.2v   9-  36      6  53  40S 230 356 228 +6.3 -7.2 +0.1+0.3 .397 -150.0      6 16 22.2  28 51  7 386.0 858.7
     78165 is double: ** 7.6 9.1
     78165 = V0395 Aur, 7.34 to 7.43, V, Type ELL, Period 23.166 days, Phase  11%
24 Aug  1 10 16  4.6 r   78186 A0  7.7  7.7    9-  36 -10 13  47  67N 304  76 301 +6.2 -7.2 +2.0-2.2 .307  136.7      6 17 45.7  29 13 11 385.3 788.9
24 Aug  2 10  4 41.7 r    1103 M1  5.8  4.9s   4-  24 -12  2  57  59S 260  23 252 +6.1 -7.2 +0.5-0.7 .452 -171.6      7 15 57.2  27 53 51 389.9 864.0
   R1103 = 53 Geminorum
      1103 = NSV 3485, 5.75, range 0.01, 2V, Type VAR, Period 6.22084 days
24 Aug  2 16  7  2.9 r    1122cG9  3.8  3.3    4-  22  44 32 342  87N 296 134 288 +5.0 -7.2 +2.0-0.3 .342  174.5      7 25 43.6  27 47 53 387.7 645.1
   R1122 = iota Geminorum
24 Aug  6 16 51 21.5 d    1576 A2  5.3  5.3    5+  25  45 48  27  33S 163 320 142 +2.2 -3.8 +1.0-2.7 .280  -32.5     10 49 15.4  10 32 43 398.0 639.7
   R1576 = 53 Leonis
24 Aug  7 23 41  7.0 d    1694 G5  8.5  8.1   11+  38     13 281  36N  58 298  36 -0.3 -1.6 +1.3+4.3 .185   65.7     11 40 30.8   3 39 15 403.2 880.2
24 Aug 11  1 49 48.6 D    1986 F3  7.1  6.9   34+  72     19 264  70S 132  16 112 -4.6 +2.6 +0.7-0.6 .407  -19.1     13 51  5.9 -13 40 45 400.9 837.1
24 Aug 13  2  0 24.9 d  183474kK0  8.1  7.5   54+  94     39 263  41N  55 306  42 -6.7 +4.9 +0.9+3.2 .255   48.5     15 26 44.6 -22 30 20 392.0 730.6
24 Aug 13 22 11 21.3 D    2332wB8  6.1  6.0V  63+ 105  -5 79  80  51N  60 166  51 -6.4 +5.7 +3.9+2.0 .198   53.9     16 14 53.4 -25 28 37 385.6 627.8
      2332 is double: AB 6.1 9.9 46"  35.8, dT = +212sec
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  44%
24 Aug 14  1 29 34.3 d  184310 K1  8.2  7.8   64+ 106     58 265  42N  50 308  41 -7.2 +5.8 +1.7+3.6 .229   49.0     16 19 22.5 -25 45 39 385.8 654.3
24 Aug 14 22 13  3.6 D    2470kB9  6.1  6.2   73+ 117  -5 68  95  78N  80 177  76 -6.6 +6.3 +2.5-0.1 .323   26.6     17 12 25.1 -27 45 44 380.4 665.3
24 Aug 14 23 20 50.3 D    2474kF2  6.7  6.4   73+ 117     82  90  63N  65 159  61 -6.8 +6.4 +3.1+1.4 .265   38.0     17 14  2.0 -27 47 48 379.7 618.5
24 Aug 15  2  0 50.7 d  185228SB0  7.9  7.6   73+ 118     63 263  21N  23 285  19 -7.4 +6.4 +0.8+7.2 .139   67.1     17 17 27.6 -27 46  1 379.7 657.4
    185228 is triple: AB 7.9 16.0 4.0" 204.0, dT = -29sec : AC 7.9 15.0 7.8" 146.4, dT = -31sec
    185228 is a close double. Observations are highly desired
24 Aug 15  5  3 41.0 D    2505 K4  5.3  4.5   74+ 119     25 250  32S 149  39 146 -7.8 +6.2 +2.3-2.4 .205  -65.4 .02 17 23 21.6 -28  8 34 381.9 912.0
   R2505 = 43 Ophiuchi
24 Aug 15  5 14 46   Gr    2505 K4  5.3  4.5   74+ 119     22 ** GRAZE: CA  7.0S; Dist.175km in az. 148deg. [Lat =-30.12+0.56(E.Long+63.95)]
24 Aug 15 19 51 14.4 d    2617cK0  4.6  4.1   81+ 128  24 26 110  43S 132 241 133 -6.0 +6.4 -0.2-2.1 .436  -31.0     18  8  5.0 -28 27 26 378.1 933.3
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = -0.3sec
      2617 is a close double. Observations are highly desired
24 Aug 15 22 20 24   d  186461cA2  7.4  7.2v  82+ 129  -6 57  99  28N  22 121  24 -6.3 +6.6 +5.3+8.1 .097   75.6     18 12 37.6 -28 14 11 374.9 713.7
    186461 is double: ** 8.2 8.2 0.050"
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
    186461 has been reported as non-instantaneous (OCc1536). Observations are highly desired
    186461 = V4385 Sgr, 7.42 to 7.46, Hp, Type ELL:, Period 2.62462 days, Phase  40%
24 Aug 15 22 30  9   Gr 186461cA2  7.4  7.2v  82+ 129  -8 60 ** GRAZE: CA 13.3N; Dist. 57km in az.  22deg. [Lat =-27.70-0.36(E.Long+63.95)]
24 Aug 15 23 28 10.2 d  186536cA3  7.5  7.4   82+ 130     71  97  66S 108 202 110 -6.5 +6.7 +2.1-1.4 .349  -13.9     18 15 13.5 -28 36 49 373.9 651.8
    186536 is double: ** 8.8 8.8 0.10"  90.0, dT = +0.27sec
    186536 has been reported as non-instantaneous (OCc 151). Observations are highly desired
24 Aug 16  0 52  5.9 D    2645 A5  6.2  6.1   82+ 130     89 130  59S 115 165 116 -6.8 +6.7 +2.7-1.4 .307  -26.9     18 17 24.1 -28 39  7 373.3 623.4
24 Aug 16  1 15 21.5 D    2644cF8  6.4  6.1   82+ 130     86 266  30N  24 295  26 -6.9 +6.7 +2.0+5.8 .163   61.9     18 17 23.8 -28 17 20 373.2 626.1
      2644 is double: ** 7.1 7.1 0.10"  90.0, dT = +0.25sec
      2644 has been reported as non-instantaneous (OCc 168). Observations are highly desired
24 Aug 16  3 36  7.1 D    2660 A3  6.2  6.0   83+ 131     56 260  77S  96 357  99 -7.3 +6.6 +1.9+0.5 .383  -19.0     18 22  0.1 -28 25 48 373.7 734.4
24 Aug 21  5 11 56.5 R    3432cK0  6.2  5.6   97- 159     67  16  29S 189 355 211 +0.2 +1.8 +0.5+2.8 .344 -141.6     23 20 40.9 - 5 54 29 354.3 754.4
   Distance of 3432 to Terminator = 14.8"; to 3km sunlit peak = 4.7"
24 Aug 22  5 12 25.8 R      24 K0  6.8  6.1   91- 145     55  34  57S 213   4 235 +2.2 +0.1 +1.1+1.6 .434 -166.1      0 13 47.6   1 23  1 355.8 772.4
24 Aug 22  6 54  8.6 r      32 M5  7.0  6.1v  91- 145     59 348  20S 176   7 198 +1.9 -0.2 -0.2+3.3 .277 -129.3      0 16 39.4   1 51  2 355.7 754.6
        32 = BV Psc, 6.89 to 7.07, Hp, Type SRB:
24 Aug 23  2 55 35.2 R     146cK0  4.3  3.8   84- 132     18  70  89N 248  11 268 +4.1 -1.3 +0.6-0.1 .532  167.2      1  2 56.6   7 53 24 361.1 954.9
