



Sacnews

Volume 25 issue 1

January 2001

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Astronomy 101

Say Cheese

By Rick Tejera

This is for those of you who don't think you're ready to get into astrophotography. Until a few short weeks ago I was among you. I thought I'd need an equatorial mounted scope, along with some expensive accessories, even for piggybacking. Not so. I just got back my first roll of astrophotos and must say I got some good shots. The best part is it came with little effort and cost.

So how can you get started? I guess the best way to explain would be to recount my first foray into photographing the sky. A few months back I noticed Steve Coe with an unusual looking gadget called a Scotch Mount. It was basically nothing more than two boards hinged at one end with a jackscrew near the other end. The mount is placed on a tripod and the hinge axis polar aligned. The jackscrew then turns at a rate that will open the two boards at a sidereal rate. A camera is attached to the top board and will thus track well enough to take timed exposures for about 4-5 minutes. Intrigued, I found plans for one in the book Making and Enjoying

Telescopes, By Robert Miller & Kenneth Wilson (Available through Sterling Publishing Co.). I made the mount in about 2 hours at a cost of about \$10.00 in hardware. A little advice from Steve regarding film selection and exposure times and I was ready to go. First light would be at Sentinel, Thanksgiving weekend.

I set the mount on my tripod, which I weighted down to give extra stability, aligned it as best I could (remember, I'm a dob driver) and crossed my fingers. Steve had suggested 1,3 & 4-minute exposures at f/3.5. The way I had constructed the jackscrew on my mount, 1 turn per minute would track properly; I would need to give a quarter turn every 15 seconds to keep from trailing the image. My first target was Cassiopeia, as its proximity to the Celestial pole would be more forgiving of tracking errors. I also shot Jupiter & Saturn framed by the Hyades and Pleiades, Ursa Major after it rose, The area between Perseus and Cassiopeia (hoping to get the Double Cluster) and finally tried

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2001: A Year of Sky Events

By Joe Orman

Mark your calendar for these interesting planetary alignments, conjunctions & meteor showers in the year 2001. Times are calculated for Phoenix; other locations may differ. Most will be easy to see with the unaided eye, some very challenging -- take a look!

