

Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



September 1996 — Issue #236

v8.21

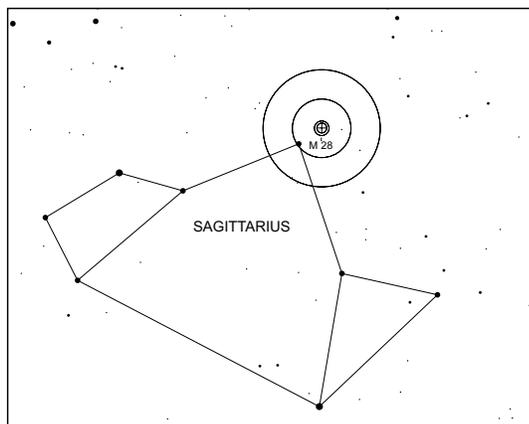
Telrad Hopping

by Ken Reeves

How do I find M 75! It's out in the middle of nowhere without any bright guide stars to start from! I've been spending hours trying to find it!

I started out this way. When I first got my telescope, it didn't have a finder at all. I probably spent a good 15 minutes trying to find the Orion Nebula. So the first accessory I got was a Telrad Finder. This made finding the bright objects pretty easy. After finding objects near bright stars and eye balling a few of the not so obvious objects, it became a chore again: get close, sweep around while looking through the eyepiece, look through the Telrad again and find out I was way off.

Finally I made a template from clear plastic with the Telrad circles drawn on it that would match up with my star atlas. The Telrad has 3 circles on it, the inner circle has a diameter of 1/2 degree, the middle circle has a diameter of 2 degrees, and the outer circle has a diameter of 4 degrees.



The idea is simple, you find the closest guide star you want to start from, lay the template on the atlas with the object in the center, and notice where the guide star sits on the Telrad circle. Then go to the telescope, and place the guide star on the same place in the Telrad circles, and the object magically appears smack dead in the center of eyepiece. OK, not exactly in the middle every time, but you should be close enough that it is within a field from

Quick Calendar

SAC Meeting

Speaker: Dan Matlaga of the ASU Planetarium

7:30 PM, Friday, August 30

SAC Deep-Sky Meeting

July and August *What's Up* Columns

7:30, Thursday, September 5

SAC Star Party

Buckeye Hills Recreation Area

Saturday, September 7

SAC Meeting

7:30 PM, Friday, September 27

where the telescope is pointed.

Using M28 as an example, Lambda Sagittarii (the tip of the Teapot) is the obvious guide star. If I center the template on M28. Lambda is on the middle circle SE of center. On the telescope, I place Lambda on the middle circle so the center is NW of the star and with some luck M28 is in the eyepiece. Note that my direction in the description change when I go from the map to the telescope, that is because on the map I am referencing to M28 while on the telescope I am referencing to the star. It's probably better if you don't think about it, just try to make the image in the Telrad the same as the image

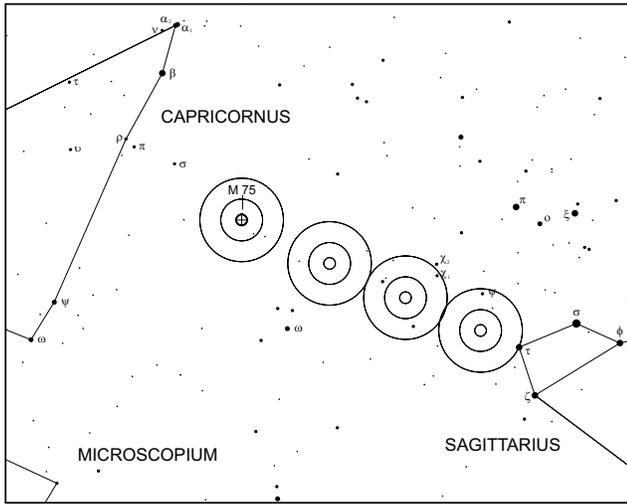
SAC Officers

Area Code (602)

President	Gerry Rattley	892-5698
Vice President	Steve Coe	789-7786
	74040.2071@compuserve.com	
Treasurer	Regina Lawless	
Secretary	David Fredericksen	979-0513
Properties	Adam Sunshine	780-1386
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	a.crayon@az05.bull.com	
SACNEWS Editor	Paul Dickson	862-4678
		FAX: 841-0509
		dickson@primenet.com

on the map.