   R146 = epsilon Piscium
24 Aug 23  4 53  4.1 r     162kF0  6.9  6.8s  83- 131     40  49  51S 207 345 228 +3.9 -1.6 +0.6+1.5 .435 -157.4      1  6 37.6   8 21 36 359.2 821.5
       162 = NSV 15244, 6.93, range 0.01, 2V, Type GDOR, Period 0.74488 days, Phase  30%
24 Aug 23  5  5 18   Gr 109678kA3  7.7  7.5   83- 131     43 ** GRAZE: CA 17.5N; Dist. 55km in az. 321deg. [Lat =-27.61+0.72(E.Long+63.95)]
24 Aug 23  5 13 30.7 r  109678kA3  7.7  7.5   83- 131     43  43  32N 304  87 325 +3.9 -1.7 +6.2-6.1 .114  104.3      1  6 42.0   8 52  7 359.0 804.2
24 Aug 23  8 31 48.1 r  109718PG0  7.2  6.9   82- 130     48 333  87N 249  93 270 +3.4 -2.2 +2.1+1.1 .403  161.4      1 10 54.3   9 33 50 359.0 739.7
    109718 is double: AB 7.3 12.7 58" 233.0, dT = -138sec
24 Aug 24  5 37 17.1 R     297cK0  6.5  5.9   73- 117     34  45  39S 198 338 217 +5.3 -3.4 +0.2+1.7 .388 -146.4      2  1 50.4  15  4  2 363.4 821.9
       297 is double: ** 7.6 7.6 0.10"  37.0, dT = +0.24sec
       297 has been reported as non-instantaneous (OCc 729). Observations are highly desired
24 Aug 25  5 54 13.7 R     435wF5  5.8  5.6S  62- 104     24  48  30S 192 328 208 +6.4 -4.8 -0.3+1.9 .342 -136.2      2 58  5.2  20 40  7 368.7 847.2
   R435 = 47 Arietis
       435 is double: AB 5.8 14.7 14.6" 113.0, dT = -8sec
       435 = NSV 15614, 5.8, , Type VAR:
24 Aug 25  6 25 47.9 d     440SA2  4.7        62- 104     28  41 -18N   0 142  16 +6.3 -4.9 -0.8+2.8 .258   55.3      2 59 12.7  21 20 25 368.4 809.1
   R440 = epsilon Arietis
       440 is triple: AB 5.17 5.57 1.29" 210.5, dT = -4sec : AC 5.2 12.7 146" 192.0, dT = -554sec
       440 is a close double. Observations are highly desired
24 Aug 25  7  8  4.6 R     440SA2  4.7        62- 103     34  32  52N 291  81 306 +6.3 -5.0 +3.3-1.9 .244  124.8      2 59 12.7  21 20 25 368.0 761.8
   R440 = epsilon Arietis
       440 is triple: AB 5.17 5.57 1.29" 210.5, dT = -0.9sec : AC 5.2 12.7 146" 192.0, dT = +88sec
       440 is a close double. Observations are highly desired
24 Aug 25  7  8  5.4 R X 54005DA2  5.6  5.5   62- 103     34  32  52N 291  81 306 +6.3 -5.0 +3.3-1.9 .243  124.8      2 59 12.7  21 20 24 368.0 761.8
   X 54005 is double: BA 5.6 5.2 1.3"  30.5, dT = +0.9sec
   X 54005 is a close double. Observations are highly desired
24 Aug 25  9 34 20.6 r   75705 K0  7.8  7.3   61- 103     40 351  57S 220  48 234 +5.8 -5.3 +1.7+1.6 .354 -159.7      3  3  2.1  21 33 55 367.9 673.4
24 Aug 26  7  4  2.5 r   76345kG8  7.5  7.0   50-  91     23  42  69S 237  17 248 +7.1 -6.1 +0.9+0.2 .440 -175.6      3 57 11.8  25 16 58 373.8 799.8
24 Aug 29  8 42 49.2 r   78930 K2  8.3  7.8   20-  53      9  51  85N 286  55 280 +7.3 -7.4 +1.3-1.4 .398  160.5      6 58 54.3  28 39 32 389.2 797.3
24 Sep  5 22 51 28.8 d  138994 K2  8.6  8.0    7+  30 -11 19 273  54N  78 320  56 -2.1 +0.9 +0.8+1.9 .316   42.1     12 50 55.3 - 6  3 40 404.1 834.5
24 Sep  5 23 22 30.7 d  139004WK0  8.5  7.8    7+  31     13 270  45N  69 311  47 -2.2 +0.9 +0.4+2.4 .292   49.2     12 51 40.3 - 6  7 59 404.8 879.5
    139004 is double: AB 8.4 10.7 15.7" 197.0, dT = -33sec
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep  5 23 57 17   m    1847 A2  8.0  7.8    7+  31      5 266   2N  26 268   5 -2.2 +0.9 +9.9+9.9 .000   90.0      12 52 12.6 - 6  5 25 405.6 933.5
24 Sep  6 23 19 49.1 D  158011dF2  7.1  6.9   13+  41     24 269  37N  61 305  41 -3.5 +2.3 +0.8+3.4 .232   55.6      13 34 17.8 -11 32 15 402.8 800.9
    158011 is double: AB 7.2 12.9 3.6" 245.6, dT = -15sec
    158011 is a close double. Observations are highly desired
24 Sep  9 20 26 27.7 d    2269cB5  5.4  5.4   36+  74  21 83  62  71N  84 205  73 -6.1 +5.5 +3.2+0.2 .269   32.7      15 53 53.9 -24 31 59 391.4 607.6
24 Sep  9 23 59 37.4 D    2286kB5  5.4  5.5v  37+  75     49 264  55N  68 323  57 -7.0 +5.7 +1.5+2.2 .300   32.5      15 58 34.9 -24 49 53 392.3 676.3
      2286 = V0913 Sco, 5.4 to 5.47, V, Type SXARI, Period 0.9789 days, Phase  90%
24 Sep 10  1 48  5.5 d  184032kA2  7.8  7.6   38+  76     27 254  58S 135  25 124 -7.2 +5.6 +1.3-0.8 .334  -39.7      16  1 26.6 -25 11 55 394.0 830.8
24 Sep 10  2 21 34.1 d    2295pA0  7.2  7.1   38+  76     20 251  71N  84 331  73 -7.3 +5.6 +0.2+1.2 .455   10.6      16  2 51.9 -25  0 51 394.6 886.6
      2295 is double: AB 7.2 9.4 4.5" 344.5, dT = -1.6sec
      2295 is a close double. Observations are highly desired
24 Sep 11  1 27 29   m  184783 G6  7.9  7.4   47+  87     42 257   8S 179  75 173 -7.8 +6.3 +9.9+9.9 .000  -90.0      16 54 49.6 -27 44 55 387.8 746.9
24 Sep 11  2 34 47.1 d    2437pA0  7.9  7.8   48+  87     29 252  62S 125  16 119 -7.9 +6.3 +1.3-0.3 .358  -37.6      16 57 53.9 -27 36 39 388.8 851.3
      2437 is double: AB 7.9 9.3 11.2"  29.9, dT = -2.6sec
24 Sep 12  1 14 38.6 d X 43016SK0  7.9  7.3   58+  99     57 260  67S 113  15 112 -8.0 +6.7 +2.3-0.3 .321  -30.9      17 53 48.2 -28 41 19 381.1 691.7
   X 43016 is triple:  5.4 10.6 0.10"       : AB 9.4 12.2 7.5"   0.9, dT = -9sec
   X 43016 is a close double. Observations are highly desired
24 Sep 13  0 15 45.6 d  187398 K0  8.2  7.6   68+ 111     82 268  86S  87 355  92 -7.5 +6.8 +2.6+0.4 .344   -8.8      18 52 58.5 -28  8 43 374.3 631.7
