

Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



March 1997 — Issue #242

v3.11

Getting Started Finding Your Way in The Sky

by Wil Milan
Part II

This article was written for SACNEWS and is Copyright © 1997 by Wil Milan (wmilan@airdigital.com). All rights reserved.

In Part 1 of this article we discussed the celestial coordinate system — right ascension, declination, and the “celestial clock.” In this installment we’ll see how the coordinates of a celestial object — a star, a Messier object, anything — can be used to locate that object. But we’ll start, not by locating it in the sky, but on a sky chart. And for that we’ll need some equipment.

What you need

I’ll assume you already have a good pair of low-power (10x or less) binoculars, the use of which we’ll get to later. After that, the most basic thing you need to find objects in the sky is a good sky chart. Unfortunately, sky charts are a bit like screwdrivers: they come in several sizes, and the best one to use depends on the situation.

What you *don’t* need to start out is a large, heavy, and expensive set of star charts. The most common of these is Tirion and Rappaport’s excellent *Uranometria 2000.0*. Excellent, that is, if what you want is a three-volume set that weighs more than 10 lbs and pinpoints more than 300,000 stars much dimmer than the eye can see. *Uranometria 2000.0* is just the thing if you are trying to document the exact position of the new comet you’ve just discovered, but if you’re not then you’ll likely find its heft and price (over \$100 for the full set) more than a bit inconvenient.

A better choice for starting out is the *Bright Star Atlas*, also by Wil Tirion. (If you shop for star charts you’ll find that Wil Tirion’s name is attached to most of the good ones.) For about \$10 you’ll find charts for all the stars visible to the naked eye, listings and locations of hundreds of nebulae, galaxies and clusters, and a set of

Quick Calendar

SAC Star Party
Buckeye Hills Recreation Area
Saturday, March 1

Arizona Messier Marathon
Arizona City Site
Saturday, March 8

SAC Meeting
7:30 PM, Friday, March 21

Public Star Party
Lunar Eclipse, Hale-Bopp, Mars
Thunderbird Park, 59th Ave, North of Beardsley
6:30–10 PM, Sunday, March 23

SAC Deep-Sky Meeting
7:30 PM, Thursday, March 27

SAC Star Party
Buckeye Hills Recreation Area
Saturday, March 29

Sentinel Star Gaze
Sentinel, Arizona
Saturday, April 5

handy locator charts so you can find which constellations are in the sky at any given time. The *Bright Star Atlas* is also very portable, about the size of a very thin magazine,

SAC Officers

Area Code (602)

President	Adam Sunshine	780-1386 asunshine@netzone.com
Vice President	Gerry Rattley	892-5698
Treasurer	Regina Lawless	
Secretary	David Fredericksen	979-0513
Properties	Jack Jones	944-5488 jack.jones@cas.honeywell.com
Public Events	Rich Walker	997-0711
Deep-Sky Group	A.J. Crayon	938-3277 a.crayon@az05.bull.com
SACNEWS Editor	Paul Dickson	862-4678 FAX: 841-0509 dickson@primenet.com

DIM MOMENTS
IN
**AMATEUR
ASTRONOMY**

by Paul Dickson

THE NEWER AND
MORE POWERFUL
THE TELESCOPE
OPTICS...

...THE FEWER
CLOUD-FREE
NIGHTS

and thus painless to tote along anytime.

If you're willing to spend a bit more and tote a bit more weight, Tirion's *Bright Star Atlas* is available another way: bound in the back of *Binocular Astronomy* by Craig Crossen and Wil Tirion. This excellent volume not only offers a nice set of star charts, but the rest of the text is a well-written and easy-to-follow guide to many of the most interesting objects in the sky. The descriptions of each object often include photos and detailed location charts for the more difficult objects. Don't be fooled by the title; this book is an interesting sky guide for any small telescope, and in fact many of the objects mentioned would be beyond the reach of most binoculars. If I could recommend only one guide to the night sky, this would be it.

There is one other type of sky chart which is perhaps not required, but you may find very useful: a planisphere.

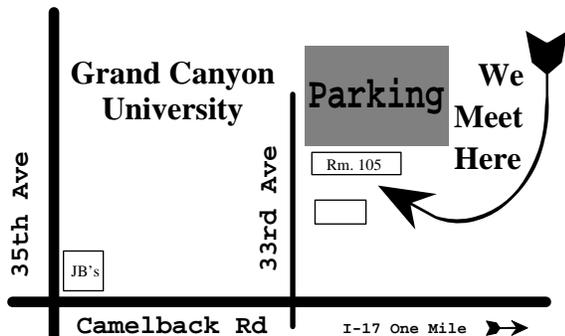
The most common of these is the Philips' Planisphere, available for a few dollars at any astronomy shop, mail order dealer, or even in many nature stores and bookstores.

A planisphere is a curious sort of chart: In its most common form, it's a round chart of an entire hemisphere of the sky (in the U.S. you would want the northern-hemisphere version, of course), overlaid with a clear plastic "window" which shows a portion of the circular chart at a time. The "window" and the circular chart are riveted together in the center so that the window can rotate to show any part of the underlying sky chart. Around the rim are scales for the day of the year and the time of day.

The clever thing about a planisphere is that by aligning the time of day with the current date, the oval window displays what the sky will look like at the given date and time. This is a wonderful thing for planning your observ-

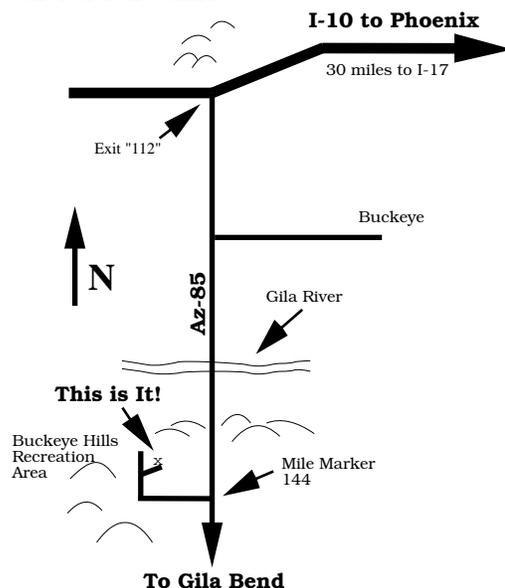
Directions to SAC Events

SAC General Meetings 7:30 PM at Grand Canyon University, Fleming Building, Room 105 — 1 mile west of Interstate 17 on Camelback Rd., north on 33rd Ave., second building on the right.



SAC Deep Sky Subgroup Meeting at John & Tom McGrath's, 11239 N. 75th St., Scottsdale, 998-4661 — Scottsdale Rd. north, Cholla St. east to 75th St., southeast corner.