- **January 5** (evening): Saturn 2 1/2 degrees above gibbous moon, Jupiter 8 degrees to left, very high in SE after sunset.
- **January 25** (evening): Mercury 4 degrees to upper right of crescent moon, very low in WSW after sunset.
- **January 28** (evening): Venus 6 degrees to right of crescent moon, in WSW after sunset. Mercury low in WSW.
- **February 15** (morning): Mars 2 1/2 degrees to lower right of last-quarter moon, high in SE before sunrise.
- **March 1** (evening): Jupiter, Saturn both 5 degrees away from first-quarter moon, making triangle, very high in WSW after sunset.
- **March 20**: Spring equinox (6:31am MST). Sunrise straight east (6:32am, azimuth 89.5 degrees), sunset straight west (6:40pm, azimuth 270.8 degrees). Always use proper eye protection when viewing the sun.
- **March 28** (evening): Saturn 3 degrees to upper right of crescent moon, Jupiter 10 degrees above, high in W after sunset.
- **March 29** (evening): Jupiter 3 degrees to lower right of crescent moon, Saturn 10 degrees below, high in W after sunset.
- **April 7** (morning): Full moon sets straight west at sunrise (sunrise 6:08am, moonset 6:10am).
- **April 25** (evening): Crescent moon between Jupiter and Saturn, in W after sunset.
- **May 6** (evening): Mercury 3 1/2 degrees to upper right of Saturn, very low in WNW after sunset.
- **May 14-16** (evenings): Mercury 3 degrees to right or upper right of Jupiter, low in WNW after sunset.
- **May 19** (morning): Venus 5 degrees to upper left of crescent moon, low in E before sunrise.
- **May 24** (evening): Mercury 5 degrees to lower right of crescent moon, low in WNW after sunset. Jupiter very low below.
- **June 17** (morning): Venus 6 degrees to left of crescent moon, in E before sunrise. Saturn very low in ENE.
- **July 12** (morning): Mercury 2 degrees to lower right of Jupiter, very low in ENE before sunrise.
- **July 15-18** (mornings): July 15: Saturn 3/4 degree to upper left of Venus, Aldebaran 3 degrees to lower right of Venus, in E before sunrise, Jupiter 3 degrees above Mercury low in ENE. July 17: Moon 1 degree to right of Saturn. July 18: Moon between pairs of planets.
- **July 17** (daytime): Occultation of Venus by crescent moon, very high in sky (disappears 10:33am, reappears 12:02pm).
- **July 19** (morning): Mercury only 9 arcminutes to lower right of moon, very low in ENE before sunrise. Jupiter, Venus and Saturn to upper right.
- **July 25** (morning): Jupiter-Venus-Saturn equidistant alignment, each 10 degrees apart, in E before sunrise.
- **August 5-6** (mornings): Jupiter 1 1/2 degrees to left or upper left of Venus, in ENE before sunrise. Saturn 20 degrees to upper right.
- **August 13-16** (mornings): Venus-Jupiter-Saturn alignment, moon in different position along line each morning, before sunrise.
- **August 15** (daytime): Occultation of Jupiter by crescent moon, in W (disappears 1:35pm, reappears 2:37pm).
- **September 10** (morning): Occultation of Saturn by last-quarter moon, very high in sky (disappears before sunrise 5:01am, reappears in daylight 6:29am).
- **September 12** (morning): Jupiter 1/2 degree to right of crescent moon, very high in E before sunrise.
- **September 15-21** (mornings): Sep 15: Crescent moon, Venus & Regulus make triangle in E before sunrise (moon 5 degrees from both). Sep 20: Regulus 3/4 degree to lower right of Venus. Sep 21: Regulus 3/4 degree to upper right of Venus.
- **September 22**: Fall equinox (4:04pm MST). Sunrise straight east (6:16am, azimuth 89.2 degrees), sunset straight west (6:25pm, azimuth 270.6 degrees). Always use proper eye protection when viewing the sun.
- **September 24** (evening): Mars 2 degrees below first-quarter moon, in S after sunset.
- **October 15** (morning): Venus 6 degrees to upper right of crescent moon, low in E before sunrise.
- **October 23** (evening): Mars 3 degrees to right of first-quarter moon, high in SSW after sunset.
- **October 29 - November 4** (mornings): Mercury 1/2 degree to left of Venus, very low in E before sunrise.
- **November 3** (evening): Saturn 3 degrees to upper

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- right of gibbous moon, rising in E after sunset.
- **November 5** (evening): Neptune 2 degrees to upper right of Mars, high in SSW after sunset.
- **November 17-18** (nights): Leonids meteor shower. Just past new moon. Shower radiates from constellation Leo, which rises in E around midnight. Best time to look between midnight and dawn.
- **November 21** (evening): Mars 4 degrees to right of first-quarter moon, high in SW after sunset.
- **November 26** (evening): Uranus 1 degree to right of Mars, high in SW after sunset.
- **November 30** (evening): Occultation of Saturn by full moon in twilight, just after rising in ENE (disappears 5:44pm, reappears 6:08pm).
- **December 3** (morning): Jupiter 1 1/2 degree from gibbous moon, high in W before sunrise.
- **December 13-15** (nights): Geminids meteor shower. New moon. Shower radiates from constellation Gemini, which rises in NE around 7pm. Best time to look between midnight and dawn.
- **December 14** (afternoon): Partial solar eclipse, starts 1:22pm, maximum 2:25pm (25%), ends 3:28pm, in SW. Always use proper eye protection when viewing the sun.
- **December 20** (evening): Mars 5 degrees to upper right of first-quarter moon, high in SSW after sunset.
- **December 28** (early morning): Occultation of Saturn by almost-full moon, high in W (disappears 1:29am, reappears 2:41am).
- **December 30** (morning): Jupiter 1/2 degree to left of full moon, low in WNW before sunrise.