24 Sep 15  7 25 22.1 d    3081 K3  6.5  5.9   88+ 140     13 254  75N  54 298  70 -6.3 +4.8 -0.2+1.5 .611    8.7      21  6 41.5 -20 10 49 365.31094.8
24 Sep 15 22 48 10.4 D    3197 K3  6.4  5.6   93+ 150  -9 39  89  85N  60 172  78 -3.9 +4.7 +1.2+0.3 .470    6.4      21 50 13.0 -16 50 42 359.6 824.4
24 Sep 19  4 57 12.1 r  109393 A3  7.7  7.6V  98- 164     56   4  87S 241  57 262 +1.7 -1.2 +1.9+1.0 .435  166.3       0 42 32.8   5 40 31 352.4 765.0
    109393 = HD 3992, 7.70, , Type ACV, Period 0.9898 days, Phase  46%
24 Sep 19  8 25 15.3 R      98 G8  6.0  5.5   98- 163     31 299  81N 252 123 273 +1.3 -1.7 +1.3+1.4 .475  163.9       0 47 23.6   6 44 27 354.6 849.6
   R98 = 60 Piscium
24 Sep 21  4 20  7.5 r     375cA5  6.8  6.7   86- 136     31  42  70N 269  50 285 +5.6 -4.4 +1.9-0.7 .391  145.2       2 33 36.5  18 52 48 360.2 831.4
       375 is double: ** 7.6 7.6 0.10"  90.0, dT = +0.26sec
       375 has been reported as non-instantaneous (OCc1189). Observations are highly desired
24 Sep 21  7 43  4.4 r   93033SK0  7.2  6.4   85- 135     41 344  69N 270 104 286 +5.1 -4.9 +2.7+0.3 .345  148.5       2 38 37.3  19 43 40 360.0 705.5
     93033 is triple: **Aa,Ab 7.5 8.5 0.30"  70.0, dT = +0.8sec : AB 7.2 14.4 45"  57.7, dT = +111sec
     93033 has been reported as non-instantaneous (OCc 312). Observations are highly desired
24 Sep 21  9 58 55.7 R     399SA0  5.7  5.8   85- 134  -2 25 312  79S 237 101 253 +4.8 -5.1 +1.6+1.6 .433 -169.8       2 42 21.9  20  0 41 361.9 772.6
   R399 = mu Arietis
       399 is multiple: Ba,Bb 12.4 14.5            : B     2.4 0.004" 189.0, dT = -0.01sec : Aa,Ab 5.7 6.2 0.031" 117.8, dT = +0.04sec : AB 5.7 12.2
18.6" 264.9, dT = -38sec
       399 is a close double. Observations are highly desired
24 Sep 22  4 55 53.8 r   75990cK0  7.5  6.9   77- 122     24  42  70S 234  14 247 +7.0 -5.8 +0.9+0.3 .464 -174.6       3 33 51.4  23 49 52 366.0 827.9
     75990 is double: ** 8.4 8.4 0.10"  85.0, dT = +0.18sec
     75990 has been reported as non-instantaneous (OCc 773). Observations are highly desired
24 Sep 22  7 11 19.6 r     522 G5  7.8  7.1   76- 121     37  11  54S 218  28 230 +6.6 -6.1 +1.4+1.3 .360 -156.5       3 37 43.5  24 15 33 365.2 695.4
24 Sep 22  8 24 31.0 r   76046cA0  7.1  7.1   76- 121     36 350  69N 275 104 287 +6.4 -6.2 +2.7+0.1 .332  151.4       3 39  6.7  24 42 10 365.6 670.3
     76046 is double: AB 7.1            45.0, dT = -20sec
24 Sep 22  9 41  1.8 r   76081 K2  7.5  6.9   75- 120  -6 31 331  40N 304 152 316 +6.2 -6.2 +2.4-0.7 .237  127.8       3 41 18.1  25  0 29 366.4 688.1
24 Sep 24  6 37 35.9 R     850cB2  6.0  5.9v  55-  96     18  41  88N 269  47 271 +8.3 -7.3 +1.5-0.8 .405  166.1       5 39 18.3  29 12 55 378.5 766.9
       850 is double: ** 6.2 8.2
       850 = V0433 Aur, 6.02 to 6.06, Hp, Type SPB:, Period 4.6382 days, Phase  90%
24 Sep 24  6 46 56.4 r   77381 K0  7.0  6.4   55-  96     19  40  12S 190 330 192 +8.3 -7.4 -1.1+3.2 .170 -114.4       5 40 35.8  28 58 37 378.4 754.4
24 Sep 24  7 35 59.4 r   77394WA   7.1  7.2   55-  95     25  31  44N 314 103 315 +8.2 -7.4 +3.4-2.8 .209  123.5       5 41 21.5  29 29 40 378.0 694.9
     77394 is double: BA 7.1 6.4 25.4" 193.8, dT = +61sec
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Sep 24  7 36 55.3 R     855WB8  6.4  6.4e  55-  95     25  30  47N 311 100 313 +8.2 -7.4 +3.2-2.6 .223  126.0      5 41 21.0  29 29 15 378.0 693.8
       855 is double: AB 6.4 7.1 25.4"  13.8, dT = -53sec
       855 = HIP 26781, 5.93, range 0.02, H1, Type EA, Period 0.674 days, Phase  54%
24 Sep 24  8 48 22.7 R     864 K1  6.6  6.1   54-  95     31  15  45S 223  28 224 +7.9 -7.5 +1.9+1.2 .269 -141.0      5 43 22.8  29 12  1 377.7 634.5
24 Sep 25  9 22 40.8 R    1032 K4  5.4  4.7   43-  82  -9 30  20  51S 237  36 232 +8.0 -7.6 +2.2+0.6 .273 -144.7 .01  6 44 45.5  28 58 15 383.5 622.3
   R1032 = 28 Geminorum
24 Sep 27  9  8 22.2 R    1283 A0  7.0  7.0   24-  59 -12 19  48  55S 253  27 239 +7.3 -6.7 +1.4-0.4 .312 -148.7      8 36  2.5  24  3  4 394.0 698.5
24 Oct  5 23 22 50.5 D  158880cF2  7.5  7.3    9+  34     19 257  48N  70 316  54 -5.0 +4.4 +0.2+1.9 .362   34.4     14 53 40.1 -19 58 21 401.0 853.8
24 Oct  6  0 10 38.7 D    2129 K0  7.4  6.8    9+  34     10 252  37N  59 302  43 -5.0 +4.4 -0.4+2.3 .344   44.1     14 55  5.7 -20  0 49 402.0 933.8
24 Oct  6 21 27 26.6 d    2237cK3  5.0  4.3s  14+  44  11 55 268  79N  97 351  85 -5.7 +5.4 +2.1+0.5 .331    8.7     15 40 16.9 -23 49  5 395.5 642.9
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.23sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Oct  6 22 51  7.1 r    2237cK3  5.0  4.3s  15+  45  -8 37 260 -89N 288 180 276 -5.9 +5.4 +1.3+0.3 .383  171.8     15 40 16.9 -23 49  5 396.8 743.7
   R2237 = 42 Librae
      2237 is double: ** 5.2 6.8 0.08"  90.1, dT = +0.19sec
      2237 has been reported as non-instantaneous (OCc1681). Observations are highly desired
      2237 = NSV 20363, 4.94 to 5.02, V
24 Oct  7 13 40 20.1 D    2349SB1  2.9     v  20+  53  49 14 112  72N  85 200  76 -5.1 +5.5 +0.1-0.8 .471   27.2     16 21 11.3 -25 35 34 397.11021.4
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 343.5, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 206.4, dT = -0.47sec : AB 2.9 8.4 20.2" 273.1, dT = -42sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase   9%
