GRAND CANYON STAR PARTY

by Dean Ketelsen
from the Feb. SACNEWS

For four years now, the Tucson Amateur Astronomy Association (TAAA) has been going to the canyon in the June dark-of-the-moon for what has to be one of the largest public star parties.

The objective of the star party is to maintain an astronomical presence there for two weekends and the week in between. The first year, in 1991, we had seven TAAA members spread out thinly, but we had enthusiastic crowds and have grown every year. In June of 1993, we had over 25 amateurs showing the sky to thousands of canyon visitors.

The concept is simple and lots of fun. The canyon has millions of visitors yearly, though only about 10% stay overnight. The mostly international crowd is always surprised to see us there, but as is mostly the case, the unexpected pleasures are the most treasured. We have been showered with gratitude on every return.

In 1994 the viewing was dominated by Jupiter, and of course the galaxies of the spring sky highlighted by the Milky Way. We had an incredible 8 clear nights in a row—the second year in a row—a record I would like to see any other star party match. In addition the seeing is amazingly good for being so close to a mile deep trench!

The dates for 1995 are **June 17-24**, and if you are interested in attending and want a real bed to sleep in, you haven't a moment to lose. June is the Grand Canyon National Park's busiest time, and it is never too early to book a room. Most hotels fill up 3-4 months in advance so you need to act now. Camping is a different story, as sites are available days before your visit. Refer to the phone list below for hotels and camping. The TAAA charges no registration fee—just take care of a place to stay and let us know you are coming (you need to sign liability waivers for TAAA and the National Park Service.)

Come join us and have a great time, but be prepared to be exhausted, because with the canyon calling by day and the incredible skies by night, who has time to sleep?

- Housing: For reservations at any of the motels or lodges at the South Rim or for the Trailer Village (camping trailers or RVs) call Fred Harvey Inc. at (602) 638-2401 as soon as you make your plans! Expect long telephone waits while making your reservations. If you can tolerate a 7 mile drive, you can also try the following motels at Tusayan (all area code 602): Squire Inn 638-3515, Moqui Lodge 638-2424, Quality Inn 638-2673, Red Feather Inn 638-2414, or the 7 Mile Lodge 638-2291.
- Camping: To make reservations for campsites at the regular rates ($10.00 per night), call MISTIX at 1-800-365-2267, no more than 8 weeks ahead.

For questions concerning the Grand Canyon Star Party, please call or write to me at:
1122 E. Greenlee Place, Tucson, AZ 85719.
Home phone (602) 293-2855 or
E-mail to ketelsen@as.arizona.edu.

Editor note: The entrance fee to the Park is waived for participants. Dean says they also give a few of the $10.00 campsites to participants. He will take names for this list after March 1st. You can also find peaceful camping in the Kaibab National Forest about 10 miles south of Tusayan (provided by your tax dollars). Lastly, the area code changes for **all** Arizona locations except Phoenix on March 19th from 602 to 520.

UPDATE YOUR STAR CHARTS

Many star charts depict Polaris as a variable star, but as of last year, this Cepheid variable star no longer pulsates! An excellent article on stellar evolution and this recent development appears in the March issue of *Astronomy*.

For those interested in optical quality of telescopes, two articles on the subject appear in the March issue of *Sky&Telescope*. Those wanting a closer look at Dick Suiter's new book on star testing telescopes as reviewed in the magazine can look through my copy at the upcoming meeting. See you then. (Editor)

ASTRONOMY NETWORK NEWS

The *Astronomy Network News* has ceased publication and is no longer uploaded to Compuserve or other online sevices. Issue #15 was the last one.

MARCH NEWSLETTER

Deadline is March 7th for material to be included in the next newsletter. Look for details from Don Wrigley on LED flashlights and a poem from Don Farley. Please submit your thoughts and stories to:

Sam Herchak
145 S. Norfolk Cir
Mesa, AZ 85206-1123
76627.3322@compuserve.com

The Deep Sky Notebook

by Robert Kerwin

Deep Sky "Doubles" in the Winter Sky

It's a given fact that two of anything are almost always more exciting than one. This is certainly true to the amateur astronomer. Without question, the Double Cluster is standard fare during fall and winter star parties and is sure to elicit a few "oohs and ahs" from even non-astronomers. Furthermore, what observer hasn't been thrilled by the sight of a close planetary conjunction or the passage of a planet close to a star? Fortunately, the winter sky offers some good examples of close pairings of deep sky objects. Although none of them approach the Double Cluster in terms of sheer magnificence, each one is fascinating in its own way.

Our first target is the open cluster **M46** and its companion **NGC 2438**, a planetary nebula. The cluster contains about 75 - 100 stars and is about half a degree across. The stars seem to be evenly distributed across the area with no evidence of a central condensation. This cluster is an impressive sight even in small telescopes. The planetary nebula is on the northern edge of the cluster. This nebula is a rather easy target for moderate telescopes. In an eight-inch scope the view is fascinating; the nebula appears slightly oval with a darker center and a faint star near the center. The star near the center is not the actual central star (which, at magnitude 17.5, is invisible in amateur instruments).