Orion, Shot by Rick Tejera at Sentinel November 25th 2000. Pentax A3000 at 50mm for 4 minutes. Camera mounted on manual Scotch Mount. See Astronomy 101 for details on how I took this shot and others that I will show at the January Meeting. (you've been warned!)

Fuzzy Spot, Orion (part 1)

By Ken Reeves

Orion is one of the most noticeable star patterns in the sky, although some people get a little confused with what constellations are what. The other night after church, someone in front of me pointed to Orion and said, "There's the Big Dipper", then pointed to the Pleiades and said "and there is the Little Dipper!" Although they weren't quite on the mark, it was great to see someone pointing to the sky, especially in the bright city lights.

In Orion, there is a wealth of deep sky objects. Although it is most famous for its nebulae, there are many clusters, planetaries, double stars, and even a few galaxies. This month I'm focusing on objects that are shadowed by the Great Orion Nebula.

NGC 1788 (05h06.9 -03 20): At 100X, this nebula was seen with a neighboring bright star more or less to W. Using averted vision makes it grow quite a bit. There is either a star or a much brighter spot in middle. The nebula did not respond to the UHC filter since it is a reflection nebula.

NGC 1973/1977 complex (05h35.4 -04 48): This complex includes NGC 1973, 1975, and 1977. On the S end of the complex, there are stars involved in very bright nebulosity. The nebulosity follows an arc of 4 stars and extends quite away to the E, but darkens quickly to the S. To the N there is a grouping of 7 stars with the brightest star having quite a bit of nebulosity surrounding it. On N end of the complex is a double star with some nebulosity around it. Between the 2 main sections of nebulosity, it darkens up somewhat. The nebulosity has a very beautiful blue/green glow. Since this is primarily a reflection nebula, the UHC filter doesn't do too much. Overall, it is a very large, pretty bright nebula. Surrounding the brightest stars, it shows some mottling and detail. If the Great Orion Nebula weren't right next to it, this would be a major showpiece.

NGC 1981 (05h35.2 -04 26): Just N of the NGC 1973/1977 complex is this open cluster. It is very large, very bright, very poor, and very loose, with 3 levels of stars and a count of 42 stars. It is visible naked eye.

NGC 1999 (05h36.5 -06 43): Located to the S of the Great Orion Nebula, this small nebula contains a very bright central star with a faint glow around it, perhaps

a little mottled. It pretty much looks like a fuzzy star, much like a planetary nebula.

NGC 2022 (05h42.1 +09 05): Moving up near the head of the hunter, this planetary nebula is small, reasonably bright, and possibly annular in the 10" scope. I was unable to verify the annularity at higher power. Using averted vision doesn't make much difference. The nebula is seen as somewhat blue/green in color without the UHC filter.