This was a pretty easy object to get at and makes a good example, but what about that pesky M75? No, I'm not going to do like all the school text books do an "leave it as an exercise to the student."



There are two 6th magnitude stars just SW of the object, and a grouping of four 5th magnitude stars SSW of the object, but lets say we are in a somewhat light polluted area and those stars aren't really visible to the naked eye, and any stars east (i.e. in Capricornus) are too low in the sky to use, so we are left with Tau Sagittarii (the bottom star in the handle). The object is obviously too far away to fit in even the 4 degree circle, so another approach can be used. If the edge of the outer circle is placed on the star,

I can start counting the number of "Telrad fields" needed to get to M75. I measured just beyond 4 full fields to get there. The direction is kind of ENE, but I find it easier to extend an imaginary line from the object through the guide star and continue it on to another bright star, in this case Delta (the star between the spout and tip of the teapot) works well. When I am at the telescope, it is easy to envision the line, and move the scope in the appropriate direction. It takes some practice to move the scope the right amount. I find it best to imagine a spot at the edge of the outer circle and concentrate on that spot in the sky while I move the scope to get the other side of the circle on the spot.

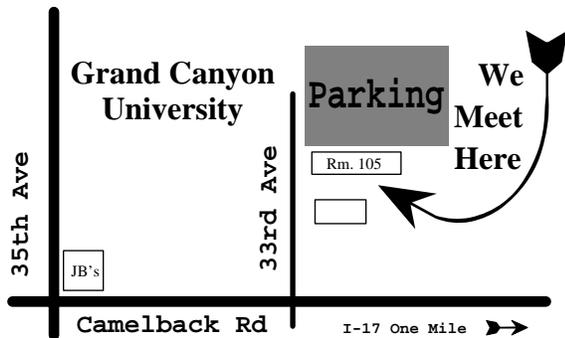
This example of M75 is probably the other extreme, it is pretty unlikely that you will wind up with the object in the center of the field (or even in the field at all), but it should get you pretty close.

I found this technique quite useful when I was first learning the skies and while my eyes were getting "tuned" into seeing the fainter stars. I still use it in a lot of circumstances, specifically when I am observing in town where fainter guide stars are hard to see, when I am using a 6th magnitude star atlas, or when I am trying to see a lot of bright objects in a short period of time such as at the Messier Marathon.

Finally I find it useful in getting close to an object without a good guide star near by. I recently tried to locate NGC 6572 in Ophiuchus by star hopping from 71 Ophiuchi using Uranometria (page 204). After about 30 minutes of losing my way around, I gave up. The next

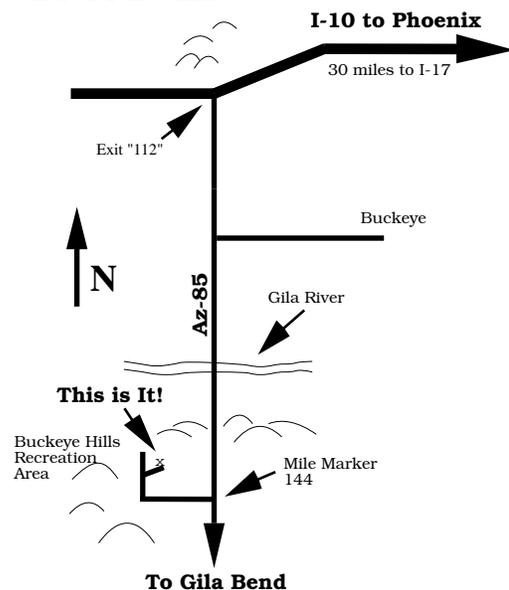
Directions to SAC Events

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.



time out, I Telrad hopped to the grouping of 7th and 8th magnitude stars just west of the object (south of 71), then star hopped over to 6572 and found the object within 5 minutes. Telrad hopping directly to the object probably would not have worked since the planetary nebula is so small I wouldn't have noticed it from the other stars, but Telrad hopping to the star pattern close by gave me a much better starting point than star hopping directly from the naked eye star.