Our next pair of objects is farther south in Puppis, near a triangle of stars composed of φ, 11 and ξ Puppis. The cluster **NGC 2467** and nebula **Sharpless 2-311** are about 1½ ° southeast of ξ Puppis. The cluster appears as a bright, scattered clump of about 50 stars. The cluster is approximately 15 arc-minutes across. The nebula is quite prominent in moderate apertures and is generally round with a bright star offset to the north of its center. With my eight-inch reflector at about 100x with a UHC filter, I noticed several very subtle dark patches and brighter filaments to the south of the star. Along the southern edge of the nebula is a brighter area running approximately east-west.

A mere two degrees to the southwest is the next pair of objects, the cluster **NGC 2453** and the planetary nebula **NGC 2452**. In my eight-inch telescope, this cluster appears rather faint, with about five bright stars and 15 fainter stars against a hazy background of unresolved stars. I find the cluster to be somewhat triangular and about three arc-minutes across. The nebula is just to the southwest of the cluster. It is about 20 arc-seconds in diameter and has a diffuse edge. I also noticed a very faint star near the south edge of the nebula. Larger telescopes may reveal the nebula's annular structure as well as subtle brightness variations within the annulus.

Our final object lies considerably farther east, in the nondescript constellation Pyxis. **NGC 2818** and **NGC 2818A** is yet another cluster and planetary nebula combination. Since it is at a rather southerly declination, try viewing it while it is on or near the meridian. NGC 2818 is fairly faint and is just over ten arc-minutes across. I find the cluster's 50 or so stars to be unevenly distributed, giving the cluster a blotchy appearance. The nebula is located on the southern edge of the cluster and although faint, is rather difficult to miss. The planetary appears as a round disk about 30 arc-seconds across. Overall, this pair of objects looks like a dimmer version of M46 and NGC 2438.

Name	Type	Mag.	Dimensions	Const	SkyAtlas	U2000	R.A.	Dec
M46	open cl	6.1	27'	Pup	12	274	07h 42m	-14° 49'
NGC 2438	plan neb	11.0	66"	Pup	12	274	07h 42m	-14° 44'
NGC 2467	open cl	7.1	14'	Pup	19	320	07h 53m	-26° 23'
Sh2-311	diff neb	—	16' x 12'	Pup	19	320	07h 53m	-26° 24'
NGC 2453	open cl	8.3	5'	Pup	19	320	07h 48m	-27° 14'
NGC 2452	plan neb	12.0	19"	Pup	19	320	07h 47m	-27° 20'
NGC 2818	open cl	8.2	9'	Pyx	20	364	09h 16m	-36° 37'
NGC 2818A	plan neb	11.6	38"	Pyx	20	364	09h 16m	-36° 38'