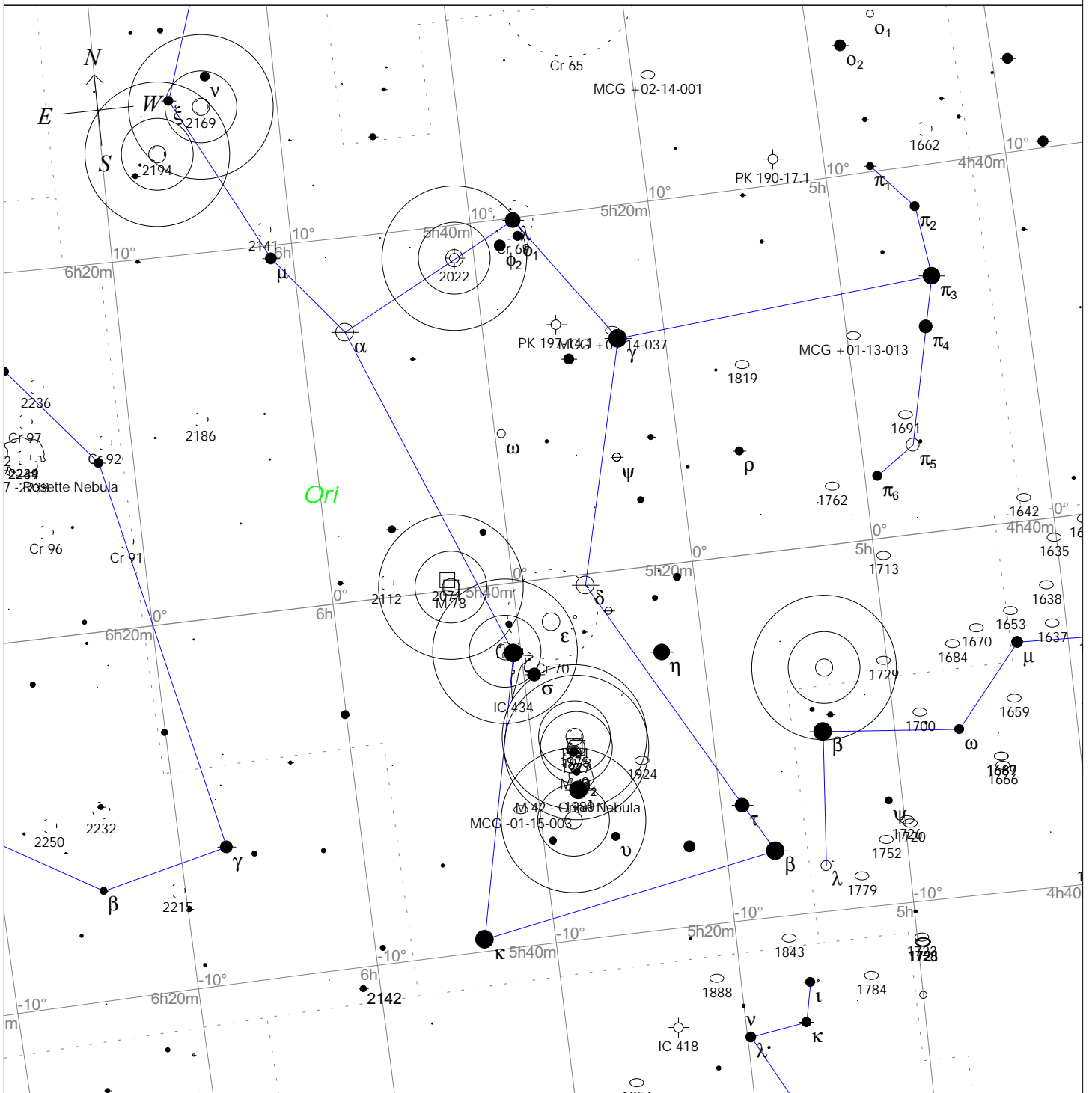
NGC 2024 (05h42.0 -01 50): One of my favorite objects in the sky, this nebula is known locally as the Tank Tracks, but I prefer the more common and much more poetic name of the Flame Nebula. The main trick in observing this object is keeping Zeta Orion out of the field. In the 10" scope, I could see 4 distinct patches of nebulosity, with a prominent N/S dark lane separating the W patch from the 3 patches on the E. In the bright patches, there is lots of detail and mottling. Again, if the Great Orion Nebula did not dwarf this object, it would be a major showpiece in the sky.

NGC 2068 (05h46.8 +00 04): M-78 is the third Messier object in Orion and the only reflection nebula in the Messier catalog. I saw it as 2 bright stars with the pretty bright nebulosity located primarily to the E of the stars, no color seen. In addition, there are 2 stars to the N with one appearing to have nebulosity around it (which is NGC 2071). There is also a faint star to the SE of the nebulosity. The object is barely visible in 10x50 binoculars.

NGC 2169 (06h08.4 +13 57): This open cluster is easily found between naked eye stars Xi and Nu Orion. It is fairly small, very bright, pretty poor, somewhat condensed, and split into 2 sections, with the W section being smaller than the E section. There are 2-3 levels of stars, with a total star count of 18, 11 in the E section and 7 in the W. The stars form the number "37" when rotated in the correct direction. This cluster can easily be viewed from the city, and is a very pretty cluster which can rival many of the Messier Clusters.