SAC Star Parties at Buckeye Hills Recreation Area Interstate 10 west to Exit 112 (30 miles west of Interstate 17), then south for 10.5 miles, right at entrance to recreation area, one-half mile, on the right. No water and only pit toilets. Please arrive before sunset; allow one hour from central Phoenix.



ing sessions: Even while it's still daylight, you can dial up the date and time when you'll be observing and you can immediately see which constellations will be up and in which portions of the sky they will be. By dialing in 9 PM on March 15, for instance, you can immediately see that Orion will be in the western sky, Cancer will be straight up, Leo high in the east, and Virgo just rising. At night, by holding the planisphere overhead you can easily align it with the sky and pick out all the major constellations. Conversely, you can also rotate the window to show a constellation you want to see, and read along the scale at what dates and times it will be visible. A very handy

gadget; I never leave home without one.

If you do get a planisphere, be aware of two things:

- Planispheres are made for specific latitudes. The design latitude of the planisphere you get doesn't have to match your observing latitude exactly, but it should not be too far off—say, within five degrees or so.
- The popular Philips' Planisphere is made in two sizes, a 6" diameter and a 10" diameter. While I find the small one handy to keep in a binocular case, the larger one is much easier to read and therefore much more useful overall.

Comet Comments

by Don Machholz

(916) 346-8963 CC223.TXT February 9, 1997
DonM353259@aol.com

1995 O1 (Hale-Bopp)					
Date	RA-2000-Dec	Elong	Sky	Mag	
02-26	21h06.9m	+31°10'	45°	M	-0.1
03-03	21h34.1m	+34°57'	46°	M	-0.4
03-08	22h06.8m	+38°40'	46°	M	-0.6
03-13	22h45.8m	+41°58'	46°	M	-0.9
03-18	23h30.8m	+44°28'	46°	M	-1.0
03-23	00h20.2m	+45°46'	45°	E	-1.1
03-28	01h10.4m	+45°38'	44°	E	-1.2
04-02	01h57.5m	+44°11'	42°	E	-1.1
04-07	02h38.9m	+41°43'	41°	E	-1.0

Comet Hale-Bopp is putting on a fine show in the morning sky. Look for numerous jets near the center of the coma and a tail several degrees long. Joining the comet in the sky is a total solar eclipse on March 9 (from Siberia) and a partial lunar eclipse on March 23 (over most of the U.S.A.). Throughout the month of March the comet's visibility in the evening western sky improves, while in the morning eastern sky the comet gets more difficult to see. As we reach perihelion (April 1) Comet Hale-Bopp will be a bright spectacular comet in the western sky as darkness falls each evening. Get out to see it, and show your friends, you are not likely to see this large a comet for a long, long time.

This year's first three comet discoveries have taken place. **Comet C/1997 A1 (NEAT)** was found by au-

tomated equipment in Hawaii on Jan. 10, it will remain faint. **Periodic Comet P/1997 B1 (Kobayashi)** was found on Jan. 30. It was at first believed to be an asteroid, but has been showing cometary features. It orbits the sun every 26 years and always stays fainter than magnitude 16. Finally, **Comet C/1997 C1 (Gehrels)** was found by Tom Gehrels visually with the Spacewatch 36" telescope on Kitt Peak on Feb. 1. The comet was at magnitude 17 when found, but may reach magnitude 10 early next year.

This column can now found at:

<http://members.aol.com/cometcom/>

46P/Wirtanen					
Date	RA-2000-Dec	Elong	Sky	Mag	
02-26	01h23.2m	+05°27'	44°	E	10.5
03-03	01h40.9m	+07°59'	44°	E	10.4
03-08	01h59.2m	+10°32'	44°	E	10.4
03-13	02h18.3m	+13°04'	44°	E	10.3
03-18	02h38.1m	+15°32'	45°	E	10.3
03-23	02h58.6m	+17°55'	45°	E	10.3
03-28	03h19.9m	+20°10'	46°	E	10.4
04-02	03h41.9m	+22°16'	46°	E	10.5
04-07	04h04.5m	+24°10'	47°	E	10.6

81P/Wild 2					
Date	RA-2000-Dec	Elong	Sky	Mag	
02-26	07h46.5m	+21°21'	137°	E	10.2
03-03	07h47.1m	+21°37'	132°	E	10.2
03-08	07h49.0m	+21°49'	128°	E	10.2
03-13	07h52.1m	+21°57'	123°	E	10.1
03-18	07h56.3m	+22°00'	119°	E	10.1
03-23	08h01.7m	+21°59'	115°	E	10.1
03-28	08h08.2m	+21°54'	112°	E	10.1
04-02	08h15.6m	+21°43'	109°	E	10.1
04-07	08h23.9m	+21°28'	106°	E	10.1

Orbital Elements

Object:	Hale-Bopp	P/Wirtanen	P/Wild 2
Peri Date:	1997 04 01.13453	1997 03 14.14299	1997 05 06.62789
Peri Dist:	0.9141030 AU	1.0637469 AU	1.5826156 AU
Arg/Peri (2000)	130.59083°	356.34322°	041.77000°
Asc Node (2000)	282.47069°	082.20387°	136.15458°
Incl (2000):	089.42936°	011.72255°	003.24276°
Eccentricity:	0.9950969	0.6567490	0.5402220
Orbital Period:	~4700 years	5.46 years	6.39 years
Reference:	MPC 28052	MPC 27080	MPC 28272
Epoch:	1997 03 13	1997 03 13	1997 04 22
Absol Mag/"n":	-1.5/4.0	9.0/6.0	7.0/6.0

Fuzzy Spot

by Ken Reeves

Monoceros

March 1997

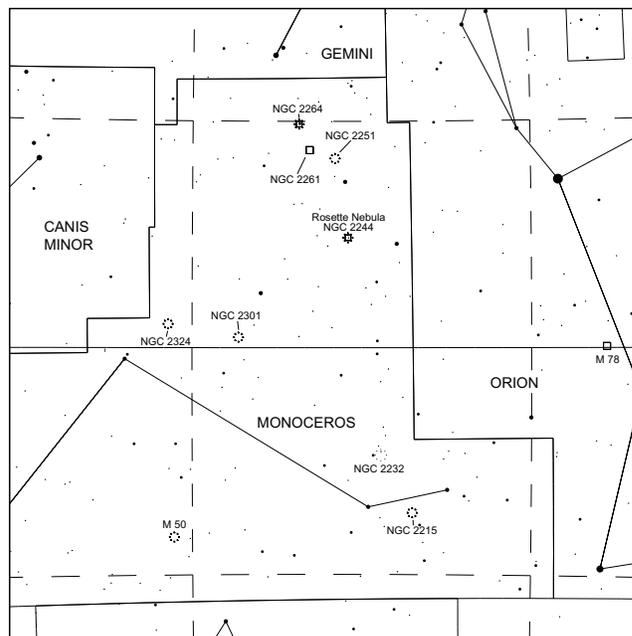
Monoceros lies in an area of the sky roughly bordered by Orion, Canis Major, and Canis minor. I used to have problems with the name until I discovered that it rhymed with rhinoceros, and with the Monoceros meaning the unicorn, it made sense. Although there are no bright stars in this constellation, the area is filled with numerous deep sky objects. One of the toughest parts about finding the objects is finding the appropriate naked eye star to start a star hop. However, take the time, the results are well worth the effort. All these observations were taken with my 10" f/4.5 scope at Buckeye Hills on a night I rated 8/10 for seeing and 6/10 for transparency.