DAY/TIME-UT (P)	AC	USNO	(O)	MAX	SP	PCT	ELG	SN	MN	MN	(CA)	PA	VA	WA	LONG	LAT	A	B	C	DM	SAO	HA	DECL.	RT. ASC.
H M S	D	REF NO	V	MAG		SNLT		AL	AL	AZ					LIB	LIB	M/O	M/O	S/K	REF NO	REF NO	O / //	O / //	H M S
SEPTEMBER																								SEPTEMBER
6/04 11 05/DA	3	2968	87	6.2	B9	89+	141		41	168	24N	16	27	30	2.2	-5.8	-1.2	3.1	1.7	-15 5626	163471	-92339	-144742	202033.6
6/04 16 29/DI	2	2969	79	3.2	G0	89+	141		41	170	29N	21	30	35	2.1	-5.8	-1.4	2.7	1.5	-15 5629	163481	-80524	-144730	202047.7
12/11 55 05/RX	4	0272	98	5.9	F0	88-	140		54	238	45N	295	248	317	4.8	.5	-2.4	-2.5	.4	+10 0252	092659	302005	110125	15039.9
1 42 32/RX	2	1281	78	6.4	K0	18-	50		28	92	77N	292	352	278	-2.6	6.9	-.9	.3	-1.1	+13 1940	097913	-653730	131616	83330.5
JBER																								OCTOBER
7/10 19 29/DV	5	3508	97	5.8	A2	98+	164		24	254	34S	130	76	155	4.3	-3.0	-1.4	-4.2	.5	+ 0 5054	128401	612331	10320	234916.1
3508 DISTANCE TO SMOOTH-MOON TERMINATOR = 11.6 ARC SEC., DISTANCE TO POSSIBLE 3-KM SUNLIT PEAK = 3.7 ARC SEC.																								
12/09 31 56/R	2	0590	87	6.3	B9	87-	137		72	153	75N	277	301	290	2.7	4.3	-2.7	-.1	-.3	+16 0544	093716	-82426	171704	40024.0
14/11 26 52/R	2	0871	67	6.9	K5	70-	114		75	166	61N	299	311	302	.2	6.2	-2.7	-1.6	-.3	+18 0950	094830	-34544	184204	54457.8
16/07 01 18/RY	1	1106	69	3.6	A2	53-	94		8	75	84S	272	329	264	-1.3	7.2	.0	1.0	-.9	+16 1443	096746	-913453	163247	71751.6
20/11 57 45/RO	3	1564	98	6.6	F5	15-	46		23	102	35S	233	288	210	-4.7	5.1	-1.1	3.7	-.6	+ 4 2375	118443	-642832	33619	104224.0
21/13 19 31/DK	1	1685	98	4.5	K0	8-	33	-4	27	111	-87N	106	157	81	-4.8	3.8	-1.0	.5	-1.0	- 0 2458	138298	-563346	-4758	113643.4
29/03 04 55/DC	2	2731	47	6.5	A0	30+	66		20	230	60S	114	71	118	1.7	-5.9	-1.6	-1.8	.5	-18 5079	161848	491752	-183613	184830.5
29/03 09 29/D	2	X25906	47	7.0	A2	30+	66		19	231	50S	123	80	128	1.7	-5.9	-1.8	-2.4	.3	-18 5080	161850	502706	-183804	184834.0
NOVEMBER																								NOVEMBER
1/06 05 52/D	2	3185	29	5.3	K0	65+	107		24	240	82S	80	32	100	4.5	-5.6	-1.1	-.7	.9	- 9 5829	145637	533305	-90557	214447.6
8/07 06 13/RA	2	0527	97	6.3	G5	99-	169		69	142	83S	264	297	279	3.2	3.8	-2.4	.7	-.3	+16 0484	093536	-130130	163124	33913.5
9/02 35 12/RJ	1	0648	98	3.9	K0	97-	159		9	75	80S	261	318	271	2.9	5.1	.1	1.2	-.7	+17 0712	093897	-905145	173156	42243.6
9/02 59 28/R	4	0653	98	4.8	A5	97-	159		14	78	41S	223	282	233	2.9	5.1	.3	2.3	-.2	+17 0714	093907	-850348	172602	42353.3
9/09 17 53/RM	2	0684	97	6.2	B8	96-	157		73	205	65S	246	224	256	1.8	4.9	-2.5	1.1	.4	+17 0750	094002	72512	180026	43320.3
11/06 10 21/R	2	0934	97	6.4	K0	86-	136		33	89	44S	231	292	230	.3	6.7	-.5	2.7	-.5	+18 1112	095337	-615840	180745	61048.7
11/09 33 05/RV	2	0951	77	6.8	K0	85-	135		71	141	80S	267	301	266	-.4	6.6	-2.6	.5	-.3	+18 1141	095456	-121744	181748	61528.3
14/09 22 10/RV	2	1309	68	5.7	A3	60-	102		41	103	88N	288	345	273	-3.6	6.9	-1.5	.3	-1.0	+13 1972	098069	-485752	124137	84259.4
16/11 26 28/RC	5	1519	88	6.5	F2	40-	78		43	117	15N	5	54	343	-5.6	5.5	.0	-7.5	-2.0	+ 6 2301	118271	-404903	54252	102301.9
20/13 05 02/R	1	1984	97	7.8	M0	6-	28		14	114	72N	308	359	286	-4.7	-.1	-.4	-.2	-1.1	-10 3768	158194	-640518	-112010	135035.3
DECEMBER																								DECEMBER
6/12 41 28/DA	4	0658	97	4.3	A2	100+	173		12	284	85S	56	357	66	1.8	4.9	-.4	.0	1.3	+17 0719	093923	870537	175503	42517.2
0658 DISTANCE TO SMOOTH-MOON TERMINATOR = 7.3 ARC SEC., DISTANCE TO POSSIBLE 3-KM SUNLIT PEAK = 1.7 ARC SEC.																								
9/03 58 50/RV	3	1029	98	5.1	A0	96-	156		22	83	37S	234	294	230	.1	6.9	-.1	2.4	-.5	+17 1357	096015	-751129	173848	64211.9
11/13 33 41/RX	2	1281	77	6.4	K0	83-	131	-10	46	253	70N	309	253	294	-4.1	7.0	-1.1	-2.3	.3	+13 1940	097913	430255	131606	83332.9
16/11 02 54/R	2	1798	88	6.3	K0	37-	75		30	120	44N	339	26	314	-6.8	2.1	-.5	-1.9	-1.3	- 4 3296	138832	-491816	-50148	123126.4
18/11 43 01/RU	2	2053	99	4.6	A2	17-	49		13	116	42S	241	292	221	-5.8	-1.1	-1.3	2.5	-.6	-12 4018	158489	-640743	-132102	141853.1
24/00 59 55/D	1	X27837	87	7.6	F5	6+	28	-7	18	236	84N	63	17	75	2.4	-6.0	-.7	-.2	1.0	-16 5478	163173	551356	-155347	200015.4
25/01 47 11/D	2	X29204	67	7.3	K2	13+	42		22	237	79S	80	34	97	4.2	-5.7	-1.0	-.7	.9	-13 5830	164080	523459	-122743	210212.1
27/04 32 47/DT	6	3366	47	6.6	A0	32+	69		17	254	12N	348	294	12	6.5	-3.9	1.2	9.8	2.3	- 4 5793	146402	672243	-31557	225654.5
GRAZE OF 3366 NEARBY -- APPROXIMATE N. LIMIT -- LAT. = 33.742 - .174(W. LONG. -111.788), CA= 2N, SEC. RA=54.457, DEC=57.27.																								
3366 DISTANCES TO TERMINATOR= .0 33.6100.8 A.S.,DIST. TO 3-KM SUNLIT PEAK= .0 .0 36.9 A.S. FOR C.A.= -2 2 6, RESP.																								
28/02 11 54/D	2	3502	17	7.4	G5	43+	81		52	215	77S	79	50	104	7.3	-2.5	-2.2	-.1	.6	- 0 4566	128375	204107	3030	234622.6
28/04 24 28/DV	3	3508	18	5.8	A2	43+	82		31	249	65N	41	350	66	7.0	-2.6	-.9	.9	1.2	+ 0 5054	128401	531055	10316	234915.4