NGC 2194 (06h13.8 +12 48): This cluster is SE from NGC 2169 and is very rich, somewhat faint, very tight, and contains 10-15 stars over some haze. To the E of the cluster are two other groupings of stars that look like clusters.

Fuzzy Spot Orion (Part 1)



STARS		SYMBOLS		Herchel 400 Objects: 1788, 1980, 1999, 2022, 2024, 2169, 2194 SAC's 110 Best of the NGC Objects: 1788, 1973, 2022, 2024, 2194
● <3	● 5.5	● Multiple star	⊞ Dark nebula	
● 3.5	● >6	○ Variable star	⊕ Globular cluster	× X-ray source
● 4		☄ Comet	○ Open cluster	○ Other object
● 4.5		○ Galaxy	⊙ Planetary nebula	
● 5		□ Bright nebula	⊞ Quasar	

Local Time: 22:00:00 11-Dec-2000 UTC: 05:00:00 12-Dec-2000
 Location: 33° 39' 56" N 112° 49' 10" W RA: 5h36m14s Dec: +0° 47' Field: 30.0°

Sidereal Time: 02:53:31
 Julian Day: 2451890.7083

Seeing Double

By Thad Robosson

Well, Andromeda the Princess has moved past the edge of my back porch, so I found it necessary to abandon her for another. High in the North in the early evenings through the holidays, I found Cassiopeia to be a pleasant companion to my back porch sessions. Sifting through Burnham's, I found 30 doubles that should make good candidates through my little 90mm ETX. Here are a few that I snuck a peek at.

Eta Cas (0h49.1, +57 49, 3.4/7.5, 11"/297):

An easy first stop, Eta was notably split at an easy 39x, but the PA was a bit hard to determine. I estimated the PA at 305* with 83x. Colors are a very slight yellow primary with a barely bluish companion.

Struve 3057 (0h04.9, +58 32, 6.6/8.7, 3.7"/299*) & Struve 3062 (0h06.3, +58 26, 6.4/7.2, 1.3"/259*): Both of these pairs are in the same FOV. Surprisingly, Struve 3057 was the first one suspected as double, even with the fainter companion. It took a great deal of averted vision to get the companion to 3062 in sight. Neither of these were seen well enough to determine PA at 166x. (in retrospect, 1.3" is a fairly tight pair for a 90mm 'scope. Tight, but not impossible.)

Struve 3053 (0h02.6, +66 06, 5.9/7.3, 15.2"/70*): Wow!! A very pretty pair at 39x. I saw it as a pale yellow and blue. Unequal, but very easy. Companion is at approx. PA 90*, and further examination refined this to PA of 80*. I'd like to measure this one someday.

Sigma Cas (23h59.0, +55 45, 5.0/7.1, 3.0"/326*): At 166x, Sigma Cas only showed a classic figure 8; not truly split. I estimated the PA at 135*/305* (couldn't distinguish which one was the primary...).

I rated that night as a 6 for seeing and about a 4.5 for transparency. Not that great, but a nice evening on the porch anyway. Hopefully in the next couple of months, I'll be treating you to my insights as a junior measurer of doubles. My EQ mount is nearly done, and I'm dying to try out the filar micrometer I made last year. You'll be the first to know how it works out.

If you would like to discuss these observations, or would like me to post some of your own, please contact me at tmrob@primenet.com

Dues Reminder

Just a friendly reminder that dues for the year 2001 are currently payable. If haven't already renewed your membership, please do so now, as you have only two newsletters left. The March issue will be the last un renewed members will receive. Also keep in mind that even if you renew after March ALL renewals are payable at a full years rate. Pro-rating of dues is applicable only to new memberships, so there is no point in waiting.

Please send your remittance to the good Dr. Peggy Kain using the form on page 11 of this issue. You can either mail it to her (the address is on the form, or see her in person at our General Meetings. Peggy can also handle your magazine subscriptions at the same time.