NGC 2215 (06 21.0 -07 17) At 70x, I saw this cluster as pretty big, somewhat bright, not very rich or condensed. There were 2 levels of stars with a star count of about 25 stars. The cluster is triangular or arrow head in shape pointing to the E.

NGC 2232 (06 26.6 -04 45) This is a confusing cluster, I saw about 20 stars including a bright central star, very bright, very large, pretty poor and not at all condensed. The brightest stars form a V shape pointing to the N. It is hard to tell what is the cluster as there are some other groups in the area, however this group is the most obvious and is at the location indicated in Uranometria 2000. Also with the background so rich, it is hard to tell where the cluster ends.

NGC 2244 (06 32.4 +04 52), also **NGC 2237**, **2238**, **2239**, and **2246**. This group of clusters and nebulae is the **Rosette Nebula**, 2244 and 2239 being the cluster and 2237, 2238, and 2246 being the nebula.

Use low power when looking at this object. At 35x I saw the cluster as pretty bright, very large, very loose, not at all rich, with 15 stars in 3 levels, including a fairly bright yellow star. I also observed a starless area to the W of the cluster. This was the only indication I had of the nebula without the filter. However, when I used the UHC filter, the nebula really jumped out. The starless area to the W of the cluster is the largest area, grey without any detail. To the E and SE the nebula is smaller, but much more detailed including many dark areas. This is definitely one of the beauties in Monoceros.



NGC 2251 (06 34.7 +08 22) This cluster is split into 3 groups with the whole cluster elongated E/W. I saw about 20 stars in 2 levels, somewhat bright, somewhat large, poor, not condensed. Not much of a cluster here, but the elongation and groupings are unusual for an open cluster.

Now that you have a sky chart...

Now that you have at least a sky chart, let's see how we go about finding an object. Let's start with a very easy one: the Orion Nebula, also known as Messier 42 or just M42. This is probably the best known and most easily located nebula in the sky, but even if you can find it with your eyes closed, follow along to understand the technique.

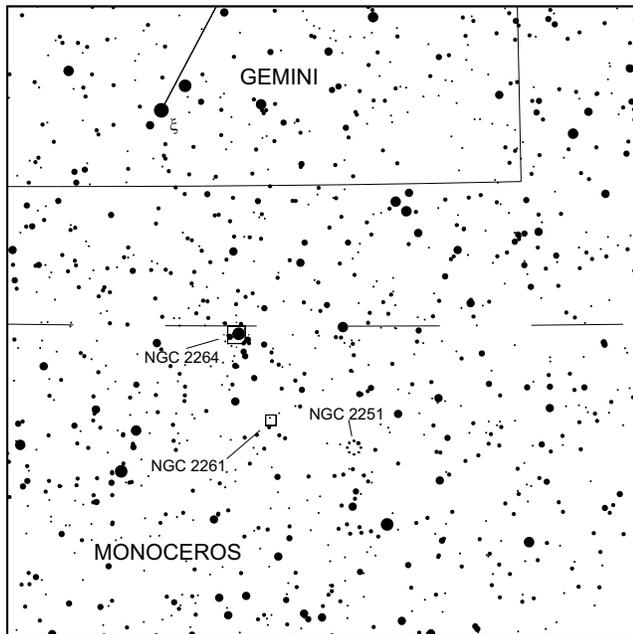
Let's start by finding the coordinates of M42: 5h35m (5 hours, 35 minutes) right ascension, -5 degrees 23 minutes declination. You can get these coordinates in any listing of deep-sky objects, or most sky charts have listings of common deep-sky objects and their coordinates.

Now let's find M42 by its coordinates — not in the sky, but on the sky chart. Turn to the page in your sky chart where the constellation Orion is shown. If you're following along in the *Bright Star Atlas*, that's page 4,

which you can locate by using the round constellation finder charts on the back cover. Other star charts should have similar finder charts for finding on which page a given constellation lies.

Looking at the page which contains Orion, note that along the edges are listed the sky coordinates: the hours and minutes of right ascension running east and west (usually marked along the top and bottom borders of the page) and degrees and minutes of declination running north and south (usually marked along the right and left margins). Looking along the right ascension scale, look between the 5h (5 hours) and 6h (6 hours) markings and estimate where the 35-minute mark would lie between 5h and 6h. This is 5 hours, 35 minutes of right ascension, which is the right ascension of M42. Mark where the 5h35m line would cross the constellation Orion. (It'll cross right along Orion's sword and through the middle of his belt.)

NGC 2261 (06 39.2 +08 44) This is **Hubble's Variable Nebula**. At 140x, I saw this as pretty small, pretty bright, fan shaped with the head on the south end. This very much looks like a small comet with a wide tail. The star at the head comes and goes, and averted vision helps extend the tail. This is a very unusual object, hard to describe, and quite a beauty.



NGC 2264 (06 41.1 +09 53) This is an open cluster contained in a very large field of nebulosity, includ-

ing the cone nebula (which I was unable to observe). I saw the cluster as extremely large, very bright, very poor, not at all condensed. The stars form a rough shape of a Christmas tree with a bright star on the N forming the trunk and a double star on the S forming the top. According to pictures and maps, the cone would point down to the top of the tree. Some nebulosity was seen around the W end near the base, and possibly around the base star. Using the UHC filter did not seem to enhance the nebulosity at all.

NGC 2301 (06 51.8 +00 28) This cluster is one of my favorites in Monoceros. I saw this as very large, pretty bright, somewhat compressed, a little rich, with a very nice yellow/blue double star in the middle. About 50 stars were seen in 4 levels, with stars radiating out from the center forming sort of an X. This was a perfect object to end the evening.