24 Oct  7 14 32 36.1 r    2349SB1  2.9     v  20+  54  59 24 107 -52N 321  72 312 -5.1 +5.6 -0.3-2.1 .432  152.7     16 21 11.3 -25 35 34 395.9 933.8
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.004" 343.5, dT = -0.01sec : Aa,Ab 3.06 5.24 0.42" 206.4, dT = +0.4sec : AB 2.9 8.4 20.2" 273.1, dT = -31sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase   9%
24 Oct  7 18 29 55.8 D    2366dM1  1.1  0.1v  21+  55  49 75  88  72N  84 184  76 -5.8 +6.0 +2.9-0.1 .288   28.8 .15 16 29 24.5 -26 25 55 391.8 625.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  54%
24 Oct  7 19 56 31.0 R    2366dM1  1.1  0.1v  22+  55  31 86 291 -55N 317 203 309 -6.1 +6.1 +2.3-2.6 .269  150.7 .16 16 29 24.5 -26 25 55 391.3 585.1
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  54%
24 Oct  8  0 46 43.0 d    2389kB9  8.4  8.4   23+  57     25 251  53S 138  28 131 -7.0 +6.1 +1.4-1.1 .297  -48.9     16 38 36.3 -26 59 22 394.3 864.6
24 Oct  8 17 15  4.1 d    2505 K4  5.3  4.5   30+  66  62 47 102  86S 100 202  97 -6.1 +6.5 +1.3-1.3 .396    7.7     17 23 21.6 -28  8 34 389.4 754.4
   R2505 = 43 Ophiuchi
24 Oct  9  0 52 10.8 d  185524kK1  8.5  7.8   32+  68     35 254  60N  64 318  62 -7.6 +6.5 +0.5+1.8 .412   17.7     17 35 10.4 -28 12 13 389.0 816.4
24 Oct  9  2 22 36.5 D  185573 K5  6.8  5.8s  32+  69     17 247  45N  49 296  47 -7.7 +6.4 -0.5+2.0 .430   32.7     17 38 12.0 -28  2 48 390.5 969.1
    185573 = NSV 23046, 6.83, range 0.01, 8V, Type VAR, Period 1.18268 days
24 Oct  9 23 52 34.0 d  186922cG0  8.4  8.1   41+  80     59 261  73S 104   6 107 -7.7 +6.8 +2.3+0.1 .327  -28.6     18 31 53.4 -28 30 40 382.4 690.9
    186922 is double: AB 8.7 10.3 0.8"   7.7, dT = -0.29sec
    186922 is a close double. Observations are highly desired
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

```
       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct 10 22 56 46.7 D    2848pK1  5.6  4.9   52+  92  -8 83 278  89N  81 339  89 -7.4 +6.6 +2.5+0.7 .342   -9.4     19 29 52.2 -26 59  8 376.3 632.8
      2848 is double: AB 5.6 8.8 7.6" 144.1, dT = +10sec
      2848 is a close double. Observations are highly desired
24 Oct 11 22 58 35.4 D    2985SK2  6.8  6.2   63+ 105  -9 83  53  60S 105 235 118 -6.9 +6.0 +3.1-1.1 .276  -40.2     20 28 44.2 -23 59  2 370.4 649.9
      2985 is triple: ** 7.7 7.7 0.10"  90.0, dT = +0.35sec : AB 6.8      10.1"  40.0, dT = +16sec
      2985 has been reported as non-instantaneous (OCc1595). Observations are highly desired
24 Oct 11 23 10 47   M    2984cG6  7.1  6.6   63+ 105 -11 85  32  11S 154 303 167 -6.9 +6.0 +9.9+9.9 .000  -90.0     20 28 29.3 -24  9 48 370.3 652.1
      2984 is double: AB 6.9      0.20"  81.0
      2984 is a close double. Observations are highly desired
24 Oct 12  2 30 45.8 d    3000 M4  8.2  7.3v  64+ 106     48 266  69S  96 349 109 -7.5 +5.7 +1.8+0.7 .369  -36.3     20 34  7.6 -23 14 59 371.1 824.9
   R3000 = AK Capricorni
      3000 = AK Cap, 8.04, range 0.44, V, Type LB, Period 90.759079 days, Phase  10%
24 Oct 12  4 42  6.6 d    3009 F5  7.4  7.2   64+ 107     20 255  42N  26 273  40 -7.6 +5.4 -0.5+2.2 .450   37.1     20 37 43.4 -22 26 34 373.11020.4
24 Oct 12 23 44 39.7 d    3140 K1  7.8  7.0s  73+ 118     78  40  88N  68 211  85 -6.1 +5.0 +2.3+0.8 .380  -11.3     21 27  3.1 -19  3 29 364.5 685.9
      3140 = NSV 25600, 7.86 to 7.95, Hp
24 Oct 14  1 23 18.3 d  165053 K2  7.8  7.1   84+ 132     74 347  46S 110 302 130 -5.0 +3.5 +4.3-1.6 .207  -60.4     22 24 44.1 -12 57 28 359.0 731.8
24 Oct 16  2 15  6.4 d      24 K0  6.8  6.1   97+ 161     59  18  36S 121 286 143 -1.3 -0.1 +6.7-4.6 .120  -74.5      0 13 47.6   1 23  1 352.6 769.4
   Distance of 24 to Terminator = 19.0"; to 3km sunlit peak = 7.7"
24 Oct 16 22 51 46.3 D     146cK0  4.3  3.8  100+ 173  -7 13  74  75N  62 183  83 +1.0 -1.4 +0.4+0.0 .585   -5.9      1  2 56.6   7 53 24 355.81015.3
   R146 = epsilon Piscium
   Distance of 146 to Terminator = 5.7"; to 3km sunlit peak = 0.0"
24 Oct 18  1  9 36.5 r     297cK0  6.5  5.9   99- 171     25  55  62S 205 337 224 +3.1 -3.4 +0.2+1.3 .465 -151.4      2  1 50.4  15  4  2 355.5 913.9
       297 is double: ** 7.6 7.6 0.10"  37.0, dT = +0.21sec
       297 has been reported as non-instantaneous (OCc 729). Observations are highly desired
   Distance of 297 to Terminator = 9.7"; to 3km sunlit peak = 1.8"
24 Oct 19  3  9 22.7 r   75715cK0  7.3  6.7   96- 156     30  38  64S 219   3 233 +4.9 -5.2 +0.7+0.9 .451 -162.1      3  4 15.2  21 28 22 358.2 823.8
     75715 is double: ** 8.2 8.2 0.10" 222.0, dT = -0.22sec
     75715 has been reported as non-instantaneous (OCc 751). Observations are highly desired
24 Oct 20  3 58 36.7 r   76472cG8  7.2  6.5   89- 142     25  37  13S 176 319 186 +6.5 -6.4 -1.7+4.0 .172 -112.3      4  8 39.0  25 52 40 363.5 801.8
   Distance of 76472 to Terminator = 14.4"; to 3km sunlit peak = 3.3"
24 Oct 20  6  2  5.5 R     616 F2  5.4  5.2v  89- 141     35   8  81N 263  75 272 +6.2 -6.6 +2.4+0.0 .378  165.0      4 10 49.9  26 28 51 362.9 689.4
   R616 = 44 Tauri (IM)
       616 = IM Tau, 5.33 to 5.46, V, Type DSCT, Period 0.14497 days, Phase  36%
24 Oct 21  7 29 39.0 R     788 F0  6.8  6.4   80- 127     33   1  79S 251  69 254 +7.2 -7.4 +2.4+0.5 .354 -169.7      5 17 15.5  28 54 18 369.2 645.0