LUNAR OCCULTATION PREDICTIONS

I recently received these predictions that I sent for. For years now as a public service to amateur astronomers, Walter Morgan of the International Occultation Timing Association (IOTA) has been providing predictions for basically the cost of a SASE. The amount of postage depends on the limiting magnitude of stars you specify which then determines the number of pages of predictions. I use an Option Code Limit of "7" which will generate a list of stars occulted above 8th magnitude. This costs $0.50 and includes detailed instructions for reading the tables. Walter requests the postage stamps not be applied to the envelope however for more efficient use by IOTA. If you are interested in your own predictions or just want to thank him for these, contact him at:

Walter Morgan
10961 Morgan Territory Road
Livermore, CA 94550-9452

HOW TO USE THESE TABLES

The geographic coordinates that these predictions were generated for are the center of Phoenix Sky Harbor Int'l Airport, a pretty central location for the Valley. Use the underlined dates to practice with the recent occultation of Spica, the upcoming one of the Messier cluster M67, and the June graze of Spica. You'll notice the list actually begins on the other side of this page.

The first column is the **DAY** and **TIME** down to seconds in Universal Time. These times are accurate to within 10 seconds for the airport. Give yourself a few minute pad for other locations. Also subtract 7 hours to obtain Mountain Standard Time.

P stands for phenomena, meaning disappearance (D) or reappearance (R) of the star from behind the Moon. An additional letter indicates a double star. The code letter tells you more info about the double with the expanded instructions.

O stands for observability which is affected by the magnitude, twilight conditions, etc. The higher the number, the easier to observe the event.

MAX MAG is maximum magnitude (many stars are variables)

PCT SNLT is the percent of the Moon's disk sunlit with 100% being a Full Moon. With a lot of illumination the events become harder to observe.

MN ALT is the Moon's elevation above the horizon.

CA is cusp angle of the event. This is the angle in degrees from the nearest lunar cusp to the star. It's positive on the dark limb and negative on the bright one. The letters identify the north or south cusp.

For the casual observer, the other codes are either self explanatory or unimportant. I have the detailed information on them if you need them. Hope you enjoy watching these beautiful examples of the cosmos in motion as much as I do. (Editor)