January 2001

SUN	MON	TUE	WED	THU	FRI	SAT
	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			

Schedule of Events for January 2001

Jan 2nd	Moon at First Quarter, 1531 mst
Jan 3rd	Quartrantid meteor shower
Jan 9th	Full Moon 1324
Jan 12th	1st SAC General Meeting of the new Millenium 1930, Grand Canyon University, Guest Speaker TBA
Jan 16th	Moon at 3rd quarter at 0535 mst
Jan 20th	1st SAC Star party of the new millenium at Flat Iron. Sunset 1751, Ast Twilight ends 1917, Moonrise 0524
Jan 24th	Moon is new at 0607 mst
Jan 28th	Mercury at greatest eastern elongation.

Future Planning

March 24-25	2001 All Arizona Messier Marathon
April 21-22	2001 Sentinel Schwaar Star Gaze
May 25-28	Riverside Telescope Makers Conference
June 16-25	Grand Canyon Star Party

Contributing to SACnews

Ok, I know some of you got some new stuff for Christmas. I also know that you've been out observing. Why not join the ranks of contributors to your newsletter? You don't need to be an English major. Just write down some words about your new toy, what you liked and didn't like, it's value and so forth and send it on to me. Had a memorable observing experience? Let us know about it. After all, we are a group of Observers. Who knows maybe your experiences will inspire others to get out and observe.

If you haven't contributed before here are some guidelines that will make your poor old editor's life easier. I've also included a table of deadlines for each issue. Should you have any questions, feel free to contact me. Should you come across any articles in other newsletters or other sources you think would be of interest, let me know. I would ask that you provide me with the authors contact information so I can get proper permission to publish his/her work.

Articles

Articles for SACnews should be submitted either in ASCII Text format (*.txt) or Microsoft Word (*.doc) formats. If you sent it in Word, please help with the formatting. Use full justification and 12 point type, I use Swis 721 BT font, if you have it available, use it. It will save me time in changing it later. Try to keep article to about two pages, including table's photos or diagrams. Please spell-check your documents. Although I'll run spell check sometimes a typo will get through.

Tables and Ephemeris'

If you have a table of astronomical information, such as ephemeris, please try to arrange it in Microsoft Excel. If the table is part of an article

you should be able to embed the excel file into word. If you do not have access to excel, any spreadsheet program would do, or you could use the table function in Word. As a last resort, try to type the table as clearly as possible with enough space between entries that my scanner will recognize it as a table. I'll scan the information and convert it. Include information where the table is to be placed in the article if it is not obvious. Keep in mind this can take me some time to do and may delay publication. If your information is time sensitive, try to give me as much lead-time as possible.

Photographs

Keep in mind the limitations on what I can do with pictures. Astrophoto's will probably not print well unless they are of the moon. For best results, pictures should have good contrast and a moderately light background. I can work with most picture and graphic file formats, but prefer JPEG, particularly if you're sending me the picture via e-mail. I can scan prints, but once again give me plenty of lead time and include a SASE for return of the original, or contact me to find out what meeting or star party we'll both be at so I can return the original.

Deadlines & Contact Info

In order to have the newsletter ready for distribution at the meetings, I need to have all articles, photos, etc. to me by the Friday prior to the meeting. Submissions after this date may not make it into that particular issue. Keep in mind that currently, the newsletter is 12 pages. Of this 5 pages are reserved for regular features. I will do my best to get your submissions published as soon as practical, but space

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constraints may delay publication. Hopefully my test to see how many pages the post office will take on one stamp will allow me to increase the size of the newsletter to 14 pages. If you have any questions regarding suitability and format of something you'd like to submit, contact me at the following numbers and address:

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Newsletter Deadlines			
Issue	Deadline	Issue	Deadline
February	Jan 5ht, 2001	August	June 29th
March	Feb. 2nd, 2001	September	Sept. 21st, 2001
April	Mar. 2nd,2001	October	Oct. 19th, 2001
May	April 1st, 2001	November	Nov. 23rd, 2001
June	April 27th, 2001	December	Dec. 14th, 2001
July	June 1st, 2001		

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Orion. I imagine Thad was getting tired of hearing my tape recorder count off 15-second intervals. I kept notes for each exposure as to time, what I shot and camera settings. This will enable me to figure out which exposure times and settings worked best for each shot.