24 Oct 21  7 47  1.0 r   77089 A*  7.3  7.1   80- 127     33 357  40S 211  34 215 +7.2 -7.4 +2.2+2.2 .226 -129.0      5 18 15.4  28 46 48 369.3 643.1
24 Oct 22  4  6 55   m     948 G8  4.3  3.8   71- 115      5  53   9N 350 116 348 +8.5 -7.4 +9.9+9.9 .000   90.0      6 15 22.7  29 29 53 377.5 876.6
   R948 = kappa Aurigae
24 Oct 22  4  7 20   Gr    948 G8  4.3  3.8   71- 115      6 ** GRAZE: CA  9.1N; Dist. 67km in az. 145deg. [Lat =-28.98+0.62(E.Long+63.95)]
24 Oct 22  7 45 46.7 R     968cA1  6.4        70- 114     31  12  59N 301 109 299 +7.9 -7.6 +2.7-1.2 .296  148.9      6 21 11.9  29 32 27 375.7 630.2
       968 is double: AB 6.54 9.03 0.069" 126.8, dT = +0.23sec
       968 is a close double. Observations are highly desired
24 Oct 22  7 47  0.3 r     967 F0  7.0  6.8   70- 114     31  12  83S 263  71 261 +7.9 -7.6 +2.5-0.1 .343 -173.1      6 21  4.1  29 22 18 375.7 629.7
24 Oct 23  6 56 43.0 r   79295 A2  7.2  7.1   60- 102     23  36  90N 277  61 270 +8.4 -7.4 +2.0-1.0 .366  176.3      7 20 22.8  28  7 20 382.6 680.1
24 Oct 23  9  0 57.1 r   79358 K2  7.7  7.0   60- 101  -7 34   8  35S 222  34 214 +7.9 -7.4 +3.5+2.4 .157 -118.5      7 23 56.5  27 47 40 382.0 610.0
24 Oct 23  9  7  2.4 D    1122cG9  3.8  3.3   60- 101  -6 34   7 -53S 135 308 127 +7.9 -7.4 +2.3-1.5 .284  -30.5 .01  7 25 43.6  27 47 53 382.1 609.7
   R1122 = iota Geminorum
24 Oct 23 10 30 13.3 R    1122cG9  3.8  3.3   59- 101  12 33 345  72S 260  95 252 +7.6 -7.3 +2.9+0.7 .298 -149.9 .01  7 25 43.6  27 47 53 382.5 639.0
   R1122 = iota Geminorum
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time      P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B   m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Oct 24  9 12 17.7 r    1252cK3  7.3  6.5   49-  89  -5 34  20  52N 322 122 309 +7.7 -6.9 +2.2-2.0 .278  149.0      8 20 41.0  25 20 11 387.8 610.7
      1252 is double: ** 8.2 8.2 0.10"  90.0, dT = +0.22sec
      1252 has been reported as non-instantaneous (OCc  99). Observations are highly desired
24 Nov  3 23 55 36.7 d  184361kA2  9.7  9.5    5+  27     10 246  75S 123   6 114 -5.7 +5.8 +0.4-0.1 .436  -31.7     16 24  5.9 -26  7 53 397.0 985.8
24 Nov  4  0 12 25   m  184356pA0  8.9  8.8    5+  27      7 244  17S 181  63 172 -5.7 +5.8 +9.9+9.9 .000  -90.0     16 23 47.2 -26 16 16 397.31016.2
    184356 is double: AB 8.0 15.7 11.4" 273.0
24 Nov  5  0 13 57.7 d  185274kA2  8.7  8.6   11+  38     18 247  63N  73 320  69 -6.4 +6.3 -0.1+1.4 .490   11.2     17 20  7.5 -27 46 23 393.0 953.0
24 Nov  5 18 33 18.9 d    2617cK0  4.6  4.1   17+  48  52 79  95  56N  60 151  60 -5.8 +6.7 +2.9+1.5 .268   33.5     18  8  5.0 -28 27 26 386.0 602.0
      2617 is double: AB 5.1 5.9 0.26"  12.0, dT = +0.7sec
      2617 is a close double. Observations are highly desired
24 Nov  5 23 31  4   M  186536cA3  7.5  7.4   18+  50 -12 38 254  16S 166  61 168 -6.8 +6.5 +9.9+9.9 .000  -90.0     18 15 13.5 -28 36 49 387.6 822.5
    186536 is double: ** 8.8 8.8 0.10"  90.0
    186536 has been reported as non-instantaneous (OCc 151). Observations are highly desired
24 Nov  5 23 42 50.8 d  186569dK0  8.9  8.3   18+  50     35 254  82N  84 338  86 -6.8 +6.5 +0.8+1.1 .442   -8.0     18 16 28.9 -28 18 19 387.7 840.2
    186569 is double: AB 9.0 13.3 9.0" 151.2, dT = +8sec
    186569 is a close double. Observations are highly desired
24 Nov  5 23 44  0.5 d  186549 B8  8.3  8.4   18+  50     35 254  12N  14 268  16 -6.8 +6.5 -1.2+4.5 .210   62.0     18 15 39.0 -28  4 48 387.8 842.6
24 Nov  5 23 49 25.8 d  186560 A0  8.7  8.7   18+  50     34 253  28N  30 284  32 -6.8 +6.5 -0.4+3.0 .314   46.1     18 16  7.6 -28  5 51 387.9 851.1
24 Nov  6  0  9 54.9 D    2644cF8  6.4  6.1   18+  50     30 252  89N  92 344  93 -6.9 +6.5 +0.7+0.9 .453  -15.5     18 17 23.8 -28 17 20 388.2 884.5
      2644 is double: ** 7.1 7.1 0.10"  90.0, dT = +0.22sec
      2644 has been reported as non-instantaneous (OCc 168). Observations are highly desired
24 Nov  6  0 12 32.5 d  186596 K0  8.7  8.2   18+  50     29 252  85N  87 339  89 -6.9 +6.5 +0.6+1.0 .463  -10.9     18 17 29.4 -28 15 53 388.2 888.8
24 Nov  6  0 23 13.9 d  186599cA0  8.3  8.2   18+  50     27 251  50N  52 303  54 -6.9 +6.4 -0.1+2.0 .439   24.1     18 17 37.3 -28  6  2 388.4 906.7
    186599 is double: ** 9.4 9.4 0.10"  90.0, dT = +0.18sec
    186599 has been reported as non-instantaneous (OCc 119). Observations are highly desired
24 Nov  6  0 55 55.3 d  186635 B9  8.9  8.9   18+  50     20 248  88S  95 343  96 -6.9 +6.4 +0.4+0.8 .485  -18.0     18 19  3.2 -28 12 55 389.0 962.1
24 Nov  6  1 43 49.8 d  186680 A0  8.0  7.9   18+  51     11 244  88S  94 338  96 -6.9 +6.3 +0.0+0.8 .528  -16.9     18 20 55.7 -28  7  8 389.91043.7
24 Nov  6 18 37 18.7 D    2784cK1  3.3  2.7   25+  60  52 68  95  83N  79 176  85 -6.0 +6.7 +2.4+0.0 .339    6.2 .01 19  6 56.4 -27 40 14 382.4 632.4
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 306.0, dT = -0.02sec
24 Nov  6 20 11 54.4 r    2784cK1  3.3  2.7   25+  61  31 89  72 -88S 264  13 271 -6.3 +6.6 +2.7+0.3 .325  173.7 .01 19  6 56.4 -27 40 14 381.6 604.9
   R2784 = tau Sagittarii
      2784 is double: AB 4.2 4.2 0.009" 306.0, dT = -0.02sec