1995 LUNAR OCCULTATIONS FROM PHOENIX

DAY/TIME-UT (P) AC H M S D	USNO REF NO	(O) V	MAX MAG	SP	PCT SNLT	ELG	SN AL	MN AL	MN AZ	(CA)	PA	VA	WA	LONG LIB	LAT LIB	A M/O	B M/O	C S/K	DM REF NO	SAO REF NO	HA O / //	DECL. O / //	RT. ASC? H M S
JANUARY													JANUARY										JANUARY
6/00 52 34/DX 3	3370	47	6.2	G5	25+	60	-4	49	214	80S	75	47	99	6.6	-5.2	-2.1	.0	.7	- 3	5539	146412	215955	-22516	2258
7/02 13 39/DV 2	3507	18	6.4	F2	35+	72		48	229	64S	91	52	116	6.1	-4.3	-2.2	-.9	.7	+ 1	4773	128393	304007	21116	2348
7/04 53 54/D 2	3512	28	5.8	K2	35+	73		18	261	37N	12	316	37	5.8	-4.4	-.4	2.7	1.4	+ 2	4725	128427	700206	25413	235143.0
9/03 55 41/D 2	0209	17	7.2	A0	55+	95		51	241	56S	103	54	126	4.3	-1.9	-2.3	-1.7	.7	+ 9	0167	092434	335658	102255	12543.5
18/04 04 44/RA 2	1341	99	4.3	A3	98-	163		25	92	70N	323	22	307	-4.0	6.8	-.9	-1.1	-1.3	+12	1948	098267	-680410	115224	85815.1
18/10 57 34/RL 2	1359	98	5.2	B9	97-	161		52	241	54S	267	219	250	-5.3	7.1	-2.1	-.8	.8	+11	1984	098378	330622	104104	90730.8
23/10 02 26/DZ 1	1925	69	1.0	B1	58-	99		31	132	-72S	131	170	107	-3.4	2.4	-1.0	-.5	-1.1	-10	3672	157923	-400922	-110811	132457.1
23/11 17 26/RZ 2	1925	69	1.0	B1	58-	99		41	152	82S	284	308	261	-3.6	2.5	-2.0	.1	-.7	-10	3672	157923	-212031	-110811	132457.1
25/12 18 41/R 3	2192	78	6.2	K0	35-	73		30	144	60S	255	286	239	-1.9	-.7	-2.1	1.4	-.4	-17	4312	159187	-325523	-180824	152037.4
26/13 46 22/R 4	2353	79	4.6	K0	24-	59	-9	31	152	90S	280	305	270	-.9	-2.2	-1.8	.3	-.7	-19	4365	159892	-254327	-200128	162349.1
FEBRUARY													FEBRUARY										FEBRUARY
2/01 39 27/DC 1	3320	89	5.3	K0	5+	27	-9	18	252	85S	65	12	88	4.9	-5.4	-.6	-.2	1.0	- 4	5716	146210	652937	-41512	223729.7
7/03 27 39/D 3	0403	19	5.8	B8	46+	85		53	250	82S	80	26	100	2.0	.6	-2.0	-.5	.8	+14	0457	093082	355054	151727	24417.6
7/05 44 27/D 2	0413	17	6.8	K0	47+	86		26	272	86N	69	9	88	1.6	.7	-.8	-.4	1.1	+14	0469	093113	691726	152914	24744.0
9/04 14 03/D 2	0654	18	6.0	F0	65+	108		64	243	86N	76	24	87	-.7	3.3	-2.4	.1	.7	+18	0633	093918	242127	190147	42441.4
9/06 58 10/D 3	0668	39	3.6	K0	66+	108		31	273	41N	32	330	42	-1.2	3.5	-1.9	2.3	1.9	+18	0640	093954	643424	191007	42821.3
9/07 31 46/R 2	0668	37	3.6	K0	66+	108		24	278	-16N	334	273	345	-1.2	3.5	.6	-4.5	-.1	+18	0640	093954	730036	191007	42821.3
10/07 19 18/D 2	0796	37	6.8	A0P	75+	119		37	270	65N	59	356	64	-2.5	4.7	-1.6	.2	1.3	+19	0898	094467	575556	193419	52002.6
11/08 41 36/D 2	0943	57	6.2	B8	83+	131		30	274	22S	155	93	155	-3.7	5.8	.3	-3.5	-.1	+18	1129	095397	661550	184046	61317.9
12/06 27 19/DX 2	1072	68	5.9	M1	89+	142		65	236	84S	96	49	91	-4.1	6.3	-2.2	-.9	.4	+17	1479	096407	212107	174535	70210.5
14/04 23 45/DV 2	1309	97	5.7	A3	98+	164		54	117	61S	115	165	100	-4.3	6.8	-1.8	-.3	-.8	+13	1972	098069	-325150	124140	84258.4
14/10 21 25/D 1	G00011	97	6.1	OC	98+	166		36	260	65S	109	51	93	-5.4	7.2	-.9	-1.6	.6	M	0067	000000	544412	114935	85118.2
ABOVE PREDICTION IS FOR CENTER OF GALACTIC NEBULAR OBJECT M 67, DIAMETER 15.0 ARCMIN, APPROX. TIME TO OCCULT = 34.1 MINUTES.																							
19/09 28 59/R 2	1887	87	6.4	K0	83-	131		44	155	69N	316	336	292	-2.6	2.7	-1.4	-1.1	-1.0	- 8	3495	139183	-175547	-93051	130900.7
23/11 17 45/R 3	2456	78	6.2	B3	39-	77		21	134	39S	225	265	219	1.0	-3.5	-2.2	2.9	.2	-20	4627	184999	-453439	-202913	170428.6
25/12 19 23/R 3	2787	97	6.4	B8	18-	51		14	124	40S	216	264	223	2.9	-5.4	-1.5	2.9	.2	-18	5206	162204	-584537	-184440	190651.3
MARCH													MARCH										MARCH
4/02 58 35/D 2	0103	88	6.1	K0	7+	31		11	272	51N	25	328	50	3.5	-2.5	-.4	1.6	1.3	+ 6	0105	109470	821502	71621	4802.1
19/08 59 06/RA 3	1971	98	5.8	K0	93-	149		44	171	63S	266	274	244	-1.9	1.6	-2.5	.3	-.1	-11	3591	158152	-70004	-122417	134542.9
24/10 42 53/RK 3	2733	87	6.4	A0	43-	82		18	129	36S	212	256	217	3.8	-5.4	-1.9	3.3	.5	-19	5182	161871	-515742	-190847	184919.0
24/12 48 51/RA 3	2745	87	6.9	K0	42-	81	-8	34	156	35N	321	342	326	3.5	-5.3	-2.1	-1.8	-2.2	-18	5115	161935	-211219	-183828	185250.2
APRIL													APRIL										APRIL
5/02 50 49/D 3	0697	48	6.3	F5	22+	56		39	267	30S	144	82	154	-1.7	4.1	-.4	-3.9	.2	+18	0661	094036	543909	183153	43658.2
8/04 31 03/DK 2	1091	18	6.7	K5	50+	89		47	259	88S	99	40	93	-5.4	6.9	-1.5	-1.4	.7	+17	1518	096611	440529	165854	71131.1
8/08 00 30/DY 1	1106	19	3.6	A2	51+	91		5	287	87N	94	38	87	-5.8	7.2	.2	-1.1	.8	+16	1443	096746	950025	163247	71749.9
10/03 44 51/D 2	G00011	18	6.1	OC	69+	112		67	204	89N	103	82	87	-6.5	7.2	-2.4	-.9	.1	M	0067	000000	93139	114935	85117.7
ABOVE PREDICTION IS FOR CENTER OF GALACTIC NEBULAR OBJECT M 67, DIAMETER 15.0 ARCMIN, APPROX. TIME TO OCCULT = 44.8 MINUTES.																							
15/10 07 07/DZ 2	1925	98	1.0	B1	100+	178		30	229	-5S	147	106	124	-4.0	2.4	-1.3	-2.4	-.4	-10	3672	157923	415055	-110821	132458.6