NGC 2324 (07 04.2 +01 03) At 100x, I saw this cluster as somewhat faint, pretty large, very rich, and very compressed. 3 levels of stars were noted over a very granular haze, with about 30 counted and many more suspected with averted vision. I estimated that if I really studied this cluster or used a larger telescope, I would count about 100 stars.

Herschel 400 Objects

2185, 2215, 2232, 2244, 2251, 2264, 2286, 2301
2311, 2324, 2335, 2343, 2353, 2506

SAC's 110 Best of the NGC Objects

2244, 2261

Now look along the declination scale and find the space between the -5 degree and -6 degree marks. On the declination scale there are 60 minutes to each degree, so estimate where the 23-minute mark would lie between -5 and -6 degrees. 23 minutes is about $1/3$ of 60, so $1/3$ of the way from -5 to -6 is close enough. Once you locate that point, mark where the -5 degree, 23-minute line would cross Orion. You'll find that it crosses right through the middle of Orion's sword. Because the 5h35m right-ascension line we drew before crossed right along the sword, the middle of the sword is where the right ascension and declination coordinates meet — and there indeed is M 42, right in the center of Orion's sword, easily visible in binoculars or even with the naked eye as a fuzzy spot.

OK, that was too easy...

OK, OK, M 42 was too easy. M 42 is so popular and so easy to find that you probably knew that one already. So let's try one that may be a bit more challenging: M 78, also in Orion. Note that M 78 is not nearly as large or bright as M 42, so if you live in the city you may need a darker site or something larger than binoculars to find it.

M 78's coordinates are 5h47m right ascension, 0 degrees 6 minutes declination. Looking again on the chart page containing Orion, find 5 hours, 47 minutes along the right ascension scale. Draw a line (or just lay a straight-edge) from there through Orion. You'll find that the line

from 5 hours, 47 minutes runs along the east side of Orion, just to the left of his belt if you're looking with north behind you.

Now look along the declination scale and find 0 (zero) degrees. (If you were awake when you read Part 1 of this article, you'll recall the zero-degree declination line is the celestial equator. The celestial equator happens to run right through Orion.) Since the declination we want is only 6 minutes ($1/10$ th of a degree) above zero degrees, look just above the zero-degree mark and lay the straightedge from there to Orion. You'll find that it runs just above Orion's belt, and it meets our right-ascension line just north and east (above and left, if looking south) of the eastern-most (left-most) star of Orion's belt. If you're looking on a good star chart you'll see a little marker here which marks this as the location of M 78 (or NGC 2068/71, which is the New General Catalogue — "NGC" — designation for the same thing).

Now this is where it gets a bit tricky: Not only is M 78 much smaller and dimmer than M 42 was, but it doesn't have any convenient bright stars right next to it. There are some fairly bright stars not far from it, but nothing immediately adjacent to serve as markers, as do the stars of Orion's sword for M 42. So how to find it in the sky? Two things to do:

- First, look up in the sky and find Orion. Orion hap-

pens to be about the easiest constellation to find, but if it were a more difficult constellation you would use the whole star chart page (or a planisphere) to locate the constellation. (If you're trying to find an object and the seeing is so poor that you can't even see the constellation, that's often a good clue that you should reserve that object for when you're under better observing conditions.)

- Second, with Orion in sight, look down at the star chart and freeze in your mind the location of M 78 within the pattern of Orion's brighter stars. Note, for instance, that (again, if looking toward the south) M 78 is about 1/3 of the way from the left-most star of Orion's belt to the bright reddish star marking the upper left corner of Orion. (That bright reddish star is Betelgeuse—a good star name to learn.) With the chart location of M 78 frozen in your mind's eye, look up in the sky and look in the same spot with your binoculars—and there will be M 78, assuming the local light pollution doesn't overwhelm it.

Note that we used binoculars to find the object. Most deep-sky objects are too dim to be seen with the unaided eye, but don't be tempted to look for the object with a telescope unless the telescope is capable of low power comparable with binoculars—say, no more than 10x. Most telescopes cannot go that low and therefore show only a very narrow field, which makes it hard to locate objects. Binoculars, with their low-power, wide-field views are therefore much better suited to locating objects when you're not quite sure where they are in the sky.

Once you've spotted an object with binoculars you'll find you'll be able to picture its location and find it again very easily. Once you can find it with binoculars, you can then use the star patterns you can see with the binoculars to “walk” your telescope to the object from a nearby easily-located star. This process, known as “star-hopping,” makes it easy to point your scope at any object you can find with binoculars, but it depends on the wide-field view possible with binoculars to give you an overview of where you're “walking” the scope's narrow field of view.

A couple of other thoughts about star-hopping:

- Binoculars will always show a field of view which is right-side-up and correctly oriented left to right. Telescopes, however, offer a field of view which may be upside down, reversed left to right, rotated at an angle, or a combination of any of these. I wish I could suggest an easy way to deal with this, but I can't. The best solution I've found is that if the binoculars indicate I should move the scope in a given direction, I often look over the top of the scope—not through the eyepiece—and start to move it, then look through the eyepiece and see which the stars move when the scope is moving in that direction. Practice improves the technique, so don't give up if you're frustrated early on—it happens to everyone.
- If you have a large finder (7x50 or larger) on your scope you may be able to use the finder instead of binoculars

to locate objects. This has the advantage that when the finder is aimed the scope is also aimed, but it has a couple of significant disadvantages: (1) the view through a finder scope is usually upside down, making it much harder to make the mental jump from the image on the sky chart to the image in the finder, and (2) the finder scope, being attached to a much larger scope, is not nearly as easy to point and aim as a pair of binoculars.

Finally, a thought about locating objects too dim to see in binoculars or a finder scope: Don't, or at least don't try for them at first. Gain some practice with the Messier objects first, almost all of which are fairly easy to spot under dark skies with 7x50 or 10x50 binoculars. The Messier objects are also the “cream of the crop” of deep-sky objects, the ones you should go after before chasing any others. Once you have the expertise gained from locating the 110 Messier objects you'll have sufficient star-hopping experience that you can progress to dimmer and more elusive objects.

Above all, approach all this with a patient attitude. Don't turn it into a frantic chase, but a low-key meander for the most beautiful sights in the universe. In fact, you may find that some of the most beautiful sights you see you'll find on the way to others, and that's OK too—enjoy whatever you find, which is good advice for life in general, but particularly worthwhile for astronomers.

Newsletter Deadline

Mail items for Such-a-Deal at least two weeks before the end of the month. Articles that need to be published in a timely fashion must be submitted or the newsletter editor notified of the article at least 6 weeks before month they are published. Items arriving too late for an issue will be included in the next newsletter.