24 Nov  6 23 39 23.1 d  187861cA0  8.6  8.5   26+  62     47 259  55S 120  17 127 -7.0 +6.4 +2.5-0.6 .263  -51.5     19 14 29.5 -27 22 45 382.7 784.5
    187861 is double: ** 9.2 9.3 0.10"  36.3, dT = +0.04sec
    187861 has been reported as non-instantaneous (OCc 702). Observations are highly desired
24 Nov  6 23 41 44.2 d X 45671MA0  8.7  8.7   26+  62     47 259  68S 107   4 114 -7.0 +6.4 +1.9+0.2 .331  -38.8     19 14 39.6 -27 19 15 382.7 787.4
   X 45671 is triple: AB 8.7 9.4 2.3" 324.8, dT = -6sec : AC 8.7 10.5 63"  55.0, dT = +117sec
   X 45671 is a close double. Observations are highly desired
24 Nov  8  3  9 52.3 d  189132 K1  7.8  7.1   37+  75     14 250  66S 102 347 114 -7.1 +5.5 +0.3+0.6 .458  -36.6     20 18 54.6 -23 53 39 380.71054.4
24 Nov  8 23  6 52.5 d  190029 K0  8.2  7.6   47+  86  -6 75 298  68N  51 288  67 -6.4 +5.1 +1.7+1.9 .383    4.3     21  7 19.8 -20 29 59 372.2 693.9
24 Nov  9  0 28  4.1 D    3090 K0  6.7  6.2   47+  87     58 277  69N  52 301  68 -6.6 +5.0 +1.1+1.9 .424    2.8     21  9 15.4 -20 11 35 372.6 767.7
   R3090 = 26 Capricorni
24 Nov  9 23 12  7   M    3225SG8  7.2  6.6   58+  99  -7 77 347  18S 141 333 160 -5.6 +4.0 +9.9+9.9 .000  -90.0     22  1 32.9 -15 36 43 367.3 698.7
      3225 is quadruple: AB 7.2 10.3 9.1" 270.0 : AC 7.2 11.5 109" 291.1 : AD 7.2 9.9 181" 312.9
      3225 is a close double. Observations are highly desired
24 Nov 10  0 26 18.0 d  164837 K0  7.9  7.3   58+ 100     66 300  88N  68 300  87 -5.8 +3.8 +1.9+1.4 .398  -17.1     22  3 23.0 -14 57  6 367.4 741.2
24 Nov 10  1 43  4.2 d  164844 K5  7.4  6.6   59+ 100     50 282  38N  17 260  36 -6.0 +3.6 +0.2+2.8 .373   34.9     22  4 27.9 -14 26 49 368.1 812.9
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s    o  sec  h  m   s    o  m  s   Mm   m/s
24 Nov 10  3 22 43   M    3240 A2  6.7  6.6   59+ 101     29 269  13S 146  31 165 -6.2 +3.4 +9.9+9.9 .000  -90.0     22  7 35.3 -14 29 27 369.6 939.3
24 Nov 13  1 58 29.8 d  109393 A3  7.7  7.6V  89+ 141     55 347  69S  89 280 110 -1.9 -1.3 +2.9+0.2 .324  -41.6      0 42 32.8   5 40 31 356.4 748.8
    109393 = HD 3992, 7.70, , Type ACV, Period 0.9898 days, Phase  94%
24 Nov 13  5 22 58.7 D      98 G8  6.0  5.5   90+ 142     24 293  88N  67 302  88 -2.3 -1.7 +1.0+1.5 .497   -9.2      0 47 23.6   6 44 27 358.7 875.5
   R98 = 60 Piscium
24 Nov 14  0 51 39.2 d     230SA3  7.3  7.2   95+ 154     44  30  38N  21 174  41 +0.1 -2.8 +0.6+1.7 .403   28.2      1 34 51.6  12 33 31 355.8 789.0
   R230 = 100 Piscium
       230 is quadruple: AB 7.3 8.3 15.7"  76.7, dT = +22sec : AC 7.3 13.6 77" 312.1, dT = +68sec : AD 7.3 11.6 125"   8.0, dT = +301sec
24 Nov 15  1 21 57.8 d     375cA5  6.8  6.7   99+ 168     36  33  58N  58 207  75 +2.0 -4.5 +1.4+0.4 .463   -3.9      2 33 36.5  18 52 48 356.7 803.2
       375 is double: ** 7.6 7.6 0.10"  90.0, dT = +0.18sec
       375 has been reported as non-instantaneous (OCc1189). Observations are highly desired
   Distance of 375 to Terminator = 13.8"; to 3km sunlit peak = 4.5"
24 Nov 15  6 49 20.9 D     399SA0  5.7  5.8   99+ 170     20 308  67N  74 302  90 +1.3 -5.0 +1.3+1.3 .469   -4.4      2 42 21.9  20  0 41 358.5 817.9
   R399 = mu Arietis
       399 is multiple: Ba,Bb 12.4 14.5            : B     2.4 0.004" 189.0, dT = 0.00sec : Aa,Ab 5.7 6.2 0.025" 125.3, dT = +0.03sec : AB 5.7 12.2
18.6" 264.9, dT = -39sec
       399 is a close double. Observations are highly desired
   Distance of 399 to Terminator = 11.8"; to 3km sunlit peak = 3.1"
24 Nov 20  5 17 57.2 R    1189cA3  5.0  4.9   77- 122     21  41  35N 333 112 322 +7.8 -7.0 +2.4-3.2 .222  125.6      7 53 29.8  26 45 57 381.1 705.2
   R1189 = phi Geminorum
      1189 is double: AB 5.0      0.006"  18.8, dT = -0.02sec
24 Nov 20  5 49 23.5 r   79777 F9  7.6  7.3   77- 122     26  35  84N 284  69 273 +7.7 -7.0 +2.1-1.1 .364  176.9      7 53 45.2  26 33 51 380.8 673.2
24 Nov 20  7 20 19   m    1196 K1  7.6  7.1   76- 122     34  15  10S 198   3 187 +7.4 -6.9 +9.9+9.9 .000  -90.0      7 56 47.9  26  6 19 380.3 624.5
24 Nov 23  7 15 50.3 r   99149 A2  7.1  7.0   47-  87     27  56  60N 322  93 302 +6.0 -4.1 +1.3-2.4 .343  158.3     10 28 42.4  13 17 20 396.5 710.4
24 Nov 24  6  7 11.7 r  118702 K5  7.5  6.6s  38-  76      8  77  80S 284  44 262 +5.0 -2.8 +0.5-1.4 .429 -166.2     11 10 30.8   7 53 30 401.5 860.5
    118702 = NSV 18681, 7.56 to 7.62, Hp
24 Nov 24 13 55 10.4 d    1644 B9  4.1  4.1   36-  74  60 40 307 -74N  97 323  76 +3.4 -2.0 +2.1+0.6 .306   34.6     11 21  8.2   6  1 46 399.1 719.1
   R1644 = Shang Tseang = sigma Leo
24 Nov 24 14 59 52.3 R    1644 B9  4.1  4.1   36-  74  74 27 294  40N 343 217 321 +3.2 -1.9 +0.2-2.0 .334  145.3     11 21  8.2   6  1 46 400.4 788.3
   R1644 = Shang Tseang = sigma Leo
24 Nov 26  6 49 38.3 r  138861kK5  7.9  7.2   21-  54      6  91  81S 285  43 263 +2.2 -0.1 +0.1-1.4 .465 -164.0     12 35 27.6 - 3 32 46 404.6 949.1
24 Nov 27  7 42 36.5 r  139282kK0  8.6  8.1   14-  43     11  94  46N 335  92 314 +0.7 +1.3 -0.2-2.3 .408  147.1     13 19 47.5 - 9  6 20 403.7 951.4
24 Nov 28  8 48 47.2 r  158333kG6  7.2  6.7    8-  32  -5 19  97  57S 253   8 235 -0.7 +2.7 +0.8-0.6 .314 -130.9     14  5 13.0 -14 51 25 401.5 934.8