15/11 02 16/RZ 2	1925	98	1.0	B1	100+	178		21	240	-72N	249	202	226	-4.2	2.4	-1.1	-.4	1.3	-10	3672	157923	554043	-110821	1324
20/10 04 46/R 2	G00031	77	6.5	OC	69-	112		30	147	68N	287	316	290	4.3	-5.2	-1.8	.2	-.9	M	0025	000000	-302611	-191454	1831
ABOVE PREDICTION IS FOR CENTER OF GALACTIC NEBULAR OBJECT M 25, DIAMETER 40.0 ARCMIN, APPROX. TIME TO OCCULT =103.9 MINUTES.																							
20/09 57 58/RT 2	2687	87	6.3	F5	69-	112		29	145	37N	318	349	321	4.3	-5.2	-1.5	-1.1	-1.9	-19	5047	161571	-320953	-190737	183137.9
26/11 26 21/RV 2	3515	97	6.2	A0	10-	37		6	91	40N	300	357	325	6.2	-3.2	-.3	.2	-1.6	+ 1	4792	128436	-842424	20349	235250.0
MAY													MAY										MAY
8/07 24 07/DO 5	1397	27	5.5	G0	54+	94		11	274	29N	47	350	29	-7.7	7.4	-.7	.7	2.3	+ 9	2188	117717	825118	90428	92813.1
13/03 52 02/DA 3	1971	97	5.8	K0	96+	157		36	143	39S	158	189	136	-4.1	1.3	-.6	-1.8	-1.4	-11	3591	158152	-294558	-122419	134543.3
14/06 19 39/DV 2	2118	99	2.9	A3	100+	172		40	170	37N	57	66	38	-2.7	-.4	-3.0	1.8	.7	-15	3966	158840	-80104	-160125	145039.3
2118 DISTANCE TO SMOOTH-MOON TERMINATOR = 3.6 ARC SEC., DISTANCE TO POSSIBLE 3-KM SUNLIT PEAK = .2 ARC SEC.																							
17/11 48 21/RT 2	2629	87	6.3	A2	90-	143	-8	31	210	72S	246	219	247	2.6	-4.9	-1.6	.1	.9	-19	4886	161153	271555	-195029	181100.2
24/11 30 39/R 2	0064	88	6.6	F5	21-	54	-10	23	100	39S	197	253	222	6.8	-2.2	-.1	3.2	.5	+ 4	0063	109238	-650042	45002	2954.3
JUNE													JUNE										JUNE
4/03 28 37/DL 2	1359	29	5.2	B9	28+	63	-11	34	259	67N	87	30	70	-6.8	7.3	-1.3	-1.1	1.0	+11	1984	098378	553633	104105	90729.9
6/04 15 25/DK 3	1566	27	6.6	K2	47+	87		38	243	27S	175	127	153	-7.8	6.1	-.1	-4.1	-1.2	+ 3	2408	118473	445832	23036	104455.8
9/07 05 07/DZ 5	1925	69	1.0	B1	79+	126		25	236	14S	187	142	164	-6.9	2.2	-.7	-8.2	-4.6	-10	3672	157923	502637	-110821	132458.6
GRAZE OF 1925 NEARBY -- APPROXIMATE S. LIMIT -- LAT. = 32.928 + .078(W. LONG. -111.788), CA= 4S, SEC. RA=58.560, DEC=20.75.																							
1925 DISTANCES TO TERMINATOR= .0 4.5 17.2 A.S.,DIST. TO 3-KM SUNLIT PEAK= .0 .0 3.0 A.S. FOR C.A.= 0 4 8, RESP.																							
9/07 18 45/RZ 5	1925	69	1.0	B1	79+	126		22	239	-8S	209	162	186	-6.9	2.2	-1.4	5.2	5.5	-10	3672	157923	534823	-110821	132458.6
14/09 52 02/RX 2	2715	97	6.0	M5	98-	162		35	200	72S	235	217	239	2.2	-5.2	-1.6	.6	1.0	-19	5134	161754	174648	-191710	184241.0
17/12 17 26/R 2	3185	78	5.3	K0	75-	120	0	46	197	86N	253	238	273	6.8	-5.6	-2.1	.3	.5	- 9	5829	145637	114000	-90603	214447.0
22/10 13 15/RX 2	0272	68	5.9	F0	26-	61		18	88	71S	230	289	253	6.2	.3	-.1	2.0	-.3	+10	0252	092659	-760019	110112	15037.6
24/11 17 14/R 2	0505	97	7.0	A0P	11-	38	-11	15	80	36N	307	6	323	3.7	3.1	-.8	-.2	-1.7	+16	0450	093454	-824142	164441	32926.9
JULY													JULY										JULY
1/03 30 09/DK 3	1332	78	5.7	K0	9+	35	-9	10	277	42N	66	8	50	-5.6	7.3	-.3	-.4	1.4	+12	1941	098235	853352	113831	85540.3
8/01 28 50/DV 2	2118	37	2.9	A3	75+	120	13	34	148	72S	126	153	107	-4.8	-.8	-1.4	-.5	-1.0	-15	3966	158840	-264353	-160124	145039.2
8/02 46 36/RV 2	2118	37	2.9	A3	75+	120	-2	40	171	-79S	276	284	258	-5.0	-.6	-2.2	.0	-.3	-15	3966	158840	-71231	-160124	145039.2
13/11 21 00/RI 2	2969	99	3.2	G0	99-	166		26	229	48N	280	240	294	3.2	-6.0	-1.6	-1.3	.6	-15	5629	163481	440814	-144732	202047.6
22/10 38 10/R 2	0600	77	6.8	G5	23-	57		23	84	64S	231	292	244	3.5	4.0	-.1	2.2	-.4	+17	0676	093749	-733758	173014	40424.3
24/10 58 18/R 2	0871	87	6.9	K5	9-	35		9	73	71S	243	301	245	.9	6.0	.3	1.7	-.5	+18	0950	094830	-914434	184202	54455.4
AUGUST													AUGUST										AUGUST
8/04 55 10/DX 2	2715	87	6.0	M5	91+	145		37	177	60S	121	124	125	-.1	-5.3	-2.5	-1.0	-.8	-19	5134	161754	-22442	-191709	184241.4
14/11 48 23/R 2	0064	77	6.6	F5	84-	132		56	218	65N	270	239	295	6.2	-1.9	-2.4	-.6	.5	+ 4	0063	109238	201546	45017	2956.7
17/12 09 44/R 2	0445	67	7.3	F8	56-	97	-9	70	154	75S	239	261	257	4.7	2.4	-2.1	1.7	.1	+14	0502	093235	-90722	150049	30039.9
20/11 26 17/D 8	0832	87	4.2	M2	28-	64		39	93	-27S	148	210	152	1.4	5.8	-2.6	-3.0	-2.2	+18	0875	094628	-544900	183523	53157.5
20/12 00 06/R 9	0832	89	4.2	M2	28-	64	-11	46	98	23S	198	258	201	1.4	5.8	.1	6.2	.5	+18	0875	094628	-462423	183523	53157.5
22/11 43 32/RK 2	1091	88	6.7	K5	13-	42		23	84	70S	251	311	244	-.8	6.9	-.3	1.8	-.8	+17	1518	096611	-732824	165856	71131.3
23/12 20 14/RK 2	1212	87	7.1	A5	7-	31	-8	20	85	89N	273	333	262	-1.8	7.0	-.5	1.0	-1.0	+15	1734	097503	-760054	145737	802
SEPTEMBER													SEPTEMBER										SEPTEM.
2/03 57 32/D 2	2345	27	6.9	A0	47+	87		23	225	62N	72	33	61	-3.0	-3.3	-1.3	-.4	1.1	-18	4260	159849	433545	-184857	161920.7
5/03 53 04/DX 5	2826	49	3.9	F0	80+	127		39	180	72S	104	104	111	.8	-5.8	-2.5	-.4	-.3	-18	5322	162512	-622	-175109	192126.8