So next time you are out and are having a hard time

finding an object, or if you just want to try something different, give this a try and see if it works for you.

Bits and Pieces

Minutes from the July Meeting

The July meeting was called to order by Gerry Ratley at 7:30.

All of our guests were asked to sign the guest book

Comet Comments

by Don Machholz

(916) 346-8963 CC217.TXT August 7, 1996
DonM353259@aol.com

Comet NEAT, discovered March 16 by a CCD camera attached to a 39-inch telescope atop Mt. Haleakala in Hawaii, has brightened to a magnitude that is observable in amateur's scopes. NEAT stands for Near-Earth Asteroid Tracking, it was designed to detect earth (orbit) crossing asteroids and comets. The equipment for this project, funded by both JPL and the U.S. Air Force, consists of a CCD camera and electronic scanning software. It is one of several new comet and asteroid discovery systems currently being developed.

C/1996 E1 (NEAT)					
Date	RA-2000-Dec	Elong	Sky	Mag	
08-25	09h30.9m	+76°27'	66°	M	10.4
08-30	10h29.9m	+79°57'	71°	M	10.3
09-04	12h32.8m	+82°32'	76°	E	10.3
09-09	15h29.7m	+81°44'	81°	E	10.3
09-14	17h20.6m	+77°13'	86°	E	10.3
09-19	18h14.5m	+70°51'	91°	E	10.3
09-24	18h44.8m	+63°36'	95°	E	10.3
09-29	19h04.7m	+55°57'	98°	E	10.5
10-04	19h19.2m	+48°17'	100°	E	10.6
10-09	19h40.6m	+34°12'	99°	E	11.0

Meanwhile, **Comet Brewington** remains in our evening western sky while **Periodic Comet Kopff** fades in our evening southern sky. **Comet Hale-Bopp**, still some 250 million miles away from us, is visible to many astronomers without optical aid. A telescope shows a coma that is about a quarter-degree in size and a tail nearly a

half-degree long. The comet is slowly moving northward; it remains within eight degrees of the equator until early 1997.

1995 O1 (Hale-Bopp)					
Date	RA-2000-Dec	Elong	Sky	Mag	
08-25	17h44.2m	-06°59'	113°	E	5.4
08-30	17h40.3m	-06°40'	107°	E	5.4
09-04	17h37.0m	-06°22'	102°	E	5.3
09-09	17h34.4m	-06°05'	96°	E	5.3
09-14	17h32.3m	-05°49'	91°	E	5.2
09-19	17h30.9m	-05°33'	86°	E	5.1
09-24	17h30.0m	-05°19'	81°	E	5.1
09-29	17h29.7m	-05°04'	77°	E	5.0
10-04	17h29.9m	-04°50'	72°	E	4.9
10-09	17h30.6m	-04°35'	68°	E	4.8

22P/Kopff					
Date	RA-2000-Dec	Elong	Sky	Mag	
08-25	19h42.9m	-24°02'	141°	E	8.2
08-30	19h48.3m	-24°10'	138°	E	8.4
09-04	19h54.2m	-24°13'	134°	E	8.6
09-09	20h00.7m	-24°11'	131°	E	8.9
09-14	20h07.6m	-24°03'	127°	E	9.1
09-19	20h15.0m	-23°52'	124°	E	9.4
09-24	20h22.7m	-23°35'	121°	E	9.6
09-29	20h30.6m	-23°15'	118°	E	9.9
10-04	20h38.9m	-22°51'	115°	E	10.2
10-09	20h47.3m	-22°23'	112°	E	10.4