24 Dec  3  0 10 10.0 D    2601SK4  6.8         3+  20      5 241  33N  46 286  46 -5.8 +6.1 -0.8+1.7 .478   34.3     18  2 54.3 -27 49 36 390.11096.1
   R2601 = 7 Sagittarii
      2601 is triple: Aa,Ab 6.90 9.37 0.33" 345.0, dT = +0.34sec : AB 6.9 13.0 9.7"  47.7, dT = +20sec
      2601 is a close double. Observations are highly desired
24 Dec  6  0  9 29.2 d  189827 A3  8.0  7.9   22+  56     36 264  54N  40 290  55 -5.6 +4.8 +0.2+2.1 .464   18.5     20 54 43.6 -20 56 58 377.0 895.6
24 Dec  6  2 20 33.0 d    3068cG2  8.2  7.9   23+  57      8 251  73N  58 301  74 -5.7 +4.5 -0.3+1.4 .593    5.2     20 59 24.3 -20 26 40 379.51095.6
      3068 is double: ** 7.9 10.4 0.047" 326.0, dT = 0.00sec
      3068 has been reported as non-instantaneous (OCc 668). Observations are highly desired
24 Dec  6 23 27 58.1 D    3190SA5  2.9  2.8e  32+  68  -6 54 281  40N  21 265  40 -5.1 +3.8 +0.3+2.7 .374   31.2     21 47  2.4 -16  7 38 372.4 788.9
   R3190 = Deneb Algedi = delta Capricorni
      3190 is triple: AB 2.9 15.0 45"  51.0, dT = +104sec : AC 2.9 13.1 168" 306.1, dT = +115sec
      3190 = del Cap, 2.81 to 3.05, V, Type EA, Period 1.0227688 days, Phase   8%
24 Dec  6 23 48  4.2 d  164659 G3  8.1  7.7   32+  69 -10 49 278  57N  39 284  57 -5.1 +3.8 +0.7+2.2 .435   14.3     21 47 50.3 -16  4 47 372.7 811.1
24 Dec  7  0 27 30.8 R    3190SA5  2.9  2.8e  32+  69     41 273 -76N 265 152 284 -5.2 +3.7 +1.3+1.1 .408  148.9     21 47  2.4 -16  7 38 373.3 861.4
   R3190 = Deneb Algedi = delta Capricorni
```

Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s        No  D    v    r V  ill     Alt Alt Az   o    o   o   o   L    B  m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      3190 is triple: AB 2.9 15.0 45"  51.0, dT = +91sec : AC 2.9 13.1 168" 306.1, dT = -312sec
      3190 = del Cap, 2.81 to 3.05, V, Type EA, Period 1.0227688 days, Phase   8%
24 Dec  7 23 54 36.7 d  165215KG0  8.2  7.9   43+  81 -11 55 295  17N 356 230  16 -4.5 +2.4 -0.6+3.7 .257   53.6     22 38 57.6 -10  6  8 369.1 774.3
24 Dec  8  0 10 41.3 D    3324KG0  6.9  6.6   43+  81     52 291  14N 353 229  13 -4.5 +2.4 -0.8+3.9 .239   57.1     22 39 16.0 -10  1 40 369.3 788.8
   R3324 = 64 Aquarii
24 Dec  9  1 58 36.2 d    3470kA0  7.1  7.0   55+  95     36 288  53N  30 267  51 -3.9 +0.5 +0.6+2.3 .436   22.8     23 32 55.4 - 3  1  0 367.4 843.5
24 Dec  9 23 20 26.2 d      40 M0  7.5  6.7v  65+ 108  -4 59   0  64N  41 221  63 -2.4 -0.7 +1.5+1.6 .412    4.9      0 20  9.5   3  2  1 363.3 728.0
        40 = BZ Psc, 7.563, range 0.08, 4w, Type SRB:, Period 19.1 days, Phase  87%
24 Dec 10  2  9  9.0 d  109180SK0  7.9  7.4   66+ 109     39 302  82N  59 287  81 -2.8 -1.1 +1.4+1.7 .446   -6.5      0 23 57.0   3 45 40 364.5 793.9
    109180 is triple: **Aa,Ab 8.8 8.8 0.10"  35.0, dT = +0.21sec : AB 8.9 13.0 50" 290.1, dT = -70sec
    109180 has been reported as non-instantaneous (OCc 951). Observations are highly desired
24 Dec 10  3 49 47   m      53wB8  6.9  7.0v  66+ 109     19 285   9S 148  27 170 -3.0 -1.3 +9.9+9.9 .000  -90.0      0 26 16.5   3 49 33 366.3 905.7
        53 is double: AB 6.9 12.6 61" 171.2
        53 = CF Psc, 6.84 to 6.87, Hp, Type SPB, Period 1.66523 days, Phase  39%
24 Dec 12 23 23 23.3 d   75715cK0  7.3  6.7   92+ 148  -4 29  40  64S 107 249 122 +1.8 -5.2 +2.6-1.7 .300  -50.1      3  4 15.2  21 28 22 362.4 822.9
     75715 is double: ** 8.2 8.2 0.10" 222.0, dT = -0.14sec
     75715 has been reported as non-instantaneous (OCc 751). Observations are highly desired
24 Dec 13  5 48 19.5 d     470WK0  6.8  6.2   93+ 150     15 307  49N  42 272  56 +0.9 -5.8 +1.5+2.1 .388   33.5      3 14 17.2  22 57 14 364.0 822.0
       470 is double: AB 6.9 10.4 42"  33.4, dT = +106sec
24 Dec 14  1 23 22   m   76472cG8  7.2  6.5   98+ 162     32  24  30S 155 312 165 +3.1 -6.5 +9.9+9.9 .000  -90.0      4  8 39.0  25 52 40 363.4 735.9
   Distance of 76472 to Terminator = 12.1"; to 3km sunlit peak = 3.1"
24 Dec 14  2 26 37.4 D     616 F2  5.4  5.2v  98+ 162     35   8  51N  57 230  67 +2.9 -6.6 +1.9+0.7 .386   10.7      4 10 49.9  26 28 51 363.2 691.1
   R616 = 44 Tauri (IM)
       616 = IM Tau, 5.33 to 5.46, V, Type DSCT, Period 0.14497 days, Phase  88%
24 Dec 15  8 21 43.9 D     810SB7  1.7  1.7  100+ 174 -11  7 307  55N 131   4 134 +3.5 -7.1 +0.1-0.3 .411  -34.1      5 26 17.5  28 36 27 369.6 888.8
   R810 = El Nath = beta Tauri
       810 is multiple: AC 1.9 19.0 8.4" 357.0, dT = -14sec : AD 1.9 18.5 9.8"  70.0, dT = +12sec : AE 1.9      10.9"  80.0, dT = +17sec : AF 1.9
15.8 11.6" 296.0, dT = -27sec
       810 is a close double. Observations are highly desired
   Distance of 810 to Terminator = 3.1"; to 3km sunlit peak = 0.0"
24 Dec 17  3 36 10.7 d    1122cG9  3.8  3.3   96- 156     25  34 -67N  62 208  54 +6.2 -7.0 +1.7+0.1 .318   33.6      7 25 43.6  27 47 53 375.5 694.6
   R1122 = iota Geminorum
24 Dec 17  4 15 24.1 R    1119 F0  5.8  5.6V  96- 156     29  26  87N 269  63 261 +6.1 -7.1 +2.3-0.5 .359 -170.4      7 24 33.5  27 38 16 375.2 662.3
   R1119 = 59 Geminorum
      1119 = HD 57927, 5.77, , Type DSCT
24 Dec 17  4 46 20.0 R    1122cG9  3.8  3.3   96- 156     32  19  42N 314 116 306 +6.0 -7.0 +2.4-1.7 .297  146.6 .01  7 25 43.6  27 47 53 375.1 646.5
   R1122 = iota Geminorum