East Valley Astronomy Club — March 1995

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26 *4:43 and 5:32 AM Galilean moons *5:45 AM Venus-Nept conjunction	**27** *6:39 AM Galilean moon *Lunar Libration Sunset: 6:20 PM Sunrise: 6:55 AM	**28** *3:56 and 4:57 AM Galilean moons	**1** ● *2:22, 3:17, and 4:32 AM Galilean moons. RS 3:33 AM *ALL MONTH NOTES *6:22 PM Young Moon	**2**	**3**	**4** Deep Sky S P *Moonset: 9:48 PM
5 *Moonset: 10:43 PM *3:39 AM Galilean moon *6:10 AM Venus occ	**6** *Moonset: 11:37 PM	**7** *Moonset next day *2:28, 4:58, 5:02, and 5:49 AM Galilean moons *3:00 AM Asteroid Hera	**8** *Moonset: 12:29 AM *3:01, 4:16, and 5:11 AM Galilean moons. RS 4:20 AM	**9** ◐ *Moonset: 1:19 AM *2:16 and 3:42 AM Galilean moons	**10** *Moonset: 2:06 AM *7:15 PM PAS Mtg	**11** *Moonset: 2:51 AM
12 *Moonset: 3:33 AM *5:32 AM Galilean moon	**13** Sunset: 6:31 PM Sunrise: 6:37 AM	**14** *5:04 AM Galilean moon	**15** 7:30 PM EVAC Mtg *4:54 and 6:08 AM Galilean moons. RS 5:06 AM	**16** ○ *2:10, 2:20, 2:21, 2:41, 4:47, and 5:34 AM Galilean moons!	**17** *2:46 AM Galilean moon *7:30 PM SAC Mtg	**18**
19	**20** *Moonrise: 10:55 PM *R Leonis peaks *7:14 PM Vernal Equinox	**21** *Moonrise: 11:59 PM	**22** *Moonrise: next day	**23** ◑ *Moonrise: 12:59 AM *2:27, 4:03, 4:27, 4:48, and 4:54 AM Galilean moons!	**24** *Moonrise: 1:53 AM *2:28, 3:26, and 4:38 AM Galilean moons	**25** Local S Parties *Moonrise: 2:42 AM
26 *Moonrise: 3:26 AM	**27** *Moonrise: 4:06 AM Sunset: 6:42 PM Sunrise: 6:19 AM	**28**	**29**	**30** ● *3:28, 5:00, 5:38, and 5:56 AM Galilean moons. RS 2:29 AM *3:28 AM Ganymede eclipse	**31** *3:10, 4:18, and 5:20 AM Galilean moons	**1** Messier Marathon