Next step: getting the photos developed. Once again I reaped the benefits of Steve experience and brought the slides to Moto Photo at Metrocenter. According to Steve, he has them well trained. When I got the Slides back Monday, I had to check in the car. I think I let out

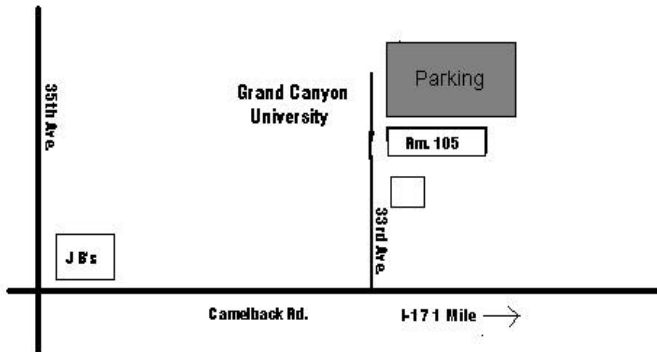
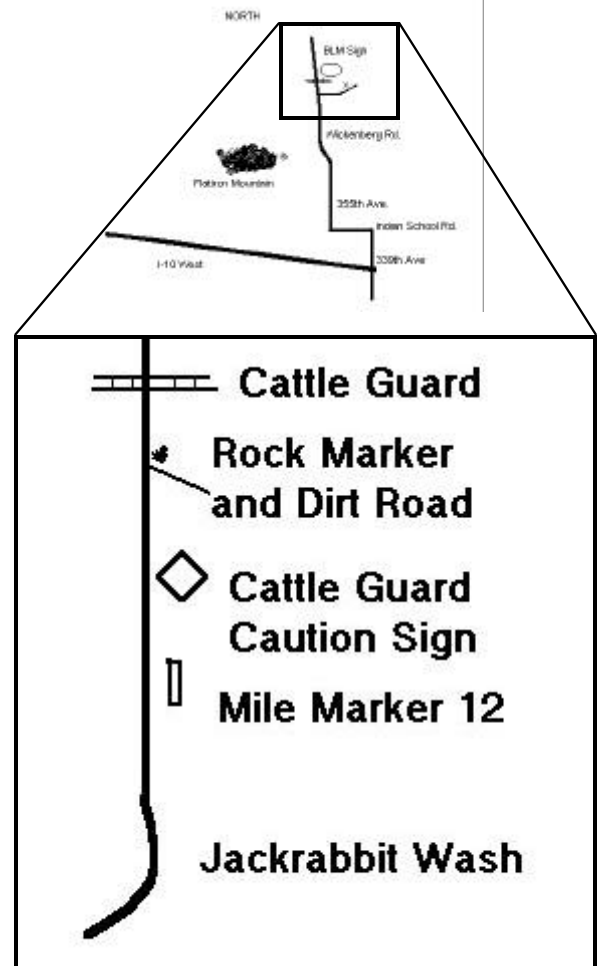
one big yelp of joy when the first slide I held to the light clearly showed Ursa Major. I got at least one good slide for each of the areas I shot, (which is the purpose of bracketing). The results far exceeded my expectations for a first effort.

Astrophotography had always been sort of intimidating to me. I'm glad I got past the horror stories of getting started and took the plunge. It was easier than I could've imagined and good results are well within the reach of anyone in this club. If you haven't tried yet, do so. You'll be glad you did.

SAC Meeting and Observing Sites

7:30 p.m. at Grand Canyon University, Fleming Building, Room 105: 1 mile west of I-17 on Camelback Rd., North on 33rd Ave., Second building on the right. Note: The I-17 exit at Camelback Will be Closed through October due to construction. Use either Indian School or Bethany Home Rd. Exits.