1997 Arizona Messier Marathon

Saturday, March 8, 1997

Saturday, March 8

6:29 PM Moon set, New Moon
 6:30 PM Sunset
 7:52 PM Evening Twilight Ends

Sunday, March 9

5:25 AM Morning Twilight Begins
 6:45 AM Sunrise
 7:11 AM Moonrise

Webster defines a marathon as a long distance race. Well the Messier Marathon is long all right; not in distance but in time. It is a one night observing session intended to view as much of the Messier Catalog as permitted by the evening, your observing skills and stamina!

The Saguaro Astronomy Club, of Phoenix Arizona, is pleased to sponsor the Fifth Annual Messier Marathon, coordinated by AJ Crayon, SAC Deep Sky Chairman and David Fredericksen. This is the largest observing session, as far as people and telescope counts, in Arizona and may well be the largest Messier Marathon!

The date is **Saturday, March 8, 1997** at a dark sky site south of Arizona City, AZ. The road from Arizona City to the site is dusty; but at the site itself is pretty well hard-packed. The site is private property, so we should give a special note of thanks to Ray Farnsworth for allowing us to use it.

As far as weather is concerned there have been times when it was cloudy and raining in Phoenix but clear at the site. You must guide yourself accordingly. See attached map for details.

If you are going to attend it is suggested that you arrive at the site at sunset at the latest. Observing times for the marathon are from sunset to sunrise.

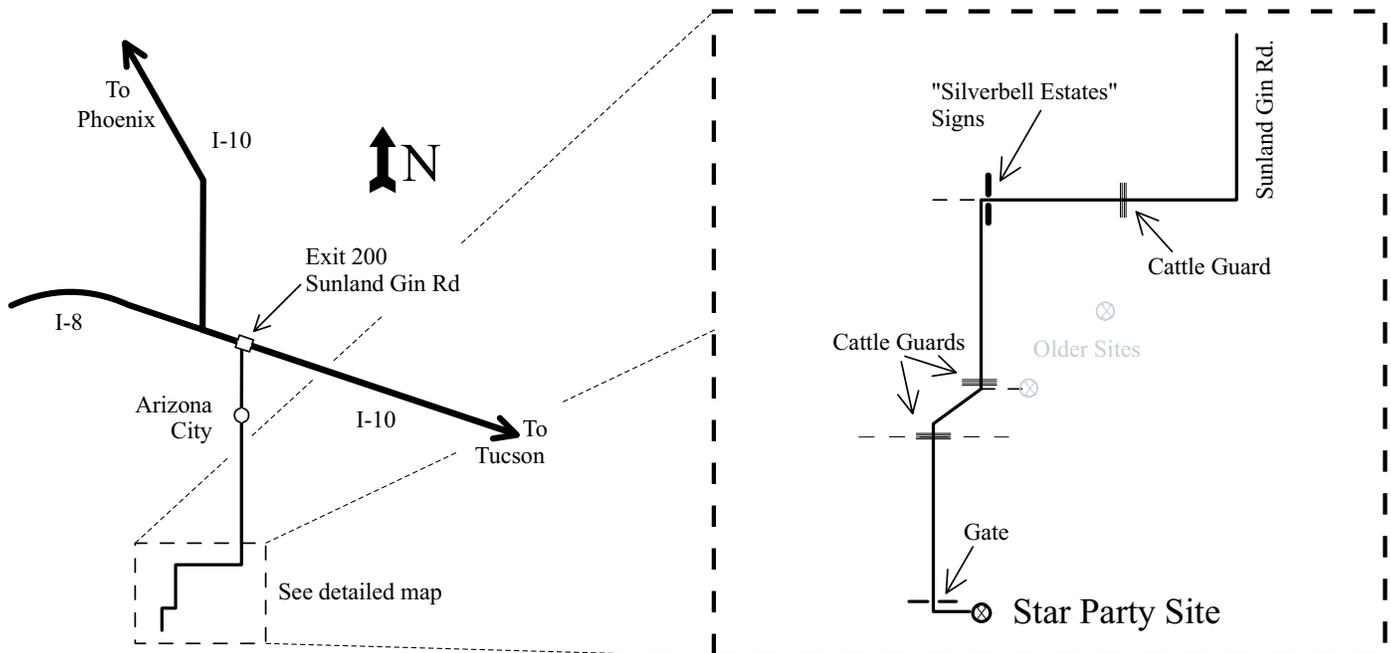
Evening objects that are hard to find will be M74 and M77. Amongst morning objects that will be difficult to get are M2, M72 and M73. Impossible will be M30 for it will not rise until well after morning twilight.

Awards —plaques suitable for mounting on a telescope— will be given for first, second and third highest totals. Certificates will be awarded to all bagging 50 or more! In order to qualify you need to get a check off list from one of the coordinators and fill it out. Since the price of the plaques can be significant for an otherwise free event we will depend on your club to pay for the awards won by its members.

For your comfort there will be a port-a-potty for those who prefer its comfort to that of the open desert.

Finally, for those who aren't interested in the marathon; come anyway! From counts of past years about half of the attendees do the marathon, the others observe, photograph or just relax and enjoy the night sky!

— A.J. Crayon, SAC Deep-Sky Chairman



Take I-10 to exit 200 (Sunland Gin Road.) Turn right (south) after exiting the freeway. After about 15 miles, the pavement ends and about one mile further, the road turns sharply to the west. After another four miles, the main road will turn south just after the "Silverbell Estates" signs. Three miles past the signs, the road will veer off to the west, and five miles further, the road will pass through a gate. Turn left immediately after the gate and continue for another 1/4 mile to the site.

Bits and Pieces

Cruise to '98 Eclipse

Steve Coe

As many of you know, there is an excellent solar eclipse on Feb. 26, 1998 near the Caribbean island of Aruba. Princess Cruises is planning a week long cruise into the path of the eclipse and you can join in with the Arizona eclipse chasers. There are 15 double occupancy cabins now available and they will go quickly on the sparkling new ship, Dawn Princess.

A deposit of \$200 will be required to confirm and hold your space on the cruise, with the total amount due by Nov. 1, 1997.

Welcome Aboard agency is holding three cabin types: 8 are BB category, which are outside/balcony cabins @ \$2,172 per person; 1 is F category, which is an inside cabin @ \$1,846 per person; 6 are JJ category, which are inside cabins @ \$1,712 per person.

This price includes round trip air fare to and from San Juan, Puerto Rico and all applicable port taxes for stops in St. Thomas, Dominica, Grenada and Caracas.