C/1996 N1 (Brewington)					
Date	RA-2000-Dec	Elong	Sky	Mag	
08-25	14h16.3m	+45°48'	62°	E	9.7
08-30	14h35.7m	+48°31'	64°	E	9.9
09-04	14h57.1m	+50°59'	67°	E	10.1
09-09	15h20.8m	+53°09'	70°	E	10.3
09-14	15h47.2m	+55°01'	73°	E	10.5
09-19	16h16.6m	+56°30'	77°	E	10.7
09-24	16h48.9m	+57°33'	80°	E	10.9
09-29	17h23.7m	+58°06'	84°	E	11.1
10-04	17h59.9m	+58°04'	88°	E	11.3
10-09	18h36.3m	+57°27'	92°	E	11.5

Orbital Elements

Object:	Hale-Bopp	Kopff	Brewington	NEAT
Peri Date:	1997 03 31.86770	1996 07 02.19980	1996 08 03.42997	1996 07 27.36189
Peri Dist:	0.9170703 AU	1.5795617 AU	0.9257232 AU	1.3585919
Arg/Peri (2000)	130.40061°	162.83487°	043.97835°	081.12936°
Asc Node (2000)	282.46983°	120.91329°	234.91014°	149.84329°
Incl (2000):	089.38442°	004.72143°	052.13812°	114.47220°
Eccentricity:	0.99674010	0.5440739	1.0	1.0005638
Orbital Period:	4700 yrs.	6.45 yrs.	Long period.	Long period.
Reference:	MPC 27287 (5-25)	MPC 22032 (1991)	MPC 27542	MPC 27428

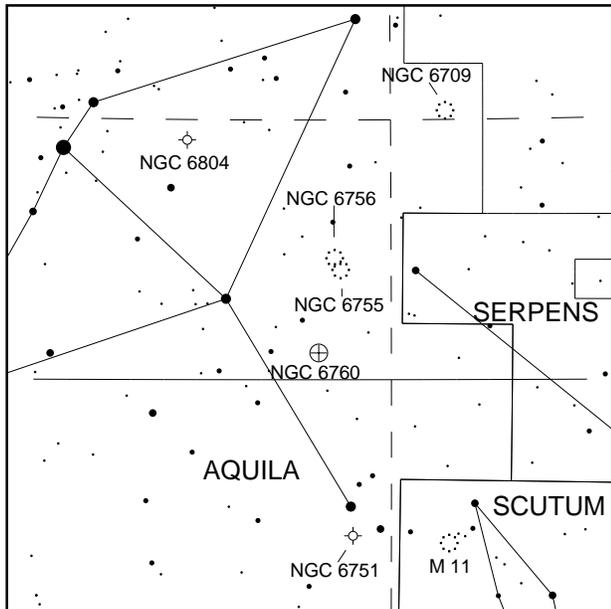
What's Up

by Steve Coe

Aquila

September 1996

Aquila is a constellation that has always presented a puzzle to me. That is: why isn't there a nice, bright Messier object located within its' borders? Here is a fairly large constellation that straddles the Summer Milky Way and does not have a real showpiece object that it can claim. Aquila shares borders with Ophi-



uchus, Sagittarius, Hercules and Aquarius, one of those grand constellations should be able to spare a nice cluster of some type. But no, Aquila must be content with what it has; several nice planetary nebulae and a few mediocre clusters. I guess someone must block for the star quarterback.

NGC 6709 is a nice open cluster in the 13"; large, pretty rich and not compressed at 100X. I counted 59 member stars, including several nice chains of stars. There is a wide blue and gold double on the western edge of the cluster. This cluster was seen in 11 X 80 finder at 18 hr 51.5 min and +10 21.

NGC 6751 is a very nice planetary nebula at 19 hr 05.9 and -06 00. In the 13" it is pretty large, bright,

somewhat elongated, and greenish at 135X. This is on a night I rated 8/10 for seeing and 9/10 for transparency in the central Arizona mountains. On that very nice evening, this object appeared to me as one of the best objects in Aquila. There are two stars of about 12th magnitude embedded within this bright planetary, one in the center and one on the eastern edge, both can be seen at 220X.