All times are LOCAL - add 7 hrs for Universal Time

Flip over for event details

Date	Start	Title	Description
3/1/95	12:00 AM	ALL MONTH NOTES	CALENDAR NOTES: Times for "Galilean moons" refer to eclipses, transits, occultations, etc of Jupiter's four largest satellites. Consult ASTRONOMY (ASTRO) and SKY&TELESCOPE (S&T) magazines, or almanacs for the exact event or just go out and watch what happens. On mornings with satellite events, applicable central meridian crossing times for the Great Red Spot (RS) are also listed. PLANETS: MERCURY reaches greatest western elongation on the 1st but is not well placed for observation from our latitude as it only reaches about 10 degrees above the SE horizon before dawn interferes. VENUS is bright and unmistakeable low in the SE before dawn and rapidly closing on the Sun. MARS still dominates the evening skies at -0.5 magnitude but shrinks in apparent size to 10 arc seconds by month's end. JUPITER rises after midnight and is well placed for observation in the AM sky. SATURN in conjunction with the Sun on the 6th and appears in the AM sky next month. URANUS and NEPTUNE are found near Venus in the AM sky. PLUTO is stationary on the 6th but starts westward motion relative to the stars (retrograde) after that. It rises just before Jupiter. OBJECTS OF INTEREST: Comet Borrelly, Zodical Light, Gegenschein, asteroids Ceres, Metis, and Vesta. See magazines for details. ASTRONOMICAL TWILIGHT TIMES: 1st: 5:38 AM and 7:43 PM. 31st: 5:00 AM and 8:09 PM. LUNAR LIBRATIONS: There are no favorable Lunar librations all month!
3/1/95	6:22 PM	6:22 PM Young Moon	Look for Young Moon right after Sunset with a telescope or binoculars. See Jan. issue of newsletter for details.
3/5/95	12:00 AM	6:10 AM Venus occ	At approximately 6:10 AM, a 9th magnitude star (SAO 163482) reappears from behind the dark limb of Venus. (Mar. S&T)
3/7/95	12:00 AM	3:00 AM Asteroid Hera	Minor planet Hera will cross the galaxy M 95, passing just north of the galaxy's center at about 3:00 AM. A 6 inch or larger telescope will show this event. (Mar. S&T)
3/10/95	12:00 AM	7:15 PM PAS Mtg	Phoenix Astronomical Society will meet at Keith Parizek's home. Call Terri Renner at 971-3355 for directions.
3/17/95	7:30 PM	7:30 PM SAC Mtg	Saguaro Astronomy Club meeting, Grand Canyon University, Fleming Bldg, Rm 105. Camelback and 33rd Ave.
3/20/95	12:00 AM	R Leonis peaks	The long period variable star R Leonis peaks around this date at a naked eye magnitude of 4.4, up from it's minimum of about 11.3! (Mar. ASTRO)
3/20/95	7:14 PM	7:14 PM Vernal Equinox	Sun's apparent path crosses the celestial equator northward and higher in our daytime sky. Note where the Sun rises and sets for due East and West.
3/30/95	12:00 AM	3:28 AM Ganymede eclipse	The geometry is outstanding for observing the eclipse of Jupiter's satellite Ganymede this AM. It will appear to vanish in thin air while near Io at 3:28 AM and reappear from nowhere at 5:38 AM. (Mar. ASTRO)

EVAC Members as of 2/8/95

Name

Manfred Alber

Enrico Alvarez

Bob Anderson

Brady & Jan Barnes

Dan Beck

Jerry Belcher

David Brown

Sheri Cahn

Walter Carruthers

Cliff DeVlieg

Paul Dickson

John & Nellie Durham

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Bill Greiner

Tom Harvey

Ted & Brenda Heckens

Sam Herchak & Anne Beeby

Frank Honer

Paul Honsinger

Terry & Denise Hutchins

Silvio Jaconelli

Mark Johnston

Jane & Bob Kearney Jr.

Kirk Keating

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Robert & Beth Kerwin

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Julie Levin

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Gene Lucas

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Tony & Joyce Muller

Joe Murray

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Bob Norby

Steve O'Dwyer

John Osborne

Eric Peterson

Jim Peterson

Randy Peterson

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Lika Romney

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Dick Simmon

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Cary & Shirley Stegman

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Tom Trollen

W. D. Westmoreland

Homer & Ginny Willard

Russell Wilson

Don Wrigley

Mrs. Mazier's Science

Art Zarkos

Frank Zullo

Valued EVAC member since 1/17/92!
Hope to see you at the next star party

EAST VALLEY ASTRONOMY CLUB
Sam Herchak, Editor
145 S. Norfolk Circle
Mesa, AZ 85206-1123

Vekol Road Site