Our travel agent for this darkness at noon rendezvous is Biff Treston at Welcome Aboard in Scottsdale, Arizona. He is not an astronomer, but is learning by being around me for several hours. Biff can certainly answer any questions you might have concerning the cruise ships or accommodations. You may reach him at 946-5333 during the day, or 486-2819 at home; speak to Biff or Hymie.

I know that this seems very distant, but putting a group of this size together requires advance planning. I have no doubt that a winter eclipse in the Caribbean will attract large numbers of observers, so get on the phone to Biff or Hymie if you are interested in sailing to an eclipse.

Being an active Arizona astronomer for 20 years, I know for a fact that there are lots of interesting, exciting, knowledgeable and fun-loving folks around here. That is really the motivating factor about trying to get this together, an opportunity to meet and spend some time with a fun bunch under the Moon's shadow!

The 1997 Sentinel Star Gaze

April 5, 1997

This is the sixth annual Sentinel Star Gaze, sponsored by SAC's Deep Sky Group. Sentinel is a remote site situated between Gila Bend and Yuma (about 100 miles southwest of Phoenix) making for a very dark sky. On the day of the event sunset is just before 7 PM, with twilight ending at 8:20. Those staying the entire night can expect twilight to start at 4:50 AM, the Moon to rise at 5:48, and sunrise at 6:14 AM. For those of you with computers, the Sentinel site is at 32° 49.7' North by 113° 12' West, at 625 feet above sea level.

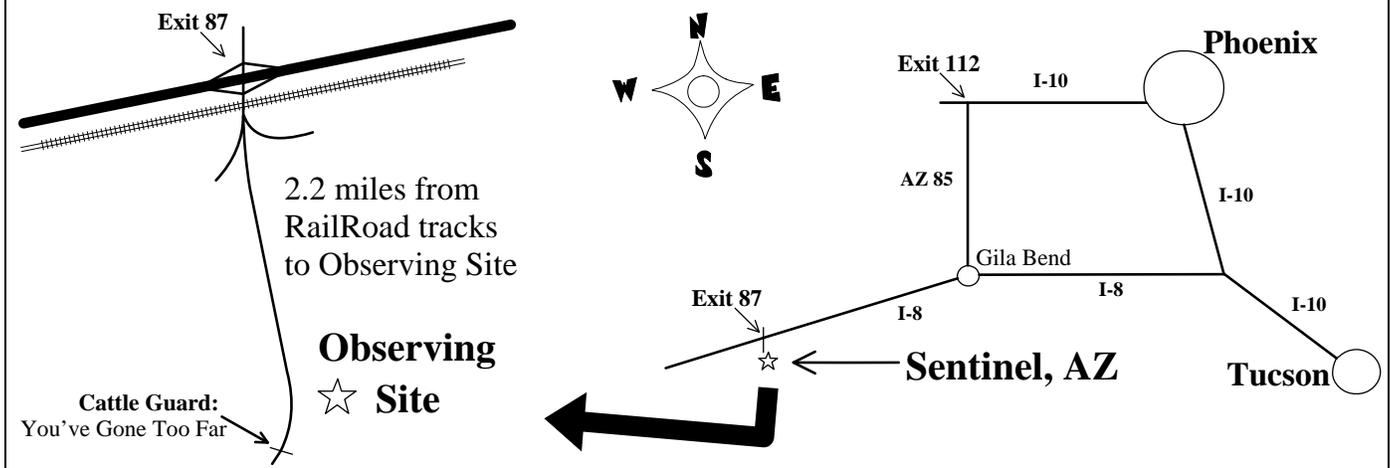
Although this is officially a one night event, frequently observers get a head-start by arriving the night before, to get an extra night of observing.

Sentinel is a good two hours drive southwest from down-town Phoenix. Please try to arrive before sunset.

A Port-a-Pottie will be provided, but there are no other facilities. Expect cold weather and hungry flying insects during twilight — let's hope we get neither.

Star Party Etiquette

1. **Do Not Litter!** If you bring it with you, please take it when you leave.
2. **No White Lights after Dark!** Use only dim red lights after sundown.
3. **Park Based on Your Observing Plan. Plan Your Departure.** Park facing towards the exit to avoid using your backup lights.
4. **Bring Observers Only.** Please leave small children and pets at home.
5. **Keep Noise to a Minimum.**



Minutes from the January 30th Board Meeting

On January 30, a Board Meeting was held at the McGrath's house before the Deep-Sky Meeting. Present for the meeting were Steve Coe, A.J. Crayon, Paul Dickson, Jack Jones, Regina Lawless, Gerry Rattley, Adam Sunshine, and Rich Walker. The meeting started at 7:05.

Regina gave a brief summary of the budget situation, saying that we are in good shape this year. SAC also purchased a second box of the R.A.S.C. *Observer's Handbooks*.

A.J. gave an update on how things are going with setting up the Messier Marathon. The notices and letters have been sent to most Arizona astronomy clubs and everything else seems ready to go.

Steve Coe briefly said that the Sentinel Star Gaze was scheduled and what little activities needed to be done were just about completed. A.J. will check on the Port-a-Jon when he rents one for the Messier Marathon.

Paul gave a short report on the guest newsletters that are mailed out. These include the sign-ins in the guest book at meetings and phone contacts. He reported that for the past year of records, one in six newsletters mailed

out resulted in a new SAC member.

Paul mentioned that he was down to 17 remaining copies of *SAC's 110 Best of the NGC* and would need funds soon for a new printing. The board readily agreed.

Steve gave a brief report of the activities of the Twentieth Anniversary Committee. He ask some questions of the board and reported he hadn't settled on anything definite yet.

Rich briefly mentioned the public star party for March 23 at Thunderbird Park.

The meeting ended at 7:37.

—Paul Dickson, Acting Secretary

Deep-Sky Group Meeting

The Deep-Sky Group is a Special Interest Group made up of people who like to discuss observing and observing techniques. They particularly like to observe objects out past the Orrt Cloud that's why they're called the Deep-Sky Group. The type of objects include stars, nebulae, and galaxies.

If you are interested in sharing your observations, or

Universal Time and Date of Total Lunar Occultations for Phoenix (33.5° Lat., 112.0°W Long.)