NGC 6755 is an open cluster at 19 hr 07.8 min and +04 14. It is large, not compressed, irregular in shape and has nice chains of stars at 100X in the 13". 50 members were counted. This object and NGC 6756 both fit in the one degree field of my giant 38mm Erfle eyepiece. I called it the Double Cluster in Aquila. Both clusters are just visible in the 11 X 80 finder.

NGC 6756 is pretty small, much compressed, elongated, a compact cluster at 165X. I counted 15 members resolved.

NGC 6760 is a nice globular cluster. I saw it as bright, pretty large, round and somewhat brighter middle at 100X. I resolved 4 stars at 270X, but the globular is grainy at all powers. I estimate its magnitude as 10.5, size as 5 arc minutes. This cluster is located at 19 hr 11.2 min and +01 02.

NGC 6804 is a planetary nebula at 19 hr 31.6 min and +09 13. I have two observations of this object which make it clear for me that it shows different shapes with direct and averted vision! The first time I observed this nebula I saw it as bright, pretty large and comet shaped at 100X. Using 200X shows a star at the tip of the comet shape and another dimmer star involved to the west. A nice object at high power. Another observation with the 13" from Dugas Rd. on a 7/10 night; pretty bright, pretty large, and round at 135X. At 220X, 4 stars are involved including a 12th magnitude star on the eastern edge. Averted vision elongates the nebula, the pretty bright star involved also makes the nebula appear comet shaped. Using direct vision it is round in shape. I observed this nebula with a 36 inch recently and I am afraid that I didn't completely solve the mystery. I saw 7 stars involved with the central star held for 20 percent of the time, central bright region is mottled and shows lots of fine detail, bright and dark regions that are small, but held steady, a unique object. There is a brighter diamond-shaped central region and then fainter outer region which makes the entire object round. So, I assume that the brighter inner section is diamond or comet shaped and the outer, faint envelope of nebulosity makes it appear round to my eye. A weird object, see for yourself.

and pick up a copy of the July Newsletter. We had 3 guests at the meeting.

The Treasurer's Report was given by Regina Lawless.

AJ Crayon talked about the Deep-Sky Group and the fact that they talk about the objects in Steve Coe's What's up column. Everyone is welcome. The next meeting is Sept. 5.

Paul Dickson talked about the Home Page for SAC on the net. He had hard copies of the June, July, and August 1996 on-line newsletters.

Steve Coe passed out to several people the last copy of the SAC Database that he is going to work with. He

wanted to have people check for errors. If they are OK, then there will be copies for anyone that wants them.

At this point, we went into our Show and Tell. After the Show and Tell, we took a break. There was 41 people in attendance.

After the break we heard from Ed Vega and Max Bray about their bed and breakfast, called the Skywatcher's Inn. It is in southern Arizona, just outside of Benson. The observatory is used twice a month for instructing students from local schools. The main instrument is a 20" Maksutov in the dome. There is also a roll-off roof building that has an assortment of different telescopes to be used. After

DIM MOMENTS
IN
**AMATEUR
ASTRONOMY**
by Paul Dickson

WHEN TAKING A
WALK FROM YOUR
OBSERVING SITE
LATE AT NIGHT

YOU
HEAR A LARGE
FOUR-LEGGED
CREATURE
FOLLOWING
YOU

Ed told us all about the bed and breakfast, Max told us all about the 20" telescope.

—David Fredericksen, SAC Secretary

August Club Speaker

The speaker for the August club meeting will be Dan Matlaga of the A.S.U. Planetarium. His topic is "Astronomical Asterisks" the words and phrases of astronomy.

Kitt Peak Cook-out & Star Party

by Dean Ketelsen

October 5, 1996

Kitt Peak has allowed the Tucson Amateur Astronomy Association (TAAA) to hold occasional cook-out star parties at its picnic area, located at 6500 feet elevation, about 1.5 miles below the summit. While these events are usually limited to about 30 attendees, they are allowing 50 this time, and I thought it would be nice to see if there was any interest in attendance from the Phoenix area.