24 Dec 17  6  1 59.6 r   79402 B8  7.3  6.9   95- 155     35 359  40S 217  37 208 +5.8 -7.0 +4.5+4.0 .118 -109.6      7 27 48.9  27 17 33 375.1 641.4
24 Dec 17  6 47 59.6 R    1132cK2  6.4  5.7   95- 155     33 347  56N 301 133 292 +5.6 -7.0 +2.0-0.6 .357  169.4      7 28 39.9  27 33 11 375.4 661.6
      1132 is double: ** 7.4 7.4 0.10"  90.0, dT = +0.24sec
      1132 has been reported as non-instantaneous (OCc 157). Observations are highly desired
24 Dec 18  6 16 49.1 r    1263DF0  6.9  6.8S  90- 143     37  11  47N 320 130 307 +6.2 -6.3 +1.9-1.7 .310  154.2      8 26 39.8  24 32  3 380.2 634.6
   R1263 = 24 Cancri
      1263 is double: A,BC 6.9 7.5 5.7"  51.8, dT = +0.44sec
      1263 is a close double. Observations are highly desired
      1263 = NSV 4076, 6.51, , Type CST
24 Dec 18  7 57 38.9 R    1270cF0  6.1  5.9v  90- 142     36 343  78N 290 126 276 +5.8 -6.2 +2.1-0.3 .360 -169.5      8 28 36.8  24  8 42 380.7 675.7
   R1270 = 28 Cancri (CX)
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Occultation prediction for Observatorio Ofiuco,Argentina
E. Longitude - 63 57 0.0, Latitude -28 15 0.0, Alt. 128m; Telescope dia 15cm; dMag 0.0

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       day  Time     P   Star  Sp  Mag  Mag    % Elon Sun  Moon   CA   PA  VA  AA Libration   A   B   RV    Cct durn  R.A. (J2000)  Dec   Mdist   SV
 y   m  d  h  m   s       No  D    v    r V  ill     Alt Alt Az   o    o   o   o  L    B   m/o m/o  "/s     o  sec  h  m   s    o  m  s   Mm   m/s
      1270 is double: ** 6.9 6.9 0.050"
      1270 has been reported as non-instantaneous (OCc1387). Observations are highly desired
      1270 = CX Cnc, 6.1, range 0.02, 5V, Type DSCTC, Period 0.096 days
24 Dec 20  5  9 35.8 r    1485 G0  7.1  6.8   75- 120     26  55  61S 260  31 240 +5.9 -4.3 +1.8-0.7 .296 -141.5     10  7 39.3  15  9 27 391.3 719.1
24 Dec 25  5 50 49.7 R    1971SG8  5.5        28-  64      7 101  25N 355 113 336 -0.1 +2.4 -0.6-2.9 .292  124.7     13 45 56.3 -12 25 36 403.21002.7
   R1971 = 86 Virginis
      1971 is triple: AB 5.66 8.47 0.88" 305.2, dT = -1.9sec : AC 5.7 11.9 27.4" 162.6, dT = +91sec
      1971 is a close double. Observations are highly desired
24 Dec 25  8 30 45.4 r  158190 M1  7.5  6.6   28-  63 -10 41  83   9N  11 127 352 -0.4 +2.7 -1.4-4.4 .184  117.2     13 50 20.9 -13  6 37 399.6 780.3
24 Dec 26  6 50 10.9 r    2081 A2  8.5  8.4   20-  53     13 104  44S 240 355 223 -1.4 +3.6 +0.8+0.1 .257 -120.1     14 32 21.8 -17 52 52 400.7 995.3
24 Dec 27  8 23 59.4 r  183431kK0  9.0  8.5   12-  41 -11 25 103  61S 251   3 238 -2.5 +4.8 +1.0-0.4 .329 -132.8     15 23 53.3 -22 21  7 396.5 932.3
24 Dec 27  8 29 32.4 R    2204kK0  7.7  7.1   12-  41 -10 26 103  17N 353 105 340 -2.5 +4.8 -1.0-3.2 .278  125.3     15 24 57.6 -22  2 37 396.4 923.9
24 Dec 28  7 30 40   Gr   2332wB8  6.1  6.0V   7-  31      7 ** GRAZE: CA 16.9S; Dist.187km in az. 214deg. [Lat =-30.27-0.58(E.Long+63.95)]
24 Dec 28  7 38  2.2 R    2332wB8  6.1  6.0V   7-  30      7 115  39S 222 340 213 -3.3 +5.4 +1.0+1.2 .207 -111.3     16 14 53.4 -25 28 37 395.11088.1
      2332 is double: AB 6.1 9.9 46"  35.7, dT = +222sec
      2332 = HD 146001, 6.06, , Type ACV, Period 3.9146 days, Phase  28%
24 Dec 28  7 54 49.0 R  184267KG8  7.7  7.3    7-  30     10 113  30N 333  89 323 -3.3 +5.4 -0.8-2.1 .415  138.4     16 15 46.9 -25  7 18 394.71060.8
24 Dec 28  8 23 12.4 r  184279pA2  8.9  8.7    7-  30 -12 15 111  36N 327  81 318 -3.3 +5.5 -0.6-2.1 .436  145.1     16 16 44.3 -25 13 45 394.01015.2
    184279 is double: AB 8.9 13.1 12.9"  34.0, dT = -12sec
24 Dec 28  9 47 59.3 D    2349SB1  2.9     v   6-  29   5 32 104 -58N  60 168  51 -3.4 +5.6 +1.8+0.3 .272   54.1     16 21 11.3 -25 35 34 392.1 881.4
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.003" 134.5, dT = 0.00sec : Aa,Ab 3.06 5.24 0.42" 206.0, dT = -1.3sec : AB 2.9 8.4 20.2" 273.1, dT = -62sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  61%
24 Dec 28 10  0  9   Gr   2349SB1  2.9     v   6-  29   5 35 ** GRAZE: CA-23.1N; Dist.380km in az.  40deg. [Lat =-23.77-0.75(E.Long+63.95)]
24 Dec 28 10 27 35.0 R    2349SB1  2.9     v   6-  29  13 41 101  13N 349  95 340 -3.4 +5.7 -0.8-3.7 .253  125.9     16 21 11.3 -25 35 34 391.2 819.1
   R2349 = Al Niyat = sigma Scorpii
      2349 is quadruple: Aa1,2 3.3 4.1 0.003" 134.5, dT = +0.01sec : Aa,Ab 3.06 5.24 0.42" 206.0, dT = +1.3sec : AB 2.9 8.4 20.2" 273.1, dT = -20sec
      2349 is a close double. Observations are highly desired
      2349 = sig Sco, 2.86 to 2.94, V, Type BCEP, Period 0.246839 days, Phase  61%
24 Dec 28 15 10  1.7 D    2366dM1  1.1  0.1v   6-  28  74 78 275 -81N  81 340  72 -4.4 +6.1 +2.8+0.9 .293   22.8 .15 16 29 24.5 -26 25 55 388.4 599.4
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -8sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  58%
24 Dec 28 16 38 15.1 R    2366dM1  1.1  0.1v   6-  27  83 58 264  60N 299 198 291 -4.7 +6.1 +2.3-0.7 .319  157.5 .14 16 29 24.5 -26 25 55 389.0 652.4
   R2366 = Antares = alpha Scorpii
      2366 is double: AB 1.0 5.4 2.5" 277.8, dT = -7sec
      2366 is a close double. Observations are highly desired
      2366 = alf Sco, 0.75 to 1.21, V, Type SRC, Period 2180. days, Phase  58%
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