Date	Time ¹	Time ²	Mag	Star Information	PH	PA ¹	PA ²	PS	Elong	MAL	MAZ	SAL	SAZ
04/11		04:53:59	1.1	ZC0692 (α Tau)	DD		105	28	051	8	285	-34	312
04/14	06:09:15	06:09:59	3.7	ZC1106 (λ Gem)	DD	149	165	49	088	24	276	-43	333
05/04	13:56:50	13:56:00	0.8	Saturn	DB	087	078	15	332	32	108	16	81
05/04	15:03:24	15:03:03	0.8	Saturn	RD	223	234	15	333	45	122	30	90
07/29	09:16:35		1.1	ZC0692 (α Tau)	DB	032		34	300	6	74	-32	29
07/29	09:55:15	09:55:39	1.1	ZC0692 (α Tau)	RD	301	314	33	300	14	79	-28	39
08/25	08:31:47	08:31:29	3.9	ZC0635 (γ Tau)	RD	247	256	50	271	21	84	-43	21
08/25	17:18:24	17:18:58	1.1	ZC0692 (α Tau)	DB	078	083	47	276	40	264	53	120
08/25	18:28:26	18:28:41	1.1	ZC0692 (α Tau)	RD	278	271	47	276	26	274	64	146
09/18	10:18:21	10:17:06	0.3	Saturn	DB	030	015	87	203	55	220	-35	59
09/18	11:17:12	11:18:56	0.3	Saturn	RD	283	295	87	203	46	238	-24	70
09/19	12:03:36	12:01:16	4.5	ZC0327 (ξ 1 Cet)	RD	177	193	79	217	51	240	-15	78
10/19	05:01:41	05:02:01	3.6	ZC0671 (θ 2 Tau)	RD	219	229	75	224	21	84	-52	301
10/19	05:06:24	05:06:31	4.0	ZC0669 (θ 1 Tau)	RD	241	250	75	224	22	84	-53	302
10/19	06:07:39	06:07:18	4.8	ZC0677 (Double)	RD	262	272	75	225	34	92	-62	324
10/19	07:51:32	07:50:18	1.1	ZC0692 (α Tau)	DB	076	065	74	226	55	110	-65	23
10/19	09:12:56	09:12:49	1.1	ZC0692 (α Tau)	RD	255	264	74	227	69	137	-64	57
12/09	07:24:47	07:25:17	0.6	Saturn	DD	058	054	67	121	24	257	-79	7
12/09	08:25:03	08:25:23	0.6	Saturn	RB	264	265	68	122	12	266	-72	58
12/13	04:00:47	03:59:23	1.1	ZC0692 (α Tau)	DD	101	089	96	173	52	106	-45	272
12/13	05:12:30	05:12:24	1.1	ZC0692 (α Tau)	RB	228	239	96	173	65	126	-60	282
12/19	09:03:48	09:02:43	4.6	ZC1486 (31A Leo)	RD	286	283	63	248	47	113	-66	72

NOTES:

Subtract 7 hours for correct Mountain Standard Time and Day.

Time¹ = Hrs:Min:Sec (Std Sta NM)

Time² = Hrs:Min:Sec (Std Sta LA)

PH = Phenomenon, i.e. RD = (R)eappearance on (D)ark Limb

PA¹ = Position Angle of star from north point of moon (90=East) (NM Std Sta)

PA² = Position Angle of star from north point of moon (90=East) (LA Std Sta)

PS = Percent Sunlit

Elong = Elongation of moon from sun (180 = full; 270 = 3rd Qtr)

MAL = Moon Altitude in degrees (90 = directly overhead)

MAZ = Moon Azimuth (90 = East)

SAL; SAZ = Sun Altitude; Azimuth

Blanks = Not Listed at Standard Station

Compiled by Brian K. Vorndam, for more info call him at (520) 726-3151.

are interested in observing techniques, then by all means come join in. The meetings are held at John McGrath's house every other month on the Thursday after the SAC meeting; directions are found on page 2 of this newsletter.

Consider this to be an invitation to this meeting. This meeting is OPEN to all SAC members. All you have to bring is an interest in what objects look like when view through a telescope.

A.J. Crayon, the chair of the group, will announce the agenda for the March Deep-Sky Meeting at the March SAC meeting.

An Astronomical Banquet

Celebrating 20 Years of the Saguaro Astronomy Club

On **Friday, May 30th** there will be a dinner banquet to celebrate the 20th year since the formation of the Saguaro Astronomy Club. The party is from 7 P.M. to 12 at Bud Brown's Barn, 909 E. Northern Avenue in Phoenix. It is east of 7th Street and Northern, just over the canal, watch for the sign on the right (south) side. The good news is that we will have the place all to ourselves, the place will be full of astronomers.

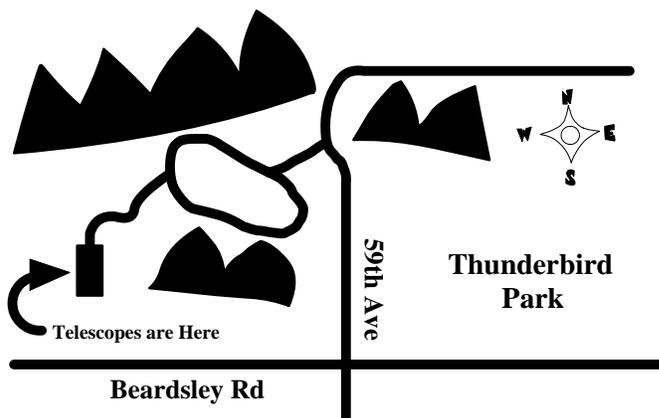
Several large tables will be set up to show off lots of photos of astronomical events, folks and scopes, deep sky astrophotography and anything else that could help celebrate all the fun that SAC has generated over the years. Those photos need to come from the participants, so bring that box or album of shots along to the party. A slide projector and video tape machine will provide the party goes an opportunity to show off their best images from 20 years of fun. With all the great photography, video and drawings that Arizona astronomers have generated, here is a great opportunity to be creative with your presentation. Arizona's largest astronomical show and tell, sounds like lots of fun.

The Anniversary Committee is trying to contact any past members of SAC who might wish to attend. So, if you know the whereabouts of folks who would be interested in coming to this celebration of 20 years of SAC, please let them know.

The banquet will cost \$20 per person and there will be

a cash bar available. There are two meals to choose from: A 10 oz. Top Sirloin Steak or BBQ Chicken. All meals come with salad, bread, coffee or tea and dessert of either "double barrel" chocolate brownie or Arizona lemon cake. Hors d'oeuvres of salsa and chips will be served before dinner.

Please give your check to Dave Fredericksen at a SAC meeting or send it to her at: 6222 W Desert Hills Dr., Glendale, AZ 85304.



Public Star Party

Thunderbird Park
Sunday, March 23

Sunset: 6:45 PM

There will be a Sky Viewing Session for the public on Sunday, March 23rd at Thunderbird Park in Glendale. The park is on 59th Avenue, north of Beardsley Road. The public session will start at 7:00 PM.

The reason this unusual Sunday session has been chosen is that on this night there will be three usual astronomical attractions to view: Mars near closest approach to Earth, Comet Hale-Bopp in the evening sky and a lunar eclipse. Seeing how this triple spectacular may very well bring out lots of folks, we need to have lots of scopes at the park for them to use for observing the sky.