There are several conditions that may make this less than ideal for amateurs that travel a long way. First of all, there is no camping allowed at the picnic area, and they expect the area to be vacated about moonrise, which is about 1 AM. The nearest place to pull over to even sleep in your car is the base of the mountain. Also, though I tried to obtain a WIYN telescope tour, the request was turned down because of manpower being devoted to other events

that evening. So with no special tours for the group, the last regular tour is at 1:30 PM. The mountain usually closes at 4 PM, at which time we all head to the picnic area. Those arriving after 4 PM should not go above the picnic area! There is a nice pavilion and clear area for setting up scopes. Cooking fires need to be put out about sunset because of telescopes in the area. There are rest rooms and water on site as well as a soda machine. Electricity may be available if you bring long extension cords, but I would plan on running off battery power unless you are running a CCD system. We usually run a pot luck picnic—bring something to grill and a dish to share—it is usually a great time to socialize and share views. As I mentioned before, the site should be vacated about 1 AM.

Now if I were doing this from Phoenix, I would combine this event with some other tourist activity on Sunday morning before heading back. Tucson has a few unique places to visit, such as the Arizona-Sonora Desert Museum, Pima Air Museum, or the Titan Missile Museum to name a few. Why not bring the family and rent a motel room off I-10 to use as a base. Come back down after observing and enjoy another activity on Sunday before heading back up to Phoenix for the heat. Speaking of heat, be sure to bring some warm clothes as the mountains can get cool in October.

Be sure to let me know as soon as possible if you are interested in attending. I will be limiting the Phoenix attendance to 20, so let me know. You can contact me at (520) 293-2855, ketelsen@as.arizona.edu, or at 1122 East Greenlee Pl., Tucson, AZ 85719. By the way, the event happens rain or shine, so even if it is cloudy, we can still enjoy a Kitt Peak tour and cook-out on the mountain.

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—Meade LX200 HP $f/10$ 10" scope with V3.34 software. Very good condition and ready for deep-sky viewing or astrophotography. Includes \$1,700 worth of accessories. Asking \$3,500 OBO. Phone 554-8789, 8 to 5 PM.

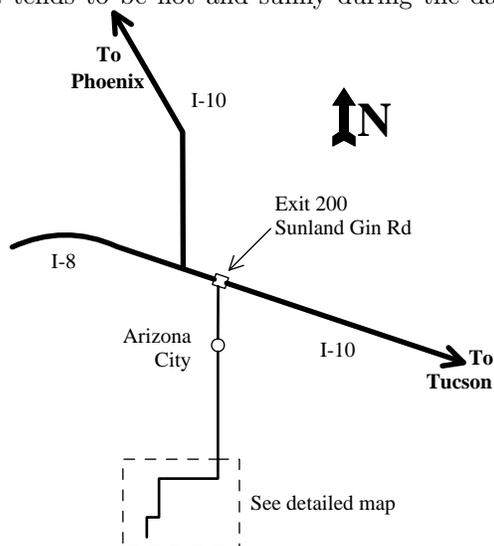
The 15th Annual All-Arizona Star Party

October 11–12, 1996

This is the fifteenth annual All-Arizona Star Party. It is a two night event, held during the new moon of October. This year's event is once again sponsored by the East Valley Astronomy Club (EVAC). In the past, this event has been sponsored by other Arizona clubs.

The star party take place at a site south Arizona City, which is almost equal distant (about 55 miles) from Phoenix and Tucson (see the map). The site is remote and very dark. The only facilities available will be a port-a-pottie.

Staying the night means you have to plan ahead. The desert tends to be hot and sunny during the day



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 after the gate and continue for another 1/4 mile to the site.

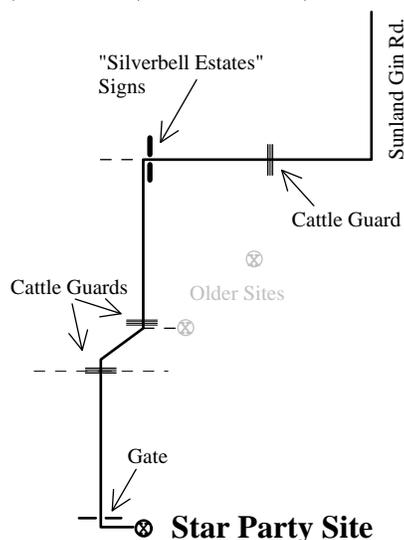
and cold at night. Plan accordingly. Remember to bring warm clothes, food, and drinks. It's best to bring too many warm clothes than too few.