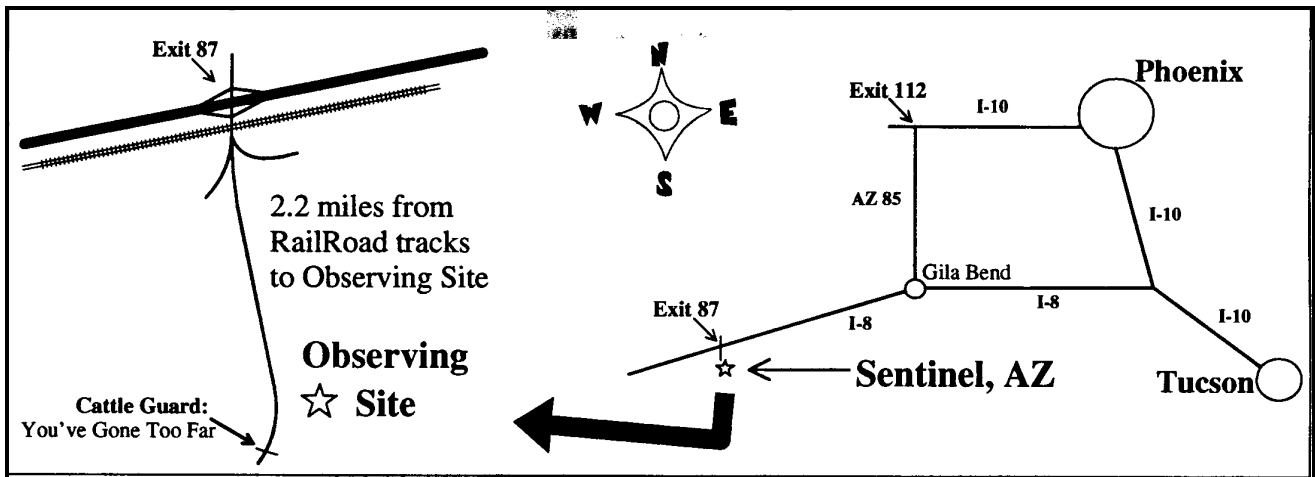
Flatiron Star Parties



Eagle Eye Star Parties



Sentinel Star Parties



SAC Membership Services Membership

Memberships are for the following calendar year and are pro-rated for new members as follows:
Jan.-Mar. 100%, Apr.-Jun. 75%; Jul.-Sep. 50%, Oct.- Dec, 25%

\$ 28.00	Individual Membership
\$ 42.00	Family Membership (one newsletter)
\$100.00	Business Membership (includes advertising)
\$ 14.00	Newsletter only
\$ 4.00	Nametag for Members

Subscription Services

The following magazines are available to members. Subscribe or renew by paying the club treasurer. You will receive the discounted club rate only by allowing the club treasurer to renew your subscription.

\$ 30.00/yr	Sky & Telescope
\$ 29.00/yr	Astronomy

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**Have a Happy and safe,
Moiston free
New Year.**

Rick Tejera

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Videmus Stellae

[www. Saguaroastro.org](http://www.Saguaroastro.org)

SAC Schedule of Events

SAC Meetings

January 21, 2000	July 14, 2000
Feb 18, 2000	August 11, 2000
March 17, 2000	September 15, 2000
April 14, 2000	October 13, 2000
May 19, 2000	November 10, 2000
Jun 16, 2000	December 9, 2000 (Holiday Party)

Deep Sky Group Meetings

February 24, 2000	August 17, 2000
April 20, 2000	October 19, 2000
June 22, 2000	December 14, 2000

SAC Star Parties

Date	Sunset	Astronomical Twilight Ends	Moonrise
1/29	1759	1924	0245
2/26	1824	1947	0131
3/25	1846	2010	2320
4/22	1907	2036	2350
5/27	1932	2111	0224
6/24	1944	2126	0056
7/22	1937	2114	2329
8/19	1911	2040	2204
9/23	1825	1948	0244
10/21	1750	1912	0141
11/18	1727	1853	0039
12/16	1725	1854	2336