So, please show up by 6:30 and let's get a wide variety of telescopes setup and ready to go by the time our guests arrive.

Such-A-Deal

SUCH-A-DEAL is a place to advertise equipment, supplies, and services related to amateur astronomy. This is a free service for SAC members and friends. SAC is not responsible for the quality of advertised items or services. All insertions must be submitted in writing.

For Sale—Astrophoto outfit. Olympus OM-1 camera body with T-ring, astrophoto focusing screen, and Olympus Varimagnifier. Worth \$450, will take \$250 for all. Jim Crisman, evenings 584-0896.

For Sale—14 1/4" Coulter, full thickness pyrex f/7 mirror. Also a 2.14" MA diagonal, 9 pt Novak Cell and circular spider. The mirror has been recoated and in storage for the past 5 years. The local community college tested the mirror at 1/8 wave. \$1000 for everything if you pickup. Paul Maxson 995-5164 (before 5:30 PM) sunspot@starlink.com.

March 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> All Times are Mountain Standard Time </div>						SAC Star Party Buckeye Hills (members&guests) 1
Yesterday Last Quarter Moon 2:38 A.M. 2	3	4	Friday: John Herschel's Birthday (1792) 5	PAS Meeting Brophy Prep. Physics Lab 6	TAAA Meeting (Tucson) 7	New Moon 6:16 P.M. Messier Marathon Arizona City 8
Comet Hale-Bopp Cross Earth's Orbit 9	Tomorrow Sun Enters Pisces 12 P.M. 10	Mercury at superior conjunction (moves into evening sky) 11	EVAC Meeting (SCC: Rm. PS172) 12	13	Tomorrow First Quarter Moon 5:07 P.M. 14	Mars Pathfinder Passes Mars Global Surveyor En Route to Mars 15
16	Mars at opposition 17	<div style="border: 1px solid black; padding: 5px;"> Public Star Party Sunday Evening, March 23 Thunderbird Park 59th Ave. North of AZ 202 <i>See Comet Hale-Bopp, Mars, and a Lunar Eclipse</i> </div>		20	SAC Meeting Grand Canyon University, Fleming Rm. 105 21	Comet Hale-Bopp Closest Approach to Earth (1.3 AU) 22
Full Moon 9:46 P.M. March 30th: Saturn in conjunction with Sun 23/30	March 31st: Last Quarter Moon 12:38 P.M. 24/31	25	26	SAC Deep Sky Meeting 7:30 P.M. 27	20 Years Ago Yesterday: The name Saguaro Astronomy Club was chosen for this club. 28	SAC Star Party Buckeye Hills (members&guests) 29

Magazines & Discounts

Club members may subscribe to astronomical magazines at reduced rates through the club Treasurer. See the Member Services Form on the back page of this newsletter. Furthermore, club members are encouraged to align their subscriptions with the Jan.-Dec. calendar year. This eases the burden both on the Treasurer and the Publisher by permitting a single Group Renewal to be placed in the autumn for the upcoming calendar year.

Those members who experience problems with their subscriptions to *Astronomy* magazine may call Kalmbach Publishing Customer Service at (800) 446-5489.

Those members who experience problems with their subscriptions to *Sky & Telescope* magazine may call Sky

Publishing at (800) 253-0245.

Besides the club discount on *Sky & Telescope* magazine, Sky Publishing offers club members a 10% discount on all other Sky publications. This means books, star atlases, observing aids, Spotlight prints, videos, globes, computer software, and more.

Club members who subscribe to *Sky & Telescope* through the Club Discount Plan may order Sky publications directly, at the above toll-free number, without going through the club Treasurer. Simply mention the Club Discount Plan and give the Saguaro Astronomy Club name to receive the discount. Sky Publishing will check their records to verify that you are eligible to receive the discount.

Saguaro Astronomy Club Member Services Form

Membership

Memberships are for the calendar year and are prorated as follows: Jan - Mar 100%, Apr - Jun 75%, Jul - Sep 50%, Oct - Dec 25%.

- \$28.....Individual Membership
- \$42.....Family Membership (one newsletter)
- \$100.....Business Membership (includes advertising)
- \$4.....Nametag for members
- \$14.....Newsletter Only

Subscriptions

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.

- Sky & Telescope.....\$27.00 for one year
- Astronomy.....\$20.00 for one year

Write your name, address, phone number, and E-mail address in the space below.

Make checks payable to SAC.
Mail the completed form to:

David Fredericksen
SAC Secretary
6222 W Desert Hills Dr
Glendale AZ 85304

SAC and SAC Meetings

Saguaro Astronomy Club (SAC) was formed in 1977 to promote fellowship and the exchange of scientific information among its members — amateur astronomers. SAC meets monthly for both general meetings and star parties, and regularly conducts and supports public programs on astronomy.

SAC meetings are usually held on the Friday nearest the full moon. This means that over the course of the year, meetings are not held on the same week of the month. The same is true of the club's star parties. Star parties at Buckeye Hills Recreation Area are mostly held on the Saturday of the third quarter moon.

SAC General Meetings: 7:30 PM at Grand Canyon University, Fleming Building, room 105 — one mile west of Interstate 17 on Camelback Rd, north on 33rd Ave., second building on the right. See inside for a map to the meeting location.

1997 SAC Meetings

Jan. 24
Feb. 21
Mar. 21
Apr. 25
May 16
Jun. 20
Jul. 18
Aug. 22
Sep. 19
Oct. 17
Nov. 14
Dec. 13 Party

1997 SAC Star Parties

Date	Sunset	Moonrise
Jan. 4	5:37PM	3:50AM
Feb. 1	6:03PM	2:35AM
Mar. 1	6:28PM	1:23AM
May 31	7:34PM	3:01AM
Jun. 28	7:44PM	1:43AM
Jul. 26	7:34PM	12:25AM
Aug. 30	6:58PM	4:56AM
Sep. 27	6:20PM	3:46AM
Oct. 25	5:46PM	3:33AM
Nov. 22	5:25PM	1:18AM
Dec. 27	5:31PM	6:22AM

SACNEWS

c/o Paul Dickson
7714 N 36th Avenue
Phoenix AZ 85051

Stamp

First Class Mail

Inside:

- Getting Started by Will Milan
- Dim Moments by Paul Dickson
- Comet Comments by Don Machholz
- Fuzzy Spot by Ken Reeves

Messier Marathon — March 8

SAC Meeting — March 21

Public Star Party — March 23

SAC Deep-Sky Meeting — March 27

Sentinel Star Gaze — April 5