All Arizona astronomy clubs are invited and it's hoped for a large turn-out. Last year there were 62 vehicles on the observing field on Saturday night. So plan on being there early to see old friends and making new ones. Last year, both nights were very good night for observing.

Swap Meet

On the Saturday afternoon, October 12, there will be a swap meeting at the site from 4 PM until sunset. Bring money to buy or things to sell or trade.

For those staying both nights, here are a list of restaurants at the given I-10 exits: **194** — Dairy Queen, Burger King, Denny's, **198** — Wendy's, **200** — Iron Skillet, Subway, Burger King, **203** — Pizza Hut, McDonald's, Taco Bell, Waffle House, and Mexican Food.



Desperately Needed

Coordinator for SAC's 20th Anniversary

The Saguaro Astronomy Club began 20 years ago and it is time to organize some sort of event marking this occasion. At the last board meeting, none of the attendees had more time to give to the club so this event could be organized as it should. So it was decided to ask a member (or members) if they would organize the event.

This does NOT mean that that person will be doing all the work. The SAC board will be available to give ideas and suggestions as to what to do and who to contact.

Some people are already gathering slides for the event.

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.

September 1996

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday			
1	2	Tomorrow Venus 2.9° of Mars (morning)	Last Quarter Moon 12:07 P.M.	SAC Deep Sky Meeting 7:30 P.M.	TAAA Meeting (Tucson) Galileo flies by Ganymede at 255km	SAC Star Party Buckeye Hills (members&guests)			
8	9	10	11	12	13	14			
	Sun enters Virgo 4 A.M.	Mercury at inferior conjunction (moves into morning sky)	Thursday, September 26: Full Moon/Lunar Eclipse 1st contact 6:12 P.M. Phoenix Moonrise 6:13 P.M. 2nd contact 7:19 P.M. Full Moon 7:51 P.M. 3rd contact 8:29 P.M. 4th contact 9:36 P.M. Moon 3° from Saturn Saturn at opposition		First Quarter Moon 4:24 A.M.	Mars 0.5° of Beehive Cluster			
15	16	17	22	23	24	25	26	27	28
Autumn (Autumnal) Equinox 10:58 A.M.							SAC Meeting Grand Canyon University, Fleming Rm. 105		
29	30	All Times are Mountain Standard Time							

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, and phone number in the space below.

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

Regina Lawless
SAC Treasurer
5808 E Turquoise,
Scottsdale AZ 85253

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 same week of the month. The same is true of the club's star parties. Star parties at Buckeye Hills are mostly held on the Saturday of the third quarter moon.

1996 SAC Meetings

Jan. 5
Feb. 2
Mar. 8
Apr. 5
May 31
Jun. 28
Jul. 26
Aug. 30
Sep. 27
Oct. 25
Nov. 22
Dec. 14 Party

1996 SAC Star Parties

Date	Sunset	Moonrise
Jan. 20	5:48pm	8:50am
Feb. 10	6:08pm	12:10am
Mar. 16	6:36pm	5:16am
Apr. 13	7:02pm	4:00am
May 11	7:16pm	2:34am
Jun. 8	7:33pm	1:15am
Jul. 6	7:43pm	11:57pm
Aug. 10	7:16pm	4:46am
Sep. 7	6:43pm	2:26am
Oct. 5	6:06pm	1:11am
Nov. 2	5:35pm	11:54pm
Dec. 7	5:21pm	5:02am

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.

SACNEWS

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

Stamp

First Class Mail

Inside:

- SAC Meeting — August 30
- SAC Deep-Sky Meeting — September 5
- Telrad Hopping by Ken Reeves
- Comet Comments by Don Machholz
- What's Up by Steve Coe
- Dim Moments by Paul Dickson
- Kitt Peak Star Party
- All-Arizona Star Party
- SAC Meeting